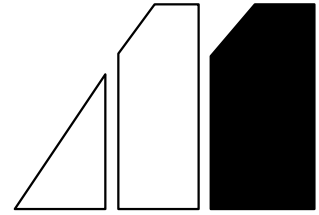


**MILLSTONE POWER STATION
GENERAL OPERATING PROCEDURE**



Plant Shutdown

**OP 3206
Rev. 010-04**



Approval Date: 12/04/05

Effective Date: 12/04/05

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**Millstone Unit 3
General Operating Procedure**

Plant Shutdown

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1. PURPOSE

1.1 **Objective**

Provide instructions to shutdown the plant from less than or equal to 25% reactor power (MODE 1) to between 1 and 2% reactor power (MODE 2). Also provide instructions for reactor shutdown for refueling.

03

2. PREREQUISITES

2.1 **General**

- 2.1.1 Load has been reduced as specified in OP 3204, "At Power Operation," or AOP 3575, "Rapid Downpower," to $\leq 25\%$ reactor power.
- 2.1.2 One main feedwater pump is in service.
- 2.1.3 Two condensate pumps are in service, if available.
- 2.1.4 At least one circulating water pump for each condenser is in service.
- 2.1.5 The turbine generator is on-line with a generator load of approximately 230 MWe.
- 2.1.6 Moisture Separator Reheater removal is in progress or has been completed.

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2.2 Documents

- 2.2.1 OP 3203, “Plant Startup”
- 2.2.2 OP 3207, “Reactor Shutdown”
- 2.2.3 OP 3209B, “Shutdown Margin”
- 2.2.4 OP 3301G, “Pressurizer Pressure Control”
- 2.2.5 OP 3316C, “Steam Generator Blowdown”
- 2.2.6 OP 3316A, “Main Steam”
- 2.2.7 OP 3317, “Reheat and Moisture Separator”
- 2.2.8 OP 3319A “Condensate System”
- 2.2.9 OP 3319B “Condensate Makeup and Drawoff System”
- 2.2.10 OP 3321, “Main Feedwater”
- 2.2.11 OP 3322, “Auxiliary Feedwater System”
- 2.2.12 OP 3323A, “Main Turbine”
- 2.2.13 OP 3323D, “Turbine Gland Steam and Exhaust”
- 2.2.14 OP 3324A, “Main Generator”
- 2.2.15 OP 3325A, “Circulating Water”
- 2.2.16 OP 3331A, “Auxiliary Boiler, Steam, and Condensate”
- 2.2.17 OP 3349, “Modcomp Process Computer System Operations”
- 2.2.18 OP 3360, “Nuclear Instrumentation”
- 2.2.19 SP 3604C.6, “Valve Closure Verification for Chemical and Volume Control System Dilution Flow Paths”
- 2.2.20 SP 3623.1, “Turbine Generator Testing”
- 2.2.21 SP 3673.5, “Remote Shutdown Monitoring”

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- 2.2.22 AOP 3571, “Instrument Failure Response”
- 2.2.23 RAC 14, “Non–Emergency Station Events”
- 2.2.24 IC 3472D14, “RVLIS Heater Controller Adjustment”

2.3 Definitions

- 2.3.1 RIL – Rod insertion limits
- 2.3.2 COLR – Core Operating Limits Report
- 2.3.3 C_b – Boron Concentration
- 2.3.4 RTP – Rated Thermal Power

3. PRECAUTIONS

- 3.1 Avoid sudden changes in Reactor Coolant System temperature or boron concentration to prevent unplanned reactivity excursions.
- 3.2 Reactivity variations due to xenon, samarium, and temperature must be anticipated following a load decrease to prevent unplanned reactivity excursions. Any rod withdrawals needed to stabilize power shall be limited to a maximum of 2 steps per minute.
- 3.3 Changes in Reactor Coolant System boron concentration must be made to maintain controlling bank within rod insertion and withdrawal limits as specified on TRM Appendix 8.1, Core Operating Limits Report (COLR).
- 3.4 Four reactor coolant pumps must be in service when in MODE 1 (power) or MODE 2 (startup) unless continuing shutdown as specified in AOP 3554, “RCP Trip or Stopping a RCP at Power.”
- 3.5 Do *not* allow flow to decrease below 1,200 gpm through any one of the in–service condensate demineralizers.
- 3.6 An atmospheric relief valve controller must be placed in “M” (manual) prior to making a setpoint change, the controller is returned to “A” (auto) after the adjustment is made. This prevents the atmospheric steam relief valve from rapidly opening, causing a steam pressure transient. The adjustments must be performed one valve at a time.

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- 3.7 Extreme care must be exercised when drawing steam from a steam generator with either the atmospheric steam dump or condenser steam dump to avoid a rate compensated steam line pressure SI. The SI results from a rapid pressure drop in the steam line caused by opening the valves too quickly. If < 4 steam generators are supplying the main steam header, steam line pressure will change more rapidly.
- 3.8 Welding is prohibited in Containment unless the reactor trip breakers are open and both source range "LEVEL TRIP" switches are in "BYPASS" to prevent spurious signals from affecting the Reactor Protection System.
- 3.9 Condenser vacuum levels and rate changes have an impact on the chances of developing turbine rubs. The following limits should reduce the chances of developing rubs:
- Turbine steam packing rubs can occur at any turbine load. Slow and careful changes in condenser vacuum should be made. (1"/hr)
 - When below 25% power, maintain condenser backpressure 2.5" to 4.0".
- 3.10 All precautions have been read, understood, and shifts have been briefed.

SM Initials / Date

A _____ / _____

B _____ / _____

C _____ / _____

D _____ / _____

E _____ / _____

4. INSTRUCTIONS

4.1 Turbine Shutdown

NOTE

1. If this procedure is entered with reactor power significantly < 25%, some steps may have been previously completed or may *not* need to be performed. The SM/US should determine which steps are *not* applicable based on the current power level.
2. Major steps may be performed in any order and in parallel if the SM/US determines no conditions or alignments established by preceding steps are required.

03

4.1.1 PERFORM initial signoffs as follows:

- a. REVIEW and INITIAL prerequisites.
- b. PERFORM the following:

- REVIEW precautions
- BRIEF each shift as they arrive
- SM INITIAL crew has been briefed on Precautions

04

CAUTION

Changes in condenser backpressure should be made slowly, less than 1"/hr, to reduce the effect on turbine vibration.

4.1.2 VERIFY condenser backpressure is being maintained between 2.5" and 4.0" backpressure.

4.1.3 Refer To OP 3317, "Reheat and Moisture Separator" and REMOVE moisture separator drain tank pumps from operation.

4.1.4 OBTAIN permission from CONVEX AND ISO–New England to unload and remove turbine generator from service.

4.1.5 ADJUST boron concentration as necessary during load decreases to maintain control bank rod position above the RIL.

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STOP

THINK

ACT

REVIEW

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4.1.6 WHEN RCS boron concentration is being changed, PERFORM the following:

- a. OPERATE pressurizer heaters and sprays to reduce the difference in boron concentration between pressurizer and Reactor Coolant System.
- b. IF a change greater than 50 ppm boron is made to RCS, Refer To OP 3301G, "Pressurizer Pressure Control," and INITIATE action to equalize boron concentrations between pressurizer and Reactor Coolant System loops while continuing with this procedure.

4.1.7 REQUEST Chemistry Department PERFORM the following:

- SAMPLE RCS for boron concentration every 4 hours during shutdown.
- SAMPLE RCS for boron concentration every 2 hours when borating.
- IF a power change exceeds 15% of RTP within a 1-hour period, PERFORM an isotopic analysis for Iodine between 2 and 6 hours following the power change.
- IF a power change exceeds 15% of RTP, PERFORM Gaseous Effluent Samples and Analysis for the following Process Monitors, 24 to 72 hours after completion of power change:
 - 3HVR-RE10B
 - 3HVR-RE19B
 - 3HVQ-RE49

4.1.8 PERFORM the following:

- a. Refer To OP 3331A, "Auxiliary Boiler, Steam, and Condensate," and PERFORM the following:
 - 1) STARTUP auxiliary boilers as required for steam demand.
 - 2) SHIFT auxiliary steam supply from Main Steam System to Auxiliary Boiler System.

