May 16, 2006

TVA-BFN-TS-431

10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Washington, D.C. 20555-0001

Gentlemen:

In the Matter of) Docket No. 50-259
Tennessee Valley Authority)

BROWNS FERRY NUCLEAR PLANT (BFN) - UNIT 1 - TECHNICAL SPECIFICATIONS (TS) CHANGE TS-431 - SUPPLEMENTAL RESPONSE REGARDING EXTENDED POWER UPRATE - TESTING PLANNED TO SATISFY DRAFT STANDARD REVIEW PLAN 14.2.1 (TAC NO. MC3812)

This letter provides TVA's supplemental responses to the NRC request for additional information regarding TVA's determination that the criteria in draft Standard Review Plan (SRP) Section 14.2.1, Generic Guidelines for Extended Power Uprate (EPU) Testing Programs, is satisfied by TVA's planned testing programs.

On June 28, 2004 (Reference 1), TVA requested a TS change to allow Unit 1 to operate at extended power uprate conditions. Enclosure 8 contained a description of the Unit 1 EPU Start-up Test Program and justification for not performing large transient testing. The NRC's December 22, 2005 letter (Reference 2) requested additional information regarding TVA's test program for Unit 1. TVA and NRC met on April 20th to discuss the overall testing issue.

As part of the April 20th meeting, TVA was requested to submit the information presented at the meeting and a description of the program that will compare the results from Unit 1 restart testing with the previous operating experience on Units 2 and 3. The requested information is provided in Enclosure 1 to this letter.

The SRP 14.2.1 acceptance criteria for a loss of offsite power, turbine trip or generator trip, or the isolation of all main steam lines will be satisfied as part of currently planned restart testing and activities. TVA will evaluate the results of the tests performed to satisfy the SRP acceptance criteria against Technical Specification requirements, test acceptance criteria, and expected responses based on applicable analyses, Units 2 and 3 operating experience, and responses predicted by the BFN simulators. Based on this information, large transient testing would not provide additional useful information.

A summary of the commitments made in this letter is provided in Enclosure 2.

TVA has determined that the additional information provided by this letter does not affect the no significant hazards considerations associated with the proposed TS changes. The proposed TS change still qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9).

If you have any questions about this submittal, please contact me at (256) 729-2636. I declare under penalty of perjury that the foregoing is true and correct. Executed on May 16, 2006.

Sincerely,

Original signed by:

William D. Crouch
Manager of Licensing
and Industry Affairs

References:

1. TVA letter, dated June 28, 2004, "Browns Ferry Nuclear Plant (BFN) - Unit 1 - Proposed Technical Specifications (TS) Change TS-431 - Request for License Amendment - Extended Power Uprate (EPU) Operation."

2. NRC letter, dated December 22, 2005, "Browns Ferry Nuclear Plant, Unit 1 – Request for Additional Information for Extended Power Uprate (TS-431) (TAC No. MC3812)."

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ENCLOSURE 1
TENNESSEE VALLEY AUTHORITY (TVA)
BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 1
TECHNICAL SPECIFICATION (TS) CHANGE 431,
SUPPLEMENTAL RESPONSE REGARDING EXTENDED POWER UPRATE - TESTING PLANNED TO SATISFY DRAFT STANDARD REVIEW PLAN 14.2.1

I. BACKGROUND

On June 28, 2004 (Reference 1), TVA requested a TS change to allow Unit 1 to operate at extended power uprate (EPU) conditions. Enclosure 8 contained a description of the Unit 1 EPU Start-up Test Program and justification for not performing large transient testing.

The NRC's December 22, 2005 letter (Reference 2) requested additional information regarding TVA's test program for Unit 1 and how Standard Review Plan (SRP) 14.2.1 criteria were addressed by the proposed EPU testing. TVA responded on March 7, 2006 (Reference 3).

Subsequent to that meeting, TVA prepared a summary of the process used by TVA in identifying the system testing requirements for the restart of each BFN unit, outlined how the Unit 1 testing is staged to support Unit 1 restart milestones, and compared the testing with regulatory guidance to ensure compliance.

TVA and NRC met on April 20th to discuss the overall testing issue. In that meeting, TVA was requested to submit the information presented at the meeting as well as a description of the program that will compare the results from Unit 1 restart testing with the previous operating experience on Units 2 and 3. The requested information is contained in this enclosure.

II. REGULATORY GUIDANCE

Guidelines for the recommended integrated plant testing for Extended Power Uprates is contained in Licensing Topical Report (NEDC-32424P-A, Appendix L), which states:

- Large transient tests are not required for uprates of up to ten percent of rated power. The initial plant testing and plant operational experience are considered sufficient;

- The licensee should perform a Main Steam Isolation Valve (MSIV) closure test if the uprate is more than ten percent above previous recorded data or provide an explanation and justification in a licensing submittal for any different approach; and

- The licensee should perform a Generator Load Reject test if the uprate is more than 15% above previous recorded data or provide an explanation and justification in a licensing submittal for any different approach.

Addition regulatory guidance is provided in draft Standard Review Plan (SRP) 14.2.1, Generic Guidelines for Extended Power Uprate Testing Programs. The SRP test acceptance criteria for a loss of offsite power, turbine trip or generator trip, and the closure of all Main Steam Isolation Valves (MSIVs) is reproduced in Table 1.

III. PROCESS FOR IDENTIFYING BFN SYSTEM TESTING REQUIREMENTS

The safe shutdown requirements are identified in the BFN Safe Shutdown Analysis (SSA). The SSA is documented as a calculation for BFN Units 1, 2, and 3. The SSA is based on the Updated Final Safety Analysis Report (UFSAR) Chapter 14 requirements and identified the accidents, abnormal operational transients, and special events from which the plant must be able to achieve safe shutdown. The SSA also identified the system modes or functions required to achieve safe shutdown for the applicable operating states. A tabulation of the accidents, transients, and special events within the scope of the SSA is provided in Table 2.

For each system, a Baseline Test Requirement Document (BTRD) specifies the testing acceptance criteria for each mode or function. An example of the contents of the BTRDs for the Main Steam system is provided below:

SYSTEM AND MODE	MODE DESCRIPTION	ACCEPTANCE CRITERIA
Main Steam 001-01	Provide Main Turbine trip on Turbine Stop Valve less than 90% open trip signal to Reactor Protection System (RPS).	Verify that position switches transmit the correct signal to RPS when the corresponding Turbine Stop Valve are less than 90% open.

SYSTEM AND MODE	MODE DESCRIPTION	ACCEPTANCE CRITERIA
Main Steam 001-02	Close Main Steam Isolation Valves (MSIVs) on primary containment isolation signal.	1. Verify each MSIV closes in 3 to 5 seconds upon receipt of a closure signal. 2. Verify each MSIV closes upon loss of both AC and DC solenoid power. Verify each valve closes on loss of air pressure. 3. Verify when only the 120VAC circuit or the 250VDC circuit are disconnected from the MSIV, the valve remains open. 4. Verify each MSIV accumulator leakage rate is within its design value. 5. Verify closure of either MSIV in one steam line transmits the correct signal to the Reactor Protection System.
Main Steam 001-05	Open Main Turbine bypass valves on Turbine Control System (047) turbine trip signal.	Test under Mode 047-05.
Main Steam 001-07	Open Safety Relief Valves (SRVs) on high Reactor pressure to provide Reactor Pressure Vessel (RPV) pressure relief	1. Verify actuation of Main Control Room (MCR) manual switches energize the correct SRV solenoid with the associated transfer switch in "normal". 2. Verify control of the non-Automatic Depressurization System (ADS) SRVs is not possible from the MCR when transfer switches are in "Emergency". 3. Verify SRV mechanical lift pressures.

