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Nuclear Regulatory Commission
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DOCKET 50-255-LICENSE DPR-20-PALISADES PLANT - UPDATE TO ACTION ITEMS FROM 1986-87 MAINTENANCE OUTAGE

Our letter of September 14, 1987, provided information regarding schedule differences in action plans described in our submittals to the 10CFR50.54(f) Confirmatory Action Letter of May 21, 1986 (Consumers Power Company letters dated July 3, 1986, December 1, 1986, and January 28, 1987). In that letter, we agreed to provide information on any further changes in planned completion of remaining actions, together with an update on the Safety Functional Evaluation (SFE) Program and any other appropriate clarifications. This letter provides that response as follows:

1. Exceptions, Clarifications, and Schedule Changes

   Our submitted responses to the 10CFR50.54(f) Confirmatory Action Letter have been further reviewed. The enclosed table provides a list of items we have identified in the following categories:

   a. Exceptions to actions that were originally planned and stated in our response submittals, along with the basis for the change. There were two such exceptions identified at this point.

   b. Clarification statements for a number of actions, where we felt such statements were appropriate.

   c. Schedule extension of the date we had planned and stated for four items of the original list, along with reason for the change.

   d. Schedule improvement for a number of action items, primarily resolution of equipment problems. This category includes items we felt appropriate to update, but does not cover all actions completed ahead of our original plans.

2. System Functional Evaluation (SFE) Program Update

   The SFE Program was first described in our December 1, 1986, submittal and later expanded in the January 28, 1987, submittal. Tests required to provide acceptability of equipment (as described in the FSAR) were conducted prior to plant restart in April 1987. The results of the pre-

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startup tests were provided to NRC Region III staff. Our original plan was to prepare ongoing periodic tests by July 1987, but this was extended to July 1988 in our letter of September 14, 1987.

The original SFE Program, as described in our January 28, 1987, submittal, has since been revised slightly with no change in basic content. The changes are corrections and clarifications resulting from further reviews, including discussions with NRC Region personnel. This updated version is provided as attachment 1 to this letter. This revision will be filed as the final document to describe the program. Changes made are indicated by a slash mark on the right side of appropriate items.

From the revised SFE of attachment 1, we have extracted an action list of post-startup items, some of which have been completed, since the end of the 1986-1987 maintenance outage. This list is provided as attachment 2.

A technical review of the original SFE list has been performed by three experienced members of the plant staff. This review resulted in 62 additional actions as shown by the list of items under attachment 3 of this letter. Taken together, the list of actions in attachment 2 and 3 represent the total work scope and provide the documents we will use for tracking purposes.

One final review performed was to screen for actions which may be appropriate to complete prior to the overall SFE completion date of July 1988. This review identified 22 actions which will be given earlier due dates for staff completion. The earlier dates were primarily to evaluate items in time for possible completion during the 1988 refueling outage.

We feel the SFE Program has been adequately reviewed at this point and staff attention to work list completion will be appropriate to other workloads. Although we plan no further formal updates, progress will be open to your inspectors on a continuing basis.

The information contained herein provides an update of the status on our followup efforts to the Confirmatory Action Letter. Many of the original list of items involve evaluations or investigations, with followup to be taken if necessary. Final disposition of these items will be made available for future NRC inspection attention.

Frederick W Buckman
Vice President
Nuclear Operations Departmnet

TABLE 1 - EXCEPTIONS, CLARIFICATIONS, AND SCHEDULE CHANGES

CPCo SUBMITTAL DATE	ORIGINAL SCHEDULED COMPLETION	ORIGINAL ACTION	EXCEPTIONS/CLARIFICATIONS/ SCHEDULE
12/01/86	88RFO	(SSFI) 1.1 Recirc Actuation signal seal - Modify 2400V fast transfer circuitry to increase efficiency associated with recovery of offsite power by the 88RFO.	Exception - The intent of this proposed modification will be superseded by the station blackout modification now scheduled for 1988-1989. A description of this modification has been provided to the NRC. There will be no fast transfer required after that change in power systems.
12/01/86 - Att 2	88RFO	MCTF - ESS-05: Shutdown cooling heat exchanger inlets & outlet valves - permanently shield shutdown heat exchanger.	Exception - The radioactive hot spot has been removed and shielding of the HTX will not be required.
12/1/86 - Att 2	88RFO	MCTF - CVC-28: AE-0203 - Remove or replace boronometer & associated instruments. (1/28/87 Boronometer is currently not used).	Clarification - The Boronometer has been abandoned in place, due to expense and exposure of removal.
12/01/86 - Att 2	88RFO	MCTF - EPS-06: Emergency lighting units replace Appendix R emergency lighting units.	Clarification - The lighting units were modified to meet Appendix R requirements, and will not be replaced. No further action planned.

TABLE 1 - EXCEPTIONS, CLARIFICATIONS, AND SCHEDULE CHANGES

CPCo SUBMITTAL DATE	ORIGINAL SCHEDULED COMPLETION	ORIGINAL ACTION	EXCEPTIONS/CLARIFICATIONS/ SCHEDULE
12/01/86 - Att 2	88RFO	MCTF - MSS-03: CV-0779, 780, 781, 782 atmospheric dump valves - write pacs to replace diaphragms every 4 years or so.	Clarification - New atmospheric damp valves have been installed during the fall 1987 maintenance outage, which should alleviate past problems that led to this MCTF concern. Any future PM required will be addressed under our PM program for the new valves, and may not include this action. This action will be closed.
12/01/86 - Att 2	5YP	MCTF - SPS-02: 480V, 2400V, 4160V switchgear - pursue addition of P-55B and P-55C motor starters.	Clarification - The decision on this action is to improve condition of the load breakers, rather than add motor starters. The breakers will be returned to the vendor for overhaul on an increased frequency basis.
12/01/86 - Att 2	88RFO	MCTF - VAS-01: Control room air condition VC-10 and VC-11 - investigate sources of vibration and propose modifications to resolve.	Clarification - The source of vibration damage has been removed and no modifications will be made.
1/28/87 - Att 1A	12/31/87	Test program update - - special testing/ post maint testing - PPACS's will be developed by the end of 1987 to verify pump head curves for these pumps at least	Schedule/Extension - Special pump head verification tests were completed last year and will not be required again for at least two years. This effort will be combined with PPACS development under the SFE program and completed by July 1988.

TABLE 1 - EXCEPTIONS, CLARIFICATIONS, AND SCHEDULE CHANGES

CPCo SUBMITTAL DATE	ORIGINAL SCHEDULED COMPLETION	ORIGINAL ACTION	EXCEPTIONS/CLARIFICATIONS/ SCHEDULE
1/28/87 - Att 2	10/30/87	System performance rqmts uncontrolled rod withdrawal: hot leg RTD time constants will be verified by test or analysis prior to startup. (Analysis complete). (Time delay will be measured at power when vendor arrangements can be made).	Schedule Extension - The analysis of RTD response time required for accident scenarios has been completed. Two of the four RTD elements were tested at power, with response of less than 3 seconds versus the 10 second limit. Failure of a separate RTD prevented further testing until after cold shutdown, because of LCO requirements. The other two RTD will be tested soon after startup from the fall 1987 maintenance outage.
1/28/87 - Att 2	88RFO	Sys performance rqmts - PCS: Prior to end of of 88RFO, new certified PORV block valves will be installed - also either certified PORVS will be installed or the PORVS will be removed and tested at feed and bleed pressures.	Schedule Extension - The engineering and procurement cycle will not support replacement of PORV valves and block valves prior to mid-1989. Partial completion of the MCTF concern (packing leakage) is being addressed by a new type of block valve packing being used during the fall 1987 maintenance outage.
1/28/87 - Att 5	12/30/87	Question/response #5: Upgrade service water ISI flow instrumentation by end of 1987.	Schedule Extension- Staff workload on other priority items prevents completion of this action by the original planned date. Proposed schedule for this modification is during the 1988 refueling outage.
12/01/86 - Att 2	88RFO	MCTF - CDS-03: P-2A and P-2B condensate pumps rebuild spare pump and install during the next convenient outage in place of P-2A.	Schedule/Improvement - The spare condensate pump has been installed during the current fall 1987 maintenance outage rather than the 88RFO.

TABLE 1 - EXCEPTIONS, CLARIFICATIONS, AND SCHEDULE CHANGES

CPCo SUBMITTAL DATE	ORIGINAL SCHEDULED COMPLETION	ORIGINAL ACTION	EXCEPTIONS/CLARIFICATIONS/ SCHEDULE
12/01/86 - Att 2	88RFO	MCTF - CDS-03: P-2A and P-2B condensate pumps - test for ground water leaks and repair as required.	Schedule/Improvement - P-2A pump well was inspected during the current outage. No leakage was found. Review of plant chemistry for the past year also shows no evidence of ground water leakage. No further action is planned.
12/01/86 - Att 2	88RFO	MCTF - CRD-02: CRD seals & autoclave gaskets - replace remaining autoclave gaskets (19).	Schedule/Improvement - This item was completed during current fall 1987 maintenance outage rather than the 88RFO. All CRD autoclave gaskets are now the improved type.
12/01/86 - Att 2	88RFO	MCTF - CRD-04: CRD primary & secondary - replace secondary position indication.	Schedule/Improvement - This item was completed during the current fall 1987 maintenance outage. All 45 secondary rod read switch assemblies are now the new type.
12/01/86 - Att 2	88RFO	MCTF - CVC-14: EC boric acid heat trace control panel - repair & restore to original as-built condition.	Schedule/Improvement - Repair of boric acid heat trace (BHAT) circuits has been completed. Operations and engineering groups agree with BAHT operability.
12/01/86 - Att 2	88RFO	MCTF - CWS-01: P-39 & P-39B cooling tower pumps - refurbish pumps.	Schedule/Improvement - The cooling tower pumps were completely overhauled during the current fall 1987 maintenance outage, rather than the 88RFO.

TABLE 1 - EXCEPTIONS, CLARIFICATIONS, AND SCHEDULE CHANGES

CPCo SUBMITTAL DATE	ORIGINAL SCHEDULED COMPLETION	ORIGINAL ACTION	EXCEPTIONS/CLARIFICATIONS/ SCHEDULE
12/01/86 - Att 2	88RFO	MCTF - EPS-01: Emergency diesel generator instrumentation - replacement of panel meters.	Schedule/Improvement - This replacement has been accomplished during the current fall 1987 maintenance outage rather than the 88RFO.
12/01/86 - Att 2	88RFO	MCTF - ESS-05: Shutdown cooling heat exchanger inlet & outlet valves. 500R/HR hot spot. Perform chemical flush of heat exchanger when conditions permit (1/28/87 - due date changed - exception of executive review board - completion requires alternate shutdown cooling path.	Schedule/Improvement - The radioactive hot spot was removed by a special flush (not chemical) and will require no further action.
12/01/86 - Att 2	88RFO	MCTF - PCS-11: Primary coolant pump/ motor instrumentation - disassemble and PM either the P-50A and P-50B PC pump motor; repair assoc motor bearing temp indicator and determine whether the other pump should be disassembled for PM in 89RFO.	Schedule/Improvement - The PCP motor RTD units have been repaired during the current 1987 fall maintenance outage, not 88RFO. Future plans are to overhaul one motor each refueling after spare can be purchased - tentatively 1989.
12/01/86 - Att 2	5YP	MCTF - RIA-04: RIA-0631 off gas monitor - consider adding reflash capability to the annunciator system.	Schedule/Improvement - This item is being completed by addition of reflash during the current fall 1987 maintenance outage, not the 88RFO.

TABLE 1 - EXCEPTIONS, CLARIFICATIONS, AND SCHEDULE CHANGES

CPCo SUBMITTAL DATE	ORIGINAL SCHEDULED COMPLETION	ORIGINAL ACTION	EXCEPTIONS/CLARIFICATIONS/ SCHEDULE
12/01/86 - Att 2	88RFO	MCTF - RIA-20: RIA-5711 radwaste addition ventilation monitor - continue with planned modifications.	Schedule/Improvement - The modifications are being completed during the current fall 1987 maintenance outage, not the 88RFO.
12/01/86 - Att 2	88RFO	MCTF - RIA-21: RIA-5712 fuel handling vent monitor - continue w/ planned modification.	Schedule/Improvement - This modification is being completed during the current fall 1987 maintenance outage, not the 88RFO.

LICENSING CORRESPONDENCE - RECORD SUMMARY

DATE: October 30, 1987

DOCKET 50-255 LICENSE DPR-20 -
PALISADES PLANT

UPDATE TO ACTION ITEMS FROM 1986-87 MAINTENANCE OUTAGE

SUMMARY:

Provides information on changes in planned completion of items in our 7/3/86, 12/1/86, and 1/28/87 letters as well as an update to the System Functional Evaluation Program.

COMMITMENTS MADE: (Identify Close-out Document)

Refer to Table 1, Attachment 2 and 3.

COMMITMENTS CLOSED:

To provide changes and update by end of October.

Previous NRC/CP Co Correspondence

NRC letters dated 5/21/86
CPC letters dated 9/14/87, 1/28/87
12/1/86, 7/3/86

Special Distribution

RDOrosz
DWJoos
TABuczwinski

AIR No

UFI No

950-70*05*03

Individuals Providing Information:

JGLewis

Individuals Assigned Responsibility for Implementing Commitments:

RMRice, et. al.

Concurrences:

JGLewis, PAL ~~GSKozup, PAL~~
DPHoffman, PAL TCBordine
~~RMRice, PAL~~
KWBerry
Budget - N/A
NSB - N/A

---- No reply

Individual Responsible for Obtaining Budget Approval:

N/A

FSAR/FHSR Change (Identify):

~~Yes~~/No Category # N/A

Originator:

JLKuemin (85867)

Individual Responsible for Initiating Change Request:

N/A

ATTACHMENT 1

Consumers Power Company
Palisades Plant
Docket 50-255

UPDATED SYSTEM FUNCTIONAL EVALUATIONS

October 30, 1987

OC1087-0195-NL02

HIGH PRESSURE SAFETY INJECTION

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR [illegible].1.1	One high-pressure pump has sufficient capacity with 25% spillage to maintain the core water level at the start of recirculation.	RO-65 verifies HPSI pump flow higher than design flow of 300 gpm from SIRW tank to PCS.	It is not clear if the 25% allowed spillage has been factored into the RO-65 acceptance criteria or if the 300 gpm design flow was used to determine the allowed percent spillage. RO-65 verifies HPSI flow higher than the design limit of 300 gpm. The spill is limited to 25% by the pressure drop across measuring orifice and the throttling capabilities of the HPSI safety injection valve. The 300 gpm design flow is indepdent of spillage to less than 25% flow. The 300 gpm design flow is independent of spillage. In other words, the accident analysis assumes 220 gpm minimum flow to the core which accounts for 300 gpm including spillage. FSAR will be clarified.

HIGH PRESSURE SAFETY INJECTION

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR .1.1	The hot leg injection is designed to split HPSI flow so that half goes to one hot leg and the other half goes to the four cold legs.	RO-65 verifies that we can send greater than 250 gpm through hot leg injection path.	No test exists to verify we can achieve a 50/50 spilt of HPSI flow to the hot and cold injection legs. RO-65 does verify hot leg flow of greater than 250 gpm. As long as 220 gpm is injected to hot leg, adequate core cooling is achieved and boron mixing will occur. Preop on system verified greater than 220 gpm per loop. FSAR will be clarified.
FSAR .1.2.3 Item 3	The high-pressure safety injection pumps inject borated water at high pressure into the Primary Coolant System during emergency conditions.	RO-8 verifies pumps start and valves position for safety injection. QO-1 verifies pumps start and valves position for safety injection. RO-65 proves system can pump design flows to PCS. QO-5 times valves to ensure operability. QO-2 ensures system responds properly during RAS. MO-22 ensures pumps operable at required pressure.	None

HIGH PRESSURE SAFETY INJECTION

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.2 Item 3	The pump motor is capable of starting and accelerating the pump to full speed with 70% of rated voltage.	Design feature which is not tested periodically.	A periodic test is not performed to demonstrate that the HPSI pump motor is capable of starting and accelerating the pump to full speed at 70% of rated voltage. A review of the Class 1E motor starting requirements was performed. All subject motors were designed and procured for the capability to start and accelerate their loads with 70% of rated voltage at the terminals (see Specification E-10). It is not feasible or necessary to test this feature. Analysis of technical data is adequate to verify the function. The plant transient loading studies calculate the motor terminal voltages for the most conservation bus voltages. These studies support the motor design features by verifying all motors will start and accelerate the pumps with their minimum postulated bus voltage. The pump/motor speed torque curves also show there exists sufficient excess torque to accelerate the pumps with 70% of terminal voltage.

HIGH PRESSURE SAFETY INJECTION

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.2 Item 3 Continued			These transient loading studies are periodically performed, reviewed, and updated to ensure the adequacy of the diesel generator and electrical equipment. (Note: The Class 1E 2400 volt buses are undervoltage protected to prevent operation at a degraded voltage condition. Setpoints are 92% of rated voltage for 6 seconds.
FSAR 6.1.2.2 Item 3b	The hot leg injection is initiated by operator action and is accomplished by realigning the valves in hot and cold legs for simultaneous hot leg and cold leg injections.	LOCA Emergency Operating Procedure lists actions for aligning system for hot leg injection. QO-5 ensures valves operable. RO-65 ensures flow path available. QO-8A ensures check valve stroking.	None
FSAR 6.1.2.1	An interconnection is provided from the Chemical and Volume Control System to allow testing of the injection line inner check valves during reactor operation.	Crosstie from CVC system to HPSI is used to stroke inner check valves during QO-8B and QO-8C. Crosstie MOV-3072 is stroke tested by QO-5, QO-8B and 8C.	None
FSAR 6.1.2.3 Item 3a	Spillage is limited to a maximum of 25% by use of the flowmeters in each injection line and the throttling capability of each safety injection valve.	Flow meters calibrated per PAC ESS 006. Safety Injection MOV's verified operable per RO-8, QO-1, QO-5.	None
FSAR 6.1.2.3 Item 3a	The SIS starts the high-pressure injection pumps, opens the safety injection valves and closes the primary system check valve leakage paths. The rest of the system is always aligned for safety injection during power operation.	MO-29 verifies system lined up for safety injection. RO-8 and QO-1 verifies pumps start and valves align upon initiation of a safety injection signal. QO-5 verifies valve stroke time. MO-22 verifies pumps operable.	None

HIGH PRESSURE SAFETY INJECTION

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR Item 5	Except for certain primary system instrumentation sensors, all active components which must function individually for the system's performance to meet the criteria stated for core protection can be tested during normal reactor operation.	MO-22 verifies pumps operable. QO-5 verifies valves operable.	None
FSAR 6.1.3.1 Item 2	A line from the discharge header of the charging pumps provides the capability of testing the check valve closest to the primary system.	Crosstie from CVC system to HPSI is available for testing. Crosstie MOV-3072 is stroke tested by QO-5, QO-8B, C test the check valves.	None
Table 6-3	HPSI Pump Design Flow 300 gpm Maximum Flow 600 gpm Minimum Flow 30 gpm Design Head 2500 feet Head at Maximum Flow 1000 feet	RO-65 verifies pumps pump > 300 gpm. RO-65, MO-22 ensures pumps run with > minimum flow. T-220 has been run during '86 Outage to ensure pump capacity and minimum flow. This tested pump performance to the extent possible without removing the reator head.	The full pump performance curve will be verified for HPSI pumps during the next Refueling Outage. No problems are expected because P-8C the third AFW pump which is a converted HPSI pump, was tested satifactorily this outage.
FSAR 6.1.2.2 Item 3	A low-flow alarm is provided on the seal cooling water to the pumps to warn of cooling water or seal cooling malfunction.	Flow switches are calibrated per PAC CCS-005.	Annunicator is not specifically tested. This will be verified this outage and periodically in the future. (#41)
FSAR 6.1.2.2 Item 3	The pumps are provided with minimum-flow protection to ensure that no damage will occur from operation against a closed discharge.	Mini-flow valves are verified locked open on CL 3.9 during start-up. Mini flow will also be verified monthly during the pump surveillance test, MO-22.	None
FSAR 6.1.2.2 Item 8	Each of the four cold leg high-pressure branch lines is equipped with flowmeters which can be used to balance injection flow rates. The hot leg injection lines also have flow indication.	PAC ESS-006 and PCS-005 calibrate flow instruments.	None

HIGH PRESSURE SAFETY INJECTION

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR [illegible].1.2.3 Item 3.a	Motor-operated valve and system piping design are such that safety injection flow will be distributed approximately equally between the four PCS cold legs. No throttling of motor-operated valves or other operator action is required to distribute flow.	RO-65 verified flow through injection lines. Equal distribution is not specifically verified per acceptance criteria. Review of RO-65 performed in early 1986 shows approximate equal distribution.	None
SOP-3 [illegible].1	Start/stop HPSI pump.	Evolutions are conducted per SOP.	None
Work Order History	A review of Work Order history revealed approximately 37 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 51 Work Orders completed between 05/19/86 and 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage. FC-623 replaced position switches on several valves in the HPSI system.	Preoperational testing was performed as part of the FC closeout.	None

ENGINEERED SAFEGUARDS CONTROLS

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.3.1	Test circuits test the redundant circuits separately. Should an accident occur while testing is in progress, the test will not interfere with initiation of the safeguards equipment required.	QO-01 tests ESF equipment control circuit in right and left channels separately. Testing of one channel does not disable other channels.	None
FSAR 7.3.2.2	Two independent and isolated circuits initiate operation of redundant engineered safeguards equipment. These control circuits monitor whether standby and/or emergency power is available and select load groups in accordance with the available power supply.	QO-01 test verifies control circuit responds with and without standby power.	Pressurizer pressure and containment high pressure 2/4 sensing logic is common to both SIS initiation channels.
	The SIS is derived from pressurizer pressure or containment pressure. Pressurizer signal is from four pressure sensors installed on the pressurizer. Each sensor supplies a signal to a pressure indicator/alarm instrument. Each is connected to a latching-type auxiliary relay. Each containment pressure sensor is connected to a latching-type auxiliary relay. Either two out of four pressurizer low-low pressure or two out of four containment high-pressure signals initiate the SIS signal, in turn, actuates two safety injection control circuits.	RI-06 calibrates containment pressure sensors. RI-07 verifies pressurizer low-pressure 2 out of 4 (SIS) logic. RO-12 verifies CHP 2 out of 4 logic.	None
	Actuation of each safety injection control circuit can be performed manually via a push button. Relay logic circuits control the loading sequence.	RO-08 verifies manual actuation of safety injection circuits and DBA sequencers have been calibrated. RO-12 verifies logic and equipment actuation.	None
	Containment spray activation requires containment high-pressure signal.	RO-12 verifies CHP 2 out of 4 logic.	None
FSAR 7.3.2.2	Upon loss of standby power during normal operation, each emergency generator will be started dependent upon undervoltage on the start-up transformer, or a turbine generator trip. Buses will then be energized from the emergency generators, normal shutdown sequencers automatically start required shutdown equipment.	RO-66C and RO-66D verify D/G start from under voltage and auto loading of diesel generator. CL-36 verifies D/G start on turbine trip. RO-8 verified auto loading of diesel RO-13 verifies operability of normal shutdown sequencers.	None

ENGINEERED SAFEGUARDS CONTROLS

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.3.2.2 Continued	Safety Injection With Standby Power Available - If standby power is available at the time of initiation of the SIS, fast transfer to the standby source is effected by the turbine generator trip. The SIS relays initiate the simultaneous start of the engineered safeguards equipment.	QO-01 documents signals to start necessary equipment upon SIS.	No periodic test documents operability of the fast transfer relays associated with standby power. This test was completed during early 1986 under HFA relay test procedure I-SC-84-06118A and 12A. An appropriate test will be generated to periodically test in the future.
	If standby power fails, all loads will be shed at the time the diesel generators receive an automatic start signal.	RO-08 verifies this feature.	None
	With load shedding completed, the diesel generator breakers close when generator voltage is normal. Closing of the breakers resets the load shedding signals and starts the DBA sequencers. Sequencers initiate operation of engineered safeguards equipment.	RO-08 verifies this feature. QO-01 verifies sequencer sends appropriate signals.	None
	Safety injection system block is manual and is effective only when three of the four pressurizer pressure sensors are between the low-pressure and the low-low-pressure set points.	RI-07 calibrates PIA's and verifies block permissive logic.	None
	Safety injection circuit block will be automatically reset when two or more of the four pressurizer pressure sensors detect normal operating pressure.	RI-07 verifies auto un-block.	None
FSAR 7.3.2.2	Testing will initiate the safeguards equipment unless their operation would adversely affect the normal plant operation. A light is provided to show that the initiating signal has energized the control circuit of the specific engineered safeguards equipment where either operation is not desirable during the test or equipment is already in operation.	QO-01 verifies operability of control circuits.	None
FSAR 7.3.3.2	CHP and CHR - Coincident two of out four high-radiation or two out of four high-containment pressure signals trigger an alarm in the main control room, close all containment isolation valves not required for engineered safeguards except the component cooling line valves which are closed by SIS, and isolate control room ventilation system. Refueling accident high-radiation monitors will also close all containment isolation valves not required for engineered safeguards when locked in by key switches.	RO-11 and RO-12 test logic and actuation for containment high-radiation and containment high-pressure respectively. RO-30 ensures refueling accident monitors initiate containment isolation.	A modification made this outage causes the CCW containment isolation valves to close on CHP instead of SIS. RO-12 checks this feature. Also, instrument air and MSIV bypasses are not closed by SIS. The FSAR will be corrected.

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.3.3.2 Continued	To de-isolate the containment, circuits must be manually reset. At least three out of four pressure sensors must sense normal pressure, three out of four radiation sensors must sense normal radiation level and the refueling accident high-radiation monitors (when locked in) must sense normal radiation level before the operator can reset the pressure isolation circuits or the radiation isolation circuits. Resetting the isolation circuits will not result in automatically opening the containment isolation valves, the operator must manually reopen each valve.	RO-11 verifies manual reset requirements for CHR. RO-12 was run in Feb '87. Upon resetting CHP it was / verified valves did not / automatically change position. /	Surveillance Test RO-11 and RO-12 do not test the high-radiation or high-containmen pressure three out of four reset logic. The reset logic is basically a reverse of the initiation logic. If three channels fall below the setpoint for high radiation or high pressure, the channel will reset. Therefore, testing of this function is not considered necessary. Resetting CHP will result in CCW valves reopening. FSAR will be clarified.
	Containment high-pressure signal will initiate SIS, start containment spray and open the hydrazine spray injection valves.	RO-12 documents required responses.	None
	Containment high-pressure signal will also initiate a reactor trip with a two out of four logic.	MO-03 verifies trip logic. MI-5 verifies channels trip / from actual pressure signals. /	None
	Containment high-pressure signal will initiate closure of the main steam isolation valves.	RI-17 documents MSIV's circuits responses. RO-12 verifies MSIV closure on / 2/4 logic. /	None
FSAR 7.3.3.3	Failure in control source power to the pressure/radiation sensor relay circuit or to the redundant initiating circuit causes the circuit to fail in a mode to initiate isolation, but isolation will not be effected unless a second failure occurs.	Containment isolation relays are normally de-energized. Testing to determine thier action upon loss of power is not necessary.	Four of the eight CHP sensin channels use auxiliary relay which, if de-energized, fail in a mode to initiate isolat The actuating relays however for pressure and radiation isolation are energized to actuate. Each independent channel is powered from a separate preferred AC bus; t fore loss of any single powe supply will neither prevent isolation, nor cause inadver containment spray actuation. The FSAR statement will be enhanced to be more specific

ENGINEERED SAFEGUARDS CONTROLS

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.3.4.2	Coincident two out of four low-level in SIRWT signals will initiate valve operations and trip both low-pressure safety injection pumps. A manual bypass is provided so that the low-pressure safety injection pumps may be restarted.	RI-14 documents logic and actuation of required equipment. QO-02 verifies equipment operability.	A modification installed thi outage changed the 2 out of 4 logic to 1 out of 2 taken twice. The FSAR will be corrected.
	A key switch is provided in parallel with the SIRW tank low-level contacts. Minimum recirculation valves may be closed without having low level in the SIRW tank.	Operation of key switch for recirc valve is administratively controlled; ie, SOP-3, Section 7.3.2.	None
FSAR 7.3.5.3	Functional response-time testing of subsystems is performed (for example, emergency generator load-sequencer timing, emergency generator start times and stroke time of important valves).	MO-07 verifies D/G start times. RO-8 documents timing of signals from DBA sequencers. QO-21, QO-5, and QO-6 document valve stroke timing.	None
FSAR 7.3.2.2	Failure of the control power on any one redundant circuit will be annunicated in the control room.	Annunicators EK-1372 and EK-1378 are available.	Annunicators are not periodically tested. These will be tested prior to start-up and periodically in the future. (#49)
FSAR 7.3.2.2	There are two sets of DBA sequencers with each set connected to a separate control circuit. The sequencers load the required equipment in sequence.	QO-1 verifies separation and sequencing.	None.
FSAR 7.3.3.2	Testing - The containment high-pressure detectors and auxiliary relays can be tested at power without actuating containment isolation by tripping one out of the four local pressure switches. Actuation of the auxiliary relay is annunicated in the control room. The detectors and auxiliary relays for containment high radiation are tested in the same manner as containment high-pressure circuits.	MI-5 checks CHP initiation circuits. MR-6 checks CHR initiation circuits. RO-11 and MR-6 check CHR initiation circuits.	FSAR wording will be verified.

ENGINEERED SAFEGUARDS CONTROLS

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.3.3.2	Testing the containment isolation circuits is done only during shutdown. One of two redundant switches located in the control room turned to test position, may be operated at a time to de-energize two of the four containment high-pressure channels which will cause containment isolation, initiate SIS, and start the containment spray pumps. The spray valves will not open in test position. Actuation of containment isolation from the high-radiation channels is done using redundant switches in the same manner as isolation via high-pressure channels. SIS is not actuated during this test.	CHP test push buttons are available to perform this function. CHR initiate push buttons are available to perform this function. These push buttons are not used for testing. RO-11 and RO-12 use simulated sensor inputs to test containment isolation.	FSAR will be clarified on test method.
FSAR 7.3.4.2	<u>Testing</u> - The RAS control circuit may be tested while the Plant is shutdown. This test will initiate the operation of the valves and the trip signal of both LP safety injection pumps.	QO-2 verifies RAS circuity. RI-14 checks level interlocks / for RAS. /	None
SOP-3 7.7	Safety injection actuation circuits - disable/restore.	Pressurizer low pressure SIS is disabled during plant cooldowns per GOP-9 and restored on heatup per GOP-2.	None
SOP-3 Attach 5	Reset of SIS equipment repositioning criteria.	Reset feature is checked during RO-8	None
MCTF ESS-20	DBA/normal shutdown sequencers: Perform Technical Specification Surveillance tests on each sequencer to ensure operability.	QO-1 has been performed on the DBA sequencers. RO-13 has been performed on the normal shutdown	NOne
sequencers.	QO-1 (DBA) operability	testing for continued operation will be in accordance with E-PAL-86-100 which requires monthly performance testing after start-up for an initial period of 4 months.	
MCTF ESS-29	Safety Inspection Circuity - Complete FC-683 and perform QO-1 "Remove Pressurizer Heater Load Centers from SIS Trip"	QO-1 was performed to verify circuitry. FC-683 has been signed off.	None

ENGINEERED SAFEGUARDS CONTROLS

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Work Order History	A review of Work Order history revealed approximately 78 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 19 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-683 removed pressurizer heater load centers from SIS trip.	Tested satisfactorily via QO-1.	None

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.7.2.1	The auxiliary feed pumps take suction from the 125,000 gallon condensate storage tank of which 60,000 gallons are required to achieve primary system cooldown in eight hours if all of the steam is blown to atmosphere. The condensate storage tank level is monitored in the control room. In addition, a low-level switch is provided to alarm at low water level of 66,750 gallons.	DWO-1 verifies 100,000 gallons of makeup water to AFW pumps available. Level switch is calibrated per DMW-002	Condensate storag tank requirements are being substantiated by the Accident Analysis Group. Results will be defined in EOPs.
FSAR 9.7.2.1	The primary system makeup tank provides an additional source of water to the AFW pump suction. A low-level switch is set to alarm at 65,600 gallons which assures a minimum combined inventory of 132,000 gallons.	DWO-1 verifies 100,000 gallons of makeup water to AFW pumps available. Level switch is calibrated per DMW-002.	None
FSAR 9.7.2.1	A cross tie from the fire system provides an additional backup water supply to the original two AFW pumps (Pumps A and B). The third pump (Pump C) may be supplied water from the Service Water System.	QO-21 verifies backup water supply available.	None
FSAR 9.7.2.1	Minimum flow recirculation is provided through breakdown orifices which are designed to pass minimum pump design flow at maximum pressure.	No testing was performed.	Flow measurement of AFW pump recirculation flow is not designed to be monitored. Flow instrumentation will be added as part of the 5-year Plan.
FSAR 9.7.2.3	In the event that a loss of normal and standby electric power occurs, the turbine-driven pump is started from the control room and is used to supply feedwater to the steam generators. The turbine-driven auxiliary feed pump and auxiliary feedwater control valves can also be operated locally.	MI-39 AFW logic testing verifies proper logic. RO-97 verifies proper pump starting.	None.

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.7.2.3	Driving steam for the turbine driven pump is supplied from the main steam header and the turbine exhaust steam is discharged to the atmosphere. The turbine operates at constant speed with steam pressures down to 40 psig and is protected by a 10% overspeed trip.	T-187 verifies 10% overspeed trip (Feb '86). T-181 verifies turbine operation at low steam pressures (Feb '86).	None
FSAR 9.7.2.3	Auxiliary feedwater flow to the steam generators will be automatically initiated on a low-steam generator water level.	RO-97 verifies this feature.	None
FSAR 9.7.2.3	The normal valve positions on all valves of the suction side of the pumps, between the condensate storage tank and the pumps, are locked open and the steam admission valves to the turbine-driven pump are closed. The flow control valves and the steam admission valves are designed to fail open.	CL 12.5 verifies AFW valve positions. This is performed each startup from cold shutdown, if deemed necessary by Ops Supt.	None
FSAR 9.7.2.3	Safety grade flow rate indication for auxiliary feedwater flow to each steam generator is provided in the main control room. In the event of loss of offsite power, the motor-driven auxiliary feedwater pumps are sequentially loaded onto their respective diesel generator.	Flow rate indicators are calibrated by FWS-034, 035, 036, 037 and checked by QO-21 and RI-95. RO-8, RO-13 verify pumps sequencing on diesels.	None
FSAR 9.7.2.3	In the event of loss or depletion of the water supply from the condensate storage tank, the backup water supplies from the fire system or Service Water System can be utilized by opening the hand valves in the cross ties and, in the case of the fire systems, starting one of the fire pumps.	QO-21 verifies valve operation. Special Test T-190 verifies service water flow to P-8C.	None
FSAR 9.7.2.3	For any condition during which feedwater to the steam generators from the main feedwater pumps is interrupted and the reactor is tripped, sufficient feedwater flow is maintained by the motor-driven or the turbine-driven auxiliary feed pumps to remove decay heat from the primary system and maintain the reactor in a safe condition.	AFW flow requirements of 300 gpm @ 985 psig for P-8A, B were verified by T-186, T-192 Feb '86. P-8C was verified by T-201 (Sept '86). T-202 (12/86) developed system differential pressure by flowing AFW to each steam generators.	None

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.7.2.3	The Feed Only Good Generator (FOGG) actuation system monitors steam generator pressure. The steam line break will result in a lower pressure in the affected steam generator and the FOGG actuation system will terminate AFW flow to that steam generator. Due to nuclear safety considerations, the automatic isolation feature has been disabled although the operator may manually isolate the affected steam generator from the control room.	FOGG actuation is not currently used or tested.	These are passive normally open valves. They were originally designed to allow for feeding an intact steam generator. This feature is presently disabled. These valves will be tested against differential pressure as part of the plant response to IE Bulletin 85-03.
FSAR 9.7.5	Tests and Inspection		
	The auxiliary feedwater pumps are tested periodically during plant operation by starting each pump, opening the control valves and observing the flow. Testing will be in accordance with Section XI of the ASME B&PV Code with applicable addenda. Diaphragm-operated valves are exercised periodically during plant operation to ensure proper functioning.	MO-38 and QO-21 periodically start the AFW pumps. QO-21 and RO-97 start the pumps and establish flow to the steam generators.	None
	All components of the system are accessible for inspection during plant operation.	Design feature.	None
	A 48-hour endurance test has been performed on the original motor-driven pump and turbine-driven pump. The results demonstrated that the pumps performed in an acceptable manner without exceeding design limits.	P-8A was 48-hour tested per T-131A in 1980. P-8B was 48-hour tested per T-131B in 1980. P-8C was 48-hour tested per T-196 in 1986.	None

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
	All valves on the suction side of the auxiliary feedwater pumps are inspected monthly to ensure that they are in the locked-open position.	Checklist 12.5 verifies suction valves are locked open each startup.	No monthly check of AFW pump suction valves in locked-open position exists. Quarterly surveillance test QO-21 on AFW verifies suction flowpath availability. Monthly Surveillance Test MO-38 verifies recirc flow capability, which also verifies an open flowpath from the condensate storage tank to the AFW pumps. FSAR will be clarified.
FSAR Table 9-13	Motor-Driven Auxiliary Feedwater Pump (P-8A) Capacity 415 gpm Head 2,730 ft Turbine-Driven Auxiliary Feedwater Pump (P-8B) Capacity 415 gpm Head 2,730 ft Motor-Driven Auxiliary Feedwater Pump (P-8C) Capacity 330 gpm Head 2,500 ft	Pump capacity tests were performed on each pump. T-186 (Feb '86) P-8B T-192 (Feb '86) P-8A T-201 (Sept '86) P-8C	As a result of th Operational Readiness Assessment o AFW, PRC approved analysis which clarified AFW flow requirements Special testing has been performe which verifies AFW system can meet these requirements (T-186 T-192, T-201, T-202). Surveillances will be modified to verif these requirement periodically.

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.4.1.4	The steam turbine-driven auxiliary feedwater pump may be used in all instances, including loss of all ac power, to supply water to either or both steam generators if necessary.	MO-38 and QO-21 verify availability of P-8B for normal operations. RO-8 and RO-97 ensure availability of P-8B turbine pump in all conditions.	None
FSAR 7.4.1.4	The condensate storage, including the Primary Coolant System makeup tank, must contain no less than 100,000 gallons of water per Technical Specification requirements. This is enough for eight hours of auxiliary feedwater operation without makeup to the tank.	DWO-1 verifies 100,000 gallons of water available.	Condensate storage tank requirements are being substantiated by the Accident Analysis Group. The results will be included in the EOPs.
FSAR 7.4.1.4	The fire mains drawing water from Lake Michigan can be used to supply water to the turbine-driven AFW pump in the event the water supply in the condensate storage tank is depleted or cannot be utilized. Manually operated valves can be used to shift the AFW pump suction.	QO-21 verifies operability of fire water cross tie to P-8B.	None
FSAR 7.4.1.4	The turbine-driven auxiliary feedwater pump can be started from the Auxiliary Shutdown Control Panel C-150, the auxiliary feedwater valves can be controlled locally, in the case of the motor-operated isolation valves, or remotely from the Auxiliary Shutdown Control Panel C-150, in the case of the air-operated flow control valves, using Steam Generator A as the steam source.	QO-21 verifies operability of P-8B and its control valves from C-150. Motor operated valves are cycled on MO-38.	None
FSAR 7.4.1.4	Assured opening of a steam supply valve for the turbine-driven auxiliary feedwater pump is provided by an alternate solenoid valve for control of the Steam Generator A steam supply valve. The power source for this solenoid valve is from the auxiliary shutdown control panel and energizing of either normal or alternate solenoid valve will open the steam valve.	QO-21 verifies operability of steam supply valve from main control room and C-150.	None
FSAR 7.4.1.4	Control of the applicable auxiliary feedwater control valves is accomplished by enabling the auxiliary shutdown control panel devices and disabling the main control panel devices via a transfer switch.	QO-21 verifies operability of control valves from C-150 and main control panel.	None

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.4.1.4	In the event a fire causes the loss of normal control air, standby 2,400 psig nitrogen bottle systems with manifold and pressure reducers located in the auxiliary feedwater pump room and in the component cooling room will supply the steam valves, steam pressure regulating valve and AFW flow control valves for 12 hours.	Special Test T-187 was performed (2/86) to verify 12 hours of N_2 backup to P-8B steam valves.	Special Test T-18 verified N_2 syste would supply 12 hours of N_2 to PCV-0521A and CV-0522B. This function will be verified for the other flow contro valves supplied with backup N_2 prior to start-up A PACS will be generated to periodically test this function in the future.
FSAR 7.4.1.8.3	There are two auxiliary feedwater flow indication channels for each steam generator loop. Indication of flow is available both in the control room and at the Auxiliary Shutdown Control Panel C-150.	QO-21 checks the flow indication at C-150 and main control room. Indicators are calibrated by PACS FWS-034, 035, 036, 037 and RI-95.	None
FSAR 7.4.1.8.5	Detection of low condensate tank level will be via a low suction pressure switch which is installed on the turbine-driven auxiliary feedwater pump. This pressure switch turns on an alarm light on the auxiliary shutdown panel.	PS-0741D provides this function. Calibrated 1/8/86 Work Order # 24600187 PAC-FWS-026 calibrates and tests this switch. /	Prior to the next Refout a surveillance procedure will be developed to calibrate this pressure switch each refueling.

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.4.1.8.5	Upon receipt of the condensate storage tank low level alarm, the auxiliary feedwater pump suction source will be transferred manually to the fire water system. Redundant pressure switches are provided to trip (three switches; two of three required for trip) the auxiliary feedwater pumps on low suction pressure, thus avoiding pump failure due to low or nonexistent tank level.	FWS-026 calibrates P-8A, B low suction pressure trips. SOP-7 gives procedure for supplying backup water to AFW pumps on low condenser storage tank level. P-8C suction pressure trip switch calibrated (Feb 86). T-202 measured pump suction pressures during high flow rates.	These pressure switches will be added to a surveillance procedure prior to the next Refout. The calibration performed this outage, plus T-20 is adequate testi to verify functio
FSAR 7.4.3.1.1	Delivery of AFW flow to the steam generators must occur within two minutes of sensor's activation.	RO-97 verifies this feature.	None
FSAR 7.4.3.1.2	If no action by the operator is performed, low-level signals from two out of four (2/4) steam generator level sensors on an OR logic between the two steam generators energize a timer relay if the motor-driven AFW pumps' mode selector switches are in the "Auto" position. Upon completion of the timing cycle, the timer contacts actuate closing of the motor-driven AFW Pump A circuit breaker provided offsite or onsite standby (emergency generator) power is available. If offsite power is unavailable, the auto start is blocked until the normal shutdown or DBA sequencer allows loading the pump motor onto the emergency generator.	RO-97 verifies proper AFW pump start sequence. RO-8 verifies proper AFW pump sequence on a simulated DBA. RO-13 verifies AFW pump start on normal shutdown sequencer.	None
FSAR 7.4.3.1.2	The motor-driven AFW Pump C is called to start if Pump A circuit breaker trips or AFW flow does not materialize. The AFW low flow initiation logic is one out of two.	RO-97 verifies proper AFW pump start logic.	None
FSAR 7.4.3.1.2	The mode selector switch position off the "Auto" position is indicated as an off-normal condition on the main control panel. The actuation timer is provided with a suitable time setting to block unwanted automatic starting due to normal transients in the steam generator level.	RO-97 verifies proper AFW pump start logic.	None.

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.4.3.1.2	An occurrence of low flow in either AFW line to the steam generators or motor-driven Pump C trip, together with a time delayed auto-start signal for the turbine-driven pump will open the turbine drive Steam Inlet Valve B and start the turbine-driven AFW pump. The steam inlet valve control switch must be in the "Auto" position for the auto-start signal to be effective.	RO-97 verifies proper AFW pump starting logic.	None
FSAR 7.4.3.1.2	The AFW low flow initiation logic for the turbine-driven AFW pump is one out of two (1/2).	RO-97 verifies proper AFW pump starting logic.	None.
FSAR 7.4.3.1.2	In the case of a successful start of one of the motor-driven pumps, the start of the turbine-driven pump is overridden by the reset of the AFW discharge line flow switches on a two out of two (2/2) basis.	RO-97 verifies proper AFW pump starting logic.	None.
FSAR 7.4.3.1.2	Manual starting of the turbine-driven pump can be accomplished at any time by its steam inlet valve control switch "Open" position. Manual trip can also be accomplished at any time by the same switch in the "Close" position. The control switch position in "Close" is indicated on the main control panel as an off-normal condition.	MO-38 and QO-21 verify manual operation of the turbine-driven pump.	None
FSAR 7.4.3.1.2	The AFW automatic initiation system is placed in operation when the Primary Coolant System is heated above 325°F. Operation of the system is normally from the control room; if the control room becomes unavailable, manual controls can be taken over from the Auxiliary Shutdown Control Panel C-150. The AFW automatic initiation system status is annunciated on the main control board.	Checklist 3.9 places AFW in automatic prior to 325°F. MO-38 and QO-21 verify operation of the system from the main control room and C-150.	None
FSAR 7.4.3.1.2	Both the motor-driven and the turbine-driven AFW pumps' automatic initiation circuits are individually tested from the main control room according to Technical Specification requirements. After a start test switch (one for each pump) has been turned to the "Test" position, a white light indicates the test status and the test signal passes through the automatic initiation circuit, including the timers, and starts the applicable pump. The test signal is sent into the circuit after the steam generator low-level signals logic, and in the case of the turbine-driven pump, after the AFW low-flow signals.	MO-38 and QO-21 verifies their functions.	None

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.4.3.1.2	The steam generator low-level signal's logic is provided with test push buttons for test of the coincidence logic and bistable trip modules.	MI-39 verifies low-level logic.	None
FSAR 7.4.3.1.2	The entire automatic initiation circuit is tested on line and the pumps themselves are tested on line by the test switches. Water is delivered to the steam generators during the test, thus checking the suction pressure and discharge flow switches operation. The steam generator level signals are checked as a part of the Reactor Protective System input channels test.	Initiation circuit is tested by MI-39. MO-38 and QO-21 test pumps and valves and QO-21 delivers flow to the steam generators. S/G level signals are calibrated by RI-04. Flow switches are calibrated under PAC-FWS-034, 035,036,037.	None
FSAR 7.4.3.1.3	Open circuitry or loss of power supply of one of the instrument channels initiates an alarm and a channel activation.	This feature is not tested.	Testing is not required to verif open circuit or loss of power sin both events initi ate an alarm or channel trip. An time a channel is removed from service for testing this function is witnessed via ala This alarm functi is not considered important to safe plant operation. A channel trip satisfies one of the 2 of 4 logic trips required an places the actuation circuit closer to a trip condition.

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.4.3.1.3	Loss of 125 volt dc power from one dc power source disables only one AFW pump auto start channel and this loss of power is alarmed.	This feature is not tested.	/ Testing is not required to verif open circuit or loss of power sin both events initi ate an alarm or channel trip. An time a channel is removed from ser- vice for testing this function is witnessed via ala This alarm functi is not considered important to safe plant operation. A channel trip satisfies one of the 2 of 4 logic trips required an places the actua- tion circuit closer to a trip condition.
FSAR 7.4.3.2	In the event of a main steam line break, the AFW flow toward the affected steam generator must be terminated. This function must be performed using isolation valves in each steam generator's AFW supply line which automatically close upon simultaneous sensing of low water level in one steam generator and excessive pressure differential between steam generators. Both steam generators are prevented from being isolated, either automatically or manually, through interlocked controls.	Automatic isolation feature (FOGG) is disabled and not tested.	No interlocks exist to prevent manual isolation of AFW flow to both steam generators during a MSLB. This function is addressed proce- durally by the Emergency Operati Procedures. The FSAR will be corrected.
FSAR 7.4.3.2	In each flow control channel, a flow indicating controller main- tains constant flow rates to the applicable steam generator and provides flow indication in the main control room.	QO-21 verifies operation of flow controls and indications. Indications are calibrated and checked by FWS-034, 035, 036, 037 and RI-95.	None

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.4.3.2	The flow controllers keep the control valves shut until one of the AFW pumps is started. This is accomplished using two flow set points on the controllers, one for shutdown (valve closed) and one for operation (valve opened for predetermined flow). Set point switching is provided by the motor-driven pumps' circuit breaker auxiliary contacts and the turbine-driven pump steam admission valve controls auxiliary contacts on an OR logic basis. This design allows timely and smooth opening of the AFW flow control valves without operator intervention.	QO-21 verifies valves operation. Flow control valves are checked by RI-95. Flow controllers are calibrated by PAC-FWS-034,035,036,037.	None
FSAR 7.4.3.2	A separate Class 1E AFW flow indication channel for each AFW flow path and a wide-range steam generator level indication channel for each steam generator are also provided allowing indication of flow independent from the control channel and monitoring of steam generator water level to cover all anticipated transients.	AFW flow instruments are checked on QO-21 and are calibrated by PACS FWS-034, 035, 036, 037 and RI-95. Wide-range level indication is calibrated per RI-04.	None
FSAR 7.4.3.2	Concurrent excessive differential pressure between steam generators and low level in the depressurized steam generator initiates isolation of the depressurized steam generator by closing corresponding motor-operated isolation valves in the AFW supply lines. Two out of four (2/4) differential pressure logic is used in coincidence with the output of the steam generator low-level logic. The isolation signal is generated through electronic bistable modules.	FOGG system is not used or tested periodically.	Due to nuclear safety considerations, the automatic isolation feature of the FOGG system has been disabled and the operator is instructed by Plant Emergency Operating Procedures to manual isolate the affected steam generator. The FSAR will be clarified.

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-12 7.1.1 7.1.2	To start/stop P-8A and P-8C	MO-38 and QO-21 start/stop and operate flow valves in similar manner. RO-97 simulates automatic operation of pumps and verfies flow to the steam generators. RO-8 verifies start of auxiliary feed water pumps following a simulated DBA. FS-0727 and FS-0749 calibrated by FWS 34 and FWS 35.	2/3 low suction pressure trip of pump is not verified by test. This will be verified prior to start-up and periodically ther after. (24) /
SOP-12	To start/stop P-8B	MO-38 and QO-21 start/stop and operate flow control valves in a similar manner. RO-97 simulates automatic operation of pumps and verfies flow to the steam generators. Overspeed testing of turbine was completed on T-186. FS-0736 and FS-0737 calibrated by FWS 37 and FWS 36.	2/3 low suction pressure trip of pump is not verified by test. This will be verified prior to start-up and periodically thereafter. (24)/
SOP-12 7.2.3	Alternate operations	EOP-10.2 placing C-150 in operation: QO-23 places C-150 in operation in similar manner. QO-21 places C-150 in operations and starts P-8B and control to steam generators. EOP-10.2 starts motor driven pumps locally: MO-38 verfies local status of pumps. EOP-10.2 controls AFW flow from C-33 QO-21 verifies C-33 control of flow.	None
Accident and Transient Analysis			

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
MCTF AFW-03	Testing of auxiliary feed pumps should be performed at hot shutdown.	Special Tests T-202 and T-203 will be performed prior to startup. Special Test T-201 tested P-8C (9/86).	None
MCTF AFW-06	Make necessary tests at hot shutdown to verify performance and make necessary adjustments to PC-0521.	Special Test T-203 will be performed prior to to startup, adjustments will be made during this test.	None
MCTF AFW-07	Test AFW check valves for back leakage.	Special Test T-222 was completed satisfactorily during hot shutdown testing period.	None
MCTF AFW-08	Test AFW power supplies.	AFW power suplies were tested (Work Order # 24606295) and PAC-FWS-072 written to perform on refueling basis.	/ /

AUXILIARY FEED SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Work Order History	A review of Work Order history revealed approximately 52 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were postmaintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 67 Work Orders completed between 05/19/86 to 12/15/86, many of these were for instrumentation required for special tests or EEQ Audit.	Work Orders were postmaintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-675 added backup N_2 supply to P-8B steam supply (moved bottle location).	Special Test T-187 was verified 12 hour N_2 backup.	None

HYDROGEN RECOMBINER

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.6.2.2	Containment atmosphere is drawn through the unit by natural convection and the temperture of the air is raised to a level sufficient for recombination of the hydrogen and oxygen to occur (approximately 1,150 °F).	RE-39 verifies physical integrity and absence of obstruction to air flow. RI-40 calibrates recombiner instruments.	Air Flow Capability Is Not Directly Measured. A document search will will be performed to ensure adequate shop testing or analysis was done to backup 100 ssfm air flow.
	Capacity (Min @ 1 Atmosphere) 100 scfm	SO-3 and RO-61 document operability of units.	
	Power (Maximum) 75 kW		
FSAR 7.4.4.2	Calibration of the power consumption involves a correction factor for containment pressure and temperature to be used for operation after an accident.	Use of correction factors addressed in SOP-5.	None
SOP 5 7.2.1	To place a recombiner in Operation following a LOCA.	SO-3 Periodically starts recombiners in same manner. Correction factors for containment conditions are used during LOCA.	None
SOP 5 7.2.2	To shutdown a recombiner.	SO-3 Secures recombiner in same manner.	None
MCTF Review	No items identified	None	None
Accident And Transient Analysis Review			
Maint. Review	One work order on each recombiner worked since 1985. To install and remove temporary instrumentation for performance of RI-40. temporary instrumentation for performance	RI-40 completed satisfactorily.	None
Mods Review	No modification performed since start of 1985 Refueling Outage.	None	None

MAIN STEAM SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 10.2.1 Item 3	The steam dump system is arranged for automatic operation and for remote manual control from the Control Room.	Special Test T-207 was performed during 1986 Maintenance Outage to ensure operability of valves and controls. Special Test T-211 will be performed at hot plant conditions. SOP-7 provides for normal testing of the system.	None
FSAR 10.2.1 Item 3	The atmospheric dump valves may be manually controlled from the Control Room or Engineered Safeguards Control Panel.	Special Test T-207 verified this feature SOP-7 tests this feature during hot/ plant conditions. PAC MSS042 performs T-207 periodically.	None.
FSAR 10.2.1 Item 4	The main steam isolation valves (MSIV's) are closed on either a low steam generator pressure signal or a containment high-pressure signal.	RO-12 ensures valves close on containment high-pressure signal.	RI-17 will be revised to document the feature of MSIV closure on low S/G pressure. This function will be verified prior to start-up.
FSAR 10.2.1 Item 4	Closure of the MSIV's will also result in a turbine-generator trip. Manual closure of one valve will cause automatic closure of the other valve.	RI-17 tests that a standing turbine trip signal is removed if key operated MSIV defeat/enable switch is placed in defeat position. RI-17 tests that manual closure of one valve will cause automatic closure of the other valve.	Turbine generator trip on MSIV closure is inferred.
FSAR 10.2.1	Each main steam header is provided with 12 spring-loaded safety valves and two atmospheric dump valves upstream of the main steam isolation valves (MSIV's). The safety valves discharge of the atmosphere and are in accordance with the requirements of the ASME B&PV Code, Section VIII. In addition, there is a steam bypass to condenser valve downstream of the MSIV's	Safety valves are tested per RM-29. CV-0511 turbine bypass was tested by T-207 during 1986 Maintenance Outage. Hot testing of turbine bypass valve will be performed per T-211 during plant heatup. SOP-7 provides for normal testing of turbine bypass valve and atmospheric dump valves.	None

MAIN STEAM SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 10.2.1 Item 4	The MSIV's are normally open, and closed in five seconds in a no-flow condition. When flow does exist, the valve will close in less than one second.	Valves are verified to shut within five seconds under no-flow conditions during normal plant start-up by GOP-2. RI-17 verifies MSIV's close in five seconds.	We do not verify closure within one second with steam flow. This is considered a design feature. Repeated closure of MSIVs under full steam differential pressure may damage valves.
FSAR 10.2.1 Item 4	Four pressure transmitters on each steam generator actuate contacts in indicting meter relays which are connected in a two-out-of-four logic to close both main steam isolation valves.	RI-5 calibrates pressure indicators.	RI-17 will be revised to document this feature. Presently RI-17 only tests feedwater regulating and bypass valves auto closure. (26) /
FSAR 10.2.1 Item 4	Automatic closing of the main steam isolation valves can be blocked by pushing both of two isolation block push buttons as the steam pressure is decreasing toward the isolation set point. The isolation block is automatically removed by a two-out-of-four logic when the steam generator pressure rises to 50 psi above the isolation set point pressure.	RI-17 verifies proper operation of blocking circuits for feedwater regulating valves and bypass valves.	RI-17 will be revised to document this (26) / feature. Presently RI-17 only tests feedwater regulating and bypass valves auto closure, but technically procedure is adequate to test MSIVs. Auto block of MSIVs auto closure is on low S/G pressure only not on containment high pressure. FSAR clarification needed and will be clarified.