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_____ /
b. IF gland seal steam *not* supplied from auxiliary steam, Refer To OP 3323D, “Turbine Gland Steam and Exhaust,” and SHIFT gland seal steam from main steam supply to auxiliary steam supply.

_____ / 4.1.9 MAINTAIN reactor power between 20% and 25%.

_____ / 4.1.10 PLACE “ROD DRIVE” control “SEL” switch in “MAN” (MB4).

_____ / 4.1.11 PLACE 3FWS–SK509A, “PP A & B MSTR SPEED CTNL,” in “MAN” and MAINTAIN feedwater ΔP between 100 and 150 psid (MB5).



CAUTION



3. To avoid severe level transients during transfer of steam generator water level control, steam generator levels should be monitored carefully and continuously during the transfer evolution. [♣ Ref. 6.4.3]
4. SG level control should be shifted from the main feedwater flow control valves to the bypass level control valves prior to removing the main turbine from service. [♣ Ref. 6.4.3]

NOTE

1. The computer display for “Wide Range Level” on a narrow band (approximately 60 to 70%) may be used as an aid in maintaining steam generator inventory constant. [♣ Ref. 6.4.4]
2. Shifting of SG feedwater flow control valves should be accomplished without delay to minimize amount of time both main and bypass valves are controlling steam generator level.
3. High auctioneered nuclear power is an input to the Steam Generator Feedwater Bypass Level Control System. Therefore, when in automatic control, an increase or decrease in nuclear power will cause the bypass valves to respond in a direct proportional manner to the change.
4. Shifting of steam generator level controls in steps 4.1.12.b. through e. may be performed in any order.

4.1.12 SHIFT SG feedwater flow control from the main to the bypass level control valve, a single steam generator at a time, as follows:

_____ / a. STATION an additional Operator at the feed control station. [♣ Ref. 6.4.4]

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b. To shift steam generator # 1 to bypass level control, PERFORM the following:

_____/

1) Maintaining feedwater flow as constant as possible, simultaneously PERFORM the following:

- THROTTLE open 3FWS–LK550, “SG FEEDWATER” “SG1” “CONTROL” “BYP”
- CLOSE 3FWS–FK510, “SG FEEDWATER” “SG1” “CONTROL” “FLOW”

_____/

2) WHEN 3FWS–FK510, “SG FEEDWATER” “SG1” “CONTROL” “FLOW” is “closed” AND 3FWS–LI551, “STEAM GEN 1” “NR LVL” is stable at 50%, PLACE 3FWS–LK550, “SG FEEDWATER” “SG1” “CONTROL” “BYP,” control switch in “AUTO.”

_____/

3) CLOSE 3FWS*MOV35A, “SG FEEDWATER” “SG 1” “CNTL ISOL.” [♣ Ref. 6.4.5]

_____/

4) ADJUST 3FWS–SK509A, “PP A & B MSTR SPEED CNTL,” as necessary, to allow SG feedwater bypass level control valves to regulate (MB5).

c. To shift steam generator # 2 to bypass level control, PERFORM the following:

_____/

1) Maintaining feed flow as constant as possible, simultaneously PERFORM the following:

- THROTTLE open 3FWS–LK560, “SG FEEDWATER” “SG2” “CONTROL” “BYP”
- CLOSE 3FWS–FK520, “SG FEEDWATER” “SG2” “CONTROL” “FLOW”

_____/

2) WHEN 3FWS–FK520, “SG FEEDWATER” “SG2” “CONTROL” “FLOW” is “closed” AND 3FWS–LI552, “STEAM GEN 2” “NR LVL” is stable at 50%, PLACE 3FWS–LK560, “SG FEEDWATER” “SG2” “CONTROL” “BYP,” control switch in “AUTO.”

_____/

3) CLOSE 3FWS*MOV35B, “SG FEEDWATER” “SG 2” “CNTL ISOL.” [♣ Ref. 6.4.5]

_____/

4) ADJUST 3FWS–SK509A, “PP A & B MSTR SPEED CNTL,” as necessary, to allow SG feedwater bypass level control valves to regulate (MB5).

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d. To shift steam generator # 3 to bypass level control, PERFORM the following:

_____/

- 1) Maintaining feed flow as constant as possible, simultaneously PERFORM the following:
 - THROTTLE open 3FWS–LK570, “SG FEEDWATER” “SG3” “CONTROL” “BYP”
 - CLOSE 3FWS–FK530, “SG FEEDWATER” “SG3” “CONTROL” “FLOW”

_____/

- 2) WHEN 3FWS–FK530, “SG FEEDWATER” “SG3” “CONTROL” “FLOW” is “closed” AND 3FWS–LI553, “STEAM GEN 3” “NR LVL” is stable at 50%, PLACE 3FWS–LK570, “SG FEEDWATER” “SG3” “CONTROL” “BYP,” control switch in “AUTO.”

_____/

- 3) CLOSE 3FWS*MOV35C, “SG FEEDWATER” “SG 3” “CNTL ISOL.” [♣ Ref. 6.4.5]

_____/

- 4) ADJUST 3FWS–SK509A, “PP A & B MSTR SPEED CNTL,” as necessary, to allow SG feedwater bypass level control valves to regulate (MB5).

e. To shift steam generator # 4 to bypass level control, PERFORM the following:

_____/

- 1) Maintaining feed flow as constant as possible, simultaneously PERFORM the following:
 - THROTTLE open 3FWS–LK580, “SG FEEDWATER” “SG4” “CONTROL” “BYP”
 - CLOSE 3FWS–FK540, “SG FEEDWATER” “SG4” “CONTROL” “FLOW”

_____/

- 2) WHEN 3FWS–FK540, “SG FEEDWATER” “SG4” “CONTROL” “FLOW” is “closed” AND 3FWS–LI554, “STEAM GEN 4” “NR LVL” is stable at 50%, PLACE 3FWS–LK580, “SG FEEDWATER” “SG4” “CONTROL” “BYP,” control switch in “AUTO.”

_____/

- 3) CLOSE 3FWS*MOV35D, “SG FEEDWATER” “SG 4” “CNTL ISOL.” [♣ Ref. 6.4.5]

_____/

- 4) ADJUST 3FWS–SK509A, “PP A & B MSTR SPEED CNTL,” as necessary, to allow SG feedwater bypass level control valves to regulate (MB5).

Level of Use
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____/____ 4.1.13 Refer To OP 3323A, “Main Turbine,” and slowly DECREASE turbine generator load to approximately 180 MWe while maintaining RCS T_{AVG} on program by inserting control rods.

____/____ 4.1.14 WHEN generator load has been decreased to 180 MWe (175 MWe – 185 MWe), STOP the load reduction.

4.1.15 OPEN the following “MOIST SEP DRAINS,” valves (MB6):

- ____/____ • 3DSM–MOV32A, “MSR TANK”
- ____/____ • 3DSM–MOV32B, “MSR TANK”

4.1.16 OPEN the following “1ST/2ND PT SPLY DRAINS” “3DTM–AOVs” valves (MB7):

- ____/____ • “1ST NRM 35”
- ____/____ • “2ND NRM 46A”
- ____/____ • “2ND NRM 46B”
- ____/____ • “2ND NRM 46C”

4.1.17 OPEN the following “3RD/4TH PT SPLY DRAINS” “3DTM–AOVs” valves (MB7):

- ____/____ • “3RD NRM 47A”
- ____/____ • “3RD NRM 47B”
- ____/____ • “3RD NRM 47C”
- ____/____ • “4TH NRM 49A”
- ____/____ • “4TH NRM 49B”
- ____/____ • “4TH NRM 49C”

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4.1.18 Under “COLD RHT DRAINS,” PERFORM the following (MB7):

____/____

- OPEN “38A–38D”

____/____

- OPEN “39A–39D”

____/____

- OPEN “24 AND 26”

____/____

- CHECK “TURB IN 25 27,” indicates partially open

____/____

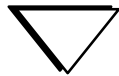
4.1.19 VERIFY SP 3623.1, “Turbine Generator Testing,” “Turbine Bearing Lift Pump Operability Test” has been performed within the last 7 days.