SYSTEM AND MODE	MODE DESCRIPTION	ACCEPTANCE CRITERIA
Main Steam 001-08	Automatic opening of Automatic Depressurization System (ADS) Safety Relief Valves (SRVs) upon coincident signals for 2 Core Spray pumps or 1 Residual Heat Removal (RHR) pumps running and either Reactor Pressure Vessel (RPV) low water level (Level 1), high Drywell pressure and time delay, or Level 1 and high Drywell pressure bypass time delay.	Verify the ADS SRVs will, as demonstrated by energizing the solenoid, actuate automatically upon receipt of the appropriate combinations of each of the following signals: 1. Drywell pressure high (including ADS timers), and 2. RPV water level (Level 1 and Level 3), and 3. 1 Low Pressure Coolant Injection (LPCI) pump or 2 Core Spray pumps running, and 4. High Drywell pressure bypass timer has elapsed.

No new system functions or modes were identified as a result of taking Unit 1 from the current licensed power level of Units 2 and 3 (105% of the Original Licensed Thermal Power level or 3,458 MWt) to EPU conditions (120% of the Original Licensed Thermal Power level or 3,952 MWt).

IV. UNIT 1 TESTING AND MONITORING

The testing that will be performed as part of the restart of BFN Unit 1 can generally be categorized and sequenced as follows:

- Post-Modification / Post-Maintenance Testing,
- Testing Leading to Fuel Load,
- Testing Leading to Start-up (Restart Testing),
- Testing Leading to 100% Original Licensed Thermal Power (3,293 MWt) (Power Ascension Testing), and
- EPU Testing and Performance Monitoring.

Examples of these types of tests and how the testing is staged to support Unit 1 restart milestones is provided in Figure 1. Additional details for each category is discussed below.

POST-MODIFICATION / POST-MAINTENANCE TESTING

Post-Modification and Post-Maintenance testing is performed after the physical work for each individual Design Change Notice or Maintenance Work Order has been completed in the field. Examples of this testing would include valve operability testing, system and component leak testing, and logic system

functional testing. This testing is required to be completed before the Design Change Notice or Maintenance Work Order is considered complete.

TESTING LEADING TO FUEL LOAD

Prior to fuel load, the BFN restart testing program includes system testing and testing which is performed to demonstrate system operability in accordance with Technical Specification requirements for having fuel in the vessel (Mode 5). Examples of this testing would include Residual Heat Removal and Core Spray logic system functional testing.

TESTING LEADING TO START-UP (RESTART TESTING)

Restart testing includes additional system testing and testing which is performed to demonstrate system operability in accordance with Technical Specification requirements for start-up and power operations (Modes 2 and 1). Examples of this testing would include Recirculation flow control testing, control rod timing and testing, and primary containment leak rate testing.

A chronology of the development of the BFN Restart Test Program (RTP), from Unit 2 restart, Unit 3 restart, and now for Unit 1 is contained in Reference 4. The primary purpose of the RTP is to verify that systems are capable of meeting their safe shutdown requirements. Test procedures are developed to satisfy the required testing identified in the BTRDs and to verify that the acceptance criteria is met.

TESTING LEADING TO 100% ORIGINAL LICENSED THERMAL POWER (3,293 MWT) (POWER ASCENSION TESTING)

Power Ascension Testing includes additional Balance of Plant system testing. Examples of this testing would include shutdown margin testing, Reactor Feedwater Pump overspeed testing and tuning, and High Pressure Coolant Injection / Reactor Core Isolation Cooling cold quick start and vessel injection testing.

EXTENDED POWER UPRATE TESTING AND PERFORMANCE MONITORING

Extended Power Uprate testing includes additional Balance of Plant system testing. Examples of this testing would include Main Turbine, Condensate and Condensate Booster pump trip testing, and additional Reactor Feedwater Level Control system tuning.

Extended Power Uprate performance monitoring includes system and component vibration monitoring, moisture separator performance, and radiation measurements.

V. COMPLIANCE WITH REGULATORY GUIDANCE

EXTENDED POWER UPRATE LICENSING TOPICAL REPORT

In TVA's April 25, 2005 letter (Reference 5), TVA addressed the guidelines for the recommended integrated plant testing for Extended Power Uprates which are contained in the Licensing Topical Report (NEDC-32424P-A, Appendix L). TVA provided a comparison of the BFN initial startup tests to the planned testing of Unit 1 for EPU. This submittal concludes that large transient testing on Unit 1 is not warranted based on similarity of the units, the extensive Units 2 and 3 operating experience, and the currently planned Unit 1 restart testing.

STANDARD REVIEW PLAN 14.2.1

The key guidance contained in SRP can be summarized as follows:

- "(T)his review is intended to ensure that functions important to safety that rely on the integrated operation of multiple SSCs following an anticipated operational occurrence are adequately demonstrated …"
- "The test program should be scheduled and sequenced to minimize the time untested functions important to safety are relied upon during operation …"
- "If a function important to safety cannot be adequately tested by overlapping individual component- or system-level tests, the licensee should propose suitable system functional testing."

- "If the licensee proposes not to perform a required transient test based on operating experience, a review should be conducted to determine the applicability of the operating experience to the specific plant configuration and test requirements."

- "The review scope can be limited to those functions important to safety associated with the anticipated operational occurrences described in Attachment 2 to this SRP."

TVA evaluated three of the operational occurrences described in Attachment 2 to SRP 14.2.1:

- Loss of Offsite Power,
- Turbine trip or generator trip, and
- Isolation of all main steam lines.

The acceptance criteria specified in the SRP for each of these operational occurrences was reviewed against the SSA systems and modes and the associated BTRD testing to ensure the criteria would be satisfied by the planned Unit 1 restart testing. Table 3 documents this comparison for the Loss of Offsite Power, Table 4 documents this comparison for the Turbine / Generator trip, and Table 5 documents this comparison for the isolation of all main steam lines. This review demonstrated that TVA will satisfy the SRP criteria for a loss of offsite power, turbine trip or generator trip, or the isolation of all main steam lines as part of its currently planned restart activities, without performing additional large transient testing.

The review of the SRP acceptance criteria supports TVA's position that the restart test program and planned EPU testing (References 4 and 5) will ensure that functions important to safety that rely on the integrated operation of multiple SSCs following an anticipated operational occurrence are adequately demonstrated. The scheduling and sequencing of the testing, as shown in Figure 1, minimizes the time untested functions important to safety are relied upon during operation.

In summary, the SRP 14.2.1 acceptance criteria will be satisfied as part of currently planned restart testing and activities. Large transient testing for a loss of offsite power, turbine trip or generator trip, or the isolation of all main steam lines would not provide additional useful information.