MAIN STEAM SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 10.2.1 Item 4	An accumulator is provided for each MSIV to hold the valve open in case of a loss of air supply to the valve operator.	None	No testing is presently performed to address this design feature. The accumulators are provided for reliability purposes. On loss of air, the accumulators provide the operator enough time to regain pressure to prevent the valves from drifting/slamming closed and causing damage. There is a low pressure alarm on each header and backup from the H/P air system. The testing of these accumulators will be evaluated.
FSAR 10.2.1 Item 5	The steam generator blowdown system is continuously monitored by a process monitor which detects radioactivity which may have leaked into the steam generator from the primary system. This radiation monitor is on the effluent of the blowdown tank and detects radioactivity which may have leaked into the blowdown water through the steam generators. High activity is annunicated in the main control room. If the radioactivity level reaches a preset valve, the surface and bottom blowdown containment isolation valves and the mixing basin discharge valve all close.	RIA-0707 continuously monitors blowdown flow and is calibrated per RR-09A, read by DWO-1 and source checked by MR-14. QR-22 verifies receipt of an alarm and closure of mixing basin discharge valve on receipt of a high radiation signal	Current testing does not verify that all S/G blowdown valves close on receipt of high radiation signal. QR-22 will be revised / to add the steam generator blowdown valves. This function will be tested prior to start-up and periodically in the future. (#9) /
FSAR 10.2.1 Item 5	The standby blowdown pump starts automatically on high blowdown tank level.	None	No testing is presently performed or necessary to test this design feature. This function does not impact safe or reliable plant operation. Normal plant operations would identify a problem if one existed.

MAIN STEAM SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Accident And Transient Analysis			
SOP-7 7.1.4	At Shift Supervisor's discretion use auxiliary boilers steam through the superheater to seal the main turbine and draw vacuum.	Normal plant operation on a start-up typically does not utilize the super-heater because of the demand on the auxiliary boiler. However, this method is fully described in SOP-13 and has been utilized by Operations in the past.	None
SOP-7 7.4	Steam generator continuous blowdown.	Normal operations validate that this design feature is satisfied.	None
SOP-7 7.5	Steam generator recirculation.	Normal operations validate that this design feature is satisfied.	None
SOP-7 7.6/7.7	To establish/secure steam generator nitrogen blanketing.	Normal operations validate that this design feature is satisfied.	None
MCTF MSS-01 Item 1	CV-0511 turbine bypass valve insure operability.	Cold post-maintenance testing (T-207) and hot (400 psi) testing were performed.	Operability determination at thirty percent power to assure adequate flow capacity (T-211) will be performed (#8) /
MCTF MSS-01 Item 2	CV-0511 turbine bypass valve, evaluate testing in conjunction with monthly turbine valve testing.	Periodic testing will be completed during turbine valve testing and the following intervals: Once a month for the first three months of plant operation; then quarterly the next four months of plant operation, and then once every six months of plant operation. Attachment 3 of SOP-7 presently performs the above testing monthly.	None

MAIN STEAM SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
MCTF MSS-02	CV-0522A and CV-0522B auxiliary feedwater pump steam supply valves: Determine correct stroke times for these valves (minimum and maximum) and adjust as necessary.	Initial valve timing has been set as part of the respective Work Orders. Surv Test QO-21 presently determines valve stroke time.	None
MCTF MSS-03	CV-0779, CV-0780, CV-0781 and CV-0782 atmospheric dump valves: Stroke and test all valves.	Valves were stroked and tested cold (T-207). All valves were satisfactorily stroked under full steam pressure (SOP-7 Attachment 4) during hot testing and will be performed each start-up and shutdown.	None
MCTF MSS-04	MO-0501 and MO-0510 MSIV bypass valves: Valve operability.	Both MSIV bypass valves were test operated satisfactorily at full steam pressure during hot testing. These valves are routinely used during normal plant start-up.	None
MCTF MSS-06	MV-101 MS, MV-102 MS, MV-103 MS, and MV-104 MS steam dump manual isolation valves: Insure valves move/operate freely. Initiate a PACS to include periodic test.	All valves operated satisfactory after repairs. PAC-MSS-034 have been developed to include periodic test operation.	None
Work Order History	A review of Work Order history revealed approximately 213 Work Orders completed between 11/30/85 to 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 96 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None

MAIN STEAM SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-709 installed a test tap upstream of CV-0511 to facilitate performance of valve testing via T-211.	None required.	None
	FC-624 replaced several pieces of instrumentation with environmentally qualified equipment.	Replaced equipment was preoperationally tested as part of the FC closeout.	None
	FC-445-02 installed motor operators on MSIV Bypass Valves.	Both MSIV bypass valves were test operated satisfactorily at full steam pressure during hot testing.	None
	FC-603 installed thermal performance monitoring instrumentation.	None required.	None

SAFEGUARDS ROOM HVAC

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.8.2.4 Item 13	The engineered safeguards equipment room coolers are started by a signal from wall-mounted thermostats and provide cooling for the protection of the engineered safeguards equipment.	MO-34 verifies auto-start and both local and remote manual start of each fan. Air flow is also verified by this test.	None
	Service water is automatically admitted to the fan cooling coils when each fan starts.	ESF room cooler valves were modified via facility change such that they are no longer repositioned by a SIS.	Automatic feature for service water valves has been eliminated.
		As a result of Consumers Power Company's evaluation of IE Bulletin 80-06, "Engineered Safety System (ESF) Reset Controls," circuitry modifications were made to ESF Room Cooler Valves SV-0825 and SV-0878 such that these valves do not close upon an ESF reset signal. In addition, to preclude an advertent closure of the service water valves supplying cooling to the ESF room coolers, the hand switch controllers (HS-0825A and HS-0878A) for these valves were changed from hand switches without locks to hand switches with cylinder lock operators. /	The FSAR will be modified to correct this discrepancy.
		MO-29 verifies proper valve lineup.	
	Each room has redundant fan coolers to maintain suitable service conditions for the equipment located in these rooms.	None	Each safeguards room does not have redundant fan cooler. Each room does have redundant fans, but the fans share common cooling coils. Need for redundant cooling coils will be addressed prior to start-up. (23)/
	Cooler performance is not verified by surveillance.	None	The performance of the Safeguards Room Coolers will be verified prior to startup and periodically thereafter.(22)/

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.4.5.2	One radiation monitor is installed for each engineered safeguards pump room to provide a room isolation signal upon high radio-activity levels in the applicable room.	RR-9E and RR-9F calibrated radiation monitors for / east and west ESF rooms respectively. QR-22 verifies isolation function.	None
SOP-24 7.5.1	To start Engineering Safeguards Coolers.	MO-34 operates fans in similar manner.	None
MCTF VAS-02	Leak Test Heat Exchangers.	VHX-27A and VHX-27B were leak tested and declared operable during 1986 Maintenance Outage.	None
Mainten-ance Review	A review of completed Work Orders from 11/30/85 to 5/19/86 revealed three Work Orders.	All work completed and declared operable.	None
Mainten-ance Review	A review of completed Work Orders from 5/19/86 to 12/15/86 revealed three Work Orders.	All work completed and declared operable.	None
Modifi-cation Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-661 modified ESF sump pump circuitry.	Performed a revise RO-11 to test this feature.	None

CONTAINMENT AIR COOLERS

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.3.2.1	The service water supply line for each cooler has an air-operated stop valve which is normally open and de-energized.	MO-29 verifies valves open.	None
FSAR 6.3.2.1	The return line for each cooler has an air-operated discharge valve which is normally held closed. QO-5 times the valve stroke.	Return line valve is operated during QO-1, RO-8 and RO-12.	None
FSAR 6.3.2.1	The service water discharge and supply valves may be manually operated from the main control room and the engineered safe-guards local panel.	QO-5 times each valve stroke from the main control room.	No periodic test is performed to operate service water supply and return valves from the engineered safeguards local panel. The surveillance will be modified to periodically stroke these valves from the local panel. (28) / These valves will be stroked locally prior to start-up.
FSAR 6.3.2.1	All fans may be manually started or stopped from the main control room or at the individual breakers.	QO-1 and normal plant operations verifies fans can be started or stopped from the main control room.	No periodic test is performed to verify fan operation from their breakers. A PACS will be generated to periodically operate the fans locally. (29) / V-1A and V-4A were operated locally this outage. V-2A and V-3A will be started locally prior to start-up.
FSAR 6.3.2.1	If a cooling coil leak or steam leak occurs to cause a flow through the drain greater than 20 gpm, the level in the sump will rise to the liquid level switch and initiate an alarm in the control room.	PPAC SWS-012 calibrates this leak detection system.	None

CONTAINMENT AIR COOLERS

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.3.2.1	Replaceable air filters are located in each cooler ahead of the coil bank to maintain coil surface cleanliness.	PPAC CRS-001-004 changes filters on air coolers. /	None
FSAR 6.3.2.1	During post DBA operation, water flows of over 150 gpm will flow through the overflow valves.	None	The design of the containment air coolers provides a breakaway panel which opens on high differential pressure due to high water level. This panel is designed to pass greater than 150 gpm flow. This panel will be visually inspected this outage and a PACS developed for future inspections. (17) /
FSAR 6.3.3 Item 2	The coil capacity is based upon 75°F service water which is the maximum expected temperature.	Temperature is verified on SHO-1 surveillance.	Event Report ER 86-091 documents this problem. Admin. controls now exist to limit plant operation based on SW temperature. Further analysis / has determined that / no limitations need be/ placed on plant / operations based on / SW temperature. /
FSAR 6.3.2.2 Item 3	The coolers are automatically changed to the emergency mode by a safety injection signal (SIS). This signal will trip the normal rated fan motor in each unit and open the high-capacity service water discharge valve from each unit.	RO-8, QO-1 and RO-12 verifies proper fan operation and valve positioned on a SIS.	None
FSAR 6.3.2.2 Item 3	If standby power is not available and a SIS occurs, the emergency diesel generators are started and the DBA sequencers allow all four coolers to start using the DBA rated fans.	RO-8 verifies proper fan operation on a simulated DBA	Recent technical specification change submittal is to required only three coolers for DBA requirements.

CONTAINMENT AIR COOLERS

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.3.2.2	The coolers units' performance may be tested with portable thermometers, manometers and pitot tube in the field at any time the containment building is accessible.	T-216 and T-219 were conducted this outage to verify design requirements per FSAR.	Containment cooler testing during the current outage does not measure service water dp across the cooler. A surveillance test will be developed to verify air cooler operability on a refueling frequency in the future. Prior to start-up, the capability of the air cooler coils to transfer heat will be verified either through test or analysis. (18) /
FSAR 6.3.2.2 Item 1	Four units are normally in operation with two fans in each unit operating.	Normal plant operation verifies this mode of operation per SOP-5.	None
FSAR 6.3.2.2 Item 1	During normal operation, the service water discharge valves for emergency operation are closed and the service water flow is modulated by temperature control valves which bypass the discharge valves.	MO-29 verifies valves for emergency operation are closed. PPAC SWS-028 inspects temperature control valves mechanically each refueling.	No testing is done to verify operability of temperature control loop for the control valves. Normal plant operations adequately demonstrates this non-safety temperature control function. (Restart Plan) /
FSAR 6.3.2.2 Item 2	During plant shutdown, all cooling units continue to operate as in normal operation.	Normal plant operation verifies this mode of operation per SOP-5.	None
FSAR 6.3.3 Item 7	A steam leak or primary coolant leak would be accompanied by an increase in the containment atmosphere humidity which would be detected by the containment humidity sensors and indicated in the control room.	RI-25 tests the function of these instruments.	None

CONTAINMENT AIR COOLERS

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.3.3 Item 7	An excessive drain water flow from the coil will be indicated in the control room by an alarm.	PPAC SWS-012 calibrated this leak detection system.	None
FSAR 6.3.3 Item 7	If a leak does exist, the cooler in the vicinity of the defective unit may meet the increased duty, by the manual opening of the service water stop valve and permitting the emergency flow of 1625 gpm through the coolers.	These return line valves are operated and tested during QO-1, RO-8 and QO-5. QO-5 times the valve stroke.	None
MCTF SWS-04	VHX-1, 2, 3, 4 containment air coolers have sufficient service water flow.	Special Test T-216 verified that each cooler required in an accident was provided its required flow in all DBA situations.	None
Work Order History	A review of Work Order history revealed approximately 14 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 40 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-713 changed VHX-4 service water outlet valve (CV-0867) from fail-open to fail-closed.	QO-1 was performed to verify valve attains proper accident position.	RO-12 will be revised to address this modification. QO-5, Attachment 1, page 5 of 14 will be revised to address closure time instead of opening time. (30)
	FC-660 added lube access connections to air cooler fan motor bearings.	None	None required.
SOP-5 7.1.1	To place coolers in operation.	Normal plant operations verify this function on plant start-up.	None
SOP-5 7.1.2	Normal operation service water flow through each cooler is automatically controlled by a temperature controller that senses cooler outlet temperature and modulates a bypass valve around the emergency discharge valve.	Normal plant operation verifies this function.	None

CONTAINMENT AIR COOLERS

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-5 7.1.3	Accident condition operation.	RO-12 tests this design feature to place the fans and coolers in their post accident condition.	RO-12 will be revised to address the auto closure of VHX-4 service water outlet valve (CV-0867) on a safety injection signal. SOP-5, Section 7.1.3a will be revised to reflect the correct accident condition of the fans and coolers.

COMPONENT COOLING WATER SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
9.3.2.1	The parts of the system located inside containment are isolated in the event of a SIS as is the component cooling water to the evaporator and spent fuel cooling systems.	CCW to the spent fuel pool and evaporators is isolated on a SIS and verified per RO-8, QO-1. During '86 Maintenance Outage valves to containment were modified to close on a containment high-pressure vice SIS. RO-12 tests closure of containment isolation valves.	No evidence located to show that testing was completed for the modification to close CCW isolation valves on containment high pressure instead of SIS and allow reopening of valves using the bypass key(s). Normal modification closeout testing will test these features prior to start-up.
9.3.2.1	The system is continuously monitored by a process monitor which detects radioactivity which may have leaked into the system from the fluids being cooled.	RE-0915 continuously monitors CCW water and is checked on DWO-1.	None
9.3.2.1	The pumps can be started and stopped from the main control room and also locally at the switchgear.	MO-18 operates the pumps from the Control Room and locally from switchgear. /	Surveillance procedures will be modified to start pump locally periodically. The pumps will be started locally prior to start-up. (#12) /
9.3.2.1	The system can be vented to the auxiliary building through a diaphragm-operated three-way valve on the surge tank. The other port on the three-way valve is connected to the gas collection header and is automatically transferred in the event the Component Cooling System contains radioactive gases due to leakage from radioactive systems being cooled.	A three-way vent valve exists to switch vent from atmosphere to waste gas system upon high activity in the CCW system.	The automatic repositioning of the CCW vent valve, CV-0915, on CCW high radiation is not periodically tested. This will be verified prior to start-up. A PACS will be generated to periodically test this function in the future. (#40) /

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
9.3.2.1	Supply valves to systems shown below are operable from the main control room and all, except the containment isolation valves and the fuel pool supply line valve, are operable from the Engineered Safeguards Auxiliary Panel. 1. To Shutdown Cooling Heat Exchangers 2. To Engineered Safeguards Pumps 3. To Spent Fuel Pool Heat Exchangers and Radwaste Equipment 4. To Services Inside the Containment	Design condition. QO-5 and QO-6 cycle valves to components from the Control Room. Switches exist on Engineered Safeguards auxiliary panel.	No periodic cycling of valves from engineered safeguards auxiliary panel (C-33) is performed. These valves will be cycled from C-33 prior to start-up. Surveillance procedures will be reviewed to determine which valves are not periodically cycled from C-33. The procedures will then be modified to test these valves locally periodically. (#38) /
9.3.2.3 Item 3	On initiation of the Safety Injection Signal (SIS), the supply of component cooling water to the Spent Fuel Cooling System and to the radwaste evaporators will be cut off by automatic closure of supply and/or return line valves.	RO-8 and QO-1 verify proper actuation of isolation valves during a SIS. QO-5 times the stroke of these valves.	None.
9.3.2.3 Item 3	The valves in the gland cooling water supply and return headers are automatically opened by a SIS to supply CCW to Engineered Safeguards pumps.	The isolation valves to Engineered Safeguards Rooms for pump cooling are verified to open during SIS per RO-8, QO-1.	Normally open CCW isolation valves to ESS pumps are not periodically cycled. These valves will be cycled prior to start-up and a PACS will be generated to cycle periodically in the future. However this is a normally open passive valve. (#15) /
9.3.2.3 Item 3	If standby power to the CCW pumps is available during an SIS, all three pumps will be started.	QO-1 verifies proper starting of CCW pumps during a SIS.	None
9.3.2.3 Item 3	If standby power is not available during a SIS, the component cooling pumps are momentarily shed from the power supply buses. after the emergency diesel generators have energized the buses, two of the pumps are automatically started by the DBA sequencers and the third pump is put on standby.	RO-8 verifies proper starting of CCW pumps during a DBA.	None

COMPONENT COOLING WATER SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
9.3.2.3	Starting of the third CCW pump is initiated by a low-pressure signal received from the pressure switch on the CCW pumps common discharge header.	None	No testing is performed to check the auto start of the third CCW pump on CCW low pressure. A test will be generated to periodically test this function in the future and prior to start-up. (#14)
9.3.2.3 Item 3	Upon receipt of a SIS, valves in the component cooling water-supply lines to the shutdown cooling heat exchangers open.	RO-8 and QO-1 verify proper operation of these valves during a SIS. QO-5 times the stroke of these valves.	None
9.3.2.3 Item 3	Upon receipt of a low-level signal from the SIRW tank, valves in the component cooling heat exchanger service water outlets and component cooling water inlets open to ensure maximum cooling water supply during the containment spray and safety injection recirculation mode.	QO-2 verifies proper actuation of these valves during a RAS.	CCW heat exchanger inlet valves CV-0945, 0946 are not checked to open on RAS. QO-2 verifies that valves which are normally open won't close from hand switch upon RAS. These are normally open valves which get an open signal on RAS. QO-2 verifies upon RAS, these valves will not close from a manual signal (handswitch in Control Room). This testing is determined adequate, since closing these valves totally isolates CCW.
9.3.2.3 Item 3	The control valve in the supply line to the Spent Fuel Cooling System can be opened and closed remotely from the Control Room at the discretion of the operator in order to prevent overheating of the spent fuel pool.	Controls exist and valve is stroked from Control Room during QO-5.	None

COMPONENT COOLING WATER SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
9.3.2.3 Item 3	Low cooling water flow in the supply header to each Engineered Safeguards Equipment Room is annunciated in the Control Room. Changeover from CCW supply to the service water is performed by remote-manual closing of the component cooling supply valve and return valve and opening one of the two service water supply valves and the return valve from the main control room or from the local Engineered Safeguards Auxiliary Panel.	Low flow is annunicated in the main Control Room. Flow switches are calibrated per CCS 005.	Service water backup to ESS pump cooling is not periodically tested. These valves will be cycled prior to start-up. A PACS will be generated to cycle them periodically in the future. (#15) /
9.3.2.3 Item 3	In the event of an accident which results in a SIS simultaneous with component cooling low pressure, the containment isolation valves in the Component Cooling Water System will close.	Containment high pressure now will close the CCW to containment supply and return valves. RO-12 tests containment isolation valves. (This outage we modified the system such that a CHP signal rather than a SIS will cause containment isolation.)	The FSAR will be modified to clarify.
9.3.2.3 Item 3	If instrument air is also lost during a simultaneous accident condition, the integrity of the containment will be maintained by the check valve in the supply header to containment and by the return header isolation valves which are provided with an air accumulator sized to place and maintain the valves in a "closed" position.	The check valve in the supply header is leak tested per QO-6 and isolation valves leak tested per RO-32-14 and RO-32-15.	Air accumulators of CCW return header isolation valves is not periodically tested. Valves are cycled via QO-6 with instrument air available. PACS being written to address. Testing will be performed prior to start-up and will be included as part of the augmented test program. (#16) /
9.3.3.1 Item 1	For post-DBA operation, one CCW pump can furnish at least 50% of the required capability for cooling the containment spray and safety injection recirculation water.	Special Test T-223 was performed during 1986 Maintenance Outage to verify sufficient flow to all safety related loads following a DBA.	None

COMPONENT COOLING WATER SYSTEM

SOURCE	SYSTEM REQUIREMENTS		TEST PERFORMED	EXCEPTION/ JUSTIFICATION
9.3.3.1 Item 3	Under post-DBA conditions, each CCW heat exchanger is capable of handling at least 50% of the heat duty required.		Special Test T-223 was performed during 1986 Maintenance Outage to verify sufficient flow to all safety related loads following a DBA. Also the CCW heat exchangers were opened and inspected to verify tube cleanliness to establish any analysis penalties due to degradation of tube heat transfer capability. This information was fed back into the containment pressure analysis. See E-PAL-86-083.	None
Table 9-6 Page 1	Component Cooling Pumps			
	Capacity (Each)	6,000 gpm (Based on Shutdown Cooling Requirements), Including Approximately 10% Wear Margin	Special Test T-206 was performed during 1986 Maintenance Outage to verify pump design values. See E-PAL-86-083.	None
	Head	164 ft		
Table 9-6 Page 1	Time Required to Accelerate Pump to Full Speed at 70% Voltage	4 s		Pump acceleration to full speed at 70% voltage in four seconds is a design feature which is not periodically tested. A review of the Class 1E; motor starting requirements was performed. All subject motors were designed and procured for the capability to start and accelerate their loads with 70% of rated voltage at the terminals (see Specification E-10). It is not feasible or necessary to test this feature. Analysis of technical data is adequate to verify the function. The plant transient loading studies calculate the motor

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Table 9-6 Page 1 Continued			terminal voltages for the most conservative bus voltages. These studies support the motor design features by verifying all motors will start and accelerate the pumps with their minimum postulated bus voltage. The pump/motor speed torque curves also show there exists sufficient excess torque to accelerate the pumps with 70% of terminal voltage. These transient loading studies are periodically performed, reviewed, and updated to ensure the adequacy of the diesel generator and electrical equipment. (Note: The class 1E 2400 volt buses are undervoltage protected to prevent operation at a degraded voltage condition. Setpoints are 92% of rated voltage for 6 seconds).

COMPONENT COOLING WATER SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR Table 9-6 Page 2	Design Duty (Each) Component Cooling Cooling Heat Exchanger 50.5 x 10^6 Btu/h (Normal) 94.8 x 10^6 Btu/h (At Start of Shutdown Cooling) 43.2 x 10^6 Btu/h (24 Hours After Shutdown Cooling) 85.0 x 10^6 Btu/h (Post-DBA)	None	Heat exchanger capacity is not tested. See E-PAL-86-083. Combining the SWS and CCW systems flow testing, plus the visual inspection of the internals of the CCW HX, the heat exchanger performance is adequate. This will be reverified prior to start-up via reanalysis of the data.

COMPONENT COOLING WATER SYSTEM

SOURCE: FSAR Table 9-7

SYSTEM REQUIREMENTS

Subsystem	Normal	At Initiation of Shutdown Cooling	24 Hours After Initiation of Shutdown	DBA Initial	Post-DBA Long Term
Number of Operating Pumps	1	2	2	1	2
Number of Operating Heat Exchangers	1	2	2	-	2
Shutdown Heat Exchanger (gpm)	-	8,000	8,000	-	8,000
Primary Coolant Sample Heat Exchanger (gpm)	20	20	20	-	-
Letdown Heat Exchanger (gpm)	1,280	158	-	-	-
CRDM Seal Cooling (gpm)	50	50	-	-	-
Charging Pumps Cooling (gpm)	73	41	-	41	41
Primary Coolant Pump Cooling (gpm)	200	200	-	-	-
Engineered Safeguards Pumps Cooling (gpm)	-	70	70	140	140
Spent Fuel Pool (gpm)	1,840	1,840	1,840	-	-
Shield Cooling HX (gpm)	126	126	-	-	-
Waste Gas Compressor Aftercoolers (gpm)	1	1	1	1	1
Vacuum Degasifier Pump, Seal Water Cooler (gpm)	8	8	8	8	8
Radwaste Evaporator Condensers (gpm)	200	200	200	-	-
Total gpm	3,798	10,714	10,139	190	8,190
Pump Capability (gpm)	6,000	12,000	12,000	6,000	12,000

TEST PERFORMED

Special Test T-213 and T-223 were performed during the 1986 Maintenance Outage to verify sufficient flow to all safety related loads following DBA.

EXCEPTION/ JUSTIFICATION

MO-29 ESS alignment verifies CCW valves lined up to P-55B or C. MO-29 will be modified to include CCW supply to P-55B and P-55C. CCW lineup is controlled also via CL-16, which includes these valves. See E-PAL-86_093. FSAR will be modified for final values.

COMPONENT COOLING WATER SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.3.2.1	The component cooling water system uses demineralized water to which an inhibitor is added for corrosion control. Makeup to the system is automatically supplied from the primary system makeup storage tank.	Automatic makeup is verified through routine operation.	None
FSAR 9.3.2.3 Item 1	High component cooling temperature is annunciated in the Control Room. The service water discharge temperature from each component cooling heat exchanger is indicated in the Control Room.	PPAC SWS-021 & CCS-007 calibrates temperature indicators for service water out of component cooling heat exchangers.	None /
FSAR 9.3.2.3 Item 1	Tank low level is annunciated in the Control Room.	PACS-CCS-009 has been developed to / calibrate level instrumentation /	This will be verified prior to start-up. (#40) A PACS will / be generated to test/ periodically in the / future.
FSAR 9.3.2.3 Item 1	High activity is annunicated in the main control room.	None	This will be verified prior to start-up. A PACS will be generated to check periodically in the future. (#40) /
SOP-16 7.3.1 7.3.2 7.3.3 7.3.4	To start first pump/to start subsequent pumps/to place pumps in standby/to stop.	Normal system operations verify these features.	None
SOP-16 7.4.1 7.4.2	To place component cooling water heat exchangers in/remove from operation.	Normal system operations verify thise functions.	None

COMPONENT COOLING WATER SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-16 7.6	To supply cooling water to engineered safeguards pumps using service water.	None	ECCS pump backup service water supply valve will be cycled prior to start-up and periodically in the future. (#6) /
MCTF CCS-03	FS-0958 and FS-0954, component cooling water flow switches test operability.	Operability was determined through normal post-maintenance testing and is periodically tested on PPAC CCS-005.	None
Work Order History	A review of Work Order history revealed approximately 22 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 47 Work Orders completed between 05/19/86 and 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-657 modified CCW isolation valve circuitry from SIS coincident with low CCW pressure to isolation on CHP.	Modification test procedure tested this feature satisfactorily.	None
	FC-638 added CCW pumps to the normal shutdown sequencers.	RO-13 was revised to incorporate this change and tested satisfactorally.	None

SHUTDOWN COOLING SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 6.1.2.3 Item 2	The shutdown cooling system is brought into use when the primary coolant temperature falls below 325°F and the primary coolant pressure falls below 270 psia. At this time, the system must be realigned for shutdown cooling.	RI-59 Surv Test (18 Month) calibrates and verifies hi-pressure interlock to initiate shutdown cooling. Standard Operating Procedure 3 covers normal use of shutdown cooling. Periodic plant cooldowns verifies this ability.	None
FSAR 6.1.2.3 Item 2	Valves MV-3189, MV-3190, MV-3198 and MV-3199 have motor operators to provide for remote realignment for shutdown cooling due to potential high radiation in the area. Realignment consists of unlocking and opening four valves on the low-pressure pump suction, closing the valves in the low-pressure pump suction line from the SIRW tank, unlocking and opening the two crossover valves from the low-pressure pumps to the shutdown cooling heat exchangers and locking the manual valves in the spray header lines closed.	Standard Operating Procedure 3 covers normal use of shutdown cooling. Periodic plant cooldowns verifies this ability.	None
FSAR 6.1.2.3 Item 2	Prior to placing the system in operation, the boron concentration is verified at various points in the system.	Generic Checklist 2 and Standard Operating Procedure 3 ensures boron concentration prior to using shutdown cooling.	None
FSAR 6.1.2.3 Item 2	During the early stages of shutdown cooling, the cooldown rate is controlled by limiting the flow through the tube side of the heat exchanger. Constant flow through the core is maintained with a heat exchanger bypass valve. In order to use this valve, it must be unlocked, its air supply returned to service and its flow controller placed in automatic operation.	Standard Operating Procedure 3 covers normal use of shutdown cooling. Periodic plant cooldowns verify this ability.	None
FSAR 7.4.1.6	When the Primary Coolant System pressure has been reduced to below 250 psig, one of the two low-pressure safety injection pumps is started (if not already operating) in recirculation mode to provide shutdown cooling. The decay heat from the Primary Coolant System is transferred to the Component Cooling System via a shutdown cooling heat exchanger; in turn, the decay heat is transferred to the Service Water System via a component cooling water heat exchanger. It is expected that the cold shutdown condition can be achieved within 72 hours.	Normal plant conditions have verified ability to cooldown to cold shutdown in 72 hours.	Analysis and testing has been performed as a result of the CCW heat exchanger flow limitation issue (See E-PAL-86-083). The results show that redirecting flows from non required CCW loads allow required flowrates to be met. Special Test T-223 has been performed to set up the system to meet these flows.

SHUTDOWN COOLING SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 7.4.1.6	Instrumentation is provided to indicate shutdown cooling return flow, service water pump flow, component cooling pump flow and component cooling surge tank level.	Shutdown cooling flow is calibrated by PAC ESS 025 (Refueling). CCW surge tank level is calibrated by PAC CCS 009 (12 Months).	FSAR Section 7.4.1.6 states that instrumentation is available to indicate service water and CCW flow. Such instrumentation is not available. Instrumentation is available to "indicate" flow, but not to quantify flow. Evaluation of modifications to provide adequate instrumentation for system performance testing is planned.
7.4.1.6	Analysis of fire damage in any of the areas containing portions of systems required for the shutdown cooling operation shows there will always be an undamaged power supply to one or the other of the shutdown cooling pumps (low-pressure safety injection pumps). The electrical operators and power supplies for powered valves may be damaged; however, valve alignment can be achieved manually. LPSI pumps used for cooldown can be started locally. (Last sentence paraphrased from related sections of FSAR.	Local starting of LPSI pumps is checked by MO-23.	Manual stroking of shutdown cooling valves needs to be verified during valve PACS. Long-Term cooling can be accomplished through steam generators until shutdown cooling system can be assigned. (#108)
9.1.2.3	Service water flow requirements during shutdown cooling will remain essentially the same as for normal operation. Both component cooling water heat exchangers are required to be in service in order to cool the primary coolant from 300°F to 130°F in 24 hours and the supply to all noncritical equipment except the auxiliary building chiller is discontinued.	None.	A reanalysis was performed for CCW with a 4000 gpm flow to the shutdown cooling heat exchanger with 6000 gpm shutdown cooling flow. The result was 53 hrs is required to cool PCS to 130°F. The FSAR will be clarified. See E-PAL-86-083 for more detail. This same section states that all noncritical service water is discontinued. This is not the normal plant practice. Typically, we continue service water flow to FWP, VRS, condensate pumps, etc. The FSAR will be corrected to clarify this statement.

Source	System Test Requirements			Test Performed	Exceptions/Justifications
FSAR Table 9-1	Service Water System Duty Requirements				
			Shutdown Cooling Flow - Gpm	Special Test T-216 balanced service water flows during '86 Maintenance Outage.	Service water flow to CCW heat exchangers for shutdown cooling may not meet FSAR Table 9-1 requirements. SWS and CCW issues addressed via ER 86-091 and ER 86-083.
	Component Cooling Heat Exchangers (2)		13,000		
FSAR Table 9-7	Component Cooling System Operational Modes (Flows)				
		At Initiation of Shutdown Cooling	24 Hours After Initiation of Shutdown	Special Test T-223 balanced CCW flows during '86 Maintenance Outage.	Same as Item 7.4.1.6 above. See E-PAL-86-083 for more detail.
	Shutdown Heat Exchanger (gpm)	8,000	8,000		
FSAR 6.1.2.2 Item 4	The Shutdown Cooling Heat Exchangers, operating together, are sized to hold a refueling temperature of 130°F with the design component cooling water temperature of 90°F at 27-1/2 hours after shutdown of an infinitely irradiated core.			Periodic plant cooldowns verify capability of system to cool and hold PCS temperature.	None
FSAR 6.1.2.2 Item 6	Two power-operated relief valves provide automatic Primary Coolant System pressure relief during low temperature water solid system operation which in turn provides relief protection for the Shutdown Cooling System.			LTOP is armed per SOP 1 and GOP 9 before shutdown cooling is placed in service. Automatic operation is verified monthly per MO-27. RI-59 verifies calibration of LTOP.	None
FSAR 6.1.2.2 Item 8	Temperature before and after the shutdown cooling heat exchangers is monitored in the control room. Each shutdown cooling heat exchanger discharge is monitored by local temperature indicators.			PAC ESS-004 and ESS-032 calibrate shutdown cooling temperature indication.	None
FSAR 6.1.2.3 Item 2	The shutdown cooling function may be used during the early stages of Plant start-up to control the primary coolant temperature. As the primary coolant temperature approaches 315°F and the primary coolant pressure approaches 270 psia, this function is discontinued, and the system aligned for emergency operation.			SOP 3 covers normal use of shutdown cooling. Periodic plant heatups verify this capability.	None

SHUTDOWN COOLING SYSTEM

Source	System Test Requirements		Test Performed	Exceptions/Justifications
Table 6-4	SHUTDOWN COOLING HEAT EXCHANGER DATA SUMMARY			
	Operating Parameters (27.5 Hours after Shutdown Assuming an infinitely Irradiated Core)		None	Periodic testing of these specific parameters is not performed. Verification of Shutdown Cooling Heat Exchanger performance is performed each shutdown when shutdown cooling is put on line and the Plant is cooled down and maintained cool. Specific heat exchanger performance will be evaluated for future trending.
	Tube Side			
	Flow	1,500,000 lb/h		
	Inlet Temperatures	130°F		
	Outlet Temperature	111.7°F		
	Shell Side			
	Flow	2,000,000 lb/h		
	Inlet Temperature	90°F		
	Outlet Temperature	103.5°F		
	Heat Transfer	27,500,000 Btu/h		
Tech Spec 3.8 Basis	The shutdown cooling pump is used to maintain a uniform boron concentration.		SOP 3 requires a minimum of 3000 gpm from a LPSI pump before a Primary Coolant Pump may be shut off.	None
	Periodic checks of refueling water boron concentration ensure the proper shutdown margin.		DWC 2 verifies boron concentration at least twice per 7 days.	None
SOP 3 7.3	Shutdown Cooling		Operations are conducted per steps of the SOP.	None
ONP 17 4.3.0	Shutdown cooling using a HPSI pump upon loss of normal shutdown cooling.		None	The ability to use HPSI pumps for shutdown cooling is not periodically tested. HPSI is a "last resort" alternative for shutdown cooling. Containment Spray Pumps and Spent Fuel Pool Cooling are priority backups available to the operator in case of loss of a normal shutdown cooling. Also because of

SHUTDOWN COOLING SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
ONP 17 4.3.a Cont'd			Low Temperature Over-pressure Protection concerns, the risk of using HPSI for Shutdown Cooling (Solid Plant) may outweigh the benefit of routine testing. This Off Normal Procedure will be reviewed and modified if necessary with respect to this concern.
ONP 17 4.3.b	Shutdown Cooling using Spent Fuel Pool Cooling System upon loss of normal shutdown cooling.	None	The ability to use Spent Fuel Pool Cooling for shutdown cooling is not periodically tested. This evolution requires the Rx Head to be removed and the Rx Cavity full and refueling gates open. This will be verified during the next refout.
ONP 25.2	Shutdown Cooling from outside the Control Room.	PAC X-OPS279 verifies operability of selected shutdown cooling valves from C-33 panel. This exercises all the active components required to enter shutdown cooling from outside the control room.	None
MCTF ESS-22	MO-3015, MO-3016 Shutdown Cooling Inlet Isolation Valves. Test stroke time after repacking.	Both valves stroke tested satisfactorily after implementing live load packing on WO's 2460 5077, 2460 2037.	None
Work Order History	A review of Work Order history revealed approximately 22 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were postmaintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 14 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were postmaintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage. Modifications are addressed in the LPSI section.		None

PRIMARY COOLANT SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 4.2.2	The following design cyclic transients were used in the fatigue analysis required by the applicable code:	The indicated transients are recorded in the Reactor Engineer's limited cycle record log.	The following PCS transients are not logged:
	500 heatup and cooldown cycles during the system 40-year design life at a heating and cooling rate of 100°F/h. The pressurizer is designed for a cooldown rate of 200°F/h.	Logged	
	10 cycles of hydrostatic testing the primary system at 3,110 psig and at a temperature at least 60°F above the Nil Ductility Transition Temperature (NDTT) of the component having the highest NDTT.	Logged	
	320 cycles of leak testing at 2,485 psig and at a temperature at least 60°F greater than the NDTT of the component having the highest NDTT.	Logged	
	500 reactor trips from 100% power.	Logged	
	15,000 power change cycles over the range of 10% to 100% of full load with a ramp load change of 5% of full load per minute increasing or decreasing.		15,000 cycles over 40 year life of plant translates to ~1 cycle/day. This is logically not a concern.
	15,000 power changes cycles over the range of 50% to 100% of full load with a ramp load change of 15% of full load per minute.		15,000 cycles over 40 year life of plant translate to ~1 cycle/day. This is logically not a concern.
	15,000 cycles of 10% of full load step power and increasing from 10% to 90% of full power and decreasing from 100% to 20% of full power.		15,000 cycles over 40 year life of plant translate to ~1 cycle/day. This is logically not a concern.
	350,000 cycles of normal operating pressure variations of ± 50 psi at operating pressure.		350,000 cycles over 40 year life of plant translate to ~1 cycle/hr. This is logically not a concern.
	The following abnormal transients were also considered: 200 cycles of loss of turbine load from 100% power.	The indicated transients are recorded in the Reactor Engineer's limited cycle record log.	None

PRIMARY COOLANT SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 4.2.2 Cont'd	200 cycles of total loss of reactor coolant flow when at 100% power.	Logged	
	2 cycles of loss of secondary system pressure.	Logged	
FSAR 4.2.3	To compensate for any increase in the NDTT shift caused by irradiation, the plant Operating Procedures for the pressure-temperature relationship during heatup and cooldown will be periodically revised to stay within the stress limits.	Plant Operating Procedures are periodically revised to account for vessel irradiation. Last revision 11/20/85.	None
FSAR 4.3.1 4.3.7 4.3.9.4	Overpressure protection is provided by three ASME Code spring-loaded safety valves connected to the top of the pressurizer.	RV-1039, 1040, 1041 are installed and checked by RM-41.	None
FSAR 4.3.3	A reactor internals vibration monitoring surveillance program has been instituted to ensure reactor vessel internals integrity. Refer to the Technical Specifications.	None	Amendment 91 to our Tech Specs date 9/5/85 deleted this requirement. The FSAR will be changed to correct this statement.
FSAR 4.3.4	Overpressure protection for the shell side of the steam generators and the main steam line piping up to the inlet of the turbine stop valve is provided by 24 safety valves.	Twenty-four safety valves are installed on the main steam lines upstream of MSIV's and are tested by RM-29.	None
FSAR 4.3.4	Cyclic transients for each steam generator are considered for the following accident conditions:	The indicated transients are recorded in the Reactor Engineer's limited cycle record log.	The following steam generator transients are not logged.
	8 cycles during which the primary side is at 2,500 psia and 600°F while the secondary side is depressurized to atmospheric pressure.	Logged	
	One cycle during which the steam on the shell side is at 900 psia and 532°F while tube (primary) side is depressurized to atmospheric pressure.	Logged	
	10 cycles of hydrostatic testing of the secondary side at 1,250 psia.	Logged	

PRIMARY COOLANT SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 4.3.4 Cont'd	320 cycles of leak testing of the secondary side at 1,000 psia.	Logged	
	8 cycles of adding a maximum of 300 gpm of 70°F feedwater with the steam generator secondary side dry and at 600°F.	Logged	
	2400 cycles of transient pressure differentials of 85 psi across the primary head divider plate due to starting and stopping the primary coolant pumps.	None	2400 cycles in 40 years translates to ∿1 starting of primary coolant pumps per week. This is not a concern.
	5,000 cycle of adding 426 gpm of 70°F feedwater with the Plant in hot standy conditions.	None	5,000 cycles over the 40 year life of the plant translates to 125 cycles per year, or ∿1 cycle every 3 days. This is logically not a concern.
FSAR 4.3.4.1	An inservice inspection program has been instituted under Technical Specifications to assure continued integrity of the steam generator tubes.	RT-60 inspection program for steam generator tubing is performed.	None
FSAR 4.3.7	Pressurizer heater controls de-energize all heaters on receipt of a Safety Injection Signal (SIS) and remain de-energized until SIS is reset.	None	This feature has been deleted during the 1986 Maintenance Outage per FC-683. The FSAR will be changed to correct this statement.
FSAR 4.3.7	In the event of a loss of offsite power, one half of the heater capacity (750 kW) is normally connected to the 1D emergency bus and can be manually controlled via a hand switch in the Control Room	Half the heaters are normally on the 1D bus and heater controls exist in the main control room. No special testing is done since this is a normal condition.	None
FSAR 4.3.7	Should the other half of the heater capacity be needed, methods and procedures have been established for manually connecting them to the 1C emergency bus via a "jumper cable." The amount of time required to make this connection is less than five hours.	Plant Procedure ONP 2.1 and ONP 25.2 lists steps to establish this capability.	None

PRIMARY COOLANT SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 4.3.7 4.3.9.3	If an abnormal incident results in pressurizer pressure rise which exceeds the relieving capacity of the pressurizer spray, this pressure will open two power-operated relief valves (note that these valves are currently isolated from the Primary Coolant System during normal power operations and therefore not available for automatic pressure relief) and trip the reactor. The relief valves are opened as a secondary action to a reactor trip. Since no credit has been taken for the relief capacity of these valves in Chapter 14, "Safety Analysis," the plant is permitted to operate at full pressure and temperature with the PORV isolation valves closed.	MI-02 calibrates the pressurizer pressure reactor trip setpoint.	The FSAR will be clarified, since the PORV block valves are closed during normal plant operation.
FSAR 4.3.9.1 4.3.9.3	Acoustical monitors and associated electronics for the power-operated relief valves and the safety relief valves provide positive valve position indication in the Control Room should they ever actuate.	Acoustical monitors exist for each PORV and safety relief in the Control Room and are checked by RI-77.	None
FSAR 4.3.9.2	The flow rate established through the spray valves must provide acceptable pressure response during transients. The pressurizer spray line and valves are sized to allow sufficient spray to prevent high steam pressure from opening the safety valves during normal transients.	Normal pressure control during plant operation verifies spray flow.	The accident analysis assumes less than 280 gpm spray flow. This will be verified during start-up. (#35)
FSAR 4.3.9.3	The PORV's are actuated by the high primary system pressure reactor trip signal. (Note that the block valves are shut during normal operations.)	MI-02 calibrates the high pressure reactor trip.	We do not perform periodic tests of the PORV or their block valves but our EOPs take credit for this operation. We do test the valves in MO-27 for low pressure protection however this does not ensure they will open when subjected to accident pressures. The PORV's are tested for low pressure protection via MO-27. They have not been tested at system differential pressures required for the feed and bleed success path for controlling the high PCS pressure. Prior to the end of the next Refout, new certified PORV block

PRIMARY COOLANT SYSTEM

Source	System Test Requirements		Test Performed	Exceptions/Justifications
FSAR 4.3.9.3 Cont'd				valves will be installed. Also, either certified PORVs will be installed or the PORV's will be removed and tested at feed and bleed pressures.
FSAR 4.3.9.3	The PORV's and their block valves would be used if a feed and bleed type operation was required to cool the Primary Coolant System in an emergency shutdown situation.		Plant Emergency Operating Procedures address this cooling path.	Same as above item
FSAR 4.3.13	Sampling system lines are provided from the primary coolant piping to provide a means for taking periodic samples of the coolant for chemical analysis. The water chemistry is maintained as indicated.			None
	PRIMARY COOLANT CHEMISTRY		Chemistry samples are taken and analyzed per the following procedures to ensure acceptable values.	
	Specific Resistivity, Prior to Additives	0.5 Megohm - cm	COP-1	
	Total Solids, Other Than Additives	< 0.5 ppm	COP-1	
	pH (Normal Operation and Cold Shutdown)	4.5 to 10.2	COP-1	
	Hydrogen (Normal Operation)	15-50 cm^3 (STP) per kg	COP-1	
	Chloride (Normal Operation)	< 0.10 ppm	DWC-2	
	Lithium (Normal Operation)	0.1-2.0 ppm	COP-1	
	Fluoride (Normal Operation)	< 0.1 ppm	DWC-2	
	Dissolved Oxygen (Normal Operation)	< 0.1 ppm	DWC-2	
	Boric Acid, Plant Cold (Maximum, Nominal) (a)	(15,000 ppm; 2,280-9,800 ppm)	DWC-2	
	Boric Acid, Plant Hot (Maximum, Nominal) (a)	(12,000 ppm; 0-9,800 ppm)	DWC-2	
FSAR 4.5.3	The surveillance program monitors the radiation-induced changes in the mechanical and impact properties of the pressure vessel materials. A schedule for removal of the surveillance samples is shown in the Plant Technical Specifications.		T/S Table 4.3.3 provides removal schedule. /	None

PRIMARY COOLANT SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 4.5.6	An inservice inspection program is detailed in Section 6.9 of the FSAR.	RT-35 implements the required ISI program for PCS welds.	None
FSAR 4.7.1	Small leaks from the Primary Coolant System can be detected by one or a combination of the following systems:		None
	1. Containment Atmosphere Relative Humidity - Four humidity detectors.	RI-25 checks and calibrates the containment humidity instruments.	
	2. Containment Sump Level - Level alarm.	RI-68 checks and calibrates the containment sump level instruments.	
	3. Containment Area Radiation - One radiation monitor, sensing from the discharge of all operating containment air coolers.	RE-1817 monitors containment ventilation and / is checked per DWO-1 /	
	4. Reactor Vessel Flange Leak Off - The inner seal leakage goes to a closed drain line and leakage will be detected by a pressure alarm set at 1,500 psig. The outer seal liquid leakage is collected and drained to a closed drain line and will be detected by action of a level switch set at 120 inches.	LS-0160 is calibrated per PAC PCS-005.	
	5. Steam Generator Tube Leakage - Radiation detectors are provided to monitor the liquid effluent from the blowdown tank and gas effluents from the air ejector.	RE-0707 monitors S/G blowdown and is calibrated by RR-09A and checked per QR-22 and MR-14. RE-0631 monitors condenser off gas and is calibrated by RR-09D and checked per QR-22 and MR-14.	
	6. Each control rod drive mechanism face seal is equipped with a leak off and each contains a thermocouple which will activate an alarm should above-normal temperatures occur.	Control rod drive seal leak off temperatures are monitored and alarmed by TRA-0150. PAC CRD-008 calibrates recorder and verifies annunciator.	
	7. The safety and power-operated relief valves may be a potential source of contained leakage detected by temperature monitors located in the valve discharge piping. Large amounts of seat leakage would also be detected by increases in level and temperature in the pressurizer quench tank. Acoustical monitors provide positive position indication in the Control Room.	Relief valve downstream temperatures are indicated and alarmed in main control room and are checked by PAC PCS-018. Quench tank level and temperature is indicated in Control Room by PPAC PCS-005 & PCS-018 /. Acoustical monitors exist for each PORV and safety relief and are checked by RI-77.	
	8. Small leaks may also be determined by comparing charging pump and letdown flow rates and observing makeup quantities to the volume control tank.	Daily leak rate test is performed per DWO-1.	
FSAR 4.8	The Primary Coolant Gas Vent System (PCGVS) is designed to relieve steam or gas bubbles in the reactor vessel head and pressurizer areas of the Primary Coolant System.	Pressurizer and reactor head vent valves are stroke tested per QO-6. Pressure indicator is calibrated per PAC PCS-005.	None

PRIMARY COOLANT SYSTEM

Source	System Test Requirements		Test Performed	Exceptions/Justifications
FSAR 4.8 Cont'd	The system consists of a flow-limiting orifice on both the reactor vessel vent and pressurizer vent lines, solenoid valves, a pressure transmitter for pressure indication and alarm, and connecting piping.			
FSAR 4.3.9.3 7.4.2.1	The Primary Coolant System overpressurization subsystem (OPS) has been designed to provide automatic pressure relief of the Primary Coolant System whenever the conditions of low temperature (250°F or lower) and high pressure (400 psia or higher) exist concurrently.		MO-27 checks operation of PORV's and controls for low temperature overpressure control. RI-59 calibrates pressure and temperature indicators.	Specific temperatures and pressures at which relief is required varies with amount of vessel irradiation. Values will be clarified as necessary.
FSAR 7.4.2.1	Three annunciators are provided for interface of the system with the operator. The first annunciator advises the operator to arm the system when the Primary Coolant System (PCS) decreases to a temperature of 300°F as the system is cooled down from an operating condition. The second annunciator advises the operator of an approaching high-pressure condition. The third annunciator advises the operator that the pressure has increased to 400 psia and the PORV's have been opened.		MO-27 checks operation of alarms.	None
Table 4-5	Secondary Safety Valve Parameters			None
	Fluid - Saturated Steam			
	Capacity, Minimum per Valve	486,600 lb/h	Design.	
	Total Capacity	11,678,400 lb/h	24 valves times valve capacity. Design number.	
	Set Pressure			
	Eight Valves, Four per Unit	1,040 psia	Relief valves set per RM-29.	
	Eight Valves, Four per Unit	1,020 psia	Relief valves set per RM-29.	
	Eight Valves, Four per Unit	1,000 psia	Relief valves set per RM-29.	