____/____

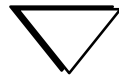
4.1.20 Refer To OP 3316C, “Steam Generator Blowdown,” AND with input from Chemistry Department, SHIFT blowdown tank vent paths from fourth point feedwater heaters to either the condenser OR atmosphere.

____/____

4.1.21 IF performing actual turbine overspeed tests SP 3623.1, “Turbine Generator Testing,” (backup overspeed trip test, 18 months and turbine overspeed test, 18 months), VERIFY the turbine load has been greater than 120 MWe for at least 3 hours.



CAUTION



Extreme care must be exercised when drawing steam from the steam generators with the condenser steam dumps to avoid a rate compensated steam line pressure SI. If < four steam generators are supplying the main steam header, steam line pressure will change more rapidly.

4.1.22 PLACE condenser steam dumps in the steam pressure mode as follows:

____/____

- a. VERIFY 3MSS–PK507, “SG PRES CNTL,” setpoint at 1,092 psig (MB5) and RECORD potentiometer setting.

Potentiometer Setting _____

____/____

- b. VERIFY 3MSS–PK507, “SG PRES CNTL” controller output indicates “0” (MB5).

____/____

- c. PLACE 3MSS–PK507, “SG PRES CNTL” controller in “MANUAL” (MB5).

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____/____

d. PLACE 3MSS–N07, “MODE SEL” switch in “STM PRESS” mode (MB5).

____/____

e. CHECK permissive MB4D 6–7, “TURB BYPASS VV ARM FOR OPENING,” blue light, *lit*.

____/____

f. PLACE 3MSS–PK507, “SG PRES CNTL” controller in “AUTO” (MB5).

____/____

g. ADJUST 3MSS–PK507, “SG PRES CNTL,” setpoint potentiometer CCW to a setting where steam dump valves are just starting to receive an open demand signal (red decrease light *not lit*) (MB5).

____/____

4.1.23 IF the condenser steam dumps will *not* operate, PERFORM the following:

a. NOTIFY I&C Department to investigate malfunction and perform repairs.

b. IF a forced shutdown is in progress OR the condenser steam dumps can *not* be made available, PERFORM the following:

____/____

1) NOTIFY CONVEX and ISO–New England that the unit will be tripped.

____/____

2) TRIP the reactor.

____/____

3) TRIP the turbine.

____/____

4) Go To EOP 35 E–0, “Reactor Trip or Safety Injection.”



CAUTION



Turbine operation below 5% load (55 MWe) should be minimized due to increased moisture erosion of the last stage turbine blading.

NOTE

A turbine load decrease will cause the condenser steam dumps to modulate open creating a T_{AVG}/T_{REF} deviation. Do *not* attempt to maintain T_{AVG} equal to T_{REF}

____/____

4.1.24 Refer To OP 3323A, “Main Turbine,” and INITIATE load decrease at 5%/min down to approximately 50 to 60 MWe.

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/ 4.1.25 WHEN turbine load decreases below the C-5 setpoint, CHECK permissive MB4D 6-4, "LO POWER AUTO ROD INTERLOCK C-5," blue light *lit*.

/ 4.1.26 WHEN generator load has decreased to approximately 50 to 60 MWe, STOP the load reduction.

/ 4.1.27 START the following lube oil pumps (MB7):

- 3TML-P2, "TDFP" "AUX OIL PP"
- 3TML-P5, "TURB LUB OIL" "MOTOR SUCT PP"

/ 4.1.28 ADJUST 90CS-3EXSN11, "VOLT REG" "MAN/AUTO" control switch to obtain "0" MVARs reactive load (MB7).

/ 4.1.29 CHECK "GENERATOR" "MAN/AUTO BAL" meter indicates "0" (MB7).

/ 4.1.30 IF actual turbine overspeed testing is desired, PERFORM the following:

/ a. To start the turbine oil pumps, PERFORM the following (MB7):

- 1) START 3TML-P3, "TURB LUB OIL" "TURN GEAR OIL PP."
- 2) PLACE 3TMJ-P1C, P1D, P1E, P1F, P1G, P1H/J, and P1K, "TURBINE BEARING LIFT PPS," in "RUN."

NOTE

The turbine will trip if a generator reverse power of at least 7.3 MWe exists for 30 seconds.

/ b. UNLOAD the turbine as follows:

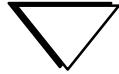
- 1) TURN "LOAD LIMIT SET" adjust knob in the CCW direction until "LOAD LIMIT LIMITING" light is *lit*.
- 2) Slowly TURN the "LOAD LIMIT SET" adjust knob in the CCW direction, to decrease turbine load.
- 3) Go To step 4.1.32.

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_____ / _____ 4.1.31 Manually TRIP main turbine at one of the following locations:

- “TRIP” pushbutton EHC insert panel (MB7)
- Manual mechanical trip at the turbine front standard



CAUTION



After the generator breaker is opened, excitation must be removed without delay to prevent a high volts-to-Hertz condition.

NOTE

Main Generator reverse power trip (and turbine trip) occurs if either of the following conditions are met:

- Main Generator reverse power of at least 7.3 MW exists for 30 seconds with or without turbine trip.
- Main Generator reverse power of at least 2.9 MW exists for 2.5 seconds AND 30 seconds have elapsed since turbine was tripped.

4.1.32 WHEN megawatt load, 3GMS-G3, “MAIN GENERATOR OUTPUT (MW),” (MB4) indicates a reverse power of at least 3 MW for a minimum of 3 seconds, PERFORM the following to shutdown the generator (MB7):

- _____ / _____
- _____ / _____
- _____ / _____
- _____ / _____
- TRIP 15G-3U-2, “GEN BKR.”
 - IF 15G-3U-2, “GEN BKR,” does *not* open, simultaneously PRESS both “MAIN GEN EMERG TRIP” pushbuttons.
 - PLACE 1-3EXSN11 “EXCITER FIELD CONTACTORS” selector switch in “TRIP” (MB7).
 - OPEN NJS-ACB-GF, “GEN FIELD” breaker.

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e. IF performing actual turbine overspeed testing, **PERFORM** the following:

- 1) Slowly **TURN** the “LOAD LIMIT SET” adjust knob in the CW direction until the turbine reaches 1800 rpm.
- 2) **CHECK** “LOAD LIMIT LIMITING” light *not* lit.
- 3) Slowly **TURN** the “LOAD LIMIT SET” adjust knob in the CW direction one additional turn while verifying the turbine speed remains at 1800 rpm.

4.1.33 **CLOSE** 3CCS–V893, exciter air cooler outlet valve (local).

4.1.34 IF *not* performing reactor shutdown for refueling, under “MSIV/REHEAT STM SPLY DRAINS” (MB7), **PERFORM** the following:

- **OPEN** “MSS–B4 22A–22D”
- **CHECK** “MSCV–B4 23” open

4.1.35 IF actual turbine overspeed testing is desired, **PERFORM** the following:

a. **PERFORM** the following during turbine testing:

- 1) **MONITOR** the following parameters:
 - Turbine vibration
 - Differential expansion
 - Exhaust hood temperatures
- 2) IF any of the above parameters change significantly, **TRIP** the turbine.

b. Refer To SP 3623.1, “Turbine Generator Testing,” and **PERFORM** the following tests:

- 1) Backup overspeed trip test (18 months).
- 2) Turbine overspeed test (18 months).

c. Manually **TRIP** the main turbine (EHC insert panel MB7).

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NOTE

Steps 4.1.36 and 4.1.37 may be performed while continuing with the remainder of the procedure.

4.1.36 PERFORM the following:

____/____

a. Refer To OP 3323A, “Main Turbine,” and COMPLETE turbine shutdown.

____/____

b. WHEN the main turbine is on the turning gear, Refer To OP 3324A, “Main Generator,” and REMOVE the generator core monitor from service.

____/____

c. WHEN the turbine has been on the turning gear for at least two hours, CLOSE 3CCS–V88, generator hydrogen cooler TCV inlet isolation valve.