VI. EVALUATION OF UNIT 1 RESTART TEST RESULTS

SIMILARITY BETWEEN UNITS

As part of the Unit 1 restart project, TVA is performing the same restart programs and implementing the same modifications that were previously completed on Units 2 and 3. In addition, TVA also incorporated the upgrades on the Units 2 and 3 five year plan into the scope of the Unit 1 restart project. As a result, Unit 1 will be operationally the same as Units 2 and 3.

SCOPE OF EVALUATION

In order to ensure Unit 1 as a whole will respond operationally the same as Units 2 and 3 during steady state operation and transient events, the results of selected Unit 1 power ascension testing will be evaluated against applicable criteria and information.

The Unit 1 steady state tests to be benchmarked against Units 2 and 3 operating experience are:

- At between 15% to 20% power, before and after generator synchronization;
- At the power plateau, between 35% and 40% power;
- At the power plateau, between 50% and 55% power;
- At the original Unit 1 licensed thermal power (100% - 3,293 MWt) plateau; and
- At the 105% power (3,458 MWt) plateau (Current Units 2 and 3 licensed thermal power level).

For example, before generator synchronization at between 15% and 20% power, the following parameters would be compared to the same parameters on Units 2 and/or 3 and any differences would be evaluated:

- Core output (MWt),
- Total steam flow,
- Total Feedwater flow,
- Number of bypass valves open,
- Reactor pressure, and
- Electrohydraulic control system header pressure.

After generator synchronization, the following parameters would be compared:

- Core output (MWt),
- Total steam flow,
- Total Feedwater flow,
- Reactor pressure,
- Turbine control valve position,
- Electrohydraulic control system header pressure, and
- Generator output (MWe).

The Unit 1 power ascension transient tests to be benchmarked against Units 2 and 3 are:

- Safety Relief Valve (SRV) manual cycle testing;
- Reactor Feedwater level control system tuning;
- Recirculation flow control testing;
- Electro-Hydraulic Control (EHC) pressure regulator tuning;
- Turbine valve testing (i.e., stop valves, control valves, and bypass valves);
- Full scram at greater than or equal to 30% power;
- High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) cold quick starts.
- HPCI and RCIC vessel injection tests.

For example, during safety relief valve cycling, the following parameters would be compared:

- Core output (MWt),
- Total steam flow,
- Total Feedwater flow,
- Number of bypass valves open,
- Reactor pressure,
- Electrohydraulic control system header pressure, and
- Reactor water level.

These parameters would also be monitored with a safety relief valve open and compared to the changes identified during testing on Units 2 and/or 3.

The results of the power ascension transient tests will be compared to:

- Unit 1 BTRD acceptance criteria,
- Unit 1 Technical Specification requirements,
- Unit 1 Surveillance Instruction acceptance criteria,

- Previous Units 2 and 3 restart or surveillance test results, and
- Predicted responses from the BFN simulators.

Additional details for each category is discussed below.

UNIT 1 BTRD ACCEPTANCE CRITERIA

As discussed above, the BTRDs specify the testing acceptance criteria for each system mode or function which ensures the plant is able to achieve safe shutdown. The testing and acceptance criteria for each BTRD required to satisfy the acceptance criteria for a loss of offsite power, turbine trip or generator trip, or the isolation of all main steam lines is provided in Tables 3 through 5. The results of the restart testing and the corresponding BTRD requirements are evaluated by the Joint Test Group prior to returning each system to service.

UNIT 1 TECHNICAL SPECIFICATION REQUIREMENTS

The Unit 1 Technical Specifications contain requirements that are demonstrated by testing. Failure to meet Technical Specification acceptance criteria results in TVA taking the specified Required Actions.

UNIT 1 SURVEILLANCE INSTRUCTION ACCEPTANCE CRITERIA

The failure to meet any acceptance criterion in the Surveillance Instruction results in a failure of the Surveillance Instruction, which would be evaluated as part of TVA's Corrective Action Program.

PREVIOUS UNITS 2 AND 3 OPERATING EXPERIENCE, AND PREDICTED RESPONSES FROM THE BFN SIMULATORS

The goal for both BFN simulators is to ensure that no noticeable differences exist between the simulator control room and simulated systems, when evaluated against the control room and systems on the referenced unit. The software development, coupled with the scenario-based testing and the reconciliation of actual event data with the simulator modeling, ensure that the simulators will faithfully portray transient response, including turbine and generator trips. The results of the Unit 1 power ascension and transient testing shall be compared against the simulator response criteria specified in Sections 4.1.3 and 4.1.4 of ANSI/ANS-3.5-1998, Nuclear Power Plant Simulators for Use in Operator Training and Examination. The

failure to meet any acceptance criterion in the standard would be evaluated as part of TVA's Corrective Action Program.

REVIEWS

In accordance with the Master Refueling test Instruction (1-TI-319), the results of restart testing are required to be reviewed by the Joint Test Group. For each test plateau, a summary report is prepared by the Joint Test Group, reviewed by the Plant Operations Review Committee, and approved by the Plant Manager prior to proceeding to the next test plateau.

VII. CONCLUSION

The SRP 14.2.1 acceptance criteria for a loss of offsite power, turbine trip or generator trip, or the isolation of all main steam lines will be satisfied as part of currently planned restart testing and activities. TVA will evaluate the results of the tests performed to satisfy the SRP acceptance criteria against Technical Specification requirements, test acceptance criteria, Units 2 and 3 operating experience, and responses predicted by the BFN simulators. Based on this information, large transient testing would not provide additional useful information.

VIII. REFERENCES

1. TVA letter, dated June 28, 2004, "Browns Ferry Nuclear Plant (BFN) - Unit 1 - Proposed Technical Specifications (TS) Change TS-431 - Request for License Amendment - Extended Power Uprate (EPU) Operation."

2. NRC letter, dated December 22, 2005, "Browns Ferry Nuclear Plant, Unit 1 — Request for Additional Information for Extended Power Uprate (TS-431) (TAC No. MC3812)."

3. TVA letter, dated March 7, 2006, "Browns Ferry Nuclear Plant (BFN) - Unit 1 - Response to NRC Round 3 Requests for Additional Information Related to Technical Specifications (TS) Change No. TS-431 - Request for Extended Power Uprate Operation (TAC No. MC3812)."

4. TVA letter, dated August 15, 2005. "Browns Ferry Nuclear Plant (BFN) - Unit 1 - Response to NRC Request for Additional Information Regarding the Restart Testing Program (TAC No. MC7208)."

5. TVA letter, dated April 25, 2005, "Browns Ferry Nuclear Plant (BFN) - Unit 1 - Response to NRC's Request for Additional Information Related to Technical Specifications (TS) Change No. TS-431 - Request for Extended Power Uprate Operation (TAC No. MC3812)."

