TENNESSEE VALLEY AUTHORITY
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JUL 30 1990

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of the Application of) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - DESCRIPTION OF SYSTEM TESTING TO BE PERFORMED UNDER PRESTART TEST CORRECTIVE ACTION PROGRAM (CAP) PLAN

NRC's letter dated May 17, 1989, requested TVA to submit a description of testing to be performed under the WBN Prestart Test CAP Plan. TVA obtained clarification of that request during a discussion with NRC on February 22, 1990. TVA's letter to NRC dated April 2, 1990, provided a comparison between test objectives for Group 1 Prestart Program systems and test objectives for the Preoperational Test Program described in WBN's Final Safety Analysis Report (FSAR), Chapter 14, Table 14.2-1, for these same systems. The purpose of this letter is to transmit by Enclosure 1 test objective comparisons for the remainder of Prestart systems (Groups 2-6) as discussed in the April 2 letter.

Additionally, the April 2, 1990 letter provided a comparison between the Prestart Test Program and the Preoperational Test Program described in FSAR Chapter 14, Table 14.2-3, for regulatory guide compliance. There were no additional regulatory guide requirements identified during the Group 2-6 comparison.

Regulatory Guide 1.68 (November 1973), Appendix A, requires that preoperational tests for radioactive waste systems determine the amount of plateout in sample system piping. Although no specific exceptions were taken in the Prestart Test CAP with respect to testing this system, it appears that such tests cannot practically be performed before fuel load (BFL). TVA will further assess this subject to determine if any practical BFL tests can be performed.

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U.S. Nuclear Regulatory Commission

JUL 30 1990

The commitment for this letter is provided in Enclosure 2. If there are any questions, please contact R. J. Stevens at (615) 365-8650.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

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Enclosure 1
Table of Contents

Note: The left-hand column is quoted verbatim from the FSAR. Typographical errors, omissions, etc. were **NOT** corrected.

Title of Test No. W-8.3
Steam Dump Control

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify proper operation of the Steam Dump System in the manual and automatic modes and to verify system protective functions. A variable test signal will be injected into each SG pressure controller to test the associated atmospheric relief valve response. The Condenser Steam Dump System will be checked to verify the appropriate valves modulate open on an increasing pressure controller signal and closed on a decreasing signal. Appropriate control panel indications are checked and local visual observations are made for verification of valve position. Temperature signals will be varied to check deviation alarms and turbine trip alarms. Timing tests will be conducted concurrently to record valve positions as functions of time to determine the responses. The test results will be acceptable if they are in accordance with the functional design requirements specified for this system in Chapter 10 of the FSAR, and for this test in the Westinghouse NSSS Startup Manual.

In agreement except that turbine trip alarms are excluded since a turbine trip signal is no longer an input to the condenser steam dump controls.

Individual valve time responses and other test results will be verified to meet scoping document requirements.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W-8.5
Dynamic Automatic Steam Dump Control

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify automatic operation of T average Steam Dump Control System; to demonstrate controller setpoint adequacy; and to obtain final settings for steam pressure control of condenser dump valves. The load rejection and turbine trip controllers are primary features of the T average Steam Dump Control System. To verify proper response of the turbine trip controller, the steam dump control will be placed in T average control and reactor power will be increased to approximately six percent by rod withdrawal and steam dump to the condenser. As power is increased, T average will rise and be controlled as the steam dump valves open.

System response will be observed for stability in the automatic mode. To verify proper response of the load rejection controller, turbine operating conditions will be simulated with the reactor at approximately three percent power and steam header pressure in manual control. A low T ref test signal will be inserted into the controller to simulate a loss of load and the steam dump will be placed under T average control. As T average is increased, the steam dump valves will open. Again, system responses will be observed for stability in the automatic mode. The steam header pressure controller will be placed in automatic control and reactor power increased to 5% by rod withdrawal. System response will

After-fuel-load test excluded from the Prestart Test Program.

Title of Test No. W-8.5
Dynamic Automatic Steam Dump Control

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

be observed for stability in this automatic mode, and discrepancies will be documented and resolved with Westinghouse Acceptance criteria will be in accordance with the functional design requirements established for this test in the Westinghouse NSSS startup manual. The atmospheric steam release flow monitoring equipment will be functionally checked during the performance of this test. This consists of verification of the instrumentation by simulation of signals associated with steam flow measurements for the steam generator power-operated relief valves, main steam safety valves, and auxiliary feedwater pump turbine; all of these vent steam from the steam generators to the atmosphere during a main steam isolation condition.

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. TVA-23A
Thermal Expansion of Systems
(Main Steam Piping)

Test Objectives Summary of Testing and Acceptance Criteria	
The test objective is to measure and observe the movement of the Main Steam Piping and Steam Generator Blowdown Piping Systems caused by thermal expansion and contraction, to verify that no interferences occur, to determine whether all components return to their original positions on cooling, to verify that selected points on the piping systems move to the prescribed hot locations. Make hot measurements of locations where hot gap shimming is called for and make pipe hanger loading measurements. Displacement measurements, loading measurements, measurements to determine hot gap shimming requirements, and visual observation will be performed during heatup from ambient to operating temperature and cooldown to ambient temperature of the Main Steam Piping and Steam Generator Blowdown Piping Systems. The acceptance criteria for this test is that the Main Steam Piping and Steam Generator Blowdown Piping Systems contract to original baseline positions, hot gaps in the pipe rupture restraints have been correctly shimmed and pipe hanger load readings are correct. The final ambient temperature measurements will ensure no permanent deformation has occurred. The movement of selected snubbers will be recorded and evaluated. Refer to section 10.3 of FSAR.	In agreement. Measurement temperature plateaus and measurement tolerances will be as specified in the scoping document.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-40
Main Steam System

Test Objectives
Summary of Testing
and Acceptance Criteria

The Main Steam System will be tested in a hot condition to demonstrate that main steam flow from all steam generators can be stopped within a specified time period by closure of all main steam isolation valves, and main steam isolation bypass valves. The system will be tested in the cold condition to verify capability of the valves to be tripped closed in response to simulated input signals denoting either high-high containment pressure or high steam line flow in coincidence with either low steam line pressure or low-low T[AVG]. The isolation valves will be tripped closed by simulated signals from each power train (i.e., A or B) to demonstrate main steam line isolation capability in the event of loss of one power train. The main steam isolation bypass valves fail closed on loss of power. Acceptance criteria for the test will be that the isolation valves close within 5 seconds of receipt of the closing signal and the main steam isolation bypass valves close within 10 seconds upon receipt of the closing signal.

In agreement except all main steam isolation valve cycling will be performed in the hot condition due to vendor restrictions on dry cycling the valves.

Valve closure times will be verified to meet scoping document requirements.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-30
Condenser Vent System

Test Objectives
Summary of Testing
and Acceptance Criteria

This test will verify the ability of the system to restrict radioactive omissions to lowest practicable levels. Verification of all filter differential pressures will be completed. In-place leak and efficiency tests of filters will demonstrate adequacy of filter installation. Proper operation of Filter System protective devices will be demonstrated.

In agreement. Additional testing will verify filter bypass valve manual and automatic operation. Manual operation will be demonstrated from the main control room. Automatic operation will be tested by verifying response to a high filter differential pressure signal.

Condensate System - System 2
(Condenser Vacuum Test)

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test
There are no FSAR Chapter 14 tests associated with condenser vacuum testing

Test Objectives
Summary of Testing
and Acceptance Criteria

Preoperational testing requirements were identified in Non Critical Scoping Document NCS-15.

The test for this system will verify manual and automatic operation, hogging, and annunciation features associated with the condenser vacuum pumps. Manual operation will be demonstrated from the main control board. Automatic operation will be demonstrated by verifying response to increasing/decreasing condenser vacuum. Condenser inleakage rates will also be collected. It will be demonstrated that the system can be operated without obvious undue vibration.

Condensate System - System 2
(Condensate Storage And Transfer Facility Test)

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test
There are no FSAR Chapter 14 tests associated with the condensate storage and transfer facility test

Test Objectives
Summary of Testing
and Acceptance Criteria

Preoperational testing requirements were identified in Noncritical Scoping Document NCS-24.

Testing will verify both manual and automatic operation of the condensate transfer pumps and makeup/dumpback to hotwell level control valves. Condensate storage tank and hotwell level alarms will also be verified. Condensate transfer pump performance will also be verified. It will be verified the system can be operated without obvious undue vibration.

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. TVA-23B
Thermal Expansion of Piping Systems (Feedwater Piping)

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to measure and observe the movement of the secondary system piping and components because of thermal expansion to verify that no interferences occur and to determine whether all components return to their original positions on cooling. Measurements are made at the steady state conditions and all piping will be observed for possible interferences. The final ambient ambient temperature measurements will ensure no permanent deformation has occurred. The movement of selected snubbers will be recorded and evaluated. Refer to section 10.3 of FSAR.

After-fuel-load test. Excluded from the Prestart Test Program.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-38
Main Feedwater System

Test Objectives
Summary of Testing
and Acceptance Criteria

This test will demonstrate the engineered safety features of the system by verifying that the feedwater flow to all steam generators can be stopped within the time required for safe shutdown of the unit. Feedwater isolation on receipt of simulated input signals will be verified. Valve response and time of closure will be verified as specified by FSAR, section 10.4.7. Generation of a trip signal at both main feed pump turbines, the standby main feed pump, all condensate booster pumps, and all deminerlized condensate pumps in response to a simulated safety injection signal or high-high steam generator level signal will be verified. Manual control of the safety related feedwater valves from the main control room and local control stations will be demonstrated.

In agreement except local handswitches will not be tested. These switches do not meet the criteria for test as defined in the Prestart Corrective Action Plan (CAP), Sections 4.1.1, 4.1.2, or 4.1.3. They are mainly used for operator convenience during local operations.

Valve response and time of closure will be verified to meet scoping document requirements.

In addition, generation of a trip signal in response to a 2 out of 4 low reactor coolant temperature will be verified.

Acceptance criteria for this test will be in accordance with the Westinghouse NSSS Steam System Design Manual.

Except for that described below, equipment protection features and other nonsafety grade system controls and instrumentation described in the FSAR and assumed in the accident analysis within the Feedwater System will be demonstrated during noncritical system test NCS-23, "Feedwater Condensate System." Steam generator level controls feedwater. Control valve operation and main feed pump turbine controls will be demonstrated during preop test W-8.2, "Automatic Steam Generator

Described W-8.2 testing is after fuel load and is excluded from the Prestart Test Program. Noncritical system testing is as follows:

Both manual and automatic operation of the hotwell pumps, demineralized condensate pumps, condensate booster pumps, condensate transfer pumps, standby motor-driven main feedwater pump, and feedwater bypass control valves will be verified. Equipment indicating lights and system annunciators will be tested. Testing will demonstrate

Title of Test No. TVA-38
Main Feedwater System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

Level Control." Feedwater flows, main feed pump, and steam generator pressures, and final feedwater temperatures will be recorded during several of the test sequences at part-power, load swing, and load reduction startup tests. This data in conjunction with certified factory pump test curves, will be reviewed to verify proper performance of the Feedwater System. In addition, several secondary side parameters will be recorded during the turbine acceptance test (after the first refueling outage) to verify that the turbine (and secondary side cycle) thermal performance are within the turbogenerator contract requirements. Concerning the waterhammer that may occur due to rapid closure of the main feedwater check valves, no preoperational testing is planned since it would be impractical to simulate rapid closure of these valves. Verification that this potential waterhammer problem has been corrected will be established by calculations and/or by comparison with other similar type valve designs.

the condensate system's ability to maintain design flow rates during short cycle recirculation mode of operation and condensate booster pump minimum flow recirculation. Proper operation of the main feedwater pump's trip logic and support equipment, such as the emergency oil pumps, main oil pump, and turning gear will be verified. It will also be verified that the condensate system can be operated without obvious undue vibration.

Auxiliary Feedwater System - System 3B and 46B

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-22
Auxiliary Feedwater System

Test Objectives
Summary of Testing
and Acceptance Criteria

The tests will demonstrate the capability of the Auxiliary Feedwater System to perform as specified in FSAR Section 10.4.9. Specifically the test includes: Demonstrating that the auxiliary feedwater pumps can start automatically and deliver rated flow within one minute following loss of offsite power (blackout), safety injection signal, low-low steam generator water level, and trip of the main feedwater pumps. All pump starts are conducted with the system in normal standby and no steps for preconditioning are included in the test instructions. Verification of proper system operation in both manual and automatic modes, from the main control room and, where applicable, the auxiliary control room and local control station.

1. Each of the electric motor-driven pumps and the steam turbine-driven pump are tested in both the minimum flow recirculation mode and at essentially rated flow conditions. Pump performance will be evaluated by comparing measured flow and head data against manufacturer's data. Acceptance criteria requires that each flow/pressure data point at the maximum start time point exceeds the manufacturer's curve. Acceptance criteria also verifies NPSH, water temperature, stablized bearing temperatures, and vibration.	1. In agreement, except local (B) handswitches for the electric motor-driven pumps will not be tested. They have been disconnected to preclude inadvertent pump start due to a postulated fire. Also, the turbine-driven pump will not be tested using auxiliary boiler steam. This was a one-time-only test and the temporary connection supplying auxiliary boiler steam was subsequently removed. Pump acceptance criteria will be verified to scoping document requirements.

FSAR Chapter 14 Associated Tests	Prestart Test Program
Title of Test No. TVA-22 **Auxiliary Feedwater System** Test Objectives Summary of Testing and Acceptance Criteria (continued)	
During cold functional tests, the turbine-driven pump will be tested to the highest capacity obtainable when auxiliary boiler steam is utilized.	
2. Cold functional and hot functional testing and post-critical testing will be conducted. The cold functional tests will demonstrate proper actuation of the motor-driven pumps from an accident signal, and will test both the motor and turbine-driven pumps for simultaneous startup in the minimum recirculation mode. Hot functional tests will be conducted with the Reactor Coolant System at temperature and pressure. The hot functional testing will include pump tests conducted over a range of steam generator pressures. Post-critical tests are conducted at less than 25% power to obtain more complete testing with the steam generators and turbine at operating temperature and pressure.	2. In agreement, except the Prestart Test Program only encompasses prefuel-load testing. The post critical testing outlined here is excluded from the Prestart Test Program. Also, the turbine-driven pump will not be started as identified in item 1. In addition, all three AFW pumps will be tested to verify they will start on a start signal from AMSAC.
3. All level-control valves and system pressure-control valves and their associated instrumentation and control circuits will be tested to demonstrate correct operation.	3. In agreement.

Auxiliary Feedwater System - System 3B and 46B

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-22
Auxiliary Feedwater System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

4. Certain system control and logic circuitry tests will be performed to demonstrate correct operation. Included will be tests to verify that suction line valves to the Essential Raw Cooling Water System supply proper response to simulated initiation signals.	4. In agreement, except the local (B) handswitches for the turbine-driven pump steam supply valves (FCV-1-15,-16,-17,-18) will not be tested. They have been disconnected to preclude inadvertent operation due to a postulated fire.
5. System vibration is within acceptable limits.	5. In agreement.
6. System leakage does not exceed the maximum values.	6. The prestart test will not test for leakage. Excluded by CAP Exhibit A, Section III.A.1.c.
7. Feedwater bypass line check valves operate properly.	7. In agreement.

Fire Detection and High Pressure Fire Protection Systems
Systems 13 and 26

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-25
High Pressure
Fire Protection System

Test Objectives
Summary of Testing
and Acceptance Criteria

The objective of this test is to verify the adequacy and reliability of the Fire Protection System. This test will 1) demonstrate the capability of the system to supply fire protection water in specified quantities and at specified pressures to safety-related areas of the plant, 2) demonstrate system response to various fire actuation alarms, 3) measure pressure differential across strainers, 4) verify that vibration of the system determined by both visual observation and measurement are within acceptable limits, and 5) verify that the RSW system is isolated from the HPFPS upon fire pump start.

The system will be tested in all design operational modes (i.e., automatic, manual-electric, and manual operations). Testing will be conducted by measuring the actual flow and pressure of water through the system piping to specified fire hazard areas. Proper operation of applicable alarms and associated control equipment will be verified.

1. In agreement. Flow, pressure, and differential pressure acceptance criteria will be as specified in the scoping document.

FSAR Chapter 14 Associated Tests — Prestart Test Program

Title of Test No.TVA-25
High Pressure
Fire Protection System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

Acceptance criteria also includes: The pumps shall be capable of not less than 150% of rated capacity at a pressure of not less than 65% of the rated pressure.

Each fire pump can be started from the main control room and misalignment alarms are verified to operate correctly.

The pressure drop across the main line strainers did not exceed 3 psid + 0.25 psid at a discharge pressure corresponding to a flow of 2 pumps flowing 3200 gpm. Refer to section 9.5.1 of FSAR.

Fire Detection and High Pressure Fire Protection Systems
Systems 13 and 26

FSAR Chapter 14 Associated Tests	Prestart Test Program
Title of Test No. TVA-74F **Fire Protection -Additional Diesel Generator Building** Test Objectives Summary of Testing and Acceptance Criteria	
The objective of this test is to verify the adequacy and reliability of the Fire Protection System for the Additional Diesel Generator Building. This test will 1) demonstrate the capability of the system to supply fire protection water or water-foam at adequate pressures to all protected areas of the Additional Diesel General Building. 2) demonstrate system response to various fire actuation alarms. 3) verify that vibration of the sytem determined by visual observation is within acceptable limits. The system will be tested in all design operational modes (i.e., automatic, manual-electric, and manual operations). Testing will be conducted by measuring the pressure of water through the system piping to specified fire hazard areas. Proper operation of applicable alarms and associated control equipment will be verified. To insure operability of the Ventilation System fire dampers, the following checks must be performed: 1. Manual actuation of all fire dampers. 2. Fusible link location in air streams.	1. In agreement. Fusible link installation will be verified as part of the damper actuation test.

Condensate Demineralizer And High Crud Filter - System 14

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test

There are no FSAR Chapter 14 tests associated with system 14.

Test Objectives
Summary of Testing
and Acceptance Criteria

Preoperational test requirements were identified in Non Critical System Scoping Document NCS-33A, NCS-33B, and NCS-38.

Testing will verify both manual and automatic operation of the Condensate Demineralizer System pumps, condensate demineralizer air compressor, high crud filter air accumulator, high crud filter system pumps, and principal valves.

Equipment indicating lights and system annunciators will be tested. It will be verified the system can be operated without obvious undue vibration.

Steam Generator Blowdown System - System 15

FSAR Chapter 14 Associated Tests Prestart Test Program

Title of Test No. TVA-29
Steam Generator Blowdown System

Test Objectives
Summary of Testing
and Acceptance Criteria

This test demonstrates that performance of the Steam Generator Blowdown Treatment System is satisfactory in all three modes of operation in which the blowdown flow is processed. Blowdown flow from each steam generator will be tested at 30 gpm. Samples of the Steam Generator Blowdown and Feedwater Systems will be collected for analysis. The water quality will be verified to comply with Westinghouse steam side water chemistry control specification. A decontamination factor for radioactive materials will not be determined as part of the test. Proper operation of all valves and pumps will be verified.

The system will be tested in a similar manner for blowdown flow rates of 20, 10, and 5 gpm from each steam generator. Temperature readings and water quality verification for the reduced flow rate testing will not be required.

Vibration of system piping will be determined by both visual observation and measurement to be within acceptable limits for all tested modes of operation. Refer to section 10.4.8 of FSAR.

In agreement, except SGBD system operation will be verified during hot functional testing at flow rates from minimum to maximum flow, as specified in the scoping document, through either the SGBD heat exchangers or SGBD flash tank to each of the designed destinations. Water chemistry is a function of the plant chemistry group and outside prestart testing scope. During prestart testing, temperature and pressure readings will be recorded at each tested flow rate.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-14A
Diesel Generators
and Supporting Auxiliaries
(Diesel Generator Fuel Oil System)

Test Objectives Summary of Testing and Acceptance Criteria	
Verify the capability of the yard transfer pump to transfer oil from the fill station to either of two yard fuel oil storage tanks, from one storage tank to another, from either storage tank to any of the 7-day storage tanks and to reject oil through the reject connection.	In agreement. Acceptance criteria will be as specified in the scoping document. In addition it will be verified that the system operates without obvious undue vibration.
Verify the capability of the diesel generator building transfer pump to transfer from any one of the 7-day embedded storage tank assemblies to any other and transfer oil from any of the 7-day tank assemblies to either of the yard storage tank.	
Verify the capability of the motor-driven/ 5 gpm pumps to transfer oil from the 7-day embedded storage tanks to the 550 gallon day tank.	
Verify the capacity of each of the transfer pumps and demonstrate that the associated instrumentation and controls are functioning properly. Acceptable system performance will be determined by comparison of the data taken during this test with Manufacturer and Design Data and FSAR section 9.5.4.	