4.1.37 CLOSE the following “EXT STM NRV ISOL” “3ESS–MOVs” (MB7):

____/____

• “21A”

____/____

• “21B”

____/____

• “21C”

____/____

• “29A”

____/____

• “29B”

____/____

• “29C”

____/____

• “38A”

____/____

• “38B”

____/____

• “38C”

____/____

• “47A”

____/____

• “47B”

____/____

• “47C”

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4.1.38 IF plant shutdown is for refueling outage, Go To Section 4.2.

_____/_____
4.1.39 PLACE the “FW PUMPS P4 TRIP BYPASS” selector switch in “BYPASS” (MB5).

_____/_____
4.1.40 SELECT “NIS RECORD INPUT” “PEN 1” and “PEN 2” to record one power range channel and one intermediate range channel (MB4).

_____/_____
4.1.41 INSERT the control banks to reduce reactor power to between 10% and 12%.

NOTE

During a power decrease, the Intermediate Range High Flux Trip bistables reset at an equivalent reactor power of 13.2% and the P-10, Reactor at Power, permissive resets at 9.2%. To preclude a reactor trip, both Intermediate Range trip bistables must reset prior to reaching the P-10 reset.

_____/_____
4.1.42 CHECK the following bistable indicators *not* lit:

- MB4F 1-16, “INTER RANGE NEUTRON FLUX HI”
- MB4F 2-16, “INTER RANGE NEUTRON FLUX HI”

_____/_____
4.1.43 INSERT the control banks to reduce reactor power to between 6% and 9%.

4.1.44 CHECK the following permissive status blue lights:

- MB4D 6-3, “TURBINE NOT AT POWER P-13,” *lit*
- MB4D 4-3, “REACTOR AT POWER P-10,” *not* lit
- MB4D 1-2, “INTER RANGE RX TRIP BLOCK TRA,” *not* lit
- MB4D 2-2, “INTER RANGE RX TRIP BLOCK TRB,” *not* lit
- MB4D 1-3, “POWER RANGE RX TRIP BLOCK TRA,” *not* lit
- MB4D 2-3, “POWER RANGE RX TRIP BLOCK TRB,” *not* lit
- MB4D 5-3, “RX OR TURB NOT AT POWER P-7,” *lit*

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4.1.45 ENTER MODE 2 as follows:

_____ /
a. COORDINATE the following to reduce reactor power AND restore steam generator master pressure controller setpoint:

- Slowly ROTATE 3MSS–PK507, “SG PRES CNTL,” potentiometer CW to raise setpoint to 1,092 psig (MB5)
- INSERT control banks to reduce reactor power to between 1% and 2%

_____ /
_____ /
b. WHEN reactor power decreases to $\leq 5\%$, PERFORM the following:

- LOG MODE change to MODE 2
- NOTIFY ISO–New England (413–535–4303) of the MODE change
- NOTIFY CONVEX of the MODE change

NOTE

The turbine driven main feedwater pump must be removed from service prior to going below the point of adding heat.

4.1.46 ALIGN to feed steam generators as follows:

_____ /
a. IF desired to use the motor driven main feedwater pump, Refer To OP 3321, “Main Feedwater,” and PERFORM the applicable section:

- Shift from TDFWP “A” to MDFWP
- Shift from TDFWP “B” to MDFWP

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b. IF desired to use auxiliary feedwater, **PERFORM** the following:

____/____

1) Refer To OP 3321, “Main Feedwater,” and **SHIFT** from main feedwater to auxiliary feedwater.

____/____

2) **PLACE** each of the steam generator bypass level controllers in “MAN” and **CLOSE** the bypass valves (MB5):

____/____

- 3FWS–LK550, “SG FEEDWATER” “SG1” “CONTROL” “BYP”

____/____

- 3FWS–LK560, “SG FEEDWATER” “SG2” “CONTROL” “BYP”

____/____

- 3FWS–LK570, “SG FEEDWATER” “SG3” “CONTROL” “BYP”

____/____

3) **CLOSE** the steam generator feed line trip valves:

____/____

- 3FWS*CTV41A, “SG FEEDWATER” “SG 1” “ISOL”

____/____

- 3FWS*CTV41B, “SG FEEDWATER” “SG 2” “ISOL”

____/____

- 3FWS*CTV41C, “SG FEEDWATER” “SG 3” “ISOL”

____/____

4) Refer To OP 3319A, “Condensate System,” and **LOWER** the hotwell to prevent overfilling OR overflowing the condensate surge tank.

____/____

5) IF makeup to the Condensate Storage Tank is required, Refer To OP 3340B, “Water Treating System,” and **FILL** the Condensate Storage Tank.

____/____

6) IF makeup to the DWST is required, Refer To OP 3340B, “Water Treating System,” and **FILL** 3FWA*TK1 (DWST).



c. OPEN the following “FW TURBINE SPLY DRAINS” “3DTM–AOVs” (MB7):

____/____

- “RH SGFP 42A”

____/____

- “RH SGFP 42B”

____/____

- “RH SGFP 66”

____/____

- “MS SGFP 44A”

____/____

- “MS SGFP 44B”

4.1.47 RECORD the following data:

- T_{AVE} Loop A _____ °F
- T_{AVE} Loop B _____ °F
- T_{AVE} Loop C _____ °F
- T_{AVE} Loop D _____ °F
- Control Bank C at _____ steps
- Control Bank D at _____ steps
- RCS C_b at _____ ppm

4.1.48 IF the reactor is to be shutdown, PERFORM the following to limit RCS cooldown:

a. CLOSE the following steam dump isolation valves (local):

____/____

- 3MSS–V21, 3MSS–PV48A isolation

____/____

- 3MSS–V23, 3MSS–PV49A isolation

____/____

- 3MSS–V27, 3MSS–PV48B isolation

____/____

- 3MSS–V29, 3MSS–PV49B isolation

____/____

- 3MSS–V33, 3MSS–PV48C isolation

____/____

- 3MSS–V35, 3MSS–PV49C isolation

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____/____

b. CLOSE “MSIV/REHEAT STM SPLY DRAINS”
“MSS–B4 22A–22D” (MB7).

c. CLOSE the following turbine driven main feedwater pump
high pressure steam inlet isolation valves (local):

____/____

- 3TFM–V7, “sg fw pp 1B mn stm inlet isol”

____/____

- 3TFM–V8, “sg fw pp 1A mn stm inlet isol”

4.1.49 WHEN reactor power is 1% – 2%, PERFORM the applicable
action:

____/____

a. IF desired to perform plant startup, Go To OP 3203, “Plant
Startup.”

____/____

b. IF desired to shutdown reactor, Go To OP 3207, “Reactor
Shutdown.”

____/____

c. IF desired to continue operation at present power,
MAINTAIN conditions stable at present power.

NOTE

Shifting of steam generator pressure controllers from manual to automatic
control can be shifted in any order as long as only one is shifted at a time.

d. IF desired to shift SG #1 pressure control to
3MSS–PIC20A1, “ATMOSPHERIC RELIEF VVS,”
PERFORM the following (MB5):

____/____

1) PRESS the “M” (manual) pushbutton on controller.

____/____

2) Slowly ADJUST controller setpoint to 1,100 psig.

____/____

3) CHECK controller setpoint greater than actual
indication (red indicator).

____/____

4) PRESS the “A” (auto) pushbutton on controller.



e. IF desired to shift SG #2 pressure control to 3MSS–PIC20B1, “ATMOSPHERIC RELIEF VVS,” PERFORM the following (MB5):

____/____

1) PRESS the “M” (manual) pushbutton on controller.

____/____

2) Slowly ADJUST controller setpoint to 1,100 psig.

____/____

3) CHECK controller setpoint greater than actual indication (red indicator).

____/____

4) PRESS the “A” (auto) pushbutton on controller.

f. IF desired to shift SG #3 pressure control to 3MSS–PIC20C1, “ATMOSPHERIC RELIEF VVS,” PERFORM the following (MB5):

____/____

1) PRESS the “M” (manual) pushbutton on controller.

____/____

2) Slowly ADJUST controller setpoint to 1,100 psig.

____/____

3) CHECK controller setpoint greater than actual indication (red indicator).

