«« EXAM INFORMATION »»

EXAM NO.: LSRO2002

DATE GENERATED: 04/29/02

TOTAL POINTS: 50.00

RESPONSE TIME (min): 0.0

AVERAGE DIFFICULTY : 0.0

MULT. CHOICE	TRUE FALSE	ESSAY	FILL IN	MATCHING
QUESTIONS: 50 POINTS: 50.00	QUESTIONS: 0 POINTS: 0.00	QUESTIONS: 0 POINTS: 0.00	QUESTIONS: 0 POINTS: 0.00	QUESTIONS: 0 POINTS: 0.00

KEY

1) PV:1.0 Q#:1 RT:0.0 DF:0 LP:1-1, GF-COMP-07.22 CT:LOW

Most of the electrons collected in a fission chamber are released as the result of ionizations caused directly by:

a. fission fragments

b. fission gammas

c. fission betas

d. fissionable materials

CORRECT RESPONSE :A
REFERENCE:
Source:

Direct NRC Bank QID B213

2) PV:1.0 Q#:2 RT:0.0 DF:0 LP:1-2, GF-COMP-03.09 CT:HI

Refer to Attachment 1.

All valves are identical and are initially 50% open. To raise the temperature at Point 1, the Operator can adjust valve _____ in the _______ direction.

a. A, shut

b. B, open

c. C, shut

d. D, open

CORRECT RESPONSE :B
REFERENCE:
Source:

Direct NRC GF Bank QID B2431

3) PV:1.0 Q#:3 RT:0.0 DF:0 LP:1-3, GF-THEORY-01.32 CT:LOW

A thermal neutron is different from other categories of neutons because only a thermal neutron:

a. was born greater than 10^{-14} seconds after the fission event

b. is a product of a thermal fission reaction

c. was released by the decay of fission fragments

d. is at the same energy level as the surrounding atoms

CORRECT RESPONSE :D
REFERENCE:
Source:

Direct from NRC GF Bank QID B945 with minor grammar changes

PV:1.0 Q#:4 RT:0.0 DF:0 LP:1-4, GF-THEORY-02.09 CT:HI

Plant conditions are as follows:

- Core refueling has just been completed
- 250 fuel bundles and 24 control rods were replaced
- All control rods are still inserted.

WHICH ONE of the following describes how the current shutdown margin (SDM) compared to the SDM just prior to fuel movements?

a. Current SDM is greater due to the addition of new fuel bundles

b. Current SDM is greater due to the addition of new control rods

c. Current SDM is smaller due to the addition of new control rods

d. Current SDM is smaller due to the addition of new fuel bundles

CORRECT RESPONSE :D
REFERENCE:
Source:

New

5) PV:1.0 Q#:5 RT:0.0 DF:0 LP:1-5, GF-THEORY-03.06 CT:LOW

WHICH ONE of the following is the reason that delayed neutrons are so effective at controlling the rate of reactor power changes?

a. Delayed neutrons make up a larger fraction of the fission neutrons in the core compared to prompt neutrons

b. Delayed neutrons have a long generation time compared to prompt neutrons

c. Delayed neutrons produce a larger amount of fast neutrons than prompt neutrons

d. Delayed neutrons are born at a higher kinetic energy than prompt neutrons

CORRECT RESPONSE :B
REFERENCE:
Source:

Direct from NRC Bank QID B1751 with minor changes ("lifetime" to "generation time" in "B" and grammar)

6) PV:1.0 Q#:6 RT:0.0 DF:0 LP:1-6, GF-THEORY-05.01 CT:HI

Rod position indication shows that a control rod is at position 22. If the control rod is then moved to position 12, it is being:

a. inserted 30 inches

b. withdrawn 30 inches

c. inserted 60 inches

d. withdrawn 60 inches

CORRECT RESPONSE :A
REFERENCE:
Source:

Direct NRC GF Bank QID 3054

7) PV:1.0 Q#:7 RT:0.0 DF:0 LP:1-7, GF-THEORY-08.31 CT:HI

The reactor has been shut down for a refueling outage for 4 days following operation at rated power for 1 year.

WHICH ONE of the following describes the fraction of rated thermal power corrently being produced by decay heat?

a. Greater than 10%

b. Greater than 5% but less than 10%

c. Greater than 1% but less than 5%

d. Less than 1%

CORRECT RESPONSE :D
REFERENCE:
Source:

New

Heat output drops below 1% after 1 hour

8) PV:1.0 Q#:8 RT:0.0 DF:0 LP:1-8 CT:LOW

Core orificing is used in the reactor core because the orifices:

a. counteract the buoyant force of the bubbles accelerating flow in the high powered bundles.

b. improve the distribution of core flow to offset the effect of increasing quality on bundle flow.

c. increase core DP so that minor crud buildup on fuel bundles will not adversely affect core flow.

d. decrease flow during periods of natural circulation to increase the void coefficient

CORRECT RESPONSE :B
REFERENCE:
Source:

Direct NRC Bank QID B291

9) PV:1.0 Q#:10 RT:0.0 DF:0 LP:2-2, NLSRO0060.06 CT:LOW

WHICH ONE of the following describes the method used to uncouple a control rod blade from the index tube?

a. Lift the control rod handle from above the vessel using the aux hoist while giving the control rod a withdraw signal

b. Lift the "D" ring at the bottom of the control rod using the golf club tool while giving the rod an insert signal.

c. Raise the piston tube from below the vessel using the uncoupling tool while giving the rod an insert signal

d. Raise the piston tube from below the vessel using the uncoupling tool while giving the rod a withdraw signal

CORRECT RESPONSE :D
REFERENCE:
a- Wrong handle
b- Wrong motion direction
c- Wrong motion direction
d- correct

Ref:
M-C-747-011

Source:
New

10) PV:1.0 Q#:13 RT:0.0 DF:0 LP:2-5, NLSRO0021.09 CT:HI

Plant conditions are as follows:

- Control cell 34-39 is being re-assembled
- The fuel support piece (FSP) was approximately 2 degrees rotated and one FSP finger is sitting on the anti-rotation pin.
- The FSP and blade were released

WHICH ONE of the following will provide indication of the mis-alignment?

a. The blade handle for 34-39 will be visible below the top of the fuel support before the double blade guide is lowered

b. The double blade guide will NOT release from the grapple due to grapple zone interlocks

c. The four bundles in cell 34-39 will show high seating during core verification seating pass

d. The guide tube will show similar rotation on subsequent in-vessel visual inspection

CORRECT RESPONSE :C
REFERENCE:
a. If the FSP is seated far enough to reach the pin, it is aligned with the rod enough to allow stroking

b. The grapple will release because the blade guide will still be low enough to satisfy grapple interlocks

c. Correct. Plant experience

d. The guide tube is installed first, and must be oriented correctly or the pin will not be visible

Ref: M-C-797-020 Source: New

11) PV:1.0 Q#:11 RT:0.0 DF:0 LP:2-3, NLSRO0030.06 CT:HI

Limerick Unit 2 plant conditions are as follows:

- OPCON 5
- 2A RHR Loop is in Shutdown Cooling mode

Some plastic FME caps have been spotted lying on the core baffle plate next to Jet Pump #10.

WHICH ONE of the following describes the component that the caps are likely to be drawn into if they become entrained by flow?

a. The north recirc suction nozzle

b. The south recirc suction nozzle

c. The east jet pump suction nozzles

d. The west jet pump suction nozzles

CORRECT RESPONSE :B
REFERENCE:
A, C, D- incorrect. The baffle plate is 12 feet below the jet pump nozzles and at the same elevation as the RHR suction. In SDC mode, flow is into the B recirc loop piping at azmith 180 (south)

Source:

New

12) PV:1.0 Q#:20 RT:0.0 DF:0 LP:2-12, NLSRO0200.05, NLSRO0200.06 CT:HI

Limerick plant conditions are as follows:

- Irradiated component movement is in progress in the Unit 2 spent fuel pool
- Refuel floor secondary containment integrity is established
- Unit 2 Refuel Floor HVAC is in service

Movement of an irradiated component near the water surface results in the "A", "B", and "D" channels of refuel floor exhaust rad monitors to read between 2.5 and 4.0 mr/hr for 30 seconds.

WHICH ONE of the following describes the expected status of unit Unit 1 and Unit 2 Refuel Floor HVAC five minutes later based on automatic actions and the above conditions?

	UNIT 1 RF HVAC	UNIT 2 RF HVAC
a.	Running	Running
b.	Running	Isolated
c.	Isolated	Running
d.	Isolated	Isolated

CORRECT RESPONSE :D
REFERENCE:
A, B, C- Incorrect. The setpoint is 2.0 mr/hr. Only the Div 1 trip system actuates (Ch A and B), which is sufficient to trip hvac and start SGTS. Limerick common refuel floor logic is intertied. A trip on either unit trips the same division on the other unit.

Source:

New

13) PV:1.0 Q#:14 RT:0.0 DF:0 LP:2-6, NLSRO0190.05 CT:LOW

Limerick plant conditions are as follows:

- Irradiated component movement is in progress in the Unit 1 spent fuel pool
- Unit 1 Refuel Floor HVAC is running

WHICH ONE of the following describes the expected refuel floor pressure and the reason for maintaining that value?

	Expected Pressure	Reason
a.	Less than atmospheric	Prevent unmonitored release
b.	Less than atmospheric	Reduce activity released
c.	Greater than atmospheric	Prevent unmonitored release
d.	Greater than atmospheric	Reduce activity released

CORRECT RESPONSE :A
REFERENCE:
B, C, D- Incorrect. Pressure is -.25" and under normal conditions there is no reduction in activity released from the refuel floor. Negative pressure only ensures that all releases are via the South Stack which is monitored.

Source:

New

14) PV:1.0 Q#:16 RT:0.0 DF:0 LP:2-8, NLSRO0080.03, NLSRO0240.02 CT:HI

Limerick Unit 1 plant conditions are as follows:

- Control rod stroking is in progress following core verification
- Rod 14-15 is at position 12 and being continuously withdrawn

The "SRM DOWNSCALE" alarm (107 G4) is received with "A" and "B" SRM indicating 1 cps.

WHICH ONE of the following describes the resulting ability to continue rod withdrawal and return the rod to fully inserted by notch insertion?

	Notch Withdrawal	Notch Insert
a.	Blocked	Blocked
b.	Blocked	Permitted
c.	Permitted	Blocked
d.	Permitted	Permitted

CORRECT RESPONSE :B
REFERENCE:
SRM DNSCL is a withdraw block. Only the RWM enforces insert blocks.

