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OCT APR 23 1979

2102-1.1
Revision 19
03/07/79

THREE MILE ISLAND NUCLEAR STATION
UNIT #2 OPERATING PROCEDURE 2102-1.1
UNIT HEATUP

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Unit 1 Staff Recommends Approval

Approval NA Date —

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Unit 2 Staff Recommends Approval

Approval NA Date —

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UNIT #2 OPERATING PROCEDURE 2102-1.1

UNIT HEATUP

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1.0 REFERENCES

1.1 Drawings Applicable for Operation

1.1.1 Reactor Coolant System, B&R Dwg. #2024.

1.1.2 Makeup and Purification System, B&R Dwg. #2024.

1.1.3 Decay Heat Removal System, B&R Dwg. #2026.

1.1.4 Radwaste Disposal - Reactor Coolant Liquid, B&R Dwg. #2027.

1.1.5 Main and Reheat Steam System, B&R Dwg. #2002.

1.1.6 Bleed Steam System, B&R Dwg. #2003.

1.1.7 Auxiliary Steam System, B&R Dwg. #2004.

1.1.8 Feedwater and Condensate System, B&R Dwg. #2005.

1.1.9 Makeup Water Treatment and Condensate Polishing System, B&R Dwg. #2006.

1.1.10 Steam Generator Secondary Side Vents and Drains Systems, B&R Dwg. #2414.

1.2 Operating Procedures Applicable for Operation.

1.2.1 2101-1.1, Nuclear Plant Limits and Precautions.

1.2.2 2101-2.1, Nuclear Plant Setpoints.

1.2.3 2101-1.3, Containment Integrity and Access Limits.

1.2.4 2103-1.1, Filling and Venting the R.C. System.

1.2.5 2103-1.2, Soluble Poison Concentration Control.

1.2.6 2103-1.3, Pressurizer Operation.

1.2.7 2103-1.4, Reactor Coolant Pump Operation.

1.2.8 2103-1.5, H_2 Addition and Degasification.

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1.2.9 2103-1.9, Reactivity Balance Calculations.

1.2.10 2104-1.1, Core Flood.

1.2.11 2104-1.2, Makeup and Purification.

1.2.12 2104-1.3, Decay Heat Removal.

1.2.13 2105-1.2, Reactor Protection System.

1.2.14 2105-1.4, Integrated Control System.

1.2.15 2106-1.1, Main and Reheat Steam.

1.2.16 2106-1.4, Gland Steam.

1.2.17 2106-2.1, Condensate.

1.2.18 2106-2.4, Feedwater.

1.2.19 2106-2.5, OTSG Secondary Fill, Drain, and Layup.

1.2.20 2106-3.1, Turbine Generator.

1.2.21 2401-4.4, Removal and Replacement of Manway and Inspection Covers of the OTSG.

1.3 Manufacturers' Instruction Manuals.

Not Applicable.

1.4 System Descriptions.

Not Applicable.

1.5 Curves, Tables, etc.

Figure 1 - Reactor Coolant System Heatup Limitations.

Figure 2 - Simultaneous DH System/RC Pump Operation Limits for Heatup.

Figure 3 - Shutdown Boron Concentrations vs EFPD.

Table 1 - Method to Determine Subcritical Neutron Multiplication.

2.0 LIMITS AND PRECAUTIONS

2.1 Equipment.

2.1.1 Reactor Coolant temperature, pressure and heatup rates shall be maintained within the limits specified in Figures 3.4-2 and 3.4-3 of T.S. 3.4.9.1. (Refer to Figures 1 and 2 attached)

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Heatup Rate shall not exceed 50°F in any 1/2 hour period.

2.1.2 The pressurizer must not be filled with water to solid 400" water conditions at any time except as required for system hydrostatic tests.

2.1.3 The pressurizer maximum allowable heatup rate shall be limited to 100°F/hr. (T.S. 3.4.9.2.a)

2.1.4 The temperature of the secondary coolant in the steam generators shall be > 110°F when the pressure of the secondary coolant in the steam generator is > 237 psig per T.S. 3.7.2.1.

2.1.5 When reactor coolant temperature is less than 525°F, no more than 3 reactor coolant pumps shall be run at one time. The 4 pump interlock is set at 528°F.

2.1.6 Do not exceed a temperature of 200°F or 200 psig pressure in the reactor coolant system until reactor coolant pump seal injection flow is established to all reactor coolant pumps.

2.1.7 Both steam generators shall be operable with a water level between 18 and 390 inches when the plant is in Modes 1, 2, 3, or 4 of operation. (T.S. 3.4.5)

2.1.8 The temperature differential between the pressurizer and the spray fluid shall be maintained less than 410°F (T.S. 3.4.9.2.b).

2.1.9 If CRA Safety Groups 1&2 are withdrawn prior to heatup, observe the following:

(1) S.P. 2313-SU2 Intermediate Range Functional must be performed immediately upon closing CRD breakers.

(2) The shutdown bypass should be initiated if CRA Groups 1 & 2 are to be withdrawn, and the high flux trip setpoint should be reset to 5.0%.

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(3) Prior to reaching 1820 psig, the shutdown bypass bistable setpoint, safety rod groups 1&2 should be inserted until the shutdown bypass has been deactivated and the low pressure bistable is reinitiated at 1900 psig. The high flux trip setpoint should be reset per Tech. Spec. Table 2.2-1 for the number of RCP's in operation when the bypass is cleared.

NOTE: If any main steam safety valves have been declared inoperable, reset high flux trip setpoint per Tech Spec Table 3.7-1.

2.1.10 For operations below 525°F Tave, maintain the main feedwater nozzles submerged. (97% to 99% on the Operate Range).

2.1.11 The Nuclear Instrumentation will be continuously monitored during any reactivity addition. During withdrawal of Safety Groups one and two, subcritical source multiplication will be confirmed according to the following equation or the startup will be terminated until an appropriate evaluation is made. $M = \frac{SDM1 \quad (100 - SDM2)}{SDM2 \quad (100 - SDM1)}$ where M = Multiplacation factor

SDM1 = Shutdown Margin prior to reactivity change (% Δk/k)

SDM2 = Shutdown Margin after reactivity change (% Δ /k).

NOTE: SDM1 and SDM2 are negative values. See Table 1 for example.

2.1.12 Plot 1/M vs rod position during control rod withdrawal to insure criticality is not achieved on Safety Groups one and two.

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2.1.13 For normal plant heatup and cooldown conditions the maximum delta T between the feedwater line temperature and steam generator lower downcomer temperature is 440F when using the main feedwater nozzles.

2.1.14 If any handholes or manways in either OTSG were opened during the previous cooldown period, retorque the bolts for those handholes or manways per Maintenanace Procedure 2401-4.4 prior to commencing plant heatup.

2.1.15 It is permissible to start one Reactor Coolant Pump outside the Curve 3 of Figure 2 limits, but inside the Curve 4 limits provided that the second pump in that loop is started as soon as feasible, and not to exceed 10 minutes.

2.1.16 To minimize RC Vent Valve noise during RCP Startups and Shutdowns, start RC-P-2A or 2B first, followed by the second pump in that loop. Secure pumps in the reverse order.

2.2 Administrative

2.2.1 The shutdown margin shall be $\geq$ 2% Δk/k when Keff $\geq$ 1.0 and 1% ΔK/K when Keff < 1.0 with the most reactive rod stuck out. (T.S.3.1.1.1).

2.2.2 The boron concentration in the reactor coolant system shall not be reduced unless at least one reactor coolant pump or one decay heat removal pump is circulating reactor coolant at a flow to the RCS of $\geq$ 2800 gpm (T.S. 3.1.1.2).

In addition, while shutdown, when the RC system boron concentration is being reduced by more than 30 ppm a 1/M plot versus the amount of water added to the RCS must be maintained. Also the source range counts per second must be recorded continuously when shutdown and decreasing RC system boron concentration.