____/____

4) PRESS the “A” (auto) pushbutton on controller.

g. IF desired to shift SG #4 pressure control to 3MSS–PIC20D1, “ATMOSPHERIC RELIEF VVS,” PERFORM the following (MB5):

____/____

1) PRESS the “M” (manual) pushbutton on controller.

____/____

2) Slowly ADJUST controller setpoint to 1,100 psig.

____/____

3) CHECK controller setpoint greater than actual indication (red indicator).

____/____

4) PRESS the “A” (auto) pushbutton on controller.

h. PLACE 3MSS–PK507, “SG PRES CNTL,” in “MANUAL” (MB5).

____/____

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____/____

i. Slowly DECREASE output on 3MSS–PK507, “SG PRES CNTL,” to obtain the following (MB5):

- “TURB BYPASS TO STM DUMP” valves closed
- 3MSS–UI 500, “DEMAND,” indicates 0%

____/____

j. PLACE the following switches to “OFF” (MB5):

- 3MSS–NO5, “INTLK – TR A”
- 3MSS–NO6, “INTLK – TR B”

____/____

k. ADJUST SG atmospheric relief valve controllers as necessary to control RCS temperature at desired value.

____/____

4.1.50 IF desired to shift SG pressure control to condenser steam dumps, Refer To OP 3316A, “Main Steam,” Section for “Main Steam System Startup,” and PERFORM steps to place the condenser steam dumps in service and remove the atmospheric relief valves from service.

____/____

4.1.51 IF desired to close the MSIVs, PERFORM the following:

a. CLOSE all four main steam isolation valves (MB5):

- 3MSS*CTV27A, “MSIV”
- 3MSS*CTV27B, “MSIV”
- 3MSS*CTV27C, “MSIV”
- 3MSS*CTV27D, “MSIV”

____/____

____/____

____/____

____/____

b. At 3BYS*PNL15F, REMOVE the following fuses and PLACE a “Danger Tag” “Fuses Removed”:

- CKT–39 (3MSS*CTV27A)
- CKT–41 (3MSS*CTV27B)
- CKT–40 (3MSS*CTV27C)
- CKT–42 (3MSS*CTV27D)

____/____

____/____

____/____

____/____

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c. At 3BYS*PNL16F, REMOVE the following fuses and PLACE a “Danger Tag” “Fuses Removed”:

____/____

____/____

____/____

____/____

- CKT-39 (3MSS*CTV27A)
- CKT-41 (3MSS*CTV27B)
- CKT-40 (3MSS*CTV27C)
- CKT-42 (3MSS*CTV27D)

- End of Section 4.1-

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4.2 Reactor Shutdown for Refueling

4.2.1 Refer To OP 3209B, Shutdown Margin,” and PERFORM a shutdown margin determination for the anticipated plant condition of MODE 3, ARI [557°F].

NOTE

The procedure may be continued while performing step 4.2.2. However, opening RX TRIP BKRS prior to closing the steam dump isolation valves may cause an unwanted cooldown.

4.2.2 CLOSE the following steam dump isolation valves (local):

- 3MSS–V21, 3MSS–PV48A isolation
- 3MSS–V23, 3MSS–PV49A isolation
- 3MSS–V27, 3MSS–PV48B isolation
- 3MSS–V29, 3MSS–PV49B isolation
- 3MSS–V33, 3MSS–PV48C isolation
- 3MSS–V35, 3MSS–PV49C isolation

4.2.3 VERIFY Prestart Checks have been performed on the following Auxiliary Feedwater pumps:

- 3FWA*P1A, “AFW–MD A” “PP A”
- 3FWA*P1B, “AFW–MD B” “PP B”

4.2.4 SELECT “NIS RECORD INPUT,” “PEN 1” and “PEN 2” to record one power range AND one intermediate range channel (MB4).

4.2.5 IF the lowest RCS operating loop temperature (T_{avg}) decreases below 551°F while the reactor is critical, PERFORM one of the following:

- RESTORE (T_{AVG}) to greater than 551°F within 15 minutes
- SHUTDOWN the reactor to HOT STANDBY (MODE 3) within the next 15 minutes

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NOTE

1. Steam generator level shrink should be anticipated as steam pressure is raised.
2. Reactor Power may decrease between 2% and 5% due to increasing the steam generator master pressure controller setpoint.

_____/_____
4.2.6 To restore the steam generator master pressure controller setpoint, slowly ROTATE 3MSS-PK507, "SG PRES CNTL," potentiometer CW and raise setpoint to 1092 psig (MB5).

_____/_____
4.2.7 CLOSE "MSIV/REHEAT STM SPLY DRAINS" "MSS-B4 22A-22D" (MB7).

_____/_____
4.2.8 PLACE 3FWS-P1, "MD FW PP," control switch in "PULL-TO-LOCK" (MB5).

_____/_____
4.2.9 VERIFY the "FW PUMPS P4 TRIP BYPASS" selector switch in "NORMAL" (MB5).



A L A R A



The resulting pH change from an early boration may result in an increase in area dose rates in Containment and Auxiliary Building.

4.2.10 To borate the RCS to reduce reactor power, PERFORM the following:

_____/_____
a. REQUEST Chemistry Department sample RCS for boron concentration every 2 hours while borating.

_____/_____
b. START one OR both of the following boric acid transfer pumps (MB3):

- 3CHS*P2A, "BA PP A"
- 3CHS*P2B, "BA PP B"

_____/_____
c. OPEN 3CHS*MV8104, "DIRECT BA TO CHG" (MB3).

_____/_____
d. CHECK 3CHS-FI 183A, "DIRECT BA FLOW," for indicated flow (MB3).

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____/____

e. MONITOR VCT level.

____/____

f. SET 3CHS–FK110, “BORIC ACID BLEND FLOW CONT,” to provide a blended flowrate for the highest RCS concentration to be obtained (MB3).

____/____

g. IF desired to stop direct boration, PERFORM the following (MB3):

____/____

1) IF “A” boric acid transfer pump is in service, PLACE 3CHS*P2A, “BA PP A,” control switch in “STOP.”

____/____

2) IF “B” boric acid transfer pump is in service, PLACE 3CHS*P2B, “BA PP B,” control switch in “STOP.”

____/____

3) CLOSE 3CHS*MV8104, “DIRECT BA TO CHG” (MB3).

____/____

h. OPERATE pressurizer heaters and sprays to reduce the difference in boron concentration between pressurizer and Reactor Coolant System.

i. IF desired to restart Direct Boration, Go To step 4.2.10.

NOTE

During a power decrease, the Intermediate Range High Flux Trip bistables reset at an equivalent reactor power of 13.2% and the P–10, Reactor at Power, permissive resets at 9.2% reactor power. To prevent a reactor trip, both Intermediate Range High Flux Trip bistables must reset prior to reaching the P–10 reset.

____/____

4.2.11 WHEN reactor power is < 13%, CHECK the following bistables *not* lit:

____/____

• MB4F 1–16, “INTER RANGE NEUTRON FLUX HI”

____/____

• MB4F 2–16, “INTER RANGE NEUTRON FLUX HI”

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4.2.12 WHEN reactor power is < 10%, PERFORM the following:

a. CHECK the following permissive status blue lights:

____/____

- MB4D 6-3, "TURBINE NOT AT POWER P-13," *lit*

____/____

- MB4D 4-3, "REACTOR AT POWER P-10," *not lit*

____/____

- MB4D 1-2, "INTER RANGE RX TRIP BLOCK TRA," *not lit*

____/____

- MB4D 2-2, "INTER RANGE RX TRIP BLOCK TRB," *not lit*

____/____

- MB4D 1-3, "POWER RANGE RX TRIP BLOCK TRA," *not lit*

____/____

- MB4D 2-3, "POWER RANGE RX TRIP BLOCK TRB," *not lit*

____/____

- MB4D 5-3, "RX OR TURB NOT AT POWER P-7," *lit*

b. CLOSE the following valves (MB5):

____/____

- 3FWA *HIC31A1, "SG1 AFW CONTROL" "MD A"

____/____

- 3FWA *HIC31B1, "SG2 AFW CONTROL" "MD B"