Source	System Test Requirements		Test Performed	Exceptions/Justifications
Table 4-10	Pressurizer Safety Valve Parameters			None
	Capacity, Each	230,000 lb/h	Design.	
	Number and Set Pressure	3	Design.	
	RV-1039 RV-1040 RV-1041	2,580 psia 2,540 psia 2,500 psia	Relief valves set per RM-41.	
Table 4-14	Pressurizer Power-Operated Relief Valve Parameters			See Exception/Justification under FSAR 4.3.9.3.
	Capacity, Each	153,000 lb/h	Design.	
	Set Pressure	2,235 psia		
FSAR 4.2.1	The Primary Coolant System is designed to operate at a power level of 2,650 MWt. The present licensing limit is, however, 2,530 MWt core power plus 15 MWt for the primary coolant pump heat input for a total Primary Coolant System output of 2,545 MWt.		Heat Balance Calculation (GOP 12) is performed daily when critical per D/WO-1.	None
FSAR 4.3.2	A continuous feed and bleed operation is maintained by the Chemical and Volume Control System during normal operation.		Normal operation per SOP 2.	None
	During Plant cooldown, water is removed from the Primary Coolant System via this nozzle, circulated through the shutdown cooling heat exchangers by the low-pressure safety injection pumps where it is cooled and then injected back into the Primary Coolant System through the safety injection inlet nozzles.		Normal operation per SOP 3.	None
	Drains from the primary coolant piping to the radioactive waste disposal system are provided for draining the Primary Coolant System for maintenance operations. A connection is also provided on the quench tank for draining it to the radioactive waste disposal system following a relief valve or safety valve discharge.		Normal operation per SOP 1 and SOP 17A.	None
	Sampling system lines are provided from the primary coolant piping, the pressurizer and the quench tank to provide a means for taking periodic samples of the coolant for chemical and radiochemical analysis.		Normal operation per CH 3.1	None
	A connection to the quench tank from the nitrogen supply system is provided to supply nitrogen for the quench tank gas blanket. A pressure regulator in the supply line maintains a constant quench tank pressure.		Normal operation per SOP 1.	None

PRIMARY COOLANT SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 4.3.2 Cont'd	A connection to the quench tank spray header from the demineralized water supply is provided for adding water to the quench tank.	Normal operation per SOP 1	None
	Component cooling water is supplied to the primary coolant pumps. Any loss of component cooling water to the pumps is alarmed in the control room.	Cooling water supplied per SOP 16 and SOP 1. CCW flow alarms are calibrated per PAC CCS 006.	None
FSAR 4.3.3	Flange sealing is accomplished by a double-seal arrangement utilizing two silver-plated Ni-Cr-Fe alloy, self-energized O-rings. The space between the two rings is monitored to allow detection of any inner ring leakage.	Pressure/Level switches are calibrated per PAC PCS 005.	None
FSAR 4.3.5	The performance of the shaft seal system is monitored by pressure and temperature sensing devices in the seal system. A controlled bleedoff flow through the pump seals is maintained. The controlled bleedoff flow is collected and processed by the Chemical and Volume Control System. Any leakage past the vapor seal (the last mechanical seal) is collected in the Radwaste System.	Seal pressure and temperature instruments are calibrated per PACS PCS 006 and PCS 018. Controlled bleedoff is normal operation per SOP 1. PPAC SWS-012 calibrates / controlled bleed-off flow recorders. /	None (#55) /
	Each seal is designed to accept the full operating system pressure but normally operates at one-third system pressure.	Seal pressures are monitored in the Control Room. ARP 5 requires the pump be shut down if 2 seals fail.	None
FSAR 4.3.7	A total installed capacity of pressurizer heaters (1,500 kW) is available. Heater kW output is nominal value at 460 volts.	Heater capacity is monitored in the Control Room	None
	The plant now operates with the backup heaters on continuously and the proportional heaters remaining in auto. A low-low pressurizer level signal de-energizes all heaters to prevent heater burnout.	Normal operation. /	None.
	An auxiliary spray line is provided from the charging pumps to permit pressurizer spray during Plant heatup or cooling if the primary coolant pumps are shut down.	None	Auxiliary spray is not periodically tested. This will be verified functional during start-up and periodi- / cally in the future. / (#56) /
	A small continuous flow is maintained through the spray lines when Primary Coolant Pump P50B or P50C is operating.	Normal operation.	None
FSAR 4.7.2	In the event a small leak is indicated in the Primary Coolant System immediate steps will be initiated to identify the source and nature of the leak.	ONP 23.1 addresses actions to take if a PCS leak occurs.	None

PRIMARY COOLANT SYSTEM

Source	System Test Requirements		Test Performed	Exceptions/Justifications
FSAR 4.7.2 Cont'd	The initial operator action following an indication of a leak in the Primary Coolant System is to check that the pressurizer level and the volume control tank level are being maintained. If the leakage rate exceeds the ability of the Chemical and Volume Control System to maintain pressurizer level, the reactor is taken to a hot shutdown condition and the procedures for a loss-of-coolant incident are followed.		Normal operation per SOP-1 and Tech Specs.	None
	If the leak is small and pressurizer and volume control tank levels can be maintained, the next step is to attempt to determine the leak rate. If the leak rate is greater than 1 gpm and the leak location is not known, the Plant is shut down and efforts initiated to locate the leak.		Normal operation per SOP-1 and Tech Specs.	None
Table 4-1	Licensed Core Power	2,530 MWt		None
	Operating Pump Power (Nominal)	15 MWt	Measured daily on GOP-12, Heat Bal per DWO-1 when critical.	
	Operating Thermal Power (NSSS)	2,545 MWt	Measured daily (GOP 12 Heat Balance) per D/WO-1 when critical.	
	Coolant Flow Rate(a)	127.5×10^6 lb/h	Steam generator DP instruments calibrated per RI-01.	
	Cold Leg Temperature	536°F	Determined daily per D/WO-1 if >95% power.	
	Average Temperature	559.5°F		
	Hot Leg Temperature	583°F		
	Normal Operating Pressure	2,010 psia	Normal operation.	
Table 4-6	Total Seal Assembly Leakage and Standby Operation		Controlled bleedoff is monitored in the Control Room.	None
	Three Seals Operating	1.2 gpm	PPAC SWS-012 calibrates controlled /	
	Two Seals Operating	1.47 gpm	bleedoff flow controllers. /	
	One Seal Operating	2.08 gpm		

PRIMARY COOLANT SYSTEM

Source	System Test Requirements		Test Performed	Exceptions/Justifications
Table 4-8	**PRESSURIZER PARAMETERS**			
	Normal Operating Pressure	2,010 psia	Normal operation.	
	Normal Operating Temperature	636.5°F		
	Installed Heater Capacity	1,500 kW	Heater capacity is monitored in the Control Room.	
	Spray Flow, Maximum	375 gpm	None	The accident analysis assumes <280 gpm spray flow. This is much less than this design number. This will be verified during start-up. (#35) /
	Spray Flow, Continuous	1.5 gpm		

Table 4-9

PRESSURIZER LEVEL CONTROL PROGRAM
(Zero Corresponds to Programmed Level at any Power Level)

Rising Level		Falling Level	Test Performed	Exceptions/Justifications
Hi Level Error Alarm "ON"	5.78%(15")	Hi Level Error Alarm "OFF"	Pressurizer level control is calibrated per RI-20.	None /
Open No 3 Orifice Stop Vlv Backup Heaters "ON" (Backup Signal "STOP 2 & 3 Pumps Open 2 & 3 Orifice")	4.6% (12")			
Minimum Pump Capacity 33 gpm	2.7% (7")			
Open No 2 Orifice Stop Vlv	2.3% (6")	Close No 3 Orifice Stop Vlv/ Backup Heaters "OFF"		
	.77% (2")	Close No 2 Orifice Stop Vlv		
No 1 Pump Operating at 44 gpm	(-0-)	No 1 Letdown Orifice Stop Valve Open		
Stop No 2 Pump	-.77% (-2")			
Stop No 3 Pump	-1.54% (-4")			
	-2.2% (-6")	Start No 2 Pump		
	-2.7% (-7")	Signal for Max Pump Capacity (53 gpm)		
	-3.08% (-8")	Start No 3 Pump		
Low level Error Alarm "OFF"	-5.78% (-15")	Low Level Error Alarm "ON" Backup Volume Control Signal A. Start No 2 & No 3 Pumps B. Close No 2 & No 3 Orifice Stop Valves		
	-36% (-172")	Low Low Level Alarm Trip All Heaters Close No 1 Orifice Stop Valve		

PRIMARY COOLANT SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
Tech Spec 3.1 Basis	Sufficient mixing of the primary coolant (boron) is assured if one shutdown cooling or one primary coolant pump is in operation.	SOP 3 requires shutdown cooling flow of 3,000 gpm before a PCP may be stopped.	None
	The operability of two PORVs or a PCS vent opening of greater than 1.3 square inches ensures that the PCS will be protected from pressure transients.	SHO-1 verifies that this condition exists each shift. MO-27 verifies operability of PORV.	
SOP 1 7.1/7.2/ 7.3	Operation of Primary Coolant System/Primary Coolant Pump/ Pressurizer.	Operations are performed per steps of the SOP.	None
ONP 25.2 Attach 1	Alternate pressurizer Heater Control	PAC X-OPS 304 verifies jumper is staged upon electrical penetration.	None
EOP 9.0 PC-5/HR-2 EOP 8.0	Natural Circulation Cooldown	None	Natural circulation cooldown is not periodically tested. Natural circulation has been verified for CE NSSS at other plants. Operators practice natural circulation procedures at the simulator.
Work Order History	A review of Work Order history revealed approximately 234 Work Orders completed between 11/30/85 and 5/19/86.	Work Orders were postmaintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 150 Work Orders completed between 05/19/86 and 12/15/86.	Work Orders were postmaintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-624 replaced pressurizer level instrumentation with environmentally qualified instrumentation.	Replacement equipment was preop tested as part of FC.	None
	FC-563 installed a power operated valve in series with CV-2083 (PCP controlled bleedoff).	Preop tested satisfactorily as part of FC closeout.	None
	FC-620 upgraded the valve monitoring program.	Satisfactorily tested as part of FC closeout via existing Tech Spec Surveillance Procedure RI-77	None

PRIMARY COOLANT SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
MCTF PCS-01	CV-1059 & POS-1059 Pressurizer Spray Valve. After repair and return to Hot Shutdown valve should be repetitively stroked and open/close indication verified with each stroke.	Was performed during startup and several times thereafter on a weekly basis.	None
	Calibrate positioners and E/P's for both CV-1057 & CV-1059.	Instrumentation for both valves was calibrated.	None
	Prepare, review and perform a post maintenance test for CV-1057 & 1059.	Post maintenance test was prepared for both pressurizer spray valves. To be tested during start-up.	None
MCTF PCS-04	EC-32 NSS Panel TE-1902 & Solenoid Valves SV-1916, SV-1917 - checkout	Valves and temperature element verified operable by Work Orders.	None
MCTF PCS-05	PCP Motor Lube Oil Lift Systems. Ensure proper pressures, flows and backstop low flow alarm concerns are resolved.	Ran all eight lift pumps and manually rotated motor and pump shafts to ensure lift system pressures and flows were proper. Upon starting each lift pump the appropriate backstop pump started as verified by alarm clearing in Control Room.	None
MCTF PCS-06	TR-0111/TR-0121 Primary loop measurement channels 1 & 2 Reactor Regulating Recorder. Perform PACS (PCS-I-38) for calibration.	Recorders were checked out and calibrated by Work Order.	None
MCTF PCS-09	PIA-0102A Pressurizer pressure S.I. "A" channel - input/output. Test PIA-0102A to identify aged or defective internal components. Perform loop calibration.	Performed calibration after repairs and performed tech spec test MI-2A to verify loop calibration.	None
MCTF PCS-13	Pressurizer Heater Breakers. Verify all pressurizer heater breakers are operational.	All heaters verified operable.	None
MCTF PCS-14	PRV-1067, 1068, 1069, 1070, 1071, 1072 Stroke all PRV's for reactor head vent and demonstrate proper open/close indication. Perform leak test.	Test T-210 was utilized to perform leak test and determine operability.	None
MCTF PCS-17	Pressurizer Block Valves MO-1043A and MO-1042A. Quantify leakage through valves.	Test T-212 was performed and quantified leakage of each valve to be approximately .2 gpm.	None
MCTF PCS-18	P-50B Primary Coolant Pump. Upon startup, perform vibration analysis to determine accuracy of installed pump vibration monitoring equipment and independent measurement of pump vibration.	Vibration testing will be performed upon pump start-up.	None

REACTOR REGULATING SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 7.5.11	Control rod motion is used for short-term regulation. Sequential insertion or withdrawal of the control rods in the regulating groups is used for normal power regulation in both manual and automatic modes of operation.	Control rod motion is controlled per SOP-6.	Automatic rod motion is not used and is therefore not tested.
FSAR 7.5.2.1	A temperature programmer establishes desired primary coolant temperature (T_{ref}) based on a power reference signal from first-stage turbine pressure. T_{ref} is subtracted from actual loop T_{avg}. This difference signal is monitored by a T_{avg} - T_{ref} deviation alarm.	T_{avg} - T_{ref} deviation alarm is verified per RO-19. Temperature indication/ calculation loops are calibrated per PAC PCS-017.	None
	T_{avg} signal is used for the pressurizer level set point programmer and steam dump controller. Difference between the individual loop T_{avg} signals are monitored and alarmed by a deviation alarm unit.	Deviation alarms are checked per RO-19 T_{avg} signal is checked per PAC PCS-107.	None
	The shutdown control rods may be moved in the manual control mode only with either individual control rod or individual group movement. A selector switch prevents withdrawal of more than one shutdown group at any time. The shutdown groups must be withdrawn above the lower limit of their exercise band before regulating group withdrawal is possible. The upper 10 inches of shutdown group control rod travel is designated as the exercise band and is provided so the shutdown control rods may be exercised while the reactor is at power. An interlock from the primary control rod position indication system prevents the shutdown groups from being driven down more than 10 inches unless the regulating control rods are fully inserted.	Interlock alarms are checked per RO-21 / Rod motion is verified per SOP-6 on each start-up. RO-22 verifies individual rod motion.	None
	Regulating control rods may be moved in manual or automatic control with sequential group movement. Individual and groups of control rods may be moved in manual control.	Rod motion is conducted per SOP-6 on each start-up. /	None
	All control rods will be prevented from being withdrawn if either a high power or high power rate-of-change pretrip condition exists.	Interlocks are verified per RO-21.	None
	The part-length control rods may be moved manually either individually or as a group. A selector switch prevents simultaneous manual movement of the part-length and any other control rods.	Rod motion is conducted per SOP-6 on each start-up.	None

REACTOR REGULATING SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 7.5.2.1	The part-length control rods are completely withdrawn from the core during power operation.	Part-length rods are withdrawn each start-up per GOP-3 and SOP-6.	None
SOP-6 7.1 thru 7.13	Operation of control rods.	Evolutions are conducted per steps of the SOP.	None
EOP 9.0 RC-4	Control rod drive down after failure to trip.	None	This is an emergency condition which can only be performed on a stuck rod and is not testable.
Work Order History	A review of Work Order history revealed approximately 2 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order	A review of Work Order history revealed approximately 3 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since 1985 Refueling Outage. No modifications were performed on this system.	None	None

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.2.2	A trip signal from any two out of four protective channels causes a reactor trip.	MO-03 tests logic matrices and trip contacts	None
	Open circuit, or loss of power supply of the channel logic, initiates an alarm and channel trip.	Design feature of RPS system. Testing is not required to verify trips from open circuit or loss of power supply due to the fact that both conditions duplicate normal trip function, ie open contact for trip. MO-03, MI-1, MI-2, MI-2A, MI-5 & R.I. Tech Spec test and calibrations verify Rx trip signlas by making contact logic open/or relays de-energize by removing voltage or bucking process signals until actuation.	Testing is not required to verify that an open circuit or loss of power supply initiates an alarm and channel trip. Any time a channel is removed from service for testing a trip function this function is indicated via alarm. Also, the alarm function is not important for safe plant operation. The alarm indicates the channel is tripped. It is important to reliable plant operation.
	The manual trip is totally independent of the automatic trip system.	CL-36 tests both manual trip push buttons.	None
	Trip signals are preceded by alarms where the operator could avert a reactor trip.	MI-01, MI-02, MI-02A and MI-05 calibrates alarm and trip set points. Verifies control room alarms and annunciators function.	None
FSAR 7.2.3.2	Reactor trips are initiated when the reactor core power level exceeds a nominal value of 106.5% of indicated full power. Provisions have been made to select different trip points for various combinations of primary coolant pump operation.	MI-01 calibrates overpower alarm and trip set points.	None
	The power range channels range change switch increases the gain of the channel by a factor of 10, providing a full-scale power indication at 12.5% full power. This also decreases the overpower trip from 106.5% to 10.65%.	CL-35 verifies functioning or sensitivity switch.	None
	Pre-trip alarms at 10.4% or 104% of indicated full power depending upon range switch. Pre-trip alarms provide annunication in addition to rod withdrawal prohibit signals.	MI-01 calibrates overpower alarm and trip set points. RO-21 verifies AWP and RWP interlocks. /	None

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.2.3.2	Neutron flux at the out-of-core detectors for a given reactor power level is affected by control rod position, radial core power distribution, and average coolant temperature. These effects are compensated for by performing periodic plant heat balances and adjusting the calibration of the power range channels accordingly. An alarm indicates when power based on steam generator ΔT measurement is different than that based upon neutron monitoring.	DWO-01 calibrates power range safety channels. RI-23 verifies ΔT nuclear deviation alarm set point.	None
FSAR 7.2.3.3	Low flow trip points and the overpower trip points are simultaneously changed by a manual switch to the allowable values for the selected pump condition.	RI-1 checks coupling of Pwr/Flow trip. This feature is not utilized. We only run with four coolant pumps.	Since we can only run with 4 PCS coolant pumps this may not be significant. The plant does not presently allow operation with less than 4 pumps running. The plant will trip if a PCP is tripped. Therefore the testing of the trip setpoints with less than four pumps operating is not required. The FSAR will be changed to clarify this function.

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.2.3.4	Pre-trip alarms are initiated if the coolant flow approaches minimum required for corresponding power level.	MI-02 checks alarm set point. RI-01 checks coupling.	Since we can only run with 4 PCS coolant pumps this may not be significant. The plant does not presently allow operation with less than 4 pumps running. The plant will trip if a PCP is tripped. Therefore the testing of the trip setpoints with less than four pumps operating is not required. The FSAR will be changed to clarify this function.
	A key-operated bypass switch ("Zero Power Mode Bypass" switch) allows this trip to be bypassed. Bypass is automatically reset above 10^{-4}% full power.	GCL 2 documents removal of keys from switches. GCL 3 documents removal of bypass.	None
FSAR 7.2.3.4	A reactor trip is initiated by two out of four coincidence logic from the four independent measuring channels if the pressurizer pressure exceeds a preset pressure (≧ 2,255 psia).	MO-03 tests logic matrices. MI-02 calibrates trip set point.	None
	Pre-trip alarms are initiated if the pressurizer pressure exceeds a preset pressure (2,205 psia).	MI-02 calibrates alarm set point.	None
FSAR 7.2.3.5	The variable thermal margin/low pressure trip set point is a calculated value.	MI-02A calibrates trip set point.	None
	TM/LP pre-trip alarms are actuated on approach to reactor trip conditions.	MI-02A calibrates alarm set point.	None
	A key-operated bypass switch ("Zero Power Mode Bypass" switch) allows TM/LP trip to be bypassed at low power level. Bypass is automatically reset above 10^{-4}% full power.	GCL 2 documents removal of keys from switches. GCL 3 documents removal of bypass.	None

REACTOR PROTECTIVE SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.2.3.7	A low steam generator water level reactor trip signal is initiated by two out of four logic from four independent downcomer level differential pressure transmitters on each steam generator. The set point is 6 feet, 0 inch below the normal water level. Pre-trip alarms are actuated for approach to reactor trip conditions.	MO-03 tests logic matrices. MI-02 calibrates trip set point. MI-02 calibrates alarm set point.	None
FSAR 7.2.3.8	Trip set point is >500 psia for low steam generator pressure trip. Four pressure transmitters on each steam generator actuate trip units are connected in a two out of four logic to initiate the reactor protective action. Signals from two of the four indicating meter relays from either steam generator close main steam isolation valves on both steam generators, main feedwater regulating and bypass valves to the applicable steam generator and the turbine stop valves. Pre-trip alarms also provided.	MI-02 calibrates trip set point. MO-03 tests logic matrix. RI-17 calibrates isolation set point and verifies logic. MI-02 calibrates alarm set point.	FSAR 7.2.3.8 states that S/G low pressure trip signal will close the turbine stop valves. This interlock does not exist. The S/G low pressure trip signal does not close the turbine stop valves. The reactor trips, which trips the turbine, which closes the turbine stop valves. This will be clarified in the FSAR.
	A key-operated bypass switch ("Zero Power Mode Bypass") allows the Rx trip unit to be bypassed. Bypass is automatically reset above 10^{-4}% full power.	GCL 2 documents removal of keys from switches. GCL 3 documents removal of bypass.	None
FSAR 7.2.3.9	Four independent containment high-pressure switches actuate trip when the containment pressure reaches 4 psig. A pre-trip alarm occurs when the containment pressure reaches 3 psig.	MO-03 tests logic matrices. MI-05 verifies trip logic. VAS 016 calibrates PIA. RI-06 calibrates pressure switches.	FSAR 7.2.3.9 states that CHP pre-trip alarm occurs at 3 psig. The actual pre-trip setpoint is 0.9 psig and MI-5 does not document the pre-trip setpoint of alarm annunication. These are calibrated every 11 months via PACS VAS-016. This PACS calibrates containment pressure indicators and was last performed on 10/21/86. The FSAR will be corrected for actual pre-trip alarm setpoint.

REACTOR PROTECTIVE SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.2.3.10	One manual trip push button interrupts the control power to the holding coils of four contactors whose contacts break ac power to the clutch power supplies. The second push button interrupts power to the undervoltage coils of two circuit breakers which disconnect all ac power to the clutch power supplies.	CL-36 (4.1) tests PB-1. CL-36 (4.2) tests PB-2.	None
FSAR 7.2.5.1	The instrument channels which supply protective action, operate channel trip units in the corresponding channel cabinet of the Reactor Protective System; each unit includes three sealed, electromagnetically actuated reed relays and associated contacts. Four units are actuated for each trip condition, eg, high primary coolant pressure. The relays in each unit are numbered one, two and three. Each relay has a single-pole, double-throw (SPDT) contact. The normally open contacts of the No 1 relays in the Channels A and B trip units are connected into a two out of two logic ladder matrix. The respective No 2 and No 3 relay contacts are similarly connected into separate logic ladder matrices. With the Channels C and D trip units arranged in a similar manner, there are a total of six independent matrices. These logic ladders are designated the AB, AC, AD, BC, BD and CD logic trips.	MO-03 tests trip logic matrices. MO-03 tests logic ladder matrices. MO-03 tests trip contacts. CL-36 (.4) tests manual trip / CL-36 (.5) tests turbine trip function./	None
FSAR 7.2.5.1	The output of each logic ladder is a logic trip set of four-sealed, electromagnetically actuated power reed relays. Each relay in these sets has a SPDT contact. The contacts from one relay of the set from each logic ladder output are placed in series with corresponding contacts from the remaining sets in each of the four trip paths. Each of these paths is the power supply line to a power trip relay which interrupts the power to the CRDM clutches. De-energizing of any one power trip relay interrupts one trip path and effects a one half trip. De-energizing any set of logic trip relays causes an interruption of all trip paths and a full trip.	MO-03 tests trip contacts.	None

REACTOR PROTECTIVE SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.2.5.2	Nuclear channel bypass is an automatic bypass. High rate-of-change is bypassed when the reactor power is below 10^{-4}% of full power or above 15% of full power. The loss-of-load trip is bypass when power is below 15% of full power. Bypassing is accomplished by contacts operated from the wide range logarithmic nuclear instrumentation channel for the high rate-of-change at 10^{-4}% and by contacts from the power range safety channel at 15% full power. A given power range channel bypasses the corresponding rate-of-change power trip channel above 15% of full power and removes the bypass for loss of load above 15% of full power. A single logarithmic channel feeds two rate-of-change of power level bypass circuits. Removal of a power range safety channel or a logarithmic channel results in removal of the bypasses associated with that channel.	CL-35 tests operation of bypass trip units.	Periodic testing is not performed to verify that removal of a power range safety channel or a logarithmic channel results in removal of nuclear channel bypasses for rate of change of change of power and loss of load trip. This circuitry is designed into the same module, so specific testing occurs anytime the channel is removed.
	Zero power mode bypass is manually initiated. This bypass is low flow, low pressure SG No 1 and 2, and TM/low pressure.	SOP-36 controls establishments and removal of ZPM bypass.	None
	This bypass is automatically removed by wide range logarithmic channel above 10^{-4}%. Each channel resets two RPS trip channels.	GCL 3 documents removal of bypass.	None
FSAR 7.2.6	Trip units are tested by inserting a voltmeter in the circuit, noting the signal level, and initiating a test input which is also indicated on the voltmeter. Test signal is provided by an external test signal generator at the input terminals. Signal is inserted into the trip unit by manual test switch.	MI-02, MI-02A, MI-05 test utilize test devices described.	None
	Sets of logic trip relays of each logic matrix are tested one at a time. Test circuits permit only one pair of relays tripped while one set can be held. Application of hold power to one set of matrix output relays denies the power source to the other sets.	MO-03 tests logic matrices.	None.
FSAR 7.2.6	Nuclear channel bypass relays can be tested as part of the norma Reactor Protective System tests by varying the wide-range logarithmic channel output above and below 10^{-4}% full power and the power range safety channel output above and below 15% full power.	CL-35 tests operation of bypass trip units.	None

REACTOR PROTECTIVE SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.2.2	When one of the four channels is taken our of service for maintenance, the protective system logic can be changed to a two-out-of-three concidence for reactor trip by bypassing the removed channel. If the bypass is not effected, the out-of-service channel assumes a tripped condition, which results in a one-out-of-three channel logic.	The change in logic by bypassing or removing a channel is indirectly tested anytime a channel is taken out of service for calibration.	None
	The RPS can be tested during reactor operation and when shutdown.	MO-3 tests the RPS during operation.	None
FSAR 7.2.3.1	A reactor trip is initiated if the rate-of-change of reactor power exceeds 2.6 decades per minute (dpm), over a range of about 10^{-4}% to 15% full power, by either of the two wide-range channels. The trip signal is automatically bypassed below 10^{-4}% and above 15% full power. Alarms for high rate-of-change of power are initiated at 1.5 dmp over the operating range of 10^{-4}% to 15% full power by the two wide-range channels.	None	Periodic testing of high rate-of-change trip and alarm is not performed. This will be tested prior to start-up and periodically in the future. / /
FSAR 7.2.3.6	A reactor trip will automatically be initiated after a turbine trip occurs. The reactor trip will be initiated when the turbine auto stop oil pressure decreases. This trip is automatically bypassed when three of four power range safety channels indicate <15% full power.	None	Periodic testing of loss of load trip is not performed. This will be verified prior to start-up and periodically in the future.
SOP-36 7.1/7.2/ 7.3/7.4	Reactor protection system operation/zero power mode bypass/ matrix logic test/clutch power trip circuit test.	Evolutions are performed per steps of the SOP.	None
EOP-9.0 RC-1	Open CRD clutch power feeder breakers./Turn "off clutch power toggle switches.	RO-20 verifies toggle switch operability. / /	None
MCTF RPS-02	TM/LP (A) PX-0102A ensure operability.	Performed Technical Specification Surveillance Procedure MI-2A "Reactor Protective Trip Units" to prove satisfactory operation of TM/LP trip circuits. Procedure was performed as part of Work Order operability.	None

REACTOR PROTECTIVE SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Work Order History	A review of Work Order history revealed approximately 22 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 4 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage. No modifications were performed on this system.		

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.1.2.1	Each pump can be started or stopped remotely from the main control room or locally at the switchgear.	MO-16 starts pumps from the Control Room. Switches exist for starting and stopping pumps from Control Room and switchgear.	Periodic testing is not performed to verify starting and stopping of pumps from local switchgear. Surveillance procedure will be modified to periodically start locally. (#5) /
FSAR 9.1.2.1	Each pump can be isolated from their common header by a hand-operated valve in the pump discharge.	Design condition.	Periodic cycling of manual or automatic valves used to isolate service water pumps, common header or critical service lines is not performed. A PACS will be developed to cycle CV-0844, 0845, 0846, 0857 and CV-1318 and 1319 in the future. Special Test (T-216) plus normal operating evolutions performed this outage cycled these valves. A PPAC was developed to test these valves. X-OPS-281 /
FSAR 9.1.2.1 9.1.3.1 Item 3 9.1.3.3	The common header contains sectionalizing valves which can be closed from the main control room if isolation of a portion of the service water supply system is required.	Control valves exist with hand-switches in main control room.	Periodic cycling of manual or automatic valves used to isolate service water pumps, common header or critical service lines is not performed. A PACS will be developed to cycle CV-0844, 0845, 0846, 0857 and CV-1318 and 1319 in the future. Special Test (T-216) plus normal operating evolutions performed this outage cycled these valves. A PPAC was developed to test these valves. X-OPS-281. /

SERVICE WATER

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.1.2.1 9.1.3.1 Item 3 9.1.3.3	Two critical service lines are joined in the auxiliary building by a double-valved crosstie. Each line has an isolation valve immediately upstream of the crosstie. These four valves permit the isolation of either critical line. Each valve is a fail open type and can be actuated remotely from the main control room or by a local handwheel.	Design condition. Control valves exist with manual operators to perform this function.	Periodic cycling of manual or automatic valves used to isolate service water pumps, common header or critical service lines is not performed. A PACS will be developed to cycle CV-0844, 0845, 0846, 0857 and CV-1318 and 1319 in the future. Special Test (T-216) plus normal operating evolutions performed this outage cycled these valves. A test was developed to test these valves. X-OPS-281. No resolution required for valve fail open comment.
FSAR 9.1.2.1	The service water discharge from equipment carrying potentially contaminated fluid is continuously monitored for radioactivity.	RIA-0833 monitors all service water discharge and is calibrated by RR-09J and checked by DWO-1.	None
FSAR 9.1.3.1 Item 4	Provisions are made to connect the fire system to the Service Water System as a partial backup.	Manual valves exist to crosstie fire and service water. ONP 6.1 addresses this capability. Valves are cycled on PAC X OPS 281.	None
FSAR 9.1.2.3 Item 3 9.1.3.1 Item 2	If plant normal and standby power sources are lost, two pump motors are automatically supplied with power from the emergency diesel generators with one pump on each diesel.	RO-8 verifies pump operation during a simulated DBA.	None

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.1.2.3	Service water through the noncritical systems is terminated by automatic closure of the noncritical header shutoff valve on a Safety Injection Signal (SIS).	Noncritical isolation is verified per RO-8, RO-12, QO-5, QO-1.	Leakage past non-critical service water isolation valves is not determined periodically. Special Test T-216 tested required critical service water flows this outage. The non-critical service water header isolation valves were closed during this test. By passing T-216, leakage to the non-critical headers was acceptable. System and pump performance testing in the future will indirectly verify acceptable isolation point leakage.
FSAR 9.1.2.3	The noncritical header automatic shutoff valve can also be actuated remotely from the main control room or by a local handwheel.	Handswitch in main control room. Valve cycled on QO-5. Local operator exists on this valve.	None
FSAR 9.1.2.3	On loss of instrument air, valves to the CCW heat exchangers fail open. Hard stops are placed on these valves to prevent them from going full open and starving other critical services. Service water is continued to all critical system heat exchangers.	Special Operating Procedure SWS-02 verifies proper setting of these valves. Valves set per T-216 during 1986 Maintenance Outage. T-216 verified flow to all critical systems.	None
FSAR 9.1.2.3	Engineered safeguards pumps seal cooling is normally provided from the Component Cooling System; however, if that system is not operable, service water can be selected from the main control room for seal cooling.	Control switches exist for these valves.	ESS pump backup service water cooling on loss of CCW is not tested periodically. Valves will be cycled prior to start-up. PACS will be generated to periodically test in the future. (#6)

SERVICE WATER

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.1.2.3 Item 1	Normal Operation - Two pressure switches are provided in the discharge of each pump connecting to the starting circuits of the remaining two pumps. If the service water pressure falls below a preset value, one of the switches initiates automatic starting.	None	No testing is performed to check the auto start of service water pumps on low discharge pressure. A test will be generated to periodically test this function in the future and prior to start-up. (#7) /
FSAR 9.1.2.3 Item 2	Shutdown Operation - Both component cooling water heat exchangers are required to be in service in order to cool the primary coolant from 300°F to 130°F in 24 hours and the supply to all non-critical equipment except the auxiliary building chiller is discontinued.	Normal plant operations including plant shutdown has both CCW heat exchangers in service. Normal plant cooldowns achieve this rate routinely.	None
FSAR 9.1.3.1	Each of the three service water pumps is capable of supplying 50% service water during normal, shutdown and post-DBA conditions.	Special Test T-216 measured flows to all loads during '86 Maintenance Outage.	None
FSAR 9.1.3.2	Each service water pump can be periodically tested for auto-start by selection of one pump for standby service and tripping of one operating pump.	None	No testing is performed to check the auto start of service water pumps on low discharge pressure. A test will be generated to periodically test this function in the future and prior to start-up. (#7) /
FSAR 9.1.3.3	All miscellaneous critical equipment connected to common discharge line is provided with block valves in the individual discharge and can be isolated if required.	These valves are not routinely cycled but normal plant operations and maintenance operate these valves periodically.	None

SERVICE WATER

SOURCE	SYSTEM TEST REQUIREMENTS		TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Table 9.1	Service Water Flows			
	Subsystem	MHA Flow - GPM		
	Critical Service Water Headers			
	Containment Air Coolers (4)	6,500	Special Test T-216 performed during 1986 Maintenance Outage measured flow to critical loads.	Some design flows to service water loads measured during Special Test T-216 did not meet Table 9.1 design requirements. Also, service water pump capacity specified in Table 9.2 was not met. These areas will require resolution. ER-86-091 addresses this.
	Component Cooling Heat Exchangers (2)	6,600		
	Engineered Safeguards Room Coolers (2)	400		
	Emergency Diesel Generators (2)	800		
	Control Room A-C Condensers (2)	25		
	Air Compressors (3)	5		
	Emergency Safeguards Pump Seals	-		
	Containment Fire Hose Reel Stations (2)	-		
Table 9.2	Service Water Pumps			
	Capacity (Each)	8,000 gpm		Some design flows to service water loads measured during Special Test T-216 did not meet Table 9.1 design requirements. Also, service water pump capacity specified in Table 9.2 was not met. These areas will require resolution. ER-86-091 address this.
	Head	140 ft	Special Test T-216 measured pump flow.	

SERVICE WATER

SOURCE	SYSTEM TEST REQUIREMENTS			TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Table 9.1	Subsystem	Normal Operation Flow - Gpm	Shutdown Cooling Flow - Gpm	None	No periodic testing is performed to verify normal flows per Table 9.1. Normal plant operations provide other parameters to monitor with attendant instrumentation and annunciation to alert operators of flow problems to components cooled by service water. Special Test T-216 verified adequate service water flows to critical loads.
	Critical Service Water Headers				
	Containment Air Coolers (4)	2,000	2,000		
	Component Cooling Heat Exchangers (2)	6,000	13,000		
	Engineered Safeguards Room Coolers (2)	-	400		
	Control Room A-C Condensers (2)	25	25		
	Air Compressors (3)	15	15		
	Non-Critical Service Water Headers				
	Auxiliary Building Chiller	125	125		
	Turbine Lube Oil Coolers	2,510	-		
	Turbine Gen EH Oil Coolers	20	-		
	Generator Hydrogen Coolers	2,610	-		
	Exciter Air Coolers	370	-		
	Generator Seal Oil Coolers	360	-		
	Isolated Phase Bus Cooler	35	-		
	FW Pumps Lube Oil Coolers and Gland Seal Condenser	120	-		
	Heater Drain Pumps Seal Cooling	50	-		
	Condensate Pumps Seal Cooling	20	-		
	Sample System Cooling Coils	15	-		
	Volume Reduction System	250	-		
	Total	14,525	15,565		

SERVICE WATER

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Surveillance Test MO-29	MO-29, Monthly valve alignment check of engineered safety systems.	MO-29	Service water valves CV-0876 and 0877 are not included in MO-29, but will be added. They are normally open passive valves which supply the diesels and CR HVAC. Other checks exist which would indicate improper valve position so no past problem exists.
SOP-15 7.1	To start/place in standby/transfer/stop service water pumps.	Normal plant operations verifies these functions.	None
SOP-15 7.2	Basket strainer operations.	Normal plant operations verifies these functions.	None
SOP-15 7.3	To start/stop service water booster pumps.	Normal plant operations verifies these functions.	None
SOP-15 7.4	Seal water supply strainers' operations.	Normal plant operations verifies these functions.	None
SOP-15 7.5	To start/stop generator seal oil cooler service water booster pump.	Normal plant operations verifies these functions.	None
SOP-15 7.6	Screen wash system operations.	Normal plant operations verifies these functions.	None
SOP-15 7.7.1	To supply cooling water to ESF pumps using service water.	None	ESF pump backup service water cooling on loss of CCW is not tested periodically. Valves will be cycled prior to start-up. PACS will be generated to periodically test in the future. (#6) /

SERVICE WATER

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-15 7.7.2	To supply AFW pump (P-8C) suction using service water.	QO-21 verifies backup water supply is available.	None
SOP-14 7.14.2	Emergency service water makeup supply using warm water recirculation pump (P-5).	Normal plant operations verifies operability of warm water recirculation pump (P-5) and its ability to supply water to the service water bay.	This will be verified prior to startup per SOP-14.
MCTF SWS-01	Identify critical service water valves with current problems and repair/replace as necessary. Rebuild actuators on: CV-1359, CV-0861, CV-0873 and CV-0864.	All valves with current problems were identified and repaired. The listed CVs were rebuilt. All valves were tested per our post-maintenance test program and declared operable.	None
MCTF SWS-02	Rebuild pump P-7C.	Pump was rebuilt and T-216 will be performed prior to start-up.	None
Work Order History	A review of Work Order history revealed approximately 83 Work Orders completed between 11/30/85 to 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 111 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since the start of the 1985 Refueling Outage.		
	FC-623 replaced position switches on several valves in the Service Water System.	Preoperational testing was performed as part of the FC closeout.	None
	FC-698 added leak-off connection to critical service water header.	NDT testing completed as part of installation.	None

CONTAINMENT ISOLATION

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.7.2.1	Manual valves which are not opened during power operation are equipped with a manual lock on each valve to insure the valve is not left open or inadvertently opened during power operation.	Containment Integrity Checklist CL 3.3 is performed to verify each valve is in proper position prior to exiting each cold shutdown condition.	None
FSAR 6.7.2.3	Each power-operated isolation valve may be opened or closed during normal plant operation by means of a hand switch in the main control room.	Control switches are located in the main control room for all power operated containment isolation valves and are stroke timed on QO-5, QO-6, QO-10 and RI-17.	None
FSAR 6.7.2.3	The containment isolation signal initiates closure of certain automatic isolation valves. This signal is derived from two out of four containment high-pressure signals (CHP) or two out of four containment high-radiation signals (CHR).	RO-11 and RO-12 verify two out of four logic and closure of associated containment isolation valves.	None
FSAR 6.7.2.3	The main steam line isolation signal initiates closure of the main steam line isolation valves and is derived from two out of four low-pressure signals from either steam generator or the containment high-pressure signals (CHP).	RI-17 verifies closure logic and time stroke the MSIV's on CHP.	RI-17 will be revised to document the feature of MSIV closure on low S/G pressure. This function will be verified prior to start-up.
FSAR 6.7.2.3	The containment spray valves can be manually opened by means of their individual hand switches located in the Control Room.	QO-10 time strokes containment spray valves from the main control room.	None
FSAR 6.7.2.3	Containment de-isolation is accomplished by a manual reset push button on each circuit when containment pressure and radiation have decreased below the isolation trip points on at least three of the four pressure and radiation sensors. In response to NUREG-0737, all automatic containment isolation valves are electrically locked closed to preclude automatic opening upon resetting of the containment isolation signal (CIS). Subsequent to resetting of CIS, the control switch for each valve will need to be moved to the "close" position and then to the "open" position to reopen the valve.	RO-11 and RO-12 check the reset of containment hi pressure and hi radiation. Electrically locked closed feature is also checked by RO-11 and RO-12.	This is not precisely true for MOIVs and CCW and CCW valves. This will be reviewed and the FSAR clarified.

CONTAINMENT ISOLATION

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.7.2.3	Instrumentation and control circuits in the Containment Isolation System are fail-safe; ie, the valves will fail closed upon the loss of voltage or control air, with the exception of the component cooling water return isolation valves. These valves are fail-open with normally de-energized solenoid valves, thereby preventing the loss of component cooling water through the primary coolant pumps' heat exchangers and lube oil coolers upon failure of the supply voltage, air supply or mechanical equipment and the resultant serious upset to the plant's operating condition and safety.	None	CCW valves from containment are air to close valves with accumulators to allow valve closure on loss of instrument air. This feature is not periodically tested. PACs being written to address. Testing will be performed prior to to start-up and periodi-. cally in the future. Also, ST and SR relays are energized to isolate. FSAR will be clarified. (#16) /
FSAR 6.7.3.2	Provisions are made for pressure testing between all isolation valves in a series arrangement enabling the verification of valve seating or check valve operation.	RO-32 checks are performed on all required containment penetrations.	None
FSAR 6.7.2.3	The containment isolation signal can be manually initiated with the test switch in the following sequence of operations: Either of two redundant switches located in the control room pushed to test position de-energizes two of four channels which will initiate containment isolation, initiate SIS and start the containment spray pumps. The spray valves will not open in test position. The containment spray valves can be manually opened by means of their individual hand switches located in the control room.	RO-11 (CHR Test) and RO-12 (CHP Test) verify operability of containment isolation system. The CHP test switches are not utilized in RO-12. The CHR test switches are used in RO-11. The containment spray valves are tested via QO-5 and QO-6.	Implied logic function is not completely true as specified in FSAR. FSAR will be clarified.
FSAR 6.7.3.2	Operation of the automatic isolation valves can be tested during power operation or while shutdown by means of push buttons located in the main control room.	RO-11 (CHR Test) and RO-12 (CHP Test) verify operability of containment isolation system. The CHP test switches are not utilized in RO-12. The CHR test switches are used in RO-11. The containment spray valves are tested via QO-5 and QO-6.	This testing cannot be be performed during power operations. The FSAR will be clarified.
CIS-01	MZ-19 personnel air locks leak test (SO-4A) after performance of PACs.	Integrity verified by performance of Tech Spec Test SO-4A.	None
CIS-02	MZ-50 escape lock leak test (SO-4B) after performance of PACS.	Integrity verified by performance of Tech Spec Test SO-4B.	None
CIS-03	Perform local leak rate test on penetrations 40, 41, 52, 64, 69 and SE electrical penetrations.	Stated penetrations were tested satisfactorily (RO-32).	None

CONTAINMENT ISOLATION

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
CIS-04	Stroke test SV-2414A, SV-2414B, SV-2412A, SV-2412B, SV-2415A, SV-2415B, SV-2413A, SV-2413B (containment hydrogen monitoring system valves) to verify position indication is proper.	Valves cycled using RO-30 and RO-11 to verify proper operation. As left testing for penetrations 21, 21A, 40A, and 40B completed (RO-32).	None
Work Order History	A review of Work Order history revealed approximately 60 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 19 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage. No modifications were performed.	None	None

CONTROL ROD DRIVE MECHANISMS

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 3.3.4.2	The total stroke of the drive is 132 inches. The speed of the drive is 46 inches per minute. For a reactor trip, the time from receiving a trip signal to 90% of the full-in position of the rod is less than 2-1/2 seconds.	RO-22 verifies control rod drop times.	Rod speed will be verified $\leq$ 46 in/min during start-up. (#34) /
	By de-energizing the magnetic clutch, the control rod drops into the reactor under the influence of gravity.	RO-22 verifies rod drop.	None
	A seal leakage collection cup is provided with a thermocouple in the seal leak-off line to monitor for cooling water or seal failure.	PAC CRD-008 calibrates seal leak-off temperature indication.	None
	Two independent position readout systems are provided for indicating the position of the control rod.	Rod positions for each rod are compared each shift per SHO-1 and calibrated each refueling per RO-19.	None
FSAR 7.6.1.3	The Plant Information Processor ("PIP") utilizes the output of a synchro geared to the control rod extension to provide a signal. Control rod position is visually displayed and is printed out on a typewriter. Position information is also used to initiate alarms under certain limiting conditions to provide contact closures for control rod sequencing and control, and to monitor for excessive control rod position deviation between individual rods within a group. The PIP is capable of measuring and recording the time for a control rod to reach bottom after the control rod clutch is released during a control rod drop test.	RO-19 calibrates rod position indication. SHO-1 checks position indication each shift. RO-21 verifies interlocks and alarms. RO-22 measures rod drop times. MO-8 compares PIP/SPI and out of sequence / margins. /	None
	The Secondary Position Indication (SPI) data processor utilizes the output of a voltage divider network controlled by a series of reed switches. Position information is supplied to a typewriter for printout. The SPI provides alarms to alert the operator to abnormal control rod control patterns.	RO-19 calibrates rod position indication. SHO-1 checks position indication each shift. MO-8 verifies control rod out-of-sequence alarm and insertion limit alarms.	None
FSAR 7.6.2.3	Should any control rods within the group deviate in position more than a preset amount from any other control rod in the group, a deviation alarm will alert the operator to this fact.	Deviation alarms for each control rod are tested every two weeks per DWO-1. MO-8 compares PIP/SPI and out of sequence / margins. /	None

CONTROL ROD DRIVE MECHANISMS

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.6.2.3	Interlocks and Limit Signals - Limit switches independent of either the primary or secondary control rod position schemes are provided within the control rod drive mechanism. These switches, which are controlled by cams on the control rod synchro shaft, provide shutdown control rod insertion limit signals and control rod upper and lower electrical limit signals.	Interlocks are tested per RO-21.	None
	Additional Control Rod Position Indication - Located on a vertical panel immediately behind the main control console, is a group of 45 light displays arranged in a shape corresponding to the control rod distribution. Each display, which represents one control rod, contains four different colored lights. These lights give individual control rod information.	Lights are continuously in view of the control operator and change in status is noted when moving control rods.	None
Work Order History	A review of Work Order history revealed approximately 60 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 21 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage. No modifications were performed on this system.	None	None
MCTF CRD-05	Test rod Number 34 bottom indication after repair.	Tested after repair per Work Order.	

MAIN FEEDWATER AND CONDENSATE SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 10.2.3.1	During Plant start-up conditions, feedwater may be recirculated from the discharge of Heaters E-6A and B back to the condenser for purposes of recycling through the condensate demineralizers for system cleanup. This path is isolated during power operation.	Checklist 12.1 verifies the feedwater recirculation path is isolated during power operation.	None
FSAR 10.2.3.3	At low power levels (less than 25% power) a single element control unit is used to control feedwater flow.	Normal plant operation verifies and provides for use of the single element control unit, i.e., steam generator water level signal input to the feed-water regulating bypass valves.	None
FSAR 10.2.3.3	In 1980, additional automatic controls were placed on the feedwater regulating and bypass valves such that they would close on receipt of a low steam generator pressure (500 psia) signal.	RI-17 tests this feature.	None
FSAR 10.2.3.3	Each feed pump turbine driver and pump must be started locally and brought up to speed before the driver can be controlled from the main control room.	SOP-12 verifies feed pump turbine driver and pump start-up and subsequent transfer of control to the main control room. /	None
FSAR 10.2.3.3	The suction and discharge pressures of the feedwater pumps are indicated and annuniciated in the main control room.	Instruments are located on panel C-01 and annunicate on panel K-01. PACS FWS-017 and HED-002 verify operability. /	None
FSAR 10.2.3.3	If the suction pressure falls (2 out of 3 logic) below a preset critical value, the pump will be automatically tripped. The turbine drivers will also be tripped from thrust bearing failure and overspeed.	The overspeed trip test was performed during the 1985/86 outage.	The 2/3 logic for the low pressure trip of the main feedwater pumps is not tested. This will be verified prior to start-up.
FSAR 10.2.3.3	Steam flow to each turbine driver is indicated and recorded in the main control room. The turbine speed is also indicated in the control room.	The instruments are located on panel C-11 and are calibrated on PACS FWS-029 / FWS-032.	None
FSAR 10.2.3.3	The turbine driver speed control system can be divorced from the feedwater regulating system and operated automatically to maintain parallel operation of each turbine driver at a manually set speed. The feedwater regulating valve system will then function to control steam generator level by automatically throttling the discharge of the feed pumps.	SOP-12 verifies this feature on start-ups/shutdowns. /	None

MAIN FEEDWATER AND CONDENSATE SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED		EXCEPTION/ JUSTIFICATION
FSAR 10.2.3.3	The speed of each turbine driver may be manually adjusted from the control room.	SOP-12 verifies this feature on start-ups/shutdowns.	/	None
FSAR 10.2.3.3	On a main turbine trip, the turbine drivers will be automatically ramped down at a rate of 1.58% per second to a speed corresponding to 5% of full load feedwater flow. At the same time, the feedwater regulating valves will be locked in place at their respective existing positions.	PACS FWS-029 verifies this function.	/	None
FSAR 7.5.1.3	In the event of low steam generator pressure less than 500 psia, the main feedwater regulating and regulating bypass valves are closed to prevent excessive flow into the steam generators. Administrative control of the bypass of the steam generator pressure signal to close these valves is facilitated by using key-operated switches to override the signal for manual take-over of the controls.	RI-17 tests the auto closure of these valves, including the override feature.		None. Although the regulating bypass valves have key switches, the main regulating valves have push button override switches. The push buttons override auto closure of regulating bypass valves, regulating valves and main steam isolation valves. The FSAR will be revised accordingly.
	The higher of the two signals provides a speed control signal to the main feedwater, turbine-driven pumps. When plant power is between 5% and 25%, feedwater is automatically controlled by a single-element controller monitoring steam generator downcomer level and positioning the feedwater regulating bypass valves. Three overrides are provided:	PACS FWS-033 and FWS-032 verifies this function.	/	None
	1. When contacts in the steam dump permissive switch are actuated on a main turbine trip, feedwater regulating control valves are maintained in the position which existed prior to the switch activation. The feedwater pumps are then ramped down in speed to obtain a linear ramp flow decrease to 5% flow in 60 seconds following the trip.	PACS FWS-029 tests this feature.	/	None
	2. When an abnormally high-steam generator level is sensed by an independent downcomer level sensor, a signal is sent to close the associated feedwater regulating control valve and a control room alarm is annunciated.	PACS FWS-027 and FWS-028 test this feature.	/	None.
	3. During low steam generator pressure less than 500 psia, the main feedwater control valves and the bypass valves are closed automatically.	RI-17 tests this feature.		None

MAIN FEEDWATER AND CONDENSATE SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.5.3.3	For power above 25% full power, conventional three-element, feedwater control is used with fail-as-is, feedwater control valves. Manual override of the automatic control is always available.	Normal plant operation verifies this feature.	None
FSAR 7.5.3.3	Accurate measurements of reactor power output use the feedwater flow instruments as a base for calorimetric calculations. These flow instruments' calibration is thus regulated by the Technical Specifications.	GOP-12 performs daily calorimetric. PACS FWS-030, FWS-002, FWS-031, and RI-24 ensures calibrated instruments.	None
SOP-11 7.4.1 7.4.2	To start/stop condensate pumps.	Normal plant start-up and shutdown verifies ability to operate condensate pumps. Pumps were run during hot shutdown testing.	None
SOP-12 7.3.1 7.3.2	To start/stop main feed water pumps.	Normal plant start-up and shutdowns verifies ability to operate main feed water pumps.	None
SOP-12 7.4.1 7.4.2	Manual and automatic feedwater control during plant start-up of feed regulation bypass valves.	Normal plant start-up and shutdown verifies manual and automatic control functions.	None
SOP-12 7.4.3 7.4.4	Manual and automatic control of main feed regulating valves.	Normal plant start-up and shutdowns verifies manual and automatic control of main feedwater controls. During plant start-up and power escalation from the 1986 Maintenance Outage, feed controls will be monitored by I&C and Operations and several deliberate pertrubations will be introduced into the control scheme to verify system response as part of post maintenance testing, following fine tuning of feed control system. Refer to MCTF observation FWS-015.	None

MAIN FEEDWATER AND CONDENSATE SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Maintenance Review	A review of completed Work Order history revealed approximately 138 Work Orders completed from start of 1985 Refueling Outage till 5/19/86.	Work Orders were completed and equipment declared operable.	None
Maintenance Review	A review of completed Work Order history revealed approximately 102 Work Orders completed from 5/19/86 to 12/15/86	Work Orders were completed and equipment declared operable.	None
Modification Review	A review of modification history was performed since the start of 1985 Refueling Outage.	None	None
Modification Review	FC-624 replaced several pieces of instrumentation with environmentally qualifed equipment.	Replacement equipment was preop tested as part of FC closeout.	None
Modification Review	FC-664 modified the main feedwater pump seal injection and seal drain system.	Preop testing was completed as part of FC closeout. We will continue to monitor for water content in the oil after start-up.	None
MCTF CDS-01	Test and check out controls for CV-0710 and CV-0711.	Control systems were verified to be correct and valves tested satisfactorily during hot shutdown testing. Proper operation of CV's will be verified per SOP-12, during plant start-up.	None
MCTF CDS-01	Test and adjust controls for CV-0730 during start-up.	Control valve and actuator were rebuilt and interim testing completed. During power escalation CV-0730 will be monitored for proper operation.	PM's are being developed to clean the condenser hotwell and to disassemble/ inspect CV-0730 each Refueling Outage.
MCTF CDS-04	Insure temperature indicator/alarm is checked out and calibrated (TIA-0794 and TIA-0795).	TE-0794 and TE-0795 were replaced, calibrated and loop checked during the 1986 Maintenance Outage. PACS CDS-004 calibrates these instruments every three months.	None

MAIN FEEDWATER AND CONDENSATE SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
MCTF CDS-05	Check proper pump operation: Hotwell sample pumps (P-64A/B). Radwaste caustic injection pumps (P-100A/B).	P-64A/B were repaired and tested satisfactorily with partial condenser vacuum. They will be post maintenance tested under full condenser vacuum during start-up. P-100A was repaired and satisfactorily tested. P-100B operated well during the last plant run and will be tested when plant conditions permit. PACS CHM-004 tests P-100A/B.	None.
MCTF CDS-06	Check out CV-0733 and adjust.	CV-0733 was repaired and tested satisfactorily. PACS CDS-007 performs PMs on this valve.	None
MCTF CDS-07	Replace CV-0608 and CV-0609 positioners and insure proper operation.	New positoners were installed and calibrated. Both valves were stroke tested during 1986 Maintenance Outage and will be functionally tested during plant start-up. PACS HED-004 and FWS-001 perform PMs on these valves.	None
MCTF CDS-08	Test both P-10A and P-10B heater drain pumps for leakage.	P-10A/B were pressure tested at 100 psig satisfactorily. They will be post-maintenance tested under full pressure after power operations.	None
MCTF CDS-10	Test RV-0765, condensate pump seal relief.	RV-0765 was removed from the system, repaired, bench-tested, reinstalled and exhibited no leakage under normal condensate pump discharge pressure.	None
MCTF CDS-11	Test PCV-0764 condensate pump seal pressure control.	PCV-0764 was adjusted and tested satisfactorily under normal condensate pump discharge pressure.	None

MAIN FEEDWATER AND CONDENSATE SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
MCTF FWS-15	Verify proper feedwater control during and after plant power ascension.	During plant start-up and power escalation, feedwater controls will be monitored by I&C and Operations. Several deliberate perturbations will be introduced into the control scheme to verify system response.	None

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.10.2.1	When the level in the volume control tank reaches the high level set point, the letdown flow is automatically diverted to the liquid radwaste system. When the level in the volume control tank reaches the low-level set point, makeup water, borated to the existing concentration of the Primary Coolant System, may be automatically or manually supplied to the suction of the charging pumps.	PPAC CVC-035 calibrates volume control tank level instrumentation. Normal plant operations (SOP-2A) verifies makeup capability to the volume control tank and letdown flow diversion on high level of VCT.	None
FSAR 9.10.2.1	The Primary Coolant System may be pressure tested for leaks by means of the variable speed charging pump. The system is also provided with connections for installing a hydrostatic test pump.	RO-70F provides the mechanism to satisfy this function.	None
FSAR 9.10.2.2	The CVC automatically adjusts the volume of water in the Primary Coolant System using a signal from the level instrumentation located on the pressurizer.	RI-20 calibrates level instrumentation for the pressurizer. Normal plant operations verify operability.	None
FSAR 9.10.2.2	The volume control tank coolant level may be automatically controlled.	PPAC CVC-035 calibrates level instrumentation. SOP-2A provides instructions for makeup operations to the volume control tank.	None
FSAR 9.10.2.2	When the level in the volume control tank reaches a low-low set point, the system automatically closes the outlet valve on the tank and switches the suction of the charging pumps to the safety injection and refueling water tank.	CVC-035 calibrates volume control tank level instrumentation. CVC-024 verifies lo level switch LS-0204 operation.	Valve operation will be verified during startup.
FSAR 9.10.2.2	Gases may be vented from the volume control tank to the waste gas surge tank.	Normal plant operations (SOP-2A) verifies this function.	None

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.10.2.4	Any one of the three charging pumps can inject boron into the primary system at a rate of 460 ppm/h; whereas the increase in reactivity due to cooldown and xenon decay is equivalent to a boron reduction rate of about 160 ppm/h.		This statement does not impact safety analysis on record and is not an issue for normal cooldown. The two limiting analysis using reactivity addition rates are Main Steam Line Break (MSLB) and Steam Generator Tube Rupture (SGTR). This minimum required charging flow is the MSLB analysis and is 68 gpm. For normal cooldown, plant procedures require establishment of cold shutdown boron prior to leaving hot shutdown, so reactivity increase due to xenon decay and cooldown is not an issue. FSAR change is required to eliminate this statement. See DV 88-029 and JAM 86-038.
FSAR 9.10.2.5	The Primary Coolant System can be tested for leaks while the plant is at power by monitoring pressurizer level and charging rate.	GOP-13 provides steps necessary to conduct a daily leak rate of the PCS.	None
FSAR 9.10.2.6 Item 7 9.10.3.4	Upon a safety injection signal, the charging pumps are started and discharge concentrated boric acid into the Primary Coolant System.	RO-8 lines up charging pumps on simulated SIS. MO-20 ensures pumps can pump to PCS. CL 2.2 pumps from concentrated tanks to PCS. QO-1 starts charging pumps and boric acid pumps.	None

CVC SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.10.2.6 Item 7	The variable capacity charging pump is capable of supplying a variable output of 33-53 gpm. The fixed capacity charging pumps have a design output of 40 gpm.	MO-20 ensures P-55A 47 to 51 gpm. MO-20 ensures P-55B 35.7 to 38.8 gpm. MO-20 ensures P-55C 36.7 to 39.8 gpm. Special test T-214 verifies variable speed feature of P-55A.	The variable speed charging pump was tested and its max flowrate is 50 gpm (620 rpm @ 1385 psia PCS pressure. Special Test T-214 will be run again prior to start-up at increased speed to determine maximum flow. The safety requirement for charging pump flow is 68 gpm for two charging pumps (main steam line break analysis). See JAM 86-038. Therefore, present surveillance testing is adequate. FSAR will be changed to clarify.
FSAR 9.10.2.6 Item 8	The chemical addition tank is used to prepare chemicals for primary coolant pH and oxygen control. These chemicals are added to the suction of the charging pumps with the metering pump.	Chemistry Operating Procedure (COP-1) address PCS chemical additions.	None
FSAR 9.10.2.6 Item 10	Each of the two concentrated boric acid tanks stores enough concentrated boric acid solution to bring the reactor to a cold shutdown condition at any time during the core lifetime.	MC-11A verifies proper boron concentration. Control Room alarm on tank level less than 118" (checked on RO-16). Standing order is in place to maintain each tank ≧ 118".	None

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.10.2.6 Item 10	The tanks are heated to maintain a temperature above the saturation temp of the concentrated solution, and sampling connections are used to verify that proper concentration is maintained.	Primary AO logs concentrated boric acid tank temperature shiftly. Tank alarms on high/low temp in Control Room. MC-11A verifies boric acid concentration proper. TICA's for tank temp controls are checked by PAC CVC 043 and CVC 031.	None
FSAR 9.10.2.6 Item 11	Upon a safety injection signal, the boric acid pumps line up with the charging pumps to permit direct introduction of concentrated boric acid into the Primary Coolant System.	RO-8 verifies pumps start and flow paths established on SIS. Q01 verifies pumps start on SIS.	None
FSAR 9.10.2.6 Item 11	Each boric acid pump is capable of supplying boric acid at the maximum demand conditions. Maximum demand is assumed to be the supply required with all three charging pumps operating - 133 gpm.	MO-21 verifies pump head on minimum recirc flow. Checklist CL 2.2 verifies pumps can deliver greater than 68 gpm and is performed each cooldown.	A performance test will be completed on each boric acid pump prior to startup. The maximum required flow is 68 gpm, as defined by the MSLB analysis. CL-22 presently verifies this flow can be met each startup (actual results of past test is 79 gpm. The acceptance criteria will be modified to 68 gpm). The FSAR will be modified to clarify this requirement.
FSAR 9.10.2.6 Item 12	The boronmeter provides a signal which is scaled and applied to a recorder located in the control room.	None	The borometer and its recorder are presently not in our preventive maintenance program. This will be evaluated in the future for need for boronometer.