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2.2.3 When operating at reactor coolant pressures less than 500 psig, the low range reactor coolant pressure instrument must be used for operation.

2.2.4 When reactor power is less than 10% FP, do not request a printout of the following computer groups unless their operability below 10% FP has been verified:

Gp. #	Description
20	Worst Case Thermal Conditions.
31	Fluid Conditions.
38	Core Average Thermal Conditions.
39	Core Map of Thermal Conditions.
40	All Thermal Outputs.
53	Selected Thermal Conditions.

2.2.5 If any Safety Limit (defined in Technical Specification 2.1 and 2.2) is exceeded, the Shift Supervisor shall notify the Station/Unit Superintendent. The reactor shall be placed in HOT STANDBY within one hour. The licensee shall notify the Commission, review the matter and record the results of the review, including the cause of the condition and the basis for corrective action taken to preclude reoccurrence. Operation shall not be resumed until authorized by the Commission.

2.2.6 If, during operation, the automatic safety system does not function as required, the Station/Unit Superintendent shall be notified. The Shift Supervisor shall take appropriate action as outlined in the Tech. Specs. The reporting requirements of T.S. 6.9 shall be followed. Note that this appropriate action may include shutting down the reactor.

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2.2.7 When a Limiting Condition for Operation (LCO) (defined in Section 3 of the Technical Specifications) is not met, the Shift Supervisor shall notify the Station/Unit Superintendent. The reactor shall be placed in at least HOT STANDBY within 1 hour and in COLD SHUTDOWN within the following 30 hours unless corrective measures are completed that permit operation under the permissible ACTION statements for the specified time interval as measured from initial discovery. The reporting requirements of T.S. 6.9 shall be followed.

2.2.8 "Nitrogen pressure should not be applied to the pressurizer or the reactor coolant hot legs unless the reactor vessel head has been installed and the studs tensioned.

2.2.9 When Tave is greater than 300°F, deboration to the Tave <300°F curve of Fig. 3 may proceed concurrent with Heatup. Do not reduce boron below the 300°F curve of Fig. 3.

3.0 PREREQUISITES

Initial Each Step When Completed.

____3.1 Concurrence has been received from the Engineering, HP/Chemistry, Operations, and Maintenance Departments that all work necessary for heatup has been completed.

____3.2 Source range (CPS) and intermediate range (AMPS) indication available on strip chart recorder on plant control panel.

____3.3 Complete Appendix A, Pre Heatup Checklist.

4.0 PROCEDURE

Initial Each Step When Completed.

____4.1 Place all Integrated Control System (ICS) control stations in manual and adjust the manual outputs to zero in accordance

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with 2105-1.4. Verify setpoint stations are set as specified in 2105-1.4.

____4.2 Verify the NDTT Key Switch and the Pressurizer Electromatic Relief valve switch (AUTO-OFF-ON) are in the AUTO setpoint position. (This reduces the electromatic relief valve setpoint to 500 psig).

____4.3 Verify the following switch line-up at plant control panel 4.

____4.3.1 A STM line break F.W. Latching System - Bypass.

B STM line break F.W. Latching System - Bypass.

____4.3.2 Control Switches for "Steam From 2A Gen to Emerg Feed Pump", "Steam From 2B Gen to Emerg Feed Pump", "Steam Driven Emerg Feed Pump Turbine", "2A Emerg Feed Pump", and "2B Emerg Feedpump" are in PULL-TO-LOCK.

____4.4 Verify that feedwater chemistry is in spec.

NOTE: If the OTSG's were being maintained in wet lay-up, the hydrazine concentration is too high. Drain the OTSG's down to 30" on the start-up range and refill with in-spec feed water to $\approx$ 380". If the hydrazine concentration isn't reduced, it will shorten the in service life of the condensate polishers.

____4.5 Establish OTSG levels between 97% and 99% on the operate range per 2106-2.5.

NOTE: For operation below 525^{o}F Tave, maintain the main feedwater nozzles submerged, At the same time, open the bypass valves (FW-V66A/B) around the feedwater control valve and control OTSG level by using either the lower tube-sheet drains in order to letdown

through the SG Hot Drain Cooler to the Heater Drain Tank per 2106-2.5 or open Turbine bypass valves to steam down as required. If water level exceeds 390" (i.e. >100% on the operating range), invoke ACTION statement b of T.S. 3.4.5.

NOTE: Ensure that locking pins are removed from the following spring hangers: MSH-105, -106, -169, -115, -116, -170, -125, -126, -171, -135, -136, -172.

____4.6 Fill the reactor coolant system in accordance with 2103-1.1, if necessary.

____4.7 Before establishing a steam bubble in the pressurizer, insure that the Reactor Coolant Leakage Recovery System is in operation in accordance with 2104-4.6.

NOTE: The RCS may be pressurized to 300 psig for a preliminary leak check by using the following steps:

1. CAUTION: The maximum allowable RC pressure for operation of the DH system with no RC pumps operating is 305 psig. Pressurizer heatup and cooldown rates are limited to 100F/hr.
2. Energize pressurizer heaters and establish a steam bubble in the pressurizer to give an RC pressure of 300 psig (RC-3A-PI2), which corresponds to a pressurizer temperature of 422°F (RC-2-TI).
3. Use the DH Aux Spray Isolation Valve (RC-V149) and the pressurizer heaters to control RC pressure as required.

4. After the leakage check has been completed, use RC-V149 to reduce pressure to 30 psig and continue with unit heatup as outlined below.

____4.8 Energize pressurizer heaters and establish a bubble in the pressurizer in accordance with 2103-1.3, if necessary. Establish the pressurizer bubble at less than 45 psig reactor coolant pressure with manual control of the pressurizer heaters. Maintain reactor coolant pressure less than 45 psig.

CAUTION: Do not exceed a temperature of 200°F for 200 psig pressure in the reactor coolant system until reactor coolant pump seal injection flow is established Per OP2104-1.2 (M.U. & Purif. System).

CAUTION: On the initial pressurization following a Reactor Coolant System Fill, RCP seal cavities must be vented per 2104-1.2.

____4.9 Start a makeup pump and establish seal injection flow to all reactor coolant pumps in accordance with 2104-1.2.

____4.9.1 Vent the RCP Seal cavities if the RCS has been drained or the MU System has been opened since the seal injection was stopped in accordance with 2104-1.2.

____4.9.2 Place pressurizer level control in automatic with setpoint at 100" (25%).

____4.9.3 Establish letdown flow as necessary to maintain pressurizer level at 100" in accordance with 2104-1.2.

____4.10 Vent the reactor coolant system in accordance with 2103-1.1, if system pressure has been less that 30 psig.

CAUTION: Do not exceed the decay heat maximum pressure as shown on Figure 2.

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____4.10.1 Verify both Upper and Lower oil reservoirs for RC-P-1A/B and RC-P-2A/B are at or slightly above the normal oil levels.

____4.10.2 Verify oil reservoirs for RCP hydraulic snubbers RC-U-6A/B and RC-U-7A/B are at approximately the normal oil levels.

____4.10.3 Verify oil level in RCP oil drain tanks RO-T-1A/B is less than half full.

____4.11 CAUTION: The following steps enable application of vacuum to the OTSG's during startup, maintain radioactive gas releases to the environment as low as practicable, and at the same time allow the discharge of small concentrations of radioactive gas from the condenser vacuum pumps to be controlled and credited as planned radioactive gas releases.

(1) Prior to proceeding to Step 4.12 accomplish the following: Insure SV-V22 and 59A/B are tightly closed. This will maintain gas releases from the vacuum pump discharges "as low as practicable".

(2) Mark VA-R-748 recorder chart as follows if counts go above background in Step 4.12: "Commenced planned release at _____ "when vacuum was applied to OTSG's.
Date and Time

(3) Nofify Radiation Protection personnel that vacuum application to the OTSG's may cause a planned radioactive gas release from vacuum pump discharge. Direct Radiation Protection personnal to take and analyze the following samples at VA-R-748 in the event the VA-R-748 increases above background when vacuum is applied to the OTSG's in Step 4.12.