____/____

- 3FWA *HIC31C1, "SG3 AFW CONTROL" "MD B"

____/____

- 3FWA *HIC31D1, "SG4 AFW CONTROL" "MD A"

c. To align suction for 3FWA *P1A to the CST, PERFORM the following (MB5):

____/____

- OPEN 3FWA *AOV23A, "AFW-MD A" "CST SUCT"

____/____

- CLOSE 3FWA *AOV61A, "AFW-MD A" "DWST SUCT"

d. To align suction for 3FWA*P1B to the CST, PERFORM the following (MB5):

- OPEN 3FWA*AOV23B, “AFW–MD B” “CST SUCT”
- CLOSE 3FWA*AOV61B, “AFW–MD B” “DWST SUCT”

e. START both of the MDAFW pumps (MB5):

- 3FWA*P1A, “AFW–MD A” “PP A”
- 3FWA*P1B, “AFW–MD B” “PP B”

4.2.13 WHEN reactor power decreases to $\leq 5\%$, PERFORM the following:

- LOG MODE change to MODE 2
- NOTIFY ISO–New England (413–535–4303) of MODE change
- NOTIFY CONVEX of MODE change

NOTE

Entry into EOP 35 E–0, “Reactor Trip or Safety Injection” is *NOT* required unless the expected results are *NOT* obtained.

4.2.14 WHEN reactor power decreases to $< 2\%$, PERFORM the following:

- a. OPEN “RX TRIP BKRS” (MB4).
- b. THROTTLE open the following valves to maintain S/G levels between 45% and 55% using auxiliary feedwater (MB5):
 - 3FWA*HIC31A1, “SG1 AFW CONTROL” “MD A”
 - 3FWA*HIC31B1, “SG2 AFW CONTROL” “MD B”
 - 3FWA*HIC31C1, “SG3 AFW CONTROL” “MD B”
 - 3FWA*HIC31D1, “SG4 AFW CONTROL” “MD A”

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c. CHECK the following indicators for expected plant response:

____/____
____/____
____/____
____/____
____/____
____/____

- All RB (rod bottom) lights *lit*
- Neutron flux dropping
- RCS Pressure > 1890 psia
- Pressurizer Level $\geq 9\%$
- RCS Temperature > 530°F
- Steam Generator Narrow Range Levels > 18%

d. IF plant response *not* as expected, Go To EOP 35 E-0, “Reactor Trip or Safety Injection.”

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e. To verify Feedwater Isolation has occurred, CHECK the following:

- SG Feedwater Regulating Valves–CLOSED

____/____

- 3FWS–510, “SG FEEDWATER” “SG !” “CONTROL FLOW”

____/____

- 3FWS–520, “SG FEEDWATER” “SG 2” “CONTROL FLOW”

____/____

- 3FWS–530, “SG FEEDWATER” “SG 3” “CONTROL FLOW”

____/____

- 3FWS–540, “SG FEEDWATER” “SG 4” “CONTROL FLOW”

- SG Feedwater Regulating Bypass Valves–CLOSED

____/____

- 3FWS–550, “SG FEEDWATER” “SG !” “CONTROL BYP”

____/____

- 3FWS–560, “SG FEEDWATER” “SG 2” “CONTROL BYP”

____/____

- 3FWS–570, “SG FEEDWATER” “SG 3” “CONTROL BYP”

____/____

- 3FWS–580, “SG FEEDWATER” “SG 4” “CONTROL BYP”

- Feedwater Isolation Trip Valves–CLOSED

____/____

- 3FWS*CTV41A, “SG FEEDWATER” “SG !” “ISOL”

____/____

- 3FWS*CTV41B, “SG FEEDWATER” “SG 2” “ISOL”

____/____

- 3FWS*CTV41C, “SG FEEDWATER” “SG 3” “ISOL”

____/____

- 3FWS*CTV41D, “SG FEEDWATER” “SG 4” “ISOL”

____/____

____/____

____/____

____/____

____/____

____/____

____/____

____/____

____/____

____/____

____/____

____/____

____/____

____/____

____/____

- TDFW pumps – TRIPPED
 - 3TFC–M1A “TD FW A” “PP A”
 - 3TFC–M1B “TD FW B” “PP B”
- 3FWS–P! “MD FW PP” – STOPPED
- SG Blowdown Isolation Valves–CLOSED
 - 3BDG–CTV22A, “SG GES TO BLDN TK” “1”
 - 3BDG–CTV22B, “SG GES TO BLDN TK” “2”
 - 3BDG–CTV22C, “SG GES TO BLDN TK” “3”
 - 3BDG–CTV22D, “SG GES TO BLDN TK” “4”
- SG Blowdown Sample Isolation Valves–CLOSED
 - 3BDG–CTV19A, “SG BLDN SAMPLE” “1”
 - 3BDG–CTV19B, “SG BLDN SAMPLE” “2”
 - 3BDG–CTV19C, “SG BLDN SAMPLE” “3”
 - 3BDG–CTV19D, “SG BLDN SAMPLE” “4”
- SG Chemical Feed Isolation Valves–CLOSED
 - 3SGF–AOV24A, “SG CHEM FEED”
 - 3SGF–AOV24B, “SG CHEM FEED”
 - 3SGF–AOV24C, “SG CHEM FEED”
 - 3SGF–AOV24D, “SG CHEM FEED”

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Continuous



____/____

f. LOG MODE change to HOT STANDBY (MODE 3).

____/____

g. NOTIFY ISO – New England (413–535–4303) of MODE change.

____/____

h. NOTIFY CONVEX of the MODE change.

4.2.15 COMMENCE raising pressurizer level as follows:

a. IF desired to use 3RCS–LK459, “PZR LVL,” PERFORM the following (MB3):

____/____

1) VERIFY 3CHS–FK121, “CHG LINE FLOW,” in “AUTO.”

____/____

2) PLACE 3RCS–LK459, “PZR LVL,” in “MANUAL.”

____/____

3) ADJUST 3RCS–LK459, “PZR LVL,” to obtain pressurizer level of 50 to 60%.

b. IF desired to use 3CHS–FK121, “CHG LINE FLOW,” PERFORM the following:

____/____

1) PLACE 3CHS–FK121, “CHG LINE FLOW,” in “MANUAL” (MB3).

____/____

2) ADJUST charging header flowrate as necessary to obtain pressurizer level of 50% to 60%.

4.2.16 OPEN the following “FW TURBINE SPLY DRAINS” “3DTM–AOVs” (MB7):

____/____

• “RH SGFP 42A”

____/____

• “RH SGFP 42B”

____/____

• “RH SGFP 66”

____/____

• “MS SGFP 44A”

____/____

• “MS SGFP 44B”

____/____

4.2.17 Refer To OP 3319A, “Condensate System,” and LOWER the hotwell to prevent overfilling or overflowing the condensate surge tank.

Level of Use
Continuous



_____/_____
4.2.18 **IF** makeup to the Condensate Storage Tank is required, Refer To OP 3340B, “Water Treating System,” and **FILL** the Condensate Storage Tank.

_____/_____
4.2.19 **IF** makeup to the DWST is required, Refer To OP 3340B, “Water Treating System,” and **FILL** 3FWA*TK1 (DWST).

NOTE

1. Steps 4.2.20 and 4.2.22 may be performed while continuing with the remainder of this section.
2. Shifting of steam generator pressure controllers from manual to automatic control can be shifted in any order.

4.2.20 To shift SG pressure control to the atmospheric relief valves, **PERFORM** the following:

a. To shift SG #1 pressure control to 3MSS–PIC20A1, “ATMOSPHERIC RELIEF VVS,” **PERFORM** the following (MB5):

- _____/_____
1) **PRESS** the “M” (manual) pushbutton on controller.
- _____/_____
2) Slowly **ADJUST** controller setpoint to 1,100 psig.
- _____/_____
3) **VERIFY** controller setpoint greater than actual indication (red indicator).
- _____/_____
4) **PRESS** the “A” (auto) pushbutton on controller.

b. To shift SG #2 pressure control to 3MSS–PIC20B1, “ATMOSPHERIC RELIEF VVS,” **PERFORM** the following (MB5):

- _____/_____
1) **PRESS** the “M” (manual) pushbutton on controller.
- _____/_____
2) Slowly **ADJUST** controller setpoint to 1,100 psig.
- _____/_____
3) **VERIFY** controller setpoint greater than actual indication (red indicator).
- _____/_____
4) **PRESS** the “A” (auto) pushbutton on controller.