TABLE 1
STANDARD REVIEW PLAN 14.2.1 ACCEPTANCE CRITERIA

Transient Test	Reference	Typical Reactor Plant Initial Conditions	Typical Transient Test Acceptance Criteria and Associated Functions Important to Safety	Applicable Accident Analyses (SRP Section)
Dynamic response of plant to turbine trip (Turbine trip or generator trip)	RG 1.68, App A 5.I.I IP 72580 IP 72514	trip from steady state operation at greater than 95% of RTP initiation of the test by trip of the main generator output breaker recirculation system flow control mode must be specified	Performance in accordance with design, including: reactor coolant pumps do not trip pressurizer spray valve opens and closes at the specified values reactor pressure remains below the setpoint of the first safety valves, pressurizer safety valves do not lift or weep pressurizer level within prescribed limits steam system power actuated pressure relief valve opens and closes at specified values reactor coolant pressure/temperature relationship remains within defined values steam generator level remains within prescribed limits, no flooding of the steam lines during the transient, no initiation of ECCS and MSIV isolation during the transient turbine bypass system operates to maintain specific pressure (plants with 100% bypass capability shall remain at power without scram during the transient) plants with select-rod-insertion shall maintain power without scram from recirculation pump overspeed or cold feedwater effect reactor protection system functions should be verified all safety and ECCS systems such as RPS, HPCI, diesel generators, and RCIC function without manual assistance if called upon Normal reactor cooling systems should maintain adequate cooling and prevent actuation of automatic depressurization system, even though relief valves may function to control pressure plant electrical loads (transferred as designed) turbine overspeed criteria met	15.2.1 Turbine Trip

Transient Test	Reference	Typical Reactor Plant Initial Conditions	Typical Transient Test Acceptance Criteria and Associated Functions Important to Safety	Applicable Accident Analyses (SRP Section)
Dynamic response of plant to automatic closure of all main steam isolation valves	RG 1.68, App A 5.m.m IP 72510	Initial power level of 100% of RTP	performance in accordance with design, including: acceptance criteria include MSIV closure time	15.2.4 Main Steam Isolation Valve Closure (BWR)
Dynamic response of plant for full load rejection (Loss of Offsite Power Testing)	RG 1.68, App A 5.n.n IP 72517 IP 72582	100% of RTP with electrical system aligned for normal full-power operation and load rejection method should subject turbine to maximum credible overspeed condition steady-state plant operations with greater than 10% generator output (IP 72517 & 72582). trip of the plant with breakers in specified positions so that plant loads will be transferred directly to the diesel generators following loss of house power recirculation system flow control mode specified	Performance in accordance with design, including: Automatic transfer of plant loads as designed, automatic start of diesel generators, automatic load of diesel generators in the specified sequence Reactor pressure remains below the first safety valve setting. Pressurized safety valves do not lift All safety systems such as RPS, HPCI, diesel generators, and RCIC function without manual assistance Normal reactor cooling systems should maintain adequate core temperatures, and prevent actuation of the Automatic Depressurization System; however selected relief valves may function to control pressure Turbine bypass system operates to maintain specified pressure value Steam system power-actuated pressure relief valves open and close at specified value Pressurizer spray valves open and close at specified values. Reactor coolant temperature/pressure relationship remains within prescribed values Pressurizer level is maintained within prescribed limits Steam generator level remains within prescribed limits	15.2.6 Loss of Nonemergency AC Power to the Station Auxiliaries

TABLE 2
SAFE SHUTDOWN ANALYSIS
ACCIDENTS, TRANSIENTS, AND SPECIAL EVENTS

- Generator Trip
- Turbine-Generator Trip with Bypass Failure
- Pressure Regulator Failure - Closed
- Turbine Trip
- Isolation of all Main Steam Lines
- Closure of One Main Steam Isolation Valve
- Loss of Condenser Vacuum
- Loss of Feedwater Heater
- Shutdown Cooling (RHRS) Malfunction
- Inadvertent Pump Start
- Control Rod Withdrawal Error
- Fuel Assembly Insertion
- Loss of Shutdown Cooling
- Feedwater Controller Failure - Maximum Demand
- Control Rod Drop Accident
- Pipe Break Inside Containment - Large Break
- Intermediate Pipe Break Inside Containment
- Small Pipe Break Inside Containment
- Pipe Break Inside - Containment and Radiological Effect
- Fuel Handling Accident
- Pipe Break Outside Containment
- Loss of Fuel Pool Cooling/Makeup
- Control Rod Removal Error
- Inadvertent Opening of All Bypass Valves
- Pressure Regulator Failure - Open
- Loss of Feedwater Flow
- Loss of Offsite AC Power
- Inadvertent Opening of a Safety/Relief Valve
- Recirculation Control Failure - Decrease
- Recirculation Pump Trip (One Pump Trip)
- Recirculation Pump Trip (Two Pump Trip)
- Recirculation Pump Seizure
- Recirculation Flow Controller Failure Increasing Flow
- Startup of Idle Reactor Recirculation Pump
- Shutdown From Outside of Control Room
- Overpressure Protection (MSIV Closure - Backup Scram)
- Shutdown Without Control Rods
- Rotated or Mis-located Bundle
- Flood
- Low Reservoir Downstream Dam Failure
- Tornado
- Earthquake
- Fire

TABLE 3
TESTING WHICH SATISFIES SRP 14.2.1 ACCEPTANCE CRITERIA FOR A LOSS OF OFFSITE POWER

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

Automatic transfer of plant loads as designed, automatic start of diesel generators, automatic load of diesel generators in the specified sequence.

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Diesel Generators (DGs) 082-01	Automatic and manual initiation of DGs to be available as an on-site Standby AC source on: 1. Common Accident Signal; 2. Pre-accident Signal; 3. Loss of voltage / Loss of station power; 4. Degraded voltage and under voltage; and 5. Manual start.	Loss of voltage, degraded voltage and undervoltage test performed as part of Unit 2 recovery. Automatic load sequencing of diesel generator test performed as part of diesel generator load acceptance test. Both tests routinely required by Technical Specifications on a 24-month frequency.	1. Common Accident Signal and Pre-accident Signal are tested in BTRD 057-05. 2. Loss of voltage, loss of station power, degraded voltage, under voltage, and manual start of DGs were tested during Unit 2 restart.
480VAC 574-05	Provide 480V Load Shed on Degraded Voltage Condition	Verifies loads are shed on loss of voltage on Unit 1 480V Shutdown Boards 1A and 1B. Unit 2 480V Shutdown Board load shed testing is currently performed on a 24-month frequency.	1. Verify that load shedding will be initiated by undervoltage at each 480V Shutdown Board. 2. Verify by test that after a loss of voltage for greater than 5 seconds, the 480V Shutdown Boards load shed.

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

All safety systems such as Reactor Protection System, High Pressure Coolant Injection, diesel generators, and Reactor Core Isolation Cooling function without manual assistance.

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Reactor Protection System (RPS) 099-01	Provide automatic Scram and Scram Discharge Volume vent and drain valves isolation signal to Control Rod Drive (CRD) system (085)	Functional testing and calibration of Turbine Control Valve low Electro-hydraulic Control (EHC) pressure scram; Functional testing and calibration of less than 90% Turbine Stop Valve open scram; and Reactor Protection System response of less than 50 msec from opening of sensor contacts to opening of scram relay contacts.	1. The CRD System receives a Channel A1 or A2 or a Channel B1 or B2 half Scram signal from the RPS for all automatic scram signals. 2. Manual reset of a Scram is inhibited for a minimum of 10 seconds following a Scram. 3. System response is less than 50 msec from opening of the sensor contacts up to and including opening of the trip actuator.
Reactor Core Isolation Cooling (RCIC) 071-01	Automatic RCIC initiation on Reactor Pressure Vessel (RPV) low water level (Level 2). Automatic RCIC shutoff (if operating) on RPV high water level (Level 8). Manual transfer of suction from Condensate Storage Tank to Suppression Pool.	RCIC logic system functional testing; RCIC flow testing at rated pressure; RCIC cold quick start at rated pressure; and RCIC injection into the vessel.	1. Verify that on RCIC initiation on RPV low water level (Level 2), RCIC initiates from Standby Mode to Injection Mode and from Pump Test Mode to Injection Mode. 2. Verify initiation of RCIC automatic shutdown logic on RPV high water level (Level 8). 3. Verify the RCIC system can be manually operated from the Main Control Room. 4. Verify the RCIC suction path can be manually transferred from the Condensate Storage Tank (CST) to the Suppression Pool and that the RCIC suction valve interlocks function. 5. Verify steam line drain valves close when RCIC steam supply valve opens.