DG Fuel Oil System - System 18

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. TVA-74A
Additional Diesel Generator and Support Auxiliaries (Diesel Generator Fuel Oil System)

Test Objectives Summary of Testing and Acceptance Criteria	
1. To demonstrate the ability of the Additional Diesel Generator Building (ADGB) Fuel Oil Transfer pump to deliver fuel oil from 7-Day tank CS to 7-Day tank 1A-A.	1. In agreement. Testing will demonstrate the ability of the ADGB transfer pump to deliver fuel oil to any DGB 7 day tank and both yard storage tanks.
2. To demonstrate the ability of Yard Fuel Oil Transfer Pump to deliver fuel oil from Yard Storage tank No. ONE to 7-Day tank CS.	2. In agreement.
3. To demonstrate the ability of skid mounted transfer pumps OC-1 and OC-2 to ADGB day tanks 1 and 2.	3. In agreement. Testing will demonstrate the ability of the skid-mounted transfer pumps to transfer fuel oil from the ADGB 7-day tank to the ADGB day tanks.
4. To demonstrate proper functioning of interlocks, automated control circuitry, alarms and annunciation associated with the above transfer capabilities.	4. In agreement.
Acceptance criteria for the system is the ability to perform the above and in accordance with section 9.5.4 of the FSAR.	In addition the capacity of the ADGB transfer pump and skid-mounted transfer pumps will be verified. It will also be verified that the system operates without obvious undue vibration.

Raw Cooling Water System - System 24

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test

There are no FSAR Chapter 14 tests associated with system 24.

Test Objectives
Summary of Testing
and Acceptance Criteria

Preoperational test requirements were identified in Non Critical Scoping Document NCS-18.

Testing will verify both the manual and automatic operation of the RCW's pumps, strainers, and principal valves. Manual operation of the equipment will be demonstrated from the main control board. Verification of automatic operations such as spare pump start on low header pressure, main and bypass strainer backwash, and temperature control valve modulation will be demonstrated.

Equipment indicating lights and system annunciators will be tested. The RCW's capability to maintain acceptable individual component flow rates will be demonstrated by flow balancing the system for normal operation. It will be verified the system can be operated without obvious undue vibration.

Raw Service Water System - System 25

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test

There are no FSAR Chapter 14 tests associated with system 25.

Test Objectives
Summary of Testing
and Acceptance Criteria

Preoperational test requirements were identified in Non Critical Scoping Document NCS-18.

Testing will verify both manual and automatic operation of the Raw Service Water System principal valves and heaters. Manual operation of the equipment will be demonstrated from the main control board. Automatic operation of the equipment will be tested by verifying response to such signals as fire pump starts and RSW tank levels.

Equipment indicating lights and system annunciators will be tested. Testing will demonstrate the Raw Service Water System's ability to maintain design pressure on the fire protection header and RSW tank levels while providing design loads.

Condenser Circulating Water System - System 27

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test

There are no FSAR Chapter 14 tests associated with system 27.

Test Objectives
Summary of Testing
and Acceptance Criteria

Preoperational test requirements were identified in Non Critical System Scoping Document NCS-04.

Testing will verify the manual and automatic operation of the CCW pumps, tube cleaning system and principal valves. Manual operation of the equipment will be demonstrated from the main control board. Equipment indicating lights and system annunciators will be tested. System logic will be tested by verifying response to such signals as CCW pump start permissives and trips, condenser valve permissives, and low river flow. It will be verified the system can be operated without obvious undue vibration.

Each valve with a stroke time requirement will be tested to verify it meets the scoping document requirements.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-4
Upper Containment Cooling System

Test Objectives
Summary of Testing
and Acceptance Criteria

Each cooling unit will be tested separately to verify individual capacity. The test will demonstrate the fan air flow CFM and water flow GPM to be not less than those rates specified in section 9.4.7 of the FSAR. Test will also confirm the automatic start of the standby unit upon loss of any of the three operating units. The test will confirm the operability of the Main Control Room annunciation, alarm, and auxiliary control circuit.

Test data, obtained during the test with the RCS at 557°F plateau of the Integrated Hot Functional Test, will be recorded as required during the performance of Test W-1.2.

The test will confirm the adequacy of the system to maintain temperatures within the design values specified in section 9.4.7.2.3 of the FSAR.

In agreement, except only air flow rates will be verified to meet scoping document requirements. Water flow rates will not be verified since they are verified by system 67 testing. Temperature requirements will be as specified in the scoping document.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-5
Lower Containment Cooling System

Test Objectives
Summary of Testing
and Acceptance Criteria

Each cooling unit will be tested separately to verify adequate air and water flow rates. The test will confirm the fan air flow and water flow to be not less than those rates specified in section 9.4.7 of the FSAR. Testing will also confirm the automatic start of the standby unit upon loss of any of the three operating units. The test will verify the correct operation of the alarm and isolation and status monitoring input curcuits for each fan. Test data, obtained during the test with the RCS at 557°F plateau of the integrated hot functional test, will be recorded as required during the performance of Test W-1.2. The test will confirm the adequacy of the system to maintain temperatures within the design values specified in section 9.4.7.2.1 of the FSAR.

In agreement, except only airflow rates will be verified to meet scoping document requirements. Water flow rates will not be verified since they are verified by system 67 testing.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-6
Air Return Fans

Test Objectives
Summary of Testing
and Acceptance Criteria

This test will verify that adequate flow rates can be achieved by operation of any combination of air-return fans. The operability of the back-draft dampers will also be verified. The operability of Air Return Fans with respect to motor horsepower, backdraft damper positions, movement of ice condenser doors, containment isolation signals and proper functioning of controls and alarms will be demonstrated. Specifically, the tests consist of:

1. Confirming ability of each air return fan to move air from upper compartment to lower compartment at a minimum flow of 40,000 cfm.	1. Tests will not be performed to confirm the ability of each air-return fan to move 40,000 cfm. The normal flow path of the air-return fans is from lower containment, through the ice condenser baskets into upper containment. This flow path is not available. Credit is taken for the original preoperational test.
2. Air flow to be adjusted to give required minimum flow at each inlet damper. Minimum acceptable flows are given in FSAR Section 6.8 and Figure 9.4-28.	2. Airflows will not be adjusted nor will branch airflow rates be measured or balanced. Due to conditions identified in 1, designed airflow rates cannot be reached, therefore balancing activities will not be performed. Credit is taken for the original preoperational test.
3. The proper operation of each backdraft damper and proper position indication will be demonstrated.	3. In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-6
Air Return Fans

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

4. Fans will operate for 15 minutes with the backdraft damper blocked closed without the motor winding temperatures exceeding 311°F.	4. Fan motor current will be measured with the backdraft damper blocked closed in accordance with scoping document requirements.
5. Fans will automatically start at 10 minutes ± 10 seconds following a containment isolation phase B initiation and provide an air flow greater than 41,885 cfm within 10 seconds following fan start.	5. Fan starts will be verified in accordance with the scoping document requirements. Airflow will not be verified due to the unavailability of the flow path.
The air return fan vendor will conduct tests, to demonstrate the fans' capability to operate in an accident type containment environment. The preoperational test will be conducted under normal ambient conditions.	Vendor tests to environmentally qualify components were completed prior to installation.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-7
Control Rod Drive Mechanism Cooling System

Test Objectives Summary of Testing and Acceptance Criteria	
Each cooling unit will be tested separately to verify adequate air and water flow rates. The test will demonstrate the fan air flow and water flow to be not less than those rates specified in section 9.4.7 of the FSAR. Testing will confirm the automatic start of the standby cooler in each pair of coolers upon loss of the other cooler in the pair. Tests will also confirm the capability to utilize that standby unit of either or both pairs of coolers for supplemental cooling should lower compartment temperature ever exceed 120°F. The test will also verify correct operation of the Main Control Room annunciation, alarm, and auxiliary circuits. Refer to paragraph 9.4.7.2.5 of FSAR.	In agreement, except only airflow rates will be verified to meet scoping document requirements. Water flow rates will not be verified since they are verified by system 67 testing. Temperature requirements will be as specified in the scoping document.
Test data results obtained during the test with the RCS at 557°F plateau of the Integrated Hot Functional Test to design conditions. This data will be recorded as required during the performance of Test W1.2. The test will confirm the adequacy of the system to maintain temperatures within the design values specified in section 9.4.7.2.2 of the FSAR.	

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-9A
Auxiliary Building Gas Treatment System and Door Status Indication System

Test Objectives
Summary of Testing
and Acceptance Criteria

This test will verify:	
1. Proper automatic startup of Auxiliary Building Gas Treatment System (ABGTS) and isolation of the Auxiliary Building Secondary Containment Enclosure (ABSCE).	1. In agreement.
2. Proper manual startup and shutdown of each air cleanup train.	2. In agreement.
3. Proper automatic startup of standby cleanup train upon failure of the operating train.	3. In agreement. Standby train starts on low airflow of operating train.
4. Verify each train's flow rate equals or exceeds the design values specified in Section 6.2.3 of the FSAR.	4. In agreement. Flow rates will be verified to meet scoping document requirements.
5. Verify system capability to each and maintain within 3.5 minutes the required 0.25 ± 0.05 inches of water negative pressure in the ABSCE.	5. System capabilities will be verified to meet scoping document requirements.
6. Verify inleakage to the ABSCE is less than or equal to the design values specified in Section 6.2.3.2 of the FSAR.	6. In agreement.
7. Verify that air cleanup units meet requirements of Regulatory Guide 1.52 as stated in Section 6.5.1 of the FSAR.	7. In agreement.
8. Verify that relative humidity (RH) heater performance meet design requirements. Refer to Paragraph 6.5.1.2.2 of FSAR.	8. In agreement.

Title of Test No. TVA-9A
Auxiliary Building Gas Treatment System and Door Status Indication System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

9. Verify proper operation of system instrumentation, controls, and alarms. Refer to paragraph of FSAR 6.2.3.2.3.	9. In agreement.
10. Verify proper operation of locks, latches and alarm annunciation for types 3, A, B and C safety-related doors.	10. In agreement.

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. TVA-9B
Reactor Building Purge System

Test Objectives
Summary of Testing
and Acceptance Criteria

The tests of the Reactor Building Purge System will demonstrate the capability to purge the containment and annulus atmosphere to the outside environment via the shield building vent exhaust and the capability to process the purged air through a cleanup system.	In agreement, except both trains will not be operated simultaneously during prestart testing. No data is required in this mode. As specified by scoping document, each train of the purge system is tested separately.
Proper automatic operation of the supply and exhaust fans and associated supply and exhaust dampers for purging of the main containment and the instrument room will be demonstrated. Proper response of the isolation dampers, leak-off valve, and control room indication lights will be verified.	Also the Incore instrument room cooling system will be demonstrated to operate properly.
Proper response of isolation valves to loss of control air will be verified. Testing of charcoal, and HEPA filters will be demonstrated per the requirements of FSAR Table 6.5-3.	
Manual control of containment purge supply and exhaust fans will be demonstrated.	
A minimum airflow rate of 22,949 cfm will be demonstrated in the Containment Purge System supply and exhaust when both supply and exhaust systems are operating and each train of HEPA and charcoal filter banks are operating at 3.5 inches water gauge differential pressure.	Scoping document does not require pressure drop across HEPA and charcoal filter banks to be measured during prestart testing. The pressure drop across these filters is measured by Surveillance Instruction 9.11.
Manual control of instrument room purge supply and exhaust fans will be demonstrated. Supply 900 + 90 cfm and exhaust 800 + 80 cfm flow rates will be demonstrated.	Incore instrument room supply and exhaust fans will be demonstrated to deliver flow requirements per scoping document.

Ventilating System - System 30

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-9B
Reactor Building Purge System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

Manual operability of isolation and relief valves will be verified. System design response to loss-of-power will be demonstrated as indicated in paragraph 9.4.6.3 of FSAR.	
Purge exhaust air flows will be shown not to cause refueling canal rippling sufficient to restrict adequate visibility of underwater fuel-handling operations.	Purge air exhaust flow rates were demonstrated not to cause rippling during preoperational tests. No further testing is required.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-9C
Auxiliary Building Heating, Ventilating, and Cooling System

Test Objectives Summary of Testing and Acceptance Criteria	
Test will be conducted to confirm and demonstrate the subsystems that makeup the Auxiliary Building Heating, Ventilating, and Cooling System function properly and that prime movers have the flow capacities as shown on applicable logic and flow diagrams. Chilled water design flow capacities will be demonstrated. Proper functioning of control dampers will be demonstrated. Capability of subsystem fans to maintain design building area/room static pressures will be demonstrated. Refer to section 9.4 of FSAR.	In agreement.
System performance will be considered acceptable upon demonstration that system flow controls, alarms, and interlocks are demonstrated to function as shown on the logic and flow diagrams noted above. Test will be conducted under actual or simulated worst-case heat load conditions. Sufficient test data will be taken to extrapolate the HVAC system capability to worst-case accident conditions. Those subsystems that have backups will be tested with simulated fault signals (i.e., high temperature, loss of flow, etc.) to demonstrate subsystem redundancy. Control room and local status indications, annunciations, and system interlocks will be monitored during system tests to verify proper response from initiating devices and controls. Correct failure mode of valves and dampers will be confirmed. Filter systems will be tested to verify proper installation and leaktightness.	Test will not be conducted under actual or simulated worst-case heat load conditions. However, airflow rates and chilled water flow rates will be measured which will provide sufficient test data to allow the ventilation system's capability to meet worst-case conditions to be established. Proper operation of valves and dampers upon receipt of an isolation signal will be confirmed. Correct failure mode due to loss of air to valves and dampers will be verified by System 32 tests.

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. TVA-9C
Auxiliary Building Heating, Ventilating, and Cooling System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

Operational status of equipment, environmental data, and other system variables will be noted during the test to provide a basis for additional system evaluation as necessary. The following subsystems will be tested:	
1. Auxiliary Building General Ventilation Systems including: a. General Supply and Exhaust Fans b. Fuel Handling Area Exhaust Fans	1. In agreement.
2. Shutdown Board Rooms Air Conditioning System	2. In agreement.
3. Shutdown Transformers Ventilation System	3. In agreement.
4. Auxiliary Board and Battery Rooms Air Conditioning Systems	4. In agreement.
5. Engineered Safety Features Equipment Emergency Cooling System including: a. Safety Injection Pump Room Coolers b. RHR Pump Room Coolers c. Containment Spray Pump Room Coolers d. Centrifugal Charging Pump Room Coolers e. Reciprocating Charging Pump Room Coolers f. Auxiliary Feedwater and Boric Acid Transfer Pump Space Coolers g. Component Cooling Water and Spent Fuel Pit Pump Space Coolers h. Emergency Gas Treatment Room Space Coolers	5. In agreement, except Unit 2 equipment not required for Unit 1 operation will not be tested.

FSAR Chapter 14 Associated Tests | Prestart Test Program

Title of Test No. TVA-9C
Auxiliary Building Heating, Ventilating, and Cooling System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

i. Auxiliary Feedwater and Component Cooling Pumps Space Coolers j. Penetration Room Space Coolers k. Pipe Chase Space Coolers	
6. Miscellaneous Ventilation and Air Conditioning Systems including: a. Sample Room Exhaust Fans b. Auxiliary Feedwater Pump Room Exhaust Fans c. Hot Instrument Shop Air Conditioning System d. CRD Room Air Conditioning Units e. Additional Equipment Building Air Conditioning Units f. Cask Decontamination Room Exhaust Fan and Cask Decontamination Area Fan g. Main Steam Valve Vault Ventilation h. Condensate Demineralizer Waste Evaporator Building Air Conditioning i. Equipment Decontamination Room Supply and Exhaust Fan	6. In agreement except Unit 2 system not required for Unit 1 operation will not be tested. Also auxiliary feedwater pump room exhaust fans Section does not exist.
7. Turbine Driven Auxiliary Feedwater Pump Room Ventilation Subsystem	7. In agreement except Unit 2 Turbine-Driven auxiliary feedwater pump room ventilation fans will not be tested.
8. Verification of Auxiliary Building Air Preheater System	8. Auxiliary Building Air Preheater System is not verified. This is not part of the Prestart Test Program.

Title of Test No. TVA-9C
Auxiliary Building Heating, Ventilating, and Cooling System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

9. Operation of Auxiliary Building Filter Room Exhaust Fan	9. In agreement.
10. Verification of Emergency Cooling to the Shutdown Board Room for the Main Control Room	10. The path for providing Emergency Cooling to the shutdown board room (SDBR) from the main control room (MCR) is through a steel door located inside the duct which penetrates the wall between the MCR and the SDBR. Access to the door will be verified.

Ventilating System - System 30

FSAR Chapter 14 Associated Tests	Prestart Test Program
Title of Test No. TVA-14C **Diesel Generators and Supporting Auxiliaries (D-G Building Heating and Ventilating System)**	
Test Objectives Summary of Testing and Acceptance Criteria	
Verify the capability of the engine room ventilation fans and associated dampers to start and operate on a diesel generator start signal. Acceptable system performance will be demonstrated if the ventilation system maintains the engine room temperature within design and manufacture limits during any diesel testing and/or operation. Refer to section 9.4.5 of FSAR.	In agreement.

FSAR Chapter 14 Associated Tests	Prestart Test Program
Title of Test No. TVA-74C **Additional Diesel Generator (ADG) and Supporting Auxiliaries (ADG Building Heating and Ventilating System)**	
Test Objectives Summary of Testing and Acceptance Criteria	
Verify the capability of the engine room ventilation fans and associated dampers to start and operate on a diesel generator start signal. Acceptable system performance will be demonstrated if the ventilation system maintains the engine room temperature within design and manufacture limits during any diesel testing and/or operation. Refer to section 9.4.5.2 of FSAR.	In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-69
Intake Pumping Station Heating and Ventilating System

Test Objectives
Summary of Testing
and Acceptance Criteria

The test objective is to demonstrate the following capabilities:

A. The supply and exhaust fans for the electrical and mechanical equipment rooms are controlled from a local control switch near each supply fan. The exhaust fans are started from auxiliary contacts on the supply fan motor starter.	In agreement.
B. Motor-operated dampers mounted in the air stream of each fan will automatically open or close when the fans are started or stopped.	In agreement.
C. A multistage duct heater is installed in the discharge air stream of each equipment room supply fan. Each heater is controlled by a step controller operated from a thermostat sensing the unheated air temperature.	In agreement.
D. The unit heaters located in the mechanical and electrical equipment rooms are properly controlled by built-in thermostats.	In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-10
Control Building Air Conditioning

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify the adequate performance of all systems in maintaining a controlled acceptable environment as described in FSAR Section 9.4.1.1 within the building for protection of mechanical and electrical equipment and for safety and comfort of operating personnel. Proper operation of the Electric Board Rooms Air Conditioning System will be demonstrated. A controlled, safe environment will also be assured for continuous occupancy of the main control room during any accident or off normal condition. Proper system response to manual and automatic initiations of each train of the control room isolation signal is verified. Verification of redundancy will be demonstrated as follows:

1. From switches in each fan's air stream, for systems having two 100% capacity fans, will automatically start the backup fan upon failure of the operating fan so as to produce the required minimum airflow.
2. For each system having 100% backup isolation dampers, both dampers close on receipt of a control building isolation signal.
3. From switches mounted downstream of each air handling unit (AHU) for fans, activate the Backup Cooling System on indication of insufficient air flow.

In agreement except;
chlorine detection is being deleted from the system and therefore will not be tested.

Local handswitches are not required to be tested. These switches do not meet the criteria for tests as defined in the Prestart Corrective Action Plan sections 4.1.1, 4.1.2, or 4.1.3. They are mainly used for operator convenience during local operations.

The positive pressure is verified to exceed minimum valves in the MCR as specified in the scoping document.

Title of Test No. *TVA-10
Control Building Air Conditioning

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

Chlorine and radiation detection and instrumentation control functions will be tested in test TVA-28, Sampling System, and in test TVA-31, Process Radiation Monitoring Systems.

Proper operation of control building and associated dampers, fans including local and remote control and automatic starts and stops will be demonstrated.