Source:

New

15) PV:1.0 Q#:18 RT:0.0 DF:0 LP:2-10, NLSRO0750.07B CT:LOW

Limerick Unit 2 plant conditions are as follows:

- Shuffle part 1 in progress
- Spent fuel pool gates are removed

An unisolable leak occurs in "2B" Recirc loop, and a loss of power to the overhead crane prevents installation of the fuel pool gates.

WHICH ONE of the following describes the lowest water level reached in the spent fuel pool prior to any boiloff and the reason?

a. below the top of the spent fuel due to the elevation of the transfer canal

b. below the top of the spent fuel due to the setpoint for the Shutdown Cooling Group II isolation

c. above the top of the spent fuel due to the setpoint for the Shutdown Cooling Group II isolation

d. above the top of the spent fuel due to the elevation of the transfer canal

CORRECT RESPONSE :D
REFERENCE:
A, B, C-Incorrect. Fuel pool is designed to maintain fuel covered. The transfer canal curb wall is above the fuel. Level stops dropping at this elevation.

Ref: M-53

Source:

New

16) PV:1.0 Q#:21 RT:0.0 DF:0 LP:2-13, NLSRO1840.03 CT:HI

Limerick Unit 1 plant conditions are as follows:

- Fuel bundles are being moved in the spent fuel pool to support re-racking
- RIS33-1M-1K600, Plug Laydown Area ARM is INOPERABLE

During the work, RIS30-1M-1K600, Steam Separator ARM is taken out of service.

WHICH ONE of the following describes the minimum actions required to allow continued spent fuel movements based on the above conditions?

a. establish secondary containment integrity with SGTS running

b. verify operability of the Fuel Pool Area Rad Monitor

c. verify no movements will take place over spent fuel

d. install temporary area rad monitor in place of an inop monitor

CORRECT RESPONSE :D
REFERENCE:
Ref:
LCO 3.3.7.1

A, B, C: incorrect. Movements of spent fuel, whether over fuel or not, require secondary containment AND two criticality monitors. A, B, and C are good actions, but inadequate for the situation.

Source:

New

17) PV:1.0 Q#:23 RT:0.0 DF:0 LP:2-15, NLSRO0240.02D CT:LOW

Limerick Unit 1 plant conditions are as follows:

- OPCON 5
- Neutron monitoring RPS shorting links are installed
- Control rod scram timing is in progress

WHICH ONE of the following is the plant response to a single source range monitor channel failing upscale?

a. Full scram and rod block

b. Rod block and NO half scrams

c. Half scram and rod block

d. Half scram and NO rod block

CORRECT RESPONSE :B
REFERENCE:
With RPS shorting links installed, the neutron monitoring non-coincident scrams are disabled. SRM upscale is rod block only

Source:

New

18) PV:1.0 Q#:25 RT:0.0 DF:0 LP:3-2, NLSRO0200.02 CT:HI

Limerick plant conditions are as follows:

- Shuffle part 2 in progress on Unit 2
- Unit 1 Refuel Floor HVAC in service

A bundle tie plate failure results in a radioactivity release to the refuel floor atmosphere and valid hi-hi rad trip of all Unit 1 exhaust rad monitors.

WHICH ONE of the following points will indicate the magnitude of the release five minutes later?

a. North stack monitor

b. South stack monitor

c. Unit 1 refuel floor exhaust rad monitors

d. Unit 2 refuel floor exhaust rad monitors

CORRECT RESPONSE :A
REFERENCE:
A- Correct
B,D, D - incorrect, under isolation conditions, SGTS exhausts to the north stack. Common misconception about the swapover of flowpaths from normal to isolation conditions is tested in this question. Unit 1 and Unit 2 HVAC rad monitors will not have flow past them following an isolation and are not valid indications.

Source:

New

19) PV:1.0 Q#:30 RT:0.0 DF:0 LP:3-7, NLSRO0767.11 CT:LOW

WHICH ONE of the following is the expected indication on the Limerick Unit 1 fuel hoist mast position encoder prior to traversing the canal with a spent fuel bundle and a double blade guide per S97.0.M, REFUELING PLATFORM OPERATION?

	Spent Fuel Bundle	Double Blade Guide
a.	0	0
b.	0	-4
c.	-4	0
d.	-4	-4

CORRECT RESPONSE :B
REFERENCE:
Ref:
S97.0.M

Double blade guide is longer than a bundle and must be raised beyond normal up to -4 to clear the cattle chute

Source:

New

20) PV:1.0 Q#:38 RT:0.0 DF:0 LP:3-15, NLSRO0011.03 CT:HI

Limerick Unit 1 plant conditions are as follows:

- Core verification is in progress
- One interior bundle was identified as high-seated
- One peripheral bundle was identifed as low due to missing the support piece
- Plans include landing the grapple (without closing the grapple) on the high bundle to settle it and hoisting the low bundle to re-land it.

WHICH ONE of the following describes the requirement for a CCTAS to correct the high bundle and the low bundle per M-C-797-020, CORE VERIFICATION?

	High Bundle	Low Bundle
a.	Required	Required
b.	NOT Required	Required
c.	Required	NOT Required
d.	NOT Required	NOT Required

CORRECT RESPONSE :B
REFERENCE:
The procedure permits landing the grapple (bumping) on the bundle to settle a high bundle without a CCTAS. The low bundle will require grappling, which requires a CCTAS.

Source:

New

21) PV:1.0 Q#:9 RT:0.0 DF:0 LP:2-1, NLSRO0080.09A CT:LOW

Peach Bottom Unit 2 plant conditions are as follows:

- Mode 5
- CRD SCRAM insertion timing per ST-R-003-485-2 is in progress
- Rod 22-49 has just been given a notch withdraw command

WHICH ONE of the following lists the expected CRD drive flow indication on FI-2-03-305 on the 20C005A panel?

Drive flow will indicate:

a. 2 gpm, then 4 gpm

b. 4 gpm, then 2 gpm

c. 2 gpm during the entire movement

d. 4 gpm during the entire movement

CORRECT RESPONSE :B
REFERENCE:
A-reversed
b-correct
c-incomplete
d-insert indications

Source:

New

22) PV:1.0 Q#:12 RT:0.0 DF:0 LP:2-4, NLSRO0655.05 CT:HI

Peach Bottom Unit 2 plant conditions are as follows:

- MODE 5 with shuffle part 2 in progress
- 2A RHR loop is operating in Shutdown Cooling (SDC) mode
- All electrical distribution equipment is operable

A complete loss of voltage to 2SU Bus and 3SU Bus occurs.

WHICH ONE of the following describes the effect on SDC core circulation and High Pressure Service Water heat removal flow?

	RHR Core Circulation	HPSW Flow
a.	Maintained throughout the transient	Maintained throughout the transient
b.	Maintained throughout the transient	Interrupted but can be restored
c.	Interrupted but can be restored	Maintained throughout the transient
d.	Interrupted but can be restored	Interrupted but can be restored

CORRECT RESPONSE :D
REFERENCE:
A, B, C - Incorrect. Loss of 2SU and 3SU will de-energize all 4KV busses. SDC and HPSW pumps will trip and be able to be re-started after the DGs re-energize the busses. There are no auto starts.
D-correct

Source:

New

23) *PV:1.0 Q#:15 RT:0.0 DF:0 LP:2-7, NLSRO1820.08B CT:HI

Peach Bottom Unit 3 plant conditions are as follows:

- MODE 5
- "C", "D", "E", and "F" Wide Range Neutron Monitors (WRNM) are the only OPERABLE nuclear instruments
- Spiral offload of "A" quadrant is in progress
- The outer ring of fuel for quadrant "A" is removed, such that the fueled region of quadrant "A" is NOT connected to the rest of the core

WHICH ONE of the following lists the maximum additional WRNMs that all may be taken out of service with fuel movement continuing in "A" quadrant

a. "E" WRNM

b. "D" and "F" WRNMs

c. "D", "E", and "F" WRNMs

d. "C", "D", "E", and "F" WRNMs

CORRECT RESPONSE :C
REFERENCE:
LCO 3.3.1.2

A, B, D - Incorrect. The maximum WRNMs that can be taken out of service is the three in the non-offload quadrants. With connectivity broken with the other quadrants, 3.3.1.2 only requires 1 WRNM to be operable in the core alt quad.

Source:

New

24) PV:1.0 Q#:17 RT:0.0 DF:0 LP:2-9, NLSRO0766.07 CT:LOW

Peach Bottom Unit 3 plant conditions are as follows:

- Shuffle part 2 in progress
- A fuel bundle is being moved to the core in semi-automatic mode

The Refuel Platform Operator has touched AUTO STOP on the hoist screen.

WHICH ONE of the following describes the expected bridge response based on the above conditions?

a. Bridge, trolley, and mast motion stop immediately.

b. Bridge motion stops immediately; mast and trolley motion stop when at NORMAL UP and aligned with the cattle chute.

c. Bridge, trolley, and mast motion stop when aligned with the cattle chute at NORMAL UP and entering the core area.

d. Bridge, trolley, and mast motion stop when aligned over the target location with the bundle 6 inches above the top guide.

CORRECT RESPONSE :A
REFERENCE:

Source:

New

25) PV:1.0 Q#:19 RT:0.0 DF:0 LP:2-11, NLSRO0021.10 CT:HI

Peach Bottom Unit 2 conditions are as follows:

- A double blade guide is suspended from the main hoist
- The NES combination grapple with a control rod blade (CRB) and fuel support piece (FSP) is suspended from the frame-mounted aux hoist

The bridge air system has just depressurized to zero psig due to a broken fitting at the backup hose connection (V-9).

WHICH ONE of the following describes the ability to complete the move and release the double blade guide and the CRB/FSP combination to the spent fuel pool.

	Double Blade Guide	CRB/FSP Combo
a.	Can be manually released	Can be manually released
b.	Can be manually released	Cannot be released
c.	Cannot be released	Can be manually released
d.	Cannot be released	Cannot be released

CORRECT RESPONSE :A
REFERENCE:
The NES combined grapple has a manual interlock release feature (actuated by reach rods) to address a malfunction of the air actuation system. The main hoist has manual hook eyes on the grapple faces.

The location of the air break is chosen to eliminate consideration of using a service air connection from the plant; a feature that is part of the bridge.

Source:

New

26) PV:1.0 Q#:22 RT:0.0 DF:0 LP:2-14, NLSRO0762.07 CT:LOW

Peach Bottom Unit 3 plant conditions are as follows:

- A fuel bundle is partially inserted in its core location
- The bridge operator needs to adjust the bridge position slightly

WHICH ONE of the following describes the maximum permitted bridge or trolley motion permitted by interlocks, and the required action if this maximum is exceeded?

a. 12 inches; Re-align using TRAVEL OVERRIDE and Traverse System Joystick

b. 12 inches; Re-align using Bridge and Trolley Master Joysticks

c. 3 inches; Re-align using TRAVEL OVERRIDE and Traverse System Joystick

d. 3 inches; Re-align using Bridge and Trolley Master Joysticks

CORRECT RESPONSE :C
REFERENCE:
3" max motion interlock with grapple closed and lowered from normal up. If any axis moves 3", all motion on that axis is locked out until travel override is used. With the bundle partly inserted, the traverse system joystick (small jog joystick)must be used.