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(a) Marinelli Beaker gas sample (VA-R-748).

(b) Particulate filter sample (VA-R-748).

(c) Charcoal filter sample (VA-R-748).

(4) In the event VA-R-748 increases above background in Step 4.12, the samples taken in Step (3) above will be taken and analyzed and calculations will be made to determine the total curies of Noble gas and Iodine and particulate release to the environment. The calculated total curies of Noble gas released will be determined by integrating the VA-R-748 recorder trace. This value will be credited according to HPP-1675. The VA-R-748 particulate and filter sample analysis results will be used to calculate the total Iodine and particulates released and this value will be credited according to 1675.

(5) Vacuum application to the OTSG's in Step 4.12 below is to be terminated immediately by closing the steam vents, drains and turbine bypass valves, if VA-R-748 recorder trace exceeds 10^5 cpm. This step insures that Tech Spec gas release rates are not exceeded and the release is conducted in a planned and controlled fashion.

____4.12 Take manual control of the turbine bypass valves at plant control panel 5 and crack open the valves to draw a vacuum on both steam generators.

NOTE: A vacuum must be maintained on the steam generators until reactor coolant temperature is greater than $220^{o}F$.

4.13 Perform the following operations prior to starting heatup. (Starting RC pumps).

____ (1) Set high flux trip setpoint to 5.0% per 2303-M6.

____ (2) Manually reset the shutdown bypass high pressure trip bistable on each channel (4 total) of the reactor protective system. This will trip the channel.

____ (3) Initiate the shutdown bypass on each channel (4 total) of the reactor protective system. Reset each channel which assures the shutdown bypass operability of each channel.

NOTE: This will remove the following trip protection:

1. Power/Imbalance/Flow
2. Power/Pump
3. Low Pressure
4. Pressure/Temperature

____4.14 Verify that the reactor will be $\geq$ 1% subcritical during heatup and/or deboration by taking boron samples per 2103-1.9. The boron concentration required to be 1% shutdown with both safety groups out is given in Figure 3.

____4.15 Place the following on computer trend recorders until 2155 psig and 532°F. Mark the recorders with date, time, and scale, and every scale change and time. When heatup is complete, remove chart paper, date and time and attach to signed off procedure. This satisfies Surveillance Requirement 4.4.9.1.1 and 4.4.9.2.

(1) Pt. 0397 - Loop B Tcold

(2) Pt. 0398 - RC Pressure

(3) Pt. 0389 - Pressurizer Temperature

(4) Pt. 0394 - Loop A Tcold (optional)

NOTE: During pressurizer auxiliary spray operation, monitor spray water temperature differential per SP 2311-7.

____4.16 During heatup, plot RCS Temperature and pressure on Figure 1 every 30 minutes. Mark time of point on plotted curve every 2 hours (T.S. 4.4.9.1.1).

____4.17 Pressurize the RCS to 150 psig to establish RCP seal venting and seal return flow per 2104-1.2.

____4.18 Increase reactor coolant pressure to greater than the minimum pressure requirements for two reactor coolant pumps in A loop (See Figure 2 area 6).

____4.19 Place the spray valve control switch in the manual position and verify the spray valve is in the closed position as indicated on Panel 4.

CAUTION: Maintain pressure within the limits of Figure 2 (area 6) with manual control of the pressurizer heaters. Should reactor coolant system pressure approach the NPSH limits specified for reactor coolant pumps on Figure 2, stop the reactor coolant pumps.

NOTE: Maintain RCS temperature <200°F to remain in Mode 5 until simultaneous operation of RCP's and one DHP is no longer required.

____4.20 Start RC-P-2A first, and then start RC-P-1A in accordance with 2103-1.4.

____4.20.1 Open RC-V138 and V139 (manual valves) to fill the pressurizer code safety valve loop seals. Leave open for approximately 10 minutes, then reclose RC-V138 and V139.

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____4.20.2 Open RC-V1 and observe RC pressure. A pressure decrease indicates RC-V1 opened and pressurizer spray was available. Close RC-V1. Record in Shift and Daily Checks (2301-S1) the spray water differential temperature (if any).

____4.21 Run RCP's simultaneously with the DH pump for at least 10 minutes.

____4.22 After at least a 10 minute run, stop RC-P-1A and then stop RC-P-2A.

CAUTION: DH-V1 and DH-V2 will automatically shut at (320) psig RCS pressure, causing loss of suction to the DHP.

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____4.23 Using pressurizer heaters, pressurize to within the area bounded by area 5 on Figure 2.

____4.24 Start RC-P-2B first, and then start RC-P-1B per 2103-1.4.

____4.25 While maintaining the RCS in accordance with Figure 2 (area 5) for simultaneous operation of an RCP and DHP, the CRDM's and Hot legs may be vented while RCS temperature is between 100°F and 200°F. Conduct reventing per 2103-1.1 Para 4.2.

____4.26 Prior to RCS T_c exceeding 200°F:

____1. Containment integrity must have been established per 2311-5.

____2. Appendix B - Mode 5 to Mode 4 checklist shall have been completed.

____3. INSURE the R.B. Purge and Exhaust system is shutdown. If the R.B. Purge System is to remain in operation insure the purge time while in Mode 4 or above is logged in Log Book in Panel 25.

____4. Verify sodium Hydroxide Tank is lined up with DH-V8A&B closed and DH-V134A&B, DH-V133A&B open.

____4.27 Secure the DH systems and place in ES standby, per 2104-1.3.

CAUTION: Insure Intermediate Cooling Water is supplied to CRDM's.

____4.28 Verify that reactor coolant pressure is greater than the required pressure for control rod drive operation (as shown on Figure 1 and 2).

____1. Complete rod programming verification per 2301-S1 and 2311-3 if applicable (T.S. 4.1.3.8a)

____4.29 Verify shutdown margin by comparing the present boron concentration with the curve value from Figure 3. If the present boron

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concentration is greater than the value of the (< 300°F) curve of Figure 3, the 1% SD margin is assured.

_____4.30 Ensure that the following surveillance is current prior to CLOSING the Control Rod Drive Trip Breakers.

_____.1 2303-M6, Section 6.10, RPS Functional Test

_____.2 2303-W1 Source Range Functional Test

_____.3 Ensure S.P. 2313-SU2 Intermediate Range Functional Test is current prior to entering Mode 4 and immediately after closing the Control Rod Drive Trip Breakers.

CAUTION: Verify subcritical multiplication per 2.1.11. Plot 1/M vs Rod position during rod withdrawel to insure criticality is not attained on the Safety Groups.

_____4.31 Withdraw Safety Groups 1 and 2, IAW 2105-1.9.

_____4.32 Establish a hydrogen overpressure in the makeup tank per 2103-1.5.

CAUTION: Limit the pressurizer heat up rate to 100°F/hr (T.S. 3.4.9.2.a) and the pressurizer to loop differential temperature to less than 410°F ΔT.

CAUTION: Limit the temperature differential between the pressurizer and spray fluid to less than 410°F (T.S. 3.4.9.2.b).

_____4.33 Insure RC pressure is above the minimum for single RCP in a loop operation, Figure 2 curve 3 and start a third reactor coolant pump and commence reactor coolant system heatup. Energize all pressurizer heaters, control the spray valve manually as necessary to maintain pressure within the boundaries of Figure 1.

____4.34 During system heatup compensate for increasing pressurizer level due to the reactor coolant system expansion by adjusting letdown flow as necessary, and diverting letdown flow to the selected bleed tank to maintain makeup tank level between 55-86 inches.

NOTE: If adequate letdown is not possible, reduce the seal flow control valve controller setpoint accordingly, normal setpoint is ≈40 gpm. Do not set less than 24 gpm. (Low flow alarm setpoint).