Level of Use
Continuous



c. To shift SG #3 pressure control to 3MSS–PIC20C1, “ATMOSPHERIC RELIEF VVS,” PERFORM the following (MB5):

____/____

1) PRESS the “M” (manual) pushbutton on controller.

____/____

2) Slowly ADJUST controller setpoint to 1,100 psig.

____/____

3) VERIFY controller setpoint greater than actual indication (red indicator).

____/____

4) PRESS the “A” (auto) pushbutton on controller.

d. To shift SG #4 pressure control to 3MSS–PIC20D1, “ATMOSPHERIC RELIEF VVS,” PERFORM the following (MB5):

____/____

1) PRESS the “M” (manual) pushbutton on controller.

____/____

2) Slowly ADJUST controller setpoint to 1,100 psig.

____/____

3) VERIFY controller setpoint greater than actual indication (red indicator).

____/____

4) PRESS the “A” (auto) pushbutton on controller.

e. PLACE 3MSS–PK507, “SG PRES CNTL,” in “MANUAL” (MB5).

____/____

f. Slowly DECREASE output on 3MSS–PK507, “SG PRES CNTL,” to obtain the following (MB5):

____/____

- “TURB BYPASS TO STM DUMP” valves closed
- MSS–UI 500, “DEMAND,” indicates 0%

g. PLACE the following switches to “OFF” (MB5):

____/____

• 3MSS–NO5, “INTLK – TR A”

____/____

• 3MSS–NO6, “INTLK – TR B”

____/____

h. ADJUST SG atmospheric relief valve controllers as necessary to control RCS temperature at desired value.

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4.2.21 IF desired, Refer To OP 3325A, “Circulating Water,” and REMOVE a circulating water pump from service in each condenser.

4.2.22 To close the MSIVs, PERFORM the following:

a. CLOSE all four main steam isolation valves (MB5):

____/____

- 3MSS*CTV27A, “MSIV”

____/____

- 3MSS*CTV27B, “MSIV”

____/____

- 3MSS*CTV27C, “MSIV”

____/____

- 3MSS*CTV27D, “MSIV”

b. At 3BYS*PNL15F, REMOVE the following fuses and PLACE a “Danger Tag” “Fuses Removed”:

____/____

- CKT-39 (3MSS*CTV27A)

____/____

- CKT-41 (3MSS*CTV27B)

____/____

- CKT-40 (3MSS*CTV27C)

____/____

- CKT-42 (3MSS*CTV27D)

c. At 3BYS*PNL16F, REMOVE the following fuses and PLACE a “Danger Tag” “Fuses Removed”:

____/____

- CKT-39 (3MSS*CTV27A)

____/____

- CKT-41 (3MSS*CTV27B)

____/____

- CKT-40 (3MSS*CTV27C)

____/____

- CKT-42 (3MSS*CTV27D)

4.2.23 WHEN at least one intermediate range channel (3NMI–NI35B OR 3NMI–NI36B) decreases below 5×10^{-11} amps, PERFORM the following to verify P–6 reset:

a. IF both intermediate range channels are $< 5 \times 10^{-11}$ amps, VERIFY P–6 reset as follows:

____/____

- CHECK annunciator MB4D 1–1, “SOURCE RANGE RX TRIP BLOCK TR A ” *not* lit

____/____

- CHECK annunciator MB4D 2–1, “SOURCE RANGE RX TRIP BLOCK TR B” *not* lit

____/____

- CHECK annunciator MB4C 4–1, “SR LOSS OF DET VOLTAGE” *not* lit

____/____

- CHECK both source range channels 3NMS–NI31B AND 3NMS–NI32B, indicating

b. IF only one intermediate range channel is $< 5 \times 10^{-11}$ amps AND the other intermediate range channel is stable (*not* decreasing), PERFORM the following to manually reset P–6:

____/____

- 1) PLACE NMS*N33A, “SR” switch collar in the “RESET DEPRESS” position and PRESS the pushbutton.

____/____

- 2) PLACE NMS*N33B, “SR” switch collar in the “RESET DEPRESS” position and PRESS the pushbutton.

____/____

- 3) CHECK annunciator MB4D 1–1, “SOURCE RANGE RX TRIP BLOCK TR A,” *not* lit.

____/____

- 4) CHECK annunciator MB4D 2–1, “SOURCE RANGE RX TRIP BLOCK TR B,” *not* lit.

____/____

- 5) CHECK annunciator MB4C 4–1, “SR LOSS OF DET VOLTAGE,” *not* lit.

____/____

- 6) CHECK both source range channels 3NMS–NI31B AND 3NMS–NI32B, indicating.

____/____

- 7) Refer To AOP 3571, “Instrument Failure Response,” (Att) “Source Range Nuclear Instrument Channel Failure,” and DETERMINE additional actions.

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4.2.24 For the source range channels, PERFORM the following:

- /
- a. SELECT “NIS RECORD INPUT” “PEN 1” and “PEN 2” to record both source range channels (MB4).
- /
- b. IF either source range channel is *not* indicating, Refer To AOP 3571, “Instrument Failure Response,” (Att) “Source Range Nuclear Instrument Channel Failure,” and DETERMINE additional actions.
- /
- c. IF SP 3673.5, “Remote Shutdown Monitoring,” for source range channels 3NMS*NI31C and 3NMS*NI32C has *not* been performed within the previous 31 days, ENTER T/S LCO 3.3.3.5 ACTION a.
- /
- d. CHECK source range audio count rate is operating.
- /
- e. IF an audio count rate is *not* established, Refer To OP 3360, “Nuclear Instrumentation,” and PERFORM actions to establish an audio count rate.

NOTE

As neutron population decreases during shutdown, the Gamma–Metrics startup ranges will come out of saturation (pulse pile–up) and increase in count rate until a true value is attained.

4.2.25 WHEN Gamma–Metrics startup range indication on 3NME*SMM1 and 3NME*SMM2, Shutdown Margin Monitors, increases above SMM setpoint as indicated by local “ALARM” indicator lights *lit* AND receipt of annunciators MB4C 2–2, “SHUTDOWN MARGIN MONITOR CHANNEL 1” OR MB4C 2–3, “SHUTDOWN MARGIN MONITOR CHANNEL 2,” PERFORM the following:

- /
- a. PRESS both “ALARM SETPOINT RESET” pushbuttons on 3NME*SMM1 AND 3NME*SMM2, Shutdown Margin Monitors.
- /
- b. IF either 3NME*SMM1 OR 3NME*SMM is inoperable, Refer To T/S 3.3.5 and DETERMINE ACTION.

/

4.2.26 CHECK annunciator MB4C 4–8, “ROD CONTROL URGENT FAILURE,” is *lit*.

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4.2.27 PLACE both Source Range Level Trip switches in “BYPASS”:

- “LEVEL TRIP” (source range drawer “N31”)
- “LEVEL TRIP” (source range drawer “N32”)

4.2.28 PLACE “Caution Tag” on “RX TRIP BKRS,” “MANUAL” switch reading “Requiring both source range “LEVEL TRIP” switches to be in “NORMAL” prior to closing the reactor trip breakers when control rods are capable of being withdrawn” (MB4).

4.2.29 Refer To OP 3349, “Modcomp Process Computer System Operations” and RESET the SOE trip buffer.

4.2.30 CLOSE the following turbine driven main feedwater pump high pressure steam inlet isolation valves (local):

- 3TFM–V7, “sg fw pp 1B mn stm inlet isol”
- 3TFM–V8, “sg fw pp 1A mn stm inlet isol”

4.2.31 IF desired to prevent thermal binding, STROKE the following valves (MB5):

- 3FWS–MOV35A, “SG FEEDWATER” “CNTL ISOL”
- 3FWS–MOV35B, “SG FEEDWATER” “CNTL ISOL”
- 3FWS–MOV35C, “SG FEEDWATER” “CNTL ISOL”
- 3FWS–MOV35D, “SG FEEDWATER” “CNTL ISOL”

4.2.32 VERIFY SP 3604C.6–001, “Valve Closure Verification for Water Supply to Emergency Boration,” is complete.

4.2.33 Refer To RAC 14, “Non–Emergency Station Events,” (Att) “Reportable Events” and DETERMINE the reporting requirements.