12" distractor based on grapple zone interlock elevation
master joystick distractor based on normal method of movement.

Source:

New

27) PV:1.0 Q#:24 RT:0.0 DF:0 LP:3-1, NLSRO0750.09 CT:HI

Peach Bottom Unit 3 conditions are as follows:

- OPCON 5
- "3A" Loop of RHR is operating in shutdown cooling Alternate Decay Heat Removal (ADHR) mode

A leak through a main steam line plug and open SRV flange results in a loss of reactor cavity level of 6 inches per minute

WHICH ONE of the following describes the highest cavity or vessel level where RHR ADHR circulation will initially be lost?

a. below the skimmer surge tank weirs

b. the level of the RPV flange

c. the shutdown cooling PCIS setpoint

d. the shutdown cooling vessel return elevation

CORRECT RESPONSE :A
REFERENCE:
A-correct. In ADHR mode, the RHR pump draws from the FPCC skimmer surge tank suction and is isolated from the normal SDC suction. After level drops below the SST weir, the RHR pump will empty the SST and ADHR suction piping, causing a loss of ADHR flow.

Source:

New

28) PV:1.0 Q#:26 RT:0.0 DF:0 LP:3-3, NLSRO1550.01 CT:HI

Peach Bottom Unit 2 plant conditions are as follows:

- Shuffle part 2 in progress
- A bundle is being lowered into location 23-26 NW
- Mast indication is +530 and increasing

The Reactor Operator has contacted the Fuel Handling Director and reported that the "H" WRNM counts have increased from 15 cps to 30 cps and have stopped rising.

WHICH ONE of the following describes reactor status and required actions per FH-6C, CORE COMPONENT MOVEMENT - CORE TRANSFER?

	Status	Required Actions
a.	Supercritical	Evacuate the refuel floor
b.	Supercritical	Raise bundle to clear the top guide
c.	Subcritical	Raise bundle to clear the top guide
d.	Subcritical	Stop lowering until WRNMs are verified stable

CORRECT RESPONSE :D
REFERENCE:
Ref: FH-6C

A,B- Incorrect. Counts are stable and do not indicate criticality
c- With less than 2 doublings, the action is to evaluate.

Source:
New

29) PV:1.0 Q#:27 RT:0.0 DF:0 LP:3-4, NLSRO1550.01 CT:LOW

Peach Bottom Unit 3 plant conditions are as follows:

- An irradiated bundle is being removed from the core
- The main hoist is raised to NORMAL UP

The bail handle fails on the bundle, allowing the bundle to drop onto the core. Bubbles are seen rising from the impact area and broken fuel pins are visible on the core.

WHICH ONE of the following describes the required actions per ON-124, FUEL FLOOR AND FUEL HANDLING PROBLEMS and the reason?

a. Grapple and lift the bundle to prevent inadvertent criticality

b. Monitor normal HVAC rad monitors. Evacuate the area if alarm occurs to reduce exposure to fission gases

c. Evacuate the refuel floor and drywell to reduce dose due to fission product release

d. Evacuate the drywell to reduce exposure to flux from anticipated criticality

CORRECT RESPONSE :C
REFERENCE:
Ref: ON-124

Source:

New

30) PV:1.0 Q#:29 RT:0.0 DF:0 LP:3-6, NLSRO1841.09 CT:HI

Peach Bottom Unit 2 plant condiions are as follows:

- Mode 5
- Fuel Pool Gates are installed
- Cavity level is 439 inches

The "2D" RHR pump has been secured after 3 days of operation to support jet pump work. The "2D" RHR pump is the only operable RHR pump.

WHICH ONE of the following describes the required actions based on the above conditions?

a. Verify fuel pool gates are removed once per 12 hours

b. Restart "2D" RHR pump within 2 hours

c. Verify one alternate heat removal method is available within 1 hour and restart 2D RHR within 2 hours

d. Verify two alternate heat removal methods are available within 1 hour and restart 2D RHR within 12 hours

CORRECT RESPONSE :C
REFERENCE:
Ref:

LCO 3.9.8

Source:

Direct LGS bank

31) PV:1.0 Q#:34 RT:0.0 DF:0 LP:3-11, NLSRO0767.11 CT:HI

Peach Bottom Unit 3 plant conditions are as follows:

- Shuffle part 2 in progress
- CCTAS Step 121 is being executed per Attachment 2
- The bundle was lowered into the core until the SLACK CABLE lamp was received
- The FHD is assessing whether to direct the grapple to be released
- Hoist screen data, mast camera view, and mast orientation are provided on Attachment 2

WHICH ONE of the following is the status of bundle orientation and hoist indication?

	Bundle Orientation	Hoist Indication
a.	Correct	Normal
b.	Correct	Abnormal
c.	NOT Correct	Normal
d.	NOT Correct	Abnormal

CORRECT RESPONSE :D
REFERENCE:
A, B, C - Incorrect.

Orientation - The mast camera view shows the channel fastener. With the mast rotated as shown, the bundle is oriented NE (the camera faces in the same direction as the operator). The CCTAS calls for SW orientation. The image is captured from actual mast camera footage.

Hoist - Bundle seated is at 549 to 551 inches down. The cable is shown slack with the bundle 20 inches above the fuel support (530).

Source:

New

32) PV:1.0 Q#:35 RT:0.0 DF:0 LP:3-12, NLSRO0762.09 CT:LOW

Peach Bottom Unit 3 plant conditions are as follows:

- Shuffle part 1 in progress
- A control rod blade and fuel support combination is being raised on the frame mounted aux hoist by depressing RAISE and HOIST LIMIT override
- The jib arm tool is being used

WHICH ONE of the following describes the operation of the equipment to prevent inadvertently hoisting the blade and support out of the water with the hoist set up per M-C-741-301, CONTROL ROD BLADE, FSP, AND CONTROL ROD GUIDE TUBE REMOVAL AND INSTALLATION for use with the jib arm tool?

a. The hoist jam block will contact the frame and cause an overload trip of the motor when the blade is 6 feet 10 inches from the surface

b. The hoist jam block will contact a switch and de-energize the RAISE function when the blade is 6 feet 10 inches from the surface

c. The hoist jam block will contact the frame and cause an overlaod trip of the motor when the blade is 5 feet 6 inches from the surface

d. The hoist jam block will contact a switch and de-energize the RAISE function when the blade is 5 feet 6 inches from the surface

CORRECT RESPONSE :B
REFERENCE:
Jam block is set per the procedure to contact a whisker switch with the CRB no closer than 6 feet to the surface.

Source:

New

33) PV:1.0 Q#:36 RT:0.0 DF:0 LP:3-13, NLSRO0655.05 CT:HI

Peach Bottom Unit 2 plant conditions are as follows:

- Shuffle part 1 in progress
- A fuel bundle is over the fuel pool in transit to the core in automatic (X, Y, Z) mode
- During the transfer, power is lost to the bridge and PLC for one minute and is restored

WHICH ONE of the following describes the resulting spent fuel pool gate status enforced and the mast NORMAL UP limit enforced per SO 18.1.A-3, OPERATION OF THE REFUELING PLATFORM?

	Gate Status	Normal UP Limit
a.	Installed	Refueling
b.	Installed	Cask Loading
c.	Removed	Refueling
d.	Removed	Cask Loading

CORRECT RESPONSE :A

REFERENCE:

On power restoration, the procedure cautions the operator that the system will default back to gate installed status and will not permit transit of the cattle chute until the status is re-input.

Source:

New

34) PV:1.0 Q#:37 RT:0.0 DF:0 LP:3-14, NLSRO0762.15 CT:HI

Peach Bottom Unit 2 plant conditions are as follows:

- Refueling platform operating mode is automatic with the access level as "Refuel Platorm Operator"
- A fuel bundle has been grappled in the spent fuel pool and raised to normal up
- Movement of fuel to the spent fuel cask is required

WHICH ONE of the following describes the required actions to allow fuel to be transferred to the cask per SO 18.1.A-2, OPERATION OF THE REFUELING PLATFORM?

a. Direct the RPO to select CASK LOADING from the utilities menu and SELECT AUTO from the main or hoist screens

b. Direct the RPO to select CASK LOADING from the utilities menu and leave the platform in manual mode

c. Log on as FUEL HANDLING DIRECTOR, select CASK LOADING from the utilities menu, and select auto from the main or hoist screens

d. Log on as FUEL HANDLING DIRECTOR, select CASK LOADING from the utilities menu, and leave the platform in manual mode

CORRECT RESPONSE :D
REFERENCE:
A,B,C - changing hoist limits requires FHD access level and valid password. The computer will not complete a move to a location in the cask. This move must be performed manually.

Source:

New

35) PV:1.0 Q#:28 RT:0.0 DF:0 LP:3-5, NLSRO0767.06 CT:HI

Limerick Unit 2 plant conditions are as follows:

- A double blade guide (DBG)has been positioned over the spent fuel racks on the first component transfer of the shift
- The Refuel Platform Operator reports that he is aligned for B-31/C-32
- The Spotter calls out that the DBG is actually over B-30/C-31 and the Fuel Handling Director (FHD) confirms that the DBG is over the wrong rack locations

WHICH ONE of the following describes the impact on Double Verification (DV) and the response per FH-105, CORE COMPONENT MOVEMENT - CORE TRANSFERS?

a. Challenge to DV; Correct the position, continue transfers, monitor for multiple challenges

b. Challenge to DV; Suspend transfers and initiate a Condition Report. Obtain NMD Mgmt approval prior to resuming transfers

c. Failure of DV; Correct the position, continue transfers, monitor for multiple failures

d. Failure of DV; Suspend transfers and initiate a Condition Report. Obtain NMD Mgmt approval prior to resuming transfers

<u>CORRECT RESPONSE :A</u>
<u>REFERENCE:</u>
Ref: FH-105

The procedure treats a mistake that is caught by verification as a "challenge" so long as the component is not actually misplaced. This is analagous to testing an interlock. Failure of DV occurs if both verifiers miss the error,and suspension of transfers is required. The procedure allows continuation of work after a challenge, but requires a CR for repeated challenges.