Complete isolation will be demonstrated. The following capabilities will be demonstrated or confirmed:

Building pressurizing fans, main and auxiliary, operate automatically for normal operation and isolation; Main Control Room can be maintained at 1/8 inch positive static pressure during all modes (except chlorine isolation), spreading room can be maintained at a slight negative pressure during normal operation; control room indicating lights operate properly; flow switches operate to automatically start redundant fans; all motor-operated dampers operate automatically and properly for normal and emergency conditions; and refrigerant compressors, air handling units, heaters, thermostat controls, and humidifiers operate properly.

Title of Test No. *TVA-10
Control Building Air Conditioning

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

In place leak rate testing of the charcoal and HEPA Supply System filters will be conducted in accordance with applicable sections of ANSI N510 - 1975, as referenced in Regulatory Guide 1.52. This testing will verify that filters are not damaged, that they are properly installed, that there are no leaks in the mounting frame or filter housing, and that the system contains no bypassing (such as channels through the charcoal absorber beds).

Title of Test No. TVA-24
Fire Protection-Ventilation System Compartmentation Fire Dampers

Test Objectives
Summary of Testing
and Acceptance Criteria

To insure operability of the Ventilation System fire dampers, the following checks must be performed:

1. Manual actuation of all fire dampers.	1. In agreement except dampers in nonvital areas are not tested as they are not within the scope of the PTP. Dampers with actuation signals from the fire detection system, and the CO_2 storage, fire protection system will be actuated from the respective system, not manually.
2. Simulated smoke actuation of applicable fire dampers.	2. In agreement.
3. Fusible link location in air streams.	3. In agreement. Fusible link installation will be verified as part of the damper actuation test.

The acceptability of system performance during these tests will be judged utilizing the criteria of NFPA-90A-1975. Refer to section 9.5.1 of FSAR.

Title of Test No. TVA-68
Postaccident Sampling Facility Environmental Control System

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify adequate operation of the Environmental Control System equipment. Testing will confirm or verify adequate operation of fans, coolers, air cleanup units, dampers, valves, heaters, duct systems, instrumentation, controls, and alarms. The acceptance criteria for the PASFECS are:

1. Fans shall start or shutdown upon receipt of a manually initiated signal from the local control panel. The normal supply fan shall shutdown upon receipt of a simulated auxiliary building isolation signal.	1. In agreement.
2. Data outputs and performance of fan instrumentation, controls, interlocks, and alarms shall operate as required.	2. In agreement.
3. Distribution and testing of airflow to the HEPA filter and charcoal adsorbers of the PASF Air Cleanup Unit (ACU) shall be as specified in Section 8 of ANSI N510-1980 and Section 9 of "Industrial Ventilation." The distribution shall be within 20% of average flow under clean filter conditions.	3. Airflow distribution test is performed per approved plant instructions as a prerequisite to the testing specified by the scoping document.
4. Leak tightness efficiency of at least 99.95% at rated flow for each HEPA filter bank of the PASF ACU shall be obtained when tested with DOP in accordance with Section 10 of ANSI N510-1980.	4. In agreement. Testing will be in accordance with edition of N510 specified in the scoping document.

Air Conditioning System - System 31

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-68
Postaccident Sampling Facility Environmental Control System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

5. Leak tightness efficiency of at least 99.95% for each charcoal adsorber section of the PASF ACU when tested with Freon in accordance with Section 12 of ANSI N510-1980.	5. In agreement except testing will be in accordance with the edition of N510 specified in the scoping document.
6. The relative humidity heater of the PASF ACU shall be at least 5kW continuous operation and shall shut off on low airflow signal.	6. In agreement with the exception that heater output is verified per the scoping document.
7. The supply and exhaust fans of the PASF sampling and associated work areas shall maintain a positive pressure greater than or equal to 0.12 inch of water with respect to atmospheric pressure for at least 30 minutes. A dirty filter condition (approximately 6-inch of water) shall be simulated to verify that delta-P requirements can be met under the worst conditions.	7. The PASF Emergency Ventilation system will be verified to establish facility differential pressures initially, and have capability to restore facility differential pressure after personnel ingress/egress. The criteria offers a more stringent demonstration of system performance.
8. The supply and exhaust fans of the PASF Sentry sampling cabinets and the valve gallery shall maintain a negative pressure less than or equal to 0.25 inch of water with respect to sampling area pressure for at least 30 minutes. A dirty filter condition (approximately 6-inch of water) shall be simulated to verify that delta-P requirements can be met under the worst conditions.	8. Refer to item 7 above.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-68
Postaccident Sampling Facility Environmental Control System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

9. The duct heater shall operate satisfactorily to maintain design temperature.	9. In agreement.
10. Powered dampers shall operate properly.	10. In agreement.
11. Alarms shall initiate as required.	11. In agreement.

Gland Seal Water System - System 37

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test

There are no FSAR Chapter 14 tests associated with system 37.

Test Objectives
Summary of Testing
and Acceptance Criteria

Preoperational test requirements were identified in Non Critical Scoping Document NCS-21.

Automatic operation of the gland seal system will be tested by verifying that the gland seal storage tank feed valve and level alarms function properly, and that the normal range of tank water levels can be maintained during system operation.

CO_2 Storage, Fire Protection, and Purging System - System 39

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-35A
CO_2 Fire Protection (Powerhouse)

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates the capability of the system to supply Carbon Dioxide in adequate concentrations and discharge rates to the following areas: 1) auxiliary instrument rooms, 2) computer room, 3) lube oil purification room, 4) lube oil dispensing room, and 5) paint shop and storage area. The applicable portions of the system will be tested for all design operational modes (i.e., automatic, manual electric, and manual operation). Testing will be conducted by actually releasing CO_2 into the specified hazard areas and measuring resulting concentrations. Proper operation of applicable alarms, timers, and associated control equipment will be verified.

In agreement except that CO_2 concentrations will not be verified. The preoperational test had previously established discharge times. Since the various parameters have not changed, only discharge times will be verified. A brief discharge will be performed to verify valve functions but a CO_2 discharge through a full cycle will not be performed. Also the paint shop storage area is being converted to office space so the CO_2 protection will be deleted and therefore will not be tested.

CO_2 Storage, Fire Protection, and Purging System - System 39

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-35B
CO_2 Fire Protection System
(Diesel Generator Building)

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates the capability of the system to supply Carbon Dioxide in specified quantities and concentrations to the diesel generator building hazard areas as specified in NEPA-12-1973. The applicable portions of the system will be tested in all design operational modes (i.e., automatic, manual electric, and manual operation). Testing will be conducted by actually releasing CO_2 into the specified hazard areas and measuring resulting concentrations. Proper operation of applicable alarms, timers, and associated control equipment will be verified. Verification that piping vibrations are not excessive.

In agreement except the capability to supply CO2 is as specified in the scoping document and CO2 concentrations will not be verified. The preoperational test had previously established discharge times. Since the various parameters have not changed, only discharge times will be verified. A brief discharge will be performed to verify valve functions but a CO2 discharge through a full cycle will not be performed.

Sample and Water Quality System - System 43

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-28
Sampling System

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates the capability of the Sampling System to provide a representative sample from specified sample point associated with the NSSS and supporting auxiliary systems. Primarily, the test includes those sampling facilities and process analyzers located in the auxiliary building sampling area (hot sample room). Testing consists of:

1. Verifying that sample flow rates can be regulated at desired values.	1. In agreement.
2. Verifying the adequacy of cooling water flow to sample heat exchangers.	2. In agreement. Samples are verified to be adequately cooled.
3. Performing standardization and operational checks on the continuous Boron analyzer.	3. In agreement.
4. Verifying that sample isolation valves respond correctly to simulated isolation signals.	4. In agreement.
5. Perform operational checks on the Containment Atmosphere H_2 Detection System, Chlorine Detector System, and Gas Analyzer Systems.	5. In agreement except for the chlorine detection system which is being eliminated.
6. To verify sample bombs and lines are pressure tight and leak tight.	6. Not tested. This item is excluded by the Prestart CAP Exhibit A III.A.1.c.
7. Verify gross failed fuel detector operation and operation of the associated annunciator in the main control room.	7. In agreement.

Refer to section 9.3.2 of FSAR.

Sample and Water Quality System - System 43

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-65
Post Accident Sampling System (PASS)

Test Objectives
Summary of Testing
and Acceptance Criteria

The purpose of the preoperational test is to verify the operability of the system and ensure that samples can be obtained; this includes testing of sample panels, supplied by Sentry; sample lines, and isolation valves to ensure the PASS is functional.
The objective of the preoperational test is to demonstrate the ability of the equipment to:

A. Obtain the reactor coolant water, containment sump, and containment atmosphere samples.	A. In agreement.
B. Transport reactor coolant water, containment sump, and containment atmosphere grab samples to a transfer station or analysis laboratory at the plant.	B. In agreement.
C. Demonstrate that the waste liquids will go back to containment or to the radwaste system.	C. In agreement except piping configuration will only be verified as going to containment sump or to the radwaste system.
D. Demonstrate that containment air and coolant stripped gas samples can be disposed of.	D. In agreement.
E. Verify that cart/casks for Liquid Sampling Panel and CASP are operational.	E. In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-65
Post Accident Sampling System (PASS)

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

F. Verify that post-accident sampling operations can be done within the timespan alloted in TVA Design Criteria WB-DC-40-39, "Post Accident Facilities for Reactor Coolant Water and Containment Atmosphere Sampling and Analysis." The acceptance criteria requires that the system obtains reactor coolant, containment atmosphere, and sump samples. On line analyses provided in the system shall be demonstrated to be in the design limits as stated in the Sentry Equipment Corporation (SEC) - High Radiation Sampling System Operation and Maintenance Manual. Conduct a test to verify that containment sump water can be sampled at conditions similar to a DBA-LOCA.	F. In agreement.

Turbogenerator Control System - System 47

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W8.4
Initial Turbine Roll

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to perform initial turbine, dynamic turbine testing and checks during hot functional testing. Note, that if the schedule does not permit testing at this time the testing can be deferred until low reactor power startup testing. Pressurizer and steam generator levels will be maintained at 80 percent levels and steam introduced to roll the turbine. During the test, reactor coolant temperature, steam generator level, pressurizer level, and pressure will be continuously recorded. The turbine will be placed on the turning gear after coastdown.

In agreement.

Title of Test No. TVA-42
Turbine and Generator Control and Protection System

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates that the Turbine Protective Systems are actuated both from Reactor Protection System inputs and from the various turbine protective trips. Applicable Reactor Protection System input signal (i.e., P-4 reactor trip signals, steam generator hi-hi level, and safety injection) will be simulated and proper functioning of the Turbine Protection System verified. It will be demonstrated that:

1. Tripping the control emergency trip fluid causes trip closure of all control and intercept valves and all nonreturn valves.	1. In agreement.
2. Tripping the stop emergency trip fluid causes tripping of all stop and reheat stop valves and also tripping of the control emergency trip fluid.	2. In agreement.
3. Tripping of the auto stop oil causes tripping of both the Control and Stop Emergency Trip Fluid Systems. Verification that auto stop oil is tripped by various turbine hazard condition monitors and interface sensors will be demonstrated. Also, the generation of proper turbine trip signal for input to the Reactor Protection System will be verified.	3. In agreement.

Title of Test No. TVA-42
Turbine and Generator Control and Protection System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

The Turbine Speed/Load Control System will be checked using a special test simulator to demonstrate proper functioning of the overspeed protection control feature.

The acceptance criteria for this test will be in accordance with the functional design requirements of the applicable portions of 1) the Westinghouse NSSS Solid-State Protection System function diagrams, 2) the Westinghouse turbo-generator instruction manuals and drawings, and 3) TVA electrical drawings schmatics (TVA drawing 45N647-1).

System Test Facility - System 52
(Seismic Instrumentation Only)

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-52
Seismic Instrumentation

Test Objectives Summary of Testing and Acceptance Criteria	
This test will verify that the seismic instrumentation has been installed and calibrated in accordance with TVA/vendor specifications. In addition this test will verify that the associated recordings and alarm systems are properly responding to signals which originate at the transducers.	In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W10.9
Ice Condenser Reactor Containment System

Test Objectives
Summary of Testing
and Acceptance Criteria

The cooldown capability of the ice condenser and operability of the ice condenser cavity doors and associated air handling, glycol circulation and refrigeration, floor cooling, and drain subsystems will be demonstrated. The ice condenser will be cooled down to design ambient condition. The initial ice loading will then be accomplished and proper quantity and quality of the ice verified. A final survey of the ice condenser environment and doors to verify that the system is an acceptable configuration for power operation. All system alarm and operational setpoints will be verified. Vibration of system piping will be determined to be within acceptable limits.

Acceptance criteria for the test shall be in accordance with criteria defining an operable Ice Condenser System in the plant technical specifications.

In agreement except the initial ice loading has been accomplished and the ice condenser is being maintained in an operational status.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W2.1
CVCS Charging and Letdown

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates that the CVCS performs as required under all phases of operation. Proper operation of control logic and instrumentation and alarm setpoints for the CVCS Systems will be verified. The capacities of letdown paths and the reactor coolant filter d/p will be measured. Letdown temperature and pressure controller responses will be demonstrated. Proper operation of the excess letdown flow path is verified and the demineralizer tested for design flow rates and pressure drops. Charging pumps will be tested for capability to deliver varying flow rates. Volume control tank level control, indications, and alarm setpoints are checked. Operational calibration and testing of the "dilute," "alternate dilute," and "borate" modes will be accomplished. These tests will verify that the system is capable of supplying varying required flow rates and that these flow rates will terminate correctly under the control of corresponding integrators. All flow rates of the various subsystems will be measured and verified.

The acceptance criteria for CVCS-charging and letdown are (specifications are referenced in the "Precautions, Limitations, and Setpoints for NSSS"):

1. Verify the control logic for the valves of the reactor coolant pump seal water letdown and excess letdown subsystems; and reciprocating charging pump, volume control tank.

In agreement except differential pressure measurements through or across system components will not be repeated. These measurements verified system design calculations and since no system or component modifications have been made which would effect the calculations, no reverification is required.

Flow rates, setpoints, etc., will be verified to scoping document requirements.

Title of Test No. W2.1
CVCS Charging and Letdown

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

2. Verify the instrumentation and alarm setpoints for seal water injection, letdown, and excess letdown subsystem and volume control tank.
3. Verify and demonstrate the operational capability of the charge pumps to deliver seal water to the reactor coolant pumps at 8 $\pm$ .25 gpm.
4. Verify individual orifices flowrates and reactor coolant filters capabilities are sufficient to satisfy design requirements.
5. Verify the operability of the letdown line temperature controllers and the excess letdown heat exchanger subsystem.
6. Demonstrate the operational capability of the demineralizers.
7. Verify the volume control tank level controllers operate to maintain tank level in the operating range and that indication and control functions operate properly at abnormal tank level (specified levels).
8. Verify the operational capabilities of the Makeup Control System in the dilute alternate and borate modes.

Title of Test No. W2.1
CVCS Charging and Letdown

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

9. Verify the vibration of system piping by both visual observation and measurement to be within acceptable limits which is used on a 10,000 psi alternating stress limit for steady-state operation. (Specified in "Displacement Criteria for Vibration Qualification of Piping," WB-DC-40-31.16.)
10. Observe transient vibration conditions for all test modes of transient operation for acceptability.

Title of Test No. W2.2
Boric Acid System

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify and demonstrate the functioning of the equipment for batching, storing, and transferring 12% boric acid solution. The batching tank will be filled with demineralized water and heater capabilities and temperature alarms will be verified. Alternate use of the transfer pumps with each tank and and alternate tanks will be demonstrated. The boric acid filter d/p will be measured. All pump discharge pressure and flow rates will be measured and all temperature indications and level alarms will be verified. Heat tracing circuits will be functionally tested for a 24-hour period with no flow in the piping. A verification that system pumps and piping do not vibrate excessively will be performed. Demonstration of the alternate makeup and emergency boration flow paths will be performed during hot functional testing.

The acceptance criteria for the Boric Acid System Test are:

1. The boric acid tanks temperatures are maintained within the limits of "Precautions, limitations, and setpoints for the Westinghouse NSSS".

2. The boric acid transfer pump controls operate as required and pumps deliver adequate flow to the boric acid tank, to the charging pump suction, and for boric acid tank recirculation.

In agreement except the boric acid filter d/p will not be reverified and the boron injection tank heaters are no longer required and have been disconnected.

Alarm and control setpoints will be verified to scoping document requirements.

The system will be tested utilizing demineralized water.

Title of Test No. W2.2
Boric Acid System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

3. The boric acid filter functions at design pressure drop.
4. Heat tracing and backup heat tracing maintain proper liquid temperatures (between 160°F and 170°F).
5. All alarms function within the setpoint tolerances of "Precautions, Limitations, and Setpoints for the Westinghouse NSSS."
6. The boric acid batching tank mixer operated as required.
7. The unit emergency boration flow path is verified.
8. System vibration level is acceptable (specified in "Displacement Criteria for Vibration Qualification of Piping," WB-DC-40-31.16).
9. Alternate foration flow path is also verified.
10. ESFAS reset capabilities for the boron injection tank heaters will be demonstrated.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W10.2
Boron Recycle System

Test Objectives Summary of Testing and Acceptance Criteria	
Test objective is to verify the proper functioning of components of the Boron Recycle System. Using demineralized water, the tank level alarms and recirculation pump flow rate will be checked. The flow path for recirculation pump flow rate will be checked. The flow path for recirculation from the holdup tanks through the different components will be tested for pump discharge pressure, ion-exchanger d/p, filter d/p, and flow rates. Distillate effluent will be discharged to the monitor tank and then pumped through the various lines to the RWST, holdup tank, or to the demineralizers. All pump flow rates and component d/p's will be measured and compared to design values (specified in FSAR Section 9.3.7) and all level alarms will be checked. Boric acid concentration (12 wt.%) capability of the evaporator unit will be verified after unit fuel load. Piping and mechanical components of the system will be observed for excessive vibration as specified in the Design Criteria for Displacement Criteria for Vibration Qualification of Piping.	In agreement except component d/ps will not be measured.

Chemical and Volume Control System (CVCS) - System 62

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-37
Hydrogen System

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify the operability and safety of the system. The system will be checked for the capability of automatically isolating the system in case of a line break and for proper functioning of system alarms and operational logic circuit. The Hydrogen reducing station will be tested for proper pressure maintenance at served components and local control stations will be tested from the capability of controlling Hydrogen flow.

In agreement except system 35 valves will not be tested since "Generator Cooling" is not included in the Prestart Test Program.

Safety Injection System - System 63

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. W3.1A1
SIS Integrated Flow Testing

Test Objectives Summary of Testing and Acceptance Criteria	
This test obtains data and verifies adequate NPSH exists during integrated operation of containment spray, centrifugal charging, reciprocating charging, safety injection, and residual heat removal pumps. The test also obtains data and verifies adequate NPSH and performance during the recirculation mode. The CCPs and SIPs are run in injection mode while drawing suction through the cross ties from RHRP A and then from RHRP B. This test will be performed following W3.1C, W3.1D, W3.1E with the vessel open and internals removed. Piping vibrations of injection lines inside containment are observed and measured in both flow modes and verified to be acceptable as specified by "Displacement Criteria for Vibration Qualification of Piping," WB-DC-40-31.16. Pump and piping vibrations outside containment are covered in preoperational tests W3.1E, W3.1D, W3.1C, and W10.7B, as appropriate.	In agreement except: The reciprocating charging pump is not tested because it is not used in any FSAR Chapter 15 analysis (not part of ECCS). Recirculation mode capabilities will not be tested when pump suction is from the containment sump. However, testing will obtain data and verify adequate NPSH on recirculation mode when pump suction is supplied from RCS loop 4 hot leg. Pipe vibration will be measured only where observed to be significant.
This test records the time required for "semi-automatic" switchover to recirculation to occur and demonstrates the time required is less than or equal to 20 seconds.	In agreement with respect to the four automatic valves that change position to provide switchover from injection mode to recirculation mode. Scoping document acceptance criteria will be used.

Safety Injection System - System 63

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W3.1A2
SIS Integrated Actuation and Alarm Testing

Test Objectives
Summary of Testing
and Acceptance Criteria

This preoperational test instruction consists of three basic parts. The first section serves to document the proper operation of various air and motor operated valves, various heater groups, various pump breakers, and the emergency diesel generators in response to a Safety Injection "S" signal, proper operation of interlocks associated with the Safety Injection System valves, and proper manual control of Safety Injection System and various other system components which receive a Safety Injection "S" signal from all of their respective control stations.