CAUTION Do not feed the steam generators unless the difference between the feedwater line temperature and steam generator lower downcomer temperature is maintained at less than a 440°F.

NOTE: Continue to maintain the main feewater nozzles submerged aoutlined in step 4.5 above.

____4.35 When R.C. temperature is >220°F and both OTSG lower downcomer temperatures are greater than 220°F the requirement to maintain a vacuum in the OTSG's is no longer in effect, place the turbine Bypass Valves in automatic.

____4.36 When OTSG temperature is approximately 230°F, cycle the main steam traps per 2106-1.1 Appendix C.

NOTE: If the heat up rate is low, perform Appendix D to attempt to find and minimize steam leakage.

____4.37 Prior to 250°F in the RCS, ensure oxygen concentration is in spec per T.S. Table 3.4-1.

____4.38 Prior to RCS T_c exceeding 280°F, ensure Appendix C, Mode 4 to Mode 3 Checklist has been completed except as noted therein.

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____4.39 After 275°F in the RCS and prior to exceeding 450 psig, place the NDTT Key Switch in the OFF position. (This restores the electromatic relief setpoint to normal - 2255 psig).

____4.40 Prior to exceeding 500 psig RCS press. place c/s's for the non-operating MUP's in Normal after stop position. Ensure one c/s for MU-P1B is in pull to lock position.

____4.41 When reactor coolant pressure is greater than 700 psig, but prior to reaching 750 psig. place the core flooding system in operation in accordance with 2104-1.1.

CAUTION: During boron concentration reductions flow in the reactor coolant system must be maintained greater than 2800 gpm (T.S. 3.1.1.2).

____4.42 Deborate as necessary in accordance with 2104-1.2 and 2103-1.2 but do not go below the (Tav <300°F) curve of Figure 3. In addition, while shutdown, when the RC system boron concentration is being reduced by more than 30 ppm a 1/M plot versus the amount of water added to the RCS must be maintained. Also, the source range counts per second must be recorded continuously when shutdown and decreasing RC system boron concentration.

____4.43 When a steam generator pressure is approximately 150 psig, start a condensate booster pump in accordance with 2106-2.1.

____4.43.1 Insure FW-V17A and B are open and vent the feedwater lines through FW-V61A (B) and FW-V62A (B). Failure to properly vent lines could result in a FW Latch Signal when the non-operating FW header is placed in service.

____4.43.2 EF-P-1 Pump Functional Test per 2303-M14A, B or C must be satisfactorily completed prior to OTSG pressure exceeding

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800 psig. If 2303-M14A, B, C has not been satisfactorily completed within the past 31 days, perform this surveillance as soon as sufficient steam is available (steam pressure >200 psig) but prior to OTSG pressure exceeding 800 psig.

____4.44 When RCS pressure reaches 1670 psig ensure the Safety Injection/ RCS press low trip Bistables have reset.

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____4.45 Prior to reactor coolant pressure reaching 1820 psig, insert the safety groups in accordance with 2105-1.9.

____4.46 Increase reactor coolant pressure greater than 1900 psig and accomplish the following:

(1) Reset all RPS cabinet bistables that are tripped except the shutdown bypass high pressure bistable.

(2) Place the shutdown bypass switches (4) on each reactor protective panel to the normal position.

CAUTION: Check main steam pressure prior to closing trip breakers. Closing trip breakers will remove the 125 PSI bias from turbine by-pass valves.

(3) Withdraw Safety Groups 1 and 2, verify subcritical multiplication and plot 1/M vs rod position in accordance with 2105-1.9.

____4.47 When reactor coolant pressure is greater than 1850 psig, verify that the Safety Injection Bypass Bistables are reset, and the "Protective Function Fully Enabled" lights are lit.

____4.48 When RCS temperature is greater than 280°F, conduct RCS hydro if required.

CAUTION: Insure that the leakage cooling water system is in operation to the RCS Drain Tank per 2104-3.3.

____4.49 When RC temperature reaches approximately 350°F commence hard bubble degasification by opening RC-V155 and intermittently jogging open RC-V137, if necessary to establish 15 to 45 cc/kg H_2 in the RCS.

____4.50 Place the turbine bypass valve control stations in automatic (if not already in automatic).

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____4.51 When steam generator pressure is approximately 500 psig, start a feed water pump on auxiliary steam in accordance with 2106-2.4.

____4.52 When reactor coolant pressure increases above 2100 psig, place the pressurizer heaters and spray to automatic as outlined in 2103-1.3, and complete 2301-M5 if required.

CAUTION: Ensure 2303-M14A,B or C is complete prior to exceeding 800 psig in OTSG.

____4.53 Place the control switches for MS-V11A and B MS-V207, EF-P2A and B in Normal-After-Stop at 800 psig in OTSG.

____4.54 Place the Emergency FW valves, EF-V11A and EF-11B in AUTOMATIC as follows:

a. With the MV-Pos switch in "Pos", place the Emergency Feed Water valve EF-V11A, H/A station in Auto by depressing the Auto pushbutton until the "Auto" light is lit.

b. Repeat step a. above for Emergency Feed Water Valve EF-V11B.

____4.55 When steam generator pressure reaches 800 psig, open and cycle those valves listed in 2106-1.1, Appendix C - Steam Trap Checklist.

CAUTION: If the F.W. Latching System switches are placed in "LATCH" position this will cause all valves associated with F. W. Latch to go shut.

____4.56 With OTSG pressure between 750 psig and 800 psig, complete the following switch lineup at Panel 4.

A STM line break F.W. Latching System to Normal

B STM line break F.W. Latching System to Normal

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____4.57 When RCS temperature is greater than 525°F, start the fourth RCP per 2103-1.4.

____4.57.1 Reduce OTSG level to the low level limit via the turbine bypass valve and/or the hot drain cooler per 2106-2.5.

____4.58 Reset the overpower trip setpoints of the RPS per 2105-1.2 for the number of RCP's in operation.

NOTE: If any main steam safety valves have been declared inoperable, reset high flux trip setpoint per T.S. Table 3.7-1.

____4.59 Deborate as necessary in accordance with 2104-1.2 and 2103-1.2 to the boron concentration specified on the 525°F curve of Figure 3.

____4.60 Transfer GS from Aux steam to main steam per 2106-1.4, if possible without cooling down.

____4.61 Continue heatup to greater than 525°F.

____4.62 Conduct rod drop testing if required per 2303-R1 (T.S. 3.1.3.5).

____4.63 Conduct a visual inspection or the reactor coolant system for leaks at this time.

____4.64 When RC temperature is greater than 525°F, check hangers MSH-105, -106, -169, -115, -116, -170, -125, -126, -171, -135, -136, -172, to ensure that the hanger setting indicator is aligned with the hot setting button. If the pointer is not on the hot setting position, readjust the hanger turnbuckle to achieve the proper hanger setting. Refer to 2102-3.2 Appendix C for proper turnbuckle setting.

____4.65 Complete 2301-3D1.

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Final Conditions

The Unit is in Mode 3 and the reactor coolant temperature is equal to or greater than 525°F. Four reactor coolant pumps are in operation. The reactor coolant system is at normal operating pressure with heater and spray controls in automatic. All ICS control stations are in hand except the turbine bypass valves and EF valves.

NOTE: Reactor coolant pump configuration may be adjusted as directed by the Shift Foreman at this time. Ensure the RPS high flux trip setpoints are proper for the RCP combination prior to criticality. The FW startup control valves may be in auto or manual and OTSG level will remain at the low level limit.

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TABLE 1

Method to Determine Subcritical Neutron Multiplication

$$M = \frac{SDM1\ (100 - SDM2)}{SDM2\ (100 - SDM1)}$$

where

M = Multiplication Factor

SDM1 = Shutdown Margin Prior to reactivity change (% Δk/k)

SDM2 = Shutdown Margin after reactivity change (% Δk/k)

NOTE: SDM1 and SDM2 are negative values.