Source:

New

36) PV:1.0 Q#:39 RT:0.0 DF:0 LP:3-16, NLSRO1570.01 CT:HI

WHICH ONE of the following Limerick situations is addressed by processing a Temporary Change (TC) to a procedure per A-3, TEMPORARY CHANGES TO APPROVED PROCEDURES AND PARTIAL PROCEDURE USE?

a. Only half the steps of a procedure need to be executed to support a unique evolution

b. The "A" train of cooling water is incorrectly directed to be placed in service for the "A" and "B" equipment

c. A procedure step lists the correct component but in the wrong location

d. A procedure needs to have steps added to disable trips to allow it to serve as a test

CORRECT RESPONSE :B
REFERENCE:
A-Partial procedure use, not a TC
C-PPIS, not a TC
D-Change in intent and scope, not a TC

Source:
New

37) PV:1.0 Q#:41 RT:0.0 DF:0 LP:3-18, NLSRO1820.03 CT:LOW

Peach Bottom Unit 3 plant conditions are as follows:

- Loss of reactor vessel cavity level during shuffle part 1
- RPV water level drops to a minimum of - 175 inches and is restored with ECCS

WHICH ONE of the following describes whether a safety limit has been violated and whether fuel cladding failure is expected?

	Safety Limit	Cladding Failure
a.	Violated	Expected
b.	Violated	NOT Expected
c.	NOT violated	Expected
d.	NOT violated	NOT expected

CORRECT RESPONSE :B

REFERENCE:
SL = TAF which is -172". PBAPS ITS points out that ACC exists until 2/3 core height (-226)

Source:

New

38) PV:1.0 Q#:40 RT:0.0 DF:0 LP:3-17, NLSRO1820.08 CT:HI

Limerick Unit 2 plant conditions are as follows:

- OPCON 5 with the core in maintenance configuration
- LPRM replacement and CRDM exhanges are about to begin

The Fuel Handling Director has been informed that the "B" train of Standby Gas Treatment has been declared INOPERABLE.

WHICH ONE of the following describes the limitations, if any, on LPRM replacement and CRDM exchanges?

a. LPRM exchanges may commence and continue indefinitely
CRDM exchanges may commence and continue indefinitely

b. LPRM exchanges may commence and continue indefinitely
CRDM exchanges may NOT commence

c. LPRM exchanges may commence and continue for 7 days
CRDM exchanges may commence and continue for 7 days

d. LPRM exchanges may NOT commence
CRDM exchanges may NOT commence

CORRECT RESPONSE :B
REFERENCE:
A, C, D- incorrect. LPRM changeout is not an OPDRV, and is permitted CRDM exchange is an OPDRV. Can not enter the specified condition (OPDRV with head off and fuel in vessel) with a train inop.

Ref:

LCO 3.6.5.3

Source:

New

39) PV:1.0 Q#:44 RT:0.0 DF:0 LP:3-21, NLSRO0750.12 CT:HI

Limerick Unit 2 plant conditions are as follows:

- Shuffle part 1 in progress
- 20C222 alarm B-2, SEAL NO. 4 REACTOR WELL (BOTTOM SEAL) has alarmed
- No other seal alarms are present
- Seal pressure indicates 52 psig and steady

ARC-BOP-20C222 and associated procedures are provided.

WHICH ONE of the following describes the required actions:

a. Adjust PCV-15-244C to 56.5 psig

b. Adjust PCV-15-244D to 56.5 psig

c. Place "C" regulator on backup bottle and adjust to 47 psig

d. Place "D" regulator on backup bottle and adjust to 47 psig

CORRECT RESPONSE :B
REFERENCE:
A- wrong seal (upper)
C- wrong seal, no need for backup bottle; wrong pressure for Seal D
D- no need for backup bottle; wrong pressure for Seal D

Source:

New

40) PV:1.0 Q#:31 RT:0.0 DF:0 LP:3-8, NLSRO1571.05 CT:HI

Plant conditions are as follows:

- Troubleshooting on the refueling platform air accumulator auto drain trap is complete. The trap was constantly blowing air by.
- The clearance has been removed
- The air system will be returned to service with the trap manually isolated and instructions to manually unisolate and blowdown hourly.

WHICH ONE of the following is the method of documenting the position of the drain trap isolation valve per OP-AA-108-106, EQUIPMENT RETURN TO SERVICE?

a. Danger Tag

b. Information Tag

c. Equipment Status Tag

d. Equipment Trouble Tag

CORRECT RESPONSE :C
REFERENCE:
Ref: OP-AA-108-106

A- Cannot operate hourly
B- Part of clearance which has been removed.
C- Correct for documenting abnormal position and condition
D- For broken equipment (the trap itself would get the ETT, not the isolation)

Source:

New

41) PV:1.0 Q#:33 RT:0.0 DF:0 LP:3-10, NLSRO1570.01 CT:HI

Plant conditions are as follows:

- A partial test procedure involving bridge movement is being performed by the Refuel Platform Operator (RPO) and the Spotter
- The Spotter is reading the procedure, ensuring correct repeat back from the RPO, and marking the portion of procedure being used.

WHICH ONE of the following lists the required annotation for un-used steps and for steps are are executed per HU-AA-104-101, PROCEDURE USE AND ADHERENCE?

	Un-Used Steps	Completed Steps
a.	"C/M"	RPO Initials only
b.	"C/M"	RPO Initals/Spotter Initials
c.	"N/A"	RPO Initials only
d.	"N/A"	RPO Initials/Spotter Initials

CORRECT RESPONSE :D
REFERENCE:
A, B, C - Incorrect. The annotation "C/M" (condition met)is plausible because it is used for steps that are skipped but verified already to be met. It has a different meaning than "N/A". When using a remote operator and executing steps by verbal methods, the annotation is "Reader/Performer" with the reader marking the procedure.

Source:

New

42) PV:1.0 Q#:42 RT:0.0 DF:0 LP:3-19, NLSRO1571.04 CT:HI

Plant conditions are as follows:

- Shift turnover is in progress in the MCR and on the Fuel Floor
- A refuel crew pre-evolution brief is required for special grapple testing involving fuel movement in the fuel pool only
- The Health Physics Technician is not on the refuel floor, but is on-site and available at all times

WHICH ONE of the following describes the individual responsible for conducting the refuel crew briefing, and the ability to commence fuel movements per Exhibit NOM-L-4.1: 13, FUEL HANDLING DIRECTOR SHIFT TURNOVER CHECKLIST?

a. The Shift Manager conducts the briefing and fuel moves may commence

b. The Shift Manager conducts the briefing, but fuel movements may NOT commence

c. The Fuel Handling Director conducts the briefing, and fuel movements may commence

d. The Fuel Handling Director conducts the briefing, but fuel movements may NOT commence

CORRECT RESPONSE :D
REFERENCE:
A, B, C -incorrect: the FHD is responsible to conduct the briefing, and continuous HP coverage is required ON THE FUEL FLOOR regardless of whether the work is in the fuel pool only

Source:

New

43) PV:1.0 Q#:43 RT:0.0 DF:0 LP:3-20, NLSRO1570.01 CT:LOW

Plant conditions are as follows:

- Control Rod Blade exchanges are in progress
- A control rod blade has been transferred to the CRB rack
- A section of loose duct tape has been sighted in the fuel pool adjacent to the CRB rack

WHICH ONE of the following describes whether the CRB and the tape (debris) are logged in the Fuel Pool Material Log per AG-CG-132, SPENT FUEL POOL INVENTORY / INSPECTION?

	Log the CRB	Log the Debris
a.	YES	YES
b.	YES	NO
c.	NO	YES
d.	NO	NO

CORRECT RESPONSE :D
REFERENCE:
A, B, C- Incorrect. Both are examples of situations tracked and controlled separately

Source:

New

44) PV:1.0 Q#:32 RT:0.0 DF:0 LP:3-9, NLSRO1572.02 CT:LOW

WHICH ONE of the following is the least severe emergency action level where the refueling crew should expect an announcement to evacuate to an offsite assembly area?

a. Unusual Event

b. Alert

c. Site Area Emergency

d. General Emergency

CORRECT RESPONSE :C

REFERENCE:
Ref:

ERP-101
Source:

New

45) PV:1.0 Q#:45 RT:0.0 DF:0 LP:4-1, NLSRO1760.04 CT:LOW

Plant conditions are as follows:

- Shuffle part 1 in progress
- The female Refuel Platform Operator states that she is not feeling well and believes this condition is a result of her being pregnant
- The RPO was relieved and directed to exit the contamination area

WHICH ONE of the following describes the administrative exposure limits in effect for the RPO and when the limits are effective?

a. a limit of zero occupational dose is immediately in effect upon this verbal declaration

b. a limit of zero occupational dose is in effect only after written declaration

c. a limit of 0.4 rem or less for the remaining term is in effect immediately based on this verbal declaration

d. a limit of 0.4 rem or less for the remaining term is in effect only after written declaration

CORRECT RESPONSE :D
REFERENCE:
LGS and PBAPS admin control is 0.4 rem for the entire term, with no planned entry into contamination or airborne areas. This limit is effective only after declaration, and the declaration must be made in writing.

Ref: HP-C-106

Source:

New

46) PV:1.0 Q#:46 RT:0.0 DF:0 LP:4-2, NLSRO1760.04 CT:LOW

WHICH ONE of the following describes the final approval level required to exceed 3000 mrem annual dose, and the amount of the extension

	Approval Required	Amount of Extension
a.	Work Group Manager	500 mRem
b.	Work Group Manager	1000 mRem
c.	Plant Manager	500 mRem
d.	Plant Manager	1000 mRem

CORRECT RESPONSE :C
REFERENCE:
A, B- Work Group manager approval is good for 2000-2500
Each extension is good for 500 mR

Per HP-C-106

Source:

New

47) PV:1.0 Q#:47 RT:0.0 DF:0 LP:4-3, NLSRO1760.06 CT:LOW

Given the following information during a Health Physics briefing prior to entering the Refuel Floor:

- General area dose rates on the refueling bridge are from 2 mrem/hr to to 12 mrem/hr depending on location
- Smearable contamination on the refueling bridge is 2000 dpm/100cm2

WHICH ONE of the following lists the expected area posting for the refueling bridge per RP-AA-376, RADIOLOGICAL POSTINGS, LABELING, AND MARKINGS?

a. Radiation Area and Contaminated Area

b. Radiation Area and Red Zone

c. High Radiation Area and Contaminated Area

d. High Radiation Area and Red Zone

CORRECT RESPONSE :A

REFERENCE:
B, C, D incorrect - high rad area starts at 100mrem/hr; red zone at 500,000 dpm/100cm2

Source:

New

48) PV:1.0 Q#:48 RT:0.0 DF:0 LP:4-4, NLSRO1760.06 CT:HI

Plant conditions are as follows:

- Entry to a High Radiation Area is required by a qualified radiation worker
- Current annual dose to the worker is 500 mrem
- General area radiation level in the work area is 500 mrem/hr

WHICH ONE of the following is the maximum permitted stay time prior to reaching the first dose control level per HP-C-106, DOSIMETRY PROGRAM?

a. 3.0 hours

b. 4.0 hours

c. 5.0 hours

d. 6.0 hours

CORRECT RESPONSE :A
REFERENCE:
a - correct (2000-500)/500= 3 hours
b - incorrect based on work group extension to 2500
c- incorrect based on plant manager extension to 3000
d. - incorrect based on VP extension to 3500

Source:

New

49) PV:1.0 Q#:49 RT:0.0 DF:0 LP:4-5, NLSRO1760.08 CT:LOW

WHICH ONE of the following is the maximum permitted background count rate on a frisker prior to use, and the minimum count rate above background that indicates the contamination limit has been reached?