Criterion satisfied by (Cont.):

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Control Rod Drive (CRD) 085-01	Provide Scram and close Scram Discharge Volume vent and drain valves.	Performs a full reactor scram at greater than 1% power; Performs individual rod scram timing; and Performs Scram Discharge Volume vent and drain valve cycling and timing	1. Verify a Scram signal from the Reactor Protection System (RPS) will activate the Control Rod Drive (CRD) System to trip the CRD Scram pilot valves and Scram Discharge Volume (SDV) vent and drain valves. 2. Verify that due to trip of Scram pilot valves and SDV vent and drain pilots, all rods are inserted and SDV vent and drain valves close. (Above full scram must be from rated temperature and pressure at greater than 1% power.) 3. Verify Scram insertion time for all control rods. 4. Verify SDV vent and drain valves close on full scram in less than 60 sec. 5. Verify on loss of power to RPS, all rods are inserted and SDV vent and drain valves close automatically. 6. Verify indication of vent and drain valve position is provided in the Main Control Room and valves open to drain the SDV only after Scram reset.
Diesel Generators (DGs) 082-01	Automatic and manual initiation of DGs to be available as an on-site Standby AC source on: 1. Common Accident Signal; 2. Pre-accident Signal; 3. Loss of voltage / Loss of station power; 4. Degraded voltage and under voltage; and 5. Manual start.	Loss of voltage, degraded voltage and undervoltage test performed as part of Unit 2 recovery and routinely required by Technical Specifications.	1. Common Accident Signal and Pre-accident Signal are tested in BTRD 057-05. 2. Loss of voltage, loss of station power, degraded voltage, under voltage, and manual start of DGs were tested during Unit 2 restart.

Criterion satisfied by (Cont.):

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
High Pressure Coolant Injection (HPCI) 073-01	Automatic HPCI system initiation on Reactor Pressure Vessel (RPV) low water level or high drywell pressure signals. Automatic HPCI system shutoff (if operating) on reactor Feedwater system RPV high water level signal. Includes automatic transfer, if needed, from Condensate Storage Tank (CST) to Suppression Pool on low CST level or high Suppression Pool level.	HPCI logic system functional testing; HPCI flow testing at rated pressure; HPCI cold quick start at rated pressure; and HPCI injection into the vessel.	1. Verify HPCI initiation on high Drywell pressure or low RPV water level (Level 2). Verify that HPCI initiates from standby mode to injection mode and pump test mode the injection mode. 2. Verify the steam line isolation valves close when the HPCI steam supply valve is open. 3. Verify the CST suction valve opens when the Suppression Pool suction valves are not fully open. 4. Verify Suppression Pool suction valves automatically open and the CST suction valve closes upon receipt of CST low level or high Suppression Pool level. 5. Verify the CST and Suppression Pool level instrumentation provides signals at the appropriate setpoints and level annunciation is provided to the Main Control Room. 6. Verify the Turbine Stop Valve closes on high RPV level (Level 8). Verify subsequent reactor low level (Level 2) will re-open the Stop Valve.

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

- Normal reactor cooling systems should maintain adequate core temperatures, and prevent actuation of the Automatic Depressurization System; however selected relief valves may function to control pressure.
- Reactor coolant temperature/pressure relationship remains within prescribed values.
- Steam system power-actuated pressure relief valves open and close at specified value.

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Main Steam 001-27	Automatically open Safety Relief Valves (SRVs) on high Reactor pressure to provide Reactor Pressure Vessel (RPV) pressure relief.	Performs calibration and functional check of SRV pressure switch opening logic.	Verify SRVs receive an open signal on high RPV pressure.
Main Steam 001-07	Open Safety Relief Valves (SRVs) on high Reactor pressure to provide Reactor Pressure Vessel (RPV) pressure relief	Verifies lift pressure for all Safety Relief Valves (SRVs). Verifies Automatic Depressurization System (ADS) and non-ADS SRV solenoids can by manually cycled; Performs ADS logic system functional testing; and Performs manual cycle of SRVs at greater than 935 psig.	1. Verify actuation of Main Control Room (MCR) manual switches energize the correct SRV solenoid with the associated transfer switch in "normal". 2. Verify control of the non-Automatic Depressurization System (ADS) SRVs is not possible from the MCR when transfer switches are in "Emergency". 3. Verify SRV mechanical lift pressures.
Main Steam 001-08	Automatic opening of Automatic Depressurization System (ADS) Safety Relief Valves (SRVs) upon coincident signals for two Core Spray pumps or one Residual Heat Removal (RHR) pumps running and either Reactor Pressure Vessel (RPV) low water level (Level 1), high Drywell pressure and time delay, or Level 1 and high Drywell pressure bypass time delay.		Verify the ADS SRVs will, as demonstrated by energizing the solenoid, actuate automatically upon receipt of the appropriate combinations of each of the following signals: • Drywell pressure high (including ADS timers), and • RPV water level (Level 1 and Level 3), and • 1 Low Pressure Coolant Injection (LPCI) pump or 2 Core Spray pumps running, and • High Drywell pressure bypass timer has elapsed.

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

Turbine bypass system operates to maintain specified pressure value.

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Main Steam 001-05	Open Main Turbine bypass valves on Turbine Control System (047) turbine trip signal.	Verifies EHC logic functions to operate bypass valves on a turbine trip	Test under Mode 047-05, below.
Turbine Control System 047-05	Provide hydraulic control to open Main Steam turbine bypass valves on Turbine trip signal.	Verifies hydraulic control oil pressure after a turbine trip opens bypass valves, and that accumulators can hold valves open for a minimum of 10 seconds on loss of pumps; and Verifies that after a turbine trip that bypass valves open within 100 msec. of the start of Turbine Stop Valve closure. Verifies hydraulic control oil pressure is provided to open the turbine bypass valves.	1. Verify hydraulic control is provided to open the turbine bypass valves. 2. Verify hydraulic pressure to keep all the bypass valves open will be maintained for a minimum of 10 seconds after a loss of the hydraulic supply or electrical power supply to the hydraulic unit. 3. Verify, after a turbine trip, that the bypass valves will start to open within 100 msec. of the start of the Main Steam stop valve closure.
Main Steam 001-24	Provide Main Steam line pressure signal to Turbine Control System (047) for operation of Main Steam turbine bypass valves.	Calibration and functional check of EHC Main Steam line and reactor pressure inputs to EHC logic	Verify 1-PT-001-16A and 16B provide control signals to the Turbine Control System (047).

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

- Reactor pressure remains below the first safety valve setting. Pressurized safety valves do not lift.
- Pressurizer spray valves open and close at specified values.
- Pressurizer level is maintained within prescribed limits.
- Steam generator level remains within prescribed limits.