The second section verifies proper operation of the Group Status Monitor Alarms common annunciators. These annunciators alarm when valves or components are placed in an other than normal position, and testing is accomplished by verifying all components are in their normal alignment, then placing each, in turn, to its off-normal position and verifying the receipt of an alarm.

In agreement.

The various heater groups, pump breakers, and emergency diesel generators response to a SI signal will be done in the respective system test.

The Control Room Design Review project has reduced the group status monitor alarms from 5 windows to 1 window. This one window will be tested. Also because this alarm has reflash capability all components do not need to be in normal alignment (re-alarm clear) before a valve can be checked.

Title of Test No. W3.1A2
SIS Integrated Actuation and Alarm Testing

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

The third section verifies proper operation of the thermal overload bypass features associated with essential valves. The thermal overloads are removed from the valve control circuitry to simulate a thermal overload, and then each valve will be operated with the thermal overload bypass in effect. An attempt will then be made to operate each valve with the thermal overload bypass reset, and each valve will be verified to be inoperable.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W3.1A3
SIS Integrated Check Valve Flow and Integrity Test

Test Objectives
Summary of Testing
and Acceptance Criteria

This test verifies that primary SIS to RCS check valves will open at reactor coolant system temperature. During the hot functional phase of testing the CCP's and SIP's are started and branch injection flow is observed to verify check valve opening. This test also verifies accumulator and injection (centrifugal charging, safety injection and residual heat removal) primary and secondary check valve integrity during the hot functional phase of testing. Closure will be considered acceptable if valve backleakage is no more than 0.1 gpm.

In agreement except the SIP injection line check valves will be tested at 450°F/1400 psig because of possible RCP NPSH problems at 557°F/1400 psig.

Closure will be considered acceptable if valve backleakage meets scoping document criteria.

Safety Injection System - System 63

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W3.1B
SIS Accumulators and Related System Performance Test

Test Objectives
Summary of Testing
and Acceptance Criteria

This test verifies proper control and operation of the valves required for accumulator filling, venting, draining, charging and blowdown. SIS test/fill line valves inside the containment are also tested. Safety injection signals are verified and ASME XI baseline data is collected as appropriate. This test functionally tests each accumulator's fill, vent, charge, and discharge capabilities. Level and pressure instrumentation and alarms are checked. Accumulator discharge valves are verified to open under maximum expected differential pressure in the required time. Each accumulator is discharged, at 100 psig into the reactor vessel with internals and head removed to evaluate the resistance of the injection piping and to demonstrate accumulator injection characteristics. Piping vibrations for cold leg injection and accumulator fill are verified to be acceptable as specified in WB-DC-40-31.16.

In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W3.1C
Centrifugal Charging Pump and Related Injection System Performance Test

Test Objectives
Summary of Testing
and Acceptance Criteria

This test verifies proper control and operation of the valves required for high pressure injection. Proper control circuitry for the centrifugal charging pumps is verified. Pump hydraulic, mechanical and electrical performance under miniflow and cold leg injection conditions is demonstrated. Cold leg injection branch line throttle valves are balanced and locking devices installed. Charging pump response time on the miniflow and cold leg injection path is determined. Baseline information is obtained as required by ASME Section XI for valve and pump testing. Verificaton that motor operated injection line isolation valves, which are opened by an "S" signal, operated properly under maximum differential pressure conditions is demonstrated. Response times of various valves are recorded as required by Preoperational Test W-7.1. Boron injection tank heaters are verified in W-2.2. Transient piping vibrations and steady state vibration data are recorded and verified to meet acceptance criteria as specified in document WB-DC-40-31.16. CCP vibration data for each mode of operation will be recorded.

In agreement except:

Control circuitry testing for CCPs will be done in the system 62 test.

Valves will not be stroked under maximum differential pressure. Program will take credit for MOVATS as stated in CAP Exhibit A Section III.A.1.c.

Boron heaters in BIT are disconnected because Boron concentration has been lowered to a level not requiring heaters.

Vibration will be done per WB-DC-40-31.16 and on equipment specified in scoping document.

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. W3.1D
SIS-Safety Injection Pump and Related Injection System Performance Test

Test Objectives
Summary of Testing
and Acceptance Criteria

This test verifies proper control and operation of the valves required for high pressure injection by the safety injection pumps. Proper control and interlock circuitry for the safety injection pumps is verified. Pump hydraulic, mechanical and electrical performance under miniflow and cold leg injection conditions are demonstrated. Cold leg injection branch line throttle valves are balanced. Pump performance under maximum flow, hot leg injection condition is demonstrated and hot leg branch line throttle valves are balanced. Safety injection pump response time on the miniflow and cold leg injection path is determined. Vibration of system piping is determined to be within acceptable limits as specified in document WB-DC-40-31.16.

In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W3.1E
SIS Residual Heat Removal Pump and Related Injection System Performance Test

Test Objectives
Summary of Testing
and Acceptance Criteria

This test verifies proper control and operation of the valves required for low-pressure injection by the residual heat removal pumps. Various other valves used during safety injection are also verified. Pump hydraulic, mechanical, and electrical performance under maximum flow, cold leg injection conditions is demonstrated. Pump performance under maximum flow, hot leg injection condition is demonstrated. Residual heat removal pump response times on miniflow and cold leg injection are determined. The time from pump start to 4500 gpm pump flow is verified to be 11 seconds. To verify proper operation the pumps are briefly run while drawing suction from the sump and discharging to the vessel. Valve interlocks required for proper operation of RHR injection not demonstrated in W-4.1 are verified. This test demonstrates that the manual portion of switchover from injection to recirculation mode can be accomplished in the time frame established in the FSAR. Refueling water storage tank (RWST) heaters and high range level instrumentation are verified. System vibrations acceptability is verified as specified in document WB-DC-40-31.16.

In agreement except testing from the containment sump will not be done. No major modifications have been performed which would invalidate previous test data (see test W-3.1A1 exception).

The injection flowrate and response time will be in accordance with the scoping document requirements.

Title of Test No. W3.1E
SIS Residual Heat Removal Pump and Related Injection System Performance Test

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

Proper operation of containment sump level alarms is verified.

RWST and containment level instrumentation used to initiate automatic switchover to recirculation is verified in W-7.3. Automatic switchover is verified in W-3.1A1.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W3.1F
Integrated ESF Systems Test

Test Objectives
Summary of Testing
and Acceptance Criteria

The test objective is to demonstrate proper operation of various systems, subsystems, and equipment (valves, pumps, coolers, and valve interlocks) which are actuated by a Safety Injection signal and phase A and B Containment Isolation signal under normal plant power and blackout conditions. After reset of the signal all required ESF equipment will remain in its proper mode.

All ESF equipment will be aligned such that any component receiving a Safety Injection or Containment Isolation signal will realign to the proper ESF position. Tests will be run on train-A and on train B equipment with normal plant power available and on train A and B equipment under blackout conditions. All equipment will be observed to verify the equipment actuates and remains in the proper mode until after reset of Safety Injection and Containment Isolation signals.

All ESF equipment will not be aligned in a position that a SI/ESF signal will realign it. Several pieces of equipment (containment spray pumps, condensate pumps, glycol valves, and other ventilation equipment) will only have the K relay energized that would normally operate the equipment. This is done to prevent the potential adverse effect on equipment. Also, respective system tests have verified that operation of the K-relay actuates the equipment.

Emergency Gas Treatment System - System 65

FSAR Chapter 14 Associated Tests	Prestart Test Program

Title of Test No. TVA-1
Shield Building Inleakage Rate Tests, Emergency Gas Treatment System Functional Tests

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates that the shield buildings and the Emergency Gas Treatment System have the capabilities needed to keep LOCA generated activity releases to or below the limits specified in 10 CFR 100. See Section 6.2.3 for a description of system operation and parameters. Test methods will be in accordance with Regulatory Guide 1.52 and ANSI N510-1975. The following tests will be performed to demonstrate fulfillment of system requirements:

1. Determination of shield building inleakage at 0.5 inches and 5.0 inches water negative pressure levels. Total infiltration will be shown to be within the expected values listed in Section 6.2.3.2.1 of FSAR.	1. In agreement. The inleakage measurement will be at the accident pressure level as specified in the scoping document. The ability to maintain 5" will be verified but inleakage measurements are not required.
2. Startup tests of annulus vacuum control subsystem, verification of automatic switchover to backup train for component failure, and verification of rated flow rates and vacuum level. Per paragraph 6.2.3.2.2 of FSAR.	2. In agreement.
3. Verification that a simulated containment isolation signal results in the following:	
a. Shutdown of the annulus vacuum control subsystem serving the unit where the simulated signal originated. The annulus vacuum control subsystem for the unaffected unit remains in operation.	3.a. Only isolation of unit 1 equipment will be verified.

FSAR Chapter 14 Associated Tests	Prestart Test Program
Title of Test No. TVA-1 **Shield Building Inleakage Rate Tests, Emergency Gas Treatment System Functional Tests** Test Objectives Summary of Testing and Acceptance Criteria (continued)	
b. Isolation of the air cleanup subsystem from the annulus vacuum control subsystem shutdown by the simulated isolation signal.	3.b. In agreement.
c. Startup of both air cleanup subsystem relative humidity heaters and fans.	3.c. Fans only. The heaters do not receive a phase A signal.
d. Activation of the designated train flow control dampers located in the annulus of the reactor unit in which the simulated isolation signal originated. The dampers in the other train are not activated. A similar capability is demonstrated with the same containment isolation signal with the other train selected as the designated train. A similar capability is demonstrated by simulating the containment isolation signal from the other reactor unit.	3.d. In agreement except only unit 1 equipment will be verified.
4. Verification that automatic switchover to the backup train occurs after failure of the operating air cleanup train.	4. In agreement.
5. Verification that each air cleanup subsystem flow rate meets or exceeds the design flow rate per paragraph 6.2.3.2.2 of FSAR.	5. In agreement.

Emergency Gas Treatment System - System 65

FSAR Chapter 14 Associated Tests	Prestart Test Program
Title of Test No. TVA-1 **Shield Building Inleakage Rate Tests, Emergency Gas Treatment System Functional Tests** Test Objectives Summary of Testing and Acceptance Criteria (continued)	
6. Verication of air cleanup subsystem filter cooling capability. Airflow induced through the inactive filter train will be shown to be at least equal to the design value specified in Section 6.2.3.3.2 of FSAR.	6. In agreement.
7. Verification that each train of the air cleanup subsystem has the capability to establish and maintain the design negative pressure in the annulus within 2.0 minutes after subsystem start (stated in paragraph 6.2.3.2.2 of FSAR).	7. The air cleanup subsystem will be verified to establish and maintain the design negative pressure. It will also be verified that the system meets the time delay response discussed in FSAR section 6.2.3.3.2 to begin operation at rated capacity.
8. Leak tightness, air flow distribution, and efficiency tests of the HEPA and charcoal filter banks in accordance with Regulatory Guide 1.52. Refer to Section 6.5.1 for additional information.	8. Airflow distribution test is performed per approved plant instructions as a prerequisite to the testing specified by the scoping document.
9. Verification tests of relatively humidity heater performance to confirm rated output per paragraph 6.5.1.2.2 of FSAR.	9. FSAR section 6.5.1.2.2 is for ABGTS. Should be 6.5.1.2.1. Minimum heater output will be verified.
10. Verification tests of system instrumentation, controls, alarms, and interlocks.	10. In agreement.
11. Verification of decay cooling line valves leak tightness.	11. A total system bypass leakage test with DOP which demonstrates the integrity of the ACU, associated decay cooling valves/lines, and drain lines will be performed.

Title of Test No. W11.1
Reactor Vessel Head Vent System (RVHVS)

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to demonstrate the operability of the RVHVS by:

1. Verifying system flow path.
2. Verifying proper operation of the remote controlled solenoid operated valves.
3. Verifying proper operation of the temperature channel alarm function.

Flow to the pressurizer relief tank (PRT) and operation of associated valves will be verified using air or nitorgen at system pressure (2485 psig). Verification of flow to the PRT and operation of the temperature alarm will be performed (at normal system operating temperature and pressure) in conjunction with RCS Hot Functional Test W-1.2. Acceptance criteria for the RVHVS test are:

1. Flow to the PRT has been verified via both flow.
2. All solenoid operated valves will open and close against system pressure.
3. Activation of the temperature alarm has been verified.

In agreement except flow verification testing will be performed at normal RCS temperature and pressure using reactor coolant (not air or nitrogen).

Title of Test No. W11.2
Reactor Vessel Level Instrumentation System

Test Objectives
Summary of Testing
and Acceptance Criteria

The purpose of this test is to verify proper installation, calibration, and scaling of the Reactor Vessel Level Instrumentation System (RVLIS).

The test will consist of verification of:

1. All hydraulic isolator overrange alarms.
2. Proper curve fitting on all electronic function generators and proper operation of all signal conditioning electronics.
3. Proper calculation of the vessel level from a simulated variable differential pressure across portions of the reactor vessel.
4. Proper level indication under dynamic RCS conditions from cold shutdown to hot stand-by.

The acceptance criteria are:

1. Each hydraulic isolator overrange alarm actuates within 2 percent of full scale of the desired setpoint.
2. All electronic function generators and electronic signal conditioning cards produce an output versus a simulated or actual input which is consistent with the scaling procedures provided by Westinghouse Electric Corporation in the RVLIS Manual.

Testing will be completed after fuel loading and is excluded by CAP Exhibit A Section II.B.

Title of Test No. W11.2
Reactor Vessel Level Instrumentation System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

3. The RVLIS outputs versus a simulated differential pressure input signal are consistent with the scaling procedures provided in the RVLIS Manual.
4. The Narrow Range and Upper Plenum indicators should read their full values for all RCS conditions with no Reactor Coolant Pumps running and the vessel is full. With any Reactor Coolant Pumps running the Narrow Range indicators will read offscale high. The Upper Plenum indicators should read offscale low if a Reactor Coolant Pump is running in a loop with a differential pressure connection on the hotleg.

   The Wide Range indicators readings will vary depending on the combination of Reactor Coolant Pumps running, but with the RCS at hot stand-by conditions the wide range indicators must read 100 percent plus or minus 1 percent.

Title of Test No. W1.1
Heatup for Hot Functional Test

Test Objectives
Summary of Testing
and Acceptance Criteria

Test W.1.1 will be accomplished in two parts. The first part will address initial operability of RCS components and instrumentation and will be performed prior to initial RCS heatup. The second part will serve as a coordinating document for all test activities to be performed during the RCS heatup portion of hot functional testing (HFT). Additionally, the second part will include specific test requirements associated with the RCS and HFT. The objective of the first part is to perform control and logic verification of those portions of the RCS which have not been addressed in other tests. The test will address:

A. All manual and automatic logic associated with the reactor coolant pumps, the RCP oil lift pumps, RCS valves (pressurizer relief, pressurizer block, pressurizer spray, and reactor vessel flange leakoff valves), and the pressurizer backup and control heater breakers. The test will verify breaker operation, valve travel, unit switch operation, lights at handswitches, alarms, etc.;	A. In agreement except local (B) handswitches will not be tested. These switches do not meet the criteria for testing defined in the CAP sections 4.1.1, 4.1.2 or 4.1.3. They are mainly used for operator convenience during local operations.
B. Instrumentation loop checks, of RCS pressure, level, temperature loops and RCS overpressure mitigating system using simulated conditions (note that each instrument loop will be tested by inducing test signals downstream of the primary transmitter, varying the signal over the range of the	B. In agreement. Complete loops will be calibrated including primary sensors in accordance with existing plant instructions.

Title of Test No. W1.1
Heatup for Hot Functional Test

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

	instrument, and verifying that all interlocks, alarms, annunciators, and bistables associated with that loop operate at the proper current (the primary transmitters are not tested here but are addressed in W1.2).	
C.	Proper operation of pressurizer heater breaker and RCP breaker protection circuitry and their associated alarms (e.g., overcurrent, undercurrent, undervoltage, underfrequency, etc., as applicable). Acceptance criteria for these tests will be determined from the specific logic and current scaling calculations associated with each component or instrument loop. All items must operate in accordance with the design logic from both the main control room and auxiliary (remote) control locations.	C. In agreement except for breaker protection circuitry which is excluded by CAP Exhibit A Section III A.1.c.

Title of Test No. W1.1
Heatup for Hot Functional Test

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

The second part serves as a coordinating document for those tests to be performed during RCS heatup to normal operating temperature and pressure. In general, the test will include water solid operation, establishment of a pressurizer steam bubble, heatup of the RCS in 100°F increments (to allow evaluation of thermal expansion) using reactor coolant pump heat, and establishment of no load operating conditions. Below 350°F temperature will be controlled by the RHR system. Above 350°F, the atmospheric or condenser dump valves will be used.

Specific test objectives to be addressed in the second part (and their associated acceptance criteria) are:

A. Prior to establishment of a pressurizer bubble, verify water solid pressure control capability (for both a 100 psi step increase and decrease in pressure control setpoint, system pressure response must be stable (i.e., convergent) with a setpoint overshoot of less than 10 percent);	A. In agreement except letdown pressure control will be established and control capability verified in accordance with operating procedures.
B. Verify acceptability of applicable general and system operating instructions (RCS brought from cold shutdown to no load operating temperature and pressure);	B. In agreement.
C. Verify proper operation of RCS and reverse rotation devices (visually verify pumps do not reverse direction after pump trip);	C. In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W1.1
Heatup for Hot Functional Test

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

D. Observe RCS piping to determine if unacceptable steady state of transient vibration (during RCP stops/starts) occurs (observation and determination of acceptability to be performed by trained TVA vibrations personnel);	D. In agreement.
E. Measure vibration of RCPs and balance as necessary (shaft vibration below coupling must be less than 15 mils at pump running speed, motor vibration at bearings must be less than 3 mils at running speed);	E. In agreement. Vibration acceptance criteria will be in accordance with existing plant instructions.
F. Monitor reactor vessel flange leakoff (no detectable leakage);	F. In agreement.
H. Verify ability to maintain RCS water chemistry with specifications (chemistry checks during heatup in accordance with system operating instructions).	H. Chemistry control will be established and RCS water chemistry will be maintained, however, this is not included in the prestart program.

Reactor Coolant System - System 68

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W1.2
Hot Functional Testing

Test Objectives
Summary of Testing
and Acceptance Criteria

W1.2 will serve as a coordinating document for all test activities to be performed during the "at temperature" portion of Hot Functional Testing (HFT). Additionally, specific test requirements associated with RCS components and HFT will be addressed. These specific test objectives (and their associated acceptance criteria) are:

A. Verify proper operation of the Pressurizer Pressure Control System. (All pressure settings specified in Table 5.2-7 will be verified with the exception of the hydrostatic test pressure, design pressure safety valve settings, and spray valve full open position. The spray valve full open position was verified in W1.1 and will not be verified in W1.2. All the instrument loop calibration and setpoints for the Pressurizer Pressure Control System were checked in W1.1. In W1.2 the control function setpoints will be checked to the accuracy possible using installed instrumentation and reactor protection setpoints will be checked to the accuracy possible using the installed RCS pressure dead weight tester.)	A. Proper operation of the pressurizer pressure control system will be verified by dynamic testing. Setpoints will be verified during calibration using plant instructions.

Title of Test No. W1.2
Hot Functional Testing

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

B. Verify proper operation of the Pressurizer Level Control System. (The following level control functions will be verified: (1) backup heater groups energized at +5% level deviation, (2) positive displacement charging pump speed control responses to level errors, (3) centrifical charging pump flow control valve response to level errors, (4) low level isolation of CVCS letdown valves and protective interlocks to the pressurizer heater at 17%, and (5) high level reactor trip at 92%. All the instrument loop calibration and setpoints for the Pressurizer Level Control System were checked in W1.1. In W1.2 the control function setpoints will be checked to the accuracy possible using the installed instrumentation and the reactor protection setpoints will be verified to the accuracy possible by measuring the level transmitters output. The level transmitters will be checked at the 0% level and 100% level points by monitoring the level changes as the actual pressurizer level is raised and lowered to these points.)	B. Proper operation of the pressurizer level control system will be verified by dynamic testing. Setpoints will be verified during calibration using plant instructions.
C. Measure the response time of the pressurizer relief valves. (The stroke time must be less than or equal to 2.0 seconds).	C. In agreement. Response time will be verified to scoping document requirements.

Title of Test No. W1.2
Hot Functional Testing

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

D. Verify the setpoints of the pressurizer and main steam safety valves. (The setpoints must be within the limits of Table 5.2-7 and Section 10.3.2.1, respectively. Note that these valves may be bench tested prior to HFT in accordance with ISI requirements instead of testing in place.)	D. In agreement. Setpoints will be verified using existing plant instructions.
E. In accordance with the emergency operating instructions, demonstrate the capability to control the RCS at hot standby conditions from the Auxiliary Control Station. (Process control will be transferred from the Main Control Room to the Auxiliary Control Station maintained at hot standby conditions for at least one hour, and then transferred back to the Main Control Room.)	E. In agreement. Time of control from the Auxiliary Control Station will be as specified in the scoping document.
F. Verify proper operation of the primary temperature, level, and pressure transmitters. (The temperature elements are checked for agreement in W9.2. The level transmitters on the pressurizer and steam generators must correctly indicate the 0% and 100% level and agree within their accuracy for intermediate levels. The pressure transmitters are checked with the dead weight tester and must agree within their accuracy at all times.)	F. Proper operation of transmitters will be verified during loop calibrations and by comparison between redundant channels.

Title of Test No. W1.2
Hot Functional Testing

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

G. Verify proper operation of the RCS low flow reactor trip. (The low flow bistables must trip when the pump in the respective loop is deenergized.)	G. Proper operation of the low flow reactor trips will be verified during calibration using plant instructions.
H. Verify proper operation of the steam generator narrow range setpoints. (The following setpoints will be verified: (1) SG high-low level deviation alarms at ± 5% reference level, (2) high-high level turbine trip at 82.4% (3) low level setpoint at 12%, and (4) low-low level reactor trip at 12%. The reactor protection setpoints will be verified to the accuracy possible by measuring the level transmitter output. The level transmitters are checked for proper readings at 0% and 100% of range.)	H. Proper operation of the S/G NR setpoints will be verified during calibration using plant instructions. Proper readings will be verified by comparisons between redundant channels.
I. Verify the capability of the Containment Ventilation Systems to maintain containment air temperatures within the limits of the weighted average air temperatures (± 20°F for upper containment and ± 30°F for lower containment.)	I. In agreement. Capability will be verified to the temperature limits specified in the scoping document.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W1.3
Cooldown from Hot Functional Testing

Test Objectives
Summary of Testing
and Acceptance Criteria

The test verifies the proper operation of all systems and instrumentation required for cooldown of the RCS from the hot standby conditions to the depressurized condition at 140°F. The setpoint pressure of the main steam dump valves is slowly reduced. Temperature drop limitations will be observed. When the RCS pressure is below 450 psig and the temperature below 350°F, the RHR System will be initiated for cooling in addition to steam dump and the pressurizer steam bubble will be collapsed. Steam stop valves are closed when condensor vacuum can no longer be maintained. RHR cooling continues with steam generator wet layup at 210°F until temperature reaches 150°F when the remaining RC pump is stopped. Cooling continues to 140°F and 50 pisg and the system is drained to the refueling level.

The ability to lower the concentration of hydrogen in the RCS to 500/kg (STP) or below will be demonstrated by verifying the ability to perform the operating procedure for purging the volume control tank. The RCS and associated piping vibration will be observed to be within acceptable limits (specified in Displacement Criteria for WB-DC-40-31.16).

The test will be considered to be acceptable if all cooldown procedures are verified workable and the plant is taken from a hot shutdown to a cold shutdown condition with acceptable pipe vibration.

In agreement. Cooldown will be in accordance with operations procedures.

Title of Test No. W1.4
Pressurizer Relief Tank

Test Objectives Summary of Testing and Acceptance Criteria	
The test verifies the appropriate flow rates and the indicating and control capabilities of the PRT services. The vent header valve will be tested for automatic actuation and the valve position indicator lights checked for proper operation. Liquid level and gas pressure alarm setpoints and cooling spray flow rate will be checked (specified in the "Precautions, Limitations, and Setpoints for the Westinghouse NSSS"). Capabilities of the nitrogen pressure regulators to maintain blanket gas pressure and downstream pressure to the gas analyzer will be demonstrated.	In agreement. Flow rate will be checked to the value specified in the scoping document.

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. W1.5
Pressurizer Spray and Heater Capability and Continuous Spray Flow Setting

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates the capability of Heater the pressurizer heaters and spray.

After fuel load test excluded from the Prestart Test Program.

Specifically the test includes:

1. To establish the proper pressurizer continuous spray bypass flow rate;
2. To verify the normal pressurizer spray effectiveness,
3. To verify the pressurizer heater effectiveness, and
4. To establish the setpoint for the spray line low temperature alarm.

The bypass flow rate is established so that:

1. The spray line temperature is never more than 200°F cooler than pressurizer water, and
2. The line temperature is high enough to prevent actuation of the line low-temperature alarm.

The bypass valves are adjusted open with temperature data taken at 10 minute intervals until equilibrium and repeated until the minimum bypass flow is determined. The pressurizer spray effectiveness test consists of a transient initiated by full spray to reduce pressurizer pressure to 2000 psig during which data is continuously recorded. The heater effectiveness test is a similar transient with the relief valve manually closed and the heaters fully

Title of Test No. W1.5
Pressurizer Spray and Capability and Continuous Spray Flow Setting

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

energized to increase the pressure to 2300 psig. The tolerance on the response times is verified to be within specified limits ("Precautions, Limitations, and Setpoints for the Westinghouse NSSS").

Title of Test No. W1.6
RCS Flow Measurement

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to obtain all necessary data for calculation of RCS flowrates by use of loop elbow tap DP and a data reduction procedure. Each of the four RCS loops will be specially instrumented and data will be taken with each pump running. Acceptance criteria is that prior to exceeding 75% power, the RCS flow rate determined from calorimetric data must be equal to or greater than 395,850 gpm. This value is the thermal design value with an allowance for measurement error of 1.50%. The 1.50% error allowance assumes no feedwater venturi fouling. If feedwater venturi fouling is known to exist then its effect on the flow measurement must be treated as a non-conservative bias. The RCS flowrate required by the acceptance criteria must then be increased by the amount of error that venturi fouling introduces into the flow measurement.

After fuel load test excluded from the Prestart Test Program as defined in the CAP section 4.

Reactor Coolant System - System 68

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W1.7
RCS Thermal Expansion

Test Objectives Summary of Testing and Acceptance Criteria	
Test objective is to measure the movement of the RCS piping and components due to thermal expansion, to verify that no interferences occur, and to determine whether all components return to their original positions on cooling. Measurements are made at ambient temperature, at 250, 350, 450, 557°F, and after cooldown in coordination with other hot functional tests. These measurements are conveniently made at the steady state temperature instrumentation, cross calibration and are normally made to the nearest 1/32-inch except for critical locations. All piping will be observed for possible unanticipated interferences. Load and movements for snubbers, spring hangers, constant supports, and pipe rupture restraints will be measured, inspected, and evaluated against piping analysis values (Postulated Pipe Failures, CEB-77-39). All reactor coolant and associated system components and supports will be shimmed to applicable specifications.	In agreement. Measurement temperature plateaus and measurement tolerance will be as specified in the scoping document.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W1.8
Reactor Coolant Flow Coastdown

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objectives are to measure the rate at which reactor coolant flow rate changes subsequent to all reactor coolant pumps trip and to measure the delay times associated with the loss of flow accident. Measurements are made by tripping all coolant pumps and recording coolant loop d/p, coolant pump breaker position, SSPS input bistable voltage and reactor trip breaker position. Acceptance criteria for test are as follows:

1. RCP breakers opening time for 4 out of 4 flow coastdown case is less than or equal to 100 ms.
2. Normalized core coastdown flow for all cases of flow coastdown tested exceed core coastdown flow values assumed by WBN FSAR for the first 10 seconds of flow coastdown.
3. The measured Low Flow Trip Time Delay is less than 1.0 second for the time the flow reaches the low flow trip setpoint until the rods are free to fall.

After fuel load test excluded from the Prestart Test Program as defined in CAP section 4.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W1.9
RTD Bypass Loop Flow Verification

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objectives for each RTD bypass loop are to (1) determine the flow rate necessary to meet the design values of reactor coolant transport time (time from RC loop to last RTD well), (2) measure the actual flow rate, (3) verify the low flow alarm setpoint and reset points. Acceptance criteria shall require alarm actuation at 90 ± 2% of total bypass flow, significant flow anomolies between loops, and overall RTD response times conservative with respect to the value specified in the plant safety analysis.

Procedure is now obsolete. RTD bypass piping has been eliminated.

Reactor Coolant System - System 68

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W1.10
RCS Post Hot Functional, Inspection, Cleaning,and Testing

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objectives are to ensure that:

1. The RCS, including the reactor vessel internals and other components, are properly cleaned after hot functional testing.
2. To ensure all core loading prerequisites and periodic checkoff lists are completed and signed off.
3. The baseline inservice inspections are complete and acceptable prior to fuel loading.

The RCS will be drained and the head, upper internals, and core barrel removed to their storage places. All internal clad surfaces will be inspected and surfaces will be flushed with high-purity water. Any residue will be analyzed. All components will be inspected and reassembled and the vessel will be filled and ultrasonically tested. Performance of all other examinations required to provide preservice inspection baseline data will be accomplished. All prerequisites outlined in the initial core loading procedure will be verified.

In agreement.

Reactor Coolant System - System 68

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-50
Reactor Pressure Boundary (RCPB) Leakage Detection System

Test Objectives
Summary of Testing
and Acceptance Criteria

The following equipment will be tested to demonstrate adequate RCPB leakage detection capability:

1. Verify calibration and sensitivity of the humidity monitor and its proper annunciation and recording in the main control room.
2. Verify proper calibration and main control room annunciation of the reactor vessel flange leakoff.
3. Verify proper operation and main control room annunciation of an abnormal rate of rise in the containment floor and equipment drain sump.

The remaining equipment used in RCPB leakage detection will be tested during the Process Radiation Monitoring, CVCS, and Liquid Waste Drains, Collection and Transfer Facilities tests.

In agreement. Proper operation and alarm setpoints will be verified using plant calibration procedures.

Containment Spray System - System 72

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W10.7A
Containment Spray System
(Air flow test)

Test Objectives
Summary of Testing
and Acceptance Criteria

This test demonstrates the operability of the containment spray system and verifies that the system will perform its design functions as described in FSAR Section 6.2.2. Specifically, the test includes the following.

The containment spray headers and the RHR spray headers will be tested with air flow through each spray nozzle to ensure that nozzles are not plugged. Satisfactory completion of the above statement denotes acceptance.

In agreement.

Containment Spray System - System 72

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W10.7B
Containment Spray System

Test Objectives
Summary of Testing
and Acceptance Criteria

This test demonstreates the performance under cold plant conditions by pumping water from the refueling water storage tank through the containment spray heat exchangers and the containment spray test line and individual minimum flow pump recirculation lines. Performance of the spray pumps will be verified. System controls and alarms will be verified at the main control room panels and auxiliary control stations. Spray pump suction valve interlock will be verified.

Satisfactory completion of the above statements denotes the acceptance.

In agreement except in general local (B) handswitches will not be tested. These switches do not meet the criteria for test as defined in the Prestart Corrective Action Plan Sections 4.1.1, 4.1.2, or 4.1.3. They are mainly used for operator convenience during local operations.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W4.1
Residual Heat Removal System

Test Objectives
Summary of Testing
and Acceptance Criteria

The test objectives are:

1. To verify the logic, controls, and interlocks associated with the motor operated valves, air operated valves, and pumps in the RHR system.	1. In agreement except in general local (B) handswitches will not be tested. These switches do not meet the criteria for test as defined in the Prestart Corrective Action Plan sections 4.1.1, 4.1.2, or 4.1.3. They are mainly used for operator convenience during local operations.
2. To verify the annunciators associated with RHR system components and RHR system operation.	2. In agreement.
3. To demonstrate RHR system performance during minimum flow recirculation with RHR system isolated.	3. In agreement.
4. To demonstrate RHR system performance during reactor shutdown (Cold Conditions).	4. In agreement.
5. To demonstrate RHR system performance during heatup of the Reactor Coolant System (RCS) with letdown from the RCS through the RHR and Chemical And Volume Control (CVCS) Systems.	5. In agreement.
6. To demonstrate RHR system performance during RCS cooldown from hot functional testing.	6. In agreement.

Residual Heat Removal System - System 74

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W4.1
Residual Heat Removal System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

7. To determine RHR heat exchanger heat transfer characteristics.	7. In agreement.
8. To demonstrate RHR system performance in transferring water between the refueling cavity and the refueling water storage tank (RWST).	8. An exception to this testing is taken in the Prestart Test Program. The Prestart Test Corrective Action Plan Revision 2, Exhibit A, "Regulatory Guide 1.68 (November 1973) Clarifications and Exclusions," item II.A.10.c, "Operability and Leak Tests of Sectionalizing Devices in Fuel Storage Pool and Refueling Canal," states that "since it is impractical to remove the new fuel presently stored in the spent fuel pit, introduction of water must be avoided." Flooding the refueling cavity increases the chances of introducing water to the spent fuel pit. This testing was successfully performed in the Preoperational Test Program and no modifications have been made which would require a retest.

Residual Heat Removal System - System 74

FSAR Chapter 14 Associated Tests | Prestart Test Program

Title of Test No. W4.1
Residual Heat Removal System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

The acceptance criteria for the various test objectives are as follows:

1. Valve interlocks and trips should function as specified on applicable TVA documents and Westinghouse documents "RHR System Description" and "Precautions Limitations and Setpoints for the Westinghouse NSSS;"

2. RHR system performance in the recirculation mode will be acceptable if the as measured parameters equal or exceed those specified in the RHR pump manual and the RHR system description;

3. RHRS performance in the refueling water transfer mode will be acceptable if water indeed can be circulated to the refueling cavity from the refueling water storage tank and vice versa;

4. RHRS RCS temperature, pressure, and chemistry control capabilities will be acceptable if these parameters are maintained within those specified in the "Chemical and Volume Control System Description," W operating instruction 0-1 "Plant Startup from Cold Conditions to Minimum Load," and W operation instruction 0-2 "Plant Shutdown from Hot Shutdown to Cold Condition."

Title of Test No. W4.1
Residual Heat Removal System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

5. RHR heat exchanger heat removal capability will be acceptable if the calculated heat removal capability equals or exceeds the heat removal capability specified in the RHRS description.

Note: The ECCS function of the RHRS will be tested in W3.1E.

Waste Disposal System - System 77

FSAR Chapter 14 Associated Tests	Prestart Test Program
Title of Test No. W10.5 **Solid Waste Processing System**	
Test Objectives Summary of Testing and Acceptance Criteria	
Test objective is to demonstrate the capability to transfer radioactive waste material to the interface with the Mobile Solidification Unit (MSU). The heat tracing on the appropriate concentrate lines is checked, and the necessary valving arrangement for each station will be established and tested utilizing non-radioactive liquid. Effluent paths from the chemical drain tank, the Condensate Demineralizer Waste Evaporator, and the spent resin storage tank to the MSU interface will be checked for flow path verification and automatic dispensing valve operation. The compressible waste operation will be demonstrated by filling drums. All handling components will be fully tested by operation.	In agreement except the compressible waste operation will not be tested in Prestart Test Program. Extensive modifications to this system are not scheduled to be completed until after fuel load.

Waste Disposal System - System 77

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W10.6
Gaseous Waste Processing System

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to demonstrate that the Gaseous Waste System can safely and relibably store and dispose of the gaseous effluents from the plant and transfer gaseous inventory as needed to other components. Nitrogen gas or control air will be used to pressurize the gas decay tanks for supply of cover gas to the CVCS holdup tank.

One waste gas compressor package will take suction from the holdup tank vent header and discharge to the other gas decay tanks. The operational mode will be to pressurize a CVCS holdup tank with air which will then be used to supply the vent header during the test. The venting process through the shield building ventilation exhaust demonstrated. Proper functioning of all instrumentation and controls will be verified. The above process will continue until all gas decay tanks and both gas compressor packages are demonstrated. Automatic setpoints and alarms will be checked. Piping and mechanical components of the system will be observed for excessive vibration.

In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W10.3
Liquid Waste Receipt and Storage

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates the capability of the WDS to receive liquid wastes and to transfer them to storage and/or disposal points. The tanks involved are the reactor coolant drain tank, chemical drain tank, laundry and hot shower drain tank. Alarm setpoints for the reactor coolant drain tank, chemical drain tank, laundry and hot shower drain tanks and high level for the tritiated drain collector tank will be verified. Proper response of pump control and interlock setpoints will be verified for the reactor Drain Pumps, Chemical Drain Pump and Laundry and hot shower tank pump. Setpoints are specified in the Westinghouse Precaustions, Limitations and Setpoints for NSSS. Flow performance of these pumps will be verified to be not less than 95 percent of values indicated by manufacturer's pump performance curve. The nitrogen supplies to the RCDT will be demonstrated to maintain tank pressure of 1.3 ± 0.1 psig. Various flow rates will be determined from tank inventory changes over time for a comparison of actual pump performance to manufacturer's data. Automatic starting and stopping of the pumps will be tested and all related interlocks to tank levels will be verified.

In agreement. Setpoints and pump performance will be verified to meet scoping document requirements. In addition the operation of the mobile waste demineralizer will be verified. This will include pumps, valves, instrumentation, and effluent flow.

Waste Disposal System - System 77

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W10.4
Liquid Waste Processing System

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify the operability of all liquid waste processing components, instrumentation and control equipment, and alarms and setpoints.

Components to be tested include the tritiated drain collector tank, floor drain collector tank, waste condensate tanks cask decontamination collector tank, and their associated pumps, valves and piping flow paths will be tested with flow rates, pressure drops, and level alarms checked. Recirculation capability and component isolation will be tested and automatic control points checked. Test results will be checked against specification requirements in the FSAR section 11.2.1. Satisfactory completion of the above statements denotes acceptance.

In agreement.

Waste Disposal System - System 77

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-34
Nitrogen Supply System

Test Objectives Summary of Testing and Acceptance Criteria	
This test will verify the operability of the Nitrogen System and its components. Capability of the high-pressure section of the system to supply Nitrogen at 416 ± 5% psig to the accumulators will be verified. The low-pressure section will be tested for automatic switching capability upon low-pressure signals and the capability to supply Nitrogen at 90 ± 2 psig to served component will be demonstrated. All applicable alarms and setpoints will be verified.	In agreement. Nitrogen supply capability will be verified to scoping document requirements.

Waste Disposal System - System 77

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-44A
Liquid Waste Drains, Collection and Transfer Facilities

Test Objectives Summary of Testing and Acceptance Criteria	
The test demonstrates that the auxiliary building, additional equipment building, and reactor building floor equipment drains are clear and capable of draining a minimum flow of 15 gpm for approximately 4 minutes passing a total of 50-60 gallons of water. Each drain will be visually inspected and any trash or solid waste material removed. Any convenient source of clean water will be used to deliver water to drains at a minimum of 15 gpm. Drain flow rates will be measured and visually observed if possible. Setpoints for sump level alarms and pump actuation will be checked by filling and draining the sumps.	In agreement. Drain flows will be verified to scoping document requirements.

Waste Disposal System - System 77

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-44B
Station Drainage Water Detection System

Test Objectives
Summary of Testing
and Acceptance Criteria

Verify that the leakage detectors actuate level and annunciate in the main control room. System performance will be deemed acceptable if the leakage detectors actuate within 1/2-inch of those specified levels, energized corresponding indicator lights on local detector panel, and energize an annunciator in the main control room.

All level detectors are considered part of system 40 (Station Drainage System) which is excluded from the Prestart Program by CAP Exhibit A. Section I.

Waste Disposal System - System 77

FSAR Chapter 14 Associated Tests | Prestart Test Program

Title of Test No. TVA-53
Equipment for Replacement of Radwaste Filter Elements

Test Objectives
Summary of Testing
and Acceptance Criteria

This test will demonstrate the adequacy of the equipment and verify the procedures used for filter cartridge changeout. Adequacy of equipment and procedure verification will be deemed acceptable if all filters can be removed and handled in a safe and timely manner.

Previous testing adequately demonstrated that all filters can be removed and handled in a safe and timely manner. Since neither the filters or the equipment has been modified, the testing remains valid and will not be repeated.

Spent Fuel Pit Cooling System - System 78

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W10.1A
Spent Fuel Pit Leak Test

Test Objectives
Summary of Testing
and Acceptance Criteria

The spent fuel storage pit, transfer canal, cask loading area, transfer canal gate, and cask loading area gate will be checked for leak tightness by filling the spent fuel pit, cask loading area, and transfer canal with near ambient temperature demineralized water for at least 24 hours and looking for flow at leakage drains. The following acceptance criteria will be met:

1. There will be no leakage of air pressure from the transfer canal gate seal.
2. There will be no leakage of air pressure from the cast loading area gate seal.
3. There will be no leakage past the spent fuel pit to transfer canal gate.
4. There will be no leakage past the spent fuel pit to cask loading area gate.
5. There will be no leakage through the spent fuel pit liner.
6. There will be no leakage through the cask loading area liner.
7. There will be no leakage through the transfer canal liner.

Excluded by CAP Exhibit A Section II.A.10.

Spent Fuel Pit Cooling System - System 78

FSAR Chapter 14 Associated Tests	Prestart Test Program

Title of Test No. W10.1B
Spent Fuel Pit Cooling System

Test Objectives
Summary of Testing
and Acceptance Criteria

The test objectives are:

1. To demonstrate filling and emptying the spent fuel pit (SFP), transfer canal, and fuel-cask loading area using refueling water storage tank (RWST).	1. Excluded by CAP Exhibit A Section II.A.10.
2. To demonstrate operation of the skimmer loop.	2. Excluded by CAP Exhibit A Section II.A.10.
3. To demonstrate the dewatering of the transfer canal and part of the spent fuel pit and cask loading area.	3. Excluded by CAP Exhibit A Section II.A.10..
4. To demonstrate circulation through the SFP demineralizers and heat exchanger loops.	4. Heat exchanger loop excluded by CAP Exhibit A Section II.A.10..
5. To demonstrate recirculation capabilities of refueling water in the RWST using the refueling water purification pumps.	5. In agreement.
6. Test the operability and setpoints for the SFP level and temperature alarms.	6. In agreement.
7. Observe and measure pump and piping vibration levels during the various operational tests.	7. In agreement for those tests actually performed.
8. Observe the SFP to determine if vortexing occurs during the various	8. Excluded by CAP Exhibit A Section II.A.10.
9. Test the SFP pumps to verify they provide adequate flow during various operational modes.	9. Excluded by CAP Exhibit A Section II.A.10.
10. Test the SFP skimmer pumps for adequate flow.	10. Excluded by CAP Exhibit A Section II.A.10.

Title of Test No. W10.1B
Spent Fuel Pit Cooling System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

The test will be conducted in accordance with WBNP System Operating Instructions SOI-78.1. The testing will demonstrate the operability of the Spent Fuel Pool Cooling System during various operational modes. The test will also simulate various abnormal conditions to ensure the instrument alarms actuate properly. The test will verify design basis information contained in WBNP FSAR subsection 9.1.3.

The test acceptance criteria are:

1. The SFP, transfer canal, and fuel-cask loading area are filled.
2. The skimmer loop operated satisfactorily.
3. The SFP, transfer canal, and fuel-cask loading area were dewatered as required.
4. There was adequate circulation through the SFP demineralizers and heat exchanger loops.
5. The recirculation capability of the refueling water in the RWST was satisfactory.
6. The setpoints operated and alarmed satisfactorily.
7. The pump and piping vibration levels are satisfactory.
8. No vortexing occurs in the SFP.
9. The SFP pumps matched their test performance curves and provided adequate flow to the various users.
10. The SFP skimmer pumps matched their test performance curves and provided adequate flow.

Spent Fuel Pit Cooling System - System 78

FSAR Chapter 14 Associated Tests	Prestart Test Program

Title of Test No. W10.1C
Spent Fuel Pool Cooling System
(Open Core Cooling)

Test Objectives
Summary of Testing
and Acceptance Criteria

The test objectives are:

1. Test the reactor refueling cavity for leakage.	1. Leak testing will not be repeated in accordance with CAP Exhibit A, Section III.A.1.c. Additionally, this test was performed successfully during the Preoperational Test Program and no modifications have been made which would invalidate the test.
2. Test the ability to align the spent fuel pit pumps to the Residual Heat Removal System for open core cooling.	2. In agreement. (Refer to System 84 comparison.)
3. Test the purification of the reactor refueling cavity.	3. In agreement.
4. Test the dewatering of the reactor refueling cavity.	4. In agreement.
5. Observe and measure piping vibration during purification and dewatering activities.	5. In agreement.

The test will be conducted in accordance with WBNP System Operating Instructions SOI-78.1 and Probable Maximum Flood AOI-7. The testing will demonstrate the operability of the Spent Fuel Pool Cooling System during various operational modes. The test will verify various design basis information contained in WBNP FSAR subsection 9.1.3.

Title of Test No. W10.1C
Spent Fuel Pool Cooling System
(Open Core Cooling)

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

The test acceptance criteria are:

1. The reactor refueling cavity is leak tight for 24 hours.
2. The open core cooling alignment is accomplished in 4-1/2 hours or less.
3. The reactor refueling cavity is purified.
4. The reactor refueling cavity is dewatered.
5. Piping vibration levels are within the acceptable limits.

Fuel Handling and Storage System - System 79

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W6.1
Fuel Handling Tools and Fixtures

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective in to check out the equipment (including the Manipulator Crane, Spent Fuel Pit Bridge, New Fuel Elevator and Fuel Transfer System) to assure that all functions are performed adequately. Each tool and piece of equipment will be utilized and evaluated for smooth and complete actuation and for the adequacy of locating devices guides and chambers. All interlock and safety devices will be tested.	In agreement except for testing the adequacy of locating devices guides and chambers for each tool and piece of equipment. These will be tested as required by the scoping document and Westinghouse Fuel Handling Instruction F-7.

Fuel Handling and Storage System - System 79

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W6.2A
Fuel Transfer System

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates the proper functioning of the Fuel Transfer System, the fuel handling tools, and equipment (including Manipulator Crane and Spent Fuel Pit Bridge). A dummy fuel assembly will be moved from the new fuel storage area to the fuel elevator in the transfer canal and through the Transfer System to the RCC change fixture and then to positions in the reactor core. The reverse of the above will also be followed and the element moved to a storage rack in the spent fuel pit. All operational modes, ranges of travel, limit stops, and interlocks for the system will be tested. The refueling crane and the spent fuel pit bridge will be load tested to 125% of their design loads.

In agreement except the refueling crane and spent fuel pit bridge will not be load tested to 125% of design load. These tests were performed in the Preoperational Test Program. The Prestart Test Program will test to the loads required by SI-9.5 (refueling crane) and MI-79.2 (spent fuel pit bridge).

Fuel Handling and Storage System - System 79

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. W6.2B
Fuel Transfer System

Test Objectives
Summary of Testing
and Acceptance Criteria

Using the dummy fuel assembly provided by Westinghouse, perform a drag test on each cell in the new fuel pit and the spent fuel pit. The acceptable drag force for both insertion and withdrawal of each cell is 50 pounds or less.

Not tested in the Prestart Test Program. These tests were performed as part of the Preoperational Test Program and there were no modifications made since that could have affected testing.

Primary Makeup Water System - System 81

FSAR Chapter 14 Associated Tests	Prestart Test Program
Title of Test No. TVA-46 **Primary Makeup Water System**	
Test Objectives Summary of Testing and Acceptance Criteria	
The test demonstrates the capability of the primary makeup pumps to supply the required makeup water flow to the Primary Makeup Water System. The recirculation line pressure control valve opens when the associated line pressure reaches 100 psig. The adequacy of the distribution piping with respect to vibration is checked.	In agreement. Recirculation valve control will be verified to scoping document requirements.

Standby Diesel Generator System - System 82

FSAR Chapter 14 Associated Tests	**Prestart Test Program**

Title of Test No. TVA-13C
Onsite AC Distribution System
Diesel Generation
Qualification Tests

Test Objectives Summary of Testing and Acceptance Criteria	
Demonstrate full load carrying capability of the diesel generator unit for 24 hours. Confirm the cooling system functions within design limits. Demonstrate proper operation during diesel generator load shedding. Demonstrate functional capability at full-load temperature conditions. Demonstrate the ability to a) synchronize the diesel generator with offsite power while the unit is connected to the emergency load, b) transfer this load to the offsite power, c) isolate the diesel generator unit, and d) restore it to standby status. Perform 23 start and load tests for each diesel generator unit. Acceptance criteria will be that the requirements listed above are met in accordance with Regulatory Guide 1.108, IEEE 308-1977 and per section 8.3.1 of FSAR.	In agreement.

Standby Diesel Generator System - System 82

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA 14E
Diesel Generators and Supporting Auxiliaries (Diesel Generator Functional Tests)

Test Objectives
Summary of Testing
and Acceptance Criteria

Obtain performance parameters for the diesel generators and supporting auxiliaries after field installation. The test should include:

1. D-G control panel dry run functional test.
2. Engine alarm tests.
3. Exciter regulator test.
4. Preheat system test.
5. Manual start and stop test.
6. Manual start and acceleration to rated speed without excessive vibration.
7. Exciter and generator tests at rated speed.
8. 24-hour integrated heat run and fuel consumption test, and
9. Automatic start and acceleration to rated speed and voltage test.

System performance will be deemed acceptable if the diesel generator and supporting auxiliary parameters approach the Bruce GM Diesel factory test data and per section 9.5.8.4 of FSAR. In agreement. In addition it will be verified that the DGs operate without obvious vibration.

Standby Diesel Generator System - System 82

FSAR Chapter 14 Associated Tests | Prestart Test Program

Title of Test No. TVA-73A
Additional Diesel Generator Onsite AC Power Distribution System Test (6.9kV Diesel Generator Board C-S, 480V Diesel Auxiliary Supply Board C-S)

Test Objectives
Summary of Testing
and Acceptance Criteria

The test for the 6.9kV diesel generator board C-S and 480V diesel auxiliary supply board C-S will verify the proper operation of the protective relaying and that the interlocks and transfer schemes perform under manual and automatic conditions. The acceptance criteria will be that the protective relaying and all interlock and transfer schemes operate properly.

In agreement except protective relays will not be tested. They are excluded by CAP Exhibit A Section III.A.1.a.

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. TVA-73C
Additional Diesel Generator Onsite AC Power Distribution System Test (Interface, Qualification)

Test Objectives
Summary of Testing
and Acceptance Criteria

Demonstrate the diesel generator's capability to carry its short time rating for two hours. Immediately following this 2-hour period demonstrate the diesel generator to carry its continuous rating for 22 hours. Demonstrate the proper operation of the diesel generator and its controls during the load shedding of its largest single load and total load. Demonstrate twice the ability of the diesel generator and its controls to accept a load that is 10 percent greater than the most severe single step load without experiencing instability. Perform 23 start and load tests for the diesel generator unit.

The following tests shall be performed with the additional diesel generator as a replacement for each of the trained diesel generators:

Demonstrate that the capability of the additional diesel generator unit is not impaired during periodic testing. All remote control, protective, and annunciation circuits that are used to interface the fifth diesel generator to the onsite ac auxiliary power system shall be demonstrated to be operative. Confirm proper startup operation of the additional diesel generator upon loss of all ac voltage. While performing the loss of all ac voltage starting tests, disconnect all other onsite ac power sources not under test and verify an absence of voltage at

In agreement except that protective circuits will not be tested. Protective circuits are excluded from the test program by the Prestart Corrective Action Plan, Exhibit A Section III.A.1.a.

Also as committed to in FSAR chapter 8 and evaluated in the SER, the 2 hour short time rated load test will be performed immediately following the 22 hour rated load test.

Title of Test No. TVA-73C
Additional Diesel Generator Onsite AC Power Distribution System Test (Interface, Qualification)

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

the other onsite buses. Verify the operability of the safety injection-diesel generator common start circuit. The operability of each of the trained diesel generators in their original positions shall be demonstrated. The acceptance criteria will be that all of the above requirements are met in accordance with the design and regulatory commitments made in section 8.1 of the FSAR.

FSAR Chapter 14 Associated Tests	Prestart Test Program
Title of Test No. TVA-74E **Additional Diesel Generator and Supporting Auxiliaries (Diesel Generator Functional Tests)**	
Test Objectives Summary of Testing and Acceptance Criteria	
1. Preoperational Test Instruction TVA-74E is intended to verify proper functioning of the D.C. control circuitry for Diesel Generator C-S as depicted on TVA drawings 45W760-82-11 thru 16. Remote circuits will be tested by operating the remote control relays using temporary switches from the Additional Diesel Generator Building (ADGB) and verifying that subsequent functions perform as designed. Testing in TVA-73C will complete the remote control verification by proving each set of remote switches will operate their remote control relays.	1. In agreement. Except the prestart test will not use temporary switches at the ADGB prior to verifying proper operation of the remote indication and controls of the replaced diesel generator.
2. All alarm initiating devices for DG C-S will be operated (where practical) or jumpered to verify local annunciation. Additionally, continuity will be verified to the final local terminal block which sends closed contact signals to remote annunciation panels in the Main and Auxiliary Control Rooms. TVA-73C will then jumper these same terminal block terminals (simulating previously proven continuity) and verify that remote annunication is received at the remote panels.	2. In agreement except that all main control room, auxiliary control room, and local annunciation will be verified upon operating or jumpering the initiating device.
3. Operation of the ERCW valves and minimum flow thru each path will be verified in this test. This will be the only interaction with any part of the unit ONE configuration as a result of this test.	3. In agreement. Prestart testing of the C-S diesel generator will be performed with the C-S DG interacting with unit one where applicable.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-74E
Additional Diesel Generator and Supporting Auxiliaries (Diesel Generator Functional Tests)

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

System performance will be deemed acceptable if the diesel generator and supporting auxiliary parameters approach the Vendor factory test data and per section 9.5.8.4 of FSAR.

In addition, it will be verified that the DG operates without obvious undue vibration.

Hydrogen Recombination System - System 83

FSAR Chapter 14 Associated Tests	Prestart Test Program
Title of Test No. TVA-8 **Post LOCA Hydrogen Recombiner Test**	
Test Objectives Summary of Testing and Acceptance Criteria	
Operation of each recombiner at design flow rate and temperature will be demonstrated. Operation of each recombiner through it full range of power inputs will be demonstrated. Testing will include: 1. Preliminary check of temperature readout instruments. 2. Heatup test will consist of operating each recombiner unit for 5 hours at power input of 48 kW. If outlet temperature is not 1225 ± 10°F, the power will be adjusted to bring temperature within this range. Acceptance criteria will be met if final power setting is less than 54 kV with a recombiner outlet temperature of 1225 ± 10°F for containment temperatures above 68°F. 3. An airflow test will be run using special Westinghouse equipment and measuring airflow with a velometer. Acceptance criteria will be met if the average airflow is greater than 100 SCFM.	In agreement. Acceptance criteria will be as specified in the scoping document.

Title of Test No. TVA-51
Flood Protection Provisions

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates that an adequate supply of water (at least 34.2 gph/unit) can be pumped from the auxiliary makeup tank by the auxiliary charging booster pumps through the demineralizer and filter and raised to the required pressure (525 psig) by the auxiliary charging pumps. The test confirms the system's capability of discharging simultaneously to both units at the required flow rate and pressure. The test will be successful when the pressures and flow rates outlined in FSAR Section 9.3.6 have been demonstrated.

A second part of the test will confirm the capability of the open mode of reactor cooling (refer to section 2.4.14.2.2). The open mode flow test of TVA-51 at Sequoyah Nuclear Plant will serve as a prototype for Watts Bar. In order for the Sequoyah test to serve as a prototype, it will be confirmed that the individual Watts Bar features utilized in the open mode meet the requirements for open mode cooling.

A third part of the test will demonstrate the installation of spool pieces and prefabricated jumper cables used for flood protection provisions.

System vibrations will be observed and selected points recorded during the test. An evaluation will be made to determine the acceptability of these vibrations as specified by WB-DC-40-31.16.

In agreement except:

Flow will be verified to unit 1 only.

Open mode cooling will not be tested because water will not be introduced into the fuel canal due to new fuel in the spent fuel pit.

In addition, verification has been previously made to allow Watts Bar to utilize the Sequoyah TVA-51 test as a prototype and no modifications have been made to the affected components or piping that would invalidate the results of this comparison.

Diesel Starting Air System - System 86

FSAR Chapter 14 Associated Tests	**Prestart Test Program**
Title of Test No. TVA-14B **Diesel Generators and Supporting Auxiliaries (Diesel Generator Starting Air System)**	
Test Objectives Summary of Testing and Acceptance Criteria	
This test will demonstrate the ability of the Air Start System controls to maintain the air pressure in the air receiver between 200 psig and 250 psig and 160 psig air to the air start motors through air reducing valves. The test will also demonstrate the proper operation of the Air Start System interlocks and alarms. The ability of the air receivers to provide a sufficient quantity of air to allow five diesel starts will be verified as well as the ability to recharge the receivers from 150 psig to 250 psig within 30 minutes. This test will be divided into four sections; one section per diesel generator unit. Acceptance criteria for system is the ability to perform the above requirements and in accordance with section 9.5.6 of FSAR.	In agreement. Acceptance criteria will be as specified in the scoping document. In addition it will be verified that the system operates without obvious undue vibration.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-74B
Additional Diesel Generator and Supporting Auxiliaries (Diesel Generator Starting Air System)

Test Objectives
Summary of Testing
and Acceptance Criteria

1. To verify the ability of the diesel starting air compressors to maintain air receiver pressure between 200 psig and 240 psig and to annunciate when air pressure in the air receivers or downstream of the pressure reducer decreases below the alarm setpoint.
2. To verify that the diesel generator air start system interlocks operate properly to cycle the engaging air for 3 cycles; then lock out the diesel on a fail to start signal 5 seconds after initiation of start signal.
3. To verify that the air receivers can supply sufficient air to provide five diesel starts without rechanging, then to verify that the air compressor can rechange one air receiver to 240 psig within 30 minutes after the five unsuccessful starts.

Acceptance criteria for system is the ability to perform the above requirements and in accordance with section 9.5.6 of FSAR.

In agreement. Acceptance criteria will be as specified in the scoping document.

In addition it will be verified that the system operates without obvious undue vibration.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-2A
Containment Vessel
Pressure and Leak Test
(Integrated Leakage Rate Test)

Test Objectives
Summary of Testing
and Acceptance Criteria

The test objective is to assure that leakage of the primary containment and associated systems is within the allowable leakage rate limits prior to initial reactor operation as defined by the Plant Technical Specifications and Appendix J to 10 CFR 50. The following tests will be performed:

Type A tests at containment pressure between 15.0 and 16.8 psig will demonstrate that integrated leakage rate satisfies the FSAR acceptance criteria. The pressure test shall be at least 8 hours in duration. Following a type A test, a verification test shall be performed to demonstrate the validity of the measurements. The test shall be deemed acceptable if verification test data demonstrate an agreement within plus or minus 25 percent of the maximum allowable leakage in accordance with Appendix J to 10 CFR 50. The "absolute pressure temperature method" will be used.

In agreement. Test conditions and acceptance criteria will be in accordance with the Surveillance Instruction current at time of test. In addition, a visual inspection of the containment liner will be included to identify any damage which may have occurred from modifications performed since the initial construction of WBN.

Containment Isolation System - System 88

FSAR Chapter 14 Associated Tests | Prestart Test Program

Title of Test No. TVA-2B
Containment Vessel Pressure and Leakage Rate Test (Testable Penetrations)

Test Objectives Summary of Testing and Acceptance Criteria	
Containment integrity will be demonstrated by local types B leak tests of all testable penetrations except personnel access hatches. These tests will be performed before type A tests. Initial test pressure will be between 15.0 and 15.4 psig with containment at atmospheric pressure. The total leakage from all testable leakage paths in TVA-2B, TVA-2C and TVA-3 shall be less than 60 percent L_a. The total leakage subject to bypass leakage requirements in TVA-2B, TVA-2C and TVA-3 shall be less than 25 percent L_2.	In agreement. Test conditions and acceptance criteria will be in accordance with Surveillance Instruction current at time of test.

Containment Isolation System - System 88

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-2C
Primary Containment Isolation Valve Leakage Rate Test

Test Objectives
Summary of Testing
and Acceptance Criteria

Containment integrity will be demonstrated by Appendix J of 10 CFR 50 local types C leak tests on piping system isolation valves which become part of primary boundary under LOCA conditions. These tests will be performed before the Type A test.

Test nitrogen/air pressure will be between 15.0 and 15.4 psig with containment at atmospheric pressure. The main steam lines, main feedwater lines, and auxiliary feedwater lines will not be subjected to the Type C tests.

Sealed system leakage tests will be performed on Containment Spray System with test water pressure greater than 17.0 psig.

The total leakage from all testable leakage paths in TVA-2B, TVA-2C and TVA-3 shall be less than 60 percent L_a.

The total leakage subject to bypass leakage requirements in TVA-2B, TVA-2C, and TVA-3 shall be less than 25 percent L_a.

The leakage subject to solid system leakage requirements shall be less than 60.3 $ft.^3$ per 30 days per leakage path.

In agreement. Test conditions and acceptance criteria will be in accordance with the Surveillance Instruction current at time of test.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-3
Personnel Air Locks

Test Objectives
Summary of Testing
and Acceptance Criteria

This test will demonstrate the functional capability and leaktightness of the personnel airlocks. Specifically, it will be demonstrated that:

1. Communications system from inside the lock to the outside is operable.
2. Mechanical door interlock system functions properly.
3. Mechanical door interlock can be defeated.
4. There is an acceptable airlock leak rate of less than 0.05 L_a (11.83 SCFH for each airlock) when the airlock is pressurized with air to between 15.0 and 15.4 psig.
5. There is an acceptable leak rate of less than 0.01 L_a for each door when the spaces between double O-ring door seals are pressurized with air between 6.0 and 6.4 psig Test for each door-seal volume will continue for a minimum of 15 minutes.

Acceptance criteria are provided in TVA-2A, Containment Vessel Pressure and Leak Test. This test will cover only the operability and leak tightness of the doors and door seals. Leak tightness of any electrical penetrations through the lock will be tested in preoperational test TVA-2B, "Containment Vessel Pressure and Leak Test." Leaktightness of the seal between the lock and the shield building will be tested in preoperational test TVA-1, "Shield Building Inleakage."

In agreement. Test conditions and acceptance criteria will be in accordance with the Surveillance Instruction current at time of test.

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. TVA-41
Containment Isolation System

Test Objectives
Summary of Testing
and Acceptance Criteria

The test verifies capability of the system to isolate the containment upon receipt of actuation signals generated by either the Solid State Protection System or main control room switches.

Specifically, the test includes the following:

1. Manual operation of each containment isolation valve using control room switches. The following will be verified: valve change of position, position light indication, and valve closing time.	1. In agreement except local "B" indicating lights not verified.
2. Simulated output signals from the Solid State Protection System will be used to actuate those containment isolation valves or other valves which function automatically in response to containment isolation phase A, phase B, and containment vent isolation signals. Redundancy will be demonstrated a) by verifying that all containment isolation valves change to the proper position upon receipt of an isolation signal and b) by verifying the independent operation of train "A" and train "B" containment isolation valves. (Note: Equipment actuations verified in the Safety Injection System test need not be retested here).	2. In agreement. Control air redundancy will be verified in system 32 tests.

Containment Isolation System - System 88

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-41
Containment Isolation System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

3. Air-operated containment isolation valves will be demonstrated to change to proper "fail-safe" position upon loss of either control air or electrical power.	3. In agreement. Loss of air fail position will be verified in system 32 tests.
4. Each containment isolation valve that is actuated by a containment isolation signal from the Solid State Protection System remain in the accident position after reset of the initiating signal.	4. In agreement.

Acceptance criteria for the test will be that the system satisfies design functional requirements specified in FSAR Section 6.2.4.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-31A
Process Radiation Monitoring System
(Off-Line Gamma Scintillation Liquid Monitors)

Test Objectives
Summary of Testing
and Acceptance Criteria

All off-line gamma scintillation liquid monitors shall be tested. Response of the monitors to appropriate check sources will be demonstrated and interlock and annunciation functions will be checked and indication on main control room panel O-M-12 will be verified. Flow tests will be conducted to check pump operation, flow indication and control, and proper valve operation.

Acceptance criteria will be that the monitors respond to check sources in accordance with calibration data, sample flow rates meet design requirements, and all annunciations and alarms function properly.

In agreement except:

Some liquid monitors have local indication instead of MCR indication. For these monitors local indication will be verified.

Liquid monitors have no provision for flow control, therefore flow control and valve operation will not be tested.

Pump operation will be tested only where applicable since not all liquid monitors have pumps.

The acceptance criteria for the monitors response to the check source will be as specified in the scoping document.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-31B
Process Radiation Monitoring System
(Off-Line Particulate, Total Gas, and Iodine Monitors)

Test Objectives
Summary of Testing
and Acceptance Criteria

All off-line particulate, total gas, and iodine monitors shall be tested. Response of the monitors to appropriate check sources will be demonstrated and interlock and annunciator functions will be checked and indication on main control room panel O-M-12 will be verified. Flow tests will be conducted to check pump operation, flow indication and control, and proper valve operation.

Acceptance criteria will be that these monitors respond to check sources in accordance with calibration data, sample flow rates meet design requirements, and all annunciations and alarms function properly.

In agreement except the acceptance criteria for the monitors response to the check source will be as specified in the scoping document.

Additionally, the isokenetic sampling systems for the auxiliary building vent monitor and the service building vent monitor will be tested.

Radiation Monitoring System - System 90

FSAR Chapter 14 Associated Tests	Prestart Test Program

Title of Test No. TVA-31C
Process Radiation Monitoring System
(In-Line Gaseous Monitors -Total Gas)

Test Objectives Summary of Testing and Acceptance Criteria	In agreement except:
All inline gaseous (total gas) monitors shall be tested. Response of the monitors to appropriate check sources will be demonstrated and interlock and annunciation functions will be checked and indication on main control room panel O-M-12 will be verified. Flow tests will be conducted to check fan operation, flow indication and control, and proper valve operation.	The inline monitor has no fan, flow control, flow indication, or flow alarm. Therefore, no flow tests will be performed for the in-line monitor.
Acceptance criteria will be that these monitors respond to check sources in accordance with calibration data, sample flow rates meet design requirements, and all annunciations and alarms function properly.	The acceptance criteria for the monitor's response to the check source will be as specified in the scoping document.

Radiation Monitoring System - System 90

FSAR Chapter 14 Associated Tests	**Prestart Test Program**

Title of Test No. TVA-31D
Process Radiation Monitoring System
(Off-Line Gaseous Monitors)

Test Objectives Summary of Testing and Acceptance Criteria	
All monitors shall be tested. Response of the monitors to appropriate check sources will be demonstrated and interlock and annunciation functions will be checked and indication on main control room panel O-M-12 will be verified. Acceptance criteria will be that these monitors respond to check sources in accordance with calibration data, and all annunciations and alarms function properly.	In agreement except: Some off-line gas monitors have local indication instead of MCR indication. For these monitors local indication will be verified. Acceptance criteria for the monitors response to the check source will be as specified in the scoping document. In addition, sample pumps and sample flow indication will be tested.

Radiation Monitoring System - System 90

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-32A
Area Radiation Monitoring System - Area Monitors

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify reliable monitoring by the fixed area radiation and airborne radioactivity monitors for personnel safety. Response to the appropriate check source signals will be verified and the proper initiation of the annunciation functions for high and low trips will be checked. Operation of pumps, indicators, and control valves will be demonstrated for all air particulate monitors. The corrected flow rate through each of these monitors will be shown to be between 9.5 and 10.5 cfm. All malfunction alarms will be checked.

Acceptance criteria will be that the monitors operated as designed, monitors respond to check sources in accordance with calibration data, and that system alarms function properly.

In agreement except:

The required flowrate for the air particulate monitors will be as specified in the scoping document. The monitors will be tested for that flowrate.

The acceptance criteria for the monitors response to the check source will be as specified in the scoping document.

In addition, the portable particulate, iodine, and noble gas monitors which are capable of taking samples from various duct sample stations located throughout the plant will be tested.

Radiation Monitoring System - System 90

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-32B
Area Radiation Monitoring System (Radiation Survey)

Test Objectives
Summary of Testing
and Acceptance Criteria

Laboratory radioactivity counting equipment, portable survey equipment, laundry monitor, portable monitors, and local hand and foot monitors will be tested to demonstrate they function in a manner which ensures accurate and reliable monitoring and personnel safety. The calibration, performance, and functional operation of this equipment shall be verified.

This testing is included in a program administrated by Radiological Control and is excluded from the Prestart Program by the CAP Exhibit A II Section A.12.b.&c.

Radiation Monitoring System - System 90

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-33
Environs Radiation Monitoring System

Test Objectives
Summary of Testing
and Acceptance Criteria

This test will verify and document the capability of the local and perimeter environmental radiation monitors and recorders to perform their design function. Each unit will be tested individually to verify local and control room indication response. All alarms and high and low setpoints will be checked.

The Environs Radiation monitoring System will not be tested under the Prestart Test Program.

The two main control room recorders have been deleted. The Environmental Radiological Monitoring and Instrument Branch is responsible for taking air samples and providing maintenance for these monitors.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-54
Main Control Room Meterological Tower Data

Test Objectives Summary of Testing and Acceptance Criteria	
Verify that the main control room meteorological tower instrumentation track with the meterological tower instrumentation. Instrumentation performance will be deemed acceptable if: 1. The Veritical Temperature Difference (T) Recording System for 10 to 46 meters will be with ± 0.18°F accuracy for the average of the data taken over the full range of the system. 2. The Vertical Temperature Difference (T) Recording System for 10 to 91 meters will be within ± 0.18°F accuracy for the average of the data taken over the full range of the system. 3. The wind speed recording system at 10-meter level will be within ± 0.50 mph accuracy for wind speed ≤15 mph and approximately ± 0.79 mph accuracy for wind speed greater than 15 mph to 50 mph for the average of the data taken. 4. The wind direction recording system at the 10-meter level will be within +3.152° and -4.296° for the average of the data taken over the full range of system and within ± 5° for individual measurements.	In agreement. Control Room instrumentation acceptance criteria will be as specified in the scoping document.

Title of Test No. TVA-54
Main Control Room Meterological Tower Data

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

5. The wind speed recording system at the 46-meter level will be within ± 0.50 mph accuracy for wind speed greater than 15 mph to 50 mph for the average of the data taken.

6. The wind direction recording system at the 46-meter level will be within +3.152° and -4.296° for the average of the data taken over the full range of the system and within ± 5° for individual measurements.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-71
Post Accident Radiation Monitoring System

Test Objectives
Summary of Testing
and Acceptance Criteria

This preoperational test is to verify the operability of the subject radiation monitors.

The following applies to the shield building vent, condenser vacuum pump exhaust and steam generator discharge radiation monitors:

This preoperational test will demonstrate that:

A. Channel radioactivity measurements are available in the mcr and that the interrogative features of each monitor are operational.
B. Monitor check sources are operable.
C. Alarm setpoints may be set with the required accuracy over the monitor range.
D. The high, high-high, and loss of counts (failure) alarms are operational.

Also, the preoperational test will demonstrate that the shield building vent and condenser vacuum pump exhaust monitors flow adjustment and air purging mechanisms are operational.

In addition, the preoperational test will verify that the sample air volume flow rate is automatically adjusted to maintain isokinetic conditions as the air volume flow rate in the effluent duct varies.

All procedures for taking grab samples from the shield building vent monitoring equipment will be tested to verify their adequacy.

In agreement except:

Only the high radiation alarm and the malfunction alarm will be tested; there is no high-high alarm.

The condenser vacuum monitor does not have flow adjustment, automatic purge, or an isokinetic sampling system. Therefore, these features will not be tested.

Neutron Monitoring System - System 92

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W9.1
Nuclear Instrumentation System (NIS)

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify the system performs the required indicating and control functions through the source, intermediate, and power range of operation. All functions will be tested utilizing permanently installed controls and adjustment mechanisms. All operational modes of the source range channels, intermediate range channels, power range channels, comparator and range rate circuits will be tested for the proper functioning of all indicator lights, bistable trips, and alarms. Permissive, control, and protection signals are provided by bistable units in each of the range channels. These bistables are initially set in accordance with the plant set point document using precision calibration instruments. This test confirms proper bistable operation by injecting built-in test signals and recording power level meter values at the trip and reset points for the appropriate channel being tested. Acceptance criteria for these trip points are ± 5% of meter full scale for all source range outputs; ± 1% meter full scale for intermediate range high level reactor trip and high level rod stop; and ± 5% of meter full scale for power range high and low range overpower reactor trips, overpower rod stop, power above P10 permissive, power above P9 permissive, and power above P8 permissive. The test will also verify the source range nuclear instruments response to a neutron source. The test includes the backup source range channel, 1,2-RM-90-210.

In agreement except that Unit 2 backup source range channel 2-RM-90-210 will not be tested. Acceptance criteria for the trip points will be in accordance with plant surveillance instructions.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W9.5
Operational Alignment of Nuclear Instrumentation

Test Objectives
Summary of Testing
and Acceptance Criteria

The objective of the test is to make final adjustments to the source range channels, the intermediate range channels, and the power range channels.

Voltage settings for source range channels are determined prior to core loading. Trip setpoints are established for the intermediate and power range channels prior to power escalation, then adjusted during power escalation. The gain setting for the flux deviation averaging amplifiers is determined prior to criticality then the alarms are checked during power escalation. The amount of overlap between source range and intermediate range channels, and between intermediate and power range channels is determined during power escalation. The power range detector currents vs. core power are determined and the high flux trip setpoint is adjusted during power escalation. Following shutdown from power operations, the source range operating voltages are checked, the intermediate range detectors compensation voltages are set, and the Power Range Test currents for 100 percent indicated power level are obtained.

The Nuclear Instrumentation System has demonstrated the ability to achieve the operational adjustments made during the test and satisfactorily (1 1/2 decade) overlap between source, intermediate, and power ranges.

After-fuel-load test excluded from the Prestart Test Program.

Neutron Monitoring System - System 92

FSAR Chapter 14 Associated Tests | Prestart Test Program

Title of Test No. W9.11
***Axial Flux Difference Instrumentation Calibration**

Test Objectives
Summary of Testing
and Acceptance Criteria

This test is to demonstrate that the response of the incore power range detectors is linear with respect to incore axial power distribution, to calibrate the incore power range detector input to the delta T reactor trip setpoint calculator, and to calibrate the incore power range detector signals to the axial flux difference (delta q) meters, flux recorders, and plant process computer. Satisfactory completion of each of the above steps in accordance with its requirement denotes acceptance.

After-fuel-load test excluded from the Prestart Test Program.

Reactor Protection System - System 99

FSAR Chapter 14 Associated Tests | Prestart Test Program

Title of Test No. W7.1A
Reactor Protection System
Time Response (sensors)

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify the specified response times (as specified in the FSAR Table 7.2-3) to the Reactor Protection System. Simulated sensor input signals will be used to determine response time of protection channel sensor (pressure transmitters, differential pressure transmitters, level transmitters, RTDs). Sensor response times will be with channel response times in test W7.1B to obtain overall channel response times.

In agreement except response times will be verified only for the channels required by Technical Specifications. Response times will be verified to the values specified in the Technical Specifications.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W7.1B
Reactor Protection System
Time Response Measurements

Test Objectives
Summary of Testing
and Acceptance Criteria

Verify that the reactor protection system time responses are less than or equal to the maximum allowed response times in the WBN FSAR. Verify that the ESF actuation time responses are less than or equal to the maximum time used in the WBN FSAR. Verify that the overall ESF (including the actuated equipment) time responses are less than or equal to the maximum time used in the WBN FSAR.

In agreement except response times will be verified only for the channels required by Technical Specifications. Response times will be verified to Technical Specification values.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W7.2
Reactor Protection System
Operational Test

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify the proper functioning of the Reactor Protection System logic. The reactor trip breakers will be shown to open when a manual or automatic trip is initiated. Each reactor trip bypass breaker will be shown to open on a trip signal when the associated reactor trip breaker has been bypassed for periodic testing of the logic system. Annunciator, status lights, and computer functions associated with operation of the Reactor Protection System will be verified. The test includes both analog system tripping and logic train functioning, with and without overriding manual or blocking circuits. The various controllers and/or devices will be placed in the tripped or untripped condition and the apppropriate logic train observed for the expected effect on the reactor trip breakers. The power supplies will be tripped and the effect observed to verify correct assignment of redundant power sources and correct failure mode on loss of power. Instrument channels and logic trains not expected to be effected will also be observed for possible extraneous interactions.

In agreement.

Reactor Protection System - System 99

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W7.3
Safeguards Systems
Operational Test

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify the capability of the Safeguards Sytem controls to actuate all of the required components in response to the proper input signals. Simulated sensor output signals will be used to actuate each Engineered Safety Feature's actuation channel required by the Technical actuation channel required by the Technical Specifications. Each sensor input associated with a given actuation function will be tested. Checks will also be made for spurious effects on extraneous channels and for possible actuation signals resulting from input combinations not intended to cause actuation. Acceptability is determined by proper actuation for a given signal.

In agreement.

Reactor Protection System - System 99

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W7.4
Control System Test for
Runback Operation (NSSS only)

Test Objectives
Summary of Testing
and Acceptance Criteria

The test verifies the proper operation of the Turbine Electrohydraulic Control System in response to turbine runback signals. Test input signals will be actuated from the analog bistables and normal operation of the E-H System will be simulated by installing jumper wiring and a signal generator for turbine speed indication. The overtemperature and overpower trip channels will be actuated to initiate turbine runback. The voltage signal to the servo-valve function generators will be recorded and evaluated to verify proper runback rate. Each governed valve postion from open to closed valve time will also be recorded. Annunciator and indicator will be demonstrated to operate in accordance with design.

In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W7.5
Reactor Plant Systems
Setpoint Verification

Test Objectives
Summary of Testing
and Acceptance Criteria

The objectives of the test are to verify that initial setpoint adjustments have been made prior to plant startup and to specify and maintain records of the setpoints which require readjustment or probable readjustment during subsequent startup and test operations.

Upon completion of all initial setpoint adjustments and just prior to initial startup, verification that each setpoint has been established will be made and the value of each setpoint will be recorded. Setpoint changes performed during startup and testing operations will be recorded.

All final setpoints will be verified and recorded.

After fuel load test excluded from Prestart Program.

Reactor Protection System - System 99

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W8.1
Automatic Reactor Control System

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify the performance of the Automatic Reactor Control System is maintaining reactor coolant average temperature within acceptable steady state limits. Flux, power mismatch, T average, T ref, T error, rod speed demand signal, and pressure signals are continuously recorded. Reactor control will be placed in automatic to verify T average will maintain +1.5°F of Tref. Reactor control is switched to manual and T average will be successively increased and decreased to 6°F higher and 6°F lower than the T ref setpoint and the reactor switched to automatic control. The transient recovery of the system will be observed to within 1°F of T ref. Recorder traces will be labeled with pertinent parameters and retained for documentation.

System performance will be deemed acceptable if 1) no manual intervention is required to stabilize conditions and 2) T average is returned to within ± 1.5°F of T ref.

After fuel load test excluded from Prestart Program.

Reactor Protection System - System 99

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. W8.2
Automatic Steam Generator Level Control

Test Objectives
Summary of Testing
and Acceptance Criteria

Test objective is to verify the stability of the system following simulated transients at low power conditions and to verify the variable speed feature of the main feedwater pumps. Transients are simulated by manipulation of controllers and test input signals. Continuously monitored parameters include steam pressure, steam flow, feedwater flow, SG narrow range level, level controller output, and flow controller output. Each SG level controller will be tested individually and setpoints will all be checked. Feedwater pumps variable flows will be measured and response times will be checked. The test results will be observed to verify the system's ability to properly recover from simulated transients and return to a stable condition. The automatic steam generator level control will be demonstrated to overshoot (undershoot) the level setpoint by less than $\pm$ 4 percent in response to a setpoint or level increase (decrease). The automatic steam generator level control will be demonstrated to return steam generator level to the programmed level setpoint $\pm$ 2 percent within five minutes following a level or setpoint change. The feedwater pump speed control will be demonstrated to keep feedwater pump speed oscillations less than 3 percent of operating speed at steady state. The feedwater pump speed control will be demonstrated to overshoot (undershoot) the pump

After fuel load test excluded from Prestart Program.

Title of Test No. W8.2
Automatic Steam Generator Level Control

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

speed setpoint by less than 1% in response to 5% step speed change at the feedwater pump speed controller. The feedwater pump speed control will be demonstrated to stabilize feedwater pump speed at the new value within two minutes following a pump speed step change. The stability of the system at higher power levels (75 and 100% power) will be demonstrated under actual transient conditions during the performance of scheduled transient tests included in the startup program. These tests will include SD-4.7, Load Swing Tests, SU-4.8, Large Load Reduction Test, and SU-4.9, Plant Trip From 100 Percent Power.

Reactor Protection System - System 99

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. W9.4
Calibration of Steam and Feedwater Flow instrumentation at Power

Test Objectives
Summary of Testing
and Acceptance Criteria

The objective of the test is to calibrate the feedwater flow and steam flow instruments to the feedwater flow as determined by special test instruments.

The feedwater flow, as determined by the special test equipment, is compared to recorded readings from plant instruments indicating steam and feedwater flow in the main control room.

Gain adjustments in the detector output voltage of plant instruments are performed as necessary to obtain best possible fit of plant instrument data to that of the special test instrumentation.

After fuel load test excluded from Prestart Program.

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. W9.6
Operational Alignment of Process Temperature Instrumentation

Test Objectives
Summary of Testing
and Acceptance Criteria

The objective of the test is to align the delta T and T_{avg} process instrumentation under isothermal conditions prior to criticality, at power levels up to approximately 75 percent power and then extrapolate values to 100 percent, and finally at full power.

Prior to initial criticality each delta T channel is aligned to within ± 0.5% accuracy. The resistance/voltage converter (R/E) outputs are aligned to within 0.7°F of the respective equivalent spare resistance temperature detectors (RTD) resistance readings. The T_{avg} voltage/current (E/I) amplifiers are aligned to within 0.5°F of the mathematical average of the R/E outputs.

At approximately 30% and 50% power levels, the R/E outputs are aligned to within 0.7°F of the respective equivalent spare RTD resistance readings. The T_{avg} E/I amplifiers are aligned to within 0.5°F of the mathmatical average of the R/E outputs.

At approximately 75% power level, the 100% power T_{avg} and delta T values are determined by extrapolation. The extrapolated T_{avg} values are compared to the maximum T_{avg} as defined by Westinghouse (+1, -2°F). Corrective if necessary will be made in Preoperational Test W-9.7. The delta T channels will be aligned to within 1% of reactor power from calorimetric analysis.

After fuel load test excluded from the Prestart Program.

Title of Test No. W9.6
Operational Alignment of Process Temperature Instrumentation

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

At approximately 90% power level, the R/E outputs are aligned to within 0.7°F of the respective equivalent spare RTD resistance readings. The T_{avg} E/I amplifiers are aligned to within 0.5°F of the mathmatical average of the R/E outputs. The delta T channels are aligned to within 1% of reactor power from calorimetric analysis.

At approximately full power level, the R/E outputs are aligned to within 0.7°F of the respective equivalent spare RTD resistance readings. The T_{avg} E/I amplifiers are aligned to within 0.5°F of the mathmatical average of the R/E outputs. The delta T channels are realigned to within 1% of reactor power from calormetric analysis, if necessary. New 100% power delta T values are linearly extrapolated if the T channels required realignment. The reference T_{avg} values for the overpower delta T trip channels are rescaled to the extrapolated T_{avg} values.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. W9.7
Startup Adjustments of Reactor Control Systems

Test Objectives
Summary of Testing
and Acceptance Criteria

This test is to obtain system temperature and steam pressure data at steady-state conditions for zero power and at the hold points during power escalations. Evaluation of these data will provide the basis for the adjustments to the following systems during the power escalation.

1. Primary system temperature data will be used for making signal adjustments to the Reactor Control System. This test will be the final adjustment of the reactor control system. The optimum T_{avg} program will be established without exceeding the design values of T_{avg}. The accuracy of the auctioneered T_{avg} subsystem for each loop will be verified. This test will be the final adjustment of the reactor control system. The optimum T_{avg} program will be established without exceeding the design values of T_{avg}. The accuracy of the autioneered T_{avg} subsystem for each loop will be verified.
2. Turbine impulse pressure data will be used for adjusting the pressure instruments and signals to the Reactor Control System and the Turbine E-H Control System. Full load steam generator pressure will be demonstrated to be within $\pm$ 10 psi of the design value.

After fuel load test excluded from Prestart Test Program.

6.9-kV Shutdown Power - System 211
480-V Shutdown Power - System 212

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-13A
Onsite AC Distribution
(6.9-kV Shutdown Boards)

Test Objectives Summary of Testing and Acceptance Criteria	
The test, for the 6.9-kV and 480V shutdown system boards, will verify the proper operation of the protective relaying, and that the interlocks and transfer schemes perform under manual and automatic conditions as described in FSAR section 8.3.1.1. Acceptance criteria will be that the protective relaying and all interlock and transfer schemes operate properly.	In agreement, except the protective relaying will not be tested. It is excluded by the CAP Exhibit A section III.A.1.a.

6.9-kV Shutdown Power - System 211
480-V Shutdown Power - System 212

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-13B
Onsite AC Distribtuion System
(Diesel Generator Loading Logic)

Test Objectives Summary of Testing and Acceptance Criteria	
Confirm proper startup operation of the diesel generators upon loss of all AC voltage. Confirm proper operation of the design accident loading sequence. Confirm the capability of the diesel generator unit to supply emergency power within the required time is not impaired during periodic testing. Confirm that all of the generator breaker trip relays are disabled, with the exception of the differential and overspeed relays, when the unit is in the emergency mode. Confirm proper operation of the diesel generator units for an accident signal in absence of a substained loss of voltage. The status of the plants Preferred Electrical Distribution System shall be recorded. Acceptance criteria will be that all of the above requirements are met in accordance with Regulatory Guide 1.108. Refer to section 8.3.1 of the FSAR.	In agreement.

6.9-kV Shutdown Power - System 211
480-V Shutdown Power - System 212

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-73B
Additional Diesel Generator Onsite AC Power Distribution System Test (Diesel Generator Load Sequence)

Test Objectives Summary of Testing and Acceptance Criteria	
Confirm proper startup operation of the additional (C-S) diesel generator upon loss of all ac voltage. Demonstrate the additional (C-S) diesel generator's capacity and capability while at full load temperature to supply power during the trained design accident loading sequence to design load requirments and verify that voltage and frequency are maintained within required limits. Demonstrate the ability to synchronize the diesel generator with offsite power while the unit is connected to the above design accident load. Transfer this load to offsite power, isolate the diesel generator unit, and restore it to standby status. The acceptance criteria will be that all of the above requirements are met in accordance with with the design and regulatory commitments made in section 8.1 of the FSAR.	In agreement (note referenced section is incorrect, correct section is 8.3.1).

Title of Test No. TVA-14D
Diesel Generators and Supporting Auxiliaries (125V Control and Field Flashing Batteries)

Test Objectives
Summary of Testing
and Acceptance Criteria

Verify the capability of diesel generator control and field flashing batteries to:

1. Verify the manufacturer's capacity rating.	1. In agreement.
2. Verify that the battery is sized properly to supply the actual loads.	2. In agreement.
3. Verify that the charger will recharge the battery to its full charged state from the 30 minute minimum design discharge while supplying normal loads.	3. In agreement.
4. Verify that the starting system control function properly when the battery is on equalize charge.	4. In agreement.

Performance acceptability will be judged per manufacturers and design data and per section 8.3.2.1 of FSAR.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-74D
Additional Diesel Generator and Supporting Auxilaries (125V Control and Field Flashing Batteries)

Test Objectives Summary of Testing and Acceptance Criteria	
1. The battery will be tested in accordance with IEEE 450-1980 acceptability will be be per that standard.	1. In agreement.
2. Determine the battery's capacity as a percent of the manufacturer's rating (100% or better is acceptable).	2. In agreement. Acceptance criteria will be as specified in the scoping document.
3. Verify that the charger will recharge the battery to its fully charged state while supplying normal loads. Determine the time required for the recharge.	3. In agreement.
4. Verify that the battery system' alarms and instrumentation perform as designed.	4. In agreement.

Emergency Lighting System - System 228

FSAR Chapter 14 Associated Tests | Prestart Test Program

Title of Test No. TVA-36
Emergency Lighting System

Test Objectives Summary of Testing and Acceptance Criteria	
The test is to confirm that the Emergency DC Lighting System satisfies design requirements. Test will consist of interrupting the standby and normal lighting sources and providing illumination solely from the Emergency System. Footcandle level data will be taken at selected locations. Acceptance criteria will be that the Emergency System immediately provides minimum illumination levels in areas essential to safe shutdown of the plant for a period of 2 hours, when other lighting sources are unavailable.	In agreement. In addition, testing will verify operation of eight hour battery packs. Acceptance criteria will be as specified in the scoping document.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-15
Vital 120V AC Power System

Test Objectives
Summary of Testing
and Acceptance Criteria

The test will confirm the ability of the 120V AC Vital Power System to automatically switch between the 480V AC and the 125V DC power sources while delivering the maximum demand load and maintaining output voltage at 120 volts AC ± 2% and 60 Hz ± 1/2%. While the system is loaded with an equivalent maximum demand load, the 480V AC power source will be disconnected and the 125V DC supply allowed to carry the load for at least 10 minutes. The system will also be tested for its ability to revert to its internal clock on removal of the syn signal in accordance with the voltage and frequency limits above. Refer to section 8.3.1.2.2 of FSAR.

In agreement. Voltage, frequency, and time limits will be as specified in the scoping document.

120-V ac Vital Power - System 235

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-67
Onsite Testing of the AC Auxiliary Power System and of the 120V AC Vital Plant Control Power System to Verify Design Calculation Methods

Test Objectives
Summary of Testing
and Acceptance Criteria

The test objective is to provide data to verify the calculation methods used in the evaluation of the AC Auxiliary Power System and the 120V AC Vital Plant Control Power System. The data will be comprised of voltage, current, megawatt, and megavar readings taken during transient and steady state conditions on the plant Onsite AC Distribution System that provides power to the engineered safety features. The test will be acceptable if the required data is recorded.

This test is not part of the Prestart Test Program. It is intended as a one-time-only test to verify NE calculation methodology and was completed during the Preoperational Test Program.

Since the Preoperational Test performance, the calculation software has changed and several modifications to the subject electrical systems are pending (replacement of CSST C & D with automatic load tap changing transformers, addition of current limiting reactors between the 3200 amp and 1600 amp buses of the 480 V Shutdown Boards, and repulling of most MCC and switchgear board feeder cables). However, a retest is not required to be performed because Nuclear Engineering will model the previously tested electrical system configuration with the new software and compare the results to the original test results. This will verify the new calculation software. The new electrical system configuration will then be modeled to show that the necessary voltages will be maintained.

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. TVA-16A
Vital 125V DC Power System
Discharge/Recharge Test

Test Objectives
Summary of Testing
and Acceptance Criteria

The test will confirm that the Vital DC Power System can supply the 125V DC power requirements under the worst case operating conditions. The test will be conducted in three phases as follows:

In agreement.

1. The first phase will involve discharging the battery for the 2-hour design discharge period to demonstrate that the battery satisfies DC System load requirements. Acceptance criteria for this part of the test will be that the battery supply its rated load for the 2-hour period maintaining a battery terminal voltage of at least 105 volts and that the battery chargers do not drain power from the batteries during the discharge period.

2. During the second phase, battery discharge will continue to 105 volts to establish the battery capacity margin.

Title of Test No. TVA-16A
Vital 125V DC Power System
Discharge/Recharge Test

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

3. The third phase of the test will involve recharging the battery (while supplying the loads that are required with the 480V system available regardless of plant status) from the discharge state produced by the first two hours of the discharge test to establish the time required for a return to normal conditions. Acceptance criteria for this part of the test will be a battery recharge period of approximately 36 hours. Refer to section 8.3.2.1.1 of FSAR.

If TVA-16A is performed prior to TVA-16B and the load measured when TVA-16B is performed exceeds the TVA-16A values by 5%, TVA-16A will be repeated using the TVA-16B values.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-16B
Vital 125V DC Power System-Battery Load Verification

Test Objectives
Summary of Testing
and Acceptance Criteria

The test objective is to measure and record the demand for current from typical groups of equipment so that by analysis a maximum current demand may be extrapolated. The analysis will be made a part of the test report and the test is acceptable if the loads are measured and reported.

The analysis results will be used to determine if the 125V DC Power System is capable of supplying its loads. Refer to section 8.3.2.2 of FSAR.

In agreement.

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-16C
125V Fifth Vital Battery System

Test Objectives
Summary of Testing
and Acceptance Criteria

The test will verify: (1) Adequate fifth vital battery capacity per manufacturer's rating. In addition, TVA-16C will provide data necessary to determine the fifth vital battery capacity margin, (2) The ability to supply each primary vital battery board (I, II, III and IV) from its dedicated primary vital battery and charger, (3) The ability to supply each primary vital battery board from its associated spare vital battery charger, (4) The ability to electrically isolate each primary vital battery board from its dedicated primary vital battery, vital battery charger, and associated spare vital battery charger, (5) The ability to supply each primary vital battery board from the fifth vital battery, to monitor the vital battery system alignment via MCR annunciations, and to transfer all required primary vital battery board and asociated MCR instrumentation to measure fifth vital battery parameters, (6) The ability to maintain electrical isolation between redundant divisions of the 125V DC Control Power System with the fifth vital battery substituting for each primary vital battery, (7) The ability of the fifth vital battery to maintain 105V DC at each primary vital battery board following a 2-hour discharge at manufacturer's rated current (battery terminal voltage equals 108.5V DC), (8) The ability to recharge the fifth vital battery from a spare vital battery charger while supplying the worst case (480-V AC available) loading of the primary

In agreement except item (8) will not be tested as an isolated function. However, both spare vital battery chargers will be capacity tested and the connections from the fifth vital battery to each charger and to each associated vital battery board will be verified which satisfies this objective.

Title of Test No. TVA-16C
125V Fifth Vital Battery System

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

vital battery board to which it is connected, (9) The ability of the fifth charger to recharge the fifth vital battery (following a 2-hour discharge test) in approximately 40 hours.

The discharge test will be conducted as an IEEE 450-1980 acceptance test. All acceptance criteria is as stated above.

Sound Powered Telephones - System 251

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-11A
Communications System
(Emergency Sound-Powered Telephone System)

Test Objectives
Summary of Testing
and Acceptance Criteria

The test will verify the adequacy of the Plant Emergency Sound Powered Telephone Communications System. Intelligible reception and transmission of voice communications will be demonstrated. Particular emphasis will be placed on demonstrating that communications at all stations required for the initial fuel loading are functioning properly per section 9.5.2.2 of FSAR.

In agreement. In addition the Sound Powered Telephone System (SPTS) testing will verify the capability of the phone stations to signal other stations, where designed. Testing for the SPTS system will also verify the plant operations sound powered system.

Plant Paging System - System 252
(Evacuation alarm Portion Only)

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-11B
Communications System
(Code Call, alarms, and Paging Systems)

Test Objectives
Summary of Testing
and Acceptance Criteria

The Plant Evacuation Alarm System will be tested to demonstrate that the evacuation signal is annunciated in all areas normally habitable of the plant per section 9.5.2.2 of FSAR.

In agreement. In addition testing will verify system batteries are capable of providing power after loss of the battery chargers. Testing will also verify strobe lights installed in high noise areas, where designed.

Sound Powered Telephones - System 251
Plant Paging System - System 252
(Evacuation alarm Portion Only)

FSAR Chapter 14 Associated Tests | **Prestart Test Program**

Title of Test No. TVA-74G
Additional Diesel Generator Building- Plant Communications Systems

Test Objectives Summary of Testing and Acceptance Criteria	
This test will verify the adequacy of the Plant Emergency Sound Powered Telephone Communications System and the Plant Evacuation Alarm System in the Additional Diesel Generator Building per FSAR section 9.5.2.2.	In agreement. See TVA-11A and TVA-11B descriptions.

Hydrogen Mitigation System - System 268

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-63
Operational Test of the Permanent Hydrogen Mitigation System (PHMS)

Test Objectives
Summary of Testing
and Acceptance Criteria

The purpose of the test is to verify that the system will provide ignition sources of a specified temperature. Each igniter is energized and the voltage and surface temperature of the igniter is recorded. The acceptance criteria for the igniters are:

A. The AC voltage at each igniter is no greater than 135 volts and no less than 120 volts.

B. The surface temperature of each igniter is equal to or greater than 1700°F.

This test covers only the operational verification of the Ignition System. The igniters will not be tested in place for their ablity to burn Hydrogen.

In agreement. Voltage and temperatures will be verified to scoping document requirements.

In addition testing will verify alarms and indication.

**Containment and Auxiliary Buildings
(Reactor Components Handling Systems Only) - System 271**

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-43A
Cranes and Heavy Equipment
(175-ton Reactor Building
Polar Crane)

Test Objectives Summary of Testing and Acceptance Criteria	
The test demonstrates that the safety features of the 175-ton polar crane are functioning properly. Testing will verify:	
1. All brake settings.	1. In agreement.
2. Proper operation of the hoists dynamic braking system.	2. In agreement.
3. The ability of each hoist brake to independently stop at full lowering speed within 6 inches at rated load. (Unit 1 crane will be exempt from this requirement upon successful completion of the test on the unit 2 crane prior to unit 1 fuel loading.)	3. In agreement. The brake effectiveness functions for the main hoist and auxiliary hoist for the unit 1 Reactor Building polar crane were exempted from the unit 1 preoperational test by amendment 53 of the FSAR. Letter from TVA to NRC dated March 14, 1984, (A27 840314 001) documented the exception with the NRC. The Unit 2 crane test has been successfully completed.
4. Proper operation of hoist travel, overspeed, and overload limit switches.	4. In agreement except the overload limit switches will not be tested. They were tested during the 125% rated load tests. These one time tests were performed during the Preoperational Test Program. They will not be retested during the Prestart Program because they are considered an unnecessary risk to structures and components.

**Containment and Auxiliary Buildings
(Reactor Components Handling Equipment Only) - System 271**

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-43A
Cranes and Heavy Equipment
(175-ton Reactor Building
Polar Crane)

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

5. Proper operation of warning horn.	5. In agreement.
6. Proper operation of trolley and bridge without excessive skewing.	6. The check for excessive skewing was performed during the 100% load test through full bridge and trolley travel. This test was performed during the Preoperational Test Program and will not be repeated because it is considered an unnecessary risk to components and structures.
7. Proper operation of equalizing cylinders.	7. In agreement.

**Containment and Auxiliary Buildings
(Reactor Components Handling Equipment Only) - System 271**

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-43B
Cranes and Heavy Equipment (125-ton Auxiliary Building Crane)

Test Objectives
Summary of Testing
and Acceptance Criteria

The test demonstrates that the safety features of the 125-ton auxiliary building crane are functioning properly. Testing will verify:

1. All brake settings.	1. In agreement.
2. Proper operation of the hoists dynamic braking system.	2. In agreement.
3. The ability of each hoist brake to independently stop at a rated load at full lowering speed within 6 inches.	3. The brake effectiveness functions for the main hoist and auxiliary host for the Auxiliary Building crane were performed as part of the Preoperational Test Program. The Prestart Program will verify correct adjustment and rating of the brakes. The Prestart Program will not verify a full speed stop of full load with half of the brakes disabled because it is considered an unnecessary risk.
4. Proper operation of hoist travel, overspeed, and overload limit switches.	4. In agreement, except the overload limit switches will not be tested. The limit switches were tested during the 125% rated load tests. These one time tests were performed during the Preoperational Test Program. They will not be retested during the Prestart Program because they are considered an unnecessary risk to structures and components.

**Containment and Auxiliary Buildings
(Reactor Components Handling Equipment Only) - System 271**

FSAR Chapter 14 Associated Tests **Prestart Test Program**

Title of Test No. TVA-43B
Cranes and Heavy Equipment
(125-ton Auxiliary
Building Crane)

Test Objectives
Summary of Testing
and Acceptance Criteria
(continued)

5. Proper operation of warning horn.	5. In agreement.
6. Proper movement control of all movements.	6. In agreement.
7. Proper operation of trolley and bridge without excessive skewing.	7. Not in the Prestart Test Program. The check for excessive skewing was performed during the 100% rated load test through full bridge and trolley travel. This was performed during the Preoperational Test Program and cannot be repeated because of the storage of nuclear fuel in the building. The special nuclear materials license stipulates that no heavy objects are to be transported over the storage area.
8. Proper operation of equalizing cylinders.	8. In agreement.
9. Proper operation of "emergency stop" control.	9. In agreement.
10. Proper operation of limit switches and mechanical stops to restrict bridge and trolley movement.	10. In agreement.

ENCLOSURE 2

LIST OF COMMITMENTS

Regarding testing for plateout in sample system piping, TVA will further assess this subject to determine if any practical before fuel load (BFL) tests can be performed.

ENCLOSURE

PROPOSED FSAR REVISIONS

3.2
3.6
3.7
3.9

NOTE: HAAUP indicated by "H"