	Max Background	Contamination Limit
a.	100 cpm	100 cpm above background
b.	100 cpm	300 cpm above background
c.	300 cpm	100 cpm above background
d.	300 cpm	300 cpm above background

CORRECT RESPONSE :C
REFERENCE:
HP-CG-400-4

Source:

New

50) PV:1.0 Q#:50 RT:0.0 DF:0 LP:4-6, NLSRO1760.07 CT:LOW

WHICH ONE of the following decribes the radiation work permit (RWP) activities required for entry to the power block and subsequent LPRM removal on the fuel floor?

a. Proceed directly to the refuel floor control point and log in to the General RWP covering refuel floor work

b. Log on to the Work Group RWP at the plant entrance. Proceed to the fuel floor control point and transfer to the Specific RWP covering fuel floor work

c. Log on to the Work Group RWP and Specific RWP covering fuel floor work at the plant entrance and proceed to the fuel floor.

d. Log on to the Work Group RWP at the plant entrance. Proceed to the fuel floor control point and additionally log on to the General RWP for fuel floor work

CORRECT RESPONSE :B

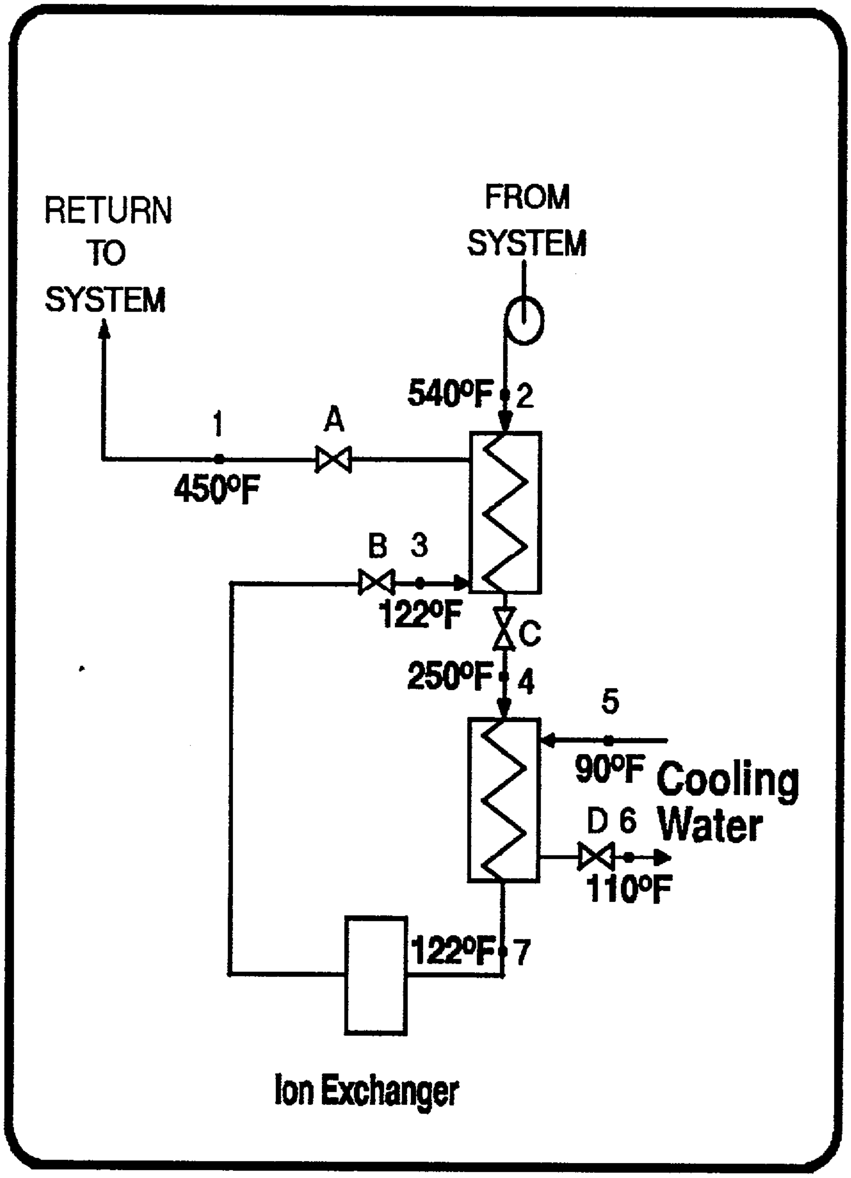
REFERENCE:

A, C, D- Wrong RWP type or sequence.
Must exit one RWP to set the new setpoints for the oncoming RWP and charge the dose against the correct work activity.

Source:

New

ATTACHMENT 1



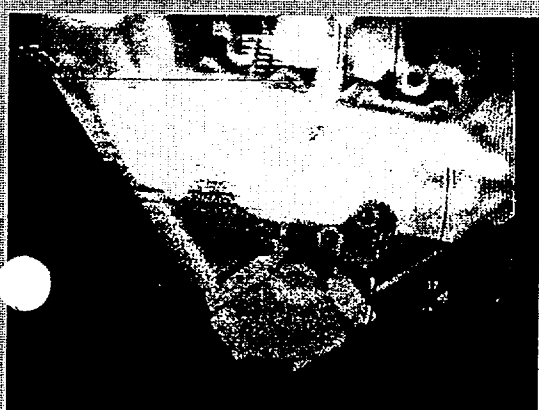
Water Cleanup System

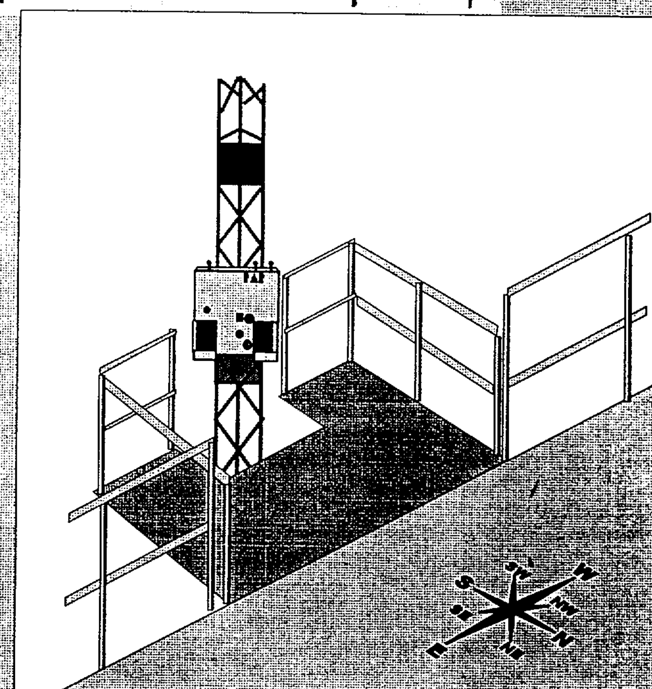
ATTACHMENT 2

STEP NO.	COMPONENT SERIAL NO.	MOVE FROM	ORIENT	MOVE TO	ORIENT
121	PYN521	P2SPENT C-22	SE	P2CORE 19-22	SW

CCTAS

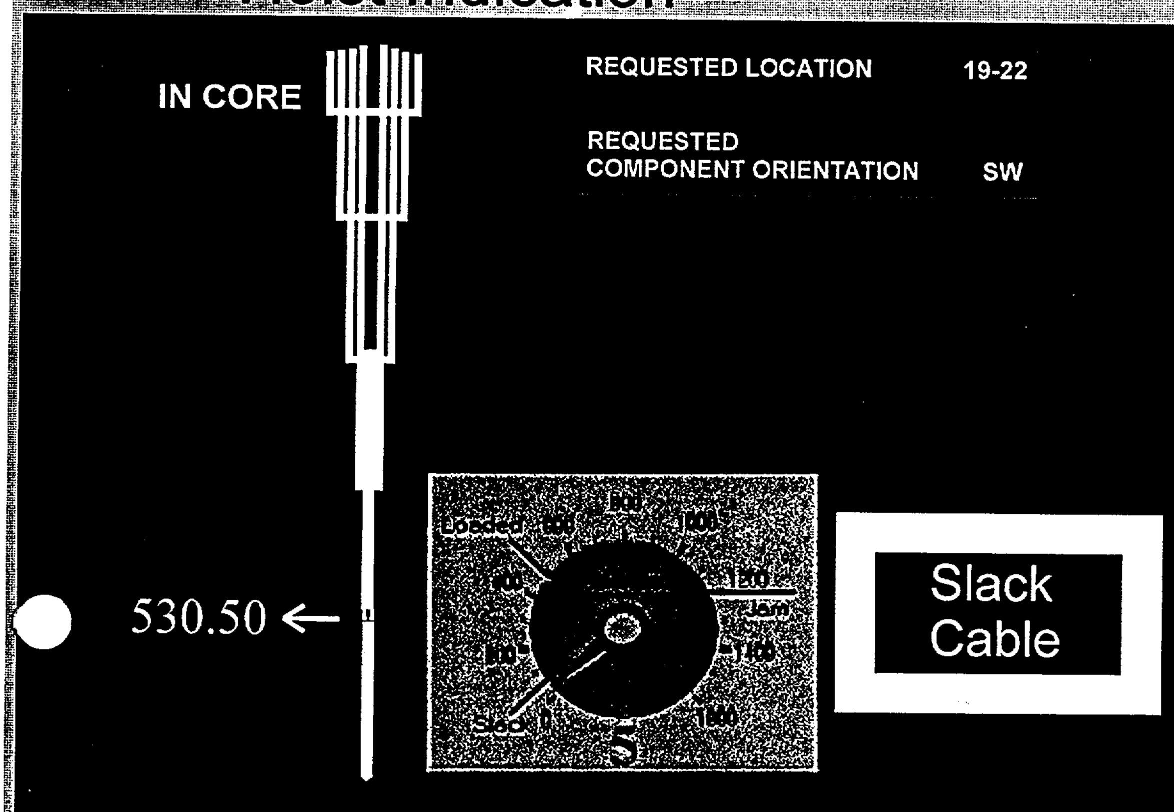
Mast Camera View





Hoist Indication

Mast Rotation



ATTACHMENT 3

Reference

ARC-BOP-20C222, REV. 3

February 9, 2000

Windows that have been changed:

TABLE OF CONTENTS ADDED WITH THIS REVISION
B-3

1	*				
2					
3					
4					
	A	B	C	D	E

ALARM WORDING:

**SEAL NO. 1
DRYER &
SEPARATOR
STOP LOG
(SOUTH SEAL)**

AUTOMATIC ACTIONS:

1. FUEL POOL COOLING & CLEAN-UP SYSTEM TROUBLE alarms at 212 CLEANUP.

OPERATOR ACTIONS:

1. Refer to S15.3.C.
2. Verify integrity of Seal No. 2.
3. IF Seal No. 1 is functioning as secondary containment, THEN refer to Tech Spec 3.6.5.
4. IF dryer/separator storage pool is flooded, THEN investigate AND contain any leakage per S53.0.A.