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.10.2.6 Item 13	The process radiation monitors RIA-0202A and B monitor the fluid from the primary coolant loop for high levels of activity which would provide an indication of failed fuel.	RR-09L calibrates RIA-0202A. DWO-1 provides daily readings of RIA.	RR 09L only checks RIA-0202A as required by tech specs. RIA-0202B is not required by Tech specs. A test will be generated periodically calibrate RIA-0202B in the future.
FSAR 9.10.3.1	During the heatup and after the steam bubble is established, the operator adjusts the pressurizer water level manually, with the intermediate pressure letdown control valves, the letdown orifice bypass control and/or the letdown orifices. The level controls of the volume control tank automatically divert the letdown flow to the waste disposal system.	Normal plant operations verify these functions on plant heat-up.	None
FSAR 9.10.3.1	The volume control tank is initially vented to the radioactive waste treatment system. After the tank is purged with nitrogen, a hydrogen atmosphere is established and the vent is secured.	Normal plant operations (SOP-2A) provides guidance and verifies these functions on each start-up.	None
FSAR 9.10.3.1	When the Primary Coolant System reaches hot standby temperature and pressure, one or both purification ion exchangers are put into service.	Normal plant operations verifies this lineup on each start-up.	None
FSAR 9.10.3.2	During Normal operation:		
	1. Level instrumentation on the pressurizer automatically controls the volume of water in the primary system by adjusting the charging rate of the variable capacity charging pump.	RI-20 calibrates pressurizer level instrumentation. Normal plant operations verifies this lineup on each startup.	None
	2. Instrumentation on the volume control tank automatically controls the level of water in the tank as described in Subsection 9.10.2.	SOP-2A provides for automatic makeup control. PPAC CVC-035 calibrates level instrumentation. NOTE: Normal operations are with the automatic makeup system disabled. The manual mode is utilized during day to day operations.	None
	3. The operator controls the hydrogen concentration and pH of the coolant as described in Subsection 9.10.2.3.	COP-1 provides direction for PCS chemistry. Normal plant operations verify adequacy of PCS hydrogen chemistry control.	None

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.10.3.2 Continued	4. The operator may compensate for changes in the reactivity of the core by controlling the concentration of boric acid in the primary coolant. He may operate in four modes.	Normal plant operations verifies these modes of control per SOP-2A. Integrated system testing on CVC during start-up will verify proper operation of dilution, boration, and blender operation, using SOP-2A.	None
	a. In the <u>dilute mode</u>, the operator preselects a quantity of primary makeup water and introduces it into the charging pump suction at at preset rate. When the selected quantity of makeup water has been added, the flow is secured upon signal from the integrating flowmeter.		
	b. In the <u>borate mode</u>, the operator preselects a quantity of concentrated boric acid and introduces it at a preset rate as described in a. above.		
	c. In the <u>manual blend mode</u>, the operator presets the flow rates of the primary makeup water and concentrated boric acid. This mode is primarily used to supply makeup to the safety injection and refueling water tank.		
	d. In the <u>automatic mode</u>, the operator presets the flow rates of the primary makeup water and concentrated boric acid to achieve the concentration present in the primary coolant. The solution is automatically blended and introduced into the charging pump suction line according to signals received from the volume control tank level program.		Normal operations are with the automatic makeup system disabled. The manual mode is used during day to day operations.

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.10.3.3	Shutdown		
	Before the plant is cooled down, the volume control tank is vented to the gaseous Radwaste System to reduce the activity and hydrogen concentration in the Primary Coolant System. The operator may also increase the letdown flow rate to accelerate degasification, ion exchange, and filtration of the primary coolant.	Normal plant operations verify operability of degasification of PCS each shutdown/cool-down, per GOP-9.	None
	Before the plant is cooled down, the operator increases the concentration of boric acid in the primary coolant to the value required to cold shutdown. This is done to assure that the reactor has an adequate shutdown margin throughout its period of cooldown. However, the operator does not insert the shutdown group of control rods until he verifies the concentration of boric acid in the primary coolant by sample analysis.	Normal plant operations verifies this function each shutdown/cooldown, per GOP-8.	None
	During cooldown, the operator uses the charging pumps to adjust and maintain the level of water in the pressurizer. Makeup water is automatically introduced at the shutdown boric acid concentration. The operator may switch the suction of the charging pumps to the safety injection and refueling water tank, or a portion of the charging flow may be used as an auxiliary spray to cool the pressurizer, when the pressure of the primary system is below that required to operate the primary coolant pumps.	Normal plant operations verifies these functions each shutdown/cooldown.	Makeup water is not automatically introduced at the shutdown boric acid concentration. Makeup to the volume control tank is normally operated in the manual, dilute or borate mode. This will be reviewed and the FSAR will be clarified.

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.10.3.3	Emergency Operations Under emergency conditions, the charging pumps are used to inject concentrated boric acid into the Primary Coolant System. Either the pressurizer level control or the safety injection signal will automatically start all charging pumps. The safety injection signal will also cause the charging pump suction to be switched from the volume control tank to the discharge of the boric acid pump.	EOPs provide proper guidance on charging pump operation to inject concentrated boric acid into the PCS. RI-20 calibrates pressurizer level instrumentation and controls. QO-1 and RO-8 verifies charging pumps auto start and suction switch to discharge of boric acid pumps on receipt of SIS. QO-5 and QO-6 time charging pump suction valves stroke.	We do not verify charging pumps start on receipt of a pressurizer low level signal. This will be verified prior to start-up and periodically in the future. FSAR needs to be clarified that all 3 charging pumps do not start by SIS. The 3rd pump starts on low level in the pressurizer.
FSAR 9.10.3.4	The safety injection signal will cause the charging pump suction to be switched from the volume control tank to the discharge of boric acid pump.	QO-05 times valves. QO-06 times valves in cold shutdown. RO-08 verifies valve cycle on SIS.	None
FSAR 9.10.3.4 9.10.4	If the boric acid supply from the boric acid pump is not available, boric acid from the concentrated boric acid tanks may be gravity fed into the charging line.	Gravity feed valves verified operable during SIS on RO-8. Checklist CL 2.2 verifies gravity feed available at 68 gpm and is performed each cooldown. QO-6 times valve in cold shutdown.	None
9.10.3.4 9.10.4	If the charging line inside the reactor containment bldg is inoperative, the charging pump discharge may be routed via the Safety Injection System to inject concentrated boric acid into the Primary Coolant System.	QO-5 times cross tie valve. SOP-2A establishes valve lineup if path is necessary. Flow path is verified frequently during maintenance shutdowns due to equipment tagouts, plus each startup via SOP 3, Attachment 4.	None
FSAR 9.10.4	The charging and boric acid pumps are powered by the diesel generators under emergency conditions. One diesel generator supplies Charging Pumps A and B and Boric Acid Pump A. The other diesel generator supplies Charging Pump C and Boric Acid Pump B.	RO-8 verifies proper electric lineup. Review of electric prints. QO-1 verifies proper channel condition.	None
FSAR 9.10.4	Additionally, Charging Pumps B and C can be powered from an alternate power supply (refer to FSAR Section 7.4 for details).	MO-20 verifies each refueling that pumps can be started on alternate power supplies. MO-20 verified alternate power supplies during hot shutdown testing period.	None

CVC SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.10.4	The boric acid pumps and the charging pumps may be controlled locally at their switchgear.	Switches exist on switchgear.	MO-20 has been revised to start the B&C charging pumps locally periodically. This was performed during Hot Shutdown Testing. The A charging pump will be started locally prior to start-up. This will also be added to the surveillance.
FSAR 9.10.4	The boric acid solution piped in heat-traced lines to preclude precipitation of the boric acid. Two independent and redundant heating systems are provided for the boric acid tanks and lines.	DWO-1 verifies piping temp greater than 155°F. EC-30A and B calibrated per PAC CVC 038.	None
FSAR 9.10.4	Low temp alarms and automatic temp controls are included in the heating systems.	EC-30A and B calibrated per PAC CVC 038. Alarms alarm in Control Room.	None
FSAR 9.10.5	During normal operation, all duplicate components of the CVC system are cycled to demonstrate operability.	Standard Operating Procedure 2A covers manual operating of the chemical and volume control system. T-224 to be performed this outage will verify proper operation of CVC system (includes letdown portion). PACS-XOPS 282 Periodic Activity (Refueling PM) verifies proper functioning and absence of pack-leaks in CVC charging and letdown stop valves. PACS CVC 042 and CVC 024 Periodic Activity (12 Months and Refueling PM) verifies set point and operability of high-temperature trips on letdown stop and ion exchanger bypass valves.	None
Tech Spec 3.2 Basis	An alternate method of boration will be to use the charging pumps directly from the SIRW storage tank.	Checklist CL 2.2 verifies SIRW tank flow greater than 68 gpm to charging pumps and is performed each cooldown.	None

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP 2A 7.1.1 7.1.2	Operation of Charging pumps from Control Room.	MO-20 individually starts and stops charging pumps. Normal heatup/ operations/cooldown routinely starts and stops charging pumps. Checked during Hot Shutdown testing period.	None
SOP 2A 7.1.3 7.1.4	To provide alternate power to P-55B (P-55C).	MO-20 verifies alternate power ability each refueling outage. Checked during Hot Shutdown testing period.	None
SOP 2A 7.1.5d	To switch charging pumps.	MO-20 shifts between operating pumps. Normal plant operation/maintenance requires frequent shifting of charging pumps. Checked during hot shutdown testing period.	None
SOP 2A 7.2	Charging Pump seal lubrication.	Normal A.O. rounds ensure seal lubrication system functioning. Checked during Hot Shutdown testing period.	None
SOP 2A 7.3.1	To stop charging and letdown.	Frequently performed to allow for maintenance on system. Special test T-224 performed during 86 maintenance outage to verify proper isolation.	None
SOP 2A 7.3.2	To start charging and letdown.	Frequently performed following maintenance on system. Special test T-224 performed during 86 maintenance outage to verify proper isolation.	None
SOP 2A 7.3.3 7.3.4	To increase/decrease charging and letdown flow.	Routinely performed during plant heatup/cooldown and for chemistry control during operation. Checked this outage during Hot Shutdown Testing period.	None

CVC SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP 2A 7.3.5	Operation with variable speed charging pump out of service.	Frequently performed during repacking maintenance on P-55A. Checked this outage during Hot Shutdown Testing period.	None
SOP 2A 7.4.1	Purging Volume Control Tank to establish, Hydrogen or Nitrogen overpressure	Routinely performed during plant heatup/cooldown. Checked this outage during Hot Shutdown Testing period.	None
SOP 2A 7.4.2	Makeup additions to the volume control tank.	Routinely checked during plt cooldowns and to makeup for PCS sampling/leakage Checked this outage during Hot Shutdown Testing period.	None
SOP 2A 7.5.1	Boration	Routinely performed prior to plant cooldown, and during scheduled power decreases for testing/maintenance.	None
SOP 2A 7.5.2	Emergency Manual Boration	Flow path verified during CL 2.2 each cold shutdown. CL 2.2 ran during this outage to verify flow path available.	None
SOP 2A 7.5.4	Dilution	Routinely performed during plant heatup and startup. Will be verified during next startup.	None
SOP 2A 7.8	To add makeup to SIRW tank.	Routinely performed to maintain level in SIRWT. Performed several times this maintenance outage.	None
SOP 2A 7.10	Recirculating concentrated Boric Acid.	Performed monthly for Pump surveillance MO21 and chemistry sample MC11A.	None
SOP 2A 7.10.3	To transfer recycled Boric Acid to concentrated Boric Acid tanks.	Routinely performed to maintain concentrated Boric Acid Tnk Levels.	None

CVC SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP 2A 7.11	To start/stop concentrated Boric Acid Pumps.	Monthly Pump surveillance MO-21 and chemistry sampling MC11A verifies pump operation.	None
SOP 2A 7.12	Charging via HPSI flow path.	Path is routinely used during maintenance outages. QO-5 ensures valves in pathway are operable.	None
SOP 2B 7.1	Purification filter operations.	Routinely performed during plant normal operations.	None
SOP 2B 7.2	Purification or deborating ion exchanger operations.	Routinely performed during plant normal operations.	None
MCTF CVC-01	Develop a test program to ensure proper operation and determine acceptable values for leakage for CK-2154, 2156.	Test instruction were written and incorporate into applicable work orders.	None
MCTF CVC-02	Test CV-2001 letdown isolation valve.	Special test T-224 performed during 86 maintenance outage tested CV-2001.	None
MCTF CVC-03	Test CV-2003, 2004, 2005 letdown orifice stop valves.	Valves were tested prior to maintenance and retested by T-224 performed during 86 maintenance outage.	None
MCTF CVC-04	Test and determine extent of leakage.	Valves were tested during 86 maintenance outage.	None
MCTF CVC-05	Inspect packing for leakage stroke test valve prior to startup CV-2009.	Special test T-224 stroke tested valve and check for packing leakage during hot shutdown testing period.	None.

CVC SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
MCTF CVC-06	Perform dynamic testing of intermediate letdown backpressure regulators and adjust this outage.	Special test T-224 was performed to adjust regulators during the hot shutdown testing period with limited success. Special Test T-224 will be performed prior to start-up to adjust regulators.	None
MCTF CVC-07	Stage and test a replacement valve as a contingency for leakage problems which may occur during startup (CV-2056).	Spare parts for rebuild of valve are on site.	None
MCTF CVC-09	Stroke test CV-2111	Special test T-224 stroke tested CV-2111 satisfactory during the hot shutdown testing period.	None
MCTF CVC-10	Test valves CV-2115, 2113	Special test T-224 stroke tested and check for packing leakage during the hot shutdown testing period.	None
MCTF CVC-11	Adjust packing and stroke to ensure proper operaton.	Adjust packing and stroke tested satisfactorily during the hot shutdown testing period.	None
MCTF CVC-12	Test CV-2130, 2136	Special test T-224 verified operation during hot shutdown testing period.	None
MCTF CVC-13	Test CV-2153, CV-2155, CV-2165	Leak testing was performed satisfactorily on those valves during the 86 maintenance outage as part of post maintenance testing.	None
MCTF CVC-16	Rebuilt and test P-56B	Pump rebuilt and MO-21 performed.	None
MCTF CVC-17	Post installation testing on letdown orifices and trim valves.	Special test T-224 verified proper operation during hot shutdown testing program.	None

CVC SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
MCTF CVC-18	Replace/Rebuilt RV-2006 following letdown testing.	RV-2006 will be rebuilt following T-224 letdown test prior to start-up.	None
MCTF CVC-21	Test P-55C discharge check for exterior leakage.	VT-2 exam was performed during hot shutdown testing period.	None
MCTF CVC-22	Test MV-2035, 2046, 2248 CVC	Valves were bench tested satisfactory during 86 maintenance outage. MV-2035 had a slight packing leak during the hot shutdown testing period. Check MV-2035 CVC packing leakage following repack during next hot shutdown.	None
MCTF CVC-24	Test MV-2106 P-55C outlet isolation.	Valve replaced and tested during 86 maintenance outage as part of post maintenance testing.	None
MCTF CVC-26	Test P-57 Hydrazine Metering Pump	Pump replaced and tested during 86 maintenance outage as part of post maintenance testing.	None
MCTF CVC-27	Test MV-2201, 2162 Primary Makeup Water.	Valves were tested leak tight when CV-2165 was removed during 86 maintenance outage.	None
Maint. Review	A total of 130 work orders have been worked since the start of the 85 refueling outage on the CVC system.	Post maintenance testing was performed satisfactorily on all work orders.	None
Maint. Review	A total of 157 work orders have been worked since the start of the 86 maintenance outage on the CVCS system.	Post-maintenance testing was performed satisfactorily on all work order.	None

CVC SYSTEM

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Modication Review	FC-690 Added test tap upstream of CV-2001 FC-693	Test tap installed and leak tested during hot shutdown testing program.	None
	FC-700 Added temporary leak collection system to P-55A CHG Pump.	Tested collection system satisfactorily during hot shutdown testing program	None
	FC-703 Added clamp to P-55A head	Tested clamp satisfactorily during hot shutdown testing program.	None
	FC-636 Added local charging flow indication.	Tested as part of FC closeout.	None
	FC-623 replaced position switches on several valves in the CVC system.	Position switches were preop tested as part of FC.	None

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 9.5.2.1	A fail-open isolation valve in series with a check valve is located in the instrument air line outside the containment building. These valves are containment isolation valves. Compressed air is required after a DBA and the valves are designed to fail-open to provide a supply of instrument air to controls inside the containment.	QO-6 stroke tests isolation valve. RO-32-65 performs local leak rate testing on this penetration.	FSAR 9.5.2.1 states instrument air is required after a DBA but system is not designed to be available following a DBA. The instrument air system was designed as a non-safety system/ The Emergency Operating Procedures are heavily dependent on the availability of instrument air, however procedural direction is provided if air is lost. A backup means of providing instrument air is available in case offsite power is lost per ONP 25.2. FSAR will be clarified.
9.5.2.1	Two banks of 2,400 psig nitrogen bottles provide limited backup of the compressed air system for operation of the Auxiliary Feedwater System valves. One bank of five bottles is headered into the instrument air system and supplies 90 psig N^2 to valves in the steam supply to the auxiliary feedwater pump turbine drive. The second bank, of three bottles, is piped to supply 90 psig N^2 to valves in the auxiliary feedwater supply piping to the steam generators.	Special Test T-187 was performed 2/26/86 and verified N^2 to Steam Supply Valves CV-0522B and PCV-0521A available and valves will cycle.	Nitrogen pressure is maintained at 60 psig vs 90 psig stated in Section 9.5.2.1 of FSAR. Also 8 nitrogen bottles are now in service to operate the AFW steam supply valve versus 5 stated in the FSAR. Special testing (T-187) verified 60 psig is adequate to operate AFW valves. FSAR will be changed to clarify this, plus the numbers of bottles available. No periodic testing is performed on the Nitrogen supply system to the AFW valves. Special Test T-187 verified 60 psig N^2 system would supply 12 hours of N^2 to PCV-0521A and CV-0522B. This function will be verified to the flow control valves supplied with backup N^2 prior to startup. A PACS will be generated to periodically test in the future.

Source	System Test Requirements	Test Performed	Exceptions/Justifications
9.5.2.3.1	The instrument air header downstream of the filters has a pressure switch which initiates the closing of a shutoff valve on the service air header in the event the instrument air pressure drops to 85 psig. In addition, low-pressure is alarmed in the Control Room.	None	We do not periodically functionally test the pressure switches downstream of the air filters which isolates service air if it drops to 85 psig - nor do we test its alarm feature. A PACS will be developed to periodically verify this function.
9.5.2.3.1	A continuous supply of 80-100 psig instrument air is supplied to hold power operated valves in positions required for operations positions and modulating valves.	Normal operations verifies the instrument air pressure in this range. The pressure is verified adequate via operator rounds.	
9.5.2.3.1	In the event of a DBA with loss of standby power, the compressor motors are shed from the normal ac bus. Subsequently, the emergency diesel generators are started and the compressors can be manually started after all engineered safeguards equipment has started to provide the air supply.	RO-8 tests this feature during a simulated DBA.	None
9.5.3.1	Each of the three air compressors in the compressed air system is rated to deliver 200 scfm and the total requirement is 195 scfm.	Normal instrument air load is approximately 180 scfm.	No periodic testing is performed to verify air compressor capacity. Additionally normal instrument air load is now ~ 180 scfm versus 195 scfm stated in the FSAR. Compressor cycle time is being trended by System Engineer, which will flag degraded compressor or system performance.

Source	System Test Requirements	Test Performed	Exceptions/Justifications
9.[illegible]	Each compressor can be tested to ensure operability with manual "on-off" switches located in the main control room (one switch for each compressor).	Design feature. Compressors are routinely operated from the Control Room.	None
9.5.3.3	During a Design Basis Accident or post-DBA condition, operation of piston-type, air-operated valves may be desired. The piston air operator requires a minimum of 70 psig to function and will become inoperable or will assume its failed position in 1.4 minutes. When the instrument air supply drops to below 90 psig, a check valve in the nitrogen supply from the high-pressure bottles opens and continues to feed auxiliary feedwater valves. The bottles are designed to supply the valves for a minimum of 12 hours. No failure of valves due to loss of instrument air precludes maintaining the plant in a safe condition.	Design condition. Special Test T-187 verified 12 hour capacity of N_2 backup.	Our backup nitrogen system is maintained at 60 psig. The adequacy of 60 psig vs 70 psig will be reviewed and the FSAR corrected. Special Test T-187 verified 60 psig N_2 system would supply 12 hours of N_2 to PCV-0521A and CV-0522B. This function will be verified to the flow control valves supplied with backup N_2 prior to startup. A PACS will be generated to periodically test in the future.
9.5.3.3	In the unlikely event a Design Basis Accident occurs simultaneously with loss of instrument air, no valve failure will limit the ability of the engineered safeguards systems. Maximum cooling is initiated to the containment air coolers upon loss of air and the containment spray header isolation valves fail open. No other air-operated valve operation is required of valves supplied from the compressed air system.	Design feature.	CCW containment isolation valves have accumulators to position valves during a DBA in response to loss of instrument air. This feature is not tested. PACS being written to address future testing. Testing will be performed prior to startup.
SOP 19 7.1/7.2 7.4/7.6	Operation of Instrument Air System/Air Compressors/Instrument Air Dryer/Instrument Air Filters.	Evolutions are performed per steps of the SOP.	None
ONP 7.1 3.3	Tie Feedwater Purity Building Air to plant air supply (open CV-1221).	Crosstie of FWP compressors to the Plant Instrument Air System is performed occasionally to allow maintenance on the in-plant compressors.	None

INSTRUMENT AIR SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
ONP 25.2 4.12	Restore Instrument Air (using LCC-13 power feed to LCC-91)	None	Alternate power feed to LCC-91 is not periodically tested. This will be tested prior to startup and periodically in the future.
EOP 9.0 MVAA-1 Oper Act 4	Cool Air Compressors with Fire Water.	This backup compressor cooling is periodically used to allow for maintenance on the SW System.	None
MCTF CAS-03	M-2 Instrument Air Dryer. Perform post-installation testing to ensure dryer is acceptable for use.	Tested and operability verified per Facility Change 684.	None
Work Order History	A review of Work Order history revealed approximately 54 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were postmaintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 59 Work Orders completed between 05/19/86 and 12/15/86.	Work orders were postmaintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since the start of 1985 Refueling Outage.		
	FC-684 replaced the instrument air dryer (M-2)	Vendor assisted operational tests completed as part of FC closeout.	None
	FC-694 installed ½" and 1" blowdown lines into instrument air system.	Leak test completed as part of Work Order closeout.	None.
	FC-640 installed filter assembly into air supply line to CV-0511.	Hot testing completed on CV-0511.	None

CONTROL ROOM HEATING AND VENTILATION

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.8.2.4 Item 2	Emergency mode of operation is actuated either by a containment high-radiation or a containment high-pressure or manually. During emergency operation, the air handling units and the charcoal filter units of both Train A and Train B operate. Condensing Units VC-10 and VC-11 are manually started by the operator. During an emergency, operation of Purge Fan V-94 and Isolation Damper D-15 and D-16 is blocked, toilet exhaust,fan in the viewing gallery is shut off, and Fan Isolation Dampers D-17 and D-18 close.	MO-33 verifies emergency flow path and flow by manually initiating Emergency Mode of operation for each train, one at a time. RO-28 verifies local and remote control of fans and dampers, filter dp acceptable, and system warning lights operable. System and filter flows are documented in both Emergency and Recirc Modes. RO-11 and RO-12 verify auto-initiation of Emergency Mode. RO-85D documents collection efficiency of filter units.	None
	Purge Mode - Smoke can be purged from the Control Room by Fan V-94. This fan is manually started by the operator, when required. When the purge fan is started (with V-95 running), Dampers D-15 and D-16 open; return Damper D-3 closes; and Dampers D-1 and D-2 open fully to bring in 12,450 ft/min outside air and prevent recirculation. When the purge fan is started (with V-96 running), Dampers D-15 and D-16 open; Damper D-10 closes; and Dampers D-8 and D-9 open.	Preoperational Test Procedure 8721-501Q completed in Spring of 1984.	This system serves a post accident function to remove smoke from the control room to allow re-entry. A PACS will be developed to peridically test the function in the future and prior to startup.
	Tornado Protection - Tornado dampers are provided in all the out-side air intakes, the purge exhaust and the toiler exhaust ducts. During tornado depressurization, the tornado dampers close to isolate the HVAC system from the outside.	Tornado dampers are a passive mechanical device. They were tested by the vendor (QAD) and verified to be installed to the manufacturer's specification in early 1984.	A PACS will be developed to periodically inspect. They will be visually inspected prior to startup.

CONTROL ROOM HEATING AND VENTILATION

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.4.5.1	In the event of isolation, all the makeup air for the Control Room is drawn through a charcoal filter such that 0.5 inch of water positive pressure design in the air recycle is provided to ensure no in-leakage of radioactivity.	RO-28 verifies proper control room pressure.	NUREG-0800 para II.3.a requires positive pressure "relative to all surrounding air spaces". The turbine building and the attached corridor constitute the surrounding air space for normal entry to the Control Room. Reviewing the different options to locate the reference point, this location was considered the best. See E-PAL-85-022. The acceptance criteria of RO-28 requires greater than 0.125 inch of water vice 0.5 inch of water. The FSAR will be changed to correct this discrepancy.
FSAR 9.8.2.4 Item 12a	A smoke detector downstream of outside air dampers in the outside duct is provided to detect smoke.	None	No testing can be found to document smoke detector operable. A PACS will be generated to periodically test the smoke detector.

CONTROL ROOM HEATING AND VENTILATION

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR Table 9-15	Design basis ambient conditions table.	NOTE: Table reviewed as a whole not only for Control Room HVAC. No specific monitoring of ambient temperature except control room inside temperature is performed.	Some design basis numbers in Table do not reflect normal plant operation. The FSAR will updated.
SOP-24 7.6.2 7.6.3	To start/secure control room ventilation.	MO-33 and RO-28 routinly starts and stops Control Room HVAC. Trains are rotated on a weekly basis per the SOP Procedure.	None
SOP-24 7.6.6 7.6.7	To purge Control Room with fresh air.	Non routine purging of Control Room is currently performed. Purging is occasionally performed to remove welding smoke.	A PACS will be developed to periodically test the purge mode and will be completed prior to startup.
SOP-24 7.6.10 7.6.11	Control Room HVAC emergency operation.	RO-11 and RO-12 verifies operation of Control Room HVAC System on A CHP or CHR condition.	None
SOP-24 7.6.12	Fire in Control Room HVAC charcoal filters.	Emergency operation which should not be routinely checked. Walk down of system shows equipment available for performance as written.	Calibration PAC's for temperature indicators addressed for SOP TE-1733, 1734, 1735, and 1736 and their alarms can not be found. This will be added to PACS for periodic checks in the future.
Accident and Transient Analysis			

CONTROL ROOM HEATING AND VENTILATION

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
MCTF	No testing proposed prior to startup.	None	None
Maintenance Review	A review of completed Work Orders from 11/30/85 to 5/19/86 revealed nine Work Orders (four preventative).	All work completed, tested and declared operable.	None
Maintenance Review	A review of completed Work Orders from 5/19/86 to 12/15/86 revealed nine Work Orders.	All work completed, tested and declared operable.	None
Modification Review.	No minor or major modifications were completed on Control Room HVAC since start of 1985 Refueling Outage.	None	None

LOW PRESSURE SAFETY INJECTION, SAFETY INJECTION TANKS, AND SAFETY INJECTION AND REFUELING WATER TANK

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.1	The borated water in the elevated safety injection tanks (SIT) is at safety injection and refueling water (SIRW) tank concentration range of 1,720 to 2,000 ppm boron; the tanks are pressurized with nitrogen to greater than 200 psig. (The tanks are maintained between 186" and 198" as required by Tech Specs.)	Shiftly verify SIT pressures and levels per SHO-1. Monthly verify boron concentration per MC-11B. Verify pressure and level instruments per RI-15A, RI-15B, and RI-15C.	None
FSAR 6.1.2.1	The SIT's are connected to the Primary Coolant System cold legs through isolation valves which are normally open and have had the electrical power removed from the valves' electrical system in order to meet the ECCS single failure criteria.	Motor operated valves are verified open during plant heatups per CL 3.9. Valves are checked electrically locked open monthly on MO-29.	None
FSAR 6.1.2.1	Two check valves prevent primary coolant from entering the tanks. Injection will occur whenever the primary system pressure falls below the combined pressure of the static waterhead plus the tank gas pressure.	Loop check valves are partially stroked on QO-8C. Loop check valves are full flow stroke test on QO-8B. SIT outlet check valves partially stroked on QO-8C. PAC-ESS-008 calibrates SI tank pressure controllers. SO-9, plus level alarms on the SITs, verify leak tightness of check valves.	The capability to provide flow from the safety injection bottles to the PCS was verified via preop test #12 by completely dumping the SI bottles. Presently, the capability to provide flow is verified quarterly while shutdown, per surveillance procedure QO-8C. This procedure partially strokes the check valves, which verifies free swing, and therefore flow capability.
FSAR 6.1.2.1	The safety injection pumps are started automatically by a safety injection signal (SIS).	RO-8 lines up pumps for a simulated safety injection. QO-1 ensures pumps start on safety injection signal. MO-23 verifies monthly pumps are operable.	None

LOW PRESSURE SAFETY INJECTION, SAFETY INJECTION TANKS, AND SAFETY INJECTION AND REFUELING WATER TANK

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.1	Flow from the low pressure safety injection pumps is ensured since the shutdown cooling heat exchanger bypass valve is normally locked open and has had the air supply removed in order to meet the ECCS single failure criteria.	CL 3.9 lines up bypass valve during plant heatup. MO-29 verifies valve lined up for SIS condition and air supply valve locked closed.	None
FSAR 6.1.2.1	The safety injection signal also opens certain valves, as shown on P&ID 203, Sheets 1 and 2.	LPSI MOV's verified open on QO-1 on safety injection signal. LPSI MOV's open on RO-8 test of safety injection.	FSAR will be clarified on P&ID numbers.
FSAR 6.1.2.1	Borated water at a minimum concentration of 1,720 ppm boron is initially pumped from the SIRW tank to the Primary Coolant System.	Boron concentration in SIRW tank verified on MC-11C. Pumps verified operable on MO-23. Flow path verified operable on MO-23. Flow path verified during RO-8, QO-1, QO-8B and QO-8C. Manual valves verified in correct position on MO-29.	The capability to provide flow from the SIRW tanks to the PCS is verified periodically. Monthly safeguards pump tests take suction from the SIRW and recirc via mini-flow lines. Quarterly and refueling tests (QO-1, QO-8B and QO-8C, plus RO-8) also verify the flow path. Containment spray pump flow testing this outage (modified QO-10) pumped greater than 1500 gpm from the SIRW tank through the pump and back to the SIRW tank. Also, shutdown cooling flow through the LPSI pumps into the PCS was tested at 3000 gpm this outage via Special Test T-225. This testing verifies the capability to provide flows from the SIRW tank to the PCS.

LOW PRESSURE SAFETY INJECTION, SAFETY INJECTION TANKS, AND SAFETY INJECTION AND REFUELING WATER TANK

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.1	The pump suction is automatically switched to the containment sump when the SIRW tank level falls to a preset point. At this time, the flow path from the containment sump is opened, the SIRW tank flow path is closed, the low-pressure safety injection pumps are stopped and water is recirculated from the sump by the high-pressure pumps.	Level sensors calibrated per RI-38. Level switch interlock verified on RI-14. Components actuate to safety position verified on QO-2. Low-pressure pumps verified stopped by QO-2	The capability to provide recirculation flow from the sump to the HPSI pumps is verified via QO-2. This procedure verifies the sump valves open and SIRW tank discharge valves close, plus the sump check valves are verified they will free swing. These tests provide verification of recirc flow capability.
FSAR 6.1.2.1	The low-pressure safety injection pumps can also be used for long-term cooling, if the primary coolant pressure is sufficiently low.	Pumps verified operable on MO-23. Valve lineup checked on MO-29.	None
Table 6.2	LPSI Pump Design Flow Rate 3,000 gpm LPSI Pump Minimum Flow 163 gpm	Pump curves verified during 1986 Maintenance Outage per Special Test T-209 and T-225. Minimum flow on recirc verified > 163 gpm on MO-23.	None
FSAR 6.1.2.2 Item 1	The SIRW tank contains a minimum of 250,000 gallons of water containing boron in the range of 1,720 ppm to 2,000 ppm.	Volume is checked shiftly per SHO-1. Boron concentration is checked on MC-11C.	None
FSAR 6.1.2.2 Item 1	During safety injection, with all injection pumps and containment spray pumps running, the tank will provide approximately 20 minutes supply of water (201,000 gallons) before the pump suction must be switched to the containment sump	Volume is checked shiftly per SHO-1. Pump operability is checked on monthly surveillance. Special Tests during 1986 Maintenance Outage verified ESS pump performance (T-209, T-225, modified QO-10).	None
FSAR 6.1.2.2 Item 1	Heating steam is provided to maintain the SIRW tank above 40°F to prevent freezing.	SIRW tank temperature is verified to be > 40°F per SHO-1.	None

LOW PRESSURE SAFETY INJECTION, SAFETY INJECTION TANKS, AND SAFETY INJECTION AND REFUELING WATER TANK

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.2 Item 2	The LPSI pump motor is capable of starting and accelerating the pump to full speed with 70% of rated voltage.		A periodic test is not performed to demonstrate that the LPSI pump motor is capable of starting and accelerating the pump to full speed at 70% of rated voltage. A review of the Class 1E motor starting requirements was performed. All subject motors were designed and procured for the capability to start and accelerate their loads with 70% of rated voltage at the terminals (see Specification E-10). It is not feasible or necessary to test this feature. Analysis of technical data is adequate to verify the function. The plant transient loading studies calculate the motor terminal voltages for the most conservative bus voltages. These studies support the motor design features by verifying all motors will start and accelerate the pumps with their minimum postualated bus voltage. The pump/motor speed

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.2 Item 2 Continued			torque curves also show there exists sufficient excess torque to accelerate the pumps with 70% of terminal voltage. These transient loading studies are periodically performed, reviewed, and updated to ensure the adequacy of the diesel generator and electrical equipment. (NOTE: The Class 1E 2400 volt buses are undervoltage protected to prevent operation at a degraded voltage condition. Setpoints are 92% of rated voltage for 6 seconds.
FSAR 6.1.2.2 Item 5	The four safety injection tanks are used to flood the core with borated water following a depressurization of the Primary Coolant System. The tanks contain borated water at a boron concentration of 1,720 ppm to 2,000 ppm. The tanks are pressurized with nitrogen to greater than 200 psig which, together with the elevation head, assures that the core is protected.	Volume of tanks verified on SHO-1. Boron concentration checked by MC-11B. Overpressure verified on SHO-1. Flow path verified by CL 3.9, MO-29, QO-8B and QO-8C.	None
FSAR 6.1.2.3 Item 3.a	The SIS starts the low-pressure injection pumps, opens the safety injection valves and closes the primary system check valve leakage paths. The rest of the system is always aligned for safety injection during power operation.	Pumps start and valves align is checked during RO-8, QO-1. Valve stroking times are verified during QO-1 and QO-5. MO-29 verifies valve lineup for safety injection	None
FSAR 6.1.2.3 Item 3.a	The safety injection tanks will discharge into the primary system when the pressure drops to approximately 240 psig.	Nitrogen overpressure is verified > 200 psi during SHO-1. The remaining 40 psig is made up in elevation head provided via plant design.	None

LOW PRESSURE SAFETY INJECTION, SAFETY INJECTION TANKS, AND SAFETY INJECTION AND REFUELING WATER TANK

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.3 Item 3.b	The RAS opens the containment sump valves, closes the SIRW tank valves, stops the low-pressure pumps and provides a permissive to manually close the valves in the pump minimum flow lines.	QO-2 verifies RAS. Valves cycle to RAS position and low-pressure pumps trip, and a close permissive is sent to the minimum flow line valves. Minimum flow lines are verified to close manually.	None
FSAR 6.1.2.3 Item 3.b	The supply valves from the SIRW tank and sump are designed to ensure at least a one-minute overlapping stroke to allow mixing and assure adequate NPSH during the transfer.	QO-2 ensures valves cycle and gives acceptance criteria. Currently the SIRW valves close in 45 seconds and the sump valves open in 35 seconds.	The acceptance criteria QO-2 may not positively demonstrate that flow from the sump and SIRW tank will overlap for a minimum of one minute following receipt of a RAS. The acceptance criteria to QO-2 will be reviewed and modified prior to startup. Clarify FSAR on this issue. /
FSAR 6.1.3.1 Item 2	The safety injection tank check valves may be tested during operation. Each safety injection tank has two check valves in series between the tank nozzle and the Primary Coolant System.	SIT check valves are tested per QO-8C for partial stroke.	None
FSAR 6.1.3.1 Item 3	Because the low-pressure safety injection line check valves provide overpressure protection from the high-pressure Safety Injection System, their proper closure is confirmed after each use of the system for shutdown cooling, per Technical Specification requirements.	SOP-3 requires check of closure each startup when shutdown cooling is removed from service.	None
FSAR 6.1.4 Item 5	Except for certain primary system instrumentation sensors, all active components which must function individually for the system's performance to meet the criteria stated for core protection can be tested during normal reactor operation.	Active components of low-pressure safety injection are tested per MO-23, QO-5.	None

LOW PRESSURE SAFETY INJECTION, SAFETY INJECTION TANKS,
AND SAFETY INJECTION AND REFUELING WATER TANK

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.2 Item 2	The LPSI pumps are provided with minimum flow protection to ensure that no damage results when starting against a closed system.	CL 3.2 locks open the mini-flow valves when securing shutdown cooling. Monthly pump surveillance test MO-23 verifies mini-flow path.	None
FSAR 6.1.2.2 Item 8	The SIRW tank temperature is indicated and alarmed for high and low temperatures in the main control room.	Temperature indication is calibrated per RI-18	Annunicator feature is not specifically checked. RI-18 will be modified to verify alarm function. The alarm will be verified prior to startup. Alarm set at 110°F. Must be changed to less than 100°F prior to startup.
FSAR 6.1.2.2 Item 8	Pressure in each safety injection header is indicated in the main control room.	PAC ESS-013 calibrates indication.	None
	Pressure between the injection check valves is indicated in the main control room. The pressure is individually controlled in each of these four injection lines.	PAC ESS-008 calibrates controllers and indicators.	None
	The pressure of each safety injection tank is indicated in the main control room. Redundant high- and low-pressure alarms are provided.	Pressure indicators and switches are calibrated per RI-15A and RI-15B.	None
	The water level in the safety injection and refueling water tank is monitored by either of two separate level indicators in the main control room. Each indicator is equipped with both high- and low-level alarms.	Level indication is calibrated per RI-38. Operation of control room annunciators is verified.	None

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.2 Item 8 Continued	Level instrumentation mounted on each safety injection tank provides indication in the main control room. Redundant high- and low-alarms on each tank are provided.	Level indicators and switches calibrated per RI-15C.	Annunicator not tested. The alarms will be tested prior to start-up and perodically in the future.
	Containment sump water level indication is provided by two level indicators in the main control room. Each level indicator and a redundant level switch actuate a redundant high-water level alarm. In 1982, pursuant to NUREG-0578, a modification was completed which added diverse and redundant Class 1E sump level transmitters. These transmitters and associated control room recorders were added to provide better assurance that Plant operators will understand plant conditions.	LIA-0359, LS-0358, and LS-0360 are calibrated per PAC ESS-001.	Annunicator is not specifically checked. The high-level alarm will be tested prior to start-up and periodically in the future.
	Water level in each engineered safeguards pump room is indicated in the main control room.	None	This will be calibrated prior to start-up and periodically in the future.
	Shutdown cooling and total low-pressure injection flow rates are measured by an orifice meter installed in the low-pressure injection header. Flow rate is indicated in the main control room. The flow element also transmits a signal to a controller which will provide automatic flow control during shutdown cooling operation.	PAC ESS-025 calibrates this instrument loop.	None
	Each of the four cold leg low-pressure injection branch lines is equipped with flowmeters which can be used to balance injection flow rates.	PAC ESS-006 calibrates flow instruments.	None
	A flowmeter installed in the safety injection test and leakage return line is used during operation tests of the Safety Injection System.	This flow meter is calibrated periodically via Maintenance Order prior to use on the monthly pump tests.	None
FSAR 6.1.2.3 Item 3.a	Motor-operated valve and system piping design are such that safety injection flow will be distributed approximately equally between the four PCS cold legs. No throttling of motor-operated valves or other operator action is required to distribute flow.	QO-8B verifies approximately equal distribution of flow.	None

LOW PRESSURE SAFETY INJECTION, SAFETY INJECTION TANKS, AND SAFETY INJECTION AND REFUELING WATER TANK

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.3 Item 3.b	After RAS, the low-pressure pumps may be manually restarted to obtain increased cooling flow when the primary coolant system pressure is reduced.	None	QO-2 verifies that LPSI pumps trip on RAS, but does not verify that the pumps can be restarted with a RAS still in. This will be verified prior to start-up.
FSAR 6.1.2.3 Item 3.b	Leaks in the engineered safeguards pump room during the recirculation mode are detected as follows: (1) Room Vent Radiation Monitor (2) Sump Water Level (3) Process Flow Instrumentation		
	Isolation will be required if the leakage is beyond the capability of the room sump pumps (50 gpm).	Room sump pumps are turned off on receipt of RAS per EOP 4.0	None
	If the event radiation releases are beyond permissible limits, the vent exhaust damper is automatically closed and the recirculation cooling units will permit continued equipment operation.	RAD monitors are calibrated per RR-09E/F, and verified operational daily per D/WO-1. QR-22 verifies automatic damper closure.	None
	If sump and/or high radiation indication is accompanied by an observable change in process flow, the appropriate valve will be closed and the alternate flow path will be activated. If this action does not stop the leakage, the affected system will be shut down or all equipment in the affected room will be shut down, minimum safeguards in the other room will be started and the suction header isolation valve for the affected room will be closed.	SOP-3, Paragraphs 7.6.2 and 7.6.3 describe room isolation steps. Valves required to perform header isolation are stroked during QO-2.	None
/	/	/	/

LOW PRESSURE SAFETY INJECTION, SAFETY INJECTION TANKS,
AND SAFETY INJECTION AND REFUELING WATER TANK

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 6.1.2.2 Item 8 Continued	To prevent highly radioactive waste from being transferred to the dirty waste drain tank and possibly beyond in a post-accident scenario, the receipt of a containment high-radiation signal will prevent auto start or stop the engineered safeguards pump rooms sump pumps if the pumps are running in the normal auto position.	RO-11 verifies pumps are off after a CHR signal.	None
Table 6-2	Design Flow Rate 3,000 gpm Design Head 350 ft Shutoff Head 410 ft Maximum Flow 4,500 gpm Head at Maximum Flow 250 ft	Special Test T-225 and T-209 verified pump capacity.	None
Tech Spec 3.3, Basis	Prior to the time the reactor is brought critical, the valving of the safety injection system must be checked for correct alignment and appropriate valves locked.	CL's 3.1, 3.2, 3.8 and 3.9 ensure the system is correctly aligned prior to critical. MO-29 checks lineup monthly.	None
SOP-3 7.2	Start/stop LPSI pump	Operations are performed per steps of the SOP.	None
SOP-3 7.4/7.5	SIRW tank operations/SI tank operations.	Operations are performed per steps of the SOP.	None
SOP-3 7.6	Engineered safeguards pump room.	Operations are performed per steps of the SOP.	None
MCTF ESS-06	CV-3031, CV-3057 (SIRW outlet isolation valves). Check valve stroke timing.	Valve stroke timing checked per Tech Spec Test QO-2.	None
MCTF ESS-17	P-67B LPSI pump decreased performance.	Performed Special Test T-225 satisfactorily after rebuild of pump.	None
MCTF ESS-21	CV-3040, CV-3044, CV-3048, and CV-3050 (N_2 supply to SI tanks). Test valves and ensure valves are leak tight.	CV-3044 and CV-3050 tested satisfactory following repair CV-3040 and CV-3048 did not leak during test.	None
Work Order History	A review or Work Orders history revealed approximately 115 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None

LOW PRESSURE SAFETY INJECTION, SAFETY INJECTION TANKS, AND SAFETY INJECTION AND REFUELING WATER TANK

SOURCE	SYSTEM REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Work Order History	A review or Work Orders history revealed approximately 92 Work Orders completed between 05/19/86 and 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-514-05 rotated MOV-3008.	Valve operability verified during QO-5.	
	FC-679 added support and funnel to nozzle of HC-23-3" (corroded SIRW tank nozzle).	No specific testing required for for installation of support and funnel. Program established to visually inspect nozzles.	
	FC-571 upgraded the SIRW tank foundation.	Extensive testing performed as part of the modification including ASME required testing on piping work, functional test on electrical work, concrete sample testing, preop testing of new heat tracing and final tank deflection testing.	None

CONTAINMENT SPRAY AND IODINE REMOVAL

Source	System Test Requirements	Test Performed	Exceptions/Justifications
6.2.1	Two of the three pumps have starting times off the emergency diesel generator of 17 and 35 seconds.	Procedure ESS-I-13 verifies sequencer start of pump timing and is performed prior to RO-8. RO-8 specifies proper sequence times for use in ESS-I-13.	ESS-I-13 is a maintenance procedure which verifies sequencer operation and pump sequence times. The test is performed on a refueling cycle. The starting times are incorrect as presently stated in the FSAR. The FSAR will be changed to reflect the proper times of 2 seconds and 20 seconds.
6.2.1	The spray lines in containment are maintained filled to elevation 735 feet to provide for rapid-spray initiation.	DWO-1 verifies weekly containment spray headers filled to greater than 735 feet. RI-98 calibrates spray header level and pressure instrumentation.	None
6.2.2.3 Item 2	The spray system is initiated by a containment high-pressure signal or remote-manual operation from the Control Room.	RO-12 verifies containment high pressure system actuation. Emergency Operating Procedure and Control Room controls exist for manually initiating spray. Spray valves are stroked per QO-10. Pumps are started per MO-19.	None
6.2.2.3 Item 2	If standby power is available, the containment high-pressure signal starts all three spray pumps and opens the isolation valves to the dual containment spray headers.	RO-12 verifies containment high-pressure system actuation.	None
6.2.2.3 Item 2	If the normal and standby AC power sources are not available, the emergency diesel generators are started and the DBA sequencers allow all three spray pumps to start.	RO-8 verifies containment spray pump starting on a simulated DBA.	None

CONTAINMENT SPRAY AND IODINE REMOVAL

Source	System Test Requirements	Test Performed	Exceptions/Justifications
6.2.2.3 Item 2	Initially, the pumps take suction from the SIRW tank. Upon reaching low tank level, continuation of containment spray is accomplished by automatic transfer of the pump suction to the containment sump. Transfer is automatically accomplished by closing The SIRW tank suction valves and opening the containment sump outlet valves. Switchover is initiated on coincident low level signals from two of the four level switches in the SIRW tank.	RI-14 verifies SIRW tank level switch logic. QO-2 verifies proper operation of valves during a simulated RAS.	RAS has been changed to 1/2 taken twice logic. FSAR will be corrected.
6.2.2.3 Item 2	Coolant from the containment sump is recirculated and cooled by component cooling water in the shutdown heat exchangers prior to discharge into the containment atmosphere.	Shutdown cooling heat exchangers are lined up when PCS is greater than 325°F for spray cooling. MO-29 verifies proper flow path available.	None
6.2.2.3 Item 2	During the recirculation phase from the containment sump, a portion of the cooled effluent from the shutdown heat exchangers may be directed to the suction of the high-pressure safety injection pumps.	Valves and Control Room switches exist and Emergency Operating Procedures direct this operation. QO-5 times the valve.	Periodic testing of subcooled recirculation water from the spray pump via the HPSI pumps is not performed. The capability to provide flow from the shutdown cooling heat exchangers to the suction of the HPSI pumps was verified initially via Pre-op #12 step D.13. A normally closed valve which is opened to allow flow is tested periodically via QO-5 (CV-3070 & CV-3071). This flow path will be verified prior to startup.
6.2.3.2	A recirculation line is provided on the discharge of each spray pump for testing purposes by recirculating water back to the SIRW tank. The recirculation line is sized to pass the minimum allowable pump flow.	MO-19 uses this recirculation line to pass minimum flow for pump head testing.	None

Source	System Test Requirements	Test Performed	Exceptions/Justifications
6.2.3.2	Minimum required spray flow to achieve the design basis is 2500 gpm. The minimum spray flow delivered is 2680 gpm.	MO-19 ensures pumps deliver proper head while on minimum recirc flow. Pump curves were verified during 1986 Maintenance Outage on a modified QO-10.	The capability to provide flow from the SIRW tank through the containment spray nozzles is verified. The following testing verifies this capability: 1. A modified QO-10 verified containment spray pump performance per its original head flow curve. This tested the pumps taking suction from the SIRW tank, pumping through the normal containment spray flowpath through the shutdown cooling heat exchangers to a 6-inch recirc line back to the SIRW tank. A pump flow of greater than 1500 gpm was seen, 1270 gpm through the 6-inch recirc path and the remaining through the mini-flow recirc. 2. Flow capability through the piping from the 6-inch recirc line to the containment spray penetration is verified by the normal QO-10 check valve test. This partially strokes these valves by pumping 70 gpm through the valves and recircing the water back to the SIRW tank. These check valves were also inspected in Aug 1985 to verify free swing.

Source	System Test Requirements	Test Performed	Exceptions/Justifications
			3. The containment isolation valves are cycled periodically using QO-5. 4. The containment spray riser header inside containment is required to be maintained at a certain level. Normal operation fills this header periodically. 5. The capability to provide flow through the riser pipe and through each spray nozzle is verified every five years via FT-03. This is an air flow test which verifies nozzle flow capacity. This combined testing verified the capability of the Containment Spray system to provide adequate flow. Plant design will not allow for a full system performance test.
Table 6-7	Containment Spray Pumps — Injection / Recirculation Capacity (each): 1,340 gpm / 1,800 gpm Head: 450 ft / 405 ft Pumps' Acceleration Time: 4 secs at 70% voltage	Pump curves were verified during 1986 Maintenance Outage with a modified QO-10 surveillance test.	A periodic test is not performed to demonstrate that the spray pump motor is capable of starting and accelerating the pump to full speed at 70% voltage in four seconds. The four-second acceleration time will be verified at normal bus voltage prior to startup.

Source	System Test Requirements	Test Performed	Exceptions/Justifications
			A review of the Class IE motor starting requirements was performed. All subject motors were designed and procured for the capability to start and accelerate their loads with 70% of rated voltage at the terminals (see Specification E-10). It is not feasible or necessary to test this feature. Analysis of technical data is adequate to verify the function. The plant transient loading studies calculate the motor terminal voltages for the most conservative bus voltages. These studies support the motor design features by verifying all motors will start and accelerate the pumps with their minimum postulated bus voltage. The pump/motor speed torque curves also show there exists sufficient excess torque to accelerate the pumps with 70% of terminal voltage. These transient loading studies are periodically performed, reviewed, and updated to ensure the adequacy of the diesel generator and electrical equipment. (note: The class IE 2400 volt buses are under voltage protected to prevent operation at a degraded voltage condition. Setpoints are 92% of rated voltage for 6 seconds).

CONTAINMENT SPRAY AND IODINE REMOVAL

Source	System Test Requirements	Test Performed	Exceptions/Justifications
Table 6-7	Shutdown Cooling Heat Exchangers		
Capacity	(Each) - 83.5 x 10^6 btu/h based on 4000 gpm of cooling water at 114°F inlet temperature and 1420 gpm of spray water at 183°F inlet temperature.	Special test T-223 verified CCW flow to shutdown heat exchanger but did not achieve 4000 gpm.	We are not able to deliver a CCW flow of 4000 gpm to each shutdown heat exchanger. T-223 did establish a lesser value. ER-86-083 addressed reduced CCW flow to the shutdown cooling heat exchanger (2500 gpm per HX). Special test T-223 set the CCW system up to provide this flow. The capability of providing 1420 gpm through the shutdown cooling heat exchangers is performed each cooldown when shutdown cooling is lined up. This, combined with the containment spray flow testing performed via QO-10, verified the capability to provide spray flow through the shutdown cooling heat exchanger (containment spray pump performance testing this outage via modified QO-10 pumped 1270 gpm via this flowpath).

CONTAINMENT SPRAY AND IODINE REMOVAL

Source	System Test Requirements	Test Performed	Exceptions/Justifications
Table 6-7	Spray Nozzles Number - 80 Nozzles per Spray Header Flow per Nozzle - 15.2 gpm Pressure Drop - 40 psi Maximum Spray Droplet Size - 1,000 microns (mean)	FT-03 air tests 160 spray nozzles.	Flow capability of the containment spray nozzles is verified on a 5-year frequency per procedure FT-03. This test verifies air flow through each nozzle. The accident analysis for containment spray system assumes a flowrate and header pressure at the inlet to the spray nozzles. This will give proper droplet size. The header pressure was derived from the pump performance curves and system design. No modifications have been performed on this piping, so the analysis is good.
6.4.2.1	An iodine removal hydrazine tank and an iodine removal makeup sodium hydroxide tank are provided with redundant tank heating and temperature controls to maintain a minimum temperature in both tanks to avoid freezing or precipitation.	Indications and alarms exist in Control Room for high/low temperature and heat tracing trouble. MO-25 verifies tank temperatures.	Alarms set points will be verified prior to startup. PACS will be written for future testing.
6.4.2.1	Redundant indicator alarm devices for level and temperature are provided as well as pressure indicator alarms.	Redundant temperature and level indication as well as pressure indications exist and are checked on PACS ESS 018, 017, 019, 086, 087, 088. MO-25 verifies temperature/ pressure and level.	Alarms set points will be verified prior to startup.
6.4.2.1	Each spray header is provided with two locked open gate valves, a normally closed power-operated valve, and two check valves.	MO-29 checks gate valves locked open. QO-10 and MO-29 check the spray valves. QO-10 test strokes the check valves.	None.
6.4.2.1	The iodine removal hydrazine tank contains 270 ± 17 gallons of 15.5 ± 0.5% by weight of hydrazine solution with a nitrogen cover gas pressure of 11.2 ± 2 psig.	MO-25 verifies proper tank level and pressure. SC-05 verifies proper concentration and level. Alarms exist in main Control Room on tank Hi/Lo level and Hi/Lo pressure. ESS-086 and ESS-088 verify level.	Alarms set points will be verified prior to startup. PACS will be written for future testing.

CONTAINMENT SPRAY AND IODINE REMOVAL

Source	System Test Requirements	Test Performed	Exceptions/Justifications
6.4.2.1	The sodium hydroxide tank provides a storage volume of 4200 ± 300 gallons of 30.0 ± 0.5% by weight sodium hydroxide solution with a nitrogen cover gas.	MO-25 verifies proper tank level. ESS-017 and ESS-087 check tank level instrument calibration. SC-05 verifies proper concentration and level. Alarms exist in main Control on tank Hi/Lo level.	Alarms set points will be verified prior to startup. PACS will be written for future testing.
6.4.2.1 6.4.2.2	Periodic samples will be taken to determine pH and necessary additions of NaOH.	Sampling is addressed in Emergency Operating Procedures.	None
6.4.2.2	Upon receipt of a containment high-presure signal, the power-operated valves in the chemical injection lines from the iodine removal hydrazine tank will be opened after a one-minute time delay.	RO-12 verifies valves open on containment high-pressure following a one-minute delay. QO-13 time strokes outlet valves.	None
6.4.2.2	Operating procedures require the operator to proceed with injection prior to the one-minute time delay if radiation levels indicate cladding failure and fission product release. If, at the end of one minute, it is determined to be a spurious signal or a secondary line break, the hydrazine injection signal will be manually overridden.	Emergency Operating Procedures address blocking hydrazine injection on a spurious signal or a main steam/feed line break.	EOPs do not address early initiation of hydrazine injection for high rad levels. The procedures will be reviewed and modified and the FSAR clarification will be made.
6.4.2.2	Injection of hydrazine will cease when the level in the iodine removal hydrazine tank reaches a point corresponding to a total of 270 gallons delivered to containment.	Design feature. Tank level of 270 gallons is ensured by MO-25 and SC-05.	None
6.4.2.2	After injection and mixing of the hydrazine is complete, the composition of the mixed solution will be maintained at a pH of approximately 7.0 by manually adding NaOH from the makeup sodium hydroxide tank into the engineered safeguards pump suction.	Emergency Procedure address sampling, and procedures exist for manually adding NaOH.	None
6.1.2.3 Item 3.b	One or more spray pumps can also be used to augment flow to the core after the pressure is reduced.	SOP 1, Step 7.2.4, uses this flow path when first starting PCPs.	EOPs do not address use of spray pumps as alternate injection pumps. Operating Procedures will be reviewed and modified as necessary to address this evaluation.
SOP 4 7.1/7-2	Containment Spray System Operations/Iodine removal injection system operations.	Operations are conducted per steps of the SOP.	None

CONTAINMENT SPRAY AND IODINE REMOVAL

Source	System Test Requirements	Test Performed	Exceptions/Justifications
MCTF ESS-08	FI-0303, FT-0302, FI-0301, FT-0301 (Containment Spray Flow indication). Perform loop check.	Performed loop checks on flow transmitters. Per PACS ESS-033 and ESS-089.	None
ESS-31	CK-3226, CK-3216 Containment Spray check valves - Pass QO-10.	QO-10 was performed and flows above minimum acceptance criteria achieved through containment spray header check valves and down stream one inch recirc line.	None
Work Order History	A review of Work Order History revealed approximately 21 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order History revealed approximately 23 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		None
	FC-419 increased pressure on T-102 and added CHP actuated solenoid valves to N^2 supply.	Facility Change was not worked after 11/30/85; however, SC 86-180 was completed to resolve some design inadequacies from FC-419.	None
	FC-686 added manual valve to containment spray pump P-54A discharge.	None	None

STATION POWER SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 8.1.2	If the turbine generator is out of service for an extended period, the generator disconnect links may be removed and Main Transformer 1 can be placed in service to supply auxiliary power through the station power transformers.	This function is routinely performed when shutdown if work is required to be performed on start-up transformers	None
FSAR 8.1.2	Cooling tower pumps, fans and lighting supplies are normally shared between 345-4.16 kV Start-up Transformers 1-1 and 1-3 with the capability of supplying total load on either transformer.	None; this is a design feature that is available should we wish to spare one of the start-up transformers.	None
FSAR 8.1.2	The non-vital instrumentation and controls are supplied from a 120 volt AC instrument bus. The instrument bus is normally supplied from one of two 480-120 volt transformers, each transformer being connected to a separate 480 volt motor control center. The transfer to the alternate source is automatic.	None	SOP-30 provides instructions for transferring power sources. This auto transfer function will be verified prior to start-up and periodically in the future.
FSAR 8.2.3	Station loads, including the safety loads, are normally supplied from the main generator through the station power transformer. On loss of the main generator there is an automatic transfer from this normal source to the immediate access offsite power circuit. The design includes provisions to test this feature during Plant operation.	Normal plant trips (<16% power) functionally test this design. This fast transfer was tested in early 1986 as part of a HFA relay replacement job.	This function will be periodically verified in the future. This is not tested during plant operation. The FSAR will be clarified.
FSAR 8.3.1.2	The capabilities of the four 4,160 volt sections are sufficient to permit plant operation under reduced load with any 4,160 volt bus out of service.	Bus 1A and 1B cannot be taken out of service because operation on PCPs is not allowed.	FSAR will be clarified.

STATION POWER SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 8.3.1.2	Normal and Shutdown Operation - Power to buses 1A and 1B during normal operation is furnished from the main generator via Station Power Transformer 1-1. During start-up or shutdown, power is furnished from the power system grid via the switchyard and Start-up Transformers 1-1 and 1-3. Buses 1F and 1G (cooling towers) are supplied from Start-up Transformers 1-1 and 1-3, respectively, during both normal and shutdown operation.	Routine operations verify this capability during each start-up and shutdown.	None
	If the standby power source is not available, power may be furnished by the main transformer backfeeding the plant auxiliary buses. This mode of operation is allowed during plant shutdown.	This function is routinely performed when shutdown or work is required on start-up transformers.	None
	After the main turbine generator is started and before 20% reactor power is reached, buses 1A and 1B are manually transferred from the start-up transformers to the station power transformer. During normal operation, all 4,160 volt buses are energized.	Routine operations each start-up verifies this capability.	None
FSAR 8.3.1.2 8.3.2.2	Operation of all 4,160 V and 2,400 V equipment is effected and monitored in the control room. Important functions are annunicated in the control room.	Normal design configuration allows operation, control and monitoring of all 4,160 V and 2,400 V equipment from the control room. Normal plant evolutions verify this capability.	None
FSAR 8.3.1.2 8.3.2.2	Testing Testing of parts of the system can be performed when the system is in operation and carrying load.	Relays and protective devices are calibrated by electric lab at frequencies determined by experience.	None
FSAR 8.3.2.2	The reserve transformer will provide capability of sparing Start-up (Standby) Transformer 1-2 during shutdown conditions.	None	This installed reserve transformer has provisions to supply plant buses. Instructions are provided in SOP-30, however, there are no tests routinely performed to validate this design feature. This will be verified prior to start-up.

STATION POWER SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 8.3.2.2	A spare 345-2.4/4.16 kV, 25 MVA transformer can be brought on-line within 3 days to provide full replacement of a failed start-up transformer.	None	This is an installed spare. No testing is performed, however, normal maintenance procedures may be used to connect this transformer to spare a start-up transformer.
FSAR 8.3.2.2	<u>2,400 Volt System</u> <u>Normal and Shutdown Operation</u> - Power during normal operation is furnished from the main generator via Station Power Transformer 1-2. During start-up or shutdown, the power is furnished from the power system grid via the switchyard and Start-up Transformer 1-2.	Routine plant start-ups and shutdowns verify this design feature.	None
FSAR 8.3.2.2	After the main turbine generator is started and before 20% reactor power is reached, the buses are manually transferred from the start-up transformer to the station power transformer. During normal operation, the three 2,400 volt buses are energized.	Routine plant start-ups perform this evolution. CL-30 controls electrical lineups to have all three 2,400 volt buses energized.	None
FSAR 8.3.3.2	<u>480 Volt System</u> During normal operation, all incoming bus breakers and motor control center feeder breakers are closed and all bus tie breakers are open. The status of these breakers will be changed only for emergency or maintenance.	CL-30 aligns breakers for normal operation. Administrative procedures provides for equipment status controls.	None
FSAR 8.3.5.2	<u>DC and Preferred AC System</u> Administrative controls limit the operation of battery chargers such that only one charger per battery is in service.	SOP-30 and CL-30 control operation of battery chargers such that only one charger per battery is in service. /	None
FSAR 8.3.5.2	Each inverter, one at a time, can be manually bypassed and its preferred AC bus supplied from the instrument AC panel via a bypass regulator.	This feature is routinely utilized when performing maintenance and is described in SOP-30. Kirk key interlock exists allowing only one preferred AC bus to be powered from the instrument AC panel, at one time.	None

STATION POWER SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 8.3.6.2 8.3.6.3	Instrument AC System The instrument AC system is supplied by two three-phase transformers from Motor Control Centers 1 and 3. An automatic transfer switch is provided to transfer supply to the instrument AC panel between the two power sources. Automatic transfer is initiated by an undervoltage relay on the panel and annunicated in the control room. Transfer in either direction may be made manually. The operation of the transfer switch may be checked at any time without affecting plant operation.	None	SOP-30 provides instructions to test this feature, however, no periodic testing is performed. This will be verified prior to start-up.
FSAR 8.6.2	In order to permit the main transformer backfeed mode of operation (Subsection 8.2.3), the fast transfer on turbine generator trip and the emergency generators automatic start signals are blocked manually using a selector switch in the main control room ("Instant Transfer Cutout").	This function is routinely performed when the generator is off line.	Diesel Generators are only blocked by manual action. FSAR will be clarified.
FSAR 8.6.2	4,160 Volt System - Automatic transfer of the 4,160 volt buses from the normal power source (Station Power Transformer 1-1) to the standby power source (Start-up Transformer 1-1 and 1-3) is initiated by turbine trip or generator trip.	This feature is demonstrated during a normal plant trip above 16% power. Fast transfer was verified in early 1986 as part of the HFA relay replacement job.	This function will be periodically verified in the future.
FSAR 8.6.2	Automatic transfer is blocked if the start-up transformer voltage is low. The lockout relays may also be operated manually to prevent bus transfer if a start-up transformer is inoperable for any reason.	None	There is no testing performed to verify the auto transfer block feature on low voltage. The manually operated lockout relays although calibrated, are not covered by periodic testing. These lockout relays will tested periodically in the future.
FSAR 8.6.2	2,400 Volt System - Automatic transfer of the 2,400 volt buses from the normal power source (Station Power Transformer 1-2) to the standby power source (Start-up Transformer 1-2) is initiated by turbine trip or generator trip. Two separate turbine auto stop oil pressure sensors are provided for initiating the transfer.	This feature is demonstrated during a normal plant trip above 16% power. Fast transfer test was performed in early 1986.	This function will be periodically verified in the future.

STATION POWER SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 8.6.2	Automatic transfer is blocked if the start-up transformer voltage is low. Each of the lockout relays may also be operated manually to prevent one of the bus transfer if the corresponding start-up transformer breaker is inoperable for any reason.	None	There is no testing performed to verify the auto transfer block feature on low voltage. The manually operated lockout relays although calibrated, are not covered by periodic testing. These lockout relays will be tested periodically in the future.
FSAR 8.7.1	The 480 volt Buses 11 and 12 may be tied together by closing Breakers 52-1118 and 52-1217 (normally open). An interlock prevents the closure of these tie breakers if both breakers connecting the redundant sources to Buses 11 and 12 (Breakers 52-1102 and 52-1202, respectively) are closed; one of these two supply breakers must be open in order to close the time breakers. Associated nonsafety-related 480 volt Bus 77 is interconnected with nonsafety-related Bus 78 by a single tie breaker. The supply breakers to Busses 77 and 78 are interlocked with the time breaker such that one of the two supply breakers must be open to close the time breaker.	SOP-30 provides instructions and normal plant maintenance provides the opportunity to verify buses can be tied.	No testing is performed to verify interlocks. This will be verified prior to start-up.
Work Order History	A review of Work Order history revealed approximately 302 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 95 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None

STATION POWER SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-631 replaced transfer switch for bus Y-01 (instrument AC)	Preoperational testing was satisfactorily performed.	SOP-30 provides instruments to test this automatic bus transfer device, however, no periodic testing is performed. This will be verified prior to start-up.
	FC-652 removed electrical penetration EZ-104 for repairs; cable rerouted to EZ-102.	Cables were tested satisfactorily via post-maintenance testing.	None
MCTF SPS-02	Charging Pump Motor Breakers: 1. Replace 52Y coils.	Coils were replaced and tested satisfactorily. PPACS SPS-049 performs PM.	None
	2. Inspect breaker latch springs.	Latch springs were inspected and no problems noted. Step added to procedure to include this inspection for future.	None
	3. Evaluate reliability of this switchgear.	INPO failure rate was reviewed for all 2,400 volt and 4,160 volt switchgear types and evaluation determined that failure rates were 3 to 15 times higher than other switchgear types in use.	Evaluation is underway to either replace switchgear or to refurbish existing switchgear.
	4. Develop recommendation for a revised PM Program.	PMs were modified to be performed during plant operation through use of spare breakers vice each outage. The intent is to monitor performance of breakers and determine if improved PMs will serve to lower failure rate.	None
MCTF SPS-03	Evaluate importance of DC ground alarm in control room and troubleshooting techniques for isolating/repairing DC grounds.	None	A procedure and/or checklist will be devised with operations to determine which breakers can be troubleshot during specific plant conditions.

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-30			
7.1	4,160 V Buses		
7.1.1	To Transfer From Start-up to Station Power Transformer	Normal plant operations verifies this	None
7.1.2	To Energize Buses 1F (**EA-23) and 1G (**EA-24) From Alternate Source	None	The F and G bus are considered part of the grid system. No testing is done to verify this.
7.2	2400 V Buses		
7.2.1	To Transfer From Start-up to Station Power Transformer or Station Power to Start-up Transformer	Normal plant operations verifies this feature each start-up and shutdown.	None
7.2.3	To Remove Start-up Reserve Transformer From Service .		
7.2.4	To Energize Bus 1E Following SIS With Offsite Power Available	RO-8 cause bus 1E to trip. We routinely place bus 1E back in service following these tests.	None
7.3	480 V Buses		
7.3.1	To Feed Load Center 480 V Bus 11 (**EB-11) From Station Power Transformer No 12 (**EX-12)	Routine plant operations and maintenance activities verifies these functions.	None
7.3.2	To Feed Load Center 480 V Bus 12 (**EB-12) From Station Power Transformer No 11 (**EX-11)	Routine plant operations and maintenance activities verifies these functions.	None
7.3.3	To Feed Load Center 480 V Bus 13 (**EB-13) From Station Power Transformer No 14 (**EX-14)	Routine plant operations and maintenance activities verifies these functions.	None
7.3.4	To Feed Load Center 480 V Bus 14 (**EB-14) From Station Power Transformer No 13 (**EX-13)	Routine plant operations and maintenance activities verifies these functions.	None

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-30 7.3.5	To Feed Load Center 480 V Bus 77 (**EB-77) From Station Power Transformer No 78 (**EX-78)	Routine plant operations and maintenance activities verifies these functions.	None
7.3.6	To Feed Load Center 480 V Bus 78 (**EB-78) From Station Power Transformer No 77 (**EX-77)	Routine plant operations and maintenance activities verifies these functions.	None
7.3.7	To Supply Load Center 90 V (**EB-90) From Station Power Transformer No 13 (**EX-13)	Routine plant operations and maintenance activities verifies these functions.	None
7.3.8	To Supply Load Center 91 V (**EB-91) From Station Power Transformer No 13 (**EX-13)	Routine plant operations and maintenance activities verifies these functions.	None
7.4	Pressurizer Heater Buses 15 and 16 (**EB-15 and **EB-16)		
7.4.1	To Energize	Routine plant operations and maintenance activities verifies these functions.	None
7.5	Preferred AC Buses	Routine plant operations and maintenance activities verifies these functions.	None
7.5.1	To Energize	Routine plant operations and maintenance activities verifies these functions.	None
7.5.2	To Supply A Preferred AC Bus With the Bypass Regulator .	Routine plant operations and maintenance activities verifies these functions.	None
7.5.3	To Transfer A Preferred AC Bus From the Bypass Regulator To Its Associated Inverter	Routine plant operations and maintenance activities verifies these functions.	None

STATION POWER SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-30 7.6	Instrument AC Bux	Routine plant operations and maintenance activities verifies these functions.	None
7.7	Battery Chargers	Routine plant operations and maint-tenance activities verifies these functions.	None
7.7.1	To Load Batter Chargers	Routine plant operations and maintenance activities verifies these functions.	None
7.7.2	To Change Operating Station Battery Chargers	Routine plant operations and maintenance activities verifies these functions.	None
7.7.3	To De-Energize Batter Chargers	Routine plant operations and maintenance activities verifies these functions.	None
7.7.4	To Place CFMS/Datalogger Inverter In Service	Routine plant operations and maintenance activities verifies these functions.	None
7.7.5	To Shutdown Inverter Y210 & Place On Alternate Supply . .	Routine plant operations and maintenance activities verifies these functions.	None
7.7.6	To Shutdown Inverter Y220 & Place On Alternate Supply . .	Routine plant operations and maintenance activities verifies these functions.	None
8.3.11	Backfeeding Through Main Transformer	These functions are routinely performed when sparing the start-up transformer 1-2.	None
8.3.12	To Return To Normal From Backfeeding Through Main Transformer	These functions are routinely performed when sparing the start-up transformer 1-2.	None

STATION POWER SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
ONP-2.1 Attach 1	Emergency feed of pressurizer heater transformer #15 from Bus 1C.	None	No periodic testing is performed to verify this feature. However, normal electrical maintenance procedures may be used to change the electrical feed to the pressurizer heater transformer #15.

EMERGENCY ELECTRICAL POWER SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.2.2	Zone relaying is provided for the circuit from the switchyard to the generator main power transformer and for the two switchyard main buses. One of the main bus zones includes the circuit from the switchyard to the startup transformers. The six outgoing lines are each provided with high-speed relays. In addition, all 345 kV power circuit breakers are provided with relays to trip the second zone breakers for each circuit should the line breakers fail to trip.	Relays are calibrated by electric lab at frequency determined by experience.	Zone relaying functions to protect power grid system from outside faults. It is not used for protection of the internal plant. Existing testing is therefore satisfactory.
FSAR 8.2.2	Description - Switchyard Control System - 2,400 volt Buses 1C and 1E supply the switchyard control power through the 2400-240/120 volt, 60 hertz switchyard power transformers. Bus 1E may be supplied from either diesel generator after the disconnect links on Station Power Transformer 1-2 are removed. Each of the transformers supplies half the 240/120 volt, 60 hertz power requirements for the switchyard; however, either transformer can be connected to carry the total load via a bus tie breaker. The AC load is divided among four power panels; the loss of one power Panel will not affect operation of the other three and hence will not jeopardize the total 240/120 volt, 60 hertz auxiliary power in the switchyard.	Normal switchyard power is provided by the plant systems. Normal plant evolutions provide control power to the switchyard. RO-8 recovery exercises this function.	None
	The 125 volt DC switchyard auxiliary power is supplied from a 60-cell battery which is located in the switchyard and can supply the switchyard DC power requirements for six hours without recharging. The DC load is divided between two power panels; the loss of one power panel will not disrupt all the 125 volt DC auxiliary power in the switchyard.	PM SWY 002 is performed on switchyard batteries. The January 1984 loss of power incident proved the batteries functioned to recover offsite power on a total loss of AC. Batteries were supplying the switchyard for greater than 4.3 hours. No periodic testing is performed to verify battery capacity.	Switchyard battery capacity and load testing is not routinely performed. This will be reviewed. Removing battery and performing capacity checks affects the reliability of the switchyard, which is controlled by power control. This is handled the same way all other switchyards in the Consumers grid.
FSAR 8.2.2	The 345 kV power circuit breakers have enough air stored in their high-pressure receivers to permit five breaker operations.	None,	Testing of the 345 kV breaker to cycle on loss of their air compressors is not periodically performed. This will be tested prior to the start-up and periodically in the future.

EMERGENCY ELECTRICAL POWER SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.2.2	The main generator breakers are normally controlled remotely from the plant main control room; in an emergency, they can be controlled from the switchyard relay house.	Control room function verified during normal operations.	Control of switchyard breakers from the switchyard panels is a design feature which is not routinely tested. Control of the main generator breakers from the switchyard is an unnecessary design feature. No scenario would require this. Therefore no testing is necessary.
FSAR 8.2.2	The relays are supplied with test switches that will permit the removal of one relay or one set of relays from service for maintenance at any time. Because of the redundancy in the relay circuits, the power circuit will still be relay protected.	Relays are routinely removed for testing.	None.
FSAR 8.2.3	All circuits or portions of the buses and overhead lines have primary and backup relaying. The outgoing lines have three sets of high-speed relays. The circuit breakers have dual trip coils on separate DC control circuits, and breaker failure relays to trip the adjacent breakers. The two redundant control circuits will operate even with one set of relays out of service.	Switchyard relay protection is calibrated and checked by System Lab on an as needed basis.	None.
FSAR	Station loads, including the safety loads, are normally supplied from the main generator through the station power transformer. On loss of the main generator there is an automatic transfer from this normal source to the immediate access offsite power circuit (see Section 8.6). The design includes provisions to test this feature during plant operation.	Buses are manually transferred during each start-up and shutdown. This was tested in early 1986 under HFA relay test I-SC-84-06811A and 12A. This is not tested during normal operation.	Generate a test to periodically test fast transfer in the future. Clarify FSAR that this function is not tested during normal operation.

EMERGENCY ELECTRICAL POWER SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.2.3	The delayed access circuit is established by removing disconnect links at the main generator (to establish the main transformer backfeed mode of operation). In accordance with 10CFR50, Appendix A, General Design Criterion 17, this delayed circuit must be designed to be available in sufficient time, following a loss of all onsite AC power supplies and the other offsite immediate access circuit, to assure that specified acceptable fuel design limits and design conditions of the primary coolant pressure boundary are not exceeded. In the plant design, the time required to remove the disconnect links is 4 to 6 hours. The DC battery system is designed to supply the required shutdown loads, with total loss of AC power for at least 6 hours (see Subsection 8.4.2.3).	Established back feeding lineup is a normal maintenance function. Plant batteries are load tested per FE-5A and B and RE-83A and B. Delayed access circuit is used during refueling.	Four to six hours is normal, non-emergency time period required as defined by performance in a typical outage. This therefore has been verified in an informal way. No further action required.
FSAR 8.3.1	STATION DISTRIBUTION - 4160 VOLT SYSTEM		
FSAR 8.3.1.2	Following a turbine or reactor trip, the 4,160 volt Buses 1A and 1B will automatically transfer to the standby source and all auxiliaries will continue to run.	This has been verified in the past on reactor trips.	Last cycle the plant operated normally on start-up power. This mode of normal plant operations is presently being evaluated. If it is determined to operate on station power, fast transfer testing will be periodically performed.
FSAR 8.3.1.2	If the trip is accompanied by a failure in the standby source, the turbine generator will supply power to the primary coolant pumps for a limited time while coasting down to 80% speed.	During start-up testing this feature was verified.	This function will be reviewed. Periodic testing will be performed if this is determined to be necessary.
FSAR	STATION DISTRIBUTION - 2400 VOLT SYSTEM		
FSAR 8.3.2 8.3.2.2	The 2400 volt system has sufficient capacity to start the largest motor when all the other motors are energized.	RO-8 verifies pump starting during a simulated DBA. A load study is performed any time loads are added to the bus.	RO-8 does test the Class 1E power system under full accident load. We do not verify the 2,400 V can start the largest motor with all other motors energized. Load studies will be reviewed to verify this function.

EMERGENCY ELECTRICAL POWER SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.3.2.2	Following a turbine or reactor trip, the 2400 volt buses will automatically transfer to the standby source and all auxiliaries will continue to run. If the trip is accompanies by a failure in the standby source, the emergency generators will supply power to the engineered safeguards .	Availability of standby source is demonstrated by normal plant trip from above 20% power. RO-8 verifies power available upon loss of standby power.	None.
FSAR 8.3.2.2 8.4.1.2	Breakers 152-103, 107 and 110 have special remote/local isolation switches to allow control in the event of fire in certain areas of the plant. These switches are intended to ensure operability of safe shutdown equipment per 10CFR50.48 and 10CFR50, Appendix R. Reference FSAR Section 7.4 for critical fire areas.	Isolation switches tested under FC-639.	periodic testing is not performed to verify remote/ local operation of Appendix R isolation switches for the 2400V breakers. Testing was performed in early 1986 as part of modification closeout process. (Completed under T-FC-639-501.) A PACS will be generated to periodically verify the function.
FSAR 8.3.2.2	Important control circuits, such as bus transfer and load shedding, have white indicating lights to show circuit availability. Undervoltage relays initiate an alarm upon loss of potential.	RE-66 checks Bus 1-C and 1-D undervoltage relays.	None
FSAR 8.3.2.2	All 2400 breakers on Buses 1C and 1D are also capable of being controlled from the switchgear.	None	No routine testing is performed to verify control of Bus 1C and 1D breakers from the switchgear. Exceptions found during the review of the mechanical systems resulted in changing surveillance to start various loads locally periodically. These breakers will therefor be operated locally prior to start-up and periodically in the future.
FSAR 8.3.2.3	The engineered safeguards loads can be supplied by standby power, diesel power or from the switchyard through the main transformer after disconnecting the turbine generator.	Demonstrated by normal plant evolutions, RO-8, and normal refueling operation while backfeeding.	None.

EMERGENCY ELECTRICAL POWER SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.3.3 8.3.3.2	STATION DISTRIBUTION - 480 VOLT SYSTEM Station Power Transformers 11, 12, 19 and 20, corresponding Load Centers and Motor Control Centers 1, 2, 21, 22, 23, 24, 25 and 26 are an integral part of the engineered safeguards electrical system. This equipment is arranged into two channels so that multiple pieces of equipment with a common function are fed from opposite channels. The capacities of the station power transformers and the 480 volt bus tie breakers for Load Centers 11 and 12 are sufficient to permit plant operation at full load with one transformer out of service.	Verified during normal operation when Load centers removed for maintenance.	None
FSAR 8.3.3.2	The 480 volt system has sufficient capacity to start and accelerate largest motor when all other motors on the system are energized.	RO-8 does test the 1E power system under full accident load.	(FSAR 8.3.3.2) The 480 volt system is not capacity tested with all 480 volt motors at full accident loads. Load studies are performed whenever additional loads are added to buses. This method will be reviewed to determine if this criteria is an input to those loads.
FSAR 8.3.3.2	Starters in the 480 volt motor control centers assigned to engineered safeguards loads may be controlled from the control room or from local panels. Status of these starters is indicated by lights in the control room and at the local panels. Other starters are controlled at the motor control centers or at local panels. Critical breaker and motor overload trips are annunciated in the control room.	Lights verified in the control room and locally by operators.	(FSAR 8.3.3.2) Local control of 480V is not demonstrated periodically. Local control associated annunciators and indicating lights are not periodically tested. The annunciation of critical breaker trips and motor overload trip will be verified prior to startup and periodically in the future to the extent practical.
FSAR 8.3.3.2	The 480 volt load center breakers are equipped with thermalmagnetic devices. Motor control centers are equipped with thermal-magnetic breakers for nonmotor loads, and magnetic breakers and starters with thermal protection for the motor circuits.	Trip devices calibrated by electric lab on an every other refueling basis.	None
FSAR	480 volt loads will continue to run when the 2400 and 4160 volt systems transfer to the standby source. Cooling tower 480 volt loads are supplied from Start-up Transformers 1-1 and 1-3 via 4160 volt buses 1F and 1G and are not transferred.	Buses manually transferred each start-up and shutdown.	None

EMERGENCY ELECTRICAL POWER SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.3.3.2	Loss of Normal and Standby Power - If the standby source fails, all cooling tower and nonessential loads will be shed. Load Centers 11, 12, 19 and 20 and Motor Control Centers 1, 2, 21, 22, 23 and the essential loads will be supplied by the emergency generator through the 2400 volt buses.	RO-8 and RO-13 tests system response following a simulated DBA or loss of standby power.	None
FSAR 8.3.3.2	Shutdown Operation - No change in status of the incoming bus breakers and tie breakers is required during shutdown. Other breakers and the motor starters are operated manually or automatically as required by the shutdown sequence.	Demonstrated by normal plant shutdown.	None
FSAR 8.3.3.2	Operation After Loss of Coolant Accident - A Loss of Coolant Accident affects the 480 volt in-plant system only if accompanied by loss of standby power in which case all loads except the engineered safeguards load centers and motor control centers are shed automatically. Upon return of power to 2400 volt Buses 1C and 1D, additional 480 volt loads may be energized manually by the operator.	Demonstrated by RO-8.	None
FSAR 8.3.3.2 8.3.5.2	Fuses are provided to ensure containment electrical penetrations overcurrent backup protection for circuit breakers in the MCC starters feeding submerged equipment not de-energized following a Loss of Coolant Accident (LOCA) and also to ensure that the operation of backup protection does not lead to interruption of the power supply to other safety-related equipment. Fuses are provided for electrical penetration backup protection in motor starters 120 V AC control circuits to protect electrical penetrations against damage by overcurrent. For similar reasons, the Pressurizer Heater Transformers X15 and X16 are tripped upon safety injection signal actuation.	QO-1 verified pressurizer heaters do not trip on receipt of an SIS signal.	Fuses are a backup design feature which are not tested. Fuses were added as modification for submerged electrical equipment concerns. Fuses are backup protection of the penetration downstream of the breakers. Fuses are passive devices. No testing is necessary. Pressurizer heaters do not trip on a SIS signal. FC-683 was completed during 1986 Maintenance Outage. FSAR will be corrected.
FSAR 8.3.4 8.3.4.2	STARTUP DISTRIBUTION - CONTROL ROD DRIVE POWER Loss of control rod drive power does not affect the rod position. Loss of power is annunciated in the control room	Control rod drive power is independent of rod hold power. The emergency rod drive power interrupt alarm operability is verified as part of normal plant evolutions.	None

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.3.5 8.3.5.2	DC AND PREFERRED AC SYSTEMS The following design features assure the availability of 125 volt DC power for the operation of Diesel Generators 1-1 and 1-2, safeguards 2400 volt Buses 1C and 1D, nonsafeguards Buses 13 and 14 and the Auxiliary Shutdown Control Panel C150 in the event a fire damages 125 volt DC distribution equipment in the cable spreading room.		
	Fuses between each battery and its bus are located in their respective battery rooms.	Fuses are considered a non-testable design feature.	None
	In each battery room, a nonautomatic circuit breaker with a shunt trip is provided in the circuit between the battery fuse and its bus. The shunt trip device of these circuit breakers is a trip coil that is energized by battery voltage via the 125 volt DC distribution panel. The nonautomatic circuit breakers were specified for use in 125 volt DC systems and for a steady-state load of 400 amperes. They are qualified per lEEE 323-1974 and lEEE 344-1975. They do not contain fault detectors and are not intended to interrupt fault currents although they have that capability. They are manually operated open or closed with the capability of being opened remotely via the shunt trip device.	None	(FSAR 8.3.52., Items 2 and 3) The shunt trip device associated with the 125 volt DC buses are not periodically tested. These will be tested prior to startup and periodically in the future.
	If the shunt trip push button is closed inadvertently, the battery will be separated from the principal 125 volt DC bus. An undervoltage relay has been installed on the battery and will detect the separation of the battery from its charging source. Operation of the relay is annunciated in the control room.		The 125 volt DC buses undervoltage relays are not periodically calibrated. This was tested under modification procedure FC-407-148. This relay and annunciator will be verified functional prior to startup and periodically in the future.
FSAR 8.3.5.2	The chargers are provided with filters and surge protection to enable either charger to supply the DC loads including the operation of 2400 volt circuit breakers with the battery disconnected.	Recovery from RE-83A/B and FE-5A/B provide testing of this function.	None
FSAR 8.3.5.2	Both DC systems are ungrounded and are equipped with ground detectors continuous monitoring. Monitoring is also provided on other important system parameters. such as bus voltage and current. Abnormal conditions are annunciated in the control room.	Shiftly checks of ground indications are performed. No periodic testing is performed.	The ground detectors and annunciators will be verified operable prior to startup and periodically in the future.

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.3.5.2	The preferred AC buses operate ungrounded and are equipped with ground detectors.	Bus status is verified each shift. Any problems or changes would be identified and addressed. This is deemed adequate.	The ground detectors will be verified operable prior to start-up and periodically in the future.
FSAR	In order to comply with the electrical isolation requirements of IEEE 384, Regulatory Guide 1.75 and Regulatory Guide 1.6, the bypass regulator output breakers are interlocked to preclude supplying more than one preferred AC bus at a time.	Kirk key interlock exists with only one key available.	None
FSAR 8.3.5.2	The battery on each bus is kept fully charged, floating at approximately 130 volts.	ME-12 measures battery voltage and specific gravity.	None
FSAR 8.3.5.2	Periodically, the charger voltage is raised to approximately 138 volts for battery equalizing.	ME-12 specifies a 24 hour equalize charge at 138 volts.	None
FSAR 8.3.5.2	Emergency Operation - On loss of normal and standby AC power, all DC loads will be supplied from the station battery. As soon as one of the diesel generators has started and is ready for loading, the battery chargers will automatically resume operation and support the battery.	Tested during RO-8, but is not documented on the checkoff list.	RO-8 will be revised to document auto operation of battery chargers.
FSAR	Testing - A test push button is provided at the DC control center to check the operation of the DC emergency lights.	Containment DC lights are tested by RE-87 and DC lights outside containment are tested by AE-5 and AE-5A	None
FSAR 8.3.5.2	System Monitoring - The DC and preferred AC power systems (ie, chargers, inverters, batteries and breakers) are controlled locally. The operational status information is displayed locally.	Bus status is verified each shift. any problems or changes would be identified and addressed.	Periodic testing and calibration of alarm and monitoring devices associated with DC and preferred AC power systems is not performed. Proper operation of these devices will be verified prior to startup and periodically in the future.

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.3.5.3	In order to meet IEEE 308-197B, Paragraph 7.1.3 requirements, the control room features an assortment of DC power system alarms (ie, "Battery Chargers Power Off", "125 Volt DC Bus Ground", "125 Volt DC Bus Undervoltage/Trouble" and "Preferred AC Bus Trouble"). The proper combination of these alarms will alert the operator of most conceivable malfunctions, misalignments or maladjustments which might occur to render any part of the system inoperable.	Alarm response procedures exist for these conditions.	Periodic testing and calibration of alarm and monitoring devices associated with DC and preferred AC power systems is not performed. Proper operation of these devices will be verified prior to startup and periodically in the future.
FSAR 8.3.5.3	Each of the two battery chargers provide on the DC bus is capable of supplying the normal DC loads on the bus and simultaneously recharging the battery in a reasonable time. A fully discharged battery can be recharged in less than nine hours. The inverters are rated at 20% higher than the maximum anticipated power requirement of the preferred AC buses.	Battery chargers are rested for capacity under RE-83A/B each refueling	Modifications have been performed to add loads to preferred AC buses. This will be reviewed to verify excess capacity still exists. If not the FSAR will be clarified.
FSAR 8.3.5.3	<u>Emergency Operation</u> - Complete loss of all AC power analysis is given in Subsection 8.4.2.3.	RE-83A and B and FE-5A and B test the battery for this mode of operation.	None
FSAR 8.3.6.2	INSTRUMENT AC SYSTEM This system can only furnish power to one of the preferred AC buses through a bypass regulator.	Kirk key interlock exists allowing only one preferred AC bus to be powered.	None
FSAR 8.3.6.3	Each of the two instrument AC transformers is sized to supply the panel load and one preferred AC panel bus via the bypass regulator.	Periodic operation with inverter in bypass adequately verifies ability of inverter to handle its load.	None
FSAR 8.4 8.4.1.2	EMERGENCY POWER SOURCES The synchronizing equipment is automatically bypassed by breaker position interlocks to permit manual and automatic closing of the emergency generator breaker or a dead bus.	RO-8 demonstrates this.	None
FSAR 8.4.1.2	The four 2400 volt bus station power and startup transformer incoming breakers are interlocked to prevent automatic closing when the associated emergency generator breaker is closed. The transformer breakers can be closed manually only by using synchronizing equipment when the associated emergency generator breaker is closed.	Interlocks are tested via normal operation each time a line bus transfer is performed (from D/G to station or start-up power.	None

EMERGENCY ELECTRICAL POWER SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.4.1.2	Each engine has two independent starting control circuits, one for each air motor, each initiated from a separate signal and energized from separate battery sources. The diesel engines, fuel oil systems and air start systems are equipped with instrumentation to monitor all important parameters and annunciate abnormal conditions. Water and oil heaters are provided to maintain the engines to "start" readiness.	MO-7A-1 and 2 test both diesel starters and control circuits on an alternating monthly basis. Monthly load tests pick up any abnormal instrumentation.	None
FSAR 8.4.1.2	The generators and their 2400 volt breakers have overcurrent and differential protection.	Relays are periodically checked by Lab Services.	None
FSAR	The automatic start initiation circuits are a part of the safety injection control circuits and are redundant and physically isolated.	RO-8 tests these circuits.	None
FSAR 8.4.1.2	The controls for the governor, voltage regulator, synchronizing and for the generator breaker are located in the control room.	MO-7A tests this.	None
FSAR 8.4.1.2	Normal Operation - As shown on Figures 8-17, 8-19, 8-20 and 8-21, both diesel generators are automatically started: Whenever power is unavailable from the startup transformer, or When the main turbine generator trips while connected to the utility system grid, or If the undervoltage is sensed on either 2400 volt Bus 1C or 1D. Section 8.6 provides additional details on undervoltage starting.	RO-8 tests starting by undervoltage.	None
FSAR 8.4.1.2	Shutdown Operation - During a normal shutdown operation, the emergency diesel generators will supply power only if the standby power source fails. At this time, the automatic features will govern and normal shutdown sequencers will sequentially load the generators.	RO-13 checks normal shutdown sequencers.	None
FSAR 8.4.1.2	Operation After Loss of Coolant Accident - The emergency generators are required to supply power only if the standby power source fails. At this time, the automatic features will govern and DBA sequencers will sequentially load the diesels.	RO-8 tests the DBA sequencers.	None

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.4.1.3	In addition, each generator has enough reserve capacity to start and carry the largest single engineered safeguards device that may be loaded on the bus by a control circuit malfunction.	R-8 test sequencing of all loads onto the diesel.	We do not test to demonstrate that the diesel generator has enough reserve capacity to start and carry the single largest safeguards device that could be loaded on the bus due to a circuit malfunction. A load study addresses this. (See Report QAS-83-RP-50). No testing other than RO-8 performed.
FSAR 8.4.1.3	The emergency generators are designed to reach rated speed and voltage and to be ready for loading with ten seconds after the receipt of a start signal and be capable of carrying full load within 30 seconds.	MO-7A and RO-8 test start time and load time.	None
FSAR 8.4.1.3	Each emergency generator and diesel engine is provided with several alarms, interlocks and trips. Each engine may be started and placed in service locally or from the control room. The generators may be synchronized from the control room so that they can be paralleled with the system for loading tests.	MO-7A verifies normal control of diesels from control room	Not all alarms, interlocks and trips on page 8.4.4 of FSAR are covered by periodic testing. The ones not tested will be tested or justifica-ion for continued operation will e provided.
FSAR 8.4.1.3	The diesel will be automatically tripped on generator differential or overcurrent relay action, engine overspeed/underspeed, overcrank or low lube oil pressure, low jacket water pressure and can be manually tripped at any time from the local station or from the control room.	MO-7A verifies several diesel generator parameters are in this normal operating range.	Not all diesel engine trips are testing periodically. See previous item.
FSAR 8.4.1.3	Either of the two 20 gpm fuel oil transfer pumps are used for transferring fuel oil from the storage tank to the day tasks should additional fuel oil be required.	Oil transfer pumps are tested per MO-7C	None
FSAR 8.4.1.3 /	The jacket water pump on each diesel is connected to a surge line running to a 40 gallon expansion and makeup task located eight feet above the crankshaft. Makeup water from the condensate storage tank is supplied through an automatic fill valve. When the engines are not running, the jacket water is heated by two thermostatically controlled heating elements mounted in the engine jackets.	Monthly and Refueling Surveillances, plus operator rounds on the diesel during surveillance is adequate to define problems with jacket water cooling.	None

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.5 8.5.2	RACEWAY AND CABLING SYSTEM High-speed clearing of faults is applied to prevent damage of cable. The design prevents the conductor temperature from exceeding 250°C for thermosetting insulation materials, 200°C for rubber insulated cable or 150°C conductor temperature for plastic insulated cable.	All breakers overcurrent trip setpoints on safety buses are periodically tested. No testing is required on non-safety bus breakers.	None
FSAR 8.5.3.1	The safety-related cabling system does not fully meet the requirements of Regulatory Guide 1.75 since the plant was designed and constructed before the Guide was established. As a result, fixed automatic water fire suppression systems have been provided in areas of dense safety-related cables. Manual hose stations and portable extinguishers are provided as backup.	MO-26 checks fire suppression and hose station alignment.	None
FSAR 8.5.3.4	In order to meet the intent of Regulatory Guide 1.75 and NRC BTP CMEB 9.5-1, the following design features are provided for protection against a fire in the cable spreading room:		
	Fire detection provided by flow alarms in the sprinkler system.	SO-6 tests sprinkler alarms	None
FSAR 8.5.3.6	Smoke detectors to detect incipient fires.	Smoke detectors are tested periodically per SI-7.	None
FSAR 8.5.3.4	The ventilation ducts leading to the turbine building and into the battery rooms have fusible link fire dampers installed.	RM-93 checks and tests safety-related fire dampers.	None
FSAR 8.5.3.8	As a result of this potential for fire, fire detection devices are provided in the reactor containment instrument room and cable penetration area; primary coolant pump bearing temperature and motor winding temperature readout are also available to give indication of a fire in the primary coolant pump area; portable carbon dioxide and water extinguishers are provided.	RI-67 checks containment fire detection system. PCP indications are available and normally used in control room.	None

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.6	AUTOMATIC TRANSFER, VOLTAGE PROTECTION AND LOAD SHEDDING CONTROLS Voltage protection and load shedding features for safety-related buses at the 2400 volt and lower voltage levels are designed in accordance with 10CFR50, Appendix A, General Design Criteria 17 and the following features:	RO-8 tests the single DBA sequence triggered on undervoltage. RE-66 A & B and RO-66 C and D calibrates and tests Bus 1C and 1D undervoltage relays.	FSAR Chapter 14 time delays will be verified.
	Two levels of automatic voltage protection from loss or degradation of offsite power sources are provided. The first level provides normal loss of voltage protection. The second level of protection has voltage and time delay set points selected for automatic trip of the offsite sources to protect safety-related equipment from sustained degraded voltage conditions at all voltage levels in accordance with ANSI C8.4.1-1977, with coincidence logic to preclude spurious trips. Maximum time delays for second level trip do not exceed the maximum time delay assumed in Chapter 14 analysis for engineered safeguards actuation while allowing short duration bus voltage disturbances without trip and short enough to prevent damage or failure of safeguards systems and components. This second level of protection meets IEEE 279-1971, IEEE 308-1978, IEEE 501,1978 and its components are located in a controlled atmosphere not requiring environment qualification.		
	The voltage protection system automatically prevents load shedding of the safety-related buses when the emergency generators are supplying power to the safeguards loads. Automatic bypass and reinstatement is verified by periodic testing.	None	Past procedures will be reviewed to determine if this is indirectly verified. If not this will be verified prior to startup and periodically in the future.
FSAR 8.7 8.7.2.5	PHYSICAL SEPARATION, ELECTRICAL ISOLATION AND SUPPORT SYSTEMS Fire Protection of Switchgear Room		
	Fire detection is provided by smoke detectors and flow alarms actuated by water flow in the sprinkler system. Fire extinguishment capability is provided by an automatic sprinkler system in the switchgear rooms and the cable tunnel, backed up by water hose stations and portable extinguishers.	SI-7 checks fire detection circuits. MO-26 checks fire suppression and hose station alignment. RM-93 checks and tests safety-related fire dampers.	None
	Additional protection factors are provided as follows: Smoke detectors for detection of incipient fires (both rooms); Dampers in ventilation duct penetrations of fire barriers; and Fire sensitive closure device on fire doors.		

Source	System Test Requirements	Test Performed	Exceptions/Justifications
FSAR 8.7.2.7	Batter Room Protection		
	A sail switch in the ventilation duct warns the control room of a loss of battery room ventilation.	None and periodically in the future.	Verify this sail switch functions prior to startup
	Each room has a pressurized air intake from the cable spreading room with fusible link dampers installed. The battery rooms' ventilation exhausts to the outside.	RM-93 checks and tests safety-related fire dampers. SI-7 checks fire detection circuits.	None
	Smoke detection is provided for these rooms. Fire extinguishment is provided by water hose stations located in adjacent areas and by portable extinguishers.	MO-26 checks fire suppression and hose station alignment.	None
MCTF EPS-04	Replace hoses and clean diesel belly and day tanks for 1-2 D/G.	All flex hoses were replaced. Belly and day tanks were cleaned. Visual inspection of hoses with D/G in operation during testing, and observation of acceptable fuel oil pressure during operation was performed.	None
MCTF EPS-05	Complete maintenance on K-6A Lube Oil temperature switch, TS-1478.	New indicator was installed and calibrated. PACS EPS-011 performs yearly calibration on instrumentation. MO-7A performed on K-6A and lube oil temperatures and alarms functioned normally.	None
MCTF EPS-07	Obtain output voltage data on D/G battery chargers and evaluate for acceptability.	An automatic battery charger has been installed on both D/G 1-1 and 1-2. Chargers have been in service approximately one year and adequately maintain the charge for the air compressor batteries. PPAC EPS-027 performs yearly PM on batteries and chargers.	None
MCTF EPS-09	Complete evaluation as to adequacy and stability of D/G controls including the implications of these factors on each mode of operation.	Load instabilities were corrected by replacing electric governor circuitry and motor operated potentiometer. Injection nozzle for cylinder 3L was replaced. Full load portion of MO-7A was performed and load stability was satisfactory.	None

EMERGENCY ELECTRICAL POWER SYSTEM

Source	System Test Requirements	Test Performed	Exceptions/Justifications
Work Order History	A review of Work Order history revealed approximately 99 work orders completed between 11/30/85 and 05/19/86.	Work orders were post maintenance tested and declared operable.	None
Work Order History	A review of work order history revealed approximately 92 work orders completed between 05/19/86 to 12/15/86	Work Orders were postmaintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-639 installed isolation switches on 1C Engineered Safeguards bus and on 1-1 Diesel Generator.	Tested satisfactorily via a modification test procedure.	None
	FC-653 installed DC Panel short circuit protection.	Tested satisfactorily during post maintenance test.	None
SOP-30 7.2.1	To transfer from startup to station power transformer or station power to startup transformer.	Normal plant operations during startups and shutdowns verifies these operations.	None
SOP-30 7.2.2	To supply 2400 V 1C, 1D and 1E from the startup reserve transformer.	None	This capability is not routinely tested. The reserve transformer is a spare transformer located on site. It is only required during long shutdown conditions when the startup is not available. Testing is not required for improving reliable or safe plant operations.
SOP-30 7.3	480V Buses - feeding load centers through bus tie breakers.	Normal plant electrical operations utilize these bus tie breakers routinely. MO-29 and CL-30 verifies proper electrical lineup.	None
SOP-30 7.5	Preferred AC buses - to energize and to transfer to/from a bypass regulator.	Normal plant electrical operations verifies these functions. MO-29 and CL-30 verifies proper electrical lineup.	None

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Source	System Test Requirements	Test Performed	Exceptions/Justifications
SOP-30 7.7	Battery chargers operations	MO-29 and C1-30 verifies proper electrical lineup and normal plant electrical operations verifies these functions.	None
SOP-22 7.5	Diesel Engine and Generator Operations	MO-7A, 1/2, MO-7C and RO-8 verify diesel generator operability.	None
ONP-20	/ Diesel Generator manual control.	This procedure has been performed once however, this is not routinely tested.	This will be performed prior to startup.

TURBINE GENERATOR

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.5.2.6	The electronic controller performs basic analog computations on reference signals and turbine feed-back signals and generates an output to the actuators.	Tested by PAC TGS010	None
	The operator's panel contains push buttons and switches which are used to change the reference input to the controller to vary the speed or load.	These controls are used during turbine startup and normal operations.	None
	Indicators provide continuous monitoring of steam admission valve position, load limit setting and control signal.	Tested by PAC TGS010	None
7.5.2.6	Emergency trip action is caused by the operation of trips located in the hydraulic mechanical system protective device unit: low-vacuum, low bearing oil pressure, overspeed trip and loss of generator load, or manually with the overspeed trip lever. This action is also caused by operation of the solenoid trip which is actuated by the manual trip switch in the control room and by electrical system protective relays.	PAC TGS016 calibrates low vacuum and low bearing oil pressure trip switches. Solenoid trip is manually actuated on each turbine startup per SOP 8.	Overspeed testing is performed after each refueling outage as part of the turbine inspection program but is not documented on a controlling document. Loss of load trip is not periodically tested. This will be verified prior to startup and periodically in the future (item 59).
7.5.2.6	A reactor trip results from a turbine generator trip only when the reactor is about 15% full power level. A turbine generator trip on closure of the main steam isolation valves (MSIVs) is provided to protect the MSIVs from experiencing the full differential pressure of a steam generator.	RI-17 tests the turbine trip on MSIV closure.	None
7.5.2.6	The turbine generator unit is controlled from the operator's panel. The panel shows which devices are controlling the turbine generator. The controller computes signals to position the governor valves. As the speed reference is changed during start-up, the speed transducer signal is compared to the reference speed setting. The difference or speed error then sets the position of the governor valves servo actuators. The governor valve servo actuators change the steam flow to the turbine. The result is a change in turbine speed which is detected by the speed transducer and is compared to the reference speed setting.	Tested by PAC TGS010	None
7.5.2.6	When the turbine is under dispatch control, load reference changes are made manually. The impulse chamber pressure is compared to the load reference setting. The difference is a load error to the controller, which repositions the governor valve actuators until the load error becomes zero.	None	This feature is not used at Palisades. The FSAR will be clarified.

TURBINE GENERATOR

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
7.5.2.6	The reheat stop and interceptor valves can be tested while the turbine is loaded. A signal can be introduced to the servo amplifier to cause the servo valves to exercise the stop and governor valves.	Tested by PAC X-Ops 240.	None
7.5.3.6	To have an uncontrolled source of steam from the main steam line, all of the following turbine control devices would have to fail:		None
	1. Main governor and governing valves.	Tested each startup per SOP 8 and tested monthly per PAC X-OPS 240	
	2. Auxiliary governor. This is an acceleration response device which closes the turbine main governing valves and the moisture separator intercept valves.	None	Auxiliary governor overspeed limiter is not periodically tested. This will be tested prior to startup and periodically in the future.
	3. Emergency trip. This is a centrifugally actuated device which trips the turbine throttle valves and the moisture separator stop valves.	Tested each refueling outage.	None
10.2.2	<u>STEAM TURBINE</u> In the event of turbine trip initiated from a solenoid trip, overspeed, low bearing oil pressure, low condenser vacuum, thrust bearing failure or a manual trip, a signal is supplied from the turbine auto-stop oil system to the Reactor Protective System to trip the reactor.	RI-37 calibrates the low auto-stop oil pressure switch.	Turbine trip input to RPS is not periodically tested. This will be verified prior to startup and periodically in the future.
10.2.2	Upon turbine control's receipt of a dropped rod signal from the Control Rod Drive System or a rapid flux change signal from the power range nuclear instruments, the turbine output is automatically limited by the turbine controls to a maximum of 70% of full load output. The 70% of load limit is accomplished within 30 seconds by the turbine governor control. If Plant power is less than 70% when a dropped rod signal occurs, the turbine output will not be affected. If the reactor temperature moderator coefficient is positive, this feature will be defeated to prevent power peaking problems within the core.	None	This feature is disabled and is no longer used. The FSAR will be clarified.
10.2.2.2	In order to minimize the possibility of turbine disc rupture, it is necessary to periodically inspect the critical disc bore region.	This inspection is performed every 5 years as part of the turbine overhaul.	None

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
10.2.2.3	Electrical Generator		
	Seal Oil System - The turbine bearing oil system serves as a seal oil backup should the seal oil pump stop or if the seal oil pressure should drop below 8 psi.	None	Turbine bearing oil pump auto start is not periodically tested. This will be verified prior to startup and periodically in the future.
10.2.2.3	Signal System - This system provided the operator with signals on the operating conditions present in Table 10-4.		Hydrogen supply low pressure, Hydrogen high temperature and hydrogen side low oil level switches are not periodically tested. These will be verified prior to startup and periodically in the future.
	SIGNAL SYSTEM OPERATING CONDITIONS		
	1. Hydrogen Purity - High or Low	PAC TGS 032	
	2. Hydrogen Pressure - High or Low	PAC TGS 032	
	3. Hydrogen Supply Pressure - Low	None	
	4. Water Detection - High	AC TGS 022	
	5. Hydrogen Temperature - High	None	
	6. Defoaming Tank Level - High	PAC TGS 021	
	7. Air Side Seal Oil Pump - Off	PAC TGS 015	
	8. Seal Oil Pressure - Low	PAC TGS 015	
	9. Hydrogen Side Level - Low	None	
	10. Seal Oil Turbine Backup Pressure - Low	PAC TGS 015	
	11. Hydrogen Side Seal Oil Pump - Off	PAC TGS 015	
	12. Air Side Seal Oil Backup Pump Running	PAC TGS 028	
10.3.1	REACTOR AND/OR TURBINE TRIP		
	Following a reactor and/or turbine trip, the feedwater flow to the steam generator is ramped down to 5% of full flow in the first 60 seconds. Once the system transient has terminated, the operator, while monitoring the primary coolant temperature, can restore and maintain the steam generator level. The feedwater temperature will decrease to that of the stored condensate.	PAC FWS 032 calibrates feedwater control. EOP 1.0 directs operator action after a reactor trip.	None

TURBINE GENERATOR

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
10.4	**TESTS AND INSPECTIONS**		
	The turbine governor and stop valves, reheat stop and intercept valves, bleeder trip valves and auxiliary feedwater pump may be tested while the turbine is in operation.	PAC X-OPS 240 test turbine valves MO-38 tests AFW pump. SOP-10, section 7.5, tests bleeder trip valves monthly. Intercepts and reheat stop valves are tested per SOP-8, Attachment 2.	None
SOP 8 7.1	Turbine Generator Operations	Normal operations verify these functions.	None
7.2	Electrohydraulic Control System Operations	Normal operations verify these functions.	None
7.4	Provide HP Cylinder Heating Steam	Normal operations verify these functions.	None
7.5	Lube Oil Purification System Operation	Normal operations verify these functions.	None
7.6	Lube Oil System and Turning Gear	Normal operations verify these functions.	None
7.7	Seal Oil System	Normal operations verify these functions.	None
7.8	Hydrogen Gas System	Normal operations verify these functions.	None
7.9	Isophase Bus Coolers Operations	Normal operations verify these functions.	None
7.10	Main Transformer	Normal operations verify these functions.	None
7.11	Pilot Wire Transfer Trip Operations	The trip relays are reset after actuation per the steps of SOP-32.	None
SOP 8 Attachment 2 Items 1 & 2	Test intercept, reheat stop, main stop and governor valves.	Periodically tested per PAC X-OPS 240.	None
SOP 8 Attachment 2 Item 3	Testing of Main Turbine Protective Trip Devices.	Tested per the SOP	None
SOP 8 Attachment 2 Items 4 & 6	Pilot Wire Test/Exciter Field Ground Test	Exciter field ground is automatically checked every 24 hours.	Pilot wire is not periodically tested. This will be tested during startup.
SOP 8 Attachment 2 Items 5 & 7	Test start Turbine/Seal Oil System Oil Pumps.	None	Testing is not periodically performed. This will be performed during startup.

TURBINE GENERATOR

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP 8 Attachment 16	Generator condition monitor and generator RTD temperature records checks.	None	Testing is not periodically performed. Perform during escalations.
EOP 1.0 Step 5.a.	Manually trip main turbine at turbine pedestal.	None	Local manual trip is not periodically tested. This will be performed as part of startup testing.
MCTF TGS-01	Generic issue EHC problems. Perform turbine valve testing with System Engineer.	Turbine valve testing was verified during post maintenance testing with System Engineer and Westinghouse representative. See Test Instructions "Post Maintenance Test of T-G Electro-Hydraulic Control System" Rev 1.	None
MCTF TGS-02	Generator Hydrogen Leakage. Perform a generator air drop test and evaluate results for acceptability.	Generator drop test was performed and consistent with past leakage. See internal memo JDA 86-062/JDS 86-022 Attachment I "Acceptance Action Level Critical for Generator Hydrogen Leakage".	None
MCTF TGS-06	Gland Seal Air In-Leakage. Continue with current rebuild.	Leak tests were performed at 18" Vac and no major leaks identified.	None
MCTF TGS-08	Automatic turbine functions. Turbine auto latch has been adjusted during current outage. Test and verify.	Latch was tested satisfactorily under SC-86-208.	None
MCTF TGS-10	Turbine Lube Oil lift pumps. Test and ensure lift pump starts at 600 RPM on a turbine trip.	Test performed verifying the proper operation of the bearing lift pumps. See Test Instructions "Post Maintenance Test of Turbine Generator Lift Pumps and Turning Gear."	None
MCTF TGS-13	CV-0571 & CV-0575 Turbine stop valves. Inspect test and repair as necessary. This included complete verification of closing times, limit switch and events recorder circuitry.	All turbine valves were stroked to verify proper operation of the valves, position switches and data logger. See test instructions "Post Maintenance Test of T-G Electro-Hydraulic Control System" Rev 1.	None
MCTF TGS-16	Turbine-Generator EHC Power Supplies verify proper operation of -15 VDC, and +48 VDC supplies; check voltage regulation and ripple.	The-15 and +15 volt and +48 volt were checked out and voltage regulation and ripple verified. Testing was conducted via work order close out.	None

TURBINE GENERATOR

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Work Order History	A review of Work Order history revealed approximately 307 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were postmaintenance tested and declared operable.	None
Work Order	A review of Work Order history revealed approximately 140 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were postmaintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-650 added hydrogen supply flowmeter for main generator.	Tested as part of FC closeout via operational test instructions.	None
	FC-651 installed high capacity dual tower H^2 dryer.	Tested as part of FC closeout via operational test instructions.	Part of H^2 dryer was recently returned to Westinghouse to have a vendor recommended mod completed to an electrical penetration. Part needs to be reinstalled prior to startup.
	FC-681 added valve on auto stop oil system down stream of 1/16" orifice.	No testing necessary.	None
	FC-682 added pressure and vacuum gauges on main turbine glands.	Data collection verified proper installation.	None
	FC-710 added isolation valve to main condenser vacuum sensing line.	Verified turbine low vacuum alarm and trip set points; performed freon leak test during hot testing.	None
	FC-692 Installed alarm for loss of power supplies at EC-23.	Post Maintenance test satisfactory per closeout of WO #24606503.	None

MISCELLANEOUS HVAC (D/G ROOM AND AUXILIARY BUILDING)

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.8.2.4 Item 7	The redundant supply units for the diesel generator room supply recirculated air or fresh air as the cooling load requirements demand. These fans are started automatically in sequence by thermostats.	PAC VAS-015 calibrates the thermostats. Auto start is verified by normal operation.	None
FSAR 9.8.2.4	Operation of the air supply units for the fuel handling area and the radwaste area is as follows:		
	The preheat coil is energized by an outside air thermostat at temperatures lower than 35°F.	None	Thermostat is not periodically checked. This will be verified prior to 100% power.
	The reheat coil is controlled by a leaving air thermostat set a 60°F.	None	Thermostat is not periodically checked. This will be verified during startup.
	A thermostat senses the coil leaving air temperature and closes an alarm circuit on low temperature to signal faulty coil performance. The alarm is located in the control room HVAC panel.	PAC VAS-019 calibrates the thermostat.	The annunicator is not specifically checked. This will be verified prior to 100% power.
	If the fan motor is shut off, the fresh air inlet dampers close.	None	Fan/damper interlock is not tested. This will be verified during startup.
FSAR 9.8.2.4 Item 16	The radwaste area exhaust system operates as follows:		
	Normally both fans, each rated at 50% of the normal flow, operate continuously. Dampers in the fan discharge modulate to maintain a uniform status pressure in the filter intake plenum.	PAC VAS-014 calibrate the damper and controller. SOP-24 directs operation of both fans.	None
	In the event of failure of the radwaste area supply fan, one of the exhaust fans is automatically shut down but the pressure control apparatus will limit the amount of the negative pressure developed by the lack of supply air and prevent excessive pressure differentials.	PAC VAC-014 calibrates the exhaust plenum pressure controller.	Supply/exhaust fan interlock is not periodically tested. These interlocks will be verified periodically in the future.

MISCELLANEOUS HVAC (D/G ROOM AND AUXILIARY BUILDING)

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.8.2.4 Item 16	In the event of a spillage of radioactive material in the radwaste area, the radiation monitor at the filter plenum senses the activity and stops the supply fan, closes the radwaste area supply Damper PO-1809, and stops the selected exhaust fan; however, a low flow alarm will override the high radiation signal and keep the standby exhaust fan running. The duct to access control remains open and is isolated from the radwaste area by Damper PO-1809.	None	Automatic actions resulting from high radiation are not periodically tested. These interlocks will be verified periodically in the future.
FSAR 9.8.2.4 Item 17	The fuel handling area exhaust system operates as follows:		
	During normal operation, one or both of the exhaust fans run, as required, and draw air through a prefilter and high-efficiency filter.	SOP-24 directs this operation.	None
FSAR 9.8.2.1 Item 3	During refueling operations the exhaust air is diverted to flow through a high-efficiency radiological filter (high-efficiency filter) which is in parallel with the high-efficiency filter used during normal operation.	MO-37 verifies refueling mode of operation.	None
	In the event of a fuel handling accident in the spent fuel pool, the exhaust airflow is reduced to one-half by tripping the supply fan and closing the inlet damper and tripping one of the 50% capacity exhaust fans. All of the exhaust flows through the high-efficiency radiological filter.	ONP-11.2 directs this operation.	None
FSAR 9.?.8.4 Item 18	The operation of the auxiliary building addition fuel handling supply and radwaste supply is as follows:		
	The preheat coil is controlled by a thermostat in the fresh air intake set at 35°F. The reheat coil is controlled by a leaving air thermostat to maintain a discharge temperature of 60°F.	PAC VAS-023 calibrates the thermostat.	None
	Another thermostat is provided in the leaving air stream which is set at 45°F and alarms in the control room when this temperature is reached to indicate faulty coil performance.	PAC VAS-023 calibrates the thermostat.	None
	If the fan motor is shut off, the fresh air inlet dampers close.	None	Interlock is not periodically tested. This will be verified periodically in the future.

MISCELLANEOUS HVAC (D/G ROOM AND AUXILIARY BUILDING)

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.2.8.4 Item 18	The supply fans will trip on a high-radiation signal from radiation monitors located in the corresponding exhaust system ducts.	None	Trip is not periodically tested. This will be verified periodically in the future.
FSAR 9.2.8.4 Item 19	The operation of the auxiliary building addition fuel handling area exhaust and radwaste exhaust systems is as follows:		
	Normally both fans, each rated at 50% of the normal flow, operate continuously. Dampers in the fan discharges modulate to maintain a uniform static pressure in the filter intake plenum.	SOP-24 directs operation of the system PAC VAS-024 calibrates the dampers and controllers.	None
	In the event of an exhaust fan failure, the supply fan may be shutdown.	SOP-24 directs this operation.	None
	In the event of failure of a supply fan, one of the exhaust fans will shutdown.	None	Interlock is not periodically tested. This will be verified periodically in the future.
	In the event of release of radioactive material in the area serviced by the system, the radiation monitor at the filter plenum senses the activity and trips the supply fan which in turn trips one of the exhaust fans. However, a low flow condition will override the high-radiation signal and keep the standby exhaust fan running.	None	Automatic actions from high radiation are not periodically tested. This will be verified periodically in the future.
FSAR 9.2.8.4 Item 20	The penetration and fan rooms' heating and ventilating system:		
	The supply and exhaust systems run concurrently and are controlled by a thermostat located in the exhaust duct. The supply and exhaust fans are started when the exhaust air temperature is 90°F and stop when the exhaust air temperature is 70°F. A differential pressure controller which measures differential pressure across the filters and filter inlet damper, modulates the filter inlet damper to maintain a preset negative pressure across the filters and dampers.	PACS VAS-012 calibrates the differential pressure controller, thermostat and damper positions.	None

MISCELLANEOUS HVAC (D/G ROOM AND AUXILIARY BUILDING)

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.2.8.4 Item 24	The electrical equipment, switchgear, cable spreading and battery rooms' HVAC System.		
	Supply fan V-33 provides air to the areas identified. Makeup air to V-33 is a blend of outside air and recirculated air from V-43. This blend is controlled by a mixed air temperature controller.	None	Temperature controller and damper positioners are not periodically tested. This will be verified periodically in the future.
	Cable spreading, switchgear and 2.4 kV switchgear rooms increases above 104°F, temperature switches 1824, 1825 and 1826 will initiate a control room annunicator. The operator manually starts the supplemental exhaust fan V-47.	PAC VAS-043 calibrates the temperature switches. Alarm response procedure (ARP-8) directs starting V-47.	The annunicator is not periodically tested. This will be verified periodically in the future.
FSAR 9.8.4	LOSS OF INSTRUMENT AIR TO VENTILATION DAMPERS		
	The normal radwaste area and engineered safeguards room ventilation mode is with all dampers open, supply fan V-10 running, one or both exhaust fans (V-14A and/or V-14B) running, and the exhaust dampers (PO-1839 and PO-1840) controlled by filter intake pressure to maintain balanced airflow from all radiation monitor (RE-1809) which will close the radwaste area supply damper (PO-1809), trip one exhaust fan (V-14A or 14B) if both are running, close the respective exhaust damper, and trip the supply fan (V-10) which will in turn close the supply damper.	PAC VAS-014 calibrates the dampers and controller. SOP-24 directs operation of both fans.	None
	The remaining exhaust fan will maintain a slight negative pressure on the radwaste area to prevent leakage out of the building. The tripped exhaust fan will restart if 2.5 inches of water vacuum is not maintained in the exhaust plenum.	PAC VAS-014 calibrates the dampers and controller. SOP-24 directs operation of both fans.	None
	The normal ventilation mode in the fuel handling area during reactor operation or reactor shutdown is supply damper PO-3007 open, supply fan V-7 operating, one or both exhaust fans (V-8A or V-8B) operating, and one or both gravity exhaust dampers open.	SOP-24 directs this operation.	None

MISCELLANEOUS HVAC (D/G ROOM AND AUXILIARY BUILDING)

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.8.4 Continued	No change in the normal ventilation mode occurs in the unlikely event of a DBA unless the DBA is accompanied by a loss of standby power at which time the ventilation fans will be shed from their respective bus and the dampers will close.	RO-8 verifies load shed.	None
	Upon a fuel building high-radiation area alarm, fan V-7 is manually tripped which closes dampers PO-3007 and one exhaust fan is manually tripped closing its gravity damper. The remaining running fan continues to run maintaining a slight negative pressure on the fuel building to prevent leakage from the building.	SOP-24 directs this operation.	None
SOP-24 7.1	System start-up and main exhaust fans.	Functions are verified by normal operations.	None
SOP-24 7.3	Radwaste area ventilation.		
SOP-24 7.4	Fuel handling area ventilation.		
SOP-24 7.7	Piping penetration ventilation.		
SOP-24 Attach 2 Item 2	Test radwaste area fans and supply dampers.	None	This test is not periodically performed. This will be tested in the future.
Work Order History	A review of Work Order history revealed approximately 52 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 34 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage. No modifications were performed on this system.		

SHIELD COOLING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.2.1	The system is designed to maintain concrete temperature below 165°F. It is capable of removing 180,000 Btu/h.	None.	Concrete temperature is not monitored. Heat capacity is not measured. Technical Specification basis lists capacity as 120,000 Btu/hr. This will be verified during startup by test or analysis. The FSAR will be clarified.
FSAR 9.2.1	The supply header to each set of cooling coils is provided with a diaphragm-operated, fail-open valve operated from the main control room.	Normal plant maintenance activities required operation of these valves to the closed position.	None.
FSAR 9.2.3.3 Item 1	During normal operation, one shield cooling pump and one set of cooling coils are in continuous service. The idle pump is in standby. The normal flow through the shield cooling coils is 125 gpm.	Normal operation per SOP-29 sets pump and cooling coils use.	The ability of the system to perform its function will be verified during startup per above item.
FSAR 9.2.2.3	Both pumps can be started and stopped from the main control room. The standby pump starts automatically on low discharge header pressure.	Normal operation per SOP-29 verifies pump start and stop from the control room.	Automatic start feature is not periodically tested. This will be verified prior to startup.
FSAR 9.2.2.3	Makeup water to the surge tank is pumped from the condensate storage tank through an on-off solenoid valve which is actuated by a level switch on the surge tank.	Normal operation verifies this function.	This supply comes from condensate tank. Supply is from T-81. FSAR will be clarified.
FSAR 9.2.2.3	High and low level in the tank is annunicated in the control room.	PAC SCS-003 calibrates the level switch, transmitter and indicator.	The annunicator is not specifically tested. This will be verified prior to startup and periodically in the future.
FSAR 9.2.2.3	The surge tank normally vents to the containment vent header. A relief valve is provided to protect the surge tank from overpressure.	None	The surge tank vents to the containment atmosphere. The FSAR is incorrect. This will be corrected.
FSAR 9.2.2.3	The temperature of the shield cooling water is regulated by manual adjustment of the component cooling water outlet header butterfly valve.	Component cooling water flow was set by special test T-223.	None

SHIELD COOLING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.2.2.3	Temperature indication, high temperature (120°F) and low flow annunication from the discharge of each set of coils are located in the control room.	PAC SCS-006 calibrates temperature indication. PAC SCS-008 calibrates flow switches.	Annunicators are not specifically tested. These will be verified prior to startup and periodically in the future.
	If the cooling coil set in operation becomes inoperative, the standby set is brought into operation by opening the inlet header control valve manually from the control room. Both pumps can supply cooling water to either set of coils.	Normal operation per SOP-29 verifies this function.	None
Table 9-4	<u>Shield Cooling Pumps</u> Capacity (each) 125 gpm TDH 38 ft	None.	The ability of the shield cooling system to perform its function will be verified by test or data gathering and analysis during startup.
	<u>Shield Cooling Heat Exchanger</u> Design Duty 200,000 Btu/h Fluid: Component Cooling Water / Shield Cooling Water Temperature In: 90°F / 100°F Temperature Out: 93.2°F / 96.8°F	None.	The ability of the shield cooling system to perform its function will be verified by test or data gathering and analysis during startup.
SOP-29 7.1/7.2/ 7.3	Shield Cooling System Operations	Normal plant Operations verify system function.	None
Work Order History	A review of Work Order history revealed approximately 9 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 6 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None

SHIELD COOLING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage. No modifications were performed on this system.	None.	None.

CIRCULATING WATER SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 10.2.4.1	Motor-driven butterfly valves are provided in both pump discharge and condenser inlet piping. The valves are provided for throttling during pump start-up and for maintenance isolation. The valves are interlocked with their corresponding pump motor breakers.	Normal operations per SOP-14 verify the valve functions.	The interlock will be verified.
FSAR 10.2.4.2	In order to minimize the discharge temperature through the blowdown line, the blowdown is extracted from the circulating water piping just upstream of the condenser inlet and is discharged to the discharge mixing basin. The blowdown is controlled to keep the discharge temperature in compliance with the Plant's NPDES permit and to maintain 1-1/2 cycles of concentration when compared to the lake inlet.	Blowdown is controlled per SOP-14. Makeup basin level is monitored each shift by auxiliary operator rounds.	None
FSAR 10.2.4.3	Dilution water is normally added to the Circulating Water System on the inlet line downstream of the blowdown line. Two 30,000 gpm vertical dilution pumps provide this flow. In addition, dilution flow may be directed to the mixing basin on an as needed basis.	Normal operations per SOP-14 verify these functions.	None
Table 10-9	Cooling Tower Pumps Design Flow, gpm 205,000 Design Head, ft 106	None.	Normal plant operation verifies adequate circulating water flow. Trend program will monitor performance during power escalation.
SOP-14 7.1 through 7.13	Circulating water/diluton water/cooling towers/chlorination/ chemical control operations.	Normal operations verifies these functions.	None

CIRCULATING WATER SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-14 7.14	Warm water recirculation and emergency service water makeup.	None	These backup functions are not periodically tested. Warm water recirc is provided in case of intake screen icing. Failure of this system will not impact the plant immediately. Alternative actions could be taken in time to correct the problem. However, this system function capability will be exercised during power escalation to or at 100% power.
Work Order History	A review of Work Order history revealed approximately 108 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 85 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-689 added a cooling water scaling inhibitor system.	Preliminary equipment testing has been satisfactorily completed.	Final acceptance test to be performed with plant on line.
	FC-666 structurally upgraded and repaired the cooling towers.	No testing is required.	None

NEUTRON MONITORING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.6.1.2	Each power range safety channel is provided with a rod drop detection circuit and provides output to an axial power ratio calculator.	RI-62 verifies this function.	None
FSAR 7.6.1.4 Item 4	The output signal of the incore flux detectors will be calibrated or adjusted for changes in sensitivity due to emitter material burnup.	Computer program software is updated based on burnup.	None
FSAR 7.6.1.4	The incore instrumentation is required to measure radial peaking factors for Technical Specifications limits monitoring.	DWT-12A verifies incore instrumentation is available.	None
FSAR 7.6.1.4	The incore instrumentation must also provide a diverse monitoring of reactor core quadrant power tilt and linear heat rate, both parameters being monitored also by the excore nuclear instrumentation.	DWT-12A verifies these functions.	None
FSAR 7.6.1.4	Quadrant power tilt is alarmed in the control room via the power range safety channels and linear heat rate is alarmed in the control room via the incore alarm system.	DWT-12A and DWT-12B verifies the incore alarm.	Quadrant power tilt alarm from power range safety channels is not periodically tested. This will be verified prior to startup and periodically in the future.
FSAR 7.6.2.2	Audible count rate signal from start-up channels are available in the control room and in the containment building.	GOP's 3, 8, 10 and 11 places the audible count rate signal in operation.	None
FSAR 7.6.2.2	The rate-of-change information from 10^{-4}% to 15% full power (wide range logarithmic channels) actuates alarms, a reactor trip, or a control rod withdrawal prohibit signal.	RI-47 verifies alarms and control rod withdrawal prohibit.	Reactor trip on high start-up rate is not periodically tested. This will be verified prior to startup and periodically in the future.
FSAR 7.6.2.2	Comparison between power range channels allows detection of radial flux imbalance.	SHO-1 verifies no imbalance.	None
FSAR 7.6.2.2	The gain of each power range control channel is adjustable to provide a means for calibrating its output against a plant heat balance.	Adjustment is performed per SOP-35 when necessary.	None

NEUTRON MONITORING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
	STARTUP CHANNELS		
FSAR 7.6.2.2	Start-up channel rate signal feeds a front panel meter, a remote meter and alarm trip units.	RI-99 and PAC NMS-003 calibrates the start-up channels.	None
FSAR 7.6.2.2	Start-up channel detector voltage is also monitored by a trip unit which lights a light on decrease of voltage or removal of any of the drawer modules.	RI-99 verifies this function.	None
FSAR 7.6.2.2	A drawer-mounted trip unit provides a visible alarm at approximately 1.5 decades/minute. Alarm trip units reset automatically when the trip condition clears. Each trip unit actuates a front panel light. This light is reset manually to allow determination of the previous state of the the trip unit.	RI-47 verifies this alarm function.	None
FSAR 7.6.2.2	Wide Range Logarithmic Channels The logarithm of neutron flux is obtained. This signal drives a front panel meter (10^{-8}% full power to 125% full power), a remote meter, a remote recorder and trip units.	PAC NMS-002 calibrates wide range neutron monitoring.	None
FSAR 7.6.2.2	Wide range rate signal feeds a front panel meter, a remote meter and trip units.	PACS NMS-002 calibrates wide range neutron monitoring.	None
FSAR 7.6.2.2	Detector voltage is also monitored by a trip unit which initiates an alarm on decrease of detector voltage or removal of any of the drawer modules.	PAC NMS-002 verifies high voltage alarm trip setpoint.	None

NEUTRON MONITORING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.6.2.2 Table 7-4	Each wide-range logarithmic channel contains eight trip units. Operation of the trip units is according to Table 7-4.	PAC NMS-002 verifies all bistables on the wide range channels.	None

Input Signal	Action	Approximate Set Point
Detector Voltage, Module Interlock, Operate Calibrate Switch	Audible and Visible Alarm	15% Below Normal Operating Voltage
Log Power Level	Bypass Rate-of-Change of Power Trip. Disable Zero Power Mode Bypass (Effective for One Protective Channel)	10^{-4}% Full Power
Log Power Level	Bypass Rate-of-Change of Power Trip. Disable Zero Power Mode Bypass (Effective for One Protective Channel)	10^{-4}% Full Power
Rate-of-Change of Power	Pretrip Signal and Rod Withdrawal Prohibit (Effective for Two Protective Channels)	1.5 Decades/Minute (Bypassed $<10^{-4}$% and >15%)
Rate-of-Change of Power	Trip Signal to Reactor Protective System (Effective for One Protective Channels)	2.6 Decades/Minute (Bypassed $<10^{-4}$% and >15%)
Rate-of-Change of Power	Trip Signal and Reactor Withdrawal Prohibit (Effective for Two Protective Channels)	2.6 Decades/Minute (Bypassed $<10^{-4}$% and >15%)

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR	POWER RANGE SAFETY CHANNELS		
7.6.2.2	The outputs of a A and B subchannels are compared and the deviation signal sent to an axial power ratio calculator for axial power distribution monitoring.	PAC NMS-001 calibrates the power ratio recorder.	None

NEUTRON MONITORING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.6.2.2	The output from the comparator average is returned to each channel drawer and compared to each channel via two deviation comparators. The two levels of deviation are alarmed at the channel drawer and also by remote alarms as percent average core power radial (quadrant) flux tilt, Level 1, or Level 2, for operator action to ensure the Technical Specifictions limits on radial peaking factors are observed.	SHO-1 compares power range channels each shift and verifies deviation does not exist.	Quadrant power tilt alarm is not periodically checked. Incore neutron monitoring is primary means of quadrant power tilt measurement and alarm. This alarm will be verified prior to startup and periodically tested in the future.
FSAR 7.6.2.2	The axial power ratio recorder-alarm monitor consists of an axial power ratio signal calculator, a power ratio set point potentiometer, a power ratio deviation potentiometer and a power ratio recorder.	PAC NMS-001 calibrates the power ratio recorder.	None
FSAR 7.6.2.2	The alarm light alerts the operator in the event that the power ratio signal violates an operator-set upper-or-lower limit which would be indicative of an undesirable axial power distribution.	PAC NMS-001 calibrates the power ratio recorder.	The power ratio alarm is not periodically checked. This will be verified prior to startup and periodically in the future.
FSAR 7.6.2.2	Power range safety channels are an alternate (diverse) means of ensuring the Technical Specifications limits on reactor core parameters are observed, the primary means being the incore alarm system.	DWT-12A verifies these functions.	None
FSAR 7.6.2.2	The power ratio signal calculator: Generates high- and low-power ratio signal alarm limits from signals sent from the power ratio set point potentiometer and power ratio deviation potentiometer located on the control console. These potentiometers are adjusted by the operator as a function of control rod position and NSSS power, or as directed by the reactor engineer. -Compares the computed power ratio signal with the calculated high- and low-alarm limits and provides an annunicated alarm when either limit is violated. -Generates from the power ratio set point potentimeter a power ratio set point signal which is displayed on the two-pen power ratio recorder. The duel pen power ratio recorder gives the operator a continuous trace of the power ratio set point and the power ratio signal. -An alarm light mounted on the recorder comes on whenever the high- or low-power ratio signal alarm limits are violated.	PAC NMS-001 calibrates the power ratio recorder. Power ratio set point is determined periodically by reactor engineering.	The power ratio alarm is not periodically checked. The power ratio alarm is not annunicated. This will be verified prior to startup and periodically in future (same as earlier item).

NEUTRON MONITORING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.6.2.2	The full-scale signal output is changed by the range selector switch resulting in the high power trip and pretrip set points being lowered by a factor of ten when the range selected is 0.1%-12.5%.	GOP's 3, 8 and 10 specify when X10 position is to be used.	None
FSAR 7.6.2.2	The summing circuit also has X2 gain selector switch which disconnects the input of one ion chamber and doubles the gain for the other ion chamber to allow full-scale power indication should one ion chamber fail.	CL-35 verifies this capability prior to each start-up.	None

NEUTRON MONITORING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.6.2.2 Table 7-5	Each power range channel contains eight trip units. Operation of the trip units is according to Table 7-5.	MI-1 verifies high power trips for existing pump combination. RI-47 verifies rod withdrawal prohibit condition. MI-1 verifies rate trip inhibit and loss-of-load trip bypass. MI-1 verifies high voltage trip alarm.	None

Input Signal	Action	Set Point
Detector Voltage, Module Interlock, Operate Calibrate Switch	Audible and Visible Alarm	15% Below Normal Operating Voltage
Power Level	Trips Signal to RPS (Four Pumps)	$\leq$106.5% Full Power
Power Level	Pretrip Signal to Alarm and Rod Withdrawal Prohibit (Four Pumps)	$\leq$104.5% Full Power
Power Level	Trip Signal to RPS (Three Pumps)	$\leq$39% Full Power
Power Level	Pretrip Signal to Alarm and Rod Withdrawal Prohibit (Three Pumps)	$\leq$37% Full Power
Power Level	Trip Signal to RPS (Two Pumps)	$\leq$21% Full Power
Power Level	Pretrip Signal to Alarm and Rod Withdrawal Prohibit (Two Pumps)	$\leq$17% Full Power
Power Level	Rate Trip Inhibit to Logarithmic Channel	$>$15% Full Power
	Bypass Loss-of-Load Trip	$<$15% Full Power

NEUTRON MONITORING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.6.2.2	A reacitivy computer can be reconnected to one of the power range control channels to read reactivity for 10^{-2}% to 100% full power. The output indication is located in the control room next to the other meters above to provide surveillance during start-up and at power, as well as an accurate source of test data.	None	This equipment is not used. This will be clarified in the FSAR.
FSAR 7.6.2.2	Reactor Internals Vibration Monitor - In order to provide the necessary data for evaluation of the characteristics and degree of reactor internals motion, the four excore nuclear instrumentation (safety channels) neutron flux detector signals are sent to a minicomputer (noise analyzer located in the control room) to monitor the changing patterns of the signal noise. The Technical Specifications have limits of motion amplitude at two separate levels calculated and displayed by the minicomputer	None	This capability is no longer used. Technical Specifications have been revised to delete these limits. The FSAR will be corrected.
FSAR 7.6.2.4	Incore Instrumentation Verification of incore channel readings and identification of inoperable detectors are done by correlation between readings and with computed power shapes using an off-line computer program.	Capability is verified per the Palisades Incore Detector Analysis System (INCA).	None
	Quadrant power tilt and linear heat rate can be determined from the excore nuclear instrumentation provided they are calibrated against the incore readings as required by the Technical Specifications.	SOP-35 directs performance of the process.	None
	The incore alarm system function is verified by the plant information processor program out-of-sequence alarm and channel check feature.	MO-08 verifies this function.	None
Tech Spec 3.11.1 Basis	Incore alarm setpoints must be updated periodically based on measured power distribution.	DWT-12B updates incore alarms.	None

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-35 7.1.2/ 7.2.1/ 7.3.1	Place excore monitoring systems in operation.	Normal operations verify these functions.	None
SOP-35 7.1.2/ 7.2.2/ 7.3.3	Change an indication channel while operating.	None	These are contingency action which are only performed should a channel fail.
SOP-35 7.3.5	Calibrate power range safety channels.	Normal operations verify this function.	None
SOP-35 7.3.6/ 7.3.7	Monitor power distribution/set target power ratio.	These functions are performed, as needed, per the steps of the SOP.	None
SOP-35 7.4	Incore neutron monitoring.	Functions are performed per the steps of the SOP.	None
SOP-35 7.5	Calibrate power range control channels.	Functions are performed per the steps of the SOP.	None
Work Order History	A review of Work Order history revealed approximately 70 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 6 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage. No modifications were performed on this system.		None
MCTF NMS	No entries.	None	None

PLANT DATA LOGGER

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 7.6.1.5	A data logging system is provided to monitor, record and identify sequences of events for safety and non-safety related plant parameters of the following systems: 1. Reactor Protection System 2. Engineered Safeguards Controls 3. Reactor Shutdown Controls 4. Fluid Systems Protection 5. Regulating Controls 6. Primary Plant Process Instruments 7. Secondary Plant Process Instruments 8. Electrical Power Distribution	Routine plant operations verifies these functions. PPAC DTA-002 (6 month PM) calibrates power supplies. PPA DTA-003 (3 month PM) performs calibration on field remote stations.	No periodic testing is performed to verify the validity of inputs to the data logging system. This will be evaluated to determine methods to ensure proper datalogger functionability.
FSAR 7.6.2.5	The software part of the system includes a command print station switchover such that the remote print station in the feedwater purity building can take over the function of the CPS in the main control room if the CPS is non-functional. A pre/post-event program also allows recording in the main control room of significant event history. Finally, alarm, status, analog and diagnostic summaries are provided.	These capabilities are routinely exercised after each plant trip, in that the post trip review data is printed out on the remote print station. This is done to preclude further distraction of the operator in the main control room. The CPS is monitored and used routinely during plant operation to verify its functions.	None
SOP-34 7.1	To request various printouts, to temporarily disable and and reenable all major events, to modify data logger system time.	These activities are routinely performed during normal plant operations.	None
Admin 4.08	Post trip review requirements - collect hard copies of data.	This is routinely performed after each plant trip.	None
Work Order History	A review of Work Order history revealed approximately 23 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 20 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None

PLANT DATA LOGGER

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage. No modifications were performed on this system.	None	None
MCTF DTA-01	Some thirteen points did not respond when comparable event recorder pens operated during the 5/19/86 trip. Repair inputs identified.	All thirteen points were repaired and tested during this outage and all channels responded appropriately to the simulated inputs.	None
MCTF DTA-02	1. Evaluate relocation of data logger printer to cable spreading room.	The data logger central printing station is now located in the cable spreading room (SC-86-173).	None
	2. Improve documentation of maintenance activities on data logger systems.	I&C supervisors and engineers have been informed of expectations on keeping records of computer maintenance in accordance with memo RKT86-006, dated 7/14/86.	None

POST ACCIDENT SAMPLING MONITORING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.9.2	The post-accident sample system is designed to extract samples of primary coolant, low pressure injection pump discharge and containment atmosphere following an accident involving fuel damage.	EI 7.1 provides instructions for obtaining samples from the indicated sources. The PASMS is operated weekly to insure samples can be drawn.	None
9.9.2	Liquid samples may be taken directly or diluted with demineralized water to reduce the activity levels. The undiluted sample may be injected into a shielded transportable sample flask for transport to the lab for analysis.	EI 7.1 provides instructions for dilution of samples.	None
9.9.2	Each hydrogen monitor contains a sample pump, temperature, pressure and flow controllers, and a thermal conductivity cell.	RI 81 A and B verify systems ability to detect H^2. In addition PACS MGS 004, MGS 014 PCS 027, PCS 026 and PCS 025 calibrate temperature pressure and flow instruments in the PASMS and H^2 monitoring system.	None
9.9.2	Piping from the containment to the H^2 analyzer panels are heat-traced and maintained at approximately 285° to prevent condensation in the sample stream.	Heat Trace alarm in Control Room will alert Operators to implement ARP 33 PACS MGS-14 calibrates the Alarm.	None
9.9.2 SOP 38	During normal Plant operation, the system is maintained at standby conditions permitting rapid start-up.	SOP 38 provides system operating instructions.	None
9.9.2 SOP 3	System operation may be initiated locally at the panel or remotely from the control room. Once initiated, operation is automatic.	SOP 38 (Step 7.13) provides instructions for local/remote control.	None
EI-7.0 Attachment 2	Jumpering CV-1910 and CV-1911 for PASM sample.	This evolution is performed during the annual emergency drill.	None
MCTF PAS-01	EC-103-1 Post Accident Sampling Panel /		
	Calibrate a. Liquid Sample hi/lo flow lights b. Containment Air hi/low flow lights c. Temperature elements 1900, 1902, 1903 d. High Sump Alarm	FE/FS-1901 Calibrated FS-1900 Calibrated TE-1900, 1902 & 1903 Calibrated LS-1901 Tested	None

POST ACCIDENT SAMPLING MONITORING SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
Work Order History	A review of Work Order history revealed approximately 6 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were postmaintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 30 Work Orders completed between 05/19/86 to, 12/15/86.	Work Orders were postmaintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage. No modifications were performed on this system.	None	None

RADIATION MONITORING

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 11.5	PROCESS AND EFFLUENT RADIOLOGICAL MONITORING AND SAMPLING SYSTEM		
	Detection devices are located in the various process systems and at selected positions throughout the containment and auxiliary buildings to monitor radiation levels and annunicate any abnormally high radiation activity.	QR-22 verifies annunication of process system hi-level alarms and circuit failures.	None
FSAR 11.5.1	Additionally, all monitors in the stack-gas, containment air, off-gas, waste gas, engineered safeguards areas ventilating system discharge, radwaste ventilation and radwaste liquid discharge systems have been supplied with check sources. The check source is to simulate a radioactive sample and serve as a check for both the readout and detector.	MR-14 utilizes check sources to verify detector response.	None
FSAR 11.5.2	The detection devices display their information in radiation monitoring equipment panels located inside the main control room. The panel provide mounting for indicators, recorders, power supplies and alarms for each of these radiation monitoring systems.	QR-22 verifies annunication of process system hi-level alarms and circuit failures.	None

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR Table 11-15	The type of detectors used and the information displayed are listed in Table 11-15. The alarm conditions for each instrument are also listed.	Health Physics or surveillance procedures perform the indicated activities as shown below:	None

Process Radiation Service and Equipment

Process Radiation Monitoring Systems	Detection Equipment/ Sampling Equipment	Alarm and Control	Channel Check	Source Check	Channel Calibration	Channel Functional Test
Liquid Service Water RIA-0833	Scintillation detector/detector well in service water line to structure.	Alarm on high radiation, circuit failure.	DWO-1	MR-14	RR-9J	QR-22
Steam Generator Blowdown RIA-0707	Geiger-Mueller tube/ external to blowdown tank, drain to discharge structure.	Alarm on high radiation, signal; isolates blowdown tank.	DWO-1	MR-14	RR-9A	QR-22
Radwaste Liquid Discharge RIA-1049	Scintillation detector/in well in radwaste liquid line to discharge structure.	Alarm on high radiation, circuit failure; high radiation prohibits radwaste discharge to lake.	DWO-1	MR-14	RR-9B	QR-22
Component Cooling Water RIA-0915	Scintillation detector/piping, valves, sample pump and detector housing; storage tank discharge to waste gas surge tank.	Alarm on high radiation, circuit failure; isolates component cooling water surge tank.	HP 6.8	MR-14	HP 6.9A	HP 6.8
Liquids Discharge RIA-1323	Scintillation detector/piping, valves, sample pump and detector housing; circulating after to discharge structure.	Alarm on high radiation, circuit failure.	HP 6.8	MR-14	HP 6.9A	HP 6.8
Stack-Gas RIA-2318/2319	Scintillation detector/piping, valves, filters, sample pump, detector housing and sample nozzle; discharge to atmosphere.	Alarm on high radiation, and circuit failure.	DWO-1	MR-14	RR-9G	QR-22

RADIATION MONITORING

SOURCE	SYSTEM TEST REQUIREMENTS			TEST PERFORMED				EXCEPTION/ JUSTIFICATION
	Process Radiation Service and Equipment							
	Process Radiation Monitoring Systems	Detection Equipment/ Sampling Equipment	Alarm and Control	Channel Check	Source Check	Channel Calibration	Channel Functional Test	
	Off-Gas Monitoring RIA-0631	Scintillation detector/piping, valves and detector housing; main condenser steam jet air ejector noncondensibles.	Alarm on high radiation and circuit failure.	DWO-1	MR-14	RR-9D	QR-22	
	Radwaste Area Ventilation RIA-1809	Geiger-Mueller tube/ piping, valves, sample pump and detector housing; air monitoring prior to discharge through stack.	Alarm on high radiation and circuit failure; isolates radwaste vent system.	HP 6.8	MR-14	HP 6.9A	HP 6.8	
	Engineered Safeguards Pump Rooms Vent RIA-1810/1811	Geiger-Mueller tube/ piping, valves, sample pump and detector housing; to stack, 2 systems, east and west rooms.	Alarm on high radiation and circuit failure; isolates pump room vent supply and exhausts.	DWO-1	MR-14	RR-9F RR-9E	QR-22	
	Waste Gas Radiation RIA-1113	Geiger-Mueller tube/ piping, valves and detector housing; from the waste gas surge tank and waste gas decay tanks to stack.	Alarm on high radiation and circuit failure; isolates waste gas surge tank and decay tanks.	DWO-1	MR-14	RR-9I	QR-22	
	Containment Building Gas Monitoring System RIA-1817	Geiger-Mueller tube/ piping, solenoid vavles and detector housing; from 5 sample locations on (4) cooler fans discharge and (1) purge fan exhaust.	Alarm on high radiation and circuit failure; isolates waste gas surge tank and decay tanks.	DWO-1	MR-14	HP 6.9A	HP 6.8	
	Failed Fuel RIA-0202A/B	Scintillation detector/ in sample line boronometer.	Alarm on high radiation, circuit failure.	DWO-1	HP 6.8	RR-9L	HP 6.8	

RADIATION MONITORING

SOURCE	SYSTEM TEST REQUIREMENTS			TEST PERFORMED				EXCEPTION/ JUSTIFICATION
	Process Radiation Service and Equipment							
	Process Radiation Monitoring Systems	Detection Equipment/ Sampling Equipment	Alarm and Control	Channel Check	Source Check	Channel Calibration	Channel Functional Test	
	Steam Generator Blowdown RIA-2320	Scintillation detector/ in well on blowdown vent line.	Alarm on high radiation, circuit failure.	DWO-1	MR-14	RR-9H	QR-22	
	Turbine Sample RIA-5211	Scintillation detector/ piping, valves, sample pump, and detector housing, sump pump discharge to drain.	Alarm on high radiation, circuit failure.	DWO-1	MR-14	RR-9C	QR-22	
	Radwaste Addition Vent RIA-5711	Beta Scintillation/ moving paper, sample pump, motor, discharge at radwaste addition vent.	Alarm on high radiation circuit failure; high radiation isolates fuel building	HP 6.8	MR-14	HP 6.9B	HP 6.8	
	Fuel Building Addition Vent RIA-5712	Beta Scintillation/ moving paper, sample pump, motor, discharge at fuel building addition vent.	Alarm on high radiation circuit failure; high radiation isolates fuel building vent.	HP 6.8	MR-14	HP 6.9B	HP 6.8	
	Dirty Waste Sample RIA-8265	Scintillation detector/ piping, valves, detector housing, discharge at dirty waste sample.	Alarm on high radiation, circuit failure.	HP 6.8	MR-14	HP 6.9A	HP 6.8	
	RGEMS RIA-2325 RIA-2326 RIA-2327	Scintillation detectors for beta and gamma, ionization chamber/ piping, valves, filters,sample collection bottle; discharge to atmosphere.	Alarm, set recorder speed, isolate sample on alert level. Alarm transfer flow to upper range on high radiation.	DWO-1 SHO-1 /	MR-14	RR-84A RR-84B RR-84C	QR-22	
	Main Steam RIA-2323/2324	Gieger-Mueller tube/ in lead collimator adjacent to main steam lines.	Alarm on high radiation.	SHO-1	MR-14	RR-9K	QR-22	

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 11.5.3	In 1983 a main steam relief monitoring system was installed to monitor accident releases in the event the atmospheric dump or safety valves lift. In the event of a steam release, an acoustic switch, triggered by the high speed for greater resolution.	RI-2323 and RIA-2324 are calibrated by RR-9K, functionally tested by QR-22 source checked by MR-14 and channel checked by SHO-1.	No pacs could be found which calibrates the acoustic switch or verifies recorder response. This will be verified periodically in the future and prior to start-up.
FSAR 11.5.3.1	ORIGINAL STACK MONITORING SYSTEM		
	Prior to 1983 the stack monitoring system consisted of an isokinetic nozzle, dual particulate samplers, flow control valve, pump, gas monitoring channel and a flow indicator/ transmitter. The samplers are analyzed by a cryogenic spectrum analyzer to determine isotopic identify.	Surv Test DWR-10 is performed weekly to analyze for I-131, particulate and other radio nuclide.	None
FSAR 11.5.3.1	The flow rate through the particulate samples is automatically controlled to compensate for filter loading and stack flow. The stack flow transmiter and sample flow indicator/transmiter operate through a controller and current pneumatic converter to regulate the control valve at the pumping system inlet. A two-pen flow indicator/recorder with flow alarm outputs continuously monitors the stack and sample flow.	None	These flow recorders are no longer used. A local continuous monitor is now used and calibrated by RR-84D. The FSAR will be corrected.
FSAR 11.5.3.1	An encapsulated check source is also included in the gas monitoring unit. The source is placed into service by actuating normally closed electric-solenoid-type isolation valves for the duration of the test-calibration period.	MR-14 utilizes check sources to verify detector response.	None
FSAR 11.5.3.2	RADIOACTIVE GASEOUS EFFLUNET MONITORING SYSTEM (RGEMS)		
	Flow through the system is provided by two 100% capacity diaphragm vacuum pumps. The flow is controlled by automatic flow control valves to maintain a constant flow rate of 2 scfm through the system.	Surv Test RR-84D calibrates the flow meter.	None
	During normal operation, 2 scfm of the stack effluent is routed through a particulate/radioiodine filter then through the beta detector. The filter is continuously monitored by the NaI detector to detect any buildup on the filter. The filter is changed and counted on a regular basis by Plant personnel.	Surv Test DWR-10 is performed weekly to analyze stack effluent.	None

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 11.5.3.2	On indication of abnormal stack effluent activity (alert level), a 15-second grab sample is automatically trapped in a sample bottle and an annunicator in the control room indicates the off-normal condition.	QR-22 verifies the alarm.	Grab sample feature testing is not documented. Alert levels are alarmed on the RIA, but are not annuciated. FSAR will be clarified. The grab sample and annunciator will be verified prior to start-up and periodically in the future.
	Following a high level indication, the normal sample loop is bypassed and the sample flow is split with approximately 0.02 scfm directed through the high-range filter and the balance of the 2 scfm through the ion chamber. A "high radiation" annunicator in the control room alerts the plant operators to the condition.	QR-22 verifies the alarm.	Testing of changes in sample flow paths are not documented. This will be verified and documented prior to start-up and periodically in the future.
FSAR 11.6.5.2 Table 11-6	AREA RADIATION MONITORING SYSTEMS Thirty-nine continuous monitoring points within the plant are selected to provide indication and warning where radioactivity may be present:		None