$CR_2 = M(CR_1)$ where CR_2 = new count rate

CR_1 = initial count rate

Example:

Condition: The reactor is 10% subcritical. 5.3% reactivity is added by withdrawing safety rods. The initial count rate is 10 cps. The reactor is now 4.7% subcritical.

Calculation:

SDM1 = 10%: SDM2 = 4.7%

$$M = \frac{10\ (100 + 4.7}{4.7\ (100 + 10)} = \frac{10\ \ (104.7)}{4.7\ (110)} = 2.025$$

$CR_2 = 2.025\ (10) = 20.25$ cps.

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APPENDIX A

Pre-Heatup Checklist

Overall Support Systems

No.	Description	Initial
1.	Verify a current normal electrical system lineup per 2107-1.1	_____
2.	Verify a current Class 1E electrical system lineup per 2107-1.2.	_____
3.	Nuclear Service river water system is in operation per 2104-3.1	_____
4.	Secondary services river water system is in operation per 2104-3.4	_____
5.	Nuclear Services closed cooling water system is in operation per 2104-3.2.	_____
6.	Secondary Services closed cooling water system is in operation per 2104-3.5.	_____
7.	Instrument and service air systems are in operation per 2104-2.3 and 2104-2.10.	_____
8.	Place one or more circulating water pumps in operation per 2104-3.6.	_____
9.	All the below listed auxiliary systems are in service:	
	A. Spent Fuel Cooling - 2104-1.5	_____
	B. Aux. and Fuel Handling Building Ventilation - 2104-5.3/2104-5.2.	_____
	C. Cycle Makeup Pretreatment - 2104-2.1	_____
	D. Demineralizer Service Water - 2104-2.2.	_____
	E. Miscellaneous Support Building HVAC	
	1. Control Building HVAC - 2104-5.4.	_____
	2. Service Building HV - 2104-5.5.	_____
	3. Turbine Building HV - 2104-5.6.	_____
	4. Diesel Building HV - 2104-5.7.	_____
	5. Chlorinator Building HV - 2104-5.8.	_____

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APPENDIX A

Pre-Heatup Checklist

Overall Support Systems

No	Description	Initial
	6. Coagulator Building HV- 2104-5.9	_____
	7. Control Building Area HV - 2104-5.10	_____
	8. Circ. Water Pump House HV - 2104-5.11	_____
	9. Air Intake Tunnel HV - 2104-5.12	_____
	10. Fire Pump House HVAC - 2104-5.13	_____
	11. Mech. Draft Cooling Tower Pump House HV - 2104-5.14	_____
	12. River Water Pump House HV - 2104-5.15.	_____
F.	Solid Waste Disposal - 2104-4.4	_____
G.	Screen House Equipment - 2104-3.7	_____
H.	Circ Water Chlor. & Chem. Feed - 2104-3.10	_____
I.	River Water Chlor. - 2104-3.9.	_____
J.	Mech. Draft Cooling Tower - 2104-3.8	_____
K	Sump Pump and Drainage - 2104-2.5	_____
L.	Nuclear Plant Sampling - 2104-1.11	_____
M.	Secondary Plant Sampling - 2104-2.8.	_____
N.	Fire Service System - 2104-6.1	_____
O.	Heat Tracing - 2107-1.4	_____
P.	Domestic Water - 2104-2.7	_____
Q.	Sludge Facility & Industrial Waste - 1104-50	_____
R.	Turbine Bypass - 2106-1.5	_____
10.	Start the turbine auxiliaries and place the turbine on the turning gear per 2106-3.1.	_____

APPENDIX A

Pre-Heatup Checklist

Overall Support Systems

No	Description	Initial
11.	Start the feed pump turbine's auxiliaries and place both main feed pumps on their turning gears per 2106-2.4.	_____
12.	Verify a current valve lineup for the feed system per 2106-2.4.	_____
13.	Verify a current valve lineup for the condensate system per 2106-2.1.	_____
14.	Start both auxiliary boilers or use Unit 1 Cross-Tie and warm up the auxiliary steam header per 2106-1.3.	_____
15.	Verify a current valve lineup for extraction steam, feed water heater vents and drains per 2106-1.2.	_____
16.	Start one condensate pump and perform the feed water cleanup for both heater trains per 2106-2.1.	_____
	Train A	_____
	Train B	_____
17.	Place at least 2 condensate polishing units in service per 2106-2.2.	_____
18.	Place gland steam system in operation per 2106-1.4.	_____
19.	Establish vacuum in the main condensers per 2106-2.3.	_____
20.	Place condensate chemical feed system in operation per 2106-2.8.	_____
21.	Open the isolation valves on the turbine bypass system (MS-V-23A & B and MS-V-24 A & B)	_____
22.	Complete a vavle lineup on the emergency feed system per 2104-6.3	_____
23.	Complete a valve lineup on the main steam system per 2106-1.1.	_____
24.	Place the isolated phase bus duct cooling system in operation per 2106-3.6.	_____
25.	Commence purging generator with CO_2 in preparation for adding H_2 gas. Insure seal oil system is in operation per 2106-3.3.	_____

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APPENDIX A

Pre-Heatup Checklist

Overall Support Systems

No	Description	Initial
	Reactor Buildin Systems	
26.	Place environmental barrier sytem in operation per 2104-1.8	
27.	Place penetration cooling sy[illegible]em in operation per 2104-1.7.	
28.	Place reactor building ventition systems in operation per 2104-5.1.	
28.1	Verify Reactor Vessel heads are in operation.	
	Primary[illegible]port System	
29.	Decay heat closed cooling[illegible]r system is in operation per 2104-3.3.	
30.	Decay heat removal system[illegible]n operation per 2104-1.3.	
31.	Place intermediate cooli[illegible]tem in operation per 2104-1.6.	
32.	Complete a valve lineup [illegible] makeup and purification system per 2104-1.[illegible].	
33.	Verify a current valve [illegible]on the nitrogen supply system per 2104-1.10.	
34.	Complete a valve lineup chemical addition system per 2104-1.12.	
35.	Verify a minimum volume[illegible].000 gallons in the reactor coolant bleed t[illegible]	
36.	Verify OTSG manway and [illegible]: cover bolts are torqued or retorqued, [illegible]riate, per 2401-4.4.	
	Instion Systems	
37.	The following instrume[illegible]ystems are in the conditions specified b[illegible]	
	I	
	A. Two source range in[illegible], NI-1 & NI-2 have current tests [illegible]nd read greater than 2 cps.	

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APPENDIX A

Pre-Heatup Checklist

Overall Support Systems

No	Description	Initial
	B. NI lined up per 2105-1.1	_____
	C. RPS lined up per 2105-1.2.	_____
	D. Verify below listed RPS signal jacks are connected to operating channels.	
	1. RC Pressure to NNI	_____
	2. RC Flow to NNI	_____
	3. RC Flow to Computer	_____
38.	SFAS lined up per 2105-1.3.	_____
39.	NNI lined up per 2105-1.6.	_____
40.	Secondary Plant Auxiliary Control System Instrumentation in operation per 2105-1.7.	_____
	Locked Valves	
41.	Verify the status of the plant locked valves per the Locked Valve Book.	_____
42.	Review "Jumper and Bypass Control" Book.	_____

APPENDIX A Checklist Complete:

_____ _____
Signature Date

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APPENDIX B

SURVEILLANCE REQUIREMENTS

Appendix B data sheets list the surveillance requirements for ascention form Mode 5 to Mode 4.

a. The INITIALS block for each requirement certifies that satisfactory data for the applicable Surveillance Procedure has been collected within the time interval indicated in the SURV FREQ block and is available for audit.

b. The DATE SP SATISFIED block shall contain the date of the last satisfactory performance of the applicable Surveillance Procedure.

c. The NAME, DATE, TIME entries at the bottom of the MODE columns signify that surveillance requirement compliance has been verified and that entry may be made into the specified OPERATIONAL MODE.

d. When a Surveillance Procedure is established, the schedule of surveillance relevant to that procedure is a function of that procedure, the responsible supervisor and the Tech Spec Surveillance Program (AP1010).

e. The pump and valve functional tests are usually designated as A/B. The A procedure functionally tests the pumps and valves and has a 92 day interval. The B procedure usually only contains pump testing, and has a 31 day interval. If the A test was performed within the past 31 days, this satisfies the monthly pump test requirement. Note however, that if the A test was run 60 days ago (still current based on an 92 day interval), the pumps must be retested by either another A test or a B test to be current within the last 31 days.

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Mode 5 to Mode 4

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		S,D	OPS	2301-S1	REFER TO 2301-S1	SHIFT AND DAILY CHECKS
		7 da	OPS	2301-W1	REFER TO 2301-W1	WEEKLY CHECKS
		7 DA	OPS	2301-W2	4.8.2.3.2	STA STG BATT CHECKS
		31 da	OPS	2301-M2 attachment 1 & 2A or 2B	4.1.2.1 (b) 4.1.2.2 (b)	BORON INJ VALVE LINEUP
		31 da	OPS	2301-M7	4.5.2 (b) 4.5.3 (b)	ECCS VLV LINEUP VERIF (MODE 4: ONE SUB-SYS REQ'D)
		31 da	OPS	2301-M8	4.6.1.1 (a)	CONTAINMENT INTEGRITY
		31 da	OPS	2301-M9	4.6.2.1 (a) 4.6.2.2 (a)	RB SPRAY SYS VLV LINEUP VERIF

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DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		31 da	OPS	2301-M10	4.7.3.1 (a)	NSCCW VLV LINEUP VERIF
		31 da	OPS	2301-M11	4.7.3.2 (a)	DHCCW VLV LINEUP VERIF
		31 da	OPS	2301-M12	4.7.4.1 (a)	NSRW VLV LINEUP VERIF
		92 da	EL	2301-Q1	4.8.2.3.2 (b)	STATION STORAGE BATTERIES
		18 Mo	IC	2302-R3	4.3.3.1 tab 4.3-3 4.4.6.1 (a)(c)	RMS CHAN CALIB
		18 Mo	IC	2302-R9	4.4.6.1 (b)(d)	RB SUMP LVL & AIR CLR EXCESS COND LEVEL SWITCHES CALIB
		18 Mo	IC	2302-R16	4.8.1.1.2 (6)	DG LOAD SEQ RELAY CALIB
		18 Mo	IC	2302-R22	4.3.2.1.1 tab 4.3-2 (4a)	RB AUTO SUMP SUCT. CHAN. CALIB

APPENDIX B

Mode 5 to Mode 4

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		--	OPS	2313-SU3	Table 4.3-1 Funct. Unit 1	MANUAL REACTOR TRIP (2 PUMPS OPERABLE)
		31 da	OPS	2303-M1A or B	4.1.2.4 4.5.3 (f)	MU PUMP FUNCTIONAL (2 PUMPS OPERABLE)
		31 da	OPS	2303-M2A or B	4.1.2.5 4.5.3 (f)	DHR PUMP FUNCTIONAL (2 OPERABLE)
		--	OPS	2311-5 *	4.5.2.C (4.5.3) 4.6.1.1.a.1 "*" 4.6.1.3.a (4.6.1.1.b) (4.6.1.2.e)	CONTAINMENT INTEGRITY
		31 da	OPS	2303-M9	4.3.3.1 tab 4.3-3(b) 4.4.6.1 (a)(c)	RMS-RB CHAN FUNCTIONAL (HP-R-227)
		31 da	IC	2303-M10	4.3.3.7	CHLOR DET SYS FUNCTIONAL
		31 da	OPS	2303-M12	4.6.2.3 (a)	RB CLG UNIT OPERATIONAL
		31 da	OPS	2303-M15	4.7.7.1 (b)	CONTROL ROOM EMERG VENT CK
		31 da	OPS	A or C and B or D 2303-M16	4.8.1.1.2 (a)	EMERG DG OPER CHECK (2 OPERABLE)
		92 da	OPS	2303-M16A and B	4.0.5	EMERG. D.G. VALVE TESTING
		92 da	OPS	2303-M23A	4.0.5	CONT BLDG LIQ COOL PMP AND VALVE FUNCT
		31 da	OPS	2303-M23A or B	4.0.5	CONT BLDG LIQ COOL PMP FUNCT
			IC	2313-SU2	4.3.1.1.1 Table 4.31-1.10	INTERMEDIATE RANGE CHANNEL FUNCTIONAL TEST

*Insure the appropriate sections of 2311-5 are current.

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Mode 5 to Mode 4

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		92 da	OPS	2303-M24A	4.0.5 4.6.2.1 (b)	RB SPRAY PUMP AND VALVES
		31 da	OPS	2303-M24A or B	4.6.2.1 (b)	RB SPRAY PUMP FUNCT
		92 da	OPS	2303-M25A	4.0.5 4.7.3.2	DHCCW PUMP AND VALVES
		31 da	OPS	2303-M25A or B	4.0.5 4.7.3.2	DHCCW PUMP FUNCT
		31 da	OPS	2303-M26	4.1.2.7	BORIC ACID PUMP FUNCT
		92 da	OPS	2303-M27A	4.0.5	EF PUMP AND VALVES
		31 da	OPS	2303-M27A or B	4.0.5	EF PUMP FUNCTIONAL
		92 da	OPS	2303-M28A	4.0.5	NSRW PUMP AND VALVE
		31 da	OPS	2303-M28A or B	4.0.5	NSRW PUMP FUNCTIONAL
		31 da	OPS	2303-M29	4.0.5	CONT BLDG RW BOOST PUMP AND VALVE FUNCT
		92 da	OPS	2303-M30A	4.0.5	NSCCW PUMP AND VALVE
		31 da	OPS	2303-M30A or B	4.0.5	NSCCW PUMP FUNCTIONAL
		92 da	OPS	2303-M31A and B	4.6.2.3 (b) 4.0.5	RB EMERG COOL BOOST PUMP AND VALVE FUNCT
		31 da	OPS	2303-M31A or C	4.6.2.3 (b) 4.0.5	RB EMERG COOL BOOST PUMP FUNCTIONAL (A & B Pumps)
		31 da	OPS	2303-M31 B or D	4.6.2.3(b) 4.0.5	RB EMERG COOL BOOST PUMP FUNCTIONAL (C & D PUMPS)
		31 da	OPS	2303-M32A/B	4.0.5	SF COOLING PUMP FUNCT
		31 da	OPS	2303-M33	4.0.5	SW PUMP AND VALVE FUNCT
		31 da	OPS	2303-M34	4.3.2.1.1 tab 4.3-2 (1a,1e,2c)	SAFETY INJ MAN INITIATION AND ACTUATION LOGIC FUNCT.

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Mode 5 to Mode 4

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		31 da	OPS	2303-M35	4.3.2.1.1 tab 4.3-2 (1d,2a)	RB ISOL & CLG/MAN INITIATION ACTUATION LOGIC FUNCT
		92 da	OPS	2303-Q5	4.0.5	INSERVICE TESTING OF HVAC VALVES
		92 da	OPS	2303-Q7	4.0.5	VALVE OPERABILITY TEST DURING COLD SHUTDOWN
		184 da	OPS	2303-SA2	4.6.1.1 (b) 4.6.1.3 (b)(c)	RB HATCH INLK & AIRLOCK CK
		184 da	ES	2303-SA4	4.7.5.1 (b)	INTAKE CHANNEL ELEV. VERIF.
		18 Mo	OPS	2303-R8	4.5.3 (d.3)	ECCS ISOL, INLK & LEAK INSP
						CLASS 1E DIST SYS-SOURCE XFER

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Mode 5 to Mode 4

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		18 Mo	OPS	2303-R21	4.8.1.1.2(c.2,3,5)	CLASS 1E DIST SYS FUNCT
		18 Mo	EL	2303-R22	4.8.2.3.2(c,d)	STA STG BATT-SERVICE TEST
		18 Mo	OPS	2303-R25	4.7.7.1(c,e)	CONT RM EM VENT PERFORM.
		18 Mo	OPS	2303-R26	4.6.2.1(d.1,d.2)	RB SPRAY SYS LEAK MEASURE
		18 Mo	OPS	2303-R29	4.8.1.1.2(c.4)	EMERG DG LOADING TEST (BOTH DG'S)
		5 YRS	EL	2303-5Y1	4.8.2.3.2(e)	STA STG BATT PERF DISCHG TEST
		5 YRS	OPS	2303-5Y2	4.6.2.1(e)	RB SPRAY NOZZLE FLOW CHECK
		5 YRS	OPS	2303-5Y3	4.6.2.2(d)	NAOH TK SOL FLOW RATE CK

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Mode 5 to Mode 4

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		3 da	CH	2304-3D3	4.7.1.4 tab 4.7-2(1)	SEC COOLANT SPECIFIC ACTIVITY (SECTION 6.1)
		184da	CH	2304-3D3	4.7.1.4 tab 4.7-2(2b)	SEC. COOLANT SPECIFIC ACTIVITY (SECTION 6.2)
		92 da	CH	2304-Q1	4.8.1.1.2(b)	DG FUEL TESTING
		184da	CH	2304-SA1	4.6.2.2(b.2)	RB SPRAY NAOH TK CONC ANAL.
		184da	CH	2304-SA3	4.7.1.4 tab 4.7-2 (2b)	SEC COOLANT SPECIFIC ACTIVITY
		184da	ES	2305-SA1	4.7.6.1.2 (a,b)	DIKE INSPECTION
		>6 EFP months but by 3/28/80	ES	2305-R2	4.4.5.1 thru 4.4.5.5	OTSG EDDY CURRENT TEST
		18 Mo		2305-R3	4.8.1.1.2 (c.1)	DG INSPECTION
		18 Mo	OPS	2305-R5	4.7.8.1 (c)	HYD SNUBBER INSPECTION

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Mode 5 to Mode 4

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		2 yrs. after comm.		2313-R5	4.6.1.6.2	RB STRUCT INTEGRITY TEST
		40±10 Mo.		2313-R6	4.6.1.2(a,b,c) 4.6.1.6.1	RB INTEG LEAK RATE TEST
		≤24 Mo.		2313-R7	4.6.1.2 (d,f)	RB INDIV LEAK RATE TEST
		18 Mo	IC	2303-R3	4.3.2.1.3	ESFAS RESPONSE TIMES
		31 da	OPS	2601-M1	4.1.2.9	RECLAIMED BORIC ACID TANK TEMP CHAN CHECK
		18 Mo	OPS	2305-R1	4.5.2 (d2)	ECCS RB EMER. SUMP INSP.
		18 Mo	IC	2602-R10	4.7.7.1 (a)	CONTROL ROOM AIR TEMP CALIB
		18 Mo	IC	2602-R14	4.6.1.5	CONTAINMENT AIR TEMP CALIB
		18 Mo	IC	2602-R15	4.6.2.2	NAOH STOR. TK LEVEL CALIB
		18 Mo	IC	2602-R22	4.4.6.2	RCS LEAKAGE INSTR CALIB

ALL TECH SPEC REQUIREMENTS FOR ENTRY INTO MODE 4 HAVE BEEN SATISFIED:

PERFORMED BY: _____ DATE _____ TIME _____

APPROVED BY: _____ DATE _____ TIME _____

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APPENDIX C

SURVEILLANCE REQUIREMENTS

Appendix C data sheets list the surveillance requirements for ascention form Mode 4 to Mode 3.

a. The INITIALS block for each requirement certifies that satisfactory data for the applicable Surveillance Procedure has been collected within the time interval indicated in the SURV FREQ block and is available for audit.

b. The DATE SP SATISFIED block shall contain the date of the last satisfactory performance of the applicable Surveillance Procedure.

c. The NAME, DATE, TIME entries at the bottom of the MODE columns signify that surveillance requirement compliance has been verified and that entry may be made into the specified OPERATIONAL MODE.

d. When a Surveillance Procedure is established, the schedule of surveillance relevant to that procedure is a function of that procedure, the responsible supervisor and the Tech Spec Surveillance Program (AP1010).

APPENDIX C

Mode 4 to Mode 3

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		S,D	OPS	2301-S1	REFER TO 2301-S1	SHIFT & DAILY CHECKS
		31 da	OPS	2301-M1	4.3.3.6	POST ACCIDENT MON INSTR CHECKS
		31 da	OPS	2301-M4	4.3.3.5 tab 4.3-6 (all)	REM S/D MON. INSTR CHAN CHECKS
		31 da	OPS	2301-M6	4.5.1 (c)	CF TK ISOL VLV BKR POSIT VERIF (WHEN RC PRESS > 800 PSIG)
		31 da	OPS	2301-M7	4.5.2 (b)	ECCS VLV LINEUP VERIF
		31 da	OPS	2301-M5	4.4.6.2 (c)	RCP Seal Leakoff Check (When RCS Press = 2155 ± 50 PSIG)
		92 da	IC	2302-Q1	4.3.3.5 tab 4.3-6 4.3.3.6 tab 4.3-10(1)	REM S/D, PWR RANGE INSTR CAL.
		18 Mo	IC	2302-R1.2	4.3.3.6 tab 4.3-10(4)	RCS OUTLET TEMP CHAN CALIB
		18 Mo	IC	2302-R1.1	4.3.3.5 tab 4.3-6 4.3.3.6 tab 4.3-10(6)	RPS-RCS PRESS H/L CHAN CALIB
		18 Mo	IC	2302-R1.3	4.3.3.5 tab 4.3-6	RPS-RCS FLOW CHAN CALIB

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Mode 4 to Mode 3

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		18 Mo	IC	2302-R1.6	4.3.3.5 tab 4.3-6 4.3.1.1.1 tab 4.3-1(10)	RPS-IR FLUX/RATE CHAN CHECK
		18 Mo	IC	2302-R1.7	4.3.3.5 tab 4.3-6	RPS-SR FLUX/RATE CHAN CALIB.
		18 Mo	IC	2302-R2	4.3.2.1.1,4.3.2.1.2 tab 4.3-2 (3a)	RB SPRAY, RB PRESS HI-HI CH CALIB
		18 Mo	IC	2302-R3	4.3.3.6 tab 4.3-10 (5)	RMS CHAN CALIB
		18 Mo	IC	2302-R6	4.3.3.5 tab 4.3-6	CRD PI CHAN CALIB
		18 Mo	IC	2302-R7	4.3.3.5 tab 4.3-6 4.3.3.6 tab 4.3-10(7)	PRZR LEVEL/TEMP CHAN CALIB
		18 Mo	IC	2302-R8	4.3.3.5 tab 4.3-6	RC TOTAL FLOW-NNI CHAN CALIB
		18 Mo	IC	2302-R10	4.3.2.1.1,4.3.2.1.2 tab 4.3-2 (1b)	SAFETY INJ RC PRESS LOW CH CALIB
		18 Mo	IC	2302-R11	4.3.2.1.1,4.3.2.1.2 tab 4.3-2 (1c,2b)	RB ISOL & CLG/SAFETY INJ, RB PRESS HIGH CHAN CALIB
		18 Mo	IC	2302-R12	4.3.2.1.1,4.3.2.1.2 tab 4.3-2 (5a)	ESF-FDW LATCHING SYS CH CALIB

APPENDIX C

Mode 4 to Mode 3

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		18 Mo	EL	2302-R14	4.3.2.1.1 tab 4.3-2 (7.a.1)	4kv ESF BUS 2-1E/2-2E UV RELAY CALIB
		18 Mo	IC	2302-R17	4.3.3.5 tab 4.3-6(3) 4.3.3.6 tab 4.3-10(8,9)	OTSG LEVEL CHAN CALIB
		18 Mo	EL	2302-R18	4.3.2.1.1 tab 4.3-2 (7.a.2)	4KV ESF BUS 2-3E/2-4E UV RELAY CALIB
		18 Mo	IC	2302-R19	4.3.3.6 tab 4.3-10 (10)	BWST TEMP/LEVEL CHAN CALIB
		18 Mo	IC	2302-R20	4.3.3.6 tab 4.3-10 (2)	RB AIR PRESS CHAN CALIB
		18 Mo	IC	2302-R21	4.3.3.5 tab 4.3-6 (5)	MU STG TANK LEVEL INST CALIB
		18 Mo	IC	2302-R23	4.3.1.1.1 tab 4.3-2 (6a)	FDW LINE RUPTURE AUTO DETECTION CHAN CALIB
		18 Mo	IC	2302-R24	4.3.3.6 tab 4.3-10 (3)	CF TK LEVEL/PRESS CHAN CALIB
		18 Mo	IC	2302-R25	4.3.3.6 tab 4.3-10 (12)	LPI FLOW CHAN CALIB
		18 Mo	IC	2302-R27	4.3.3.5 tab 4.3-6 (4)	RC INLET TEMP CHAN CALIB

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Mode 4 to Mode 3

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		18 Mo	IC	2302-R26	4.3.3.6 tab 4.3-10 (11)	HPI-FLOW CHAN CALIB
		18 Mo	IC	2302-R28	4.3.3.6 tab 4.3-10 (14)	OTSG PRESS CHAN CALIB
		18 Mo	IC	2302-R29	4.3.3.6 tab 4.3-10 (13)	RB SPRAY PUMP FLOW CHAN CALIB
		31 da	OPS	-2303-M1A or B	4.5.2 (f) 4.05 4.1.2.4	MU PUMP FUNCTIONAL
		31 da	OPS	2303-M2A or B	4.5.2 (f) 4.0.5	DHR PUMP FUNCTIONAL
		31 da	OPS	2303-M6	4.3.1.1.1 tab 4.3-1 (12,13)	RPS CHANNEL FUNCTIONAL (WITH CRD BKRS CLOSED)
		31 da	OPS	2303-M7	4.3.2.1.1 tab 4.3-2 (3a,3b)	RB PRESS HI HI CHAN AND ACTUATION LOGIC CHAN, FUNC.

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Mode 4 to Mode 3

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		92 da	OPS	*2303-M14A	4.0.5 4.7.1.2 (a)	EF-P-1A AND "A" VALVE FUNCT AND VALVE LINE-UP VERIF.
		92 da	OPS	*2303-M14B	4.0.5 4.7.1.2 (a)	EF-P-1A AND "B" VALVE FUNCT AND VALVE LINE-UP
		31 da	OPS	*2303-M14 A,B or C	4.0.5 4.7.1.2 (a)	EF-P-1A AND VALVE LINE-UP
		31 da	OPS	2303-M14D	4.7.1.2 (a)	EF VALVE LINE-UP VERIF
		31 da	OPS	2303-M14E	4.7.1.2 (a)	EF VALVE LINE-UP VERIF
		31 da	OPS	2303-M20	4.3.2.1.1 tab 4.3-2 (1b) 4.3.2.1.2	SAFETY INJ/RCS PRESS LOW CHAN FUNCTIONAL
		31 da	OPS	2303-M21	4.3.2.1.1 tab 4.3-2 (1c,2b)	RB ISOL & CLG/SAFETY INJ-RB PRESS Hi CH. FUNCTIONAL
		31 da	OPS	2303-M36	4.3.2.1.1 tab 4.3-2 (7.a.1)	4KV ESF BUS UV RELAY CHAN FUNCTIONAL
		92 da	OPS	2303-02	4.7.1.5, 4.0.5	MSIV: A- POWER OPERATION B- COLD SHUTDOWN
		18 Mo	OPS	2303-R6	4.5.1 (d)	CF TK ISOL VLV ALARM CHECK (WHEN RCS > 800 PSIG)

*Must be satisfactorily completed prior to exceeding OTSG press. of 800 psig.

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Mode 4 to Mode 3

DATE SP SATISFIED	INITIALS	SURV. FREQ.	RESPON-SIBILITY	SP NO.	TS NO.	DESCRIPTION
		18 Mo	OPS	2303-R7	4.5.2 (d.1)	DHR ISOL & INTERLOCK CHECK
		18 Mo	OPS	2303-R8	4.5.2 (d.3)	ECCS ISOL INLK & LEAKAGE INSP.
		18 Mo	OPS	2303-R18	4.7.1.2 (b)	EFW VALVE ACTUATION (OTSG PRESS > 800 PSIG)
		18 Mo	OPS	2303-R21	4.3.2.1.1 tab 4.3-2 (7.a.2)	CLASS 1E DIST SYS FUNCTIONAL
		EACH REFUELING	MAINT	2302-R24	4.4.3, 4.0.5	PRZR CODE SAFETY VLV CHECK (2 VALVES OPERABLE)
		EACH REFUELING	MAINT	2302-R27	4.7.1.1	MS SAFETY VLV LIFT TEST
		18 Mo	IC	2602-R16	4.7.1.3.1	COND. STOR. TK. LEVEL CALIB.
		31 da	CH	2304-M1	4.5.1 (b)	CF TANK BORON CONC

ALL TECH SPEC REQUIREMENTS FOR ENTRY INTO MODE 3 HAVE BEEN SATISFIED:

PERFORMED BY: _____ DATE: _____ TIME: _____

APPROVED BY: _____ DATE: _____ TIME: _____

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APPENDIX D

STEAM LEAKAGE DETECTION AND CORRECTION

NOTE: This appendix may be utilized if steam leakage is suspected due to a low heat up rate.

CAUTION: Any valves left closed by this addenda should be identified in the SF's Log.

1. Establish a steady heat up rate.
2. Close MS-V23A and observe heat up rate.
3. If heat-up rate has not appreciably increased in 1/2 hour, reopen MS-V23A.
4. Close MS-V23B and observe heat up rate.
5. If heat up rate has not appreciably increased in 1/2 hour, reopen MS-V23B.
6. Close MS-V24A and observe heat up rate.
7. If heat up rate has not appreciably increased in 1/2 hour, reopen MS-V24A.
8. Close MS-V24B and observe heat up rate.
9. If heat up rate has not appreciably increased in 1/2 hour, reopen MS-V24B.
10. Close MS-V36A, insure MS-V35A is closed, and observe heat up rate.
11. If heat up rate has not appreciably increased in 1/2 hour, reopen MS-V36A.
12. Close MS-V36B, insure MS-V35B is closed, and observe heat up rate.
13. If heat up rate has not appreciably increased in 1/2 hour, reopen MS-V36B.
14. Close MS-V32A, insure MS-33A is closed, and observe heat up rate.

APPENDIX D (CONT'D)

15. If heat up rate has not appreciably increased within 1/2 hour, reopen MS-V32A.
16. Close MS-V32B, insure MS-V33B is closed, and observe heat up rate.
17. If heat up rate has not appreciably increased in 1/2 hour, reopen MS-V32B.
18. Insure FW-P-1A is being supplied by aux steam, and close MS-V21B.
19. If heatup rate does not appreciably increase in 1/2 hour, reopen MS-V21B.
20. Insure FW-P-1B is being supplied by Aux. steam, and close MS-V21A.
21. If heat up rate does not appreciably increase within 1/2 hour, reopen MS-V21A.
22. Check position of MS-V17. During start ups, aux steam should be supplying the turbine gland seal system, and MS-V17 should be closed.
23. Excessive leakage through the turbine throttle valves should cause the turbine to spin. Main steam isolation valves may be closed if this flowpath exists.

TMI DOCUMENTS

DOCUMENT NO: TM-012

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Wilda R. Mullinix, NRC

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