CAUSES:

1. Low pressure in Seal No. 1 with Service Air Supply 15-2413A NOT in full vent position.

ANNUNCIATOR#:

- PAL-15-245A

SETPOINT:

- 43 psig

DEVICE(S):

- PSL-15-249A
- ZS-15-245A

	A	B	C	D	E
1					
2	*				
3					
4					

ALARM WORDING:

SEAL NO. 2
DRYER &
SEPARATOR
STOP LOG
(NORTH SEAL)

AUTOMATIC ACTIONS:

1. FUEL POOL COOLING & CLEAN-UP SYSTEM TROUBLE alarms at 212 CLEANUP.

OPERATOR ACTIONS:

1. Refer to S15.3.C.
2. Verify integrity of Seal No. 1.
3. IF Seal No. 2 is functioning as secondary containment, THEN refer to Tech Spec 3.6.5.
4. IF dryer/separator storage pool is flooded, THEN investigate AND contain any leakage per S53.0.A.

CAUSES:

1. Low pressure in Seal No. 2 with Service Air Supply 15-2413B NOT in full vent position.

ANNUNCIATOR#:

- PAL-15-245B

SETPOINT:

- 43 psig

DEVICE(S):

- PSL-15-249B
- ZS-15-245B

1		*			
2					
3					
4					
	A	B	C	D	E

ALARM WORDING:

SEAL NO. 3
REACTOR
WELL
(TOP SEAL)

AUTOMATIC ACTIONS:

1. FUEL POOL COOLING & CLEAN-UP SYSTEM TROUBLE alarms at 212 CLEANUP.

OPERATOR ACTIONS:

1. Refer to S15.3.C.
2. IF reactor cavity is flooded, THEN investigate AND contain any leakage from the Reactor well per S53.0.A.
3. Verify integrity of Seal No. 4.
4. Refill well as necessary per S53.0.A.

CAUSES:

1. Low pressure in Seal No. 3 with Service Air Supply 15-2413C NOT in full vent position.

ANNUNCIATOR#:

- PAL-15-245C

SETPOINT:

- 53.5 PSIG

DEVICE(S):

- PSL-15-249C
- ZS-15-245D

	A	B	C	D	E
1					
2		*			
3					
4					

ALARM WORDING:

SEAL NO. 4
REACTOR
WELL
(BOTTOM SEAL)

AUTOMATIC ACTIONS:

1. FUEL POOL COOLING & CLEAN-UP SYSTEM TROUBLE alarms at 212 CLEANUP.

OPERATOR ACTIONS:

1. Refer to S15.3.C.
2. IF reactor cavity is flooded THEN, investigate AND contain leakage from Reactor Well per S53.0.A.
3. Verify integrity of Seal No. 3.
4. Refill well as necessary per S53.0.A.

CAUSES:

1. Low pressure in Seal No. 4 with Service Air Supply 15-2413D NOT in full vent position.

ANNUNCIATOR#:

- PAL-15-245D

SETPOINT:

- 53.5 psig

DEVICE(S):

- PSL-15-249D
- ZS-15-245D

PECO Nuclear
LIMERICK GENERATING STATION

S15.3.C RESPONSE TO LOSS OF SERVICE AIR FOR REFUEL FLOOR INFLATABLE SEALS

1.0 PURPOSE

To maintain integrity of inflatable seals during a loss of Service Air.

2.0 PREREQUISITES

2.1 One of the following is established:

- Secondary Containment Integrity per Tech Spec 3.6.5.1.2

OR

- Spent Fuel Pool flooded

OR

- Reactor Well flooded

2.2 Backup Air Bottle Carts are available.

3.0 PRECAUTIONS

3.1 Loss of Service Air has potential to vent inflatable seals installed on Refuel Floor.

3.2 **WHEN** an alarm annunciates from seal station indicating potential loss of Secondary Containment Integrity
OR potential loss of water inventory in Spent Fuel Pool/Reactor Cavity
THEN all fuel handling activities
AND any activity with potential of draining Reactor Vessel while there is still fuel in vessel must be suspended.

3.3 The latest performance of ST-6-076-360-*, RX ENCL SEC CNTMT INTEGRITY VERIFICATION, should be referred to when determining which seals are required to maintain secondary containment.

4.0 PROCEDURE

> **NOTE**
>
> Attachment 1 shows the relationship between the letter and number designators for an inflatable seal.
>
> Attachment 2 shows locations of Seal Air Supply Stations.
>
> These seals are in place to provide Secondary Containment during handling of spent fuel
> **AND** also to maintain water inventory of Reactor Well/Spent Fuel Pool during flooded conditions.
>
> Procedure should be performed on seals alarming on *0C222 first.

4.1 SEAL AND SERVICE AIR ASSESSMENT

4.1.1 **CHECK** *0C222 for any annunciators indicating low seal air pressure.

> **NOTE**
>
> 1. Seal alarms may come in periodically due to the need for a small adjustment in the pressure regulator setting. This is particularly true for seals which have a narrow operating pressure range.
>
> 2. The MCR should be kept informed about actions taken on the seals due to their affect on Secondary Containment or Pool water levels.

4.1.2 **IF** Service Air is still available as evidenced by observing pressure gauge PI-015-*44(A-K).
THEN **ADJUST** service air pressure to the seal per S15.3.E
AND **EXIT** this procedure.

4.1.3 **IF** Service Air pressure is dropping noticeably or gone evidenced by observing pressure gauge PI-015-*44(A-K),
THEN **PROCEED** to step **4.2** and attach Secondary Back up Bottles.

4.2 INSTALLATION OF SECONDARY BACKUP BOTTLES TO INFLATABLE SEALS

NOTE

1. Backup air bottles are maintained on the Refuel Floor **AND** are readily accessible for use as secondary backup air for inflatable seals. Bottles are tagged with an OP-AID denoting their function.

2. Primary location for backup air bottles is along the North Wall of the Refuel Floor. Bottles may be located in other refuel floor locations due to refuel floor activities.

4.2.1 **OBTAIN** cart containing two backup air bottles with regulators, hose **AND** appropriate quick disconnect fittings.

4.2.2 **POSITION** cart near seal station **AND CONNECT** one bottle to quick disconnect attached to calibration port of PI-015-*49A(B,C,D,E,F,G,H,J,K), "Seal Supply Press Indicator."

4.2.3 **CLOSE** 15-*411A(B,C,D,E,F,G,H,J,K), "Supply Valve," <u>AND</u> "Root Valve" for PI-015-*49A(B,C,D,E,F,G,H,J,K). (Both valves located in PIT next to manifolds.)

4.2.4 <u>UNIT 2 ONLY</u>
ENSURE "Plug Valve" for PI-015-249A(B,C,D,E,F,G,H,J,K) closed. (Plug valve located on manifold.)

WARNING

<u>IF</u> any seal is inflated past its specified pressure,
<u>THEN</u> serious personnel
<u>OR</u> equipment damage may result.

4.2.5 **OPEN** bottle valve
<u>AND</u> **ADJUST** regulator for pressure setting on applicable seal as follows:

SEAL	PREFERRED REGULATOR SETTING (psig)	ACCEPTABLE REGULATOR PRESSURE RANGE (psig)
A,B,G,K	47	42 to 48
C,D	56.5	52.5 to 57.5
E,F,H,J	41.5	37 to 42.5

4.2.6 **<u>UNIT 2 ONLY</u>**
OPEN "Plug Valve" for PI-015-249A(B,C,D,E,F,G,H,J,K).

4.2.7 **OPEN** "Root Valve" for PI-015-*49A(B,C,D,E,F,G,H,J,K) <u>AND</u> **ENSURE** it indicates accordingly.

5.0 REFERENCES

NONE

6.0 TECHNICAL SPECIFICATIONS

6.1 3.6.5.1.2

7.0 INTERFACING PROCEDURES

7.1 E-1, Loss Of All AC Power (Station Blackout)

7.2 E-10/20, Loss Of Offsite Power

7.3 ST-6-076-360-*, RX ENCL SEC CNTMT Integrity Verification

7.4 S15.3.E, Adjustment to operating pressure for Reactor Well, Fuel Pool Gate, Fuel Pool Stop Log, Cask Handling Pit Gate, and Equipment Pool Stop Log Seals.