Instrument(s)	Channel Check	Source Check	Channel Calibration
East Engineering Safeguards Room - RIA-2300	DWO-1	MR-6	RI-86A
Charging Pump Room Entrance-North - RIA-2301	DWO-1	MR-6	RI-86A
Radwaste Control Panel C-40 - RIA-2302	DWO-1	MR-6	RI-86A
Fuel Pool Equipment Room Corridor - RIA-2303	DWO-1	MR-6	RI-86A
Radiochemistry Lab Entrance - RIA-2304	DWO-1	MR-6	RI-86A
Access Control - RIA-2305	DWO-1	MR-6	RI-86A
Outside of Cont Personnel Air Lock - RIA-2306	DWO-1	MR-6	RI-86A
Containment Purge Unit Room-North - RIA-2307	DWO-1	MR-6	RI-86A
Radwaste Demineralizer Room Roof - RIA-2308	DWO-1	MR-6	RI-86A
Control Room/Turbine Building Corridor - RIA-2309	DWO-1	MR-6	RI-86A
Control Room/Entrance - RIA-2310	DWO-1	MR-6	RI-86A
Containment 590' Elev SW Side - RIA-1806	SHO-1	MR-6	RI-86F
Turbine Floor East Side - RIA-2311	DWO-1	MR-6	RI-86A
Health Physics/Engineering Office - RIA-2312	DWO-1	MR-6	RI-86A
Containment 490'Elev SE Side - RIA-1808	SHO-1	MR-6	RI-86F
Containment 590'Elev NW Side - RIA-1805	SHO-1	MR-6	RI-86F
Spent Fuel Pool - RIA-2313	SHO-1	MR-6	RI-86A

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED			EXCEPTION/ JUSTIFICATION
	Instrument(s)	Check	Check	Calibration	
	Air Room 590' Elev - RIA-2314	DWO-1	MR-6	RI-86D	
	Containment 590' Elev NE Side - RIA-1807	SHO-1	MR-6	RI-86F	
	Inside of Cont Personnel Air Lock - RIA-2315	DWO-1	MR-6	RI-86D	
	Decontamination Room - RIA-5701	DWO-1	MR-6	RI-86B	
	Evaporator "A" - RIA-5702	DWO-1	MR-6	RI-86B	
	Evaporator "B" - RIA-5703	DWO-1	MR-6	RI-86B	
	Evaporator Control Panel C-105 - RIA-5704	DWO-1	MR-6	RI-86B	
	Waste Gas Decay Tank T-101, A, B, and C - RIA-5705	DWO-1	MR-6	RI-86B	
	Environmental Lab Entrance - RIA-5706	DWO-1	MR-6	RI-86B	
	Radwaste Packaging Area-North - RIA-5707	DWO-1	MR-6	RI-86B	
	Radwaste Packaging Area-South - RIA-5708	DWO-1	MR-6	RI-86B	
	Radwaste Demineralizer 649' Elev - RIA-5709	DWO-1	MR-6	RI-86B	
	Steam Dumps Area - RIA-5710	DWO-1	MR-6	RI-86B	
	Resin/Filter Media Handling Area - RIA-8266	DWO-1	MR-6	RI-86C	
	Cask Handling Area - RIA-8267	DWO-1	MR-6	RI-86C	
	Flaked Filter Operator Area - RIA-8268	DWO-1	MR-6	RI-86C	
	Makeup Water Area - RIA-8269	DWO-1	MR-6	RI-86C	
	Phase Separator Area - RIA-8270	DWO-1	MR-6	RI-86C	
	Demineralizer Access - RIA-8271	DWO-1	MR-6	RI-86C	
	Holding Pump/Valve Gallery Area - RIA-8272	DWO-1	MR-6	RI-86C	
	Containment 649' Elev Rx Cavity - RIA-2316	DWO-1	MR-6	RI-86E	
	Containment 649' Elev Rx Cavity - RIA-2317	DWO-1	MR-6	RI-86E	
FSAR 11.6.5.2	High-radiation levels and individual circuit failures are alarmed both visually and audibly on the area radiation monitoring panel.	MR-6 verifies alarm response.			None
FSAR 11.6.5.2	The containment building gas monitor supplies a signal to a linear rate meter. The output from this system is recorded and an alarm is given for both high-radiation levels and circuit failures.	MR-14 and HP 6.8 verify alarm response.			None
11.6.8.2	Area and Process Radiation Monitors				
	Each area and process monitor is periodically tested to determine that: 1. The calibration of the monitor is correct so that control room readout instrumentation indicates true radiation levels. Proper calibration is assured by placing radiation sources at reproducible geometries on at least two points of the range of the instrument. 2. The alarm scale trip points function properly and that the alarms function properly.	See Table 11-15 and 11-6 entries			None

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
11.6.8.3	Continuous Air Monitors		
	Each continuous air monitor is periodically tested to determine that: 1. The calibration of the monitor is correct and that readout in counts per minute can be converted to air contamination in uCi/cm³. 2. Air flow is constant. 3. Trip alarm points are set and function properly.	HP 9.42 is performed at 6 month intervals for CAM which are place in service.	None
SOP 37 7.1/7.2	Meter Functions	Meter functions are verified daily per D/WO-1.	None
7.3	Place Monitors in Operation	Steps are performed per the SOP.	None
SOP 38 7.1/7.2	Meter Functions	Meter functions are verified daily per D/WO-1.	None
7.3 through 7.12	Place Monitors in Operation	Steps are performed per the SOP.	None
7.13	H³ Monitoring	Steps are performed per the SOP.	None

RADIATION MONITORING

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP 39 7.1/7.2	Area Monitor Functions	Functions are verified daily per D/WO-1.	None
7.3/7.6	Monitor Operation	Steps are performed per the SOP.	None
7.4	Alarm point setting	Steps are performed per the SOP.	None
7.5	Test meter reading	MR-6 performs this test monthly.	None
MCTF RIA-01	FR-2318 Stack Gas Flow Recorder Ensure Operability	W.O. Testing verified component/system working properly. Performed Tech Spec Test RR-84b.	None
MCTF RIA-02	P-1811 West Engineering Safeguards Room Monitor Ensure Operability of sample pump	See MCTF RIA-31	None
MCTF RIA-03	RIA-0202A failed fuel monitor ensure operability radiation indicator	Performed H.P. 6.8. "Process monitor operational check-quarterly" test demonstrates operability through internal testing capabilities for meter response and calibration.	None
MCTF RIA-04	RIA-0631 Off Gas Monitor Radiation Indicator	MR-14 and QR-22 were satisfactorily performed to assure proper alarm logics and unit operation.	None
MCTF RIA-05	RIA-1049 Liquid Radwaste Discharge Process Monitor	Assured operability through Tech Spec Test MR-14 and Tech Spec Test QR-22.	None

RADIATION MONITORING

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
MCTF RIA-06	RIA-1805 Containment Isolation High Radiation Monitor Ensure operability	Assured operability through Tech Spec Test MR-6.	None
MCTF RIA-07	RIA-1808 Containment Isolation High Radiation Monitor Ensure operability	Assured operability through Tech Spec Test MR-6.	None
MCTF RIA-08	RIA-2304 Controlled Lab Monitor Ensure operability	Assured operability through Tech Spec Test MR-6.	None
MCTF RIA-09	RIA-2307 Containment Purge Room Monitor Ensure Operability	Assured operability through Tech Spec Test RI-86A.	None
MCTF RIA-10	RIA-2315 Personnel Air Lock Monitor Ensure Operability	Performed Tech Spec Surveillance Procedure MR-6	None
MCTF RIA-11	RIA-2318 Stack Gas Radiation Alarm Indicator Ensures Operability	Assured operability through Tech Spec Test QR-22.	
MCTF RIA-12	RIA-2319 Stack Gas Monitor Radiation Alarm Indicator Ensure Operability	Assured operability through Tech Spec Test MR-14 and QR-22.	None
MCTF RIA-13	RIA-2320 S/G Blowdown Tank Vent Monitor Ensure Operability	Assured operability through Tech Spec Test MR-14 & QR-22.	None
MCTF RIA-14	RIA-2321 Containment Gamma Radiation Monitor (Left) Ensure Operability	Assured operability through Tech Spec Test MR-6	None
MCTF RIA-15	RIA-2322 Containment Gamma Radiation Monitor (Right) Ensure Operability	Assured operability through Tech Spec Test MR-6	None
MCTF RIA-16	RIA-2323 Mainstream Safety & Dump Valve Area Monitor Ensure Operability	Assured operability through Tech Spec Test MR-14 & QR-22	None

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
MCTF RIA-17	RIA-2324 Main Stream Safety & Dump Valve Area Monitor Ensure Operability	Assured operability through Tech Spec Test MR-14 & QR-22	None
MCTF RIA-18	RIA-2326 Normal Range Noble gas stack monitor Ensure Operability	Assured operability through Tech Spec Test MR-14 & QR-22	None
MCTF RIA-19	RIA-2327 High Range Noble Gas Stack Monitor Ensure Operability	Assured operability through Tech Spec Test MR-14 & QR-22	None
MCTF RIA-20	RIA-5711 Radwaste Addition Ventilation Monitor Ensure Operability	Assured operability through HP Test 6.8	None
MCTF RIA-21	RIA-5712 Fuel Handling Ventilation Monitor Ensure Operability	Assured operability through HP Test 6.8	None
MCTF RIA-22	RIA-8258 Flat bed filter Room Radiation Monitor Ensure Operability	Assured operability through Tech Spec Test MR-6	None
MCTF RIA-23	RIA-2316 Fuel Handling area monitor #1 Ensure Operability		Exception. This monitor is used during refueling activities only and the detector head is removed after they are complete. Not needed during power operations. Will be installed and verified operable prior to refueling activities by RI-86E.
MCTF RIA-25	RIA-0707 S/G Blowdown Monitor Ensure Operability	Assured operability through Tech Spec Test MR-14 & QR-22	None
MCTF RIA-26	RIA-1113 Waste gas discharge Ensure Operability	Assured operability through Tech Spec Test MR-14 & QR-22	None

RADIATION MONITORING

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
MCTF RIA-27	RE-1805 Containment Isolation High Radiation Monitor Ensure Operability	Assured operability through Tech Spec Test MR-6	None
MCTF RIA-28	RE-1807 Containment Isolation High Radiation Monitor Ensure Operability	Assured operability through Tech Spec Test MR-6	None
MCTF RIA-29	RE-1809 Radwaste Ventilation Monitor Ensure Operability	Assured operability through H.P. Test HP 6.8	None
MCTF RIA-30	RE-1810 East Engineered Safeguard Radwaste Isolation Vent Ensure Operability	Assured operability through Tech Spec Test MR-14 & QR-22	None
MCTF RIA-31	RIA-1811 West Engineered Safeguard Radwaste Isolation Vent Ensure Operability	Assured operability through Tech Spec Test MR-14 & QR-22	None
Work Order History	A review of Work Order history revealed approximately 77 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were postmaintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 54 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were postmaintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-514-01 replaced RE-1805 through RE-1808	Satisfactorily tested via a Modification Test Procedure	None

FIRE PROTECTION SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.6.2	The fire system may also provide a backup water supply to the following:		
	1. Auxiliary Feedwater Pumps Suction	QO-21 verifies operability of fire water cross-tie. Emergency Operating Procedures address this capability.	None
	2. Critical Service Water Supply	Manual valves exist to cross-tie fire and service water. Emergency Operating Procedures address this capability. Valves are cycled on PAC X-OPS-281, each refueling outage.	None
	3. Spent Fuel Pool Fill	None	This is a design feature which is not tested periodically. A six inch swing elbow is in place with appropriate valving should it become necessary to use lake water to fill the fuel pool. SOP-27 provides appropriate instructions.
FSAR 9.6.3.1	Indication of individual systems in various areas is indicated on an annunicator panel in the main control room.	SO-6 verifies operability of fire system annunicator panel (C-47).	None
FSAR	Fixed fog deluge systems protect the main, start-up, station auxiliary, and the spare station transformer Each of these deluge systems are automatically actuated and annunicated by a general alarm in the main control room.	CL-21.2 tests all these transformers deluge systems semi-annually	There are no PACS to periodically schedule these activities. Operations Department manually schedules and controls these checklists. This scheduling system will be reviewed for effectiveness.
FSAR 9.6.3.1	A manual operated fixed fog deluge system protects the charcoal filters used to maintain control room habitability.	CL-21 verifies proper valve lineup. The system operating procedure (SOP-24) provides instructions on how to activate the system.	None

FIRE PROTECTION SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.6.3.1	Wet pipe fusible link sprinkler systems are provided to protect various areas and rooms throughout the plant. Actuation of any system is annunicated by a general alarm in the main control room.	SO-6 verifies operability of these systems, including annunication in the control room.	None
FSAR 9.6.3.1	A dry pipe fusible link sprinkler system is provided for protection of the track alley. It is annunicated and indicated in the same manner as the wet pipe systems.	CL 21.17 verifies operability of this system, including annunication in the control room on a quarterly basis.	This activity is not scheduled periodically by a PACS. Operation Department manually schedules and controls this checklist. This scheduling system will be reviewed for effectiveness.
FSAR 9.6.3.1	Fire detection is provided in the form of smoke detectors. These detectors are located throughout the plant. Initiation of any of these detector zones alarms on the annunicator panel located in the main control room and in switchgear room 1D.	SI-7 verifies operability of smoke detector zone alarms.	None
FSAR 9.6.3.1	Portable fire extinguishers are provided at convenient and accessible locations. The extinguishing media are pressurized water, CO², or dry chemicals as appropriate for the service requirements of the area.	CL 21.15, CL 21.16, CL 21.4, CL 21.5 CL 21.6, CL 21.7 and CL 21.9 provide instructions for monthly inspections of all fire extinguishers.	There are no PACS to periodically schedule these activities. Operations Department manually schedules and controls these check-lists. This system will be reviewed for effective-ness.
FSAR 9.6.3.1	Water for the fire system is supplied by one of three full capacity fire pumps. Each pump is capable of providing water to the largest system demand plus hose streams in the area of demand.	RO-52 verifies the capacities of the fire water pumps	This statement is a design criteria which was used to establish pump capacity.
FSAR 9.6.3.1	One pump is electrically driven; the other two are diesel engine-driven. Any pump will start automatically and can be manually started from the pump control panel.	MO-7B and RO-52 verifies automatic start features of fire pumps. SOP-21 provides instructions for manually starting each pump locally.	None

FIRE PROTECTION SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.6.3.1	A jockey pump with local controls is provided to maintain the system full and pressurized.	Normal plant operations provides the plant with this function.	None
FSAR 9.6.3.1	A cross-connection provided with two, series, hand operated valves connects the fire pump discharge header to the suction header of the auxiliary feedwater pump.	QO-21 verifies operability of this cross-connect feature.	None
FSAR 9.6.3.1	One cross-connection provided with a hand-operated valve connects the fire pump discharge header to each of the critical service waterlines.	These cross-connect valves are cycled via PAC X-OPS-281 each refueling outage to verify this function.	None
FSAR 9.6.3.1	A header terminating in a blind flange is provided at the spent fuel pool for emergency filling.	None	This is a design feature which is not tested periodically. A six-inch swing elbow is in place with appropriate valving should it become necessary to use lake water to fill fuel pool. SOP-27 provides instructions to perform this task. It will not be tested.
FSAR 9.6.3.3	The motor driven pump starts automatically on a low fire system header pressure of 90 psig with the first diesel driven pump being started at 75 psig. The second diesel driven pump starts upon a pressure drop to 60 psig. The diesel driven pumps are thus arranged to back up the electrically driven pump in case the latter does not start.	MO-7B and RO-52 verify operability of automatic start features for each fire pump.	None
FSAR 9.6.3.3	The jockey pump operates continuously to keep the system pressurized to 110 psig on the pump discharge. In case of failure of the jockey pump or if the jockey pump is out for maintenance, the system will be pressurized by automatic operation of the motor driven fire pump by tripping of the pump discharge header pressure switch. Operation of the motor driven pump is annunicated in the control room to alert the operators of system usage.	MO-7B and RO-52 verifies these functions.	None

FIRE PROTECTION SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
FSAR 9.6.4	The fire protection system is provided with connections with test hose valves on the supply header for periodic testing. All equipment is accessible for periodic inspection.	RO-50A/B hydrostatically tests all fire hoses inside and outside of containment.	None
FSAR 9.6.4	Procedure are in effect to maintain and test in accordance with the Technical Specifications and,established standards.	See the list of fire protection systems tests.	None
FSAR 9.6.6	There is a five-man fire brigade onsite at all times. Procedures are in effect that provide fire brigade training and actions required for the Emergency Response Plan. The Fire Protection Implementing Procedures cover the following topics: Organization Fire Emergency Responsibility Plant Fire Brigade Fire Protection Systems Inspection Maintenance and Testing Training Fire Prevention Activities	Fire Protection Implementing Procedures (FPIP) controls all these activities.	None
FSAR Table 9-12	1. Fire Pump, Motor Driven Capacity 1,500 gpm Discharge Pressure 125 psig 2. Fire Pump, Diesel Driven Capacity 1,500 gpm Discharge Pressure 125 psig 3. Fire System Jockey Pump Capacity 50 gpm Discharge Pressure 110 psig	RO-52 verifies the motor driven and both diesel driven fire pumps capacity and discharge pressure.	There is no periodic test to verify capacity of the fire system jockey pump (P-13). Normal plant operations and indications would denote if system pressure (flow) degraded to cause the other pumps to start. This will be reviewed for inclusion in the equipment trend program.

FIRE PROTECTION SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-21 7.1	To place system in operation.	Normal plant operations places the system in operation.	None
SOP-21 7.2	To test run/manually start/stop electric fire pump (P-9A).	Normal plant operations, MO-7B and RO-52 verifies these functions.	None
SOP-21 7.3	To test run/manually start/stop diesel fire pump (P-9B).	Normal plant operations, MO-7B and RO-52 verifies these functions.	None
SOP-21 7.4	To test run/manually start/stop diesel fire pump (P-41).	Normal plant operations, MO-7B and RO-52 verifies these functions.	None
SOP-21 7.5	Supplying service water system using the fire water system.	Manual valves exist to cross-tie the systems. Emergency Operating Procedures address this feature. Valves are cycled each refueling outage via PAC X-OPS-281.	None
SOP-21 7.5.2	Supplying auxiliary feedwater pump suction using the fire water system.	QO-21 verifies operability of this cross-tie feature.	None
SOP-21 7.6	Warehouse fire protection system	None	There is no testing or periodic inspection of the warehouse fire protection systems with the exception of fire extinguishers and hose reels. This is an external plant building. No further testing will be performed.
SOP-21 7.7	Emergency fill of diesel fire pump day tanks.	None	This is a design feature which is not periodically tested. A hand pump and 150 feet of hose are readily available to the operators. This will be verified prior to full power.

FIRE PROTECTION SYSTEM

SOURCE	SYSTEM TEST REQUIREMENTS	TEST PERFORMED	EXCEPTION/ JUSTIFICATION
SOP-21 7.4	To connect fire water to the fuel pool system.	None	This is a design feature which is not tested periodically. A six inch swing elbow is in place with appropriate valving should it become necessary to use lake water to fill the fuel pool.
MCTF FPS-03	Resolve the problem of ability to open the cross-tie valves between the fire protection system and service water system under differential pressure.	MV-130FP and MV-131FP were modified to add a 3:1 ratio valve operator. Both valves were stroked satisfactorily against a differential pressure of approximately 105 psi during the conduct of special test T-216.	None
Work Order History	A review of Work Order history revealed approximately 62 Work Orders completed between 11/30/85 and 05/19/86.	Work Orders were post-maintenance tested and declared operable.	None
Work Order History	A review of Work Order history revealed approximately 45 Work Orders completed between 05/19/86 to 12/15/86.	Work Orders were post-maintenance tested and declared operable.	None
Modification Review	A review of modification history was performed since start of 1985 Refueling Outage.		
	FC-564 added auxiliary hot shutdown panel (C-150A).	Tested satisfactorily via modification test procedure.	None
	FC-642 address sprinkers in the 1C switchgear room.	Tested satisfactorily during work order closeout.	None
	FC-705 provided early fire detection for intake structure room 136.	Tested satisfactorily via modification test procedure.	None

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
FSAR 14.2	1. Reactor Protection System (Note 1):			
Uncontrolled Rod Withdrawal	°High Nuclear Flux Reactor Trip			
	Low power range	≦ 15%	MI-01	None
	High power range	≦112%	MI-01	None
	Maximum trip delay time	≦0.4 sec	None	Trip delays will be verified by test or analysis prior to startup. Relevant safety analyses will be reviewed to assure consistency with results of this verification if necessary. <u>COMPLETE</u> Six logic combinations for high neutron flux were time delay tested with maximum delay time .054 sec.
	°High Pressurizer Pressure Trip	≦2277 psia	MI-02, MI-02A RI-03	None
	°Thermal margin/low pressure trip	≧TM/LP - 165 psia	RI-02, MI-02A	None
	°TM/LP Maximum Trip Delay	≦0.6 sec	None	Trip delays will be verified by test or analysis prior to startup. Relevant safety analyses will be reviewed to assure consistency with results of this verification if necessary. <u>COMPLETE</u> Response time of two pressurizer transmitters were tested along with six logic combinations. Maximum time delay measured was 0.2 seconds.

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Cold leg RTD time constant	≤5 sec	None	RTD time constants will be verified by test or analysis prior to start-up. Relevant safety analyses will be reviewed to assure consistency with results of this verification if necessary.
	°Hot leg RTD time constant	≤9 sec	None	RTD time constants will be verified by test or analysis prior to startup. Relevant safety analyses will be reviewed to assure consistency with results of this verification if necessary.
	2. Chemical and Volume Control System:			
	°Pressurizer spray flow	Note 2	None	Note 2
	3. Control Rod Drive System:			
	°Max rod withdrawal rate	≤46 in/min	None	Maximum rod withdrawal speed will be verified during startup. <u>COMPLETE</u> Rod withdrawal verified <46 in/min.

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES

(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
FSAR 14.3	1. Chemical and Volume Control System:			
Boron Dilution Incident	°Maximum charging pump flow	≤ 133 gpm	MO-20	None
	°Minimum PCS boron conc (Refueling)	≧1720 ppm	MC-11C,D	None
	(Hot Standby)	≧1150 ppm	EM-04-08& Tech Data Manual	None
	(Cold Shutdown)	≧1720 ppm	MC-11C,D	None
	2. Engineered Safeguards System:			
	°Minimum low level alarm on NaOH Storage Tank guarantees ≧3900 gal		MO-25	None
	°Maximum NaOH storage tank Vol ≦6000 gal		MO-25	None
	°Procedural controls ensure closure of redundant isolation valves between iodine removal system and PCS during outages.		CL-3.5	None
FSAR 14.4	1. Chemical and Volume Control System:			
Control Rod Drop Event	°Maximum pressurizer spray flow	Note 2	None	COMPLETE Max pressurizer spray flow in analysis ≦375 gpm. Max charging flow to aux spray is 133 gpm.

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES

(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
FSAR 14.7	1. Reactor Protection System:			
Loss of Coolant Flow Incident	°Low PCS flow trip	≥93%	RI-94	None
	°Maximum trip delay	≤0.6 sec	None	Trip delays will be verified by test or analysis prior to startup. Relevant safety analyses will be reviewed to assure consistency with results of this verification if necessary. COMPLETE Four PCS flow transmitters (Channel A) and the six logic combinations were time delay tested. Maximum time delay measured was 0.527 seconds.
	2. Chemical and Volume Control System:			
	°Maximum pressurizer spray flow	Note 2	None	Same as Control Rod Drop Event spray flow response.

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
FSAR 14.9	1. Feedwater System:			
Excessive Feedwater Incident	°Maximum enthalpy rise across last stage of high pressure headers	≤58 Btu/lb	None	Historical operating data prove this assumption to be non-conservative. The excessive feedwater incident will be evaluated taking plant data into consideration. If a reanalysis is necessary, assumptions regarding FW system performance will be reviewed or modified to ensure that they are conservative with respect to actual system performance limits. COMPLETE The Excessive Feedwater event has been reviewed by ANF (Exxon). The bounding case for this incident was reviewed, resulting in MDNBR of 1.2 which is above the 1.17 limit. See JDE 87-08.
	°Minimum time to ramp feedwater reg valve from 50% flow to 100% flow control point	≥8 sec	None	In the event of a reanalysis, assumptions regarding feedwater system performance will be reviewed or modified to ensure that they are conservative with respect to actual system performance limits. COMPLETE ANF determined the Safety Analysis to be insensitive to this parameter.

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Maximum flow capacity through either main feedwater reg valve	≤120% nominal	None	In the event of a reanalysis, assumptions regarding feedwater system performance will be reviewed or modified to ensure that they are conservative with respect to actual system performance limits. COMPLETE The Excessive Feedwater event has been reviewed by ANF (Exxon). The bounding case for this incident was reviewed, resulting in MDNBR of 1.2 which is above the 1.17 limit. See JDE 87-08.
	°Minimum time to ramp main feedwater reg valve/main feed pump speed from 102% flow to 120% flow control point	≥2.8 sec	None	In the event of a reanalysis, assumptions regarding FW system performance will be reviewed or modified to ensure that they are conservative with respect to actual system performance limits. COMPLETE ANF determined the Safety Analysis to be insensitive to this parameter.

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Maximum main feedwater pump overspeed trip setpoint	≦5500 rpm	None	System was tested in March, 1986, and trip setpoints were found to be 5500 rpm ± 1%. PACS will be established to verify this set-point. Also see above. COMPLETE The Excessive Feedwater event has been reviewed by ANF (Exxon). The bounding case for this incident was reviewed, resulting in MDNBR of 1.2 which is above the 1.17 limit. See JDE 87-08.
FSAR 14.10	1. Reactor Protection System Trip Setpoints:			
Excessive Load Increase Incident	°High Nuclear Flux Trip			
	Low power range	≦15%	MI-01	None
	High power range	≦112%	MI-01	None
	Maximum trip delay time	≦0.4 sec	None	Trip delays will be verified by test or analysis prior to startup. Relevant safety analyses will be reviewed to assure consistency with results of this verification if necessary.
	°Low Pressurizer Pressure SIS Trip	≧1571 psia	RI-03	None

Revision 1

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Auto closure of ADVs & Turbine Bypass Valve on PCS T_{av}	≥532°F	RRS-I-1	None
	2. Engineered Safeguards System: See "Steamline Break", entry in this table.			
	3. Main Steam System:			
	°Maximum excess flow capacity of turbine control valves	≤5% of 2450 Mwt	None	Maximum valve capacities have been verified through review of procurement specs. If necessary, the excessive load increase analysis will be redone based on the results of this verification. COMPLETE Maximum valve capacities have been verified through procurement spec review as acceptable.
	°Maximum flow capacity of ADVs	≤35% of 2450 Mwt	None	See above
	°Maximum flow capacity of turbine bypass valve	≤5% of 2450 Mwt	None	See above.
FSAR 14.12	1. Reactor Protection System (Note 1):			
Loss of Load Incident	°High Pressurizer Pressure Rx Trip	≤2277 psia	MI-02, MI-02A RI-03	None

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES

(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
FSAR 14.13				
Loss of Feedwater Incident	1. Reactor Protection System (Note 1):			
	°Low SG Level Reactor Trip	≤82" below nominal level	MI-02, RI-04	None
	°Maximum trip delay on SG Level Trip	≤0.6 sec	None	Trip delay times will be verified by test or analysis prior to startup. Relevant safety analyses will be reviewed to ensure consistency with results of this verification if necessary. <u>COMPLETE</u> Two S/G level transmitters (B&C) and the six logic combinations were time delay tested. Maximum time delay measured was 0.322 sec for S/G #1, and 0.195 sec for S/G #2.
	°Low Pressurizer Pressure SI Actuation	≥1571 psia	RI-03	None
	2. Main Steam System:			
	°Minimum SG water inventory @ low level trip (less margins)	Note 3	RI-04 MI-02	Note 3
	3. Feedwater System:			
	°Maximum time to activate AFWs	16 min	RO-97	None

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
FSAR 14.14	1. Reactor Protection System (Note 1):			
Steam Line Rupture	°Reactor trip on SG low pressure (incl uncertainty)	≧478 psia	MI-02, MI-05	None
	°Low Pressurizer Pressure SI Actuation	≧1571 psia	RI-03	None
	2. Chemical and Volume Control Systems:			
	°Minimum boric acid concentration charging pumps	≧10,940 ppm	MC-11A	MC-11A indicates Tech Spec limits on concentration to range from 10,928 ppm to 17,483 ppm. The lower end of this range is not conservative w.r.t. the safety limit. Administrative concentration limits are 11,500 ppm - 17,000 ppm. Safety analysis will be corrected as necessary or a Tech Spec change increasing the lower limit to 10,940 ppm will be implemented. <u>COMPLETE</u> ANF determined that the 12 ppm difference has negligible impact on the Safety Analysis results.
	°Minimum charging pump flow	≧34 gpm/pump	MO-20	None

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Maximum charging pump startup delay			
	with power	≦ 5 sec	None	Pump starting times will be tested prior to startup. Relevant safety analysis will be reviewed to assure consistency with results of these tests if necessary. COMPLETE Starting time verified <1 sec for each charging pump with power and <17 sec without power (Item 61)
	without power	≦17 sec	None	See above
	°Maximum time to purge charging lines (incl pump startup delay)	≦80 sec	None	Testing has demonstrated that the charging pumps are capable of delivering their design flow rates. Relevant safety analyses will be reviewed to ensure that line purge time calculations are consistent with demonstrated pump performance. COMPLETE ANF has determined limiting case MSLB is insensitive to this number (see JDE 87-08)

<u>SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES</u>
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Minimum charging water temperature	≧ 140°F	DWO-1 SHO-1	Surveillance procedure ensures that SIRW temperature is ≧40°F and boric acid tanks and lines are ≧155°F. Safety analyses will be reviewed to assure consistency with these temperatures. <u>COMPLETE</u> ANF determined charging temp has negligible impact on safety analysis results.
	3. Engineered Safeguards Systems			
	°Minimum boric acid concentration via HPSI pumps	≧1720 ppm	MC-11C	None
	°Minimum HPSI pump flow	≧Fig 14.14-17	T-220	Testing has demonstrated that the HPSI pumps meet or exceed their design performance curves. Relevant safety analyses will be reviewed to ensure that analysis values are consistent with demonstrated pump performance. <u>COMPLETE</u> HPSI system configuration was taken into account and design performance curves were shown to satisfy the assumed delivery curve Fg 14.14-17.

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Maximum HPSI pump startup delay with offsite power	≦6 sec	None	Pump starting times will be tested prior to startup. Relevant safety analyses will be reviewed to assure consistency with results of these tests, if necessary. COMPLETE HPSI pump start times verified ≦ 6 sec with power and ≦ 21 sec without power (Item 36)
	without offsite power	≦21 sec	None	See above.
	°Minimum HPSI water temperature	≧ ___ °F	SHO-1	Surveillance procedure ensures that SIRW temperature is ≧40°F. Safety analysis will be reviewed to ensure consistency with this temperature. COMPLETE Analysis is consistent with ≧ 40°F.

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES

(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Maximum time to purge HPSI injection lines	≤ ___ sec	None	Testing has demonstrated that the HPSI pumps meet or exceed their design performance curves. Relevant safety analyses will be reviewed to ensure that line purge time calculations are consistent with demonstrated pump performance. COMPLETE ANF has determined that the current MSLB analysis will support operation with an end of core life moderator temperature coefficient of -32 pcm/°F when neglecting boron injection due to HPSI.
	4. Primary Coolant System:			
	°PCS pump coastdown	≥Relap 4-EM curve	FSAR Fig 14.14-15	None

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	5. Main Steam System:			
	°Maximum SG Mass			
	full power	Note 3	None	Note 3
	hot standby	Note 3	None	Note 3
	°Maximum MSIV closure time	≦4 sec	RI-17	RI-17 performs a stopwatch test to verify valve closure in ≦5 sec with no flow through the valve. Since the MSIV is a stop-check design, closure times are expected to be much less than 4 sec when there is flow through the valve. MPR study shows MSIV closure less than 1 second. Se P-528 memo dated 6/12/80 (MPR report 653, Rev 1).
	6. Feedwater System:			
	°Maximum AFW flow to SG with ruptured line	≦650 gpm	RO-97 QO-21 T-201 T-202 T-192 T-196	Automatic initiation and flow limiting controls have recently been added to the AFWS. Safety analyses will be reviewed to ensure that assumptions in the analyses are consistent with measured performance of this system. Plant testing has demonstrated that the new system meets all specified design requirements. COMPLETE Safety analysis group has determined it is possible to supply 675 gpm to a ruptured S/G vice 650 gpm. This has a negligible effect on analysis. See JDE 87-08.

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Minimum time for AFW flow to ramp from 0 to maximum flow	≧5 sec	RO-97 QO-21	None
	°AFW temperature	70°F	None	COMPLETE ANF has determined that AFW temperature decrease of 30°F has negligible impact on steam line break event. See JDE 87-08
	°Main feedwater temperature		None	COMPLETE ANF determined small changes in initial steady state temperature of main Feed would have negligible effect on steam line break event. See JDE 87-08.
	full power	100°F	None	
	hot standby	436°F	None	
	°MFW control valves must be capable of controlling main feedwater flow to SGs following SLB to less than the integrated flow that would be delivered assuming a linear ramp from 100% to 5% flow for 60 sec following reactor trip.		None	This is a representative assumption used for the analysis. It is not intended to limit feedwater system operation. The safety analysis will be reviewed to justify the conservatism of this assumption. COMPLETE ANF determined safety analysis is insensitive to this number. See JDE 87-08.

7. Turbine Generator System:

Source	System Requirement		Test Performed	Exception/Justification
	°Maximum delay from scram to end of T/G-assisted PCS pump coastdown	≤70 sec	None	Plant trip data and safety analysis will be reviewed to ensure that this is a conservative safety assumption. COMPLETE ANF determined the safety analysis insensitive to turbine generator assist delay time, however coastdown delay time must be >10 sec for the pump seizure transient. Present trip setpoint is at 50% rated speed.
	8. Engineered Safeguards System: See "Containment Pressure Analysis" entry in this table.			
FSAR 14.15 Steam Generator Tube Rupture	1. Reactor Protection System (Note 1):			
	°Low Pressurizer Pressure SIS Trip	≥1571 psia	RI-03	None
	2. Chemical and Volume Control System:			
	°Maximum charging pump flow (3 pumps)	≤133 gpm	MO-20	None

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	3. Engineered Safeguards System:			
	°Maximum HPSI flow from 2 pumps	≤____ gpm @____ psia	T-220	Testing has demonstrated that the HPSI pumps meet or exceed their design performance curves. Relevant safety analyses will be reviewed to ensure that analysis values are consistent with demonstrated pump performance.
	4. Main Steam System: °Temperature setpoints for auto closure of ADVs	≥535°F	RS-I-1	None
FSAR 14.17 LOCA	1. Reactor Protection System (Note 1): °Thermal Margin/Low Pressure Trip	≥1750 psia	RI-02 MI-021	None
	°SIS or high containment pressure (for HPSI & LPSI initiation only)	≤5 psig	RI-06 MI-05	None
	2. Engineered Safeguards System: °Minimum HPSI pump flows	See Att Curves	T-220	None
	°Maximum HPSI pump startup delay after SIS	≤21 sec	None	Pump starting times will be tested prior to startup. Relevant safety analyses will be reviewed to assure consistency. COMPLETE HPSI starting delay time verified ≤ 21 sec. (see Item 36)

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
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Source	System Requirement		Test Performed	Exception/Justification
	°Maximum SIRW tank temperature	≤70°F	SHO-1 RI-18	LOCA analysis is relatively insensitive to HPSI and LPSI temps. SIT temp has overriding effect. ECCS water spills out break cooling containment, reducing containment back pressure and therefore reflood rate. This effect outweighs the effect or reduced subcooling for core cooling. SIRWT temp should not be listed here. An SIT temp of 90°F was assumed, historial data is being checked, but containment atmospheric temperature remains relatively high during operation. Therefore, < 70°F is not a concern. The FSAR will be modified.
	°Minimum LPSI pump flows	See Att Curve	T-209 T-225	None
	°Maximum LPSI pump startup delay after SIS	≤28 sec	None	Pump starting times will be tested prior to startup. Relevant safety analyses will be reviewed to assure consistency with results of these tests. COMPLETE LPSI start time verified <28 sec after SIS (Item 36).

Revision 1

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES

(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Minimum Safety Injection Tank (SIT) volume	≧1100 ft^3	SHO-1 RI-15C	RI-15C shows a Tech Spec limit of 1103 ft^3 which is used to set low alarm setpoint for tank level. The FSAR reports a value of 1150 cubic feet and will be changed to 1100 cubic feet.
	°Minimum SIT pressure	≧215 psia	SHO-1 RI-15A/B	None
	°Maximum spray flow (2 pumps)	≦4840 gpm	T-86-250 T-86-256	Testing has demonstrated that spray pumps meet or exceed their design performance curves. Relevant safety analyses will be reviewed to ensure that analysis values are consistent with demonstrated pump performance. <u>COMPLETE</u> System delivery curve which includes system flow losses shows this value to be conservative.
	°Minimum spray water temperature	≧40°F	MO-25 SHO-1	None

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Containment air cooler capacity	≤Table 14.17-10	None	Bases for air cooler heat capacity will be reviewed to verify conservatism. COMPLETE Values assumed here are correct. Westinghouse analysis shows we meet this curve.
	3. Emergency Power System:			
	°Maximum time to load HPSI pumps on DG	≤ ____ sec	RO-8	ESF sequencer timings will be verified prior to startup. Relevant safety analyses will be reviewed to ensure that analysis values are consistent with demonstrated sequencer performance. COMPLETE Eliminate. Limiting case does not assume loss of offsite power.
	°Maximum time to load charging pumps on DG	≤ ____ sec	RO-8	See above.
FSAR 14.18 Containment Pressure Analysis	1. Reactor Protection System (Note 1):			
	°Maximum high containment pressure SIS	≤ 5 psig	RI-06 MI-05	None

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES

(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	2. Engineered Safeguards System:			
	°Minimum flow from 1 HPSI pump	≧450 gpm	MO-22 T-220	Testing has demonstrated that HPSI pumps meet or exceed their design performance curves. Relevant safety analyses will be reviewed to ensure that analysis values are consistent with demonstrated pump performance.
	°Maximum delay for start of HPSI	≦33 sec	None	Pump starting times will be tested prior to startup. Relevant safety analyses will be reviewed to ensure consistency with results of these tests.
	°Maximum SIRW tank temperature	≦100°F	None	Surveillance procedures only ensure minimum SIRW temperature. Plant historical data will be reviewed to determine maximum SIRW temperatures, and if necessary, an assessment will be made regarding the impact of higher temperatures on the analysis.
	°Minimum flow from 1 LPSI pump	≧5000 gpm	MO-23 T-209 T-225	Testing has demonstrated that LPSI pumps meet or exceed their design performance curves. Relevant safety analyses will be reviewed to ensure that analysis values are consistent with demonstrated pump performance. COMPLETE Value is conservative when compared to the system delivery curve.

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES

(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Maximum delay for start of LPSI	≦33 sec	None	Pump starting times will be tested prior to startup. Relevant safety analyses will be reviewed to ensure consistency with results of these tests. <u>COMPLETE</u> Max delay time for LPSI verified ≦ 33 sec. (see Item 36).
	°Heat removal capacity of 2 spray pumps	≧240 MBtu/hr	None	Basis for spray heat removal capacity will be reviewed to verify conservatism. <u>COMPLETE</u> Remove this number. This is not an input to the analysis. It is a result.
	°Flow capacity of 2 spray pumps (1 EDG)	≧2500 gpm	TCNs T-86-250 T-86-256	Testing has demonstrated that spray pumps meet or exceed their design performance curves. Relevant safety analyses will be reviewed to ensure that analysis values are consistent with demonstrated pump performance. <u>COMPLETE</u> Head curve verification meets inputs into the analysis.

Source	System Requirement		Test Performed	Exception/Justification
	°Maximum delay for start of spray	≤48 sec	None	Pump starting times will be tested prior to startup. Relevant safety analyses will be reviewed to ensure consistency with results of these tests. COMPLETE Spary response verified ≤ 48 sec. (SFE Item 4).
	°Heat removal capacity of 3 air coolers	≥229 MBtu/hr	None	Basis for air cooler heat removal capacity will be reviewed to verify conservatism. COMPLETE Westinghouse calculation shows 3 coolers supply ≥229 MBta/hr.
	°Maximum delay for start of air coolers	≤33.5 sec	None	Fan starting times will be tested prior to startup. Relevant safety analyses will be reviewed to ensure consistency with results of these tests.
	3. Service Water System:			
	°Maximum service water inlet temp	≤53°F	SHO-1	None
FSAR 14.20 Liquid Waste Incident	1. Radiation Monitoring System:			
	°Treated waste pump primary discharge isolation valve trips closed on high radiation level		QR-22	None

SYSTEM PERFORMANCE REQUIREMENTS IMPOSED BY ACCIDENT ANALYSES
(As Documented in Chapter 14 of Palisades FSAR, Rev 1, Effective December, 1985)

Source	System Requirement		Test Performed	Exception/Justification
	°Treated waste pump backup discharge isolation valve trips closed on low circulating water			
	°Backup radiation monitor in discharge canal alarms on high radiation level		HP-6.8	None
FSAR 14.22 Maximum Hypothetical Accident	1. Engineered Safeguards System:			
	°Hydrazine concentration of containment spray	≥50 ppm	SC-05	Design basis for SC-05 states that 15.5% wt concentration of hydrazine will produce ≥50 ppm spray concentration under all conditions. However, surveillance requirements allow ±0.5% deviation from 15.5%. The safety analysis will be reviewed to ensure that the tolerance on hydrazine concentration do not affect the analysis results. Complete: Re-review of SC-05 basis document calculation shows 15.0% wt concentration hydrazine corresponds to >50 ppm spray concentration. No further action required.
	°Maximum time delay for hydrazine addition to spray subsequent to spray initiation	≤1 min	RO-12 QO-13	None

ATTACHMENT 2

Consumers Power Company
Palisades Plant
Docket 50-255

SYSTEM FUNCTIONAL EVALUATION
LONG TERM COMMITMENTS

October 30, 1987

36 Pages

OC1087-0195-NL02

SYSTEM FUNCTIONAL EVALUATION LONG TERM COMMITMENTS

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00001	AFW	1	1	9.7.2.1 Condensate storage tank requirements substantiated by the Acc Anal group. Results will be defined in EOPs. (See Logno 00012)			
00002	AFW	1	4	9.7.2.1 Flow measurement of AFW pump recirculation flow is not designed to be monitored. Flow instrumentation will be added as part of the 5 year plan. See MCTF generic topic on pump testing instrumentation.			
00003	AFW	10	2	7.4.3.2 In the event of a main steam line break, the AFW flow toward the affected S/G must be terminated. No interlocks exist to prevent manual isolation of AFW flow to generators during a MSLB. This function is addressed procedurally by the EOPs. The FSAR will be corrected.			
00004	AFW	11	3	7.4.3.2 Due to nuclear safety considerations, the automatic isolation feature of the FOGG system has been disabled and the operator is instructed by Plant Emergency Operating Procedures to manually isolate the affected steam generator. The FSAR will be clarified.			
00005	AFW	12	1	7.1.1 SOP-12. To start/stop P-8A and P-8C. 2/3 low suction pressure trip of pump is not verified by test. This will be verified periodically.			
00006	AFW	12	2	SOP-12. To start/stop P-8B. 2/3 low suction pressure trip of pump is not verified by test. This will be verified periodically.			
00007	AFW	3	1	9.7.2.3 The FOGG valves are passive normally open valves. They were originally designed to allow for feeding an intact steam generator. This feature is presently disabled. These valves will be tested against differential pressure as part of the plant response to IEB 85-03.			

SYSTEM FUNCTIONAL EVALUATION LONG TERM COMMITMENTS

LOGNO	SYSTEM/PAGE/ITEM	REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00008	AFW 3 1	9.7.2.3 The FOGG actuation system monitors S/G pressure. These are passive normally open valves. They were originally designed to allow for feeding an intact steam generator. This feature is presently disabled. These valves will be tested against differential pressure as part of the plant response to IEB 85-03. (Response could lead to periodic testing but a single test is adequate for this commitment. The bulletin should pick up any needed commitment.			
00009	AFW 4 1	9.7.5 All valves on the suction side of the aux feed pumps are inspected monthly to ensure that they are in the locked-open position. This is not directly true. FSAR will be clarified.			
00010	AFW 4 2	Table 9-13 As a result of the Operational Readiness Assessment on AFW, PRC approved analysis which clarified AFW flow requirements. Special testing has been performed which verifies AFW system can meet these require-ments (T-186, T-192, T-201, T-202). Surveillances will be modified to verify these requirements periodically.			
00012	AFW 5 2	7.4.1.4 Requirements are substantiated by the Acc Anal group. Results will be included in EOPs. (See Log No 00001)			
00013	AFW 6 1	7.4.1.4 Verify 12 hours of N^2 backup to P-8B steam valves. Special Test T-187 verified N^2 system would supply 12 hours of N^2 to PCV-0521A and CV-0522B. This function will be verified for the other flow control valves supplied with backup N^2 prior to startup. A PACS will be generated to periodically test this function in the future.			
00014	AFW 6 3	7.4.1.8.5 Detection of low condensate tank level will be via a low suction pressure switch which is installed on the turbine driven auxiliary feedwate pump. This pressure switch turns on an alarm on the auxiliary shutdown panel. Prior to the next Refout a surveillance procedure will be developed to calibrate this pressure switch each refueling.			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00015	AFW	7	1	7.4.1.8.5 Upon receipt of the condensate storage tank low level alarm, the auxiliary feedwater pump suction source will be transferred manually to the fire water system. Redundant pressure switches are provided to trip (3 switches; 2 of 3 required for trip) the aux feed pumps on low suction pressure, thus avoiding pump failure due to low or nonexistent tank level. - These switches will be added to a surveillance procedure prior to the next refout.			
00016	AIR	1	1	9.5.2.1 Instrument air is not designed to be available following a DBA - was designed as a non-safety system. The EOPs are heavily dependent on the availability of instrument air, however procedural direction is provided if air is lost. A backup means of providing instrument air is available in case offsite power is lost per ONP 25.2. FSAR will be clarified.			
00017	AIR	1	2	9.5.2.1 Nitrogen pressure is maintained at 60 psig vs 90 psig stated in FSAR. Also 8 nitrogen bottles are now in service to operate the AFW steam supply valve versus 5 stated in FSAR. FSAR will be changed to clarify this, plus the number of bottles available.			
00018	AIR	1	6	9.5.2.3.1 Special Test T-187 verifies 60 psig N^2 system would supply 12 hours of backup N^2 to the AFW flow control valves. This will be verified periodically in the future.			
00019	AIR	2	1	9.5.2.3.1 PACS will be developed to verify that instrument air header downstream of the filters has a pressure switch which initiates the closing of a shutoff valve on the service air header in the event the instrument air pressure drops to 85 psig and low-pressure is alarmed in the control room.			
00020	AIR	2	5	9.5.3.1 Normal instrument air load is now approximately 180 scfm versus 195 scfm stated in FSAR. Compressor cycle time is being trended by System Eng which will flag degraded compressor or system performance. FSAR will be modified.			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00021	AIR	3	2	9.5.3.3 Our backup nitrogen system is maintained at 60 psig. The adequacy of 60 psig vs 70 psig will be reviewed and the FSAR corrected.			
00022	AIR	3	2	9.5.3.3 During design basis accident or post-DBA condition, operation of piston-type air-operated valves may be desired. Generate PACS to periodically test the function to the flow control valves supplied with backup N^2.			
00023	AIR	3	3	9.5.3.3 Generate PACS to address testing to assure that CCW containment isolation valves have accumulators to position valves during a DBA in response to loss of instrument air.			
00024	AIR	4	1	ONP-25.2 - 4.12 - Restore Instrument Air (using LCC-13 power feed to LCC-91) - Alternate power feed to LCC-91 will be tested periodically.			
00025	CAC	1	3	6.3.2.1 The service water discharge and supply valves may be manually operated from the main CR and the engineered safeguards local panel. - The surveillance will be modified to periodically stroke these valves from the local panel. (QO-5)			
00026	CAC	1	4	6.3.2.1 All fans may be manually started or stopped from the main CR or at the individual breakers. - A PACS will be generated to periodically operate the fans locally.			
00027	CAC	2	2	6.3.2.1 During post DBA operation, water flows of over 150 gpm will flow through the overflow valves. - PACS will be developed for future inspections.			
00028	CAC	2	5	6.3.2.2 3 If standby power is not available and a SIS occurs the emergency D/Gs are started and the DBA sequencers allow all four coolers to start using the DBA rated fans. Recent T/S change submittal is to require only three coolers for DBA requirements. FSAR will be revised to pick this up.			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00029	CAC	3	1	6.3.2.2 A surveillance test will be developed to verify containment air cooler operability on a refueling frequency. Rev 1			
00030	CAC	4	6	FC 713 A review of modification history was performed since start of 1985 Refueling Outage. FC-713 changed VHX-4 service water outlet valve (CV-0867 from fail-open to fail-closed. RO-12 will be revised to address this mod. QO-5, Att 1, page 5 of 14 will be revised to address closure time instead of opening time. Rev 1			
00031	CAC	5	1	SOP5 7.1.3 Accident condition operation. SOP-5 7.1.3a will be revised to reflect the correct accident condition of the fans and coolers. Rev 1			
00032	CAC	5	1	SOP5 7.1.3 RO-12 will be revised to address the auto closure of VHX-4 service water outlet valve (CV-0867) on a safety injection signal. Rev 1			
00033	CCS	4	2	9.3.2.3 3 Containment high pressure now will close the CCW to containment supply and return valves. RO-12 tests containment isolation valves. (This outage we modified the system such that a CHP signal rather than a SIS will cause containment isolation.) The FSAR will be modified to clarify.			
00034	CCS	8	1	Table 9-7 Number of Operating Pumps: Special Test T-213 and T-223 were performed during the 1986 maintenance outage to verify sufficient flow to all safety related loads following DBA. FSAR will be modified for new values as a result of the new analysis.			
00035	CCWS	1	3	9.3.2.1 The pumps can be started and stopped from the main CR and also locally at the switchgear. - Surveillance procedures will be modified to start pump locally periodically.			

SYSTEM FUNCTIONAL EVALUATION LONG TERM COMMITMENTS

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00036	CCWS	1	4	9.3.2.1 The system can be vented to aux bldg through a diaphragm-operated three-way valve on the surge tank. - A PACS will be generated to periodically test this function in the future.			
00037	CCWS	10	1	7.6 ' SOP-16 - ECCS pump backup service water supply valve will be cycled periodically.			
00038	CCWS	2	1	9.3.2.1 Supply valves to systems shown below are operable from main CR and all, except the containment isolation valves and the fuel pool supply line valve, are operable from the Engineered Safeguards Aux Panel: 1 Shutdown Cooling Heat Exchangers 2 Enginered Safeguards Pumps 3 Spent Fuel Pool Heat Exch 7 Radwaste Equip 4 Services Inside Containment Surveillance Procedures will be reviewed to determine which valves are not periodically cycled from C-33. Procedures will be modified to test these vlvs locally periodically. Rev 1			
00039	CCWS	2	3	9.3.2.3 3 The valves in the gland cooling water supply and return headers are automatically opened by a SIS to supply CCW to Engineered Safeguards pumps. - A PACS will be generated to cycle periodically.			
00040	CCWS	3	1	9.3.2.3 Starting of the third CCW pump is initiated by a low pressure signal received from the pressure switch on the CCW pumps common discharge header. - A test will be generated to periodically test this function.			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00041	CCWS	4	1	9.3.2.3 3 Low cooling water flow in the supply header to each Engineered Safeguards Equipment Room is annunciated in the CR. Changeover from CCW supply to SW is performed by remote-manual closing of component cooling supply valve and return valve and opening one of the two SW supply valves and the return valve from the main CR or from the local Engineered Safeguards Auxiliary Panel. - A PACS will be generated to cycle Service Water backup to ESS pump cooling periodically in the future. Rev 1			
00043	CCWS	4	3	9.3.2.3 3 Air accumulators of CCW return header isolation valves are not periodically tested. Valves are cycled via QO-6 with instrument air available. PACS will address and testing will be included as part of augmented test program.			
00044	CCWS	8	1	Table 9-7 Number of Operating Pumps - MO-29 will be modified to include CCW supply to P-55B and P-55C. See E-PAL-86-093.			
00045	CCWS	9	2	9.3.2.3 1 High component cooling temperature annunciation is not tested. A PACS will be generated to check periodically.			
00046	CCWS	9	3	9.3.2.3 1 Tank low level is annunciated in the CR. A PACS will be generated to check periodically.			
00047	CCWS	9	4	9.3.2.3 1 High activity is annunciated in the main CR. A PACS will be generated to check periodically.			
00048	CIS	1	4	6.7.2.3 The main steam line isolation signal initiates closure of main steam line isolation valves and is derived from two out of four containment high-pressure signals (CHP) or two out of low pressure signals from either S/G. - RI-17 will be revised to document the feature of MSIV closure on low S/G pressure. Rev 1			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00049	CIS	1	6	6.7.2.3 Containment de-isolation is accomplished by a manual reset push button each circuit when containment pressure and radiation have decreased below the isolation trip points on at least 3 of the 4 pressure and rad sensors. In response to NUREG-0737 all auto containment isolation valves are electrically locked closed to preclude auto opening upon resettin of CIS. Subsequent to resetting of CIS the control switch for each valve will need to be moved to the "close" position and then to the "open" to reopen valve. This is not precisely true for MSIVs and CCW valves. FSAR will be clarified.			
00050	CIS	2	1	6.7.2.3 Instrumentation and control circuits in the CIS are fail-safe. - CCW valves from containment are air to close valves with accumulators to allow valve closure on loss of instrument air. This feature is not periodically tested. PACS being written to address. ST and SR relays are energized to isolate. FSAR will be clarified.			
00051	CIS	2	1	6.7.2.3 CCW valves from containment are air to close valves with accumulators to allow valve closure on loss of instrument air. - PACS be written to test periodically.			
00052	CIS	2	3	7.7.2.3 CIS can be manually initiated with the test switch in the following sequence of ops: Either of 2 redundant switches located in CR pushed to test position de-energizes 2 of 4 channels which will initiate containment iso, initiate SIS and start the containment spray pumps. The spray valves will not open in test position. The containment spray vlvs can be manually opened by means of their individual hand switches located in CR. Implied logic function is not completely true as specified in FSAR. FSAR will be clarified.			
00053	CIS	2	4	6.7.3.2 Operation of the automatic isolation valves can be tested during power operation or while shutdown by means of push buttons located in the main CR. This testing cannot be performed during power operations. The FSAR will be clarified.			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00054	CRHV	1	1	9.8.2.4 2 A PACS will be developed to periodically test the post accident function to remove smoke from the control room to allow re-entry.			
00055	CRHV	1	1	9.8.2.4 2 Tornado Dampers - are a passive mechanical device. A PACS will be developed to periodically test.			
00056	CRHV	2	1	7.4.5.1 NUREG-0800 II.3.a requires positive pressure "relative to all surrounding air spaces". The turbine building and the attached corridor constitute the surrounding air space for normal entry to the CR. Reviewing the different options to locate the reference point, this location was considered the best. See E-PAL-85-022. The acceptance criteria of RO-28 requires greater than 0.125 inch of water vice 0.5 inch of water. The FSAR will be changed to correct this discrepancy.			
00057	CRHV	2	2	9.8.2.4 A PACS will be generated to periodically test the smoke detector.			
00058	CRHV	3	1	Table 9-15 Some design basis numbers in Table 9-5 do not reflect normal plant operation. The FSAR will be updated.			
00059	CRHV	3	3	SOP-24 7.6.6 & 7.6.7 - A PACS will be developed to periodically test the purge mode (purge CR with fresh air).			
00060	CRHV	3	5	SOP-24 7.6.12 PACS for calibration of temperature indicators TE-1733, 1734, 1735, and 1736 and their alarms will be developed. (Fire in CR HVAC charcoal filters)			
00061	CSIR	1	1	6.2.1 ESS-I-13 is a maintenance procedure which verifies sequencer operation and pump sequence times. The test is performed on a refueling cycle. The starting times are incorrect as presently stated in the FSAR. The FSAR will be changed to reflect the proper time of 2 seconds and 30 seconds.			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00062	CSIR	2	1	6.2.2.3 2 Initially the pumps take suction from SIRW tank. Upon reaching low tank level, continuation of containment spray is accomplished by automatic transfer of the pump suction to the containment sump. Transfer is automatically accomplished by closing the SIRW tank suction valves and opening the containment sump outlet valves. Switchover is initiated on coincident low level signals from two of the four level switches in the SIRW tank. - RAS has been changed to 1/2 taken twice logic. FSAR will be corrected.			
00063	CSIR	7	2	6.4.2.1 An iodine removal hydrazine tank and an iodine removal makeup sodium hydroxide tank are provided with redundant tank heating and temperature controls to maintain a minimum temperature in both tanks to avoid freezing or precipitation. Alarm set points will be verified periodically.			
00064	CSIR	7	5	6.4.2.1 The iodine removal hydrazine tank contains 270 plus or minus 17 gallons of 15.5 plus or minus 0.5% by weight of hydrazine solution with a nitrogen cover gas pressure of 11.2 plus or minus 2 psig. Alarms exist in main CR and alarm setpoints will be verified periodically.			
00065	CSIR	8	1	6.4.2.1 The sodium hydroxide tank provides a storage volume of 4200 plus or minus 300 gallons of 30.0 plus or minus 0.5% by weight sodium hydroxide solution with a nitrogen cover gas. Alarms exist in main control on tank hi/lo level. Alarm setpoints will be verified periodically.			
00066	CSIR	8	4	6.4.2.2 Op procedures require the operator to proceed with injection prior to the one-minute time delay if radiation levels indicate cladding failure and fission product release. - If at the end of one minute, it is determined to be a spurious signal or a secondary line break, the hydrazine injection signal will be manually overridden. - EOPs do not address early initiation of hydrazine injection for hi rad levels. The procedures will be reviewed and modified.			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00067	CSIR	8	7	6.1.2.3 One or more spray pumps can also be used to augment flow to the core after the pressure is reduced. EOPs do no address use of spray pumps as alternate injection pumps. Operating procedures will be reviewed and modified as necessary to address this evaluation. FSAR will be clarified. Rev 1			
00068	CVC	2	1	9.10.2.4 Any one of the 3 charging pumps can inject boron into the primary system at a rate of 460 ppm/h; whereas the increase in reactivity due to cooldown and xenon decay is equivalent to a boron reduction rate of about 160 ppm/h. This statement does not impact safety analysis on record and is not an issue for normal cooldown. FSAR change is required to eliminate this statement.			
00069	CVC	3	1	9.10.2.6 Item 7 - The variable capacity of charging pump is capable of supplying a variable output of 33-53 gpm. The fixed capacity charging pumps have a design output of 40 gpm. The safety requirement for charging pump flow is 68 gpm for 2 charging pumps (main steam line break analysis) See JAM 86-038. Therefore, present surveillance testing is adequate. FSAR will be changed to clarify.			
00070	CVC	4	3	9.10.2.6 Item 11 - Each boric acid pump is capable of supplying boric acid at the maximum demand conditon. Maximum demand is assumed to be the supply required with all 3 charging pumps operating - 133 gpm. The maximum required flow is 68 gpm as defined by the MSLB analysis. 1) The acceptance criteria will be modified to 68 gpm. 2) The FSAR will be modified to clarify this requirement.			
00071	CVC	4	4	9.10.2.6 Item 12 - The boronmeter and its recorder are presently not in our preventive maintenance program. This will be evaluated in the future for need for boronmeter.			

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00072	CVC	5	1	9.10.2.6 The process radiation monitors RIA-0202A & B monitor the fluid from the primary cooolant loop for high levels of activity which would provide an indication of failed fuel. RR-09L checks RIA-0202A as req by T/S. RIA-0202B is not req by T/S. A test will be generated to periodically calibrate RIA-0202B			
00073	CVC	7	3	9.10.3.3 Makeup water is not automatically introduced at the shutdown boric acid concentration. Makeup to the volume control tank is normally operated in the manual, dilute or borate mode. This will reviewed and the FSAR will be clarified.			
00074	CVC	8	1	9.10.3.3 Either the pressurizer level control or the SIS will automatically start all charging pumps. - FSAR needs to be clarified. All 3 charging pumps do not start by SIS. The 3rd pump starts on low level in the pressurizer.			
00075	CVC	8	1	9.10.3.3 Under emergency conditions either the pressurizer level control or the safety injection signal will automatically start all charging pumps. The SIS will also cause the charging pump suction to be switched from the control tank to the discharge boric acid pump. - Charging pumps start on receipt of a pressurizer low level signal will be verified periodically.			
00076	CVC	9	1	9.10.4 The boric acid pumps and the charging pumps may be controlled locally at their switch-gear. - Charging pumps will be started locally periodically.			
00077	CWS	1	4	Table 10-9 Cooling Tower Pump Design Flow. Trend program will monitor performance during power escalation.			
00078	EEPS	1	2	8.2.2 Switchyard battery capacity and load testing is not routinely performed. This will be reviewed.			

LOGNO	SYSTEM/PAGE/ITEM	REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00079	EEPS 1 4	8.2.2 The 345 kV power circuit breakers have enough air stored in their high pressure receivers to permit five breaker operations. - Testing of the 345 kV breaker to cycle on loss of air compressors will be tested periodically in the future.			
00080	EEPS 11 3	8.4.1.3 Each emergency generator and diesel engine is provided with several alarms, interlocks and trips. Each engine may be started and placed in service locally or from the CR. The generators may be synchornized from the CR so that they can be paralleled with the system for loading tests. - All alarms, interlocks and trips on page 8.4.4 of FSAR will be tested periodically.			
00081	EEPS 11 4	8.4.1.3 The diesel will be automatically tripped on generator differential or overcurrent relay action, engine overspeed/underspeed, over-crank or low lube oil pressure, low jacket water pressure and can be manually tripped at any time from the local station or from the CR. - Diesel engine trips will be tested periodically.			
00082	EEPS 13 1	8.6 Voltage protection and load shedding. - FSAR Chapter 14 time delays will be verified.			
00083	EEPS 13 1	8.6 The voltage protection system automatically prevents load shedding of the safety-related buses when the emergency generators are supplying power to the safeguards loads. Automatic bypass and reinstatement is verified by periodic testing. - This will be tested periodically.			
00084	EEPS 14 1	8.7.2.7 Battery Room Protection. A sail switch in the ventilation duct warns the control room of a loss of battery room ventilation. - Verify this sail switch functions periodi-cally.			

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00085	EEPS 2 4	8.2.3 Station loads, including the safety loads, are normally supplied from the main generator through the station power transformer. On loss of the main generator there is an automatic transfer from this normal source to the immediate access offsite power circuit (see Section 8.6). This design includes provision to test this feature during plant operation. - Clarify FSAR that this function is not tested during normal operation.			
00086	EEPS 2 4	8.2.3 Station loads, including the safety loads, are normally supplied from the main generator through the station power transformer. On oss of the main generator there is an automatic transfer from this normal source to the immediate access offsite power circuit (see Section 8.6). The design includes provisions to test this feature during plant operation. - Periodically test fast transfer in the future.			
00087	EEPS 3 2	8.3.1.2 Following a turbine or reactor trip, the 4,160 volt buses 1A and 1B will automatically transfer to the standby source and all auxiliaries will continue to run. - Last cycle the plant operated normally on startup power. If it is determined to operate on station power, fast transfer testing will be periodically performed. Rev 1			
00088	EEPS 3 2	8.3.1.2 Following a turbine or reactor trip, the 4,160 volt Buses 1A and 1B will automatically transfer to the standby source and all auxiliaries will continue to run. Last cycle the plant operated normally on startup power. This mode of normal plant operations is presently being evaluated. Rev 1			

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00089	EEPS	3	4	8.3.1.2 If the trip is accompanied by a failure in the standby source, the turbine generator will supply power to the primary coolant pumps for a limited time while coasting down to 80% speed. - Periodic testing will be performed if this is determined to be necessary.			
00090	EEPS	3	6	8.3.2.2 The 2400 volt system has sufficient capacity to start the largest motor when all the other motors are energized. - Load studies will be reviewed to verify this function.			
00091	EEPS	4	2	8.3.2.2 8.4.1.2 also. Periodically test to verify remote/local operation of App R isolation switches for the 2400 V breakers. PACS will be generated.			
00092	EEPS	4	4	8.3.2.2 All 2400 breakers on Buses 1C and 1D are also capable of being controlled from the switch gear. - Breakers will be operated locally to verify control of Bus 1C and 1D from switchgear periodically.			
00093	EEPS	5	2	8.3.3.2 The 480 volt system has sufficient capacity to start and accelerate largest motor when all other motors on the system are energized. This method will be reviewed to determine if this criteria is an input to those loads.			
00094	EEPS	5	3	8.3.3.2 Critical breaker and motor overload trips are annunciated in the control room. - The annunciation of critical breaker trips and motor overload trip will be verified periodically in the future to the extent practical.			
00095	EEPS	6	4	8.3.3.2 Pressurizer heaters do not trip on a SIS signal. FC-683 was completed during 1986 maintenance outage. FSAR will be corrected.			
00098	EEPS	7	2	8.3.5.2 Items 2 and 3. - The shunt trip device associated with the 125 volt DC buses will be tested periodically. Rev 1			

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00096	EEPS	7	3	8.3.5.2 Both DC systems are ungrounded and are equipped with ground detectors continuous monitoring. Monitoring is also provided on other important system parameters, such as bus voltage and current. Abnormal conditions are annunciated in the control room. - The ground detectors and annunciators will be verified periodically.			
00097	EEPS	7	4	8.3.5.2 The 125 volt DC buses undervoltage relays are not periodically calibrated. This was tested under modification procedure FC-407-148. This relay and annunciator will be verified periodically.			
00099	EEPS	8	1	8.3.5.2 The preferred AC buses operate ungrounded and are equiped with ground detectors. - The ground detectors will be verified periodically.			
00100	EEPS	8	5	8.3.5.2 Emergency Operation. On loss of normal and standby AC power, all DC loads will be supplied from the station battery. As soon as one of the diesel generators has started and is ready for loading, the battery chargers will automatically resume operation and support the battery. - RO-8 will be revised to document auto operation of battery chargers.			
00101	EEPS	8	7	8.3.5.2 System Monitoring. The DC and preferred AC power systems (ie, chargers, inverters, batteries and breakers) are controlled locally. The operational status information is displayed locally. - Periodic testing and calibration of alarm and monitoring devices associated with DC and preferred AC power systems will be verified periodically.			
00102	EEPS	9	1	8.3.5.3 Periodic testing and calibration of alarm and monitoring devices associated with DC and preferred AC power systems will be done to ensure proper operation.			

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00103	EEPS	9	2	8.3.5.3 Modifications have been performed to add loads to preferred AC buses. This will be reviewed to verify excess capacity still exists. If not the FSAR will be clarified.			
00104	ESC	2	1	7.3.2.2 Safety Injection with Standby Power Available - If standby power is available at the time of initiation of SIS, fast transfer to the standby source is effected by the turbine generator trip. The SIS relays initiate the simultaneous start of the engineered safe-guards equipment. - No periodic test documents the operability of the fast transfer relays associated with standby power. An appropriate test will be generated to periodically test in the future.			
00105	ESC	2	7	7.3.3.2 Instrument air and MSIV bypasses in control room are not closed by SIS as implied by FSAR. FSAR will be corrected.			
00106	ESC	3	1	7.3.3.2 Resetting the isolation circuits will not result in automatically opening the contain-ment isolation valves, the operator must manually reopen each valve, except CCW valves. Resetting CHP will result in CCW valves reopening. FSAR will be clarified.			
00107	ESC	3	5	7.3.3.3 Failure in control source power to the pressure/radiation sensor relay circuit or to the redundant initiating circuit causes the circuit to fail in a mode to initiate isolation, but isolation will not be affected unless a second failure occurs. The FSAR statement will be enhanced to be more specific.			
00108	ESC	4	1	7.3.4.2 Coincident two out of four low level in SIRWT signals will initiate valve operations and trip both low pressure safety injection pumps. A manual bypass is provided so that the low pressure safety injection pumps may be restarted. A modification installed this outage changed the 2 out of 4 logic to 1 out of 2 taken twice. The FSAR will be corrected.			

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00109	ESC	4	4	7.3.2.2 Failure of the control power or any one redundant circuit will be annunciated in the control room. - Annunciators are not periodically tested. These will be tested periodically in the future.			
00110	ESC	4	6	7.3.3.2 TESTING. The containment high pressure detectors and aux relays can be tested at power without actuating containment isolation by tripping 1 out of the 4 local pressure switches. Actuation of the aux relay is annunciated in the control room. The detectors and aux relays for containment hi radiation are tested in the same manner as containment high pressure circuits. FSAR wording will be verified.			
00111	ESC	5	1	7.3.3.2 Testing described in the FSAR is not the method used. FSAR will be clarified.			
00112	FPS	1	6	9.6.3.1 There are no PACS to periodically schedule these activities. Ops Dept manually schedules and controls these checklists. The scheduling system will be reviewed for effectiveness.			
00113	FPS	2	2	9.6.3.1 A dry pipe fusible link sprinkler system is provided for protection in track alley. It is annunciated and indicated in the same manner as the wet pipe systems. - This activity is not scheduled periodically by a PACS. Ops Dept manually schedules and controls this checklist (CL21.17). This scheduling system will be reviewed for effectiveness.			
00114	FPS	2	4	9.6.3.1 Portable fire extinguishers are provided at convenient and accessible locations. The extinguishing media are pressurized water, Co^2 or dry chemicals as appropriate for the service requirements of the area. - There are no PACS to periodically schedule these activities. Operations Dept manually schedules and controls Checklists. This system will be reviewed for effectiveness.			

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00115	FPS	4	5	Table 9-12 There is no periodic test to verify capacity of the fire system jockey pump (P-13). Normal plant operations and indications would denote if system pressure (flow) degraded to cause the other pumps to start. This will be reviewed for inclusion in the equipment trend program.			
00116	HPA	1	1	9.5.2.1 We do not periodically test stroke the associated safety valves to verify that the HP air system is capable of placing the valves in their safety position. - A PACS will be generated to perform Special Test T-205 periodically.			
00117	HPSI	1	1	6.1.1 One high pressure pump has sufficient capacity with 25% spillage to maintain the core water level at the start of recircu- lation. FSAR will be expanded to define what this means.			
00118	HPSI	1	2	6.1.1 The hot leg injection is designed to split HPSI flow so that half goes to one hot leg and the other half goes to the four cold legs. The FSAR will be clarified as to how much flow is required to get to each hot leg to meet design assumptions.			
00119	HPSI	5	3	Table 6-3 HPSI Pump Design Flow - The full pump per- formance curve will be verified for HPSI pumps during the next Refueling Outage.			
00120	HPSI	5	4	6.1.2.2 A low-flow alarm in provided on the seal cooling water to the pumps to warn of cooling water or seal cooling malfunction. - Annunciator is not specifically tested. This will be verified this outage and periodically in the future.			

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00121	HVAC	1	1	9.8.2.4 13 As a result of evaluation of IEB 80-06 circuitry modifications were made to ESF Room Cooler Valves SV-0825 & SV-0875 such that these valves do not close upon an ESF reset signal. In addition, to preclude an advertent closure of the SW valves supplying cooling to the ESF room coolers, the hand switch controllers (HO-0825A & HS-0875A for these valves were changed from hand switches w/o locks to hand switches with cylinder lock operators. FSAR will be modfied to correct this discrepancy.			
00122	HVAC	1	4	9.8.2.4 The performance of the Safeguards Room Coolers will be verified prior to startup and periodically thereafter.			
00123	LPSI	2	2	6.1.2.1 The SIS also opens certain valves, as shown on P&ID 203, Sh 1 & 2. FSAR will be clarified on P&ID numbers. These numbers are not correct.			
00124	LPSI	7	2	6.1.2.3 The supply valves from the SIRW tank and sump are designed to ensure at least a one minute overlapping stroke to allow mixing and assure adequate NPSH during the transfer. - The acceptance criteria QO-2 may not positively demonstrate that flow from the sump and SIRW tank will overlap for a minimum of one minute following receipt of a RAS. The acceptance criteria to QO-2 will be reviewed and the FSAR will be clarified. (Was Page 6, Item 2)			
00125	LPSI	7	2	6.1.2.3 Item 3.6. The supply valves from the SIRW tank and sump are designed to ensure at least a one minute overlapping stroke to allow mixing and assure adequate NPSH during the transfer. The acceptance criteria of QO-2 may not positively demonstrate. QO-2 will be reviewed and modified. (Was Page 6)			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00126	LPSI	8	2	6.1.2.2 8 The SIRW tank temperature is indicated and alarmed for high and low temperature in the main control room. Annunciator feature is not specifically checked. RI-18 will be modified to verify alarm function - Alarm set 110°F. Must be changed to less than 100°F. (Page # changed from #7)			
00127	LPSI	9	1	6.1.2.2 Level instrumentation mounted on each safety injection tank provides indication in the main control room. Redundant high and low alarms on each tank are provided. Alarms will be tested periodically. (page # changed from 8)			
00128	LPSI	9	2	6.1.2.2 8 Containment sump water level indication is provided by two level indicators in the main control room. The high level alarm will be tested periodically. (Page # changed from 8)			
00129	LPSI	9	3	6.1.2.2 8 Water level in each engineered safeguards pump room is indicated in the main control room. This will be calibrated periodically. (Page # changed from 8)			
00130	MFCS	2	3	7.5.1.3 In event of low S/G pressure less than 500 psia, the main feedwater reg and reg bypass vlvs are closed to prevent excessive flow to S/Gs. Admin control of bypass of S/G pressure signal to close these vlvs is facilitated by using key-operated switches to override the signal for manual takeover of controls. Although the reg bypass vlvs have key switches the main reg vlvs have push buttons. The push buttons override auto closure of reg bypass vlvs, reg vlvs & MSIVs. The FSAR will be revised accordingly.			
00131	MFCS	4	7	MCTF - CDS-01 PMs are being developed to clean the condenser hotwell and to disassemble/inspect CV-0730 each Refueling Outage.			

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00132	MISC	1	9	9.8.2.4 In the event of failure of the radwaste area supply fan, one of the exhaust fans is automatically shut down but the pressure control apparatus will limit the amount of the negative pressure developed by the lack of supply air and prevent excessive pressure differentials. - Supply/exhaust fan interlock will be tested periodically.			
00133	MISC	2	1	9.8.2.4 In the event of a spillage of radioactive material in the radwaste area, the radiation monitor at the filter plenum senses the activity and stops the supply fan, closes the radwaste area supply Damper PO-1809, and stops the selected exhaust fan; however a low flow alarm will override the high rad signal and keep the standby exhaust fan running. - Automatic actions resulting from high rad will be verified periodically in the future.			
00134	MISC	2	9	9.8.2.4 Operation of the Aux Bldg addition fuel handling supply and radwaste supply. ....If the fan motor is shut off, the fresh air inlet dampers close. - Interlock will be verified periodically.			
00135	MISC	3	1	9.8.2.4 The supply fans will trip on high-radiation signal from radiation monitors located in the corresponding exhaust system ducts. - This will be verified periodically.			
00136	MISC	3	5	9.8.2.4 The operation of the aux bldg addition fuel handling area exhaust and radwaste system.... In the event of a failure of a supply fan, one of the exhaust fans will shutdown. - Interlock will be verified periodically. .			
00137	MISC	3	6	9.8.2.4 In the event of release of radioactive material in the area serviced by the system, the radiation monitor at the filter plenum senses the activity and trips the supply fan which in turn trips one of the exhaust fans. However, a low flow condition will override the high radiation signal and keep the standby exhaust fan running. - Automatic actions from high radiation will be tested periodically.			

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00138	MISC	4	2	9.8.2.4 Item 24 - Supply fan V-33 provides air to the areas identified. Makeup air to V-33 is a blend of outside air and recirculated air from V-43. This blend is controlled by a mixed air temperature controller. - Temperature controller and damper positioners will be verified periodically.			
00139	MISC	4	3	9.8.2.4 Item 24 - Cable spreading, switchgear and 2.4 kV switch gear rooms increases above 104°F, temperature switches 1824, 1825 and 1826 will initiate a control room annunciator. The operator manually starts the supplemental exhaust fan V-47. - The annunciator will be verified periodically.			
00140	MISC	5	7	SOP-24 Attachment 2 Item 2. Test radwaste area fans and supply dampers periodically.			
00141	MSS	1	3	10.2.1 4 The MSIVs are closed on either a low S/G pressure signal or a containment high pressure signal. - RI-17 will be revised to document the feature of MSIV closure on low S/G pressure.			
00142	MSS	2	2	10.2.1 4 Four pressure transmitters on each S/G actuate contacts in indicting meter relays which are connected in a two-out-of-four logic to close both MSIVs. R-17 will be revised to document this feature.			
00143	MSS	2	3	10.2.1 4 Auto block of MSIVs auto closure is on low S/G pressure only not on containment high pressure. FSAR clarification needed.			
00144	MSS	2	3	10.2.1 4 Automatic closing of the MSIVs can be blocked by pushing both of two isolation block push buttons as the steam pressure is decreasing toward the isolation set point. The isolation block is automatically removed by a two-out-of-four logic when the S/G pressure rises to 50 psi above the isolation set point pressure. - RI-17 will be revised to document this feature.			

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00145	MSS	3	1	10.2.1 4 An accumulator is provided for each MSIV to hold valve open in case of a loss of air supply to the valve operator.- No testing is presently performed to address. The MSIV accumulators are provided for reliability purposes. On loss of air, accumulators provide operators enough time to regain pressure to prevent valves from drifting/slamming closed. There is a low pressure alarm on each header and backup for the H/P air syst. Testing of these accumulators will be evaluated.			
00146	MSS	3	2	10.2.1 The S/G blowdown system is continuously monitored by a process monitor which detects radioactivity which may have leaked into the S/G from the primary system. - QR-22 will be revised to add the S/G blowdown valves. Rev 1			
00147	NMS	1	5	7.6.1.4 Quandrant power tilt is alarmed in the CR via the power range safety channels and linear heat rate is alarmed in the CR via the incore alarm system. - Quadrant power tilt alarm from power range safety channels will be verified periodically.			
00148	NMS	1	7	7.6.2.2 The rate-of-change information (wide range logarithmic channels) actuates alarms, a reactor trip, or a control rod withdrawal prohibit signal. - Reactor trip on high startup rate will be verified periodically.			
00149	NMS	4	1	7.6.2.2 The output from the comparator average is returned to each channel drawer and compared to each channel via two deviation comparators. - Quadrant power tilt alarm will be verified periodically. (SHO-1 compares power range channels each shift and verifies deviation does not exist.)			
00150	NMS	4	3	7.6.2.2 The alarm light alerts the operator in the event that the ratio signal violates an operator-set upper-or-lower limit which would be indicative of an undesirable axial power distribution will be tested periodically.			

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LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00157	PCS	4	1	4.3.7 See 4.3.9.3 also. If an abnormal incident results in pressurizer pressure rise which exceeds the relieving capacity of the press-urizer spray, this pressure will open two power-operated relief valves and trip the Rx. The relief valves are opened as a secondary action to a reactor trip. Since no credit been taken for the relief capacity of these valves in Chapt 14, the plant is permitted to operate at full pressure and temperature with the PORV isolation valves closed. The FSAR will be clarified.			
00158	PCS	4	4	4.3.9.3 PORVs are actuated by the high primary syst pressure reactor trip signal. The PORVs are tested for low pressure protection via MO-27. They have not been tested at system differen-tial pressures required for the feed and bleed success path for controlling the high ECS pressure. Prior to the end of the next Refout new certified PORV block valves will be installed.			
00159	PCS	5	1	4.3.9.3 PORVs will be installed or the PORVs will be removed and tested at feed and bleed pressures. Special Test if internals are not replaced.			
00160	PCS	5	2	4.3.9.3 The PORVs and their block valves would be used if a feed and bleed type operation was required to cool the PCS in an emergency shutdown situation. - PORVs will be installed or the PORVs will be removed and tested at feed and bleed pressures.			
00161	PCS	7	2	4.3.9.3 See 7.4.2.1 also. The PCS overpressurization subsystem (OPS) has been designed to provide automatic pressure relief of the PCS whenever the conditions of low temperature (250°F or lower) and high pressure (400 psia or higher) exist concurrently. Specific temperatures and pressures at which relief is required varies with amount of vessel irradiation. Values will be clarified as necessary.			

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LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00157	PCS	4	1	4.3.7 See 4.3.9.3 also. If an abnormal incident results in pressurizer pressure rise which exceeds the relieving capacity of the pressurizer spray, this pressure will open two power-operated relief valves and trip the Rx. The relief valves are opened as a secondary action to a reactor trip. Since no credit been taken for the relief capacity of these valves in Chapt 14, the plant is permitted to operate at full pressure and temperature with the PORV isolation valves closed. The FSAR will be clarified.			
00158	PCS	4	4	4.3.9.3 PORVs are actuated by the high primary syst pressure reactor trip signal. The PORVs are tested for low pressure protection via MO-27. They have not been tested at system differential pressures required for the feed and bleed success path for controlling the high ECS pressure. Prior to the end of the next Refout new certified PORV block valves will be installed.			
00159	PCS	5	1	4.3.9.3 PORVs will be installed or the PORVs will be removed and tested at feed and bleed pressures. Special Test if internals are not replaced.			
00160	PCS	5	2	4.3.9.3 The PORVs and their block valves would be used if a feed and bleed type operation was required to cool the PCS in an emergency shutdown situation. - PORVs will be installed or the PORVs will be removed and tested at feed and bleed pressures.			
00161	PCS	7	2	4.3.9.3 See 7.4.2.1 also. The PCS overpressurization subsystem (OPS) has been designed to provide automatic pressure relief of the PCS whenever the conditions of low temperature (250°F or lower) and high pressure (400 psia or higher) exist concurrently. Specific temperatures and pressures at which relief is required varies with amount of vessel irradiation. Values will be clarified as necessary.			

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00162	PCS	9	4	4.3.5 The performance of the shaft seal system is monitored by pressure and temperature sensing devices in the seal system. A controlled bleedoff flow through the pump seal is maintained. - No calibration PAC for seal bleedoff flow was found. This will be done periodically.			
00163	PDL	1	1	7.6.1.5 Validity of inputs to the datalogger system will be evaluated to determine methods to ensure proper datalogger functionability.			
00164	RAD	5	1	11.5.3 In 1983 a main steam relief monitoring system was installed to monitor accident releases in the event the atmospheric dump or safety valves lift. In the event of a steam release, an acoustic switch, triggered the Radiation Monitor to operate at high speed for greater resolution. - The acoustic switch will be calibrated and the recorder response verified periodically. / Rev 1			
00165	RAD	5	3	11.5.3.1 A two-pen flow indicator/recorder with flow alarm outputs continuously monitors the stack and sample flow. - Flow recorders are no longer used. A local continuous monitor is now used and calibrated by RR-84D. FSAR will be corrected.			
00166	RAD	6	1	11.5.3.2 On indication of abnormal stack effluent activity (alert level) a 15 second grab sample is automatically trapped in a sample bottle and an annunciator in the CR indicates the off-normal conditon. - Grab sample feature testing is not documented. Alert levels are alarmed on the RIA but are not annunciated. FSAR will be clarified.			
00167	RAD	6	1	11.5.3.2 On indication of abnormal stack effluent activity (alert level), a 15 second grab sample is automatically trapped in a sample bottle and an annunciator in the control room indicates the off-normal condition. - The grab sample and annunciator will be verified periodically.			

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00168	RAD	6	2	11.5.3.2 Following a high level indication, the normal sample loop is bypassed and the sample flow is split with approximately 0.02 scfm directed through the high-range filter and the balance of the 2 scfm through the ion changer. A "high radiation" annunciator in the control room alerts the plant operators to the condition. - Testing of the changes in sample flow paths will be verified and documented periodically.			
00169	RPS	2	2	7.2.3.3 Low flow trippoints and the overpower trip points are simultaneously changed by a manual switch to the allowable values for the selected pump condition. Since we can only run with 4 PCS coolant pumps this may not be significant. The plant does not presently allow operation with less than 4 pumps running. The plant will trip if a PCP is tripped. Therefore the testing of the trip setpoints with less than four pumps operating is not required. FSAR will be changed to clarify this function.			
00170	RPS	3	1	7.2.3.4 Pre-trip alarms are initiated if the coolant flow approaches minimum required for corresponding power level. Since we can only run with 4 PCS coolant pumps this may not be significant. The plant does not presently allow operation with less than 4 pumps running. The plant will trip if a PCP is tripped. Therefore testing of the trip setpoints with less than 4 pumps operating is not required. FSAR will be changed to clarify this function.			
00171	RPS	4	2	7.2.3.8 FSAR 7.2.3.8 states that S/G low pressure trip signal will close the turbine stop valves. This interlock does not exist. The S/G low pressure trip signal does not close the turbine stop valves. The reactor trips, which trips the turbine, which closes the turbine stop valves. This will be clarified in the FSAR.			

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00172	RPS	4	4	7.2.3.9 FSAR 7.2.3.9 states that CHP pre-trip alarm occurs at 3 psig. The actual pre-trip set-point is 0.9 psig and MI-5 does not document the pre-trip setpoint of alarm annunciation. These are calibrated every 11 months via PACS VAS-016. This PACS calibrates containment pressure indicators and was last performed on 10/21/86. The FSAR will be corrected for actual pre-trip alarm setpoint.			
00173	RPS	7	4	7.2.3.6 A reactor trip will automatically be initiated after a turbine trip occurs. The trip will be initiated when the turbine auto stop oil pressure decreases. This trip is automatically bypassed when three of four power safety channels indicate less than 15% full power. - Loss of load trip will be tested periodically.			
00174	SCS	2	1	7.4.1.6 FSAR states that instrumentation is available to indicate service water and CCW flow. Such instrumentation is not available. Instrumentation is available to "indicate" flow but not to quantify flow. Evaluation of modifications to provide adequate instrumentation for system performance testing is planned.			
00175	SCS	2	2	7.4.1.6 Analysis of fire damage in any of the areas containing portions of systems required for the shutdown cooling operation shows there will always be an undamaged power supply to one or the other of the shutdown cooling pumps (LPSI). - Manual stroking of the shutdown cooling valves needs to be verified during valve PACS.			
00176	SCS	2	3	9.1.2.3 A reanalysis was performed for CCW with a 4000 gpm flow to the shutdown cooling heat ex with 6000 gpm shutdown cooling flow. The result was 53 hrs is required to cool PCS to 130°F. (PAL-86-083) This same section states that all noncritical service water is discontinued. This is not the normal plant practice. Typically we continue service water flow to FWP, VRS, condensate pumps etc. The FSAR will be corrected to clarify this statement.			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00177	SCS	4	1	Table 6-4 Shutdown Cooling Ht Exc Operating Parameters. Verification of Shutdown Cooling Heat Exchanger performance is performed each shutdown when shutdown cooling is put on line and the plant is cooled down and maintained cool. Specific exchanger performance will be evaluated for future trending.			
00178	SCS	5	1	ONP 17 4.3 Low temperature overpressure protection concerns, the risk of using HPSI for shutdown cooling (solid plant) may outweigh the beneift of routine testing. This Off Normal Procedure will be reviewed and modified if necessary with respect to this concern.			
00179	SCS	5	2	OPN 17 4.3 The ability to use Spent Fuel Pool Cooling for shutdown cooling is not periodically tested. This evolution requires the RX head to be removed and the Rx cavity full and refueling gates open. This will be verified during the next refout. Special Test?			
00180	SCS	5	2	?? ONP-17. Shutdown Cooling using Spent Fuel Pool Cooling upon loss of normal shutdown cooling - Special Test to verify during the next Refout.			
00181	SCSS	1	1	9.2.1 The system is designed to maintain concrete temperature below 165°F. It is capable of removing 180,000 Btu/h. T/S basis lists capacity as 120,000 Btu/hr. FSAR will be clarified - design impact only.			
00182	SCSS	1	5	9.2.2.3 Makeup water to the surge tank is pumped from the condensate storage tank through an on-off solenoid valve which is actuated by a level switch on the surge tank. - This supply comes from condensate tank. Supply is from T-81. FSAR will be clarified.			
00183	SCSS	1	6	9.2.2.3 High and low level in the tank is annunciated in the control room. - This will be verified periodically.			
00184	SCSS	1	7	9.2.2.3 The surge tank vents to the containment atmosphere. The FSAR will be corrected.			

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00185	SCSS	2	1	9.2.2.3 Temperature indication, high temperature (120°F) and low flow annunciation from the discharge of each set of coils are located in the control room. - Annunciators will be tested periodically.			
00186	SPS	1	3	8.1.2, The non-vital instrumentation and controls are supplied from a 120 volt AC instrument bus. The instrument bus is normally supplied from one of two 480-120 volt transformers, each tranformer being connected to a separate 480 volt motor control center. The transfer to the alternate source is automatic. - This auto transfer function will be verified periodically.			
00187	SPS	1	4	8.2.3 Station loads, including the safety loads, are normally supplied from the main generator through the station power Xformer. On loss of main generator there is an auto Xfer from this normal source to the immediate access offsite power circuit. The design includes provisions to test this feature during plant operation. - This function will be periodically verified in the future. This is not tested during plant operation. The FSAR will be clarified.			
00188	SPS	1	4	8.2.3 Station loads, including the safety loads, are normally supplied from the main generator through the station power transformer. On loss of the main generator there is an auto transfer from this normal source to the immediate access offsite power circuit. The design includes provisions to test this feature during plant operation. - This function will be verified periodically.			
00189	SPS	1	5	8.3.1.s The capabilities of the four 4,160 volt sections are sufficient to permit plant operation under reduced load with any 4,160 volt bus out of service. - Bus 1A and 1B cannot be taken out of service because operation on without PCPs is not allowed. The FSAR will be clarified.			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00190	SPS	2	6	8.3.2.2 The reserve transformer will provide capability of sparing SU (Standby) Transformer 1-2 during shutdown conditions. - This installed reserve transformer has provisions to supply plant buses. Instructions are provided in SOP-30. This transformer is only needed as a backup during shutdown operations. Evaluation of testing needs will be completed prior to the next Refout.			
00191	SPS	2	6	8.3.2.2 The reserve transformer will provide capability of sparing start-up (Standby) transformer 1-2 during shutdown conditons. - Evaluation of testing needs will be completed prior to next Refout.			
00192	SPS	4	2	8.6.2 In order to permit the main transformer backfeed mode of operation (Subsection 8.2.3) the fast transfer on turbine generator trip and the emergency generators automatic start signals are blocked manually using a selector switch in the main control room ("Instant Transfer Cutout"). - Diesel Generators are only blocked by manual action. FSAR will be clarified.			
00193	SPS	4	3	8.6.2 4,160 Volt System - Automatic transfer of the 4,160 volt buses from the normal power source (station power transformer 1-1) to the standby power source (Startup Transformer 1-1 and 1-3) is initiated by turbine trip or generator trip. - This function will be periodically verified in the future.			
00194	SPS	4	4	8.6.2 Automatic transfer is blocked if the startup transformer voltage is low. The lockout relays may also be operated manually to prevent bus transfer if a startup transformer is inoperable for any reason. - These lockout relays will be tested periodically in the future.			

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00195	SPS	4	5	8.6.2 2,400 Volt System. Automatic transfer of the 2,400 volt buses from the normal power source (Station Power Transformer 1-2) to the standby power source (Startup Transformer 1-2) is initiated by turbine trip or generator trip. Two separate turbine auto stop oil pressure sensors are provided for initiating the transfer. - This function will be periodically verified in the future.			
00196	SPS	5	1	8.6.2 Automatic transfer is blocked if the startup transformer voltage is low. Each of the lockout relays may also be operated manually to prevent one of the bus transfer if the corresponding startup transformer breaker is inoperable for any reason. - These lockout relays will be tested periodically in the future.			
00197	SPS	6	6	SPS-02 Charging Pump Motor Breakers. Evaluation is underway to either replace switchgear or to refurbish existing switchgear. MCTF item.			
00198	SPS	6	8	SPS-03 Evaluate importance of DC ground alarm in CR and troubleshooting techniques for isolating/repairing DC grounds. - A procedure and/or checklist will be devised with operations to determine which breakers can be troubleshot during specific plant conditions. MCTF Item.			
00199	SWS	1	1	9.1.2.1 Each pump can be started or stopped remotely from the main control room or locally at the switchgear. - Surveillance procedures will be modified to periodically start locally.			
00200	SWS	1	2	9.1.2.1 Each pump can be isolated from their common header by a hand-operated valve in the pump discharge. - A PACS will be developed to cycle CV-0844, 0845, 0846, 0857 & CV-1318 & CV-1319 in the future.			

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00201	SWS	1	3	9.1.2.1 9.1.3.1 & 9.1.3.3 also The common header contains sectionalizing valves which can be closed from the main control room if isolation of a portion of the service water supply system is required. - A PACS will be developed to cycle CV-0844, 0845, 0846, 0857 and CV-1318 and 1319.			
00202	SWS	2	1	9.1.2.1 9.1.3.1 & 9.1.3.3 also PACS will be developed to cycle automatic valves used to isolate service water pumps, common header or critical service lines - CV-0844, 0845, 0846, 0857 and CV-1318 & 1319. Rev 1			
00203	SWS	3	4	9.1.2.3 PACS will be generated to periodically test ESS pump backup service water cooling on loss of CCW.			
00204	SWS	4	1	9.1.2.3 Test will be generated to periodically test the auto start of service water pumps on low discharge pressure. - Normal Operation. Two pressure switches are provided in the discharge of each pump connecting to the starting circuits of the remaining two pumps. If the service water pressure falls below a preset value, one of the switches initiates automatic starting.			
00205	SWS	4	4	9.1.3.2 Test will be generated to periodically test the auto start of service water pumps on low discharge pressure. - Each service water pump can be periodically tested for auto-start by selection on one pump for standby service and tripping of one operating pump.			
00206	SWS	7	1	Test MO-29 Monthly valve alignment check of engineered safety systems. - Service water valves CV-0876 and 0877 will be added to MO-29.			
00207	SWS	7	8	SOP-15 7.7.1 - To supply cooling water to ESF pumps using service water. - PACS will be generated to periodically test.			

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00208	TURB	1	4	7.5.2.6 Emergency trip action is caused by the operation of trips located in the hydraulic mechanical system protective device unit: low-vacuum, low bearing oil pressure, over speed trip and loss of generator load, or manually with the overspeed trip lever. This action is also caused by operation of the solenoid trip which is actuated by the manual trip switch in the control room and by electrical system protective relays. - Overspeed testing and loss of load trip will be verified periodically.			
00209	TURB	1	7	7.5.2.6 When the turbine is under dispatch control, load reference changes are made manually. The impulse chamber pressure is compared to the load reference setting. The difference is a load error to the controller, which repositions the governor valve actuators until the load error becomes zero. The FSAR will be clarified.			
00210	TURB	2	3	7.5.3.6 Auxiliary Governor. This is an acceleration response device which closes the turbine main governing valves and the moisture separator intercept valves. - Aux governor overspeed limiter will be tested periodically.			
00211	TURB	2	5	10.2.2 Steam Turbine. Turbine trip input to RPS will be tested periodically.			
00212	TURB	2	6	10.2.2 Upon turbine control's receipt of a dropped rod signal from the CRDS or a rapid flux change signal from the power range nuclear instruments, the turbine output is automatically limited by the turbine controls to a maximum of 70% of full load output. - This feature is disabled and is no longer used. The FSAR will be clarified.			
00213	TURB	3	1	10.2.2.3 Electrical Generator. Seal Oil System. The turbine bearing oil system serves as a seal oil backup should the seal oil pump stop or if the seal oil pressure should drop below 8 psi. Turbine bearing oil pump auto start will be verified periodically.			

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00214	TURB 3 2	10.2.2.3 Signal System This system provides the operator with signals on the operating conditons present in Table 10-4. - Hydrogen supply low pressure, hydrogen high temperature and hydrogen side low oil level switches will be tested periodically.			

ATTACHMENT 3

Consumers Power Company
Palisades Plant
Docket 50-255

SYSTEM FUNCTIONAL EVALUATION
TECHNICAL REVIEW
LONG TERM COMMITMENTS

October 30, 1987

8 Pages

SYSTEM FUNCTIONAL EVALUATION LONG TERM COMMITMENTS

LOGNO	SYSTEM/PAGE/ITEM	REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00689		Att 1A Item C, Page 10. During the outage Special Test Procedures were developed/conducted to verify safety related pumps are capable of meeting safety design basis capacities. PPACS will be developed by the end of 1987 to verify pump head curves at least every 10 years. AFW - See ST 201, 202, 186, 142 LPSI - See ST 225, 209 HPSI - See ST 220 CCW - See ST 206 SW - See St 215, 218 SPRAY - See QO-10 Modified Rev 1		87/12/31	
00754		Attachment 1A, Page 11 Due to sensitivity in the balancing of SW and CCW to small changes in system resistance PPACS will be developed to periodically reperform the special tests conducted during the 86 shutdown period. These tests will initially be conducted every refueling outage.			
00755		Attachment 2C Page 5 Shutdown Cooling System FSAR states that CCW is capable of cooling PCS to 130°F in 24 hours. For CCW at 50% of design flow 53 hours are required to achieve a PCS temperature of 130°F. Revise the FSAR to reflect this fact.			
00756		Attachment 2C Page 16, LTOP Upon completion of the investigation of new LTOP settings the Tech Specs will be revised if necessary.			
00757		Attachment 3, Page 9 We have determined that the FSAR flow values for the CCW System in Table 9-7 require revision. Values in the attachment will be incorporated in the FSAR.			
00687	5 2	SYSP PACS will be established to verify main feedwater pump overspeed trip. Rev 1			Complete

SYSTEM FUNCTIONAL EVALUATION LONG TERM COMMITMENTS

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00654	AFW	1	5	TRC 57 Local control of the turbine driven AFW pump and control valves will be verified periodically. Rev 1			
00655	AFW	7	5	TRC 83&87 Verify "off normal condition" indication periodically in future (modify RO-97). Rev 1			
00656	AFW	8	2	TRC 87&86 Modify RO-97 to verify low flow logic and that successful start of one AFW pump prevents the turbine pump from starting. Rev 1		88/09/01	
00657	AFW	8	3	TRC 87&86 Modify RO-97 to verify low flow logic and that successful start of one AFW pump prevents the turbine pump from starting. Rev 1		88/09/01	
00736	AIR	1	2	TRC* FSAR 9.5.2.1 These sections appear to be in conflict. The first states all valves can be operated twice,while the second states all valves can be cycled in one direction and enough air remains available to shift injection vales to a recirc phase.			
00660	CAC	1	1	TRC 156 Revise MO-29 to include verifying cooler inlet valves de-energized. Rev 2		88/09/01	
00688	CAC	3	1	A surveillance test will be developed to verify air cooler (VHX 1,2,3,4) operability on a refueling frequency. Rev 1			
00727	CCWS	1	1	TRC 183 FSAR will be revised to reflect the modification to close CCW isolation valves on containment high pressure instead of SIS and allow reopening of valves using the bypass key(s).			

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00673	CIS	1	1	TRC 470 Checklist 3.3 and P&ID 232 not consistent for penetration #7 (748FWS) and #8 (749FWS). Correct checklist or P&ID. Rev 1		88/11/01	
00734	CSIR	7	3	6.4.2.1 PAC-ESS-017 incorrectly lists T-102 as sodium hydroxide tank vice hydraxine tank. Also E17 Sh 6 & 7 does the same. Correct PACS & E17 Sh 6 & 7 (NRC Open Item 255/86035-141). Rev 1			
00735	CSIR	7	4	6.4.2.1 FSAR Fig 6-2 Sh 1B shows one open and one closed gate valve. FSAR will be corrected. Rev 1			
00738	CSIR	8	4	6.4.2.2 Op procedures require the operator to proceed with injection prior to the one-minute time delay if rad levels indicate cladding failure and fission product release. FSAR will be clarified.			
00739	CSIR	8	4	TRC* If, at the end of one minute, it is determined to be a spurious signal or a secondary line break, the hydrazine injection signal will be manually overridden. - The block isn't verified via testing. This will be verified in the future.			
00741	CSIR	8	7	6.1.2.3 Item 3.b FSAR Section 6.1.6 will be clarified to address that it may take two spray pumps to maintain core water level if primary coolant pressure permits.			
00746	CVC	1	1	TRC 537, 540, 541 Verify PAC CVC-035 and CVC-024 for all VCT level interlocks and alarms and revise as necessary.			
00745	CVC	1	4	TRC 537, 540, 541 Verify PAC CVC-035 and CVC-024 for all VCT level interlocks and alarms and revise as necessary.			

SYSTEM FUNCTIONAL EVALUATION LONG TERM COMMITMENTS

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00675	CVC	1	5	TRC 537, 540, 541 Verify PAC CVC-035 and CVC-024 for all VCT level interlocks and alarms and revise as. necessary. Rev 1		88/09/01	
00753	CVC	4	3	TRC* ' If A or C charging pump is inoperable as allowed by Tech Specs, only one charging pump will start after SIS. This will not meet the 65 gpm requirement of MSLB analysis. This will be evaluated for corrective action.			
00646	ESS	1	2	TRC 21 Tech review should be performed on OO-1 attachments to ensure "all redundant equip-ment is operated". Also, why doesn't Att 1 have P55A&B running in preheat status (& P7A&C) as is done in Att 3. Rev 1		88/09/01	
00647	ESS	1	2	TRC 22 Verify SIS cannot be reset when signal present. Add Step to RI-7 to verify this. Also add step to RI-6 #4.2.2, logic also picks up SIS. Rev 1			
00648	ESS	2	4	TRC 29 RI-7 should be revised to test 3 4 reset feature. Rev 2			
00649	ESS	2	7	TRC 32 Revise RO-11 to check alarm actuated by 2/4 logics for CHP/CHR. Also revise RO-12 to include both CV 1103 and CV 1104. Rev 1			
00650	ESS	2	7	TRC 32 It isn't clear why RO-12 doesn/t list CHP valves such SV-1805 through SV-1808 or SV-2412 A,B through SV-2415A,B. Rev 1			
00651	ESS	2	7	TRC 32 E-17, Sheet 6 needs to be revised to include SV-0436 A&B. Rev 1			

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00652	ESS	3	1	TRC 33 RO-11, 12 and or 30 need to be revised to verify reset logic of CHP/CHR. Rev 1			
00653	ESS	4	1	TRC 38 RI-14 still states 2/4 logic even though mod was done to revise to 1/2 taken twice. Rev 1			
00676	HPA	1	1	TRC 622 Special Test T-205 should be modified to verify valve cycling at minimum pressure. Rev 1		88/09/01	
00659	HVAC	1	2	TRC 147 Modify MO-29 to include verification of ESF cooler CV's. Rev 1		88/09/01	
00737	LPSI	2	2	TRC* FSAR 6.1.2.1 RO-8 does not verify valves actually "change" position upon receipt of an SIS (ie if the safety position of valve is closed, the initial condition of the test should be that the valve is open or verify the valve receives a signal that it change position). Also, CCW Hx SW outlet valves are normally throttled and open on SIS. RO-8 does not verify this. This will be evaluated for SIS, RAS, CHR and CHP will be evaluated and approp changes made. (NRC Open Item 255/86035-135).			
00677	LPSI	3	6	TRC 679 I&C develop PAC to periodically calibrate TI-0373 & TCV-1575. Rev 1		88/09/01	
00674	MFCS	1	5	TRC 505/517/532 I&C verify requirements contained in SFE are accomplished by the PPACS indicated. It appears some PPACS have been revised or numbering changed. Rev 2		88/09/01	
00731	MFCS	2	6	7.5.1.3 PACS will be modified to verify auto close feature of the feed reg valves. Rev 1			

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00743	MFCS	3	2	TRC 505/517/532 I&C verify requirements contained in SFE are accomplished by the PPACS indicated. It appears some PPACS have been revised or numbering changed.			
00742	MFCS	5	3	TRC* 532 PACS FWS-001 no longer performs PM on CV-0608 and CV-0609 valves. I&C engineer to determine which PACS are appropriate or prepare new ones.			
00744	MFCS	5	3	TRC 505/517/532 I&C verify requirements contained in SFE are accomplished by the PPACS indicated. It appears some PPACS have been revised or numbering changed.			
00658	MSS	1	4	TRC 121 Revise RI-17 to verify closure of one MSIV closes the other. Rev 2		88/09/01	
00678	NMS	1	1	TRC 1030 Revise RI-62 to verify rod drop detection circuit for output to axial pwr ratio recorder. Add to RI-62. Rev 2		88/09/01	
00679	NMS	2	2	TRC 1040 Modify RI-99 to verify S/U detector drawer removal annunciation. Rev 1		88/09/01	
00669	PCS	10	3	TRC333/4/5 FSAR will be modified to reflect current PCS temperature operating limits. Rev 1		87/09/01	
00662	PCS	6	2	TRC 291 Modify PPACs PCS-005 to cycle SV-0160 & CV-0101. Rev 1		88/08/01	
00663	PCS	6	5	TRC 291 Modify PPACs PCS-005 to cycle SV-0160 & CV-0101. Rev 1		88/08/01	

SYSTEM FUNCTIONAL EVALUATION LONG TERM COMMITMENTS

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00665	PCS	6	8	TRC 294 Modify PAC-PCS-018 to verify alarm annunciation. Rev 2		88/08/01	
00666	PCS	9	6	TRC 322 Calibrate pzr htr Kw meters periodically in the future. Rev 1		88/09/01	
00667	PCS	9	7	TRC 323 RI-20 will be modified to verify low level cutoff. Rev 1		87/09/01	
00680	RAM	2	6	TRC TRC 1103, 1106, 1109, 1113, 1114, 1115 MR-14 does not source check RIAs 1323, 1809, 1817, 5711, 5712, 8265. Develop test or PPACS. Rev 1		88/09/01	
00747	RAM	3	2	TRC 1103, 1106, 1109, 1113, 1114, 1115 MR-14 does not source check RIAs 1323, 1809, 1817, 5711, 1712, 8265. Develop test or PPACS.			
00748	RAM	3	5	TRC 1103, 1106, 1109, 1113, 1114, 1115 MR-14 does not source check RIAs 1323, 1809, 1817, 5711, 5712, 8265. Develop test or PPACS.			
00750	RAM	4	4	TRC 1103, 1106, 1109, 1113, 1114, 1115 MR-14 does not source check RIAs 1323, 1809, 1817, 5711, 5712, 8265. Develop test or PPACS.			
00751	RAM	4	5	TRC 1103, 1106, 1109, 1113, 1114, 1115 MR-14 does not source check RIAs 1323, 1809, 1817, 5711, 5712, 8265. Develop test or PPACS.			
00686	RAM	9	5	TRC 1179 Develop test to check FR-2318 functionability Rev 1	RMBrzezinski	88/09/01	

SYSTEM FUNCTIONAL EVALUATION LONG TERM COMMITMENTS

LOGNO	SYSTEM/PAGE/ITEM			REFERENCE (FSAR or other) COMMITMENT	ASSIGNED INDIVIDUAL	DUE DATE	STATUS
00749	RAM	4	3	TRC 1103, 1106, 1109, 1113, 1114, 1115 MR-14 does not source check RIAs 1323, 1809, 1817, 5711, 5712, 8265. Develop test or PPACS.			
00672	RPS	7	3	TRC 410 The high rate of change trip and alarm will be tested periodically in the future (develop PAC). Rev 1		88/09/01	
00670	RRS	1	2	TRC 367/8 I&C to verify these test requirements are adequately tested via RO-19 and PAC PCS-017. If not, modify PAC & RO-19 to properly verify. Rev 2		88/09/01	
00671	RRS	2	3	TRC 375 Evaluate testability. Develop test to verify if testable. Rev 1		88/09/01	
00661	SCS	1	2	TRC 219 Revise FSAR to change MV designators to "MO". Rev 1		88/09/01	
00740	TURB	2	4	TRC* FSAR 7.5.3.6 - Emergency Trip Overspeed trip causes all 4 sets of steam valves to close, not just the 2 sets listed in the FSAR. - FSAR will be clarified.			