Criteria not applicable to Boiling Water Reactors.

TABLE 4

TESTING WHICH SATISFIES SRP 14.2.1 ACCEPTANCE CRITERIA FOR A TURBINE/GENERATOR TRIP

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

- Reactor coolant pumps do not trip.
- Plants with select-rod-insertion shall maintain power without scram from recirculation pump overspeed or cold feedwater effect.

Criterion not applicable to BFN since, by design, the Recirculation pumps trip upon receipt of a turbine trip or load rejection signal. BFN does not have the select-rod-insertion logic.

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

- Steam system power actuated pressure relief valve opens and closes at specified values.
- Reactor coolant pressure/temperature relationship remains within defined values.

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Main Steam 001-27	Automatically open Safety Relief Valves (SRVs) on high Reactor pressure to provide Reactor Pressure Vessel (RPV) pressure relief.	Performs calibration and functional check of SRV pressure switch opening logic.	Verify SRVs receive an open signal on high RPV pressure.
Main Steam 001-07	Open Safety Relief Valves (SRVs) on high Reactor pressure to provide Reactor Pressure Vessel (RPV) pressure relief	Verifies lift pressure for all Safety Relief Valves (SRVs). Verifies Automatic Depressurization System (ADS) and non-ADS SRV solenoids can by manually cycled; Performs ADS logic system functional testing; and Performs manual cycle of SRVs at greater than 935 psig.	1. Verify actuation of Main Control Room (MCR) manual switches energize the correct SRV solenoid with the associated transfer switch in "normal". 2. Verify control of the non-Automatic Depressurization System (ADS) SRVs is not possible from the MCR when transfer switches are in "Emergency". 3. Verify SRV mechanical lift pressures.
Main Steam 001-08	Automatic opening of Automatic Depressurization System (ADS) Safety Relief Valves (SRVs) upon coincident signals for two Core Spray pumps or one Residual Heat Removal (RHR) pumps running and either Reactor Pressure Vessel (RPV) low water level (Level 1), high Drywell pressure and time delay, or Level 1 and high Drywell pressure bypass time delay.		Verify the ADS SRVs will, as demonstrated by energizing the solenoid, actuate automatically upon receipt of the appropriate combinations of each of the following signals: • Drywell pressure high (including ADS timers), and • RPV water level (Level 1 and Level 3), and • 1 Low Pressure Coolant Injection (LPCI) pump or 2 Core Spray pumps running, and • High Drywell pressure bypass timer has elapsed.

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

No flooding of the steam lines during the transient, no initiation of ECCS and MSIV isolation during the transient.

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Feedwater 003-11	Provide Reactor Pressure Vessel (RPV) high water level (Level 8) signal to Feedwater level control system for Main and Feedwater turbine trip.	Verifies Reactor Feedwater Pump Turbines and Main Turbines trip on high water level (Level 8); and Performs Reactor Feedwater Pump Turbines and Main Turbines high level trip logic system functional testing.	Verify High RPV water level (Level 8) signals are sent to Feedwater level control system for closure of Main and Feedwater Turbine Steam Supply stop valves.
Feedwater 003-18	Energize solenoid to close Main Steam Feedwater turbine steam supply valves on low vacuum or high Reactor Pressure Vessel (RPV) level (Level 8) signal.		Verify the trip signals from the Feedwater Level control system and Main Condenser Low Vacuum pressure switches energize the trip solenoids for the Feedwater Turbine stop valves.
Feedwater Level Control 046-01	Provide Reactor Pressure Vessel (RPV) high water level (Level 8) signal to energize Feedwater solenoid to close Feedwater turbine steam supply stop valve.		Test under Mode 003-11.

Low pressure Emergency Core Cooling Systems (ECCS), which initiate on high drywell pressure or low reactor vessel water level (Level 1) are not challenged. In addition to the above restart testing, TVA will perform Feedwater Level Control System tuning, turbine bypass valve, Reactor Feedwater Pump, Condensate Booster Pump, Condensate Pump trip, and turbine valve testing. TVA has confidence that these action will be adequate since the Feedwater Level Control System is the same on Unit 1 as Units 2 and 3. Units 2 and 3 have operating experience on turbine trips at 105% power and have had no issues with the response of the ECCS, have experienced no Main Steam Isolation Valve closures, and had no issues with reactor vessel water level control (high or low).

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

Turbine bypass system operates to maintain specific pressure (plants with 100% bypass capability shall remain at power without scram during the transient).

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Main Steam 001-05	Open Main Turbine bypass valves on Turbine Control System (047) turbine trip signal.	Verifies EHC logic functions to operate bypass valves on a turbine trip	Test under Mode 047-05, below.
Turbine Control System 047-05	Provide hydraulic control to open Main Steam turbine bypass valves on Turbine trip signal.	Verifies hydraulic control oil pressure after a turbine trip opens bypass valves, and that accumulators can hold valves open for a minimum of 10 seconds on loss of pumps; and Verifies that after a turbine trip that bypass valves open within 100 msec. of the start of Turbine Stop Valve closure. Verifies hydraulic control oil pressure is provided to open the turbine bypass valves.	1. Verify hydraulic control is provided to open the turbine bypass valves. 2. Verify hydraulic pressure to keep all the bypass valves open will be maintained for a minimum of 10 seconds after a loss of the hydraulic supply or electrical power supply to the hydraulic unit. 3. Verify, after a turbine trip, that the bypass valves will start to open within 100 msec. of the start of the Main Steam stop valve closure.
Main Steam 001-24	Provide Main Steam line pressure signal to Turbine Control System (047) for operation of Main Steam turbine bypass valves.	Calibration and functional check of EHC Main Steam line and reactor pressure inputs to EHC logic	Verify 1-PT-001-16A and 16B provide control signals to the Turbine Control System (047).

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

Reactor protection system functions should be verified.

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Main Steam 001-01	Provide Main Turbine trip on Turbine Stop Valve less than 90% open trip signal to Reactor Protection System (RPS).	Verifies calibration and functional testing of the Turbine Main Stop Valve limit switches scram	Verify that position switches transmit the correct signal to RPS when the corresponding Turbine Stop Valve are less than 90% open.
Main Steam 001-23	Provide greater than 26% open turbine first stage pressure interlock signal to Reactor Protection System (RPS) fail safe logic.	Verifies calibration and functional check of the Turbine First Stage Pressure scram bypass from a Main Turbine trip	1. Verify trip signals are provided via the trip units. 2. Verify that each trip unit initiates the correct trip signal (for each channel) to the RPS in response to a real or simulated input to the associated sensor.
Control Rod Drive (CRD) 085-01	Provide Scram and close Scram Discharge Volume vent and drain valves.	Performs a full reactor scram at greater than 1% power; Performs individual rod scram timing; and Performs Scram Discharge Volume vent and drain valve cycling and timing	1. Verify a Scram signal from the Reactor Protection System (RPS) will activate the Control Rod Drive (CRD) System to trip the CRD Scram pilot valves and Scram Discharge Volume (SDV) vent and drain valves. 2. Verify that due to trip of Scram pilot valves and SDV vent and drain pilots, all rods are inserted and SDV vent and drain valves close. (Above full scram must be from rated temperature and pressure at greater than 1% power.) 3. Verify Scram insertion time for all control rods. 4. Verify SDV vent and drain valves close on full scram in less than 60 sec. 5. Verify on loss of power to RPS, all rods are inserted and SDV vent and drain valves close automatically. 6. Verify indication of vent and drain valve position is provided in the Main Control Room and valves open to drain the SDV only after Scram reset.

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

All safety and ECCS systems such as RPS, HPCI, diesel generators, and RCIC function without manual assistance if called upon.

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Reactor Protection System (RPS) 099-01	Provide automatic Scram and Scram Discharge Volume vent and drain valves isolation signal to Control Rod Drive (CRD) system (085)	Functional testing and calibration of Turbine Control Valve low Electro-hydraulic Control (EHC) pressure scram; Functional testing and calibration of less than 90% Turbine Stop Valve open scram; and Reactor Protection System response of less than 50 msec from opening of sensor contacts to opening of scram relay contacts.	1. The CRD System receives a Channel A1 or A2 or a Channel B1 or B2 half Scram signal from the RPS for all automatic scram signals. 2. Manual reset of a Scram is inhibited for a minimum of 10 seconds following a Scram. 3. System response is less than 50 msec from opening of the sensor contacts up to and including opening of the trip actuator.
Reactor Core Isolation Cooling (RCIC) 071-01	Automatic RCIC initiation on Reactor Pressure Vessel (RPV) low water level (Level 2). Automatic RCIC shutoff (if operating) on RPV high water level (Level 8). Manual transfer of suction from Condensate Storage Tank to Suppression Pool.	RCIC logic system functional testing; RCIC flow testing at rated pressure; RCIC cold quick start at rated pressure; and RCIC injection into the vessel.	1. Verify that on RCIC initiation on RPV low water level (Level 2), RCIC initiates from Standby Mode to Injection Mode and from Pump Test Mode to Injection Mode. 2. Verify initiation of RCIC automatic shutdown logic on RPV high water level (Level 8). 3. Verify the RCIC system can be manually operated from the Main Control Room. 4. Verify the RCIC suction path can be manually transferred from the Condensate Storage Tank (CST) to the Suppression Pool and that the RCIC suction valve interlocks function. 5. Verify steam line drain valves close when RCIC steam supply valve opens.

Criterion satisfied by (Cont.):

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Control Rod Drive (CRD) 085-01	Provide Scram and close Scram Discharge Volume vent and drain valves.	Performs a full reactor scram at greater than 1% power; Performs individual rod scram timing; and Performs Scram Discharge Volume vent and drain valve cycling and timing	1. Verify a Scram signal from the Reactor Protection System (RPS) will activate the Control Rod Drive (CRD) System to trip the CRD Scram pilot valves and Scram Discharge Volume (SDV) vent and drain valves. 2. Verify that due to trip of Scram pilot valves and SDV vent and drain pilots, all rods are inserted and SDV vent and drain valves close. (Above full scram must be from rated temperature and pressure at greater than 1% power.) 3. Verify Scram insertion time for all control rods. 4. Verify SDV vent and drain valves close on full scram in less than 60 sec. 5. Verify on loss of power to RPS, all rods are inserted and SDV vent and drain valves close automatically. 6. Verify indication of vent and drain valve position is provided in the Main Control Room and valves open to drain the SDV only after Scram reset.
Diesel Generators (DGs) 082-01	Automatic and manual initiation of DGs to be available as an on-site Standby AC source on: 6. Common Accident Signal; 7. Pre-accident Signal; 8. Loss of voltage / Loss of station power; 9. Degraded voltage and under voltage; and 10. Manual start.	Loss of voltage, degraded voltage and undervoltage test performed as part of Unit 2 recovery and routinely required by Technical Specifications.	1. Common Accident Signal and Pre-accident Signal are tested in BTRD 057-05. 2. Loss of voltage, loss of station power, degraded voltage, under voltage, and manual start of DGs were tested during Unit 2 restart.

Criterion satisfied by (Cont.):

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
High Pressure Coolant Injection (HPCI) 073-01	Automatic HPCI system initiation on Reactor Pressure Vessel (RPV) low water level or high drywell pressure signals. Automatic HPCI system shutoff (if operating) on reactor Feedwater system RPV high water level signal. Includes automatic transfer, if needed, from Condensate Storage Tank (CST) to Suppression Pool on low CST level or high Suppression Pool level.	HPCI logic system functional testing; HPCI flow testing at rated pressure; HPCI cold quick start at rated pressure; and HPCI injection into the vessel.	1. Verify HPCI initiation on high Drywell pressure or low RPV water level (Level 2). Verify that HPCI initiates from standby mode to injection mode and pump test mode the injection mode. 2. Verify the steam line isolation valves close when the HPCI steam supply valve is open. 3. Verify the CST suction valve opens when the Suppression Pool suction valves are not fully open. 4. Verify Suppression Pool suction valves automatically open and the CST suction valve closes upon receipt of CST low level or high Suppression Pool level. 5. Verify the CST and Suppression Pool level instrumentation provides signals at the appropriate setpoints and level annunciation is provided to the Main Control Room. 6. Verify the Turbine Stop Valve closes on high RPV level (Level 8). Verify subsequent reactor low level (Level 2) will re-open the Stop Valve.

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

Normal reactor cooling systems should maintain adequate cooling and prevent actuation of automatic depressurization system, even though relief valves may function to control pressure.

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Main Steam 001-27	Automatically open Safety Relief Valves (SRVs) on high Reactor pressure to provide Reactor Pressure Vessel (RPV) pressure relief.	Performs calibration and functional check of SRV pressure switch opening logic.	Verify SRVs receive an open signal on high RPV pressure.
Main Steam 001-07	Open Safety Relief Valves (SRVs) on high Reactor pressure to provide Reactor Pressure Vessel (RPV) pressure relief	Verifies lift pressure for all Safety Relief Valves (SRVs). Verifies Automatic Depressurization System (ADS) and non-ADS SRV solenoids can by manually cycled; Performs ADS logic system functional testing; and Performs manual cycle of SRVs at greater than 935 psig.	1. Verify actuation of Main Control Room (MCR) manual switches energize the correct SRV solenoid with the associated transfer switch in "normal". 2. Verify control of the non-Automatic Depressurization System (ADS) SRVs is not possible from the MCR when transfer switches are in "Emergency". 3. Verify SRV mechanical lift pressures.
Main Steam 001-08	Automatic opening of Automatic Depressurization System (ADS) Safety Relief Valves (SRVs) upon coincident signals for two Core Spray pumps or one Residual Heat Removal (RHR) pumps running and either Reactor Pressure Vessel (RPV) low water level (Level 1), high Drywell pressure and time delay, or Level 1 and high Drywell pressure bypass time delay.		Verify the ADS SRVs will, as demonstrated by energizing the solenoid, actuate automatically upon receipt of the appropriate combinations of each of the following signals: • Drywell pressure high (including ADS timers), and • RPV water level (Level 1 and Level 3), and • 1 Low Pressure Coolant Injection (LPCI) pump or 2 Core Spray pumps running, and • High Drywell pressure bypass timer has elapsed.

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

Plant electrical loads (transferred as designed).

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Diesel Generators (DGs) 082-01	Automatic and manual initiation of DGs to be available as an on-site Standby AC source on: 1. Common Accident Signal; 2. Pre-accident Signal; 3. Loss of voltage / Loss of station power; 4. Degraded voltage and under voltage; and 5. Manual start.	Loss of voltage, degraded voltage and undervoltage test performed as part of Unit 2 recovery. Automatic load sequencing of diesel generator test performed as part of diesel generator load acceptance test. Both tests routinely required by Technical Specifications on a 24-month frequency.	1. Common Accident Signal and Pre-accident Signal are tested in BTRD 057-05. 2. Loss of voltage, loss of station power, degraded voltage, under voltage, and manual start of DGs were tested during Unit 2 restart.
480VAC 574-05	Provide 480V Load Shed on Degraded Voltage Condition	Verifies loads are shed on loss of voltage on Unit 1 480V Shutdown Boards 1A and 1B. Unit 2 480V Shutdown Board load shed testing is currently performed on a 24-month frequency.	1. Verify that load shedding will be initiated by undervoltage at each 480V Shutdown Board. 2. Verify by test that after a loss of voltage for greater than 5 seconds, the 480V Shutdown Boards load shed.

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

Turbine overspeed criteria met.

TVA will satisfy this criterion. Overspeed trip testing of the Main Turbine is performed as part of Power Ascension Testing. The BFN units directly trip the Main Turbine on a load reject signal. EPU has minimal impact on the store energy following a turbine trip.

SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

- Pressurizer spray valve opens and closes at the specified values.
- Reactor pressure remains below the setpoint of the first safety valves, pressurizer safety valves do not lift or weep.
- Pressurizer level within prescribed limits.
- Steam generator level remains within prescribed limits.

Criteria not applicable to Boiling Water Reactors.

TABLE 5
TESTING WHICH SATISFIES SRP 14.2.1 ACCEPTANCE CRITERIA
FOR CLOSURE OF ALL MAIN STEAM ISOLATION VALVES

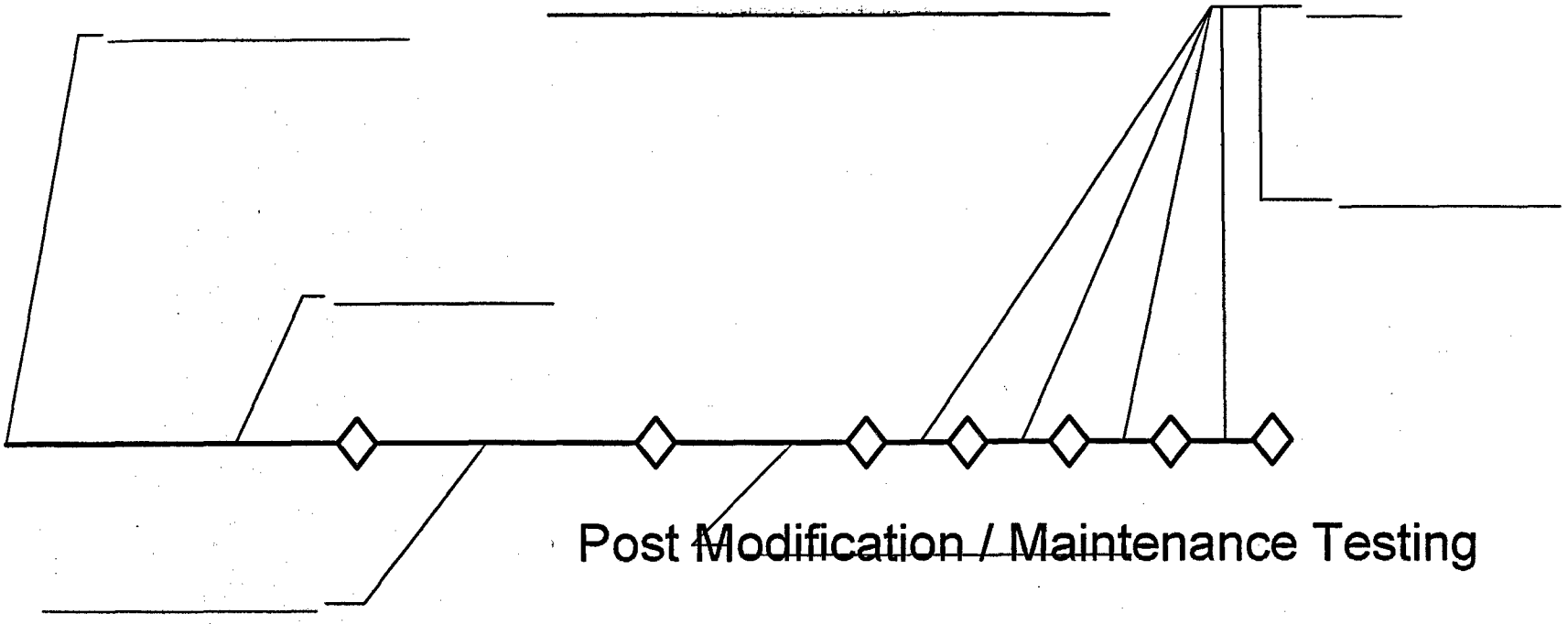
SRP 14.2.1 Acceptance Criterion: Performance in accordance with design, including:

MSIV closing time.

Criterion satisfied by:

SYSTEM AND MODE	MODE DESCRIPTION	TESTING DESCRIPTION	ACCEPTANCE CRITERIA
Main Steam 001-03	Close Main Steam Isolation Valves (MSIVs) on primary containment isolation signal.		1. Verify each MSIV closes in 3 to 5 seconds upon receipt of a closure signal. 2. Verify each MSIV closes upon loss of both AC and DC solenoid power. Verify each valve closes on loss of air pressure. 3. Verify when only the 120VAC circuit or the 250VDC circuit are disconnected from the MSIV, the valve remains open. 4. Verify each MSIV accumulator leakage rate is within its design value. 5. Verify closure of either MSIV in one steam line transmits the correct signal to the Reactor Protection System.

The MSIV closure time is checked and adjusted once per cycle in accordance with the In Service Testing program. Procedural requirements, which are based on operating experience, require the MSIV closure time to be set between four and five seconds while the MSIVs are cold to ensure the closing time will be greater than three seconds at rated temperature and pressure. The change in closure time due to EPU conditions is negligible.



Post Modification / Maintenance Testing

- Verification of proper rotation and setting limits on valves
- Motor-operated valve (MOV) setting and baseline diagnost
- Leak-rate testing for Primary Containment isolation valves
- Pump operability testing (verification of rated flow within sp
- Valve operability testing
- System flow balancing
- System and component leak testing
- Instrument channel calibration and functional testing
- Protective relay calibration and functional testing
- Logic system functional testing,
- System run and confirmation that process parameters are

ENCLOSURE 2
TENNESSEE VALLEY AUTHORITY (TVA)
BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 1
TECHNICAL SPECIFICATION (TS) CHANGE 431,
SUPPLEMENTAL RESPONSE REGARDING EXTENDED POWER UPRATE -
TESTING PLANNED TO SATISFY DRAFT STANDARD REVIEW PLAN 14.2.1

SUMMARY OF COMMITMENTS

TVA will evaluate the results of the steady state and transient tests listed in Section VI against Technical Specification requirements, test acceptance criteria, Units 2 and 3 operating experience, and responses predicted by the BFN simulators.