ATTACHMENT 1
Page 1 of 1

SEAL TO VALVE ASSIGNMENTS

Seal #	Description	Valve Suffix Letter
1	Steam Dryer & Separator Stop Log (South)	A
2	Steam Dryer & Separator Stop Log (North)	B
3	Reactor Well (Top)	C
4	Reactor Well (Bottom)	D
5	Cask Washdown Gate (U/1: East, U/2: West)	E
6	Cask Washdown Gate (U/1: West, U/2: East)	F
7	Spent Fuel Pool/Reactor Well Stop Log (South)	G
8	Spent Fuel Pool Gate (U/1: East, U/2: West)	H
9	Spent Fuel Pool Gate (U/1: West, U/2: East)	J
10	Spent Fuel Pool/Reactor Well Stop Log (North)	K

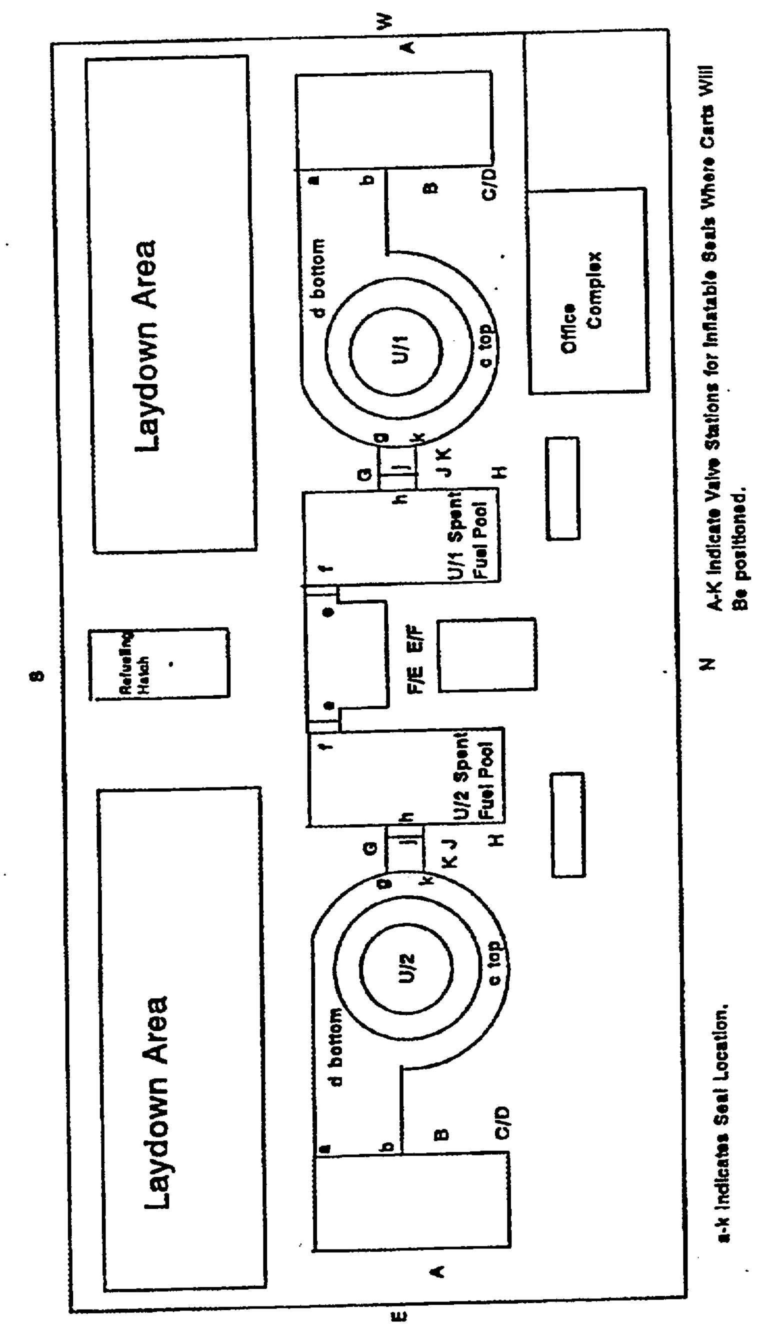
These suffix apply to the following for each seal:

1. 15-*411 - Service Air Supply Valve
2. * F285 - Service Air Supply Air Filter
3. PCV-15-*44 - Service Air Supply Pressure Control Valve
4. PI-15-*44 - Service Air Supply Pressure Indicator
5. 15-*412 - Service Air Supply Check Valve
6. PCV-15-*46 - Backup N2 Bottle Supply Pressure Control Valve
7. 15-*706 - Backup N2 Bottle Supply Valve
8. PSV-15-*49 - Seal Supply Pressure Relief Valve
9. 15-*413 - Seal Supply 3-Way Valve
10. ZS-15-*45 - Seal Supply 3-Way Valve Position Switch
11. PSL-15-*49 - Seal Supply Pressure Switch Low
12. PI-15-*49 - Seal Supply Pressure Indicator

ATTACHMENT 2
Page 1 of 1

LOCATIONS OF SEAL AIR SUPPLY STATIONS

Unit 1/2, Elev. 352'



PECO Energy Company
LIMERICK GENERATING STATION

S15.3.E ADJUSTMENTS TO OPERATING PRESSURE FOR REACTOR WELL, FUEL POOL GATE, FUEL POOL STOP LOG, CASK HANDLING PIT GATE AND EQUIPMENT POOL STOP LOG SEALS

1.0 PURPOSE

- To provide direction to adjust the operating pressure of a refuel floor inflatable seal that is already in service.

- To provide operating pressure for the service air supply **AND** Nitrogen back up bottle for a refuel floor inflatable seal.

2.0 PREREQUISITES

2.1 Radiation Work Permit has been obtained, if required.

2.2 Service Air in service to Refuel Floor.

2.3 Backup N_2 bottles to an inflatable seal are in operation.

2.4 Inflatable Seal valve operating stations are free of obstructions.

2.5 The inflatable seal requiring the pressure adjustment is in service per station procedures.

2.6 The following tools are available, if required:

- 2 Adjustable Wrenches
- Liquid Leak Detector
- Standard Screwdriver

3.0 PRECAUTIONS

3.1 IF an inflatable seal is pressurized beyond its specified pressure, **THEN** personnel injury or equipment damage may result.

3.2 The most recent performance of ST-6-076-360-*, RX Enclosure Secondary Containment Integrity Verification, can be used to determine which inflatable seals are required to maintain secondary containment.

INITIALS

4.0 PROCEDURE

NOTE

1. Inflation pressures for Inflatable Seals are listed in Attachment 3 of this procedure.

2. The "FILL"
AND "VENT" positions for the seal air supply 3-way valves are shown in Attachment 5 of this procedure.

3. The valves
AND indicators for this procedure are located at the inflatable seal air supply stations on the refuel floor. Attachment 2 shows locations.

4. Attachment 1 provides designations for valves
AND instrumentation.

5. The following apply to the operation of PCV-15-*44A(B,C,D,E,F,G,H,J,K),"Inflatable Seal Pressure Control Valve":
   - Clockwise operation will RAISE inflatable seal pressure.
   - Counterclockwise operation will LOWER inflatable seal pressure.

6. Attachment 4 lists pressure settings for the back-up nitrogen bottles to the inflatable seals.

WARNING

1. Adjustments of PCV-15-*44A(B,C,D,E,F,G,H,J,K), "Inflatable Seal Pressure Control Valve," as small as 1/16 of 1 turn have been observed to cause changes as large as 6 psig in output pressure.

2. The output pressure change from adjustments of PCV-15-*44A(B,C,D,E,F,G,H,J,K), "Inflatable Seal Pressure Control Valve," will vary depending on which inflatable seal is being inflated.

INITIALS

4.1 PREPARATION

NOTE

Sections **4.2**
AND **4.3** are used to perform specific adjustments to the pressure of the refuel floor inflatable seals.

4.1.1 **SELECT** the section of the procedure that is applicable to the required adjustment
AND **GO TO** that section of the procedure. _______

4.2 RAISE OR LOWER INFLATABLE SEAL PRESSURE WITH ADJUSTMENT OF PRESSURE CONTROL VALVE

4.2.1 **VERIFY** 15-*413A(B,C,D,E,F,G,H,J,K), "Seal Air Supply 3-Way Valve," is in "FILL" position. _______

4.2.2 **CHECK** 15-*411A(B,C,D,E,F,G,H,J,K), "Service Air Isolation Valve to Inflatable Seal # 1(2,3,4,5,6,7,8,9,10)" OPEN. _______

4.2.3 IF 15-*411A(B,C,D,E,F,G,H,J,K) is **not** open,
THEN **PERFORM** the following: _______

1. **STOP** performance of this procedure _______

2. **CONTACT** Shift Supervision for direction. _______

INITIALS

WARNING

Performance of Step 4.2.4 will change the air supply pressure to the Inflatable Seal. IF any seal is inflated past its specified pressure, THEN personnel injury or equipment damage may result.

4.2.4 **ADJUST** PCV-15-*44A(B,C,D,E,F,G,H,J,K), "Inflatable Seal Pressure Control Valve," output pressure per Attachment 3 as indicated on PI-15-*49A(B,C,D,E,F,G,H,J,K), "Seal Supply Pressure Indicator". _______

4.2.5 IF PSV-15-*49A(B,C,D,E,F,G,H,J,K), "Inflatable Seal Air Supply Relief Valve," has actuated, THEN **PERFORM** the following: _______

1. **LOWER** PCV-15-*44A(B,C,D,E,F,G,H,J,K), output pressure until PSV-15-*49A(B,C,D,E,F,G,H,J,K), resets. _______

2. **GO TO** step 4.2.4 AND **START** performance of procedure. _______

4.2.6 IF PI-15-*49A(B,C,D,E,F,G,H,J,K), shows seal pressure above PCV-15-*44A(B,C,D,E,F,G,H,J,K), output pressure per Attachment 3, THEN **LOWER** the PCV-15-*44A(B,C,D,E,F,G,H,J,K), output pressure. _______

4.2.7 IF the seal is over-pressurized, and pressure can **not** be lowered by adjusting PCV-15-*44A(B,C,D,E,F,G,H,J,K) THEN **PERFORM** Section 4.3 of this procedure. _______

INITIALS

4.3 LOWER SEAL PRESSURE WHEN PRESSURE CONTROL VALVE DOES NOT OPERATE CORRECTLY

4.3.1 IF PI-15-*44A(B,C,D,E,F,G,H,J,K), "Air Supply Pressure," shows PCV-15-*44A(B,C,D,E,F,G,H,J,K), "Inflatable Seal Pressure Control Valve," output pressure is higher than the pressure setting specified in Attachment 3
AND the pressure can **not** be lowered by using section 4.2 of this procedure,
THEN PERFORM the following: ______

1. **CLOSE** PI-15-*44A(B,C,D,E,F,G,H,J,K) calibration tap isolation valve. ______

2. **REMOVE** PI-15-*44A(B,C,D,E,F,G,H,J,K) calibration tap cap fitting. ______

3. Slowly crack **OPEN** PI-15-*44A(B,C,D,E,F,G,H,J,K), calibration tap isolation valve until slight air flow is detected from the calibration tap. ______

CAUTION

The PI-15-*49A(B,C,D,E,F,G,H,J,K), "Seal Supply Pressure Indication must be observed to determine air pressure since the PI-15-*44A(B,C,D,E,F,G,H,J,K) indication is partially isolated
AND vented.

4. **ADJUST** PCV-15-*44A(B,C,D,E,F,G,H,J,K) output pressure per Attachment 3 as indicated on PI-15-*49A(B,C,D,E,F,G,H,J,K), "Seal Supply Pressure Indication." ______

5. **CLOSE** PI-15-*44A(B,C,D,E,F,G,H,J,K) isolation valve **AND** replace the calibration tap cap fitting. ______

6. **TIGHTEN** the PI-15-*44A(B,C,D,E,F,G,H,J,K) calibration tap cap fitting. ______

INITIALS

7. **OPEN** the PI-15-*44 calibration tap isolation valve **AND** check the calibration tap fittings for leakage using liquid leak detector. _______

8. **ENSURE** inflatable seal pressure has stabilized as indicated on PI-15-*49A(B,C,D,E,F,G,H,J,K). _______

5.0 REFERENCES

5.1 LG 93-02269 Rev. 0 : DEC to replace inflatable seal low pressure switches.

6.0 TECHNICAL SPECIFICATIONS

3/4.6.5.1.1 Reactor Enclosure Secondary Containment Integrity

3/4.6.5.1.2 Refueling Area Secondary Containment Integrity

7.0 INTERFACING PROCEDURES

ST-6-076-360-1, Rx Enclosure Secondary Containment Integrity Verification

ST-6-076-360-2, Rx Enclosure Secondary Containment Integrity Verification

S15.3.A, Inflation of Reactor Well, Fuel Pool Gate, Fuel Pool Stop Log #15, Cask Handling Pit Gate And Equipment Pool Stop Log Seals.

ST-6-015-491-1(2), Stop Log Seals Pressure Decay Test.

ATTACHMENT 1
Page 1 of 1

SEAL TO VALVE ASSIGNMENTS

Seal #	Description	Valve Suffix Letter
1	Steam Dryer & Separator Stop Log (South)	A
2	Steam Dryer & Separator Stop Log (North)	B
3	Reactor Well (Top)	C
4	Reactor Well (Bottom)	D
5	Cask Washdown Gate (U/1: East, U/2: West)	E
6	Cask Washdown Gate (U/1: West, U/2: East)	F
7	Spent Fuel Pool/Reactor Well Stop Log (South)	G
8	Spent Fuel Pool Gate (U/1: East, U/2: West)	H
9	Spent Fuel Pool Gate (U/1: West, U/2: East)	J
10	Spent Fuel Pool/Reactor Well Stop Log (North)	K

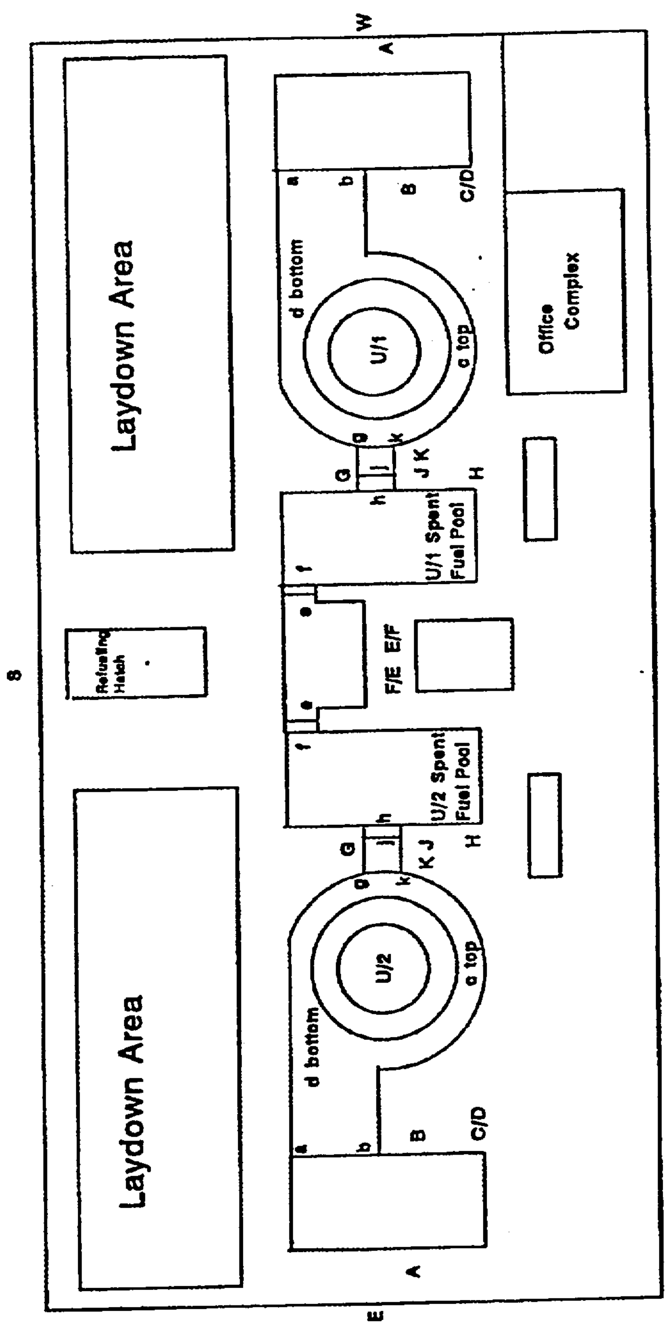
These identifications apply to the following for each seal:

1. 15-*411 - Service Air Supply Valve
2. * F285 - Service Air Supply Air Filter
3. PCV-15-*44 - Service Air Supply Pressure Control Valve
4. PI-15-*44 - Service Air Supply Pressure Indicator
5. 15-*412 - Service Air Supply Check Valve
6. PCV-15-*46 - Backup N2 Bottle Supply Pressure Control Valve
7. 15-*706 - Backup N2 Bottle Supply Valve
8. PSV-15-*49 - Seal Supply Pressure Relief Valve
9. 15-*413 - Seal Supply 3-Way Valve
10. ZS-15-*45 - Seal Supply 3-Way Valve Position Switch
11. PSL-15-*49 - Seal Supply Pressure Switch Low
12. PI-15-*49 - Seal Supply Pressure Indicator

ATTACHMENT 2
Page 1 of 1

LOCATIONS OF SEAL AIR SUPPLY STATIONS

Unit 1/2, Elev. 352'



A-K Indicate Valve Stations for Inflatable Seals Where Carts Will Be positioned.

a-k Indicates Seal Location.

Attachment 3
Page 1 of 1

The following pressure control valves control air pressure from the service air header to the refuel floor inflatable seals:

Unit 1		
Valve Number	**Description**	**Pressure Setting (psig)**
PCV-015-144A	Steam Dryer South Inflatable Seal #1	43.5-50.0
PCV-015-144B	Steam Dryer North Inflatable Seal #2	43.5-50.0
PCV-015-144C	Reactor Well Top Inflatable Seal #3	54.0-56.5
PCV-015-144D	Reactor Well Bottom Inflatable Seal #4	54.0-56.5
PCV-015-144E	Cask Washdown Gate East Inflatable Seal #5	38.5-41.5
PCV-015-144F	Cask Washdown Gate West Inflatable Seal #6	38.5-41.5
PCV-015-144G	Reactor Well/Spent Fuel Pool Well South Inflatable Seal #7	43.5-50.0
PCV-015-144H	Spent Fuel Pool Gate East Inflatable Seal #8	38.5-41.5
PCV-015-144J	Spent Fuel Pool Gate West Inflatable Seal #9	38.5-41.5
PCV-015-144K	Reactor Well/Spent Fuel Pool Well North Inflatable Seal #10	43.5-50.0

Unit 2		
Valve Number	**Description**	**Pressure Setting (psig)**
PCV-015-244A	Steam Dryer South Inflatable Seal #1	43.5-50.0
PCV-015-244B	Steam Dryer North Inflatable Seal #2	43.5-50.0
PCV-015-244C	Reactor Well Top Inflatable Seal #3	54.0-56.5
PCV-015-244D	Reactor Well Bottom Inflatable Seal #4	54.0-56.5
PCV-015-244E	Cask Washdown Gate West Inflatable Seal #5	38.5-41.5
PCV-015-244F	Cask Washdown Gate East Inflatable Seal #6	38.5-41.5
PCV-015-244G	Reactor Well/Spent Fuel Pool Well South Inflatable Seal #7	43.5-50.0
PCV-015-244H	Spent Fuel Pool Gate West Inflatable Seal #8	38.5-41.5
PCV-015-244J	Spent Fuel Pool Gate East Inflatable Seal #9	38.5-41.5
PCV-015-244K	Reactor Well/Spent Fuel Pool Well North Inflatable Seal #10	43.5-50.0

Attachment 4
Page 1 of 1

The following pressure control valves control air pressure from the backup nitrogen bottles to the refuel floor inflatable seals:

Unit 1		
Valve Number	**Description**	**Pressure Setting (psig)**
PCV-015-146A	Steam Dryer South Inflatable Seal #1	33.0
PCV-015-146B	Steam Dryer North Inflatable Seal #2	33.0
PCV-015-146C	Reactor Well Top Inflatable Seal #3	48.5
PCV-015-146D	Reactor Well Bottom Inflatable Seal #4	48.5
PCV-015-146E	Cask Washdown Gate East Inflatable Seal #5	33.5
PCV-015-146F	Cask Washdown Gate West Inflatable Seal #6	33.5
PCV-015-146G	Reactor Well/Spent Fuel Pool Well South Inflatable Seal #7	33.0
PCV-015-146H	Spent Fuel Pool Gate East Inflatable Seal #8	33.5
PCV-015-146J	Spent Fuel Pool Gate West Inflatable Seal #9	33.5
PCV-015-146K	Reactor Well/Spent Fuel Pool Well North Inflatable Seal #10	33.0

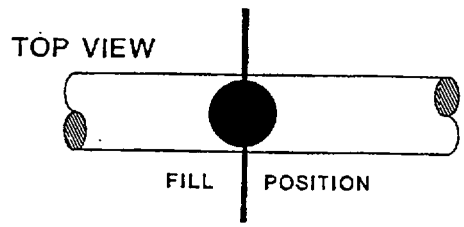
Unit 2		
Valve Number	**Description**	**Pressure Setting (psig)**
PCV-015-246A	Steam Dryer South Inflatable Seal #1	33.0
PCV-015-246B	Steam Dryer North Inflatable Seal #2	33.0
PCV-015-246C	Reactor Well Top Inflatable Seal #3	48.5
PCV-015-246D	Reactor Well Bottom Inflatable Seal #4	48.5
PCV-015-246E	Cask Washdown Gate West Inflatable Seal #5	33.5
PCV-015-246F	Cask Washdown Gate East Inflatable Seal #6	33.5
PCV-015-246G	Reactor Well/Spent Fuel Pool Well South Inflatable Seal #7	33.0
PCV-015-246H	Spent Fuel Pool Gate West Inflatable Seal #8	33.5
PCV-015-246J	Spent Fuel Pool Gate East Inflatable Seal #9	33.5
PCV-015-246K	Reactor Well/Spent Fuel Pool Well North Inflatable Seal #10	33.0

Attachment 5
Page 1 of 1

SEAL AIR SUPPLