DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

May 23, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Dear Mr. Denton:

Ms. E. G. Adensam's letter of April 10, 1984 transmitted three additional questions from the Procedures and Systems Review Branch. A response to each of these questions is attached.

Question 640.57 requested an explanation for changes to FSAR Chapter 14 which were included in Revisions 7 and 8. Since FSAR Revision 9 was submitted on April 24, 1984 and Revision 10 will be submitted in early June 1984, an explanation for changes to Chapter 14 that are included in these revisions has been included in the attached responses. Copies of FSAR Chapter 14 pages that will be revised by Revision 10 are also attached.

Very truly yours,

Hal B. Tucker ext

Hal B. Tucker

ROS/php

Attachments

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

NRC Resident Inspector
Catawba Nuclear Station

Mr. Robert Guild, Esq.
Attorney-at-Law
P. O. Box 12097
Charleston, South Carolina 29412

B001 1/1

cc: Palmetto Alliance
2135½ Devine Street
Columbia, South Carolina 29205

Mr. Jesse L. Riley
Carolina Environmental Study Group
854 Henley Place
Charlotte, North Carolina 28207

Mr. P. Taylor
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Mr. Walter J. Appley
Battelle Pacific Northwest Laboratory
Battelle Boulevard
Richland, Washington 99352

Catawba Nuclear Station
Responses to Request for Additional Information
Procedures and Systems Review

Response to Q640.55

We have revised Section 14.2.3.2 and our response to Q640.5 to more accurately reflect our intended completion of start-up test procedures. This completion schedule should afford NRC Region II personnel reasonable time to review approved start-up procedures before their use which meets the intent of Reg. Guide 1.68 Rev. 2, App. B.

Response to Q640.56

We have revised the 125 VDC Vital Instrumentation and Control Power Test to verify that individual cell limits are not exceeded during the battery discharge test. See response to Q640.57b item no. 12.

Response to Q640.57a

(a) The following explanations are given for changes made to the FSAR in Revisions 7 and 8.

1. Section 14.2.1 - p.14.2-1
Additional safety-related preoperational tests that will be completed after fuel loading were listed for the following reasons:

a. Only minimum hangers/restraints were available for HFT; therefore, the "Expansion Test" will be repeated during first heatup following fuel loading.

b. No irradiated fuel will be present at Catawba until initial startup is in progress. Spent Fuel Cooling is not required for fuel loading. This test will be completed prior to placing irradiated fuel in the pool.

c. Rod control tests are preformed as an integral part of precritical testing activities.

d. The Ice Condenser is not required to be operable during fuel loading according to the Technical Specifications.

The last sentence on the page was reworded to clarify that tests (or portions of tests) which are not safety-related, or for which exceptions are taken are identified on the appropriate FSAR Test Abstract in Table 14.2.12-1.

2. Section 14.2.4.1 - p.14.2-4, 4a, References to the SSEG (Station Safety Engineering Group) were deleted because, as an independent group, it does not report to station line management. It was replaced by the appropriate station technical staff for review of completed procedures.

3. Section 14.2.4.3 - p. 14.2-6
The added sentence described the sequence of power escalation testing. The bases for minimum testing at the various power level hold points is presented for added information.

4. Section 14.2.5 - page 14.2-7
See explanation for Item 3.

5. Figure 14.2.11-1
Specific tests and footnote were added to identify those tests that are not required during initial power escalation. Refer to FSAR Q640.3, 640.4, Sections 14.2.4.3 and 14.2.11.

6. Figure 14.2.11-2
The word "Hot" was deleted from figure because precritical testing activities commence at the end of initial fuel loading. Also, Mechanical/Electrical Systems testing is performed in both cold <u>and</u> hot conditions.

RESPONSE TO Q640.57B
PART A - EXPLANATIONS FOR CHANGES MADE TO TEST ABSTRACTS
IN FSAR TABLE 14.2.12-1

Page 2 — Reactor Coolant System Thermal Expansion and Restraint Test
No revisions have been made since Rev. 6.

Page 3 — Reactor Coolant System Hot Functional Test

Test Method

Rev. 5 (as stated) — ....after achieving hot, no-load temperature, pressurizer pressure control is demonstrated. Reactor Coolant flow trips and alarms are then demonstrated. Following completion.......

Rev. 8 (revised) — The underlined sentence above was deleted.

Reason: The Reactor Coolant Flow Trips and alarms will be tested prior to fuel loading by the Reactor Protective System Functional Test as described in Table 14.2.12-1, Page 9, and by normal process control calibration procedures.

Page 4 — Piping System Thermal Expansion Test
Prerequisites

Rev. 5 (as stated)
1. All required snubbers and spring supports are installed and have been inspected.
2. Hot Functional Testing is underway.
3. Cold settings of applicable snubbers and spring supports have been obtained.

Rev. 10 (revised) — To the word Prerequisites the words - Initial Inspection were added. No. 1 was rewritten as follows:

1. All piping supports (including snubbers and spring supports) deemed necessary by Design Engineering to support the system piping for Hot Functional Testing have been installed.

A second section was added as follows:

Prerequisites - Final Inspection

1. All required snubbers and spring supports are installed and have received final inspection.
2. Pre-critical heatup for power escalation is underway.
3. Cold setting of applicable snubbers and spring supports have been obtained.

Reason: These changes were necessary to allow testing of hangers at two separate times. Initial testing will be during HFT where only partial completion of hangers is available. Final testing will be performed during precritical testing when all hangars are complete.

Test Method

Rev. 5 (as stated) During Hot Functional Testing a visual inspection will be performed ....

Rev. 8 (revised) During hot Functional Testing and Pre-Critical Heatup for power escalation, a visual inspection will be performed......

Reason: See reason stated above.

Acceptance Criteria

Rev. 5 (as stated) Acceptance Criteria

Rev. 8 (revised) Acceptance Criteria - Initial and Final inspections.

Reason: See reason stated above.

Page 5 Pressurizer Relief Tank Functional Test

Purpose

Rev. 5 (as stated) ......associated instrumentation and alarms.

Rev. 8 (revised) ......associated instrumentation and alarms. This system is considered non-safety related.

Reason: The underlined sentence was added because FSAR Table 3.2.2-2 lists the Pressurizer Relief Tank as a non-safety related component.

The PRT does not meet the criteria justifying a safety related procedure. This statement was added to provide clarification that this test is non-safety related as discussed in FSAR Section 14.2.1.

Test Method

Rev. 8 (as stated) .....The tank is drained and backfilled using nitrogen as a cover gas

Rev. 10 (revised) .....The tank is drained.

The words "backfilled using nitrogen as a cover gas" was deleted.

Reason: Because they could be interpreted to mean left at normal operating level with N_2 cover gas. Depending on plant circumstances the tank

needs only to be bac filled to verify the tank low level alarm reset. The method as descri ed in Rev. 8 was used on Unit 1. The testing on Unit 2 can be comple.ed in a more efficient manner with this change.

Acceptance Criteria

Rev. 8 (as stated) The level and pressure alarms and cover gas system operate at the setpoints designated by Westinghouse. The pressurizer relief tank spray flow is within limits provided by Westinghouse.

Rev. 10 (revised) ......operate at the set points designated by Westinghouse and Duke Design Engineering. The pressurizer ....is within limits provided by Westinghouse and Duke Design Engineering.

The underlined words were added to clarify the acceptance criteria source. The level alarm setpoints and PRT spray flow design (minimum) are provided by Westinghouse. The tank pressure alarms, cover gas controls, and Reactor Makeup Water Pump(s) flow (provide PRT spray flow) are provided by Duke Design Engineering.

Page 6 Chemical and Volume Control System Functional Test

Test Method

Rev. 6 (as stated) .....Proper operation of the excess letdown flow path is verified and the demineralizer is tested for design flow rates and pressure drops.

Rev. 8 (revised) Proper operation of the excess letdown flow path is verified. Charging pumps ......

Reason: The above underlined sentence was deleted because each demineralizer was only half-charged during HFT. Therefore, the design pressure drop could not be obtained. This requirement will be met during pre-critical testing, if not previously performed.

Rev. 8 (as stated) 5th line...Volume control tank level control indications and alarm setpoints are checked.

Rev. 9 (revised) Volume control tank level and pressure control indications and alarm setpoints are checked.

Reason: The volume control tank pressure interlocks were also tested.

Rev. 8 (as stated) Last sentence of 1st paragraph....Flow rates within the charging, letdown, seal water and make-up flow paths are measured and verified.

Operability and flow paths for sampling......

Rev. 9 (revised) A new paragraph was inserted which states: Emergency boration is verified along with boric acid transfer pumps discharge pressure in recirculation. Boric acid tank low level and low temperature alarms are verified. Auto-opening of INV455 (boric acid batching

tank temperature control valve) upon a low temperature signal is also verified.

Reason: Emergency location, boric acid tank level, temperature alarms and low temperature interlock with INV455 were verified during the preoperational test. Therefore, these items were added to the abstract.

Page 7 Rod Control System Functional Test

Prerequisites

Rev. 5 (as stated) Electric power is available and tested.

Rev. 8 (revised) Conduct test after fuel loading. Electric power is available and tested.

Reason: This sentence was added mistakenly and is corrected in Rev. 10. Refer to FSAR Section 14.2.1.

Rev. 10 (revised) The underlined sentence above was deleted.

Reason: This is a preoperational test.

Page 8 Nuclear Instrumentation System Functional Test

Acceptance Criteria

Rev. 6 (as stated) Trip, rod stop and alarm setpoints are as specified by Westinghouse. Control room indications actuate at the proper setpoints as specified by Westinghouse.

Rev. 10 (revised) The entire acceptance criteria were rewritten as follows:

1. Trip, rod stop, alarms, and control room indications actuate at the proper setpoints as specified by Westinghouse. For setpoints that must be determined after plant operation which are not specified by Westinghouse, initial values shall be based on operating experience of similar plants.

2. Proper operation of interlocks with the Reactor Protection System is verified.

3. Neutron detectors are verified to be properly positioned.

Reason: 1. Actual detector outputs must be measured during initial power escalation. The statement was added to clarify the basis for initial setpoints.

No. 2 and No. 3 were added to reflect actual test method.

Page 9 Reactor Protection System Functional Test
No revisions have been made since Rev. 6.

Page 10 Feedwater and Condensate System Functional Test

Test Method

Rev. 6 (as stated) ....steam generator levels. Feedwater and condensate flow rates will be varied with the head curves of the feedwater, condensate booster and hotwell pumps will be verified. Manual control of.........

Rev. 7 (revised) The above underlined sentence was deleted.

Reason: Design Engineering deleted testing of these pumps because factory testing of these pumps is considered adequate and they are not safety-related.

Rev. 8 (as stated) ....will be demonstrated. Operability of the feedwater heaters and feedwater heater drains will be verified. The ability to........

Rev. 10 (revision) ....will be demonstrated. Operability of the feedwater heaters and feedwater heater drains will be verified during power escalation. The ability to.......

Reason: The feedwater heaters will not be put in service before this time, but they will be verified to operate correctly during power escalation.

Acceptance Criteria

Rev. 6 (as stated) Last paragraph - Feedwater, condensate booster and hotwell pump performance meets or exceeds the design performance levels specified by Duke Power Company Design Engineering Department, adjusted for error.

Rev. 7 (revised) This paragraph was deleted.

Reason: See reasons stated above for Test Method

Rev. 7 (as stated)	3rd paragraph - Feedwater heaters and heater drain systems operate to provide heating of feedwater and stable heater operation within the design ranges recommended by the manufacturer.
Rev. 8 (revised)	This paragraph was deleted.
Reason:	Feedwater heater and heater drain system testing was deleted because it is impossible to put the feedwater heaters in service until Power Escalation.
Page 11	Condenser Circulating Water System Functional Tests No revisions have been made since Rev. 6.
Page 12	Auxiliary Feedwater System Functional Test
	Test Method
Rev. 7 (as stated)	Each auxiliary feedwater pump is started...... .....to demonstrate flow from the upper surge tank, condenser hotwell and the auxiliary feedwater....... Auxiliary feedwater supply from the upper surge tank and the hotwell is verified with both of these sources under vacuum......
Rev. 10 (revised)	Each auxiliary feedwater pump is started.... to demonstrate flow from the upper surge tank and the auxiliary feedwater... Auxiliary feedwater supply from the upper surge tank is verified with this source under vacuum.........
Reason:	References to the condenser hotwell were deleted to reflect that the condenser hotwell is not a normal source of condensate under vacuum. The hotwell contents will be pumped to the upper surge tank, and if a blackout occurs, condenser vacuum will be broken or suction switched to RN.
	Acceptance Criteria
Rev. 5 (as stated)	1. Each motor driven pump develops a discharge pressure of greater than or equal to 1380 psig at a flow greater than or equal to 500gpm. 2. The steam driven pump develops a discharge pressure of greater than or equal to 1480 psig at a flow of greater than or equal to 800gpm with a secondary steam supply pressure of greater than or equal to 600 psig.

Rev. 7 (revised)

1. Motor driven pump A develops a total head of greater than or equal to 3605 ft. a flow of greater than or equal to 400gpm, and motor driven pump B develops a total head of greater than or equal to 3620 ft. at a flow of greater than or equal to 400gpm.

2. The steam driven pump develops a total head of greater than or equal to 3705 ft. or a flow of greater than or equal to 400gpm with a secondary steam supply pressure of greater than or equal to 600 psig.

Reason: These two statements replaced the Rev. 5 statements to more accurately reflect pump performance rather than recording only discharge pressure. The flow rates to be tested were changed in order to use the recirculation test line which is designed for 400gpm.

<u>Page 13</u> Component Cooling Water System Functional Test

<u>Test Method</u>

Rev. 5 (as stated) Flow paths, flow rates, <u>temperatures and pressures</u> are verified for normal unit conditions for each of the two trains. Flow paths, flow rates, <u>temperatures and pressures</u> are verified for normal unit conditions with full flow through both trains.

Rev. 10 (revised) The underlined words were deleted so that only flow paths <u>and</u> flow rates are verified. A sentence was added as follows:
The discharge temperature from the KC Heat Exchanger is verified to be within design limits with the units at normal operating temperature and pressure.

Reason: During flow balancing the flow paths and flow rates are verified. Temperature and pressure are not needed. In the functional test for component cooling during HFT, proper temperature at normal unit operation was verified. The ability of the KC system to provide cooling during Unit Cooldown was verified during HFT. The system pressure does not need to be verified since it changes with demand by plant equipment. The KC system pressure is recorded under ESF test under accident flow conditions.

<u>Page 14</u> Residual Heat Removal System Functional Test
No revisions have been made since Rev. 6.

<u>Page 15</u> Fire Protection System Functional Test

<u>Purpose</u>

Rev. 5 (as stated) ...to provide water at <u>design</u> flows and pressures.......

Rev. 8 (revised) .....to provide water at acceptable flows and pressures.....

Reason: This wording change was made at the time because the acceptance criteria was being developed. The acceptance criteria was finalized and incorporated into a later revision.

Acceptance Criteria

Rev. 5 (as stated) System flow paths are verified to be open. Each pump develops at least 2500gpm at a system pressure of greater than an equal to 125 psig at the yard surface. Jockey pumps.....

Rev. 8 (revised) The underlined sentence above was deleted.

Reason: See the reason stated above regarding the revision to the Purpose.

Rev. 8 (as stated) System flow paths are verified to be open. Jockey pumps are capable of maintaining system pressure.....

Rev. 10 (revised) System flow paths are verified to be open. Each pump develops $\geq$ 331 ft of head at a flow of $\geq$2500 gpm.

Reason: Pump performance acceptance criteria has been finalized.

Page 16 Nuclear Service Water System Functional Test

Purpose

Rev. 5 (as stated) 6th paragraph - Verify proper dynamic response (including setpoints) ..... demonstration to be performed for one train only.

Rev. 8 (revised) Verify proper dynamic response (including setpoints)... demonstration to be performed for one train only (Not performed on Unit 2).

Reason: The underlined words were added as there is no need to retest alignment to SNSWP for the Unit 2 test, since Unit 1 and Unit 2 pumps take suction off the same pits. The same valves are realigned.

Rev. 5 (as stated) Last paragraph - Proper system response..... at low intake pit level

Rev. 8 (revised) Proper system response .... at low intake pit level (this verification is performed for both drains of Unit 2)

Reason: The underlined words were added for the same reasons as stated in the reason above.

Acceptance Criteria

Rev. 5 (as stated)	Each RN pump meets the design performance curve specified by Duke Power Company Design Engineering Department within ±5% following correction for measurement error.
Rev. 8 (revised)	The underlined phrase above was deleted. The word curve was replaced by the word limits.
Reason:	Design Engineering has determined that excessive head near pump runout is acceptable, based on test results that indicate that pump performance near runout was not within 5% of expected values.
Rev. 5 (as stated)	Dynamic swapover is accomplished as described in FSAR Section 9.2.1.2.1.
Rev. 8 (revised)	Dynamic swapover is accomplished as described in FSAR Section 9.2.1.2.1, for the pump and pit tested.
Reason:	Same justification as that for the Rev. 8 change under Purpose.

Page 17 Loss of Instrument Air Test

Purpose

Rev. 5 (as stated)	...loss of instrument air causes fail-safe operation of related pneumatically......
Rev. 10 (revised)	...loss of instrument air causes fail-safe operation of safety-related pneumatically.....
Reason:	To correct a typographical error. Reg. Guide 1.80 only requires the testing of safety-related air operated valves.

Page 18. Control Room Ventilation System Functional Test

Test Method

Rev. 5 (as stated)	Each control room air handling unit is operated in conjunction with its respective filter train and dampers to demonstrate air capacity, direction of flow, static pressure and proper operation, for both normal conditions and emergency conditions. The refrigeration units are tested to demonstrate their proper operation and cooling capacity. Instrumentation is verified for proper sequencing and function. Proper operation of humidity and dewpoint control features is demonstrated. The control room is pressurized to 1/8" W.G. and the flow rate required to maintain this pressure is recorded.
Rev. 8 (revised)	An integrated test is performed on each train to verify proper temperature and humidity can be maintained during all normal modes of operation and proper temperature can be maintained during post-

-accident conditions. Proper flow through 1CRA-PFT and 2CRA-PFT-1 is demonstrated. Proper operation of each filter train is demonstrated. The refrigeration units are tested to demonstrate their proper operation and cooling capacity. Instrumentation is verified for proper sequencing and function. The Control Room is pressurized to ≥1/8" W.G. and the flow rate required to maintain this pressure is recorded.

Reason: The entire test method was revised to allow an integrated system test rather than verifying the performance of each component. The old abstract called for testing each air handling unit individually. This change will allow an integrated test to verify that the system can perform its design functions. The last sentence indicates a change to allow pressurizing the control room to ≥ 1/8" W.G. rather than to just 1/8" W.G. in order to be consistent with the Technical Specifications.

Rev. 10 (revised) 6th line...capacity. Instrumentation required for safety is verified.....

Reason: The underlined words above were added to specify that only that instrumentation required to perform the safety functions of the system is to be tested.

Acceptance Criteria

Rev. 5 (as stated) 1. The Control Room Ventilation System is capable of achieving a system flow of 6000cfm ±10% when tested per the requirements of ANSI 510-1975.

Rev. 8 (revised) .....is capable of achieving a system flow of 6000cfm ±10% through 1CRA-PFT-1 and also 2CRA-PFT-1 when tested......

Reason: The underlined words were added to clarify that the 6000cfm ±10% flow is through the filter trains.

Rev. 10 (revised) All references to ANSI 510-1975 were changed to ANSI 510-1980.

Reason: Done by agreement with Dr. Ron Bellamy, RI, NRC and P. A. Skinner, Resident Inspector, NRC.

Page 19 Diesel Building Ventilation System Functional Test.

Purpose

Rev. 5 (as stated) To demonstrate that........is maintained in each Diesel-Generator Room while......

Rev. 8 (revised) To demonstrate that........is maintained in one Diesel Generator Room.

Reason:	Hot day run capabilities were verified during Unit One "A" Train testing. Fan motor power and RPM will be adequate to verify that Unit One "B" train and Unit Two "A" and "B" Trains performed as designed.

Prerequisites

Rev. 5 (as stated)	....a suitable environment can be maintained in the Diesel Generator Rooms.
Rev. 8 (revised)	....a suitable environment can be maintained in one Diesel Generator Room.
Reason:	See reason stated above.

Test Method

Rev. 5 (as stated)	4th paragraph -.......The Diesel-Engine will be operated.....the two (2) external design day conditions 19°Fdb and 96°Fdb. The Emergency.......
Rev. 8 (revised)	The two temperatures were changed to 10°Fdb and 95°Fdb.
Reason:	To reflect change/clarification of outside design conditions as determined by Duke Design Engineering Department.
Rev. 5 (as stated)	End of 4th paragraph - ....internal temperature which would have been reached at the design external conditions.
Rev. 8 (revised)	New paragraph follows which reads: The above will be performed on "A" train diesel ventilation. Unit One "B" train and Unit Two "A" and "B" trains will have flow rates tested instead of design day testing.
Reason:	To reflect a change in VD test policy to design day test only Unit one "A" train system. To prove performance of Unit One "B" train ventilation and both trains of Unit Two ventilation, system flow rates will be verified.
Rev. 10 (revised)	New paragraph in Rev. 8 above revised to read: .....Unit One "B" Train and Unit Two "A" and "B" trains will have fan performance tested instead of Design Hot Day testing.
Reason:	The words fan performance replaced the words flow rates to reflect a change in TP/1/A/1450/01B whereby fan motor power and RPM allow a more accurate verification of performance. Also, Hot Day run capabilities were proven during Unit One "A" Train testing.

Acceptance Criteria

Rev. 5 (as stated)	Page 19a external design day conditions of: High - 98°Fdb temperature Low - 19°Fdb temperature
Rev. 8 (revised)	High - 95°Fdb temperature Low - 10°Fdb temperature
Reason:	The temperatures were changed to reflect outside design conditions determined by Duke Design Engineering Department.

Page 20 Emergency Diesel Generator Functional Test

Test Method

Rev. 5 (as stated)	Second paragraph - Diesel generator full-load-carrying capability is demonstrated for an interval of not less than 24 hours, of which 2 hours should be at 100% load and 2 hours should be at 110% load. During......
Rev. 7 (revised)	The underlined portion of the above was changed to read: .....24 hours of which 2 hours should be at 110% load followed by 22 hours at 100% load in accordance with Regulatory Guide 1.9. During.......
Reason:	Rev. 5 implied that the test would be conducted with the first 22 hours at 100% load and the last 2 hours at 110% load. To agree with Reg. Guide 1.9, this was changed to the first 2 hours at 110% followed by 22 hours at 100% load.

Page 21 125 VDC Vital Instrumentation and Control Power Test

Test Method

Rev. 6 (as stated)	First paragraph - ....and a load equal to the maximum accident-condition steady-state DC load is applied. The capability.....
Rev. 8 (revised)	and a load equal to the maximum accident-condition steady-state dc load as measured during the Engineered Safety Features Actuation System Functional Test is applied.
Reason:	Design Engineering has determined that the Engineered Safety Features Actuation System Functional Test is the only reasonable way to determine the battery service requirements since there are numerous variables in identifying the actual current versus time that a battery is required to deliver.
Rev. 6 (as stated)	Fifth paragraph - ....during the performance of the Safety Injection System Functional Test is compared with the design loads......

Rev. 8 (revised) The underlined words were replaced with Engineered Safety Features Actuation System Functional Test.....

Reason: Same as stated above.

Rev. 6 (as stated) Paragraph two - The capability of the system to transfer each bus from battery charger to battery power is demonstrated by de-energizing the chargers while the applicable bus is carrying its normal station loads.

Rev. 9 (revised) The above paragraph was mistakenly deleted and will be replaced in Rev. 10.

Rev. 6 (as stated) The capability of the chargers to supply sufficient current to recharge a completely discharged battery within 24 hours while carrying maximum steady-state load is verified.

Rev. 8 (revised) This paragraph was deleted, but was returned with some rewording in Rev. 9.

Rev. 9 (revised) The capability of each charger to supply sufficient current to recharge a completely discharged battery within 24 hours while supplying the steady-state loads of its own load group is verified.

Reason: Reworded to define the maximum load for the 125 VDC batteries.

Acceptance Criteria

Rev. 8 (as stated) The battery chargers provide sufficient current to recharge a battery discharged to the condition resulting from a battery service test within 24 hours while carrying maximum loads, as described in the test method.

Rev. 9 (revised) The paragraph above was replaced with the following: The battery chargers provide sufficient current to recharge a fully discharged battery within 24 hours while supplying the steady-state loads of their own load group, as described in the test method.

Reason: This wording defined maximum loads for the 125VDC batteries.

Page 22 Diesel Generator Fuel Oil System Functional Test

Test Method

Rev. 5 (as stated) Second paragraph - The day tanks are filled.....with the transfer pumps. During transfer pump operation...pressures are demonstrated for each pump.

Third paragraph - During operation, a day tank low-level alarm..... starting of the fuel oil transfer pumps.

...the Catawba diesel generators do not have fuel transfer pumps. ...deleted.

Acceptance Criteria

Rev. 5 (as stated) Last sentence - Fuel oil transfer pumps deliver.....at a rate greater than.....at full load.

Rev. 8 (revised) This sentence was deleted.

Reason: Same as above.

Page 23 Containment Initial Integrated Leak Test and Structural Integrity Test

Prerequisites

Rev. 5 (as stated) The containment is operational and penetration local leak rate testing has been satisfactorily completed.

Rev. 8 (revised) The underlined words above were changed to: completed to the greatest extent possible.

Reason: To make the wording consistent with the ILRT test philosophy that all local leak rate testing is not required to be complete prior to initiation of the ILRT.

Rev. 5 (as stated) All systems, inside Containment which have isolation valves identified as potential Bypass Leakage Paths in Table 6.2.3-1, are vented and drained except for the following:

System	Reason
Ice Condenser glycol supply and return	Ice Condenser is in operation
Steam Generator wet lay up recirculation	Steam Generators all in recirculation

Rev. 8 The underlined lined words above were deleted.

Reason: The steam generator recirculation penetrations are not potential Bypass Leakage Paths.

Rev. 10 (revised)

System	Reason
Ice Condenser glycol supply and return (M372 and M373)	Ice Condenser is in operation
Containment Air Release Line (VQ M204)	Turbine Flowmeter (For Imposed Leak Rate Test) is installed on this penetration.
Containment Hydrogen Sample and Purge (VY M346)	Containment Relief Valve is installed on this penetration.
ILRT Test Pressure sensing lines (3 penetrations)	Lines are open to monitor containment pressure during test.

Reason: The additional exceptions to draining and venting of potential By-Pass Leakage Paths were added for testing reasons. Each of these penetrations are required in order to conduct the ILRT.

Page 24 Containment Air Return and Hydrogen Skimmer System Functional Test

Acceptance Criteria

Rev. 5 (as stated) Second Sentence - Automatic opening of the containment air return fan damper and interlocks that prevent air return fan and hydrogen skimmer fan from starting.....

Rev. 9 (revised) The underlined words were deleted.

Reason: The containment pressure control system interlocks were deleted from the hydrogen skimmer fan control circuits.

Page 25 Annulus Ventilation System Functional Test

Acceptance Criteria

Rev. 5 (as stated)

1. Each train.....is capable of achieving a system flow of 9000 cfm± 10% when tested per the requirements of ANSI N510-1975.

2. HEPA filter banks demonstrated an efficiency of greater than or equal to 99.95% when they are tested in place in accordance with ANSI N510-1975 while operating.....9000 cfm ± 10%.

4. Charcoal obsorbers remove greater than or equal to 99.95% of a halogenated.....in accordance with ANSI N510-1975........

Rev. 8 (revised)

1. Each train....is capable of achieving a system flow within limits specified by Duke Power Company Design Engineering Department when tested......

2. 99.9%

Reason: The underlined words in Rev. 5 were replaced with those above. The specific flow rate was deleted since Design Engineering provides all acceptance criteria, and correct flow rates will be kept current as system revisions are made. The test efficiencies of 99.9% were a typographical error which was corrected in Rev. 10.

Rev. 10 (revised) The efficiencies stated above were revised to 99.0%.

Reason: In Table 15.6.5-10 of the FSAR, a 95% filtration efficiency is assumed for VE. Refer also to NRC Generic Letter 83-13.

Rev. 10 (revised) All references to ANSI N510-1975 were changed to ANSI N510-1980.

Reason: Done by agreement with Dr. Ron Bellamy, RI, NRC and P.A. Skinner, Resident NRC Inspector.

Page 26 Ice Condenser Region Functional Test

Purpose

Rev. 5 (as stated) Last sentence - The ability to maintain proper ice bed temperatures following initial ice loading is also verified.

Rev. 8 (revised) The underlined words were deleted.

Reason: To allow testing to be performed while ice loading is in progress or almost completed.

Test Method

Rev. 5 (as Second sentence - Following completion of initial ice loading the operability.....

Fifth Seutence - Following initial ice loading, ice bed and wear....

Rev. 8 The underlined words above were deleted.

Reason: Same as above.

Page 27 Containment Divider Barrier Leakage Area Verification Test
There have been no revisions since Rev. 5.

Page 28 Electric Hydrogen Recombiner Functional Test

Acceptance Criteria

Rev. 5 (as stated) Fourth sentence - All controls and indications function as specified..

Rev. 8 (revised) All controls and indications tested function as specified......

Reason: The word tested was inserted to clarify that only those controls and indications actually tested must meet the acceptance criteria.

Test Method

Rev. 8 (as stated) Fifth sentence - Following completion of the heatup test, heater continuity and resistance to ground will be verified.

Last sentence - Capability to monitor hydrogen concentrations with the recombiners in operation and without the recombiners in operation will be verified.

Rev. 10 (revised) The underlined words in the first sentence were deleted because the Technical Specification 4.6.4.2 only requires a resistance to ground test to prove heater integrity. The second sentence was deleted entirely because the hydrogen recombiners have no interlocks, interface, or direct effect on the hydrogen monitoring system. Therefore, testing of this capability will not be performed.

Acceptance Criteria

Rev. 8 (as stated) ..., and post-heatup continuity and resistance to ground checks are satisfactory. Containment atmosphere can be monitored for hydrogen concentration both with and without operation of the hydrogen recombiners.

Rev. 10 (revised) The underlined words were deleted because of the reasons stated above.

Page 29 Safety Injection System Functional Test

Test Method

Rev. 6 (as stated) Third paragraph - The Safety Injection System is aligned for normal power operation, with the exception that the boric acid injection tank is filled with refueling water instead of concentrated boric acid and the accumulators are not pressurized.

Rev. 8 (revised) The underlined words were deleted.

Reason: Because of the elimination of the Boric Acid Injection Tanks - DCA CN-1-M1275.

Page 31 Engineered Safety Features Actuation System Functional Test
No revisions have been made since Rev. 5.

Page 32 Upper Head Injection Functional Test

Test Method

Rev. 6 (as stated) Second paragraph - ...During these tests, the proper operation of alarms, indications and controls will be verified.

Rev. 10 (revised) A sentence was added to Paragraph 2 as follows: Only the low pressure blowdowns test is performed on the Unit 2 UHI system. The high pressure test is performed only on the Unit 1 system.

Reason: Westinghouse recommends performing the high pressure blowdown <u>only</u> on Unit 1. (Westinghouse Letter MPS # 35924)

<u>Page 33</u> Containment Spray System Functional Test

Purpose

Rev. 6 (as stated) To demonstrate the capability of the system to respond to an actuation signal and to provide the required flows.

Rev. 10 (revised) The following underlined sentence was added as follows: ....the required flows. <u>Also, Containment Control Cabinet annunciator is verified on loss of control power</u>.

Reason: This was added because of a design change that was not part of the system at the time of the procedure development.

Test Method

Rev. 6 (as stated) First paragraph - ...to demonstrate design flow rates <u>through</u> the spray headers.

Rev. 10 (revised) ...to demonstrate design flow rates <u>to</u> the spray headers.

Reason: Editorial correction.

Rev. 6 (as stated) <u>Automatic startup of the system is demonstrated by simulating high-high containment pressure logic.</u>

Rev. 10 (revised) This sentence was deleted.

Reason: System response to high-high containment pressure is verified during ESF functional test.

Rev. 6 (as stated) Second paragraph - Proper spray nozzle performance is demonstrated by blowing air or smoke through the spraying headers.... Other methods of verification such as infrared photography may be utilized as appropriate.

Rev. 10 (revised) Proper spray nozzle performance and orientation is usually verified by blowing air through the spray ring headers.

The second sentence was deleted entirely.

Reason: The visual verification of nozzle orientation was added in response to an INPO concern. References to other methods were deleted as the use of air proved to be very effective.

Rev. 6 (as stated) Third paragraph - ...is verified by the overlapping of the water flow test and the air or smoke test at the headers.

Rev. 10 (revised) The underlined words were deleted. Another sentence was added as follows:

Power is isolated to both trains of the Containment Pressure Control Cabinets to verify Control Room annunciators.

Reason: See reason stated above, and reason stated under Purpose.

Acceptance Criteria

Rev. 6 (as stated) The system responds automatically to high-high containment pressure logic, flow nozzles are unrestricted.

Pump head vs. flow performance meets the manufacturer's performance curve...Pump performance in recirculation mode meets or exceeds the requirements of Technical Specification 4.6.2.1.6

Rev. 10 (revised) The underlined words above were deleted.

Pump head vs. flow performance meets or exceeds the manufacturer's performance curve...

Two sentences were added as follows:

System response to high-high containment pressure logic is verified during the ESF Functional Test.

Control Room annunciators actuate when control power is isolated to the Containment Pressure Control Cabinets.

Reason: See reasons stated above under Test Method and Purpose. The statement that pump head vs. flow performance meets or exceeds the manufacturer's performance curve states correctly the minimum requirement. The reference to Technical Specification 4.6.2.1.6 was deleted because it is not part of the Containment Spray Functional Test. Although the pumps produced greater than 185 psig, this was not documented. The Technical Specification is verified quarterly during the NS Pump periodic tests.

Page 34 Spent Fuel Cooling System Functional Test

Acceptance Criteria

Rev. 5 (as stated) Spent fuel cooling pump performance meets or exceeds manufacturer's acceptance curve, adjusted for measurement error. Spent fuel pool .....

Rev. 8 The underlined words in Rev. 5 were replaced as follows: Spent fuel cooling pump performance meets or exceeds design values supplied by Duke Power Company Design Engineering Department.

Reason: To reflect the actual design requirement for the pump, rather than the actual manufacturer's data.

Page 35 Fuel Handling Area Ventilation System Functional Test

Acceptance Criteria

Rev. 6 (as stated)

3. HEPA Filter banks demonstrated an efficiency of greater than or equal to 99.95% when.....

5. Charcoal absorbers remove greater than or equal to 99.95% of a hologenated.....

Rev. 8 (revised) The underlined efficiencies were changed to 99.0% because according to NRC Generic Letter 83-13, 1% bypass and penetration leakage should be used to test systems in which 95% filtration ability is assumed. In Table 15.7.4-2, accident analysis, credit is taken for 95% filtration capabilities.

Rev. 8 (as stated)

1. Each train......is capable of achieving a system flow rate of 17850 cfm ± 10%.

3. HEPA filter banks demonstrated......while operating the system at a flow rate of 17850 cfm ± 10%.

5. Charcoal absorbers remove......while operating at 17850 cfm ± 10%.

Rev. 10 (revised) These acceptance criteria flow rates wre changed to read: ...a system Design Flow Rate ±10%.

All references to ANSI N510-1975, were changed to ANSI N510-1980.

Reason:	The correct flow rates will be provided by Design Engineering and will be kept current as system revisions are made. The reference to the ANSI standard was changed by agreement with Dr. Ron Bellamy, RI, NRC and P. A. Skinner, Resident Insepctor, NRC.
<u>Page 36</u>	Radiatioh Monitoring System Functional Test
	<u>Acceptance Criteria</u>
Rev. 6 (as stated)	...Sample flow rates are verified to be low enough to allow adequate decay time of sample liquid, as specified Duke Power Company Design Engineering Department
Rev. 10 (revised)	The underlined phrase below was inserted.
	...Sample flow rates <u>of the Reactor Coolant Radiation Monitor</u> are verified to be low enough...
Reason:	Decay of Nitrogen-16 is required for this monitor only.
<u>Page 37</u>	Piping System Vibration Test No change have been made since Rev. 5.
<u>Page 39</u>	Nuclear Service Water Structure Ventilation System Functional Test
	<u>Test Method</u>
Rev. 5 (as stated)	...the internal temperature which would have been reached at the design external temperature.
Rev. 10 (revised)	A second paragraph was added which states:
	Design Hot Day testing will not be done to Unit Two "A" and "B" Train, and design Cold Day testing will not be done to Unit One "A" Train and Unit Two "A" and "B" Train. Instead, fan and unit heater performance data will be taken and compared with acceptable performance on either train of Unit One for Hot Day capabilities and with Unit One "B" Train for Cold Day capabilities.
Reason:	Hot Day capabilities of the VZ System were proven on both "A" and "B" Train. Cold Day capabilities were proven on "B" Train. Because of the inability of obtaining another Cold Day, the following philosophy will be used to complete testing of the VZ System:
	The ventilation system itself does not add heat to the room, but only disperses air to obtain good equalization in space temperatures. So fan performance on "A" Train will be verified equivalent to fan performance on "B" Train by comparing fan RPM and power (Watts) data.

Acceptance Criteria

Rev. 5 (as stated) The nuclear service water pump structure internal temperature remains between 55°F and 104°F at both the external design day conditions of 10°F and 96°F.

Rev. 10 (revised) A new paragraph was added as follows: For those trains in which design day testing is not being done, fan and heater performance data is within - 10% of acceptable.

Reason: Since performance was better than required on the "B" Train Cold Day run, a -10% allowable limit will be used to compare "A" and "B" Train data. Also, this is a nominal value and needs no further adjustment.

Page 40 Electrical Load Capacity Functional Test
No changes have been made since Rev. 6.

Page 41 6900 Volt Auxiliary Power System Preoperational Test
No changes have been made since Rev. 6.

Page 42 Electrical Penetration O-Ring Seal Leak Rate Test
No changes have been made since Rev. 5.

Page 43 600 VAC Power System Preoperational Test

Purpose

Rev. 5 (as stated) To verify proper operation of breakers, interlocks, and alarms associated with the 600 VAC Normal AC Power systems. To verify....

Rev. 8 (revised) The underlined words were replaced by the words.... 600 VAC Normal auxiliary power system and 600 VA station normal auxiliary power system.

Reason: These words were revised to reflect additional testing of the 600 VAC Station Normal Auxiliary Power System.

Page 44 Emergency AC Power Systems Preoperational Test

Purpose

Rev. 5 (as stated) ...To demonstrate proper operation of breakers, interlocks and alarms.

Rev. 8 (revised) ...To demonstrate proper operation of Feeder breakers, interlocks and alarms.

Reason: To reflect the testing of the essential feeder breakers and incoming breakers and not the testing of each individual breaker.

Test Method

Rev. 5 (as stated) For each system, the breakers are operated....

Rev. 8 (revised) For each system, the feeder breakers are operated.....

Reason: Same as above.

Acceptance Criteria

Rev. 5 (as stated) Breakers, interlocks, and alarms function....

Rev. 8 (revised) Breakers, interlocks, and alarms tested function....

Reason: To specify those that are actually tested.

Page 45 250/125 VDC Auxiliary Power Systems Preoperational Test
No revisions have been made since Rev. 5.

Page 46 Heat Tracing System Test

This test abstract was deleted in Rev. 8, since the test demonstrated the ability to maintain proper temperature control in the piping systems involved with the boron injection tank which has since been deleted.

Page 47 Containment Ventilation and Purge Functional Test

Purpose

Rev. 5 (as stated) To demonstrate....containment air recirculation, control rod drive mechanism cooling, preaccess filtration, and containment purging.

Rev. 8 (revised) The underlined words above were deleted.

Reason: The containment charcoal units do not come under Reg. Guide 1.52 or 1.140, and were not constructed per ANSI/ASME N509. No credit is taken for filtration.

Test Method

Rev. 5 (as Third paragraph - The capability of the containment filtration units to provide....

Rev. 8 (revised) The capability of the containment purge exhaust filtration units to provide...

Reason: The underlined words were added to clarify that we will test the VP Units but not the VV Charcoal Units for the above stated reasons.

Rev. 5 (as stated) Last paragraph - Proper operation of all Containment Ventilation and Purge System instrumentation, interlocks, and alarms is verified.

Rev. 8 (revised) The proper operation of all essential Containment....

Reason: Not all instruments, interlocks, and alarms are essential to system operation. We will test those essential to proper system operation.

Acceptance Criteria

Rev. 5 (as stated) 1. ....System interlocks, instrumentation alarms and controls operate as described in Duke Power Company Design....

Rev. 8 (revised) The word controls was deleted.

Reason: It is not necessary to individually test all controls. Overall proper system operation is tested in both the "normal" and "refueling" modes.

Rev. 5 (as stated) HEPA filter banks demonstrate an efficiency of greater than or equal to 99.95% ......
Charcoal absorbers remove greater than or equal to 99.95%.....

Rev. 8 (revised) These efficiencies were changed to 99.9%.

Reason: This was a typographical error which will be corrected in Rev. 10.

Rev. 10 (revised) The test efficiencies above were revised to 99.0%

Reason: See FSAR, 15.7.4-3 and SER 15-18 for credit taken for VP.

Rev. 8 (as stated) Charcoal absorbers.....are tested... while operating at 9000cfm ±10%

Hepa filter banks...are tested....at a flow rate of 9000cfm ±10%.

Rev. 10 (revised) The underlined words above were replaced with the words Design Flow Rate.

Reason: The correct flow rates will be provided by Duke Power Company Design Engineering and will be updated as system revisions are made.

Rev. 10 (revised) All references to ANSI N510-1975 were changed to ANSI N510-1980.

Reason: By agreement with Dr. Ron Bellamy, RI, NRC, and P. A. Skinner, NRC Resident Inspector.

Page 49 Containment Air Release and Addition System Functional Test

Test Method

Rev. 5 (as stated) Proper operation of the system is verified by operation of fans and measurement of air flow. System alarms and interlocks are verified to operate by observation at appropriate conditions or by simulation of appropriate sensor signals. Filters are tested to verify filtration capabilities. During Hot Functional testing, the ability of the system to control containment pressure during heatup and cooldown will be verified.

Rev. 10 (revised) Containment Air Release Fans 1A and 1B are verified as being able to provide design flow. In order to simulate the pressure differential caused by a near end-of-life filter train (since at the time of this portion of the test, filters will not be installed) an obstruction will be placed in the filter train.

Flow will be established from containment to the unit vent. Maximum ΔP from lower to upper containment created by system operation is designed to be less than the amount required to open the ice condenser doors. This will be verified by the absence of an annunciator alarm indicating that an ice condenser door is open.

During Hot Functional Testing Heat-up and Cool-down, the high and low pressure annunciator alarms will be verified and proper opening and closing of unit vent and air addition valves verified. The capability of filtration units will be tested in accordance with ANSI N510-1980.

During power escalation, the ability of the system to control containment pressure will be verified.

Reason: To provide a more detailed description of the test procedure which was changed so that actual containment pressures are obtained for setpoint verification. The filter test method change is generic for all filter tests. The ability of the system to maintain containment pressure with Tech. Spec. limits was not verified during Hot Functional Testing. This ability will be demonstrated during precritical and/or Power Escalation Testing.

Acceptance Criteria

Rev. 5 (as stated) Fan capacity is 200 SCFM ± 20% with maximum filter pressure drop. All interlocks, alarms and controls function as described in Duke Power Co Design Engineering Department System Descriptions. The filtration units demonstrated an efficiency of 99.95% or greater, when tested in accordance with ANSI N510-1975.

During heatup and cooldown for Hot Functional Testing, the system functions to maintain pressure within Technical Specification limits.

Rev. 10 (revised) Fan capacity is 200 SCFM ± 20% with maximum filter pressure drop. All ice condenser doors remain closed with either fan 1A or 1B operating in the air release mode. Containment Pressure alarm is received at the high and low containment pressure setpoint ±0.05 psig. Containment pressure air release valve and containment air addition valve close at the correct containment pressure ± 0.05 psig.

The filtration units demonstrate an efficiency of 99.0% or greater, when tested in accordance with ANSI N510-1980.

The system functions to maintain pressure within Technical Specifications limits.

Reason: To provide more detailed information describing test acceptance criteria. Tolerance added to setpoint verification is included. Filter test acceptance criteria is generic for all filter tests.

Page 50 Seal Water Injection System Functional Test

Purpose

Rev. 8 (as stated) To verify proper operation of the containment isolation valve seal water injection system including throttle valve settings, interlocks and alarms....

Rev. 10 (revised) The underlined words were deleted.

Reason: So that the valves can be used as isolation valves during the system testing. The design basis has been changed to allow these valves to be fully open during plant operation.

Test Method

Rev. 5 (as stated) The system alarms and interlocks are tested by operation of.....

Rev. 8 (revised) The system alarms and interlocks essential for post-accident operation are tested by operation.....

Reason: The underlined words were added to ensure that the many new interlocks that were added would be tested to verify their proper operation under accident conditions.

Rev. 8 (as stated) ...Throttle valve settings are verified by measuring flows to individual valves. Overall system leakoff is measured by closing all valves supplied with seal water, and measuring the makeup rate required to maintain seal water injection.

Rev. 10 (revised) The first sentence was deleted. The second sentence was rewritten as follows: .....Overall system leakoff is determined by measuring the CIV leakages in valve subsets and then totaling the subsets to obtain an overall leakage.

Reason: See reason stated under Purpose, Rev. 10 above. Also, this will allow test to be performed with minimal effect on plant operation or testing.

Acceptance Criteria

Rev. 5 (as stated) ....Total system leakoff is less than the value assumed in the Chapter 15 analysis.

Rev. 8 (revised) .....Total system leakoff does not exceed the assured makeup capacity, as analyzed by Duke Power Company Design Engineering Department.

Reason: Total system leakoff allowable depends on several factors which Design Engineering will evaluate.

Rev. 8 (as stated) Second sentence.... Flow to each isolation valve is 0.3 gpm or less.

Rev. 10 (revised) The underlined words were deleted.

Reason: See reasons stated above for Test Method, Rev. 10.

Page 51 Instrument Air Functional Test

Acceptance Criteria

Rev. 5 (as stated) Third sentence - ...Station Air System crossover valve opens at the pressure setpoint stated in the specifications.

Rev. 8 (revised) ....Station Air System Crossover valve opens at a value approximately equal to the pressure setpoint stated in the specifications.

Reason: The underlined words above were changed because pressure switches cannot be expected to actuate precisely at the setpoint.

Page 52 Plant Sump Test
No revisions have been made since Rev. 5.

Page 53 Waste Gas System Functional Test

Test Method

Rev. 5 (as stated) The system will be operated to verify flow paths from the sources through the system alarms, and interlocks will be .....

Rev. 8 (revised) The system will be operated to verify flow paths from the sources through the system. Specific alarms and interlocks will be ....

Reason: Editorial change to clarify statement.

Acceptance Criteria

Rev. 5 (as stated) ...All alarms and interlocks function......

Rev. 8 (revised) The word all was deleted.

Reason: Only those alarms that perform a safety function are tested.

Page 54 Auxiliary Building Filtered Exhaust and Shutdown Ventilation System Functional Test

Purpose

Rev. 8 (as stated) To demonstrate the capability of the system to function to maintain temperatures in rooms containing safety-related equipment within design temperature limits. To verify proper.....

Rev. 10 (revised) The underlined words above were deleted.

Reason: The requirement to verify temperatures during a continuous 10 hour run was deleted because it is done during power escalation testing under TP/1/A/2600/14, Support Systems Verification Test.

Test Method

Rev. 8 (as stated) Fourth sentence - ...Temperatures in rooms containing safety-related equipment will be monitored during testing to verify temperature control capability.

.....in accordance with ANSI N510-1975.

Rev. 10 (revised) The underlined words were deleted. ANSI-N510-1975 was changed to ANSI-N510-1980.

Reason: See reason above under Purpose. The ANSI change was done by agreement with Dr. Ron Bellamy, RI, NRC and P. A. Skinner, NRC Resident Inspector.

Acceptance Criteria

Rev. 5 (as stated) ...Flow rate of filtered exhaust is 28,000 cfm ± 9%. System realigns to draw suction....upon receipt of LOCA(Ss) signal and develops 6350 cfm ± 9%.

HEPA filter banks demonstrate....99.95%.

Charcoal absorbers remove....99.95%

Rev. 8 (revised) ...Flow rate of filtered exhaust is within Design Limits as specified by Duke Power Company Design Engineering Department. System realigns to draw suction...upon receipt of LOCA(Ss) signal and flow is within limits specified by Duke Power Company Design Engineering Department.

HEPA filter banks demonstrate.... 99.9%
Charcoal absorbers remove.... 99.9%.

Reason: All acceptance criteria is provided by Design Engineering and they must be referenced correctly. The correct flow rates will be provided and will be kept current as system revisions are made. The filter efficiency above was a typographical error which was corrected in Rev. 10.

Rev. 8 (as stated) Last sentence - ...System maintains temperature limits as specified by Duke Power Company Design Engineering Department during a continuous ten(10) hour run.

Hepa filter banks demonstrate.... 99.9%. When they are tested in accordance with ANSI-N510-1975 while operating the system at a flow rate of 9000 cfm ± 10%.
Charcoal absorbers remove .... 99.9% ...when they are tested in accordance with ANSI N510-1975 while operating at 9000 cfm ± 10%.

Rev. 10 (revised) The last sentence, as underlined above was deleted entirely.

References to ANSI-N510-1975 were changed to ANSI-N510-1980.

Test efficiencies were revised to 99.0%.

The flow rates above were deleted and the words Design Flow Rate ± 10% were substituted.

Reason: The requirement to perform a continuous 10 hour run was deleted for reasons stated above under Purpose, Rev. 10.

See reason stated above regarding the ANSI standard. Specific flow rates were deleted because all acceptance criteria is provided by Design Engineering and will be kept current as system revisions are made.

Test efficiencies were changed because the system is being tested as a 95% efficient system, although no credit is taken for filtration capabilities.

Page 55 Fuel Handling Equipment Test
No revisions have been made since Rev. 5.

Page 56 Refueling Water System Functional Test
No revisions have been made since Rev. 5.

Page 57 Boron Recycle Functional Test

Purpose

Rev. 6 (as stated) To verify flowpaths associated with the boron recycle evaporator package. To verify operability of alarms, interlocks, and controls whose failure could result in uncontrolled radioactive release of the spread of containment liquid to undesired areas. To verify the ability of the boron recycle chem pumps to produce sufficient flow at the required head.

Rev. 7 (revised) Verify the operability of alarms and annunciators which, without operator action, could result in an uncontrolled radioactive release or the spread of contaminated liquid to undesired areas. Verify the operability of all interlocks and controls whose failure could result in an uncontrolled radioactive release or the spread of contaminated liquid to undesired areas. Confirm the ability to transfer evaporator distillate and concentrates through their major flowpaths. Confirm the ability to obtain a sample from distillate and concentrates sample vessels. Confirm the ability of the evaporator to produce a distillate and a concentrates stream.

Reason: Provided more detail on actual alarms, annunciators and interlocks tested. Chem pumps head verification was deleted because fluid flashing problem experienced at McGuire does not occur at Catawba. In its place, the test will verify correct flows to each component of the evaporator. The overall operation of the evaporator package verifies the proper operation of the chem pumps.

Test Method

Rev. 6 (as stated) ...The flow from the chem pumps is measured.

Rev. 8 (revised) The sentence underlined above was deleted.

Reason: See reason above stated under Purpose.

Acceptance Criteria

Rev. 6 (as stated) All alarms and interlocks actuate as specified by Westinghouse or as specified by Duke Power Company Design Engineering Department, as appropriate. Flow paths are open. Performance of the chem pumps meets or exceeds manufacturer's head/flow curve, within the accuracy of the measurement.

Rev. 7 (revised) All alarms and interlocks actuate as specified in the Westinghouse Limitations and Setpoints Manual or as specified by Duke Power Company Design Engineering Department, as appropriate. Flow paths are open. The controllers demonstrate the ability to return a process variable to a setpoint when in the "AUTOMATIC" mode. A machinist's stethoscope detects flow to the tank being tested. Concentrates and distillate sample vessels are disconnected and demonstrated to contain a sample. The refractometer monitor (ONBMT 5770) shows an upward change which indicates the boric acid is being concentrated. The CONDENSER LEVEL indicator shows that there is distillate in the Condenser. No excessive system piping motion or vibration is observed during this test per 6.1.

Reason: Wording was changed to clarify the source of the setpoints for the acceptance criteria. Clarification of evaporator functions that are tested was provided. These include the ability to take samples, direct flows, and operation of automatic controller functions. Reference to performance of the chem pumps deleted as explained above in Purpose section. Vibration monitoring added as required for Mechanical Maintenance testing test procedures.

Rev. 8 (revised) The sentences underlined above in Rev. 7 were deleted.

Reason: The stethoscope measurement of flow was deleted mistakenly, it will be returned in Rev. 10. The reference to system piping motion or vibration was deleted because vibration monitoring is covered under Test Abstract in Table 14.2.12-1, page 57 and discussed in Section 3.9.2 FSAR.

Page 58 Radwaste Solidification System Functional Test

Acceptance Criteria

Rev. 6 (as stated) Solid waste compactor produces compacted waste containing no free liquids.

Rev. 8 (revised) The underlined words were deleted.

Reason: This statement was deleted by error. It will appear again in Rev. 10.

Page 59 Liquid Waste System Functional Test
No revisions have been made since Rev. 6.

Page 60 Auxiliary Shutdown Panel Test

Purpose

Rev. 8 (as stated) Second paragraph - ...The ability to maintain hot standby conditions is demonstrated during the Reactor Coolant System Hot Functional Test (HFT). Also during HFT, the ability.....

Rev. 10 (revised) The underlined words were deleted.

Reason: Maintaining hot standby conditions is demonstrated during the Loss of Control Room Functional Test during power escalation testing.

Regulatory Guide 1.68.2 requires this demonstration to be performed with the reactor initially at a moderate power level (10-25%). Maintaining Hot Standby conditions during Hot Functional Testing would not have shown any additional capability that was not demonstrated during the cooldown from outside the control room.

Prerequisites

Rev. 8 (as stated) ...For the demonstration portion during HFT, Hot Functional Testing is in progress with primary system at normal operating temperature and pressure.

Rev. 10 (revised) The underlined words were replaced with the words approximately 400°F.

Reason: There was no need to heat up to normal operating conditions. Adequate control and cooldown capability is demonstrated with primary system at 400°F. This demonstration includes cooling down sufficiently to place the Residual Heat Removal System in service.

Test Method

Rev. 5 (as stated) Second paragraph - During HFT, with the primary system at normal operating temperature and pressure, control is transferred to the auxiliary shutdown panels. Hot standby conditions are then maintained for at least 30 minutes. Also, Reactor Coolant.....

Rev. 8 (revised) The underlined words in the first sentence were revised to approximately 400°F. The sentence referring to Hot standby conditions was deleted.

Reason: See reason stated above under Prerequisites; also see reasons stated above under Purpose.

RESPONSE TO Q640.57B
PART B - EXPLANATIONS FOR CHANGES MADE TO
TEST ABSTRACTS IN FSAR TABLE 14.2.12-2

Page 2 — Initial Fuel Loading
No changes have been made since Rev. 5.

Page 3 — Moveable Incore Detector Functional Test

Prerequisites

Rev. 5 (as stated) — Second sentence - ...The Reactor Coolant System is in the cold shutdown condition.

Rev. 10 (revised) — The underlined word above was replaced with the word hot.

Reason: To conform with vendor guidelines. This test is to be run after heatup following fuel loading.

Page 4 — Incore Thermocouple and RTD Cross Calibration
No changes have been made since Rev. 5.

Page 5 — Rod Position Indication Check

Purpose

Rev. 5 (as stated) — ...under hot shutdown conditions, and to demonstrate that all full length rods operate satisfactorily over their entire range of travel.

Rev. 10 (revised) — The underlined words above were deleted so that the phrase reads as follows:

...under hot standby conditions over its entire range of travel.

Reason:

The hot standby condition correctly reflects the prerequisite as stated in Rev. 5. The purpose of the test is to verify the system, not the satisfactory operation of the rods.

Page 6 — Rod Cluster Control Assembly Drop Time Test
No changes have been made since Rev. 5.

Page 7 — Rod Control System Alignment Test
No changes have been made since Rev. 5.

Page 8 — Rod Drive Mechanism Timing Test
No changes have been made since Rev. 5.

Page 9 Reactor Coolant System Flow Test

Purpose

Rev. 6 (as stated) To verify predicted Reactor Coolant System flow rates at normal no-load operating temperature and pressure with various operating reactor coolant pump configurations. To align....

Rev. 8 (revised) The underlined words above were deleted.

Reason: The test method was changed so that only four pump operations is analyzed as allowed by the Technical Specifications.

Prerequisites

Rev. 6 (as stated) ....All four reactor coolant pumps are operating. Pressure damping devices are installed in the elbow tap differential pressure cell sensing lines.

Rev. 8 (revised) The underlined words above were deleted.

Reason: The test method was changed according to Vendor guidelines to obtain flow from the elbow taps with all four pumps running. This will yield more accurate results.

Test Method

Rev. 6 (as stated) In each reactor coolant flow configuration, pump power, pump rotational speed and loop elbow differential pressure are measured and recorded. These measurements are compared with design pump performance curves to establish the point at which the pump is operating. From this information, in-service pump characteristic flow curves for each configuration are established. The flow transmitters are adjusted for 100 percent flow at normal operating conditions and zero output at zero flow.

Rev. 8 (revised) This paragraph was rewritten as follows:

The output voltage of each NC loop differential pressure transmitter is measured using a digital voltmeter. The output voltages are averaged and converted on equivalent differential pressure which is then converted to flow using a vendor supplied, plant specific graph. The loop flows are summed to give the total system flow. The flow transmitters are adjusted for 100 percent flow at normal operating conditions and zero output at zero flow.

Reason: Changed to obtain flow from the elbow taps with all four pumps running. Vendor recommended change to obtain more accurate results.

Page 10 Reactor Coolant System Flow Coastdown Test

Prerequisites

Rev. 0 (as stated) The reactor is in the hot shutdown condition with ....

Rev. 10 (revised) The underlined word above was replaced with standby.

Reason: This test is performed at normal no-load conditions, not at temperatures less than 350°F.

Rev. 0 (as stated) ....accordingly, and pressure damping devices installed for the flow test have been removed.

Rev. 10 (revised) The underlined words were deleted.

Reason: This statement is no longer application since pressure damping devices are no longer required/used for performing the NC flow test. Refer to Test Abstract 14.2.12-2 (Page 9).

Test Method

Rev. 0 (as stated) One shutdown bank of control rods is withdrawn, while maintaining the hot shutdown condition. One reactor coolant pump tripped, measuring and recording the time from breaker opening to first rod motion. All reactor coolant pumps are tripped simultaneously: On a high-speed strip chart recorder, for each transient, on elbow tap differential pressure cell for each loop, each reactor coolant pump breaker position, rod position indication signal for one rod and reactor trip breaker position are measured and recorded.

Rev. 10 (revised) The paragraph above was replaced with the following:

Flow coastdown will be measured for the single loop loss of flow by tripping one of four reactor coolant pumps and monitoring flow using the elbow tap differential pressure cells. Delay times for several protective functions are measured using a strip chart recorder.

Flow coastdown will also be measured for a complete loss of flow. All four pumps will be tripped simultaneously using the Reactor Coolant Pump Electrical Monitoring System. Flow will be measured using the same method as the partial loss of flow case.

Reason: The test method was reworded to more accurately reflect flow coastdown for 4/4 and 1/4 conditions. The withdrawing of a single rod is no longer required. Rod position indication is no longer required. Revised vendor guidelines now provide the time interval between the

opening of the reactor trip breaker to the first rod movement. This information was not provided in previous guidelines and required measurement. The low flow delay time can be determined by the time interval between tripping the pump and the opening of the reactor trip breaker.

Page 11 RTD Bypass Flow Verification

Prerequisites

Rev. 5 (as stated) The reactor is in the hot standby condition....

Rev. 8 (revised) For portions of the test other than the piping measurements, the reactor is in the hot standby condition....

Reason: The underlined phrase was added to clarify the fact that piping lengths are measured with the NC system under cold conditions.

Test Method

Rev. 5 (as stated) Fifth line - ...and then calculating the flow necessary to achieve less than 1.0 second transport time....

Rev. 8 (revised) ...and the calculating the flow measurement to achieve less than or equal to 1.0 second transport time...

Reason: To conform to Westinghouse acceptance criteria.

Acceptance Criteria

Rev. 5 (as stated) ...The low flow alarm actuates at 90 percent of full bypass loop flow.

Rev. 8 (revised) The low flow alarm actuates at 90 ± 2.0 percent of full bypass loop flow.

Reason: As a result of NRC concerns during Unit 1 HFT, an error band obtained from calibration procedures was added.

Rev. 8 (as stated) The RTD bypass loop transport time is less than 1.0 second or if greater, is noted...

Rev. 10 (revised) The RTD bypass loop transport time is less than or equal to 1.0 if greater, is noted...

Reason: To conform with revision to Test Method above.

Page 12 Reactor Protective System Setpoints Verification
There have been no changes since Rev. 5.

Page 13 — Initial Criticality
There have been no changes since Rev. 5.

Page 14 — Zero Power Physics Test

Test Method

Rev. 6 (as stated) — Item (h) ...The reactivity addition is determined... as the rod is withdrawn to its out limit.

Rev. 8 (revised) — The reactivity addition is determined...as the rod is withdrawn to its outer limit. (Unit 1 only).

Reason: As shown in Table 14.2.7-1 (page 2a) exception was taken to Reg. Guide 1.68 such that pseudo rod ejection tests would only be performed on Unit 1.

Page 16 — Pressurizer Pressure and Level Control System Test
No changes have been made since Rev. 5.

Page 17 — Rod Control System at-power Test
No changes have been made since Rev. 5.

Page 18 — Core Power Distribution Test
No changes have been made since Rev. 0.

Page 19 — Unit Load Steady State Test
No changes have been made since Rev. 6.

Page 20 — Radiation Shielding Survey
No changes have been made since Rev. 5.

Page 21 — Nuclear Instrumentation Initial Calibration
No changes have been made since Rev. 6.

Page 22 — Process and Effluent Radiation Monitor Test

Purpose

Rev. 6 (as stated) — To verify the performance of the process and effluent monitors under actual conditions.

Rev. 8 (revised) — ...under actual conditions. This test is not required to be completed to proceed to the next testing plateau.

Reason: The underlined sentence was added to allow the flexibility of continuing the power ascension testing to the next power level. This does not jeopardize plant safety. Refer to FSAR Q640.3, Q640.4, Section 14.2.4.3, 14.2.11 and Figure 14.2.11-1 which identify tests not required during initial escalation. Also refer to FSAR Table 14.2.7-1 item App. 4.g.A.

Page 23 Doppler Only Power Coefficient Verification Measurement

Purpose

Rev. 6 (as stated) To determine the differential power coefficient of reactivity and the integral power defect.

Rev. 10 (revised) The underlined sentence was deleted and replaced with the following: To verify the nuclear design predictions of the Doppler only power coefficient.

Reason: The original abstract was entitled Power Coefficient and Power Defect Measurement. It was based on vendor supplied methodology for the McGuire FSAR. The changed title and purpose reflect revised methodology/ guidelines received from the vendor.

Prerequisites

Rev. 6 (as stated) The reactor is in the hot zero power condition....

Rev. 10 (revised) The underlined words above were replaced with the words at a stable..

Reason: See reason stated above.

Test Method

Rev. 6 (as stated) Reactor power is maintained consistent with turbine load demand by control bank adjustment throughout the range of each load change from the hot zero power condition to the hot full power condition. Reactivity increments due to periodic control bank movement are determined and recorded throughout each load channel. At selected power levels, conditions are stabilized and a heat balance obtained to accurately determine core power. Power coefficient and power defect are calculated with data obtained over the range from hot zero power to hot full power.

Rev. 10 (revised) Initial data is taken. With the turbine and reactor controls in manual, the turbine load is decreased then increased. Data is recorded during and after the load maneuver and used to infer a measured doppler coefficient verification factor. This factor is compared to a vendor supplied predicted doppler verification factor.

Reason: See reason stated above.

Acceptance Criteria

Rev. 6 (as stated) The differential power coefficient assumed in accident analyses in Chapter 15 is equal to or more conservative than the measured coefficient. The measured power defect is within the bounds of the

most negative and least negative values assumed in the analyses of accidents as shown in FSAR Figure 15.0.4-1.

Rev. 8 (revised) The inferred measured doppler coefficient verification factor agrees with predicted values as specified by the vendor.

Reason: See reason stated above.

Page 24 Incore and Nuclear Instrumentation Systems Detector Correlation
No changes have been made since Rev. 5.

Page 25 Below Bank Rod Test

Prerequisites

Rev. 9 (as stated) ...Power escalation testing is completed to approximately the 30 percent power level.

Rev. 10 (revised) The underlined sentence was deleted, and replaced with the following: The Unit is at the 50 percent power level for testing.

Reason: This is consistent with Reg. Guide 1.68, Rev. 2, App. 5i and FSAR Table 14.2.11-1.

Test Method

Rev. 6 Single rod movement is accomplished by disconnecting the lift coils of all rods in the affected bank except the selected rod. The differential worth of the rod cluster control assembly is determined by making a series of stepwise adjustment in rod position to maintain nominal system criticality during a continuous, controlled Reactor Coolant System dilution/boration. The flux level response to the step change in reactivity is translated to equivalent reactivity. Differential and integral worths are calculated from this reactivity. During rod cluster control assembly insertion, power range detector currents, thermocouple maps and moveable incore detector traces are periodically recorded. The power range detector and moveable incore data provide information to relate core quadrant tilt to rod cluster control assembly position, from fully inserted to it's position when aligned with it's bank.

Rev. 8 (revised) This test method was inadvertently displaced by one from another abstract in this revision. The original test method above was put back in place in Rev. 9.

Rev. 10 (revised) The original test method was replaced with the following:

Initial data is obtained with the reactor at stable conditions. The lift coils of all rods in Bank D except for the most reactive RCCA are disconnected. The most reactive RCCA is diluted to the fully inserted position while taking data. When all data has been taken, the RCCA is borated back to its bank position.

Reason: From past industry experience rod worths cannot be accurately performed at power. Vendors do not supply rod worth information for at power conditions. No worth is assumed in Chapter 15 for a single completely misaligned rod, and the revised test method describes the vendor recommended method for complete misalignment.

Page 26 Pseudo Rod Injection Test (Unit 1 Only)

Test Method

Rev. 8 (as stated) Last sentence - ...The power range detectors and moveable detector data provide information to relate core quadrant tilt to rod cluster control assembly.

Rev. 10 (revised) The underlined words above were replaced with core power distribution

Reason: Power distribution, not quadrant tilt, will be the prime characteristic utilized to evaluate RCCA misalignment effects.

Acceptance Criteria

Rev. 5 (as stated) Second sentence - ... No significant radial or axial power maldistribution exists with the rod cluster control assembly...

Rev. 8 (revised) The underlined words above were replaced as follows:

Core peaking factors remain within technical specification limits with the rod cluster control assembly.

Reason: To clearly define the verification of no significant radial or axial power maldistribution.

Rev. 5 (as stated) ...Incore and/or nuclear instrumentation is demonstrated capable of detecting any significant power maldistribution caused by the misaligned rod cluster control assembly.

Rev. 8 (revised) The words underlined above were revised as follows:

Incore instrumentation is demonstrated capable of detecting the power maldistribution caused by the misaligned rod cluster control assembly.

Reason: Incore instrumentation will be the primary means of detection of a misaligned RCCA. The work "significant" was eliminated in order to clarify the statement.

Rev. 10 (revised) The following underlined words were added to the above. ....Incore and/or excore instrumentation is demonstrated...maldistribution caused by the misaligned rod cluster control assembly per Chapter 15.

Reason: Excore data is gathered during the test and examined for indication of RCCA misalignment. Chapter 15, the safety analysis, specifies that nuclear instrumentation is capable of detecting an RCCA which is misaligned in excess of 24 steps (15 inches) above its bank position.

Page 27 Unit Load Transient Test

Purpose

Rev. 0 (as stated) To demonstrate satisfactory unit response to a 10 percent load change.

Rev. 8 To demonstrate satisfactory unit response to a 10 percent load change. This test is not required to be completed at 50% or 75% testing plateau to escalate to the next testing plateau.

Reason: This statement was added to allow more flexibility in the testing sequence. This test does, however, have to be completed at each power level before power escalation is complete. If this test is not completed during the initial escalation at 75% and 50% the safety of the plant will not be effected. Refer to FSAR Q640.3, Q640.4, Sections 14.2.4.3, 14.2.11 and Figure 14.2.11-1 which describe/identify those tests not required during limited escalation.

Page 28 Dynamic Rod Drop Test

This test was deleted in Rev. 8 because the revised FSAR Section 15.4.3.1 reflected a revised vendor methodology for RCCA misoperation. This methodology has been reviewed and accepted for Cycle 1 as described in SSER1 Section 15.2.4.5. Reactor trip from any dropped rod is no longer assumed, thus verification is not required.

Page 29 Unit Loss of Electrical Load

Test Method

Rev. 8 (as stated) Last sentence - Drop times for selected individual rod control cluster assemblies are recorded.

Rev. 10 (revised) The underlined sentence was deleted.

Reason: In FSAR Table 14.2.7-1 (page 3) an exception to Reg. Guide 1.68, Rev. 2, App A5.h is taken to obtaining rod drop times at power.

Acceptance Criteria

Rev. 5 (as stated) ...Main steam and pressurizer safety valves do not lift.

Rev. 8 (revised) The underlined words above were deleted.

Reason: This was changed to match Westinghouse acceptance criteria for a large net loss of electrical load.

Rev. 8 (as stated) The turbine does not exceed design overspeed as defined in FSAR Section 10.2.

Rev. 10 (revised) The turbine does not exceed the "Electrical" backup trip(111.5%).

Reason: The underlined words in Rev. 8 were replaced in order to clarify which overspeed trip should not be exceeded. FSAR Section 10.2 does not clearly define one turbine design overspeed. With turbine controls in automatic control a mechanical overspeed trip is set at 110% of full speed. The new acceptance criteria is worded such that we ensure the mechanical overspeed trip occurs, as necessary.

Rev. 8 (as stated) The rod control cluster assembly drop times measured are less than limit of Technical Specification 3.1.3.4.

Rev. 10 (revised) This sentence was deleted.

Reason: See reason stated under Test Method.

Page 30 Turbine Trip Test

Purpose

Rev. 5 (as stated) To demonstrate the ability of the unit to sustain a trip of the main turbine generator from approximately 50% power.

Rev. 8 (revised) The underlined word was changed to 70%.

Also, a sentence was added:

This test is not required to be completed to escalate to the next testing plateau.

Reason: The increase in power level was due to a Westinghouse design change. Duke Power would like to perform this test at the highest power level possible (restricted by the Reactor Trip on Turbine Trip Logic). A reactor tip is in effect at P-9 (69% FP) and the Turbine Trip Test is performed just below the P-9 permissive. Refer to FSAR Table 14.2.7-1, App. A.5.1.1.

The added statement was meant to provide flexibility in the Controlling Procedure for Power Escalation. Plant Safety is not jeopardized by this change. Refer to Q640.3, Q640.4, Section 14.2.4.3,

14.2.11 and Figure 14.2.11-1, which describe/identify those tests not required during initial escalation.

Prerequisites

Rev. 5 (as stated) The unit is at a steady state power level, just below the P-8 setpoint, ...

Rev. 8 (revised) The term P-8 was changed to P-9. See reasons stated under Purpose. The Westinghouse analysis changed the logic to initiate on P-9 (69% FP).

Page 31 Feedwater Temperature Verification Test

Purpose

Rev. 5 (as stated) ...to determine if any system changes are required to improve transient response.

Rev. 8 (revised) ...to determine if any system changes are required to improve transient response. This test is not required to be completed to escalate to the next testing plateau.

Reason: The underlined sentence was added to give flexibility to the power escalation test sequence and does not affect the safety of the plant. Refer to FSAR Q640.3, Q640.4, Section 14.2.4.3, Section 14.2.11 and Figure 14.2.11-1 which describe/identify those tests not required during initial escalation.

Prerequisites

Rev. 8 (as stated) ...pertinent plant parameters (such as turbine speed, feedwater and steam flows, flux, steam generator and pressurizer levels....are connected to recording devices.

Rev. 10 (revised) The word turbine speed was deleted, and the word feedwater temperature substituted.

Reason: Turbine speed is secondary in importance to feedwater temperatures and flow rates for the test.

Test Method

Rev. 8 (as stated) ...is opened. The C heater drain tank pumps are manually tripped.

Rev. 10 (revised) The underlined statement was deleted.

Reason: According to the Westinghouse analysis (see FSAR 15.1-1), only the A-B heater train bypass valve is assumed to open.

Acceptance Criteria

Rev. 8 (as stated)	Turbine generator and reactor do not trip. Safety injection.....
Rev. 10 (revised)	The underlined words below were added as follows: Turbine generator and reactor do not trip <u>due to NC System transients.</u> Safety injection.....
Reason:	The Westinghouse analysis did not consider or take credit for safety function activation due to secondary side behavior. This will be reflected in this test also.
<u>Page 32</u>	Loss of Control Room Test

Purpose

Rev. 0 (as stated)	To demonstrate capability to shutdown the unit from outside the control room. To demonstrate the unit can be maintained in hot standby conditions from outside the control room. To demonstrate the potential for cooldown from hot standby conditions from outside the control room.
Rev. 5 (revised)	To demonstrate that the unit can be brought to hot standby conditions from a moderate power level using Auxiliary Shutdown Panel controls and only the minimum shift crew required for operation. To demonstrate that hot standby conditions can be maintained from outside the control room.
Reason	To better clarify the purpose so that it is consistent with the requirements of Regulatory Guide 1.68.2.
Rev. 8 (revised)	The following sentence was added: This test is not required to be completed to escalate to the next testing plateau.
Reason:	To allow continued power escalation testing if this test is delayed for any reason. This test is to be performed prior to full power operation and is to be done with the reactor at a moderate power level.

Prerequisites

Rev. 0 (as stated)	Unit generator output is at least 10 percent power. Communications between control room and the local control stations have been established. On site emergency power system is operable.
Rev. 5 (revised)	The prerequisites above were deleted entirely and replace with:

Power escalation testing is in progress with the reactor at a moderate power level (10-25%) sufficiently high that plant systems are in normal configuration with the turbine - generator in operation. All personnel in the control room area not actively participating in the test as well as those performing the test are identified and their authority and responsibility documented in the test procedure.

Reason: The paragraph was rewritten for clarification and for consistency with Regulatory Guide 1.68.2-C.3. Communications established prior to test initiation would invalidate the purpose of the test procedure, which is to verify the adequacy of emergency procedures. During power escalation testing, emergency power will be available as required by the Technical Specifications. Regulatory Guide 1.68.2-C.3 requires that only the minimum shift crew actively particpate in this test. Documentation of personnel will ensure that we meet this requirement.

Test Method

Rev. 0 (as stated) Evacuation of the control room is simulated by dispatching normal operating personnel to their assigned stations while additional operators occupy the control room to observe unit behavior. The reactor is tripped at the local reactor trip switchgear. The unit is maintained in a stable hot standby condition by the manipulation of local controls and observation of local indications. Data is gathered at the local stations. The reactor coolant system is lowered to 350°F and 400 psig. The reactor coolant temperature is reduced by the operation of the Residual Heat Removal System from the local stations.

Rev. 5 (revised) The control room is evacuated of normal operating personnel following the Normal Loss of Control Room operating procedure. Additional operators, not actively participating in the test, remain in the control room to monitor unit behavior. The unit is brought to hot standby conditions using local controls and indications and maintained at this condition for at least 30 minutes. Control is then transferred back to the control room and power escalation testing continued.

Reason: Reworded in part to better clarify the required activities of control room personnel.

The reactor can be tripped either from the control room or locally in following the emergency procedure. The Reg. Guide does not require that the reactor be tripped locally. Another test abstract (Table 14.2.12-1, page 60) identifies additional testing performed during HFT, in which it is verified that reactor coolant temperature and pressure can be lowered sufficiently to operate the Residual Heat Removal system, and then lowered an additional 50°F. This is allowable according to Reg. Guide 1.68.2-C.4.

Acceptance Criteria

Rev. 0 (as stated) The reactor and turbine generator trip. A stable hot standby condition is maintained for at least 30 minutes from local control stations. The reactor coolant temperature is reduced by at least 50°F, using the Residual Heat Removal System while maintaining the reactor coolant temperature and pressure within the limits of FSAR Chapter 16.

Rev. 5 (revised) The unit is satisfactorily brought to hot standby conditions from a moderate power level and maintained at this condition for at least 30 minutes from outside the control room. Only the minimum number of personnel required to be assigned to the unit at any one time take an active part in this demonstration.

Reason: Verification that the reactor can be tripped is not the purpose of this test. Deleted reference to Residual Heat Removal system for reasons stated under Test Method. Statement concerning minimum shift crew was added because it is of major importance as discussed in Reg. Guide 1.68.2-C.3.

Page 33 Station Blackout Test

Purpose

Rev. 1 (as stated) ...and a partial loss of onsite sources.

Rev. 8 (revised) ...and a partial loss of onsite sources. This test is not required to be completed to escalate to the next testing plateau.

Reason: The underlined statement was added to allow more flexibility to the testing sequence. This test must be complete before power escalation testing is complete. If this test is not completed during the initial escalation, but performed before the testing sequence is complete, the safety of the plant will not be affected. Refer to FSAR Q640.3, Q640.4, Sections 14.2.4.3, 14.2.11 and Figure 14.2.11-1 which describe/identify those tests not required during initial escalation.

Page 35 Natural Circulation Verification Test

Purpose

Rev. 8 (as stated) Last sentence - ...To verify, to the extent possible, the adequacy of station operating procedures and to provide operator training to satisfy NUREG 0737 requirements.

Rev. 10 (revised) The underlined words above were deleted.

Reason: Due to the nature of this test (e.g., no NC depressurization will be performed), no station procedures will be employed.

Prerequisites

Rev. 8 (as stated) Second Paragraph - ...valves have been gagged. All automatic safety injection(Ss) functions except reactor trip have been blocked. Manual initiation of safety injection functions and automatic alarms indicating channel trips remain available to the operator. The steam generator low low level reactor trip setpoints have been reduced to 5% of span. Over temperature and overpower ΔT reactor trip signals have been blocked. Safety injection initiation on low steamline pressure has been blocked.

Rev. 10 (revised) The underlined statements above were deleted.

Reason: In accordance with recent Westinghouse Recommendations and due to MNS experience, defeating these safety functions is not needed to perform this test.

Test Method

Rev. 5 (as stated) ...will be monitored. The test will be repeated for each operating shift...

Rev. 8 (revised) ...will be monitored. During the performance of this test on Catawba Unit 1 only, the test will be repeated for each operating shift...

Reason: The underlined phrase was added because this test will be performed to allow initial operation training (Refer to Q640.48) on Unit 1 startup only. All subsequent training will be via simulator.

Acceptance Criteria

Rev. 5 (as stated) ...limits supplied by the NSSS vendor. If data taken during first performance......

Rev. 10 (revised) The underlined statement was inserted as follows: ...limits supplied by the NSSS vendor. Steam generator and pressurizer levels are maintained above the levels recommended by the NSSS vendor.

Reason: This was added upon the recommendation of Westinghouse.

Page 37 Pressurizer Functional Test

Purpose

Rev. 5 (as stated) ...spray of the pressurizer heaters.

Rev. 8 (as stated) The underlined words were added:
...spray of the pressurizer heaters, <u>and verify the response time of the pressurizer power operated relief valves.</u>

Reason: This was previously covered by the Pressurizer Dynamic Response Functional Test conducted during HFT. Duke design changes on the PORV solenoids necessitate that the valve response time be reverified.

<u>Test Method</u>

Rev. 5 (as stated) Second paragraph - ...The transient is terminated...by shutting the spray valves.

Rev. 8 (revised) A third paragraph was added to follow the above:
With the unit at normal operating no load temperature and pressure, each PORV shall be cycled for response time testing. The 2185 psig interlock closes the valve and original conditions are re-established.

Reason: See reason stated above. Also, the 2185 psig interlock was recorded in the Pressurizer Dynamic Response Functional Test, but credit was not taken due to response time failure.

<u>Acceptance Criteria</u>

Rev. 5 (as stated) ...is less than 125°F.

Rev. 8 (revised) ...is less than 125°F.
<u>For pressurizer PORV response times, each PORV response time is ≤ 2 seconds.</u>

Reason: This statement was added as the acceptance criteria for the PORV response time.

Rev. 5 (as stated) Second paragraph - For spray and heater response tests, the response to induced transients is within the band assumed in the FSAR Safety Analysis.

Rev. 8 (revised) This paragraph was deleted mistakenly when the paragraph on PORV response time was added. It will appear in Rev. 10 as shown below:

Rev. 10 (revised) For Spray and heater response tests, the response to induced transients is within <u>the limits specified by Vendor guidelines</u>.

Reason: The underlined words were changed to reflect the source of the acceptance criteria and because the safety analysis does not specify the response.

<u>Page 38</u> Support Systems Verification Test

Purpose

Rev. 5 (as stated) ...cooling systems serving those areas.

Rev. 8 (revised) ...cooling systems serving those areas. This test is not required to be complete to escalate to the next testing plateau.

Reason: The underlined sentence was added. This test gathers and analyzes data at several testing plateaus. It will be completed at the 100% testing plateau. Refer to FSAR Q640.3, Q640.4, Section 14.2.4.3, 14.2.11 and Figure 14.2.11-1 which describe/identify those tests not required to be completed during initial escalation.

Page 39 Steam Generator Water Hammer Test

Purpose

Rev. 5 (as stated) To verify that the Feedwater Bypass System prevents.....

Rev. 7 (revised) The word Bypass was deleted.

Reason: To correct the name of the system.

Prerequisites

Rev. 5 (as stated) ...through the Feedwater Bypass system...

Rev. 7 (revised) The word Bypass was deleted.

Reason: To correct the name of the system.

Acceptance Criteria

Rev. 7 (as stated) No uncontrolled pressure transients are noted during switchover. No deformation or damage to the steam generators or supports is noted following the test.

Rev. 10 (revised) The word "uncontrolled" above was deleted. The underlined words below were added as follows:

No pressure transients exceeding 50psi (peak to peak) are noted during switchover. No deformation or damage to the steam generators, supports, feedwater piping or restraints is noted following the test.

Reason: Westinghouse has supplied a quantitative definition of excessive pressure transient.

Page 40   Rod Control System Functional Test

This test abstract was added with Rev. 8. It properly belongs on Page 7, Table 14.2.12-1 as a preoperational test. Rev. 10 will show that this test abstract is deleted from this table.

Chapter 14

Revision 10

Each procedure is approved prior to use by the Station Manager; or by the Operations, Maintenance or Technical Services Superintendents as previously designated by the Station Manager. Approved safety-related test procedures will be made available for review 60 days prior to their intended use, or as specified in our revised response to Q640.5.

14.2.3.3 Changes to Procedures

Changes to procedures are classified as two types: minor and major. A minor change is a change to an approved procedure which corrects errors in the applicable approved procedure of a typographical or editorial nature. A major change is any change to an approved procedure determined not to be a minor change.

A minor change may be made by an individual with no special reviews or approvals. Minor changes, by definition, cannot alter the intent or methodology of the test procedure as originally approved. Because of this, minor changes require no additional review or approval. A major change to a procedure is handled in an identical manner as the original review and approval of a procedure-see Section 14.2.3.2.

14.2.3.4 Procedure Format

The format for test procedures will be uniform to the extent practicable and will consist of the following sections: Purpose, references, time required, prerequisite tests, test equipment, limits and precautions, required station (or unit) status, prerequisite system conditions, test method, data required, acceptance criteria, procedure and enclosures. Procedures are written in sufficient detail to permit qualified personnel to perform the required tasks.

Data sheets in procedures used to verify the acceptability of Engineered Safeguards pumps and fans will include all essential information to allow extrapolation of performance from test conditions to post accident design conditions. Adequate documentation is provided by the test procedure to allow determination of system operating configurations at the time test data is obtained.

14.2.4 CONDUCT OF TEST PROGRAM

14.2.4.1 Administrative Procedures

All aspects of the startup test program are conducted under appropriate administrative procedures. The use of properly reviewed and approved procedures are required for all preoperational and startup tests. The results of each preoperational test are reviewed and approved by the responsible group superintendent before they are used as the basis of continuing the test program. The results of startup testing will be reviewed and approved by the Superintendent of Technical Services prior to proceeding to the next significant power plateau. In addition, the results of each individual startup test will receive the same review as that described for preoperational tests. All modifications to safety related systems which are found necessary are reviewed and approved by the responsible group superintendent and the station manager.

TABLE 14.2.7-1 (Page 2a)

COMPLIANCE WITH REGULATORY GUIDES

Regulatory Guide	Compliance	Affected Section(s)	Exception Taken	Justification
		App. A 4.c App. A 5.e	Pseudo-ejected-rod measurements will not be performed on Unit 2.	The calculational codes and analytical methods used for nuclear analysis of the reactor core are presented in FSAR Section 4.3.3. The validity of these codes and safety analysis assumptions for ejected rod worth will be verified as part of the extensive startup testing on Unit 1. The core design and control rods utilized on Unit 2 are identical to those for Unit 1. Control rod bank worths measurements should be sufficient to verify adequacy of ejected rod predictions. Therefore, without any gross errors in the measured bank rod worths, the Unit 2 pseudo ejected rod worth should be within the safety analysis assumptions.
		App. A 4.g	Demonstration of proper process or effluent monitoring system response based on correlation with independent laboratory analysis will be conducted only for those monitors for which process or effuent levels exceed the minimum sensitivity of the detector.	During initial startup testing historical data has shown that process and effluent monitors may not experience levels in excess of the minimum sensitivity of the monitor. A meaningful correlation with laboratory analysis is not possible for these monitors.
		App. A 4.h A.4.r A.5.a.a.	Demonstration of the operability of reactor coolant/secondary purification and clean up systems. Formal testing will not be performed.	Refer to responses to Q640.52 items A.4.h, A.4.r., A.5.a.a.
		App. A.4.i	Specific testing to demonstrate the operability of control rod sequences and inhibit/blocking functions over the reactor power level range during low power testing will not be performed.	Refer to Q640.52 item 4.i response.
		App. A.4.j	Specific testing to demonstrate the capability of primary containment ventilation during low power testing will not be performed.	Refer to Q640.52 item 4.j response.

TABLE 14.2.7-1 (Page 2b)

COMPLIANCE WITH REGULATORY GUIDES

Regulatory Guide	Compliance	Affected Section(s)	Exception Taken	Justification
		App. A.4.k	Specific testing to demonstrate the operability of steam driven ESF/plant auxiliaries and power conversion equipment during low power testing will not be performed.	Refer to Q640.52 item 4.k response.
		App. A.4.l	Specific testing to demonstrate the operability and stroke times of main steam line/branch line/bypass valves used for protective functions during low power testing will not be performed.	Refer to Q640.52 item 4.l response.
		App. A.4.n	Specific testing to demonstrate the operability of control room computer system will not be performed during low power testing.	Refer to Q640.52 items 4.n and Q540.21 response.
		App. A.4.o	Specific testing to determine control rod scram times will not be performed during low power testing.	Refer to Q640.52 items 4.0 and 5.h response and exception A.5.h below.
		App. A 4.p	Demonstration of the operability of pressurizer code relief valves at rated temperature may be demonstrated by a bench test verification, performed by the valve vendor. Results of the vendor tests as well as copies of the test procedures will be available for review.	Operability of the pressurize code relief valves need not be conducted by means of an installed functional test due to the undesirable additional transient imposed on the valves and associated discharge piping.
			Demonstration of operability of main steam safety valves will not be performed during low power testing.	Refer to Q640.52 item 4.p, Q640.13 and Q640.14 responses.
			Demonstration of operability of pressurizer/main steam PORV will not be performed during low power testing.	Pressurizer PORV's tested during precritical activities. Refer to Table 14.2.12-2 Page 37 and Q640.13 and Q640.14 responses.

TABLE 14.2.7-1 (Page 2c)

COMPLIANCE WITH REGULATORY GUIDES

Regulatory Guide	Compliance	Affected Section(s)	Exception Taken	Justification
		App. A.4.q	Demonstration of the operability of RHR systems will not be performed during low power testing.	Refer to Q640.52 item 4.q.
		App. A.4.s	Vibration measurement of reactor vessel and reactor coolant components will not be performed during low power testing.	Refer to Q640.39 response.
		App. A.4.u	Specific testing to demonstrate major or principal plant control system will not be performed during low power testing.	Refer to Q640.52 item 4.u response.

TABLE 14.2.7-1 (Page 3)

COMPLIANCE WITH REGULATORY GUIDES

Regulatory Guide	Compliance	Affected Section(s)	Exception Taken	Justification
1.68 Rev. 2	Partial	App. A 5	Tests and acceptance criteria will be developed to demonstrate the ability of major principal plant control systems to automatically control process variables within design limits around the nominal reference value.	Control system testing should verify proper control of process variables within the design control deadband, not over the range of design values of process variables. Proper control of process variables will be demonstrated during power escalation over the range of 0 to 100% F.P.
		App. A 5.b	Departure from nucleate boiling ratio (DNBR), maximum average planar linear heat generation rate (MAPLHGR), and minimum critical power ratio (MCPR) will not be directly verified during power escalation testing.	Axial, Radial, and Total Peaking will be directly measured and verified during power escalation testing and will be used to verify DNBR and linear heat rate margin by analysis.
		App. A 5.g	Special testing to demonstrate control rod sequencers/withdrawal block funtions operation will not be performed.	Refer to Q640.52 item 4.i response.
		App. A 5.h	Rod drop times will not be measured at power.	Measuring rod drop times at power would require disabling all position indication for the rods in violation of plant Technical Specifications.
		App. A 5.i	Test to demonstrate incore/excore instrumentation sensitivity to detect rod misalignment will not be performed at full power.	From vendor predictions the Xenon and power distributions at 50% and 100% are similar. The performance of this test at 50% should adequately demonstrate the capability and sensitivity of incore/excore instrumentation to detect control rod misalignments equal to or less than Technical Specifications.
		App. A 5.k	Special testing to demonstrate ECCS operation will not be performed during low power ascension testing.	Refer to Q640.52 item 5.k response.
	Partial	App. A 5.l	Specific testing to demonstrate capabilities of RHR systems will not be performed during power ascension testing.	Refer to Q640.52 item 5.l response.

TABLE 14.2.7-1 (Page 3a)

COMPLIANCE WITH REGULATORY GUIDES

Regulatory Guide	Compliance	Affected Section(s)	Exception Taken	Justification
	Partial	App. A 5.m	Differential pressure measurements will not be made across the core or major reactor coolant system components.	Measured Reactor Coolant System loop flows will be compared with predicted Reactor Coolant System loop flows. Any gross deviation of actual loop or core pressure drops from predicted values will be identified by detection of the corresponding deviation of measured flow from prediction.
			Idle loop flows will not be determined during power ascension testing.	Tech. Specs. does allow for less than full flow operation.
			Specific measurements for vibration levels of reactor coolant system components will not be performed during power ascension testing.	Refer to Q640.39 and Q640.52 item 5.m responses.
		App. A 5.o	Calibration and demonstration of the response of reactor coolant system leak detection systems will not be performed during power ascension.	Refer to Q640.52 item 5.o.
		App. A.5.p	Vibration monitoring of reactor vessel internals will not be performed during power ascension testing.	Refer to Q640.39 response.
		App. A.5.q	Proper operation of failed fuel detection systems will not be performed during power ascension testing.	Refer to response Q640.52 item 5.q.
		App. A 5.r	A verification of computer inputs and performance calculations which are utilized to ensure compliance with provisions of the station operating license or accident analysis bases will be performed.	Inputs and calculations which do not serve to ensure compliance with provisions of the station operating license or accident analysis bases do not need to be verified.

TABLE 14.2.7-1 (Page 3b)

COMPLIANCE WITH REGULATORY GUIDES

Regulatory Guide	Compliance	Affected Section(s)	Exception Taken	Justification
		App. A 5.t	Capacities, set points, and reset pressures for the pressurizer mechanical code relief valves will be verified by vendor testing and verification.	Vendor testing is adequate to ensure proper operation of the pressurizer code relief valves. Transient test data obtained during power escalation testing will be utilized to verify proper operation of the pressurizer mechanical code relief valves when reactor coolant system pressure transients of sufficient magnitude to verify proper operation are observed.

COMPLIANCE WITH REGULATORY GUIDES

Regulatory Guide	Compliance	Affected Section(s)	Exception Taken	Justification
1.68 Rev. 2	Partial	App. A 5.u	Operability of main steam isolation valves and branch steam isolation valves will not be verified during power escalation testing at the 25% F.P. platean.	Operability of the main steam isolation valves and branch steam isolation valves under full temperature and pressure conditions will be verified during hot functional testing.
		App. A 5.w	Demonstration of performance of penetration/shielding cooling system will not be performed during power ascension testing.	Refer to Q640.52 item 5.w response.
		App. A.5.c.c	Specific testing for demonstration that gaseous/liquid waste processing, storage and release systems will not be performed during power ascension testing.	Refer to Q640.52 item 5.c.c response.
		App.A.5.e.e	Specific testing for demonstration that containment injection and purging systems operate within design will not be performed during power ascension testing.	Refer to Q640.52 items 5.x, 5.f.f responses.
	Partial	App. A 5.f.f	Specific testing to verify ventilation systems can maintain area design limits will not be performed for containment systems during power ascension testing.	Refer to Q640.52 items 5.x, 5.f.f responses.

TABLE 14.2.7-1 (Page 4a)

COMPLIANCE WITH REGULATORY GUIDES

Regulatory Guide	Compliance	Affected Section(s)	Exception Taken	Justification
1.68 Rev. 2	Partial	App. A 5.i.i.	Plant dynamic response for limiting reactor coolant pump trips will not be demonstrated at 100% F.P.	The critical parameter of interest in the analysis of the limiting loss of reactor coolant flow is DNBR verses time. Since DNBR is not a directly observable parameter the determination of DNBR behavior verses time following a loss of flow depends primarily on the determination of flow coast down vs. time and the behavior of local clad heat flux verses time following the loss of flow. The behavior of local clad heat flux verses time cannot be determined directly and the analysis of this behavior is dependent on verification of reactor trip response time for a loss of flow event. Both flow coast down and reactor trip response time for a loss of flow may be determined directly during the flow coast down test. No additional meaningful data could be obtained from performance of this test at power. Plant dynamic response from power following a four pump reactor coolant pump trip will be verified by the station blackout test.
	Partial	App. A 5.k.k	Dynamic response of the plant to the loss or bypassing of the feedwater heater(s) from a credible single failure or operator error that would result in the most severe case of feedwater temperature reduction will be performed from 90% F. P. Feedwater reduction test will not be performed at 50% F. P.	Refer to response Q640.38.

TABLE 14.2.7-1 (Page 4b)

COMPLIANCE WITH REGULATORY GUIDES

Regulatory Guide	Compliance	Affected Section(s)	Exception Taken	Justification
1.68 Rev. 2	Partial	App. A 5.1.1	Dynamic response of the plant to turbine trip will be demonstrated from the maximum power level at which a reactor trip would not be automatically initiated.	Because of the reactor trip-on-turbine trip logic, reactor trips will automatically be actuated upon loss of turbine during the turbine trip test and the unit loss of electrical load test at full power. The resulting transients and plant dynamic response will not be significantly different for these two tests if both are initiated from full load. Performance of the turbine trip test from the highest power below the actuating point of the reactor trip-on-turbine trip logic will allow documentation of the plant dynamic response for the runback situation. The unit loss of electrical load test will be performed from full power to demonstrate the dynamic response to a turbine trip with reactor trip situation.
		App. A 5.m.m	A main steam isolation will not be demonstrated at power.	The severity of the transient to plant systems and components does not justify performance of the test. Proper operation of the main steam isolation valves is demonstrated during hot functional testing at full temperature and pressure. Refer to Q640.52 item 5.m.m.
	Partial	App. A.5.o.o.	Verify that piping and component, movements, vibrations and expansions will not be performed during power ascension testing except as specified on FSAR Table 3.9.2-1.a.	Refer to Q640.52 item 5.o.o. response.

Figure 14.2.11-1

TESTING FOLLOWING INITIAL FUEL LOADING

Fuel Loading	Hot Precritical Testing	Initial Criticality	Zero Power Physics Test	0% - 5% Power Post-Physics Testing	10% - 25% Power	~30% F. P.	~50% F. P.	~75% F. P.	~90% F. P.	~100% F. P.
Initial Fuel Loading	1. Moveable Incore Detector Functional Test 2. Incore Thermocouple Functional Test 3. Incore Thermocouple and RTD Cross Calibration (Optional) 4. Rod Position Indication Check 5. Rod Control Cluster Assembly Drop Time Test 6. Rod Control System Alignment Test 7. Full Length Rod Drive Mechanism Timing Test 8. Reactor Coolant System Flow Test 9. Reactor Coolant System Flow Coastdown Test 10. RTD Bypass Flow V-rification 11. Reactor Protection System Set Points V-rification Test 12. P essurizer Func-t onal Test	1. Initial Criticality	1. Controlling Procedure for Zero Power Physics Testing: (a) Nuclear Instrumentation Overlap Verification (b) Onset of Nuclear Heat (c) All Rods Out Critical Boron (d) Isothermal Temperature Coefficient Test (e) Differential and Integral Worth of Sequenced Control Banks (f) Differential Boron Worth at Hot Zero Power (g) Integral Control Rod Worth With One Stuck Rod (h) Pseudo-Ejected RCCA worth at Hot Zero Power	1. Radiation Shielding Survey 2. Natural Circulation Verification 3. Unit Load Steady-State Test *4. Process and Effluent Radiation Monitor Test 5. NIS Initial Calibration	*1. Loss of Control Room Test *2. Station Blackout Test	1. Unit Load Steady State 2. Radiation Shielding Survey 3. Rod Control System at Power Test 4. NIS Initial Calibration 5. Core Power Distribution 6. Pseudo Ejection Rod Test 7. Power Coefficient and Power Deficit Measurement 8. Unit Load Transient 1. Pressurizer Level and Pressure Control Test 10 Steam Generator Water Hammer Test	1. Unit Load Steady State Test 2. Radiation Shielding Survey 3. NIS Initial Calibration 4. Core Power Distribution Test 5. Power Coefficient and Power Defect Measurement *6. Unit Load Transient Test 7. Below Bank Test *8. Process and Effluent Radiation Monitor Test 9. Support Systems Verification Test	1. Unit Load Steady State Test 2. Radiation Shielding Survey 3. NIS Initial Calibration 4. Core Power Distribution Test 5. Power Coefficient and Power Defect Measurement *6. Unit Load Transient Test 7. Incore and Nuclear Instrumentation System Detector Correlation *8. Turbine Trip Test (power just below P-9 setpoint)	1. Unit Load Steady State Test 2. NIS Initial Calibration 3. Core Power Distribution *4. Feedwater Temperature Variation Test	1. Unit Load Steady State Test 2. Radiation Shielding Survey 3. NIS Initial Calibration 4. Core Power Distribution Test 5. Power Coefficient and Power Defect Measurement 6. Unit Load Transient Test 7. Unit Loss of Electrical Load Test 8. Process and Effluent Radiation Monitor Test 9. Support Systems Verification Test

* The completion of thi test is not required before initial escalation to the next power testing plateau.

Table 14.2.12-1

Test Abstracts

Revision 10

Table 14.2.12-1 (Page 4)

PIPING SYSTEM THERMAL EXPANSION TEST
Abstract

Purpose

Verify piping and components of systems identified in Table 3.9.2-1B are unrestricted from expanding.

Prerequisites - Initial Inspection

1. All piping supports (including snubbers and spring supports) deemed necessary by Design Engineering to support the system piping for Hot Functional Testing have been installed.

2. Hot Functional Testing is underway.

3. Cold settings of applicable snubbers and spring supports have been obtained.

Prerequisites - Final Inspection

1. All required snubbers and spring supports are installed and have received final inspection.

2. Pre-critical heatup for power escalation is underway.

3. Cold setting of applicable snubbers and spring supports have been obtained.

Test Method

During Hot Functional Testing and Pre-critical Heatup for power escalation, a visual inspection will be performed to verify that spring supports are within design range (i.e., indicator within spring scale) and recorded. Visual inspection of snubbers will be performed to ensure they have not contacted either stop and are within expected travel range. Snubber piston scales will be read to ensure acceptance criteria for piston to stop gap is met. Also system walkthroughs will be performed during HFT to visually verify that piping and components are unrestricted from moving within their range. Hot displacement measurements of all snubbers will be obtained and motion will be compared with predicted values. Discrepancies will be reviewed and evaluated by Design Engineering.

Acceptance Criteria - Initial and Final Inspections

1. Snubbers are not within ½ inch of either piston stop.

2. All Spring Support indicators remain within spring scale at all inspection times.

3. System Piping and components are unrestricted from moving.

Table 14.2.12-1 (Page 5)

PRESSURIZER RELIEF TANK FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the functional performance of the pressurizer relief tank and its associated instrumentation and alarms. This system is considered non-safety related.

Prerequisites

The nitrogen gas reactor make-up and waste gas systems are available to the extent necessary to demonstrate pressurizer relief tank performance. The pressurizer relief tank is ready for service and empty. Associated instrumentation and control equipment checkout has been completed.

Test Method

The pressurizer relief tank is isolated, filled and pressurized. Data is recorded during level and pressure increases. Associated instrumentation and control equipment setpoints are verified and/or adjusted as necessary. The tank is drained.

Acceptance Criteria

The level and pressure alarms and cover gas system operate at the setpoints designated by Westinghouse and Duke Design Engineering. The pressurizer relief tank spray flow is within limits provided by Westinghouse and Duke Design Engineering. Automatic pressure regulating valves maintains pressure within design limits as outlined in the Westinghouse Limitations and Setpoints Manual, and subsequent Westinghouse transmittals.

Table 14.2.12-1 (Page 7)

ROD CONTROL SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the operation of the Rod Control System in the automatic and manual modes of control. To assure proper interfacing between the Rod Control System and signals from other systems. To verify proper operation of rod control permissives.

Prerequisites

Electrical power is available and tested. Nuclear and temperature instrumentation channels are available for input of required test signals.

Test Method

The manual mode of control is checked for each applicable position of the bank selector switch and the response of the system is checked into the logic cabinet. The automatic mode is operationally checked by inserting simulated nuclear instrumentation signals and temperature signals into the Rod Control System. Logic cabinet rod speed and direction signal are verified to be in accordance with the test documents as the simulated input signals are varied. Automatic rod control permissives and permissive status lights are monitored for proper operation during the use of the simulated test signals.

Acceptance Criteria

Manual and automatic system response is in accordance with the criteria specified by Westinghouse. All interlocks and permissives are verified to function correctly as specified by Westinghouse.

Table 14.2.12-1 (Page 8)

NUCLEAR INSTRUMENTATION SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To assure the proper operation of the Nuclear Instrumentation System prior to initial fuel loading.

Prerequisites

System instrumentation and cabling is installed and tested. Normal electrical power sources are available and verified.

Test Method

Nuclear Instrumentation channels are operationally checked and aligned using test signals. All channels are checked to verify that trip, rod stop and alarm setpoints are in accordance with the test documents. Proper operation of indicators and recorders is also verified by the use of simulated test signals. Source range detectors and channels are operationally checked and aligned, with the detector in the presence of a test neutron source.

Acceptance Criteria

1. Trip, rod stop, alarms, and control room indications actuate at the proper setpoints as specified by Westinghouse. For setpoints that must be determined after plant operation which are not specified by Westinghouse, initial values shall be based on operating experience of similar plants.

2. Proper operation of interlocks with the Reactor Protection System is verified.

3. Neutron detectors are verified to be properly positioned.

Table 14.2.12-1 (Page 10)

FEEDWATER AND CONDENSATE SYSTEMS FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the ability of these systems to provide a steady, properly regulated supply of feedwater flow to the steam generators during normal and upset conditions. To demonstrate the operability of the secondary Chemical Addition and Sampling Systems. This test is considered to be non-safety related.

Prerequisites

Support systems necessary to operate the condensate and feedwater systems are sufficiently in service. Steam generators are in service at hot standby temperature and pressure conditions for applicable portions of the procedure.

Test Method

Feedwater flow rates will be varied with feedwater control valves in manual to demonstrate manual control of steam generator levels. Manual control of feedwater pump speeds will be demonstrated. Operability of the feedwater heaters and feedwater heater drains will be verified during power escalation. The ability to obtain samples at designated points in the system and to add chemicals to control feedwater chemistry are verified by the use of normal station chemistry procedures.

Acceptance Criteria

Valve operations which are required to supply the required flows are demonstrated by operating the required valves from the Control room. The proper response to feedwater isolation as described in Section 10.4.7.2 is verified.

Doghouse high water level alarms actuate in Control room upon simulation of high water level.

Samples are obtained from the feedwater and condensate systems. Chemical Addition capability is verified to be operable.

AUXILIARY FEEDWATER SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the capability of the system to deliver design flows to the steam generators under all anticipated conditions. To demonstrate the operability of essential controls, interlocks, and alarms.

Prerequisites

All support systems are in service to the extent necessary to operate the Auxiliary Feedwater System. The normal and alternate supplies of water are available to the pump suctions. The steam generators are in service to the extent necessary to accept auxiliary feedwater pump discharge. A temporary steam supply may be required for testing of the turbine-driven auxiliary feedwater pump. The steam generators are required to be at hot shutdown temperature and pressure conditions for portions of the test.

Test Method

Each auxiliary feedwater pump is started and run separately to demonstrate flow from the upper surge tank and the auxiliary feedwater condensate storage tank. Pump performance is verified and the existence of adequate suction head from each of the above sources is verified. Auxiliary feedwater supply from the upper surge tank is verified with this source under vacuum at normal operating temperatures.

Verification is performed of the operability of pump runout protection interlocks, automatic reset of the automatic start defeat circuitry at the P-11 permissive setpoint, and proper automatic valve alignment upon receipt of a simulated auxiliary feedwater start signal. The auxiliary feedwater nozzles will be monitored for indications of water hammer while feeding the steam generators during hot functional testing. At least five successive, cold quick starts of the steam driven auxiliary feedwater pump upon receipt of a start signal will be verified. Steam piping to the steam driven auxiliary feedwater pump will be visually monitored during cold starts for indications of water hammer, flashing, excessive vibration, or interference due to thermal expansion.

Acceptance Criteria

1. Motor driven pump A develops a total head of greater than or equal to 3605 ft. at a flow of greater than or equal to 400 gpm, and motor driven pump B develops a total head of greater than or equal to 3620 ft. at a flow of greater than or equal to 400 gpm.

2. The steam driven pump develops a total head of greater than or equal to 3705 ft. at a flow of greater than or equal to 400 gpm with a secondary steam supply pressure of greater than or equal to 600 psig.

3. Motor and steam driven pumps start on receipt of the simulated auxiliary feedwater start signal.

Table 14.2.12-1 (Page 13)

COMPONENT COOLING WATER SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the capability of the Component Cooling Water System to provide cooling water during normal unit operation, during unit cooldown and during an emergency situation; and to demonstrate proper system response to a simulated engineered safety features actuation signal.

Prerequisites

Systems and components supplied by the Component Cooling Water System are available to the extent required to conduct this test. For portions of this test, the reactor coolant system must be at hot standby temperature and pressure conditions.

Test Method

Flow paths and flow rates are verified for normal unit conditions for each of the two trains.

Flow paths and flow rates are verified for normal unit cooldown conditions with full flow through both trains.

The discharge temperature from the KC heat exchanger is verified to be within design limits with the unit at normal operating temperature and pressure.

Automatic starting of the component cooling water pumps and automatic valve alignment is demonstrated for a simulated safety injection signal. This portion of the test may be demonstrated during the Engineered Safety Features Actuation System Functional Test.

Acceptance Criteria

Automatic valve alignment and pump starts occur in response to engineered safety features actuation signals. Flows to essential components required during modes 1, 3-1, 4, and 5-2 (as defined in FSAR Section 9.2) are greater than or equal to values shown in FSAR Table 9.2.2-1.

Temperature of water in the Component Cooling System does not exceed the design temperature shown in FSAR Table 9.2.2-3.

Table 14.2.12-1 (Page 15)

FIRE PROTECTION SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the ability of the fire protection system to provide water at acceptable flows and pressures to protected areas.

Prerequisites

The filtered water system is operable to the extent necessary to supply the jockey pumps. LP pressure service water is available to supply the main fire pumps and the 200 gpm jockey pump. Nitrogen is available to the fire system pressurizer tank.

Test Method

The proper starting and operation of the main fire pumps is tested by varying starting switch pressure and by measuring the flow from each pump. The proper starting and operation of the jockey pumps and pressurized tank pressure controls are tested by observing their response to changes in pressurizer tank level. Flow paths to the major protected areas are verified. The Auxiliary Building and Reactor Building isolation valve operation is verified.

Acceptance Criteria

System flow paths are verified to be open. Each pump develops $\geq$ 331 ft. of head at a flow of $\geq$ 2500 gpm. Jockey pumps are capable of maintaining system pressure. Main fire pumps start automatically on low pressure.

Table 14.2.12-1 (Page 17)

LOSS OF INSTRUMENT AIR TEST
Abstract

Purpose

To demonstrate that a reduction and loss of instrument air pressure causes fail-safe operation of safety-related pneumatically-operated equipment.

Prerequisites

The Instrument Air System is in service at rated pressure with support systems operational to the extent necessary to conduct the test. All penumatic loads are cut-in to the extent possible at the time test begins.

Test Methods

Where safe to personnel and equipment, a total loss of air test is performed on integrated systems by venting down instrument air to all the components in the systems. Where deemed necessary, components are depressurized individually and their response noted. Systems or partial systems to be tested are air operated containment isolation valves, pressurizer relief and spray valves and other air operated valves in the Reactor Coolant System, main feedwater control valves, main steam atmospheric and condenser dump valves, control valves in the turbine gland sealing system, air operated valves in the Safety Injection Containment Spray Systems, and main steam isolation system.

Acceptance Criteria

All valves fail to positions as shown on Duke Power Company Design Engineering Department system mechanical drawings.

CONTROL ROOM VENTILATION SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the capability of the Control Room Air Conditioning and Ventilation System to provide and maintain a satisfactory environment during normal and emergency operations.

Prerequisites

The Control Room Air Conditioning and Ventilation System, normal power, anu emergency power (Class 1E) are operational to the extent necessary to perform the test. Access to the Control Room is limited while the test is being performed.

Test Method

An integrated test is performed on each train to verify proper temperature and humidity can be maintained during all normal modes of operation and proper temperature can be maintained during post-accident conditions. Proper flow through 1CRA-PFT and 2CRA-PFT-1 is demonstrated. Proper operation of each filter train is demonstrated. The refrigeration units are tested to demonstrate their proper operation and cooling capacity. Instrumentation required for safety is verified for proper sequencing and function. The Control Room is pressurized to $\geq$1/8" W.G. and the flow rate required to maintain this pressure is recorded.

Acceptance Criteria

1. The Control Room Ventilation System is capable of achieving a system flow of 6000 cfm ± 10% through 1CRA-PFT-1 and also 2CRA-PFT-1 when tested per the requirements of ANSI N510-1980.

2. Valves and dampers align as described in FSAR Section 9.4.1 in normal automatic operating mode, and realign upon receipt of simulated high radiation and high clorine alarm signals.

3. HEPA filter banks demonstrated an efficiency of greater than or equal to 99.95% when they are tested in-place in accordance with ANSI N510-1980 while operating the system at a flow rate of 6000 cfm ± 10%.

4. Laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Rev. 2 meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Rev. 2.

5. Charcoal absorbers remove greater than or equal to 99.95% of a halogenated hydrocarbon refrigerant test gas when they are tested in accordance with ANSI N510-1980 while operating at 6000 cfm ± 10%.

DIESEL BUILDING VENTILATION SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the operability of the Diesel Building Ventilation System's fans and dampers in the AUTO, TEST, and PURGE modes.

To demonstrate that the system's dampers fail to their safety position.

To demonstrate that the system's dampers and fans perform properly upon receiving a simulated fire protection signal.

To demonstrate that an environment suitable for personnel access is maintained in one Diesel-Generator Room while the Diesel-Engine is in operation.

Prerequisites

The Diesel-Engine will be required to be in operation to provide a design heat load when verifying that a suitable environment can be maintained in one Diesel-Generator Room.

Test Method

The Diesel Building Ventilation System will be operated in the AUTO, TEST, and PURGE modes to verify proper alignment of the system's fans and dampers.

The electrical supply to the Normal and Emergency Ventilation Dampers will be interrupted to determine if each damper will move to its fail safe position.

A relay jumper will be used to simulate a fire protection signal to determine that the system's fans will shutdown and their respective dampers will move to the proper position.

For one of the four station emergency diesel generators, the Diesel-Engine will be operated at times when the external conditions are expected to approach the two (2) external design day conditions, 10°Fdb and 95°Fdb. The Emergency Ventilation Fans will be in operation at the same time. Data will be recorded to verify that the internal environment is maintained within its acceptance criteria. If the exterior design day conditions are not reached, the internal vs external temperature data taken during the test will be used to extrapolate to find the internal temperature which would have been reached at the design external conditions.

The above will be performed on "A" train diesel ventilation. Unit One "B" train and Unit Two "A" and "B" trains will have fan performance tested instead of Design Hot Day testing.

Acceptance Criteria

The system's fans align as shown in FSAR Figure 9.4.4-1 in each mode of operation.

125 VDC VITAL INSTRUMENTATION AND CONTROL POWER TEST

Abstract

Purpose

To demonstrate that the 125 VDC Vital Instrumentation and Control batteries and chargers are capable of providing power during normal operation and under abnormal conditions.

Prerequisites

Battery area ventilation must be adequate. Sufficient DC loads are available to allow testing of the system.

Test Method

The system is energized for normal operation and a load equal to the maximum accident-condition steady-state dc load as measured during the Engineered Safety Features Actuation System Functional Test is applied. The capability of each battery charger to individually maintain a float charge on its associated battery, while concurrently maintaining the maximum bus dc loads, is demonstrated.

The capability of each charger to supply sufficient current to recharge a completely discharged battery within 24 hours while supplying the steady-state loads of its own load group is verified.

The capability of the system to transfer each bus from battery charger to battery power is demonstrated by de-energizing the chargers while the applicable bus is carrying its normal station loads.

A battery service test is performed in accordance with IEEE 450-1975.

The actual load on the batteries/chargers recorded during the performance of the Engineered Safety Features Actuation System functional test is compared with the design loads for the system.

The operability of vital loads is verified at reduced system voltage by the operation of selected equipment.

Acceptance Criteria

All battery chargers provide float charge while concurrently maintaining maximum bus loads. The system responds properly to loss of normal unit power by maintaining power to the normal loads from the batteries. Batteries are capable of supplying dc power upon de-energization of their chargers. The battery capacities as determined in the battery service tests are greater than or equal to the capacity necessary to carry the vital loads during the critical period of the accident analysis.

The battery chargers provide sufficient current to recharge a fully discharged battery within 24 hours while supplying the steady-state loads of their own load group, as described in the test method.

Table 14.2.12-1 (Page 23)

CONTAINMENT INITIAL INTEGRATED LEAK RATE TEST AND STRUCTURAL INTEGRITY TEST
Abstract

Purpose

To verify the structural integrity of the Containment and to verify that the integrated leak rate from the Containment does not exceed the maximum allowable leakage.

Prerequisites

The Containment is operational and penetration local leak rate testing has been completed to the greatest extent possible. All systems inside Containment which have containment isolation valves identified as Potential Bypass Leakage Paths in Table 6.2.3-1, are vented and drained except for the following:

System	Reason
Ice Condenser glycol supply and return (M372 and M373)	Ice Condenser is in operation
Containment Air Release Line (VQ M204)	Turbine Flowmeter (For Imposed Leak Rate Test) is installed on this penetration.
Containment Hydrogen Sample and Purge (VY M346)	Containment Relief Valve is installed on this penetration.
ILRT Test Pressure sensing lines (3 penetrations)	Lines are open to monitor containment pressure during test.

Test Method

Closure of containment isolation valves is accomplished by the means provided for normal operation of the valves. The Containment is strength tested at 110 to 115 percent of the design internal pressure and an integrated leak rate test is conducted at not less than the calculated peak accident pressure. Testing is performed in accordance with 10CFR50, Appendix J. The test duration is at least ten (10) hours preceded by a period for stabilization of containment conditions. In order to verify the test methods, a supplemental leak test is performed by imposing a known leak rate on the containment.

Acceptance Criteria

The Containment vessel shows no signs of structural degradation following the 110% strength test. The measured Containment integrated leak rate does not exceed .15 percent by weight of the containment volume per day. The sum total of the initial containment leak rate and the supplemental imposed leak rate shall not differ from the composite leak rate by more than 0.05% by weight of the containment volume per day. The composite leak rate is defined as the total containment leak rate, as measured by the containment leakage measuring system, during the supplemental imposed leak rate test.

ANNULUS VENTILATION SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the capability of the Annulus Ventilation System to produce and maintain a negative pressure in the annulus following a LOCA and to minimize the release of radioisotopes following a LOCA by recirculating a large volume of filtered annulus air relative to the volume discharged for negative pressure maintenance.

Prerequisites

All essential system components, including fans, filter trains, dampers, and Class 1E power systems are operational to the extent necessary to perform the test.

Test Method

Each ventilation train is operated in conjunction with its respective fan, filter train, dampers, and associated ductwork to demonstrate required capacity per ANSI N510-1980. Essential electrical components, switchovers, and starting controls are demonstrated to be functional. The ability to obtain and maintain the required negative pressure inside the annulus will be demonstrated. The acceptability of the annulus ventilation system HEPA and charcoal filters will be demonstrated per use of test procedures as specified in Regulatory Guide 1.52 Rev. 2.

Acceptance Criteria

1. Each train of the annulus ventilation system, operating independently of the other train, is capable of achieving a system flow within limits specified by Duke Power Company Design Engineering Department when tested per the requirements of ANSI N510-1980.

2. HEPA filter banks demonstrated an efficiency of greater than or equal to 99.0% when they are tested in-place in accordance with ANSI N510-1980 while operating the system at a flow rate of 9000 cfm ± 10%.

3. Laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Rev. 2 meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Rev. 2.

4. Charcoal absorbers remove greater than or equal to 99.0% of a halogenated hydrocarbon refrigerant test gas when they are tested in accordance with ANSI N510-1980 while operating at 9000 cfm ± 10%.

5. The annulus ventilation system demonstrates the ability to achieve a negative pressure of greater than or equal to 0.5 in W.G. within the time period assumed by the station safety analysis. (This criteria may be verified during the Integrated ESF Test).

Table 14.2.12-1 (Page 28)

ELECTRIC HYDROGEN RECOMBINER FUNCTIONAL TEST

Abstract

Purpose

To demonstrate the capability of each electric hydrogen recombiner to achieve recombination temperatures at an air flow equal to or greater than the minimum air flow assumed in Chapter 6 of the FSAR. The test also demonstrates the proper functioning of controls, instrumentation, and indications necessary for post-accident operation.

Prerequisites

The hydrogen recombiners and associated controls are functional to the extent required to test the system.

Test Method

The electric hydrogen recombiners will be energized. Minimum acceptable heater sheath heatup rate required in order to satisfy Technical Specifications surveillance requirements will be verified. The capability of the heaters to maintain a temperature in excess of the recombination temperature as measured on the heater sheath will be verified. Air flow to each recombiner will then be measured. Following completion of the heatup test, heater resistance to ground will be verified. The results of the heatup test will be used to establish a reference power setting for use in station operating procedures.

Acceptance Criteria

A flow rate greater than or equal to the value assumed in the FSAR analysis is verified. Heater sheath heatup rate satisfies the surveillance requirement of Technical Specifications. The ability to achieve and maintain heater sheath temperatures above the hydrogen recombination temperature is verified. All controls and indications tested function as specified in Duke Power Company Design Engineering Department system descriptions, and post-heatup continuity and resistance to ground checks are satisfactory.

Table 14.2.12-1 (Page 32)

UPPER HEAD INJECTION FUNCTIONAL TEST
Astract

Purpose

To demonstrate that the upper head injection portion of the Safety Injection System is capable of performing as required.

Prerequisites

The Reactor Coolant System is cold and the reactor vessel head installed with the upper internals removed. The Reactor Coolant System water inventory is sufficiently low and the reactor coolant piping vented to minimize pressure buildup in the Reactor Coolant System during injection.

Test Method

Blowdown tests are performed by filling and pressurizing the upper head injection water and nitrogen accumulators with the isolation valves closed. The isolation valves are subsequently opened and the accumulator is allowed to discharge into the reactor vessel.

Two blowdown tests are performed - one with low accumulator pressure (about 100 psi) and one with gas pressure in the normal operating range. The low pressure test provides piping resistance information utilized in determining the level set points for isolation valves closure. The high pressure test provides verification of isolation valve operation under maximum differential pressure and verification that the required volume of water is injected into the Reactor Coolant System prior to isolation valve closure. During these tests, the proper operation of alarms, indications and controls will be verified.

Only the low pressure blowdown test is performed on the Unit 2 UHI System. The high pressure test is performed only on the Unit 1 UHI System.

During Reactor Coolant System cooldown from hot conditions during Hot Functional Testing, check valves operability is demonstrated by injection of small flow of water upstream of the valve.

Acceptance Criteria

The volume of water delivered to the reactor vessel is equal to or greater than the value assumed in the analysis in FSAR Section 15.6.5. Check valves are demonstrated operable at elevated temperatures.

Hydraulic isolation valve closure time is within the range assumed in the Chapter 15 analysis.

Alarms, indications and controls function as specified by Westinghouse and in the Duke Power Company Design Engineering Department system description document.

Table 14.2.12-1 (Page 33)

CONTAINMENT SPRAY SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the capability of the system to respond to an actuation signal and to provide the required flows. Also, Containment Pressure Control Cabinet annunciator is verified on loss of control power.

Prerequisites

The refueling water storage tank is available and contains sufficient water for demonstration tests. The system is aligned to isolate the spray nozzles, obtain suction from the refueling water storage tank and recirculate water back to the refueling water storage tank.

Test Method

With the spray nozzles bypassed, the system is operated with suction from the refueling water storage tank to demonstrate design flow rates to the spray headers and to verify the pump head curve. Proper operation of the controls and interlocks associated with valves relied on to effect a transfer to the recirculation mode is demonstrated. Interlocks associated with the 0.25 psid permissive are verified to function as designed.

Proper spray nozzle performance and orientation is visually verified by blowing air through the spray ring headers and nozzles and observing the flow from the nozzles.

An unobstructed flow path is verified by the overlapping of the water flow test and the air test at the headers. Power is isolated to both trains of the Containment Pressure Control Cabinets to verify Control Room annunciators.

Acceptance Criteria

Flow nozzles are unrestricted.

Pump head vs. flow performance meets or exceeds the manufacturer's performance curve, within the error of the measurement. Pump performance in recirculation mode meets or exceeds the requirements of Technical Specification 4.6.2.1.6.

Interlocks which operate or prohibit operation of valves or components based upon the position of valves or containment pressure are verified to operate as designed.

System response to high-high containment pressure logic is verified during the ESF Functional Test.

Control Room annunciators actuate when control power is isolated to the Containment Pressure Control Cabinets.

FUEL HANDLING AREA VENTILATION SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the ability of the system to maintain the fuel handling and storage building at slightly less than atmospheric pressure, to control airborne acitvity, and to maintain a suitable temperature in the area.

Prerequisites

The system is operable to the extent required to conduct this test. The unit vent is capable of receiving air flow from the system.

Test Method

The system is operated in the normal filter train bypass mode. The ability of the system to automatically direct air flow through the filter trains upon a high radiation level in the exhaust duct system is demonstrated. The pressure in the fuel handling area is measured. The ability of the system to provide cooling and heating of the area is demonstrated by changing the temperature error signal.

Acceptance Criteria

1. Each train operating independently of the other train, is capable of achieving a system Design Flow Rate ± 10% when tested per the requirements of ANSI N510-1980.

2. Satisfactory performance of all components, controls, alarms, and interlocks required in order for the system to fulfill its required function, as described in FSAR Section 9.4.2, is demonstrated.

3. HEPA filter banks demonstrated an efficiency of greater than or equal to 99.0% when they are tested in-place in accordance with ANSI N510-1980 while operating the system at a Design Flow Rate ± 10%.

4. Laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Rev. 2 meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Rev. 2.

5. Charcoal absorbers remove greater than or equal to 99.0% of a halogenated hydrocarbon refrigerant test gas when they are tested in accordance with ANSI N510-1980 while operating at a Design Flow Rate ± 10%.

6. The Fuel Handling Area Ventilation System demonstrates the ability to achieve a negative pressure of greater than or equal to 0.25 in W.G. within the Spent Fuel Storage Pool area relative to the outside atmosphere.

7. The Fuel Handling Area Ventilation System responds to changes in the temperature error signal by providing heating or cooling as appropriate, to maintain the set temperature in the fuel handling area.

RADIATION MONITORING SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the capability of the Radiation Monitoring System to detect, indicate and record radiation levels in process systems, effluents and various station areas, and to alarm when high radiation levels are present or upon system circuit failure.

Prerequisites

Containment isolation valves associated with the system are operational, ventilation systems are operational in areas where samples are withdrawn or exhausted at other than atmospheric pressure, and sample tubing routing is verified.

Test Method

Sample system flowrates are verified where applicable, alarm setpoints are verified, high radiation and circuit malfunction alarms are demonstrated, and channel calibrations are verified utilizing the check sources provided with the system. Isolation features are verified to operate upon simulated high radiation signals. Ability to obtain samples is verified.

Acceptance Criteria

System channels respond to check sources in agreement with primary calibration data. Alarms function in accordance with Duke Power Company Design Engineering Department System Descriptions. Sample flow rates of the Reactor Coolant Radiation Monitor are verified to be low enough to allow adequate decay time of sample liquid as specified by Duke Power Company Design Engineering Department. Isolation features operate upon simulation of high radiation signals.

Table 14.2.12-1 (Page 39)

NUCLEAR SERVICE WATER STRUCTURE VENTILATION SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To verify that the Nuclear Service Water Structure Ventilation System can maintain the space temperature between 55°F and 104°F at design conditions.

Prerequisites

The structure and system must be complete to the extent necessary to perform the test. For the summer heat load test, the Nuclear Service Water pumps must be operable.

Test Method

The ventilation system will be operated at times when the external conditions are expected to approach the two (2) external design day conditions, 10°F and 95°F. Data will be recorded to verify that the internal environment is maintained within it's acceptable range. If the external design day conditions are not reached, the internal versus external temperature data taken during the test will be used to extrapolate to find the internal temperature which would have been reached at the design external conditions.

Design Hot Day testing will not be done to Unit Two "A" and "B" Train, and design Cold Day testing will not be done to Unit One "A" Train and Unit Two "A" and "B" Train. Instead, fan and unit heater performance data will be taken and compared with acceptable performance on either train of Unit One for Hot Day capabilities and with Unit One "B" Train for Cold Day capabilities.

Acceptance Criteria

The nuclear service water pump structure internal temperature remains between 55°F and 104°F at both the external design day conditions of 10°F and 96°F.

For those trains in which design day testing is not being done, fan and heater performance data is within -10% of acceptable.

