TU ELECTRIC

Log # TXX-89522
File # 10010
907.3
Ref. # 10CFR50.34(b)

July 28, 1989

William J. Cahill, Jr.
Executive Vice President

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 and 50-446
ADVANCE FSAR SUBMITTAL
SLAVE RELAY TESTING METHODOLOGY

Gentlemen:

The enclosure to this letter provides an advance submittal of FSAR changes related to the Engineered Safety Features (ESF) Systems slave relay testing methodology. These changes will be included in a future FSAR amendment.

In order to facilitate NRC staff review of these changes, the enclosed information related to the FSAR change is organized as follows:

1. Draft revised FSAR pages, with changed portions indicated by a bar in the margin (denoted as "draft"), as they are to appear in a future amendment (additional pages immediately preceeding and/or following the revised pages are provided if needed to understand the change).

2. A line-by-line description/justification for revised FSAR item.

3. A copy of related SER/SSER sections.

4. The bold/overstrike version of the revised FSAR pages referenced by the description/justification for each item identified above. The bold/overstrike version facilitates review of the revisions by highlighting each addition of new text in bold type font and overstriking with a slash (/) the portion of the text that is deleted. In some cases, where the bold overstrike version is unavailable, a hand marked-up version will be provided.

A029

1/1

Per the enclosed FSAR change, clarification has been provided to indicate that equipment rendered inoperable due to slave relay testing is consistent with the CPSES Technical Specifications requirements. Also, a description has been provided of an additional method which will be used for those final actuation device circuits that cannot be operated by an individual slave relay or actuation of which will cause plant upset/equipment damage and for which no additional block testing circuitry is provided. For these devices, the equipment is declared inoperable, disabled and continuity checks are performed to determined if the slave relay has changed states.

TU Electric requests that the NRC perform an expedited review of the above FSAR changes and inform us as to their acceptability.

Sincerely,

William J. Cahill, Jr.

William J. Cahill, Jr.

By: Roger D. Walker
Roger D. Walker
Manager, Nuclear Licensing

VPC/vld
Enclosure

c - Mr. R. D. Martin, Region IV
Resident Inspectors, CPSES (3)

Advance FSAR Change Related to Engineered Safety Features Systems Slave Relay Testing Methodology and Supporting Documentation

2. Subsequent to initial startup, Engineered Safety Features System tests will be conducted during each regularly scheduled refueling outage.

3. During on-line operation of the reactor, all of the engineered safety features analog and logic circuitry will be fully tested. In addition, essentially all of the engineered safety features final actuators will be fully tested. The remaining few final actuators whose operation is not compatible with continued on-line plant operation will be checked by means of continuity testing.

4. During normal operation, the operability of testable final actuation devices of the engineered safety features systems will be tested by manual initiation from the Control Room.

Performance Test Acceptability Standard for the "S" (Safety Injection Signal) and for the "P" (the Automatic Demand Signal for Containment Spray Actuation) Actuation Signals Generation

During reactor operation the basis for ESFAS acceptability will be the successful completion of the overlapping tests performed on the initiating system and the ESFAS, see Figure 7.3-2. Checks of process indications verify operability of the sensors. Analog checks and tests verify the operability of the analog circuitry from the input of these circuits through to and including the logic input relays except for the input relays associated with the containment spray function which are tested during the solid state logic testing. Solid state logic testing also checks the digital signal path from and including logic input relay contacts through the logic matrices and master relays and perform continuity tests on the coils of the output slave relays; final actuator testing operates the output slave relays and verifies operability of those devices which require safeguards actuation and which can be tested without causing plant upset. A continuity check is performed on the actuation circuitry of the untestable devices. Operation of the

DRAFT

DRAFT

final devices is confirmed by control board indication or visual observation that the appropriate pump breakers close and automatic valves have completed their travel.

The basis for acceptability for the engineered safety features interlocks will be control board indication of proper receipt of the signal upon introducing the required input at the appropriate setpoint.

Maintenance checks (performed during regularly scheduled refueling outages), such as resistance to ground of signal cables in radiation environments are based on qualification test data which identifies what constitutes acceptable radiation, thermal, etc., degradation.

Frequency of Performance of Engineered Safety Features Actuation Tests

During reactor operation, complete system testing (excluding sensors or those devices whose operation would cause plant upset) is performed periodically as specified in the Technical Specifications. Testing, including the sensors, is also performed during scheduled plant shutdown for refueling.

Engineered Safety Features Actuation Test Description

The following sections describe the testing circuitry and procedures for the on-line portion of the testing program. The guidelines used in developing the circuitry and procedures are:

1. The test procedures must not involve the potential for damage to any plant equipment.

2. The test procedures must minimize the potential for accidental tripping.

The ESFAS final actuation device or actuated equipment testing shall be performed from the engineered safeguards test cabinets. These cabinets are located near the Solid State Logic Protection System equipment. There is one set of test cabinets provided for each of the two protection trains A and B. Each set of cabinets contains individual test switches necessary to actuate the slave relays. To prevent accidental actuation, test switches are of the type that must be rotated and then depressed to operate the slave relays. Assignments of contacts of the slave relays for actuation of various final devices or actuators has been made such that groups of devices or actuated equipment, can be operated individually during plant operation without causing plant upset or equipment damage. In the unlikely event that a safety injection signal is initiated during the test of the final device that is actuated by this test, the device will already be in its safeguards position. Redundant devices in the opposite train will be functional for those components that will be made inoperable due to establishing plant conditions to support testing.

DRAFT

During this last procedure, close communication between the main Control Room operator and the operator at the test panel is required. Prior to the energizing of a slave relay, the operator in the main Control Room assures or establishes plant conditions that will permit operation of the equipment to be actuated by the relay. Appropriate LCOs will be entered for those devices rendered inoperable due to test set-up requirements. After the tester has energized the slave relay, the main Control Room operator observes that all equipment has operated as indicated by appropriate indicating lamps, monitor lamps and annunciators on the control board and records all operations. He then resets all devices and prepares for operation of the next slave relay actuated equipment.

DRAFT

DRAFT

The following methodology will be used for those final actuation device circuits that cannot be operated by an individual slave relay or actuation of which will cause plant upset/equipment damage and for which no additional block testing circuitry is provided. The end device will be declared inoperable and then disabled from operating by removing fuses/opening breakers, etc. The slave relay will be energized as described above. Proper slave relay state change will then be verified through local control circuit continuity measurements. Restoration of the slave will be as above followed by restoration of equipment to the status required per Technical Specifications.

DRAFT

Automatic actuation circuitry of all engineered safety features devices actuated by ESFAS initiation circuits, with the exceptions noted in Section 7.1.2.5 under a discussion of Regulatory Guide 1.22, are tested by means of the procedures outlined above.

Actuator Blocking and Continuity Test Circuits

DRAFT

This section describes methodology used for those final actuation devices that cannot be designed to be actuated during plant operation (discussed in Section 7.1.2.5) and that have been assigned to slave relays for which additional test circuitry has been provided to individually block actuation of a final device upon operation of the associated slave relay during testing. Operation of these slave relays, including contact operations, and continuity of the electrical circuits associated with the final devices control are checked in lieu of actual operation. The circuits provide for monitoring of the slave relay contacts, the devices control circuit cabling, control voltage and the devices actuation solenoids. Interlocking prevents blocking the output from more than one output relay in a protection train at a

2

time. Interlocking between trains is also provided to prevent continuity testing simultaneously in both trains; therefore, the redundant device associated with the protection train not under test will be available if event protection action is required. If an accident occurs during testing, the automatic actuation circuitry will

DRAFT

override testing as noted above. An exception to this is that if the accident occurs while testing a slave relay whose output must be blocked, the final actuation devices associated with this slave relay will not be overridden; however, the redundant devices in the other train would be operational and would perform the required safety function. Actuation devices to be blocked are identified in Section 7.1.2.5.

DRAFT

The continuity test circuits for these components with blocking relay circuits are verified by proving lights on the safeguards test racks.

The typical schemes for blocking operation of selected protection function actuator circuits are shown in Figure 7.3-3 as details A and B. The schemes operate as explained below and are duplicated for each safeguards train.

open this blocking relay contact - the green test lamp should be de-energized, which verifies that the circuit is now in its normal, i.e., operable position.

Time Required for Testing

It is estimated that analog testing can be performed at a rate of several channels per hour. Logic testing of both trains A and B can be performed in less than 30 minutes. Testing of actuated components (including those which can only be partially tested) will be a function of Control Room operator availability. It is expected to require several shifts to accomplish these tests. During this procedure automatic actuation circuitry will override testing, except for those few devices associated with a single slave relay whose outputs must be blocked (and then only while blocked) and for those devices rendered inoperable due to test set-up requirements. It is anticipated that testing associated with one of these slave relays could take several minutes. During this time the redundant devices in the other trains would be functional.

DRAFT

Summary of On-Line Testing Capabilities

The procedures described provide capability for checking completely from the process signal to the logic cabinets and from there to the individual pump and fan circuit breakers or starters, valve contactors, pilot solenoid valves, etc., including all field cabling actually used in the circuitry called upon to operate for an accident condition. For those few devices whose operation could adversely affect plant or equipment operation, the same procedure provides for checking from the process signal to the logic rack. Actuation of the final actuation device circuitry is checked through continuity testing.

DRAFT

The procedures require testing at various locations.

1. Analog testing and verification of bistable setpoint are accomplished at process analog racks. Verification of bistable relay operation is done at the main Control Room status lights.

2. Logic testing through operation of the master relays and low voltage application to slave relays is done at the logic rack test panel.

3. Testing of pumps, fans and valves is done at a test panel located in the vicinity of the logic racks in combination with the Control Room operator.

4. Continuity testing for those circuits with additional block testing circuits is done at the same test panel mentioned in item 3 above. DRAFT

5. Control circuit continuity testing of contacts associated with those untestable slave relays without additional block testing circuitry will be performed locally. DRAFT

DRAFT

Testing During Shutdown

Emergency Core Cooling System tests will be performed periodically in accordance with the Technical Specifications with the Reactor Coolant System isolated from the Emergency Core Cooling System by closing the

CPSES FSAR AMENDMENT 77
DETAILED DESCRIPTION

FSAR Page (as amended)	Group	Description
7.3-76	3	Instrumentation and Controls - Capability for Sensor Checks and Equipment Test and Calibration - Performance Test Acceptability for Actuation Signals Correction: Corrects the wording for testing the operability of ESF actuation signals by stating that a continuity check is conducted on the actuation circuitry, as opposed to a continuity check being conducted exclusively on the actuator. SER 7.3.3 (page 7-20) uses the prior language of "A continuity check is performed on the actuators" and not actuation circuitry. For clarity, the SER should be updated to reflect the new wording. FSAR Change Request Number: 89-538.1 Related SER Section: 7.3.3 SER/SSER Impact: Yes
7.3-77	3	Instrumentation and Controls - Engineered Safety Features Systems - Capability for Sensor Checks and Test and Calibration - Performance Test Acceptability for Actuation Signals Correction: Corrects the wording for confirmation of proper component operation by changing "...confirmed by control board indication and visual observation..." to "...confirmed by control board indication or visual observation... ." Confirmation that the final device has changed states does not require both visual observation and control board indication. Instead, determining that the final device changed states can be accomplished by either action. SER 7.3.3 uses the previous language of "...confirmed by control board indication and visual observation...." The section should be revised to reflect that either action, alone, is used to determine if a final device changed states. FSAR Change Request Number: 89-538.2 Related SER Section: 7.3.3 SER/SSER Impact: Yes
7.3-80, 84	3	Instrumentation and Controls - Engineered Safety Features Systems - Capability for Sensor Checks and Test and Calibration - Actuator Testing Correction: Corrects the wording to clarify that when testing certain final devices or actuators that are rendered inoperable due to the test setup requirements, plant conditions are established by the control room operator such that the equipment can be operated. In addition, LCO's are entered where required, and a redundant Train is available, in the event that a protective action

FSAR Page (as amended)	Group	Description
		is required due to an accident, for safety system(s) actuation. FSAR Change Request Number: 89-538.3 Related SER Section: 7.3.3 SER/SSER Impact: No
7.3-81, 84	2	See Page No(s):85 Instrumentation and Controls - Engineered Safety Features Systems - Capability for Sensor Checks and Test and Calibration - Actuator Testing Addition: Describes an additional method for testing equipment which will be used for those final actuation device circuits that cannot be operated by an individual slave relay or actuation of which will cause plant upset/equipment damage and for which no additional block circuitry is provided. These devices are declared inoperable, disabled and continuity checks performed, locally, to determine if the slave relay changed states. FSAR Change Request Number: 89-538.4 Related SER Section: 7.3.3 SER/SSER Impact: No
7.3-82, 85	3	Instrumentation and Controls - Capability for Sensor Checks and Equipment Test and Calibration - Performance Test Acceptability for Actuation Signals Correction: Clarification provided to discern the differences between the test methodologies for nonactuated final devices with block testing circuitry and without block testing circuitry. FSAR Change Request Number: 89-538.5 Related SER Section: 7.3.3 SER/SSER Impact: No
7.3-85	3	Equipment not tested at full power Correction: Deleted the discussion as to why the reactor coolant pump component cooling water supply and return isolation valves cannot be tested at full power. This is a duplicate discussion of FSAR Section 7.1.2.5 (7) FSAR Change Request Number: 89-538.6 Related SER Section: 7.3.3 SER/SSER Impact: No

the interface requirements for electrical circuit and instrument impulse lines separation involving other plant systems included in the balance of plant. The conformance to these requirements has not been addressed in the Comanche Peak FSAR. The staff has requested that the applicant identify any difference between the Comanche Peak design and the Westinghouse-specified interface requirement as described in WCAP-8534. In FSAR Amendment 22, the applicant documented that Appendices B and C of WCAP-8584 provide interface criteria for the failure modes and effect analysis. These criteria are included in the Westinghouse generic interface criteria which have been provided to Comanche Peak and has been incorporated into the balance-of-plant design. The staff finds this acceptable.

7.3.2.5 Containment Purge and Fuel Building Isolation Valves Control

The interface between the radiation monitoring system (RMS) and the ESFAS for containment ventilation and fuel building isolation was not described in sufficient detail in the FSAR to allow an evaluation of the use of nonsafety-grade equipment in the RMS and ESFAS. During the staff's plant site visit and drawing review, the applicant committed to modify the drawings to clarify the interface between the safety and nonsafety portions of the RMS to ESFAS. The staff finds this acceptable.

7.3.2.6 Safety System Set Point Methodology

The methodology for establishing safety system set points has been developed by the nuclear steam system supplier, Westinghouse. At this time, the applicant does not have information available, and he has indicated that this methodology may be used to establish set points for systems in the balance-of-plant scope of supply. Because the primary function of this information is to confirm the adequacy of set points specified in the plant Technical Specifications, the staff will audit this information when the proposed Technical Specifications are available for review.

7.3.3 Conclusions

The ESFAS includes the instrumentation and controls used to detect a plant condition requiring operation of an ESF system, to initiate action of the ESF, and to control its operation. The scope of the review of the ESFAS for Comanche Peak included single-line, functional logic and schematic diagrams, and descriptive information for the ESFAS and for those auxiliary supporting systems that are essential to the operation of either the ESFAS or the ESF systems. The review included the applicant's design criteria and design bases for the ESFAS and the instrumentation and controls of auxiliary supporting systems. The review also included the applicant's analyses of the manner in which the design of the ESFAS and the auxiliary supporting systems conform to the design criteria.

The bases for acceptance in the staff review has been the conformance of the applicant's designs, design criteria, and design bases for the engineered safety features actuation systems and necessary auxiliary supporting systems to the Commission's regulations as set forth in General Design Criteria, and to applicable regulatory guides, branch technical positions, and industry standards as listed in Table 7.1.

During reactor operation, the basis for ESFAS acceptability will be the successful completion of the overlapping tests performed on the initiating systems. Checks of process indications verify operability of the sensors. Analog checks and tests verify the operability of the analog circuitry from the input of these circuits to and including the logic input relays, except for the input relays associated with the containment spray function, which are tested during the solid state logic testing. Solid state logic testing also checks the digital signal path from, and including logic input relay contacts through, the logic matrices and master relays and performs continuity tests on the coils of the output slave relays. Final actuator testing operates the output slave relays and verifies operability of those devices which require safeguards actuation and which can be tested without causing plant upset. A continuity check is performed on the actuators of the untestable devices. Operation of the final devices is confirmed by control board indication and visual observation that the appropriate pump breakers close and automatic valves have completed their travel.

The basis for acceptability for the engineered safety features interlocks will be control board indication of proper receipt of the signal upon introducing the required input at the appropriate setpoint.

The staff has audited the following and found them acceptable: conformance to system redundancy and diversity; single failure; both electrical and physical separation; identification of control boards, equipment, cables and cable trays; and system testing and inoperable status surveillance criteria.

On the basis of its review, the staff concludes that there is reasonable assurance that the engineered safety features actuation system conforms to the applicable regulations, guides, branch technical positions, and industry standards and is acceptable, subject to resolution of the concerns identified in Section 7.3.2 above.

7.4 Systems Required for Safe Shutdown

7.4.1 Description

The systems required for safe shutdown are those required to control the reactor coolant system temperature and pressure, to borate the reactor coolant, and to provide adequate residual heat removal. The systems listed below are used for safe shutdown. Safety grade systems are noted by "s" in parenthesis (s).

(1) reactor coolant system (s)
(2) chemical and volume control system
(3) auxiliary feedwater system (s)
(4) main steam supply system (atomospheric steam relief)
(5) condensate and feedwater system
(6) residual heat removal system (s)
(7) component cooling water system (s)
(8) station service water system (s)
(9) onsite power system (s)
(10) control room ventilation system (s)
(11) containment ventilation system (s)
(12) ESF ventilation and safety chilled water system (s)

2. Subsequent to initial startup, Engineered Safety Features System tests will be conducted during each regularly scheduled refueling outage.

3. During on-line operation of the reactor, all of the engineered safety features analog and logic circuitry will be fully tested. In addition, essentially all of the engineered safety features final actuators will be fully tested. The remaining few final actuators whose operation is not compatible with continued on-line plant operation will be checked by means of continuity testing.

4. During normal operation, the operability of testable final actuation devices of the engineered safety features systems will be tested by manual initiation from the Control Room.

Performance Test Acceptability Standard for the "S" (Safety Injection Signal) and for the "P" (the Automatic Demand Signal for Containment Spray Actuation) Actuation Signals Generation

During reactor operation the basis for ESFAS acceptability will be the successful completion of the overlapping tests performed on the initiating system and the ESFAS, see Figure 7.3-2. Checks of process indications verify operability of the sensors. Analog checks and tests verify the operability of the analog circuitry from the input of these circuits through to and including the logic input relays except for the input relays associated with the containment spray function which are tested during the solid state logic testing. Solid state logic testing also checks the digital signal path from and including logic input relay contacts through the logic matrices and master relays and perform continuity tests on the coils of the output slave relays; final actuator testing operates the output slave relays and verifies operability of those devices which require safeguards actuation and which can be tested without causing plant upset. A continuity check is performed on the actuation circuitry ~~actuators~~ of the untestable devices. Operation of the

final devices is confirmed by control board indication or and visual observation that the appropriate pump breakers close and automatic valves have completed their travel.

The basis for acceptability for the engineered safety features interlocks will be control board indication of proper receipt of the signal upon introducing the required input at the appropriate setpoint.

Maintenance checks (performed during regularly scheduled refueling outages), such as resistance to ground of signal cables in radiation environments are based on qualification test data which identifies what constitutes acceptable radiation, thermal, etc., degradation.

Frequency of Performance of Engineered Safety Features Actuation Tests

During reactor operation, complete system testing (excluding sensors or those devices whose operation would cause plant upset) is performed periodically as specified in the Technical Specifications. Testing, including the sensors, is also performed during scheduled plant shutdown for refueling.

Engineered Safety Features Actuation Test Description

The following sections describe the testing circuitry and procedures for the on-line portion of the testing program. The guidelines used in developing the circuitry and procedures are:

1. The test procedures must not involve the potential for damage to any plant equipment.

2. The test procedures must minimize the potential for accidental tripping.

The ESFAS final actuation device or actuated equipment testing shall be performed from the engineered safeguards test cabinets. These cabinets are located near the Solid State Logic Protection System equipment. There is one set of test cabinets provided for each of the two protection trains A and B. Each set of cabinets contains individual test switches necessary to actuate the slave relays. To prevent accidental actuation, test switches are of the type that must be rotated and then depressed to operate the slave relays. Assignments of contacts of the slave relays for actuation of various final devices or actuators has been made such that groups of devices or actuated equipment, can be operated individually during plant operation without causing plant upset or equipment damage. In the unlikely event that a safety injection signal is initiated during the test of the final device that is actuated by this test, the device will already be in its safeguards position. **Redundant devices in the opposite train will be functional for those components that will be made inoperable due to establishing plant conditions to support testing.**

During this last procedure, close communication between the main Control Room operator and the operator at the test panel is required. Prior to the energizing of a slave relay, the operator in the main Control Room assures **or establishes** ~~that~~ plant conditions **that** will permit operation of the equipment **to** ~~that will~~ be actuated by the relay. **Appropriate LCOs will be entered for those devices rendered inoperable due to test set-up requirements.** After the tester has energized the slave relay, the main Control Room operator observes that all equipment has operated as indicated by appropriate indicating lamps, monitor lamps and annunciators on the control board and records all operations. He then resets all devices and prepares for operation of the next slave relay actuated equipment.

The following methodology will be used for those final actuation device circuits that cannot be operated by an individual slave relay or actuation of which will cause plant upset/equipment damage and for which no additional block testing circuitry is provided. The end device will be declared inoperable and then disabled from operating by removing fuses/opening breakers, etc. The slave relay will be energized as described above. Proper slave relay state change will then be verified through local control circuit continuity measurements. Restoration of the slave will be as above followed by restoration of equipment to the status required per Technical Specifications.

Automatic actuation circuitry of By all engineered safety features devices actuated by ESFAS initiation circuits, with the exceptions noted in Section 7.1.2.5 under a discussion of Regulatory Guide 1.22, are tested operated by means of the procedures outlined above the automatic circuitry.

Actuator Blocking and Continuity Test Circuits

This section describes methodology used for those few final actuation devices that cannot be designed to be actuated during plant operation (discussed in Section 7.1.2.5) and that have been assigned to slave relays for which additional test circuitry has been provided to individually block actuation of a final device upon operation of the associated slave relay during testing. Operation of these slave relays, including contact operations, and continuity of the electrical circuits associated with the final devices control are checked in lieu of actual operation. The circuits provide for monitoring of the slave relay contacts, the devices control circuit cabling, control voltage and the devices actuation solenoids. Interlocking prevents blocking the output from more than one output relay in a protection train at a
2 time. Interlocking between trains is also provided to prevent continuity testing simultaneously in both trains; therefore, the redundant device associated with the protection train not under test will be available if event protection action is required. If an accident occurs during testing, the automatic actuation circuitry will override testing as noted above. An One exception to this is that if the accident occurs while testing a slave relay whose output must be blocked, the those few final actuation devices associated with this slave relay will not be overridden; however, the redundant devices in the other train would be operational and would perform the required safety function. Actuation devices to be blocked are identified in Section 7.1.2.5.

The continuity test circuits for these components with blocking relay circuits that cannot be actuated on/line are verified by proving lights on the safeguards test racks.

The typical schemes for blocking operation of selected protection function actuator circuits are shown in Figure 7.3-3 as details A and B. The schemes operate as explained below and are duplicated for each safeguards train.

open this blocking relay contact - the green test lamp should be de-energized, which verifies that the circuit is now in its normal, i.e., operable position.

Time Required for Testing

It is estimated that analog testing can be performed at a rate of several channels per hour. Logic testing of both trains A and B can be performed in less than 30 minutes. Testing of actuated components (including those which can only be partially tested) will be a function of Control Room operator availability. It is expected to require several shifts to accomplish these tests. During this procedure automatic actuation circuitry will override testing, except for those few devices associated with a single slave relay whose outputs must be blocked (and then only while blocked) **and for those devices rendered inoperable due to test set-up requirements**. It is anticipated that ***continuity*** testing associated with **one of these** ***a blocked*** slave relays could take several minutes. During this time the redundant devices in the other trains would be functional.

Summary of On-Line Testing Capabilities

The procedures described provide capability for checking completely from the process signal to the logic cabinets and from there to the individual pump and fan circuit breakers or starters, valve contactors, pilot solenoid valves, etc., including all field cabling actually used in the circuitry called upon to operate for an accident condition. For those few devices whose operation could adversely affect plant or equipment operation, the same procedure provides for checking from the process signal to the logic rack. **Actuation of the** ***To check the*** final actuation device **circuitry is checked through continuity testing** ***a continuity test of the individual control circuits is performed.***

The procedures require testing at various locations.

1. Analog testing and verification of bistable setpoint are accomplished at process analog racks. Verification of bistable relay operation is done at the main Control Room status lights.

2. Logic testing through operation of the master relays and low voltage application to slave relays is done at the logic rack test panel.

3. Testing of pumps, fans and valves is done at a test panel located in the vicinity of the logic racks in combination with the Control Room operator.

4. Continuity testing for those circuits **with additional block testing circuits that cannot be operated** is done at the same test panel mentioned in item 3 above.

5. **Control circuit continuity testing of contacts associated with those untestable slave relays without additional block testing circuitry will be performed locally.**

~~The reactor coolant pump essential service isolation valves consist of the isolation valves for the component cooling water return and the seal water return header.~~

~~The main reason for not testing these valves periodically is that the reactor coolant pumps may be damaged. Although pump damage from this type of test would not result in a situation which endangers the health and safety of the public, it could result in unnecessary shutdown of the reactor for an extended period of time while the reactor coolant pump or certain of its parts could be replaced. This would place a great economic burden on the applicant.~~

Testing During Shutdown

Emergency Core Cooling System tests will be performed periodically in accordance with the Technical Specifications with the Reactor Coolant