4.2.34 REQUEST I&C Department Refer To IC 3472D14, “RVLIS Heater Controller Adjustment,” and adjust RVLMS heater power control.

4.2.35 Go To OP 3208, “Plant Cooldown.”

– End of Section 4.2–

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5. REVIEW AND SIGNOFF

Entire procedure was completed. (Check One):

Yes No

If procedure was terminated prior to completion, specify cause in space below:

Performed By: _____ / _____ / _____ Date: _____
Name (printed) Signature Initials

Performed By: _____ / _____ / _____ Date: _____
Name (printed) Signature Initials

Performed By: _____ / _____ / _____ Date: _____
Name (printed) Signature Initials

Reviewed By: _____ Date: _____
Signature (SM)

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6. REFERENCES

6.1 Technical Specifications

6.1.1 T/S 3.7.1.3, “Plant Systems, Demineralized Water Storage Tank”

6.1.2 T/S 3.7.1.2, “Plant Systems, Auxiliary Feedwater System”

6.1.3 REMODCM

6.2 Procedures

6.2.1 OP 3203, “Plant Startup”

6.2.2 OP 3204, “At Power Operation”

6.2.3 OP 3207, “Reactor Shutdown”

6.2.4 OP 3208, “Plant Cooldown”

6.2.5 OP 3301G, “Pressurizer Pressure Control”

6.2.6 OP 3316C, “Steam Generator Blowdown”

6.2.7 OP 3317, “Reheat and Moisture Separator”

6.2.8 OP 3319A, “Condensate System”

6.2.9 OP 3319B, “Condensate Makeup and Drawoff System”

6.2.10 OP 3319C, “Condensate Demineralizer Mixed Bed System”

6.2.11 OP 3320, “Feedwater Heater Drains and Vents”

6.2.12 OP 3321, “Main Feedwater”

6.2.13 OP 3322, “Auxiliary Feedwater System”

6.2.14 OP 3323A, “Main Turbine”

6.2.15 OP 3323D, “Turbine Gland Steam and Exhaust”

6.2.16 OP 3324A, “Main Generator”

6.2.17 OP 3329, “Condenser Air Removal”

6.2.18 OP 3331A, “Auxiliary Boiler, Steam, and Condensate”

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- 6.2.19 OP 3340B, “Water Treating System”
- 6.2.20 SP 3623.1, “Turbine Generator Testing”
- 6.2.21 AOP 3554, “RCP Trip or Stopping a RCP at Power”
- 6.2.22 AOP 3575, “Rapid Downpower”
- 6.2.23 TRM Appendix 8.1, “Core Operating Limits Report (COLR)”
- 6.2.24 EOP 35 E-0, “Reactor Trip or Safety Injection”
- 6.3 Others
 - 6.3.1 MP-14-RXM-PRG, “Reactivity Management”
 - 6.3.2 Westinghouse O-2, “Operating Instruction Plant Shutdown From Minimum Load To Cold Shutdown”
- 6.4 Correspondence, Reports and Commitments
 - 6.4.1 Commitment 300240 – revise 3206 to provide minimum times for inducing PZR spray to equalize boron. Related commitment: 3-88-0070.
 - 6.4.2 A/R 97000592 deleted use of Auxiliary feedwater to feed S/G in MODE 1, 2, and 3 using normal methods. This is a HELB concern and is a response to EEI-423/96-201-04 & 05.
 - 6.4.3 RCR-19057, LER B09254, Dated 4/18/86” Commitment to provide a Caution recommending shifting from the FRV’s to the FRVBV’s prior to removing the turbine from service.
 - 6.4.4 RCR-20473, NRC letter A07123 Dated 3/14/88, PIR 3-88-029, AR 97009344-01. Also, RCR-19838, LER B09573 dated 3/8/88, Commitment: “require an additional operator at the FW control station when feedwater control is being shifted from main valves to bypasses and provide more specific direction on the transition.”
 - 6.4.5 RCR-19778, LER B09447, dated 11/30/87, AR 97007344-01, also, AR 98010294. Commitment: “procedures revised to require that all main feedwater additions when shutdown should be made through the bypass valves only.”



7. SUMMARY OF CHANGES

7.1 Revision 010–04

- 7.1.1 Added new Precaution from OP 3204 regarding the effects of condenser backpressure changes on turbine rubs and vibration.
- 7.1.2 Added Caution before new step 4.1.2 that changes in vacuum should be made slowly to minimize turbine vibration.
- 7.1.3 Added new step in Section 4.1 to verify condenser backpressure is being maintained between 2.5" and 4" to minimize effects on turbine vibration.

7.2 Revision 010–03 AR 05000789–02

- 7.2.1 Added Note 2 prior to step 4.1.1 info to perform actions in parallel with SM/US approval.
- 7.2.2 Deleted existing step 4.1.3, turbine warming is no longer required since the installation of the monoblock rotors.
- 7.2.3 Move Caution Box from prior to step 4.1.26 to prior to step 4.1.23.
- 7.2.4 Modified step 4.1.33 to change to a conditional action to only perform if not shutting down for refueling.
- 7.2.5 Modified steps 4.1.45.b.5, 4.1.45.b.6 and 4.2.18 to Refer To OP 3340B to fill the CST instead of OP 3319B.
- 7.2.6 Move existing step 4.2.9 to become step 4.2.2.
- 7.2.7 Modified step 4.2.14.e to list all FW isolation indications.
- 7.2.8 Modified steps 4.2.18 and 4.2.19 to Refer To OP 3340B to fill the DWST instead of OP 3322.
- 7.2.9 Added new step 4.2.21 to stop a circulating water pump in each condenser if desired.
- 7.2.10 Added new step 4.2.31 to stroke 3FWS–MOV35 valves if desired to prevent thermal binding.

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7.3 Revision 010–02 AR 04002049–02

7.3.1 Moved existing step 4.1.16 to become step 4.1.2 to remove DSM pumps from service earlier during plant shutdown for refueling.

7.4 Rev. 010–01 DCR M3–03004 Voltage Regulator Modifications

7.4.1 The DCR installed a new voltage regulation system which no longer requires the exciter field breaker. Modified steps 4.1.29 & 4.1.33.c when taking the generator off line to perform turbine testing to verify open the EXS–N11 exciter field contactor instead of the NJS–ACB–EF, “EXCITER FIELD” breaker.

7.5 Revision 010 AR 03008757–14

7.5.1 This surveillance was divided into two sections, Turbine Shutdown and Reactor Shutdown for Refueling. This will give 2 separate and distinct evolutions. Shutting down the reactor earlier and cooling down quicker will save time and money during refueling outages. Actions added to the refueling Section includes borating while shutting reactor down instead of driving in control rods. AR 03005334–02

7.5.2 Added several Prerequisites Documents, these procedures are referred to during performance of this procedure.

7.5.3 Added Precaution 3.8, welding is prohibited in containment unless the reactor trip breakers are open and both source range “LEVEL TRIP” switches are in “BYPASS”

7.5.4 Modified step 4.1.12 to shift each SG feedwater control from the main to the bypass level control valve. Per Writer’s Guide each step is written independently.

7.5.5 Modified step 4.1.19 changed action to verify performed within the last 7 days instead of PERFORM.

7.5.6 Modified step 4.1.20 to allow with input from Chemistry to shift blowdown tank vent paths from fourth point feedwater heaters to either the condenser OR atmosphere.

7.5.7 Added step 4.1.36 to remove core monitor from service.

7.5.8 Added step 4.1.38 to Go To Section 4.2 if the shutdown is for refueling outage.

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7.5.9 Modified step 4.1.49 to expand operating these valves independently (writer's guide)

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