Table 14.2.12-1 (Page 47)

CONTAINMENT VENTILATION AND PURGE FUNCTIONAL TEST

Abstract

Purpose

To demonstrate the capability of the Containment Ventilation System to provide containment air recirculation, control rod drive mechanism cooling and containment purging.

Prerequisites

A cooling water supply is available for the fan-cooling units of the system. For testing portions of the system as applicable, the control rod drive mechanisms and neutron detector are capable of being energized, and plant conditions are established as required.

Test Method

Actual expected building heat loads are simulated during Reactor Coolant System Hot Functional Testing and data is taken to demonstrate the capability of the Containment Ventilation System to provide for containment recirculation and heat removal, by testing operation of the axial fans, centrifugal water chillers and the cooling coils, and by ensuring adequate flow is delivered to components and areas inside Containment as required.

Data will also be taken to verify that the control rod drive mechanisms shroud ventilation units are capable of maintaining temperatures within the shroud within design limits.

The capability of the containment purge exhaust filtration units to provide filtration is verified by testing of the filtration units.

Proper operation of the containmen tpurge supply and purge exhaust equipment is demonstrated.

Proper operation of essential Containment Ventilation and Purge System instrumentation, interlocks, and alarms is verified.

Acceptance Criteria

1. The Containment Ventilation System components function in accordance with Duke Power Company Design Engineering Department System Descriptions. Adequate ventilation flow is provided to containment areas to maintain or limit temperatures to design valves. System interlocks, instrumentation and alarms operate as described in Duke Power Company Design Engineering Department System Descriptions.

2. The filter unit must be structurally sound after filter installation per applicable sections of ANSI N510-1980, Section 5, Table 2.

CONTAINMENT VENTILATION AND PURGE FUNCTIONAL TEST
Abstract

3. HEPA filter banks demonstrated an efficiency of greater than or equal to 99.0% when they are tested in-place in accordance with ANSI N510-1980 while operating the system at Design Flow Rate ± 10%.

4. Charcoal absorbers remove greater than or equal to 99.0% of a halogenated hydrocarbon refrigerant test gas when they are tested in accordance with ANSI N510-1980 while operating at Design Flow Rate ± 10%.

Table 14.2.12-1 (Page 49)

CONTAINMENT AIR RELEASE AND ADDITION SYSTEM FUNCTIONAL TEST

Abstract

Purpose

To verify the proper operation of the fans and air addition and discharge valves. To verify the operation of interlocks and alarms associated with the system. To verify capability of the filtration units.

Prerequisites

System is complete with no discrepancies which would affect the test. For the portion of the test indicated in the test method, unit Reactor Coolant System Hot Functional Test is in progress.

Test Method

Containment Air Release Fans 1A and 1B are verified as being able to provide design flow. In order to simulate the pressure differential caused by a near end-of-life filter train (since at the time of this portion of the test, filters will not be installed) an obstruction will be placed in the filter train.

Flow will be established from containment to the unit vent. Maximum ΔP from lower to upper containment created by system operation is designed to be less than the amount required to open the ice condenser doors. This will be verified by the absence of an annunciator alarm indicating that an ice condenser door is open.

During Hot Functional Testing Heat-up and Cooldown, the high and low pressure annunciator alarms will be verified and proper opening and closing of unit vent and air addition valves verified. The capability of filtration units will be tested in accordance with ANSI N510-1980.

During power escalation, the ability of the system to control containment pressure will be verified.

Acceptance Criteria

Fan capacity is 200 SCFM ± 20% with maximum filter pressure drop. All ice condenser doors remain closed with either fan 1A or 1B operating in the air release mode. Containment Pressure alarm is received at the high and low containment pressure setpoint ± 0.05 psig. Containment pressure air release valve and containment air addition valve close at the correct containment pressure ± 0.05 psig.

The filtration units demonstrate an efficiency of 99.0% or greater, when tested in accordance with ANSI N510-1980.

The system functions to maintain pressure within Technical Specifications limits.

Table 14.2.12-1 (Page 50)

SEAL WATER INJECTION SYSTEM FUNCTIONAL TEST

Abstract

Purpose

To verify proper operation of the isolation valve seal water in jection system, including interlocks and alarms. To measure the overall leakoff of the system.

Prerequisites

The system is complete with no identified discrepancies which could affect the test. Valves supplied by the system are installed and operable.

Test Method

The system alarms and interlocks essential for post-accident operation are tested by operation of components or simulation of sensor signals. Overall system leakoff is determined by measuring the CIV Leakages in valve subsets and then totaling the subsets to obtain an overall average.

Acceptance Criteria

Alarms and interlocks function as specified by Duke Power Company Design Engineering Department. Total system leakoff does not exceed the assured makeup capacity, as analyzed by Duke Power Company Design Engineering Department.

Table 14.2.12-1 (Page 54)

AUXILIARY BUILDING FILTERED EXHAUST AND SHUTDOWN VENTILATION TEST
Abstract

Purpose

To verify proper operation of alarms, interlocks and controls. To verify the capability of the filtration units to fulfill their design function.

Prerequisites

The system is complete with no outstanding discrepancies which would affect the test. Supporting systems are complete to the extent necessary to operate the system.

Test Method

The system will be operated in both normal and LOCA (Ss) modes. Flow rates will be verified during operation. Switchover on receipt of a simulated LOCA (Ss) signal will be verified. Proper operation of alarms and interlocks will be verified by simulation of the appropriate conditions or injection of simulated sensor signals. Filtration units will be tested to verify their capabilities in accordance with ANSI N510-1980.

Acceptance Criteria

System alarms and interlocks function as specified by Duke Power Company Design Engineering Department. Flow rate of filtered exhaust is within Design limits as specified by Duke Power Design Engineering Department. System realigns to draw suction only from safety-related equipment rooms upon receipt of LOCA (Ss) signal and flow is within limits specified by Duke Power Company Design Engineering Department.

HEPA filter banks demonstrated an efficiency of greater than or equal to 99.0% when they are tested in-place in accordance with ANSI N510-1980 while operating the system at a Design Flow Rate ± 10%.

Charcoal absorbers remove greater than or equal to 99.0% of a halogenated hydrocarbon refrigerant test gas when they are tested in accordance with ANSI N510-1980 while operating at Design Flow Rates ± 10%.

Table 14.2.12-1 (Page 57)

BORON RECYCLE FUNCTIONAL TEST
Abstract

Purpose

Verify the operability of alarms and annunciators which, without operator action, could result in an uncontrolled radioactive release or the spread of contaminated liquid to undesired areas. Verify the operability of all interlocks and controls whose failure could result in an uncontrolled radioactive release or the spread of contaminated liquid to undesired areas. Confirm the ability to transfer evaporator distillate and concentrates through their major flowpaths. Confirm the ability to obtain a sample from distillate and concentrates sample vessels. Confirm the ability of the evaporator to produce a distillate and a concentrates stream.

Prerequisites

The evaporator package and support systems are complete to the extent necessary to perform the test.

Test Method

The evaporator will be run in the normal operating configuration. Flow paths will be verified to be open. Alarms and interlocks are checked by varying conditions to actuate the appropriate alarms/interlocks or by simulation of a sensor signal.

Acceptance Criteria

All alarms and interlocks actuate as specified in the Westinghouse Limitations and Setpoints Manual or as specified by Duke Power Company Design Engineering Department, as appropriate. Flow paths are open. The controllers demonstrate the ability to return a process variable to a setpoint when in the "AUTOMATIC" mode. A machinist's stethoscope detects flow to the tank being tested. Concentrates and distillate sample vessels are disconnected and demonstrated to contain a sample. The refractometer monitor (ONBMT 5770) shows an upward change which indicates the boric acid is being concentrated. The CONDENSER LEVEL indicator shows that there is distillate in the Condenser.

Table 14.2.12-1 (Page 58)

RADWASTE SOLIDIFICATION SYSTEM FUNCTIONAL TEST
Abstract

Purpose

To demonstrate the operability of the solid waste subsystem for transporting evaporator concentrates and spent resins to the proper area for solidification. To demonstrate the operability of the miscellaneous solid waste compactor.

Prerequisites

Solid waste system and supporting systems are complete to the extent necessary to perform this test.

Test Method

Pumps necessary for transfer of liquids to the solidification area will be verified to provide required flow. Flowpaths to the solidification site will be verified to be open. Alarms, setpoints, and interlocks necessary to prevent the uncontrolled release or spread of radioactive materials will be verified to operate properly. The waste compactor will be run with simulated miscellaneous solid waste, to demonstrate the operability of the compactor.

Acceptance Criteria

Sufficient flow is verified by transportating simulated waste and resin to solidification site. Flow paths necessary for proper operation of the system are verified to be open. Alarms, setpoints and interlocks function as specified by the vendor, or as specified by Duke Power Company Design Engineering Department.

Solid waste compacter produces compacted waste containing no free liquids.

AUXILIARY SHUTDOWN PANEL TEST
Abstract

Purpose

To verify automatic valve realignment following transfer of control to auxiliary shutdown panel A (B). To demonstrate operability of auxiliary shutdown panel A (B) controls and isolation of control room following transfer of control to LOCAL. To demonstrate operability of control room controls and isolation of auxiliary shutdown panel A (B) following control transfer back to the control room.

To demonstrate that the unit can be operated from the auxiliary shutdown panels prior to loading fuel. During the Reactor Coolant System Hot Functional Test (HFT). The ability to establish a heat transfer path to the ultimate heat sink using the Residual Heat Removal System and lowering the Reactor Coolant System temperature by 50°F is demonstrated. Instrumentation on the auxiliary shutdown panels is verified operable during this test.

Prerequisites

All systems interlocked or that can be controlled from auxiliary shutdown panel A (B) are available as required for this test.

For the demonstration portion during HFT, Hot Functional Testing is in progress with primary system at approximately 400°F.

Test Method

Prior to HFT, control is transferred to auxiliary shutdown panel A (B) and these controls are verified to be operable. All automatic interlocks are verified. Controls are verified by cycling valves and running Boric Acid Transfer Pump 1A (B). The remainder of the pumps and Pressurizer Heater Bank 1A (B) control circuits are verified operable with associated breakers in the "TEST" position. At the same time, main control room controls are verified to be isolated. Upon transfer back to the main control room, control is verified to be regained and auxiliary shutdown panel A (B) control is isolated. This is accomplished in the same manner as the previous section.

During HFT, with the primary system at approximately 400°F, control is transferred to the auxiliary shutdown panels. Also, Reactor Coolant temperature and pressure is lowered sufficiently to permit operation of the Residual Heat Removal System from the auxiliary shutdown panels. While using the Residual Heat Removal System the Reactor Coolant temperature is reduced at least 50°F.

Table 14.2.12 – 2
Test Abstracts
Revision 10

Table 14.2.12-2 (Page 1)

Initial Startup Testing

Table 14.2.12-2 (Page 3)

MOVEABLE INCORE DETECTOR FUNCTIONAL TEST
Abstract

Purpose

To assure proper alignment, indexing and operation of the moveable incore detector drive system and readout equipment. This test is considered to be non-safety related.

Prerequisites

Reactor core is loaded. Moveable incore detector thimbles are inserted into the core, upper internals are installed in the reactor vessel, and the reactor vessel head is installed with studs tensioned. The Reactor Coolant System is in the hot shutdown condition.

Test Method

The system is operated manually and automatically in all modes after setting the indexing and limit switches. The response of each channel to simulated detector movement is verified.

Acceptance Criteria

The moveable incore detector drive system and readout equipment perform as defined in Chapter 7 and the Technical Specifications.

Table 14.2.12-2 (Page 5)

ROD POSITION INDICATION CHECK

Abstract

Purpose

To verify that the Digital Rod Position Indication System satisfactorily performs the required indication and alarm functions for each individual rod under hot standby conditions over its entire range of travel.

Prerequisites

The reactor is at hot standby, no-load operating temperature and pressure with at least one reactor coolant pump running. All full length Rod Control System equipment has been installed and all preliminary testing and calibrations have been complete. Preliminary tests on the Digital Rod Position Indication System must be completed. Pulse-to-Analog converters must have been aligned. Plant source range channels shall be in operation and monitored at all times when rods are being moved.

Test Method

Each full length rod cluster control assembly is pulled to its fully withdrawn position and inserted to its fully inserted position in discrete increments. Indication and alarms are observed for proper operation.

Acceptance Criteria

The rod position indication system for each rod cluster control assembly indicates the correct position, within ± 4 steps, over its entire length of travel, when compared to the group step counter.

Table 14.2.12-2 (Page 10)

REACTOR COOLANT SYSTEM FLOW COASTDOWN TEST
Abstract

Purpose

To measure the rate at which reactor coolant flow rate decreases, subsequent to reactor coolant pump trips, from various flow configurations. To measure various delay times associated with assumptions made in the analysis of the loss of flow accident.

Prerequisites

The reactor is in the hot standby condition with all rod cluster control assemblies at their fully inserted position, all four reactor coolant pumps are operating. The Reactor Coolant System Flow Test has been completed with instrumentation calibrated accordingly.

Test Method

Flow coastdown will be measured for the single loop loss of flow by tripping one of four reactor coolant pumps and monitoring flow using the elbow tap differential pressure cells. Delay times for several protective functions are measured using a strip chart recorder.

Flow coastdown will also be measured for a complete loss of flow. All four pumps will be tripped simultaneously using the Reactor Coolant Pump Electrical Monitoring System. Flow will be measured using the same method as the partial loss of flow case.

Acceptance Criteria

The core flow decrease for each transient is, in each case, slower than that assumed in Figure 15.3.2-1. Time delays from actuation to low flow trip, undervoltage trip and underfrequency trip actuation are less than or equal to those assumed in Chapter 15.

Table 14.2.12-2 (Page 11)

RTD BYPASS FLOW VERIFICATION
Abstract

Purpose

To determine the flowrate necessary to achieve the required reactor coolant transport time in each RTD bypass loop (time from NC loop to lost RTD well), to verify that the coolant transport times are acceptable and to verify the low flow alarm setpoint and reset for the total RTD bypass flow in each reactor coolant loop.

Prerequisites

For portions of the test other than the piping measurements, the reactor is in the hot standby condition with all reactor coolant pumps running. All RTD bypass loop flow measurement channels are calibrated and in service.

Test Method

The flow required to achieve the required reactor coolant transport time is determined by accurately measuring and recording the lengths of installed piping from the bypass loop inlet connections on each reactor coolant loop to the last downstream RTD of both the cold and hot leg bypass loops, and then calculating the flow necessary to achieve less than or equal to 1.0 second transport time. The total bypass flowrate is then measured with both loops in service, and the actual bypass loop transport time is calculated. The low flow alarm setpoint and reset are verified by sequentially throttling the hot and cold leg manifold isolation valves in each loop and noting the flow when the alarm point(s) are reached.

Acceptance Criteria

| The RTD bypass loop transport time is less than or equal to 1.0 second or if greater, is noted for comparison with results from unit trip testing at 100 percent power. The low flow alarm actuates at 90 ± 2.0 percent of full bypass loop flow.

Table 14.2.12-2 (Page 23)

DOPPLER ONLY POWER COEFFICIENT VERIFICATION

Abstract

P rpose

To verify the nuclear design predictions of the doppler only power coefficient.

Prequisites

The reactor is at a stable power condition with rods in the specified maneuvering band. The instrumentation necessary for collection of data is installed, calibrated and operable.

Test Method

Initial data is taken. With the turbine and reactor controls in manual, the turbine load is decreased then increased. Data is recorded during and after the load maneuver and used to infer a measured doppler coefficient verification factor. This factor is compared to a vendor supplied predicted doppler verification factor.

Acceptance Criteria

The inferred measured doppler coefficient verification factor agrees with predicted values as specified by the vendor.

Table 14.2.12-2 (Page 25)

BELOW-BANK ROD TEST
Abstract

Purpose

To obtain the differential and integral worth of the most reactive below-bank rod cluster control assembly. To demonstrate the response of the nuclear and incore instrumentation to a rod cluster control assembly (RCCA) below the nominal bank position and to determine hot channel factors associated with this misalignment.

Prerequisites

All power range nuclear instrumentation channels are operable. The moveable incore detectors are operable. The unit is at the 50 percent power level for testing.

Test Method

Initial data is obtained with the reactor at stable conditions. The lift coils of all rods in Bank D except for the most reactive RCCA are disconnected. The most reactive RCCA is diluted to the fully inserted position while taking data. When all data has been taken, the RCCA is borated back to its bank position.

Acceptance Criteria

Hot channel factors, corrected for measurement uncertainty, are less than or equal to those assumed in Chapter 15, with the RCCA fully inserted and with the RCCA partially inserted at positions between it's bank position and full insertion. Core peaking factors remain within technical specification limits with the rod control cluster assembly less than or equal to fifteen inches below its bank. Incore instrumentation is demonstrated capable of detecting the power maldistribution caused by the misaligned rod cluster control assembly.

Table 14.2.12-2 (Page 26)

PSEUDO ROD EJECTION TEST (UNIT 1 ONLY)
Abstract

Purpose

To determine ejected rod worth and hot channel factors. To demonstrate the response of nuclear and incore instrumentation to a rod cluster control assembly above the nominal bank position and to an ejected rod.

Prerequisites

All power range nuclear instrumentation channels are functional. The moveable incore detectors are operable. Power escalation testing is completed to approximately the 30 percent reactor power level. Reactor is a steady state power with the controlling bank at the full power insertion limit.

Test Method

Single rod movement is accomplished by disconnecting the lift coils of all rods in the affected bank except the selected rod. The differential worth of the rod cluster control assembly is determined by making a series of stepwise adjustments in rod position to maintain nominal system criticality during a continuous, controlled Reactor Coolant System boration/dilution. The flux level response to the step change in rod position is translated to an equivalent reactivity increment. Differential worth is defined as the change in reactivity per unit change in rod cluster control assembly position about an average rod cluster control assembly position between the endpoints of the step change. Integral rod cluster control assembly worth is determined from the differential reactivity data. During the rod cluster control assembly withdrawal, periodic power range detector currents, thermocouple maps and moveable incore detector traces are recorded. The power range detector and moveable detector data provide information to relate core power distribution to rod cluster control assembly position.

Acceptance Criteria

The worth of the ejected rod and the hot channel factors, with measurement uncertainty, are less than or equal to those assumed in the safety analysis (Chapter 15). Core peaking factors remain within technical specification limits with the rod cluster control assembly less than or equal to fifteen inches above its bank. Incore and/or excore instrumentation is demonstrated capable of detecting the power maldistribution caused by the misaligned rod cluster control assembly per Chapter 15.

Table 14.2.12-2 (Page 29)

UNIT LOSS OF ELECTRICAL LOAD TEST
Abstract

Purpose

To demonstrate the ability of the unit to sustain a net electrical loss of load without exceeding turbine design overspeed conditions. To evaluate interaction between control systems and to evaluate system responses to the transient to determine if any control system changes are required to improve transient response. To demonstrate proper Steam Dump Control System response.

Prerequisites

The unit is at steady state full power with rods within their respective maneuvering bands. Pressurizer and main steam safety valves are operable. The following systems are in the automatic mode:

1) Reactor Rod Control
2) Pressurizer Pressure Control
3) Pressurizer Level Control
4) Steam Dump Control
5) Feedwater Pump Speed Control
6) Steam Generator Level Control

Pertinent plant parameters (such as turbine speed, feedwater and steam flows, flux, steam generator and pressurizer levels, feedwater pump speed) are connected to recording devices.

Test Method

Both main generator output breakers are manually placed in the tripped position to simulate net loss of electrical load. Pertinent plant parameters are recorded and the data evaluated to determine control system responses to the transient.

Acceptance Criteria

The turbine does not exceed the "Electrical" backup trip (111.5%). Safety injection is not initiated. Pressurizer safety valves do not lift. No reactor coolant system safety limits as given in Technical Specification Section 2.1 are exceeded.

FEEDWATER TEMPERATURE VARIATION TEST
Abstract

Purpose

To demonstrate the ability of the unit to sustain a reduction in feedwater temperature from opening a feedwater heater train bypass valve. To evaluate interaction between control systems and to evaluate system responses to the transient to determine if any control system changes are required to improve transient response. This test is not required to be completed to escalate to the next testing plateau.

Prerequisites

The unit is at steady state conditions at the specified power level. Pressurizer and main steam safety valves are operable. The following systems are in the automatic mode:

1) Reactor Rod Control
2) Pressurizer Pressure Control
3) Pressurizer Level Control
4) Steam Dump Control
5) Feedwater Pump Speed Control
6) Steam Generator Level Control

Pertinent plant parameters (such as feedwater temperature, feedwater and steam flows, flux, steam generator and pressurizer levels, feedwater pump speeds) are connected to recording devices.

Test Method

The A-B heater train bypass valve is opened. Pertinent plant parameters are recorded and the data evaluated to determine control system responses to the transient.

Acceptance Criteria

Turbine generator and reactor do not trip due to NC System transients. Safety injection is not initiated. Main steam and pressurizer safety valves do not lift. No sustained or divergent oscillations occur in the parameters affected by the feedwater temperature variation.

Table 14.2.12-2 (Page 35)

NATURAL CIRCULATION VERIFICATION TEST
Abstract

Purpose

To demonstrate the capability of the NSSS to remove sensible heat by natural circulation flow in the primary loop. To verify that pressurizer pressure and level control systems can respond automatically to a loss of forced circulation and can maintain reactor coolant pressure within acceptable limits. To verify that steam generator level and feedwater flow can be maintained under natural circulation conditions in order to maintain effective heat transfer from the reactor coolant system. To provide operator training to satisfy NUREG 0737 requirements.

Prerequisites

The reactor is critical at a power level of approximately 3% full power with all reactor coolant pumps in operation. Rod control is in manual with Bank D positioned to maintain a slightly negative isothermal temperature coefficient. Pressurizer pressure and level control are in automatic. Steam dump control is in the pressure control mode. Steam generator level is being maintained through use of the auxiliary feedwater header.

The intermediate and power range (low setpoint) high level reactor trips have been reduced to approximately 7% rated thermal power. UHI isolation valves have been gagged. Overtemperature and overpower ΔT reactor trip signals have been blocked.

Various Technical Specifications test exemptions are required for the conduct of this test. These special test exemptions are provided in Technical Specifications. Special operator action guidelines are provided by the test procedure to compensate for the blocking of various safety injection functions and reactor trips. The test is required to be performed at core burnups which ensure that no signifigant core decay heat levels are present.

Test Method

The test will be initiated by tripping all operating reactor coolant pumps. The establishment of natural circulation will be verified by observing the response of wide range hot and cold leg temperatures as well as core exit thermocouples. The response of pressurizer level and pressure will be observed. Steam generator level and pressure response will be monitored. During the performance of this test on Catawba Unit 1 only, the test will be repeated for each operating shift at Catawba or suitable simulator facility, for the purpose of initial operator training. Each RO and SRO will observe or participate in the initiation, detection and maintenance of natural circulation conditions during at least one of the test runs.

Acceptance Criteria

Core exit temperatures, loop ΔTs, and loop average temperatures do not exceed values specified by the NSSS vendor. ΔTs as determined by the hot leg wide range and core exit temperature indications when compared to the wide range cold leg temperatures stabilize and do not exceed limits supplied by the NSSS vendor. Steam generator and pressurizer levels are maintained above the levels recommended by the NSSS vendor. If data taken during first performance of test demonstrates acceptable performance, data does not need to be taken during subsequent operator training.

Table 14.2.12-2 (Page 37)

PRESSURIZER FUNCTIONAL TEST
Abstract

Purpose

To establish the continuous spray flow rate, determine the effectiveness of the pressurizer normal control spray and of the pressurizer heaters, and verify the response time of the pressurizer power operated relief valves.

Prerequisites

The Reactor Coolant System is at hot standby temperature and pressure. The Reactor Coolant System is lined up for normal operation in accordance with applicable operating procedures. All reactor coolant pumps are operating. Each bank of pressurizer heaters is operable.

Test Method

While maintaining pressurizer level constant, spray bypass valves are adjusted until a minimum flow is achieved which maintains less than a 125°F temperature difference between the spray line and the pressurizer steam space.

To determine pressurizer heater and spray capability, all pressurizer spray valves are closed. All pressurizer heaters are then energized and the time to reach a 2300 psig system pressure is measured and recorded. Bypass spray valves are then returned to their previously determined setting and full spray is initiated through each spray valve individually and in parallel. Pressure versus time is recorded for each transient. The transient is terminated at a Reactor Coolant System pressure of 2000 psig by shutting the spray valves.

With the Unit at normal operating no load temperature and pressure, each PORV shall be cycled for repsonse time testing. The 2185 psig interlock closes the valve and original conditions are re-established.

This test is performed following initial fuel loading due to the need to establish the effectiveness of actual spray flow with core pressure drop acting as the driving head. This test is a prerequisite test for initial criticality.

Acceptance Criteria

For setting of continuous spray flow, the flow through each bypass valve is established such that the temperature difference between the spray line and the pressurizer steam space is less than 125°F

For pressurizer PORV response times, each PORV reponse time is $\leq$2 seconds.

For spray and heater response tests, the response to induced transients is within limits specified in vendor guidelines.

Table 14.2.12-2 (Page 39)

STEAM GENERATOR WATER HAMMER TEST
Abstract

Purpose

To verify that the Feedwater System prevents any bubble collapse pressure pulses from occuring which could damage the steam generator preheater during feedwater flow switchover.

Prerequisites

Reactor power at less than or equal to 30%. Feedwater supply to the steam generator is through the Feedwater System with the feedwater isolation valve in the main feedwater line shut. Provisions are made for recording pertinent process signals during the test.

Test Method

Feedwater temperature is lowered to approximately 250°F. Feedwater flow is then switched from the auxiliary feedwater nozzle to the main feedwater nozzle while maintaining reactor power constant. Signals from the associated process instrumentation are recorded during the transient. A post-test walk-through will be conducted to check for damage in the steam generator enclosures.

Acceptance Criteria

No pressure transients exceeding 50 psi (peak to peak) are noted during switchover. No deformation or damage to the steam generators, supports, feedwater piping or restraints is noted following the test.

Table 14.2.12-2 (Page 40)

Test Abstract Deleted

Q640

Revision 10

Response:

Copies of approved, safety-related preoperational test procedures will be made available for review by NRC regional personnel approximately 60 days prior to their intended use, and not less than 30 days prior to fuel loading for tests to be performed prior to the initial criticality and not less than 60 days prior to criticality for low power and power escalation testing.

640.6 (14.2.12) The initial test program should verify the capability of the offsite power system to serve as a source of power to the emergency buses. Tests should demonstrate the capability of each starting transformer to supply power (as the alternate supply) to its unit's emergency buses while carrying its maximum load of plant auxiliaries and the other unit's emergency buses (as perferred supply). Tests should also demonstrate the transfer capabilities of the unit's emergency bus feeders upon loss of one source of offsite power. These tests should be performed as early in the test program as the availability of necessary components allows. Provide descriptions of the tests that will demonstrate these capabilities.

Response:

The Unit Main Power System for each unit at Catawba, which connects the unit to the offsite power source, is described in Section 8.3. The Unit Main Power System does not utilize startup transformers. It is divided into two separate trains, each capable of supplying power to the unit 6.9 KV Auxiliary Power System. Each train contains one step-up transformer connecting the train to the 230 KV switchyard grid, and a pair of auxiliary transformers. During times when the main generator is not supplying power for in-house loads, power is supplied from the switchyard through the main step-up transformer to the pair of auxiliary transformers, to the 6.9 KV Auxiliary Power System, and on to the 4160 V vital buses. The unit main step-up transformer is sized to carry approximately one-half the full-load electrical output of the main generator, and will carry this load during normal operation. This adequately demonstrates it's ability to carry any necessary in-house loads during shutdown.

The capability of a pair of the auxiliary transformers to carry the unit's auxiliary load plus the unit emergency bus loads will be verified during the Electrical Load Capacity Test (refer to Table 14.2.12-1, page 40). This will assure that ample capacity is available with one pair of auxiliary transformers to carry one unit's engineered safety features for a DBA while supplying the loads required for a concurrent shutdown of the other unit.

The transfer of vital bus feeders upon loss of one source of offsite power will be verified during the 6900 Volt Auxiliary Power System Preoperational Test (refer to Table 14.2.12-1, page 41).

Technical Specification surveillance values are verified to assure that the system can function to control the buildup of combustible gas.

b) Each hydrogen analyzer will be demonstrated operable by performing a channel calibration using sample gas containing hydrogen in nitrogen. Calibration procedures are included with the instruction manuals, which are not available at this time.

c) No test is included, since the Catawba design does not include vacuum breakers. The intent of verifying the operability of systems which allow mitigation of containment underpressure is demonstrated by testing of the Containment Air Release and Addition System. Refer to test Abstract Table 14.2.12-1 (page 48).

640.12 (14.2) Verify that sources of water for long-term core cooling are tested to demonstrate adequate NPSH and the absence of vortexing over the range of basin levels from maximum to the minimum calculated 30 days following LOCA.

Response:

The assurance of NPSH and the absence of vortexing are derived from scale model testing of the reactor building sump as documented in the report.

"Assessment of flow characteristics within a reactor building recirculation sump, using a scale model for the McGuire Nuclear Station," dated May 1978. An evaluation of the Catawba design has been performed to assure that the results of this test are applicable to Catawba.

640.13 (14.2.12) Provide a description of the testing that demonstrates the capacities of the pressurizer, main steam reliefs, and turbine bypass valves. It has been noted in other startups that the capabilities of these values sometimes exceed the values assumed in the accident analyses for inadvertent opening or failure of these valves.

Response:

Please refer to the response to question 440.52 for the response on capacity testing of pressurizer and main steam relief valves. The turbine bypass valves do not perform a safety-related function, as described in Section 10.3. The operating characteristics of the turbine bypass valves and controls will be adequately verified by steam dump operation during Reactor Coolant System Hot Functional Testing and transient testing during startup testing.

640.26 (14.2.10.2) Include setting high-flux scram trips at their lowest value in the initial criticality procedure.

Response:

See revised test Abstract, Table 14.2.12-2 page 13.

640.27 (14.2.12.2) Include the setting of high-flux scram trips to a value no greater than 20% beyond the power of the next test level during power ascension tests.

Response:

Section 14.2.11 has been revised to include resetting the high-flux trip setpoints to a value no greater than 20% beyond the next power level.

640.28 (14.2.12.2) A review of each test level, including extrapolation of DNBR and maximum linear heat rate values to the high-flux trip setpoint for the next power level, along with required approvals prior to ascension to the test level, must be included.

Response:

As stated in Section 14.2.5, the results of testing at each major power ascension plateau will be approved by the Superintendent of Technical Services prior to escalation to the next power level.

As stated in Table 14.2.7-1 in the exception taken to Regulatory Guide 1.68, Revision 2, Appendix A 5.6, DNBR and maximum linear heat rate values will not be directly verified during power escalation testing. The acceptance criteria for peaking factors measured during the Core Power Distribution Test at each power level are established based upon design analysis to assure that DNBR and linear heat rate margins are adequate.

640.29 (14.2.12.2 page 20) State that both neutron and gamma radiation surveys are included in your radiation shielding survey. Commit to identifying high radiation areas per 10 CFR Part 20.

Response:

See revised test Abstract (Table 14.2.12-2, page 20).

Response:

1.a.3: Please refer to the response to question 640.39.

1.d.1: The operability of the turbine bypass valves will be demonstrated during unit Hot Functional Testing. Please refer to the revised Abstract, Table 14.2.12-1, page 3. Reactor Coolant System Hot Functional Test.

1.d.2: The steam line atmospheric dump valves are verified to be operable by surveillance testing as required by the Technical Specifications, in accordance with ASME Section XI, Article IWV. This surveillance testing will be performed prior to initial fuel loading.

1.d.3:
1.d.4: Please refer to the response to question 640.14.

1.e.3: The operability of the main steam isolation valves will be verified during the Reactor Coolant System Hot Functional Test, Table 14.2.12-1, page 3; and by surveillance testing in accordance with ASME Section XI, Article IWV. This testing will be performed prior to fuel loading.

1.e.4: Please refer to the response to question 640.14.

1.e.5: The Steam Extraction System will be checked out prior to operation to assure operability. It's operation will occur during the Reactor Coolant System Hot Functional Testing. If system limitations over the design range preclude this, then the operability of the system will be verified during power escalation. Refer to Test Abstract, Table 14.2.12-2 page 19. This and subsequent operation will assure that no major problems exist with steam extraction. In line with the graded philosophy of testing applied per Regulatory Guide 1.68, Revision 2, no specific functional tests have been planned for this system.

1.e.6,10,12: The operability of the Turbine Stop, Control and Intercept Valves, the Feedwater System, and the Main Condenser Vacuum System will be demonstrated during Reactor Coolant System Hot Functional Testing (Abstract, Table 14.2.12-1, page 3). Feedwater System performance will be verified by performance of the Feedwater and condensate Systems Functional Test (Abstract, Table 14.2.12-1, page 10). System expansion and restraint testing is done under the Reactor Coolant System Thermal Expansion and Restraint Tests in conjunction with Hot Functional Testing, for those systems identified in Section 3.9.2.1.2. If system limitations over the design range preclude this, then the operability of the system will be verified during power escalation. Refer to Test Abstract, Table 14.2.12-2 page 19.

1.g.1: The testing of normal A.C power distribution systems required by Regulatory Guide 1.68, Revision 2, Appendix A 1.g.1 will be accomplished as described by the following test Abstracts:

(a) Electrical Load Capacity Functional Test (Abstract, Table 14.2.12-1, page 40).

(b) 6.9 KV Auxiliary Power System Preoperational Test (Abstract, Table 14.2.12-1, page 41).

(c) 600 VAC Power System Preoperational Test (Abstract, Table 14.2.12-1, page 43).

1.g.2: The testing of emergency AC power distribution systems required by Regulatory Guide 1.68, Revision 2, Appendix A 1.g.2 will be accomplished as described by the following test Abstracts:

(a) Emergency AC power systems Preoperational Test. (Abstract, Table 14.2.12-1, page 44).

(b) Engineered Safety Features Actuation System Functional Test (Abstract, Table 14.2.12-1, page 31)

1.g.4: The testing of DC power systems required by Regulatory Guide 1.68, Revision 2, Appendix 2 1.g.4 will be accomplished as described in the following test Abstracts.

(a) 125 VDC Vital Instrumentation and Control Power Test (Abstract, Table 14.2.12-1, page 21)

(b) 250/125 VDC Auxiliary Power Systems Preoperational Test (Abstract, Table 14.2.12-1, page 45).

1.h.6: The requirements of this section are met by the performance of the Containment Air Return and Hydrogen Skimmer System Functional Test (Abstract, Table 14.2.12-1, page 24).

1.h.8: The proper operation of alarms, indicators, and controls will be verified during the performance of the Upper Head Injection Functional Test (Abstract, Table 14.2.12-1, page 32), the Residual Heat Removal Functional Test (Abstract, Table 14.2.12-1, page 14), the Safety Injection System Functional Test (Abstract, Table 14.2.12-1, page 29), and the Refueling Water System Functional Test (Abstract, Table 14.2.12-1, page 55). Proper operation of the Heat Tracing System is verified by the Heat Tracing Systems Test (Abstract, Table 14.2.12-1, page 46).

1.h.9: The containment recirculation capability will be demonstrated by performance of the Containment Air Return and Hydrogen Skimmer System Functional Test (Abstract, Table 14.2.12-1, page 24).

in Regulatory Guide 1.68, Revision 2, Appendix A 1.J.9 will be accomplished through the performance of the following procedures:

(a) Annulus Ventilation System Functional Test (Abstract, Table 14.2.12-1, page 25).

(b) Seal Water Injection System Functional Test (Abstract, Table 14.2.12-1, page 49).

1.j.10: Seismic instrumentation will be tested and calibrated as required by Technical Specifications prior to fuel loading.

1.j.11: The Incore Instrument System will be functionally tested to the level required by Regulatory Guide 1.68, Revision 2, Appendix A 1.j.11 during the Moveable Incore Detector Functional Test (Abstract, Table 14.2.12-2, page 3).

1.j.12: Catawba Nuclear Station has no designated Failed Fuel Detection System. Failed fuel would be detected during operation by the radiochemical analysis of Reactor Coolant System samples.

1.j.13: Catawba Nuclear Station has no fixed incore neutron detectors. The excore neutron detectors will be functionally tested and calibrated as required by Technical Specifications, Table 4.3.1, prior to fuel loading.

1.j.16: The hotwell level controls and feedwater heater controls

1.j.17: will be checked and calibrated as a part of the normal plant instrument testing and calibration program, prior to fuel loading. Basic system operability, as well as the operation of the feedwater controls and hotwell level controls, is checked during Reactor Coolant System Hot Functional Testing. However, if the operation of these instrumentation and controls systems over the design range cannot be accomplished at that time, the testing will take place during power escalation. Refer to Test Abstract, Table 14.2.12-2, page 19. The graded approach to testing suggests that the importance of this testing prior to power escalation would not justify the inordinate expense and effort of attempting to simulate design conditions.

1.j.19: The instrumentation used to shutdown from outside the control room will be checked and calibrated prior to fuel loading as a part of the normal plant instrumentation and controls surveillance and calibration program. The functional verification suggested in Regulatory Guide 1.68, Revision 2, Appendix A 1.j.19, will be demonstrated during the Loss of Control Room Test, performed during startup testing, between 10% and 25% rated power. For the Abstract of this test, please refer to Table 14.2.12-2, page 32.

1.j.20: These systems will be tested by performance of the Plant Sump Test (Abstract, Table 14.2.12-1, page 51).

1.j.22: The Post Accident Monitoring Instrumentation System will be tested and calibrated as required by Technical Specifications Table 4.3-10 prior to fuel loading.

1.j.25: Please refer to the response to question 640.21.

1.k.2:
1.k.3: Personnel monitors and radiation survey instrumentation will be calibrated, tested, and source checked as a part of the normal station calibration program. These tests are adequate to verify proper operation as required by Regulatory Guide 1.68, Revision 2, Appendix A 1.k.2 and A 1.k.3.

1.l.1: Please refer to the response to question 640.54.

1.l.2: Please refer to the Abstract for the Waste Gas System Functional Test, Table 14.2.12-1, page 52.

1.l.3: Please refer to the response to question 640.54.

1.l.5:
1.l.6: The Catawba Nuclear Station design does not include off-gas isolation. The ventilation isolation features will be tested as a part of the individual ventilation system tests. Please refer to the following abstracts:

(a) Fuel Pool Ventilation System Functional Test (Table 14.2.12-1, page 35).

(b) Containment Air Release and Addition System Functional Test (Table 14.2.12-1, page 48).

(c) Containment Purge Functional Test (Table 14.2.12-1, page 47).

(d) Control Room Ventilation System Functional Test (Table 14.2.12-1, page 53).

(e) Auxiliary Building Ventilation System Functional Test (Table 14.2.12-1, page 53).

1.l.7:
1.l.8: The isolation features associated with liquid effluent and sampling systems will be tested as a part of the Radiation Monitoring System Functional Test. Please refer to the revised Abstract, Table 14.2.12-1, page 36).

1.m.2, 3, 4, & 5: This equipment will be tested during the performance of the Fuel Handling Equipment Test. (Abstract, Table 14.2.12-1, page 55).

1.n.5:
1.n.6: Please refer to the revised abstract for Chemical and Volume Control System Functional Test (Table 14.2.12-1, page 6), for the testing to verify proper operation of the sampling,

addition, the Reactor Coolant System leakage detection systems listed in Technical Specification 3.4.6.1 will be calibrated and functionally tested prior to initial criticality as required by Technical Specification 4.4.6.1. The monitoring of the leakage detection systems will be performed as required by Technical Specification 4.4.6.2.

5.p: Please refer to the response to question 640.39.

5.q: Catawba Nuclear Station does not have a failed fuel detection system as such. Failed fuel is detected through radiochemical analysis of reactor coolant samples. The Reactor Coolant System will be sampled and analyzed for specific activity as required by Technical Specifications 4.4.8, and determined to be within the limits of Technical Specification 3.4.8.

5.r: Please refer to the response to question 640.21.

5.s: The requirement of this item will be satisfied by the performance of the Unit Load Steady-State Test (Abstract, Table 14.2.12-2, page 19). The performance of these systems will be verified, and if parameters are not within normal limits for the appropriate power level, calibrations will be performed. Excore detector calibration checks are part of Nuclear Instrumentation Initial Calibration (Abstract, Table 14.2.12-2, page 21).

5.t: These parameters will have been previously verified during Reactor Coolant System Hot Functional Testing or by vendor bench testing. Pressurizer PORV and Steam Dump PORV actuation is verified during Hot Functional Testing.

5.u: Please note the exception to this item in Table 14.2.7-1, page 4. This testing is performed during Reactor Coolant System Hot Functional Testing.

5.v: Proper operation of these systems will be verified during performance of the Unit Load Steady-State Test (Abstract, Table 14.2.12-2, page 19).

5.w: The Catawba Nuclear Station design does not utilize shielding or penetration cooling systems. Adequate design performance for the main steam line penetrations is verified by concrete temperature measurements taken during Reactor Coolant System Hot Functional Testing (Abstract, Table 14.2.12-1, page 3).

(1) Pressurizer Pressure Control and Pressurizer Level Control:

Tested by the Pressurizer Pressure and Level Control Test (Abstract, Table 14.2.12-2, page 16).

(2) Feedwater Control:

Tested by the Feedwater and Condensate System Functional Test (Abstract, Table 14.2.12-1, page 10), the Unit Load Steady State Test (Abstract, Table 14.2.12-2, page 19), and the Unit Load Transient Test (Abstract, Table 14.2.12-2, page 27).

(3) Turbine Control:

Tested by the Unit Load Steady State Test (Abstract, Table 14.2.12-2, page 19), and the Unit Load Transient Test (Abstract, Table 14.2.12-2, page 27).

(4) Automatic Rod Control:

Tested by the Rod Control System Alignment Test (Abstract, Table 14.2.12-2, page 7) and by the Rod Control System at Power Test (Abstract, Table 14.2.12-2, page 17).

(5) Reactor Coolant System Average Temperature Control:

Tested by the Unit Load Steady State Test (Abstract, Table 14.2.12-2, page 19) and by the Unit Load Transient Test (Abstract, Table 14.2.12-2, page 27).

(6) Turbine Trip:

Verified by calibrations and channel tests as a part of the normal station instrument calibration and testing program. Verified during Station Blackout Test (Abstract, Table 14.2.12-2, page 33).

(7) Pressurizer Power Operated and Safety Relief Valves:

Verified during Reactor Coolant System Hot Functional Testing (Abstract, Table 14.2.12-1, page 3) and by the Station Blackout Test (Abstract, Table 14.2.12-2, page 33), and the Pressurizer Functional Test (Abstract, Table 14.2.12-2, p. 37).

(8) Steam Dump Control:

Verified during Reactor Coolant System Hot Functional Testing (Abstract, Table 14.2.12-1, page 3) and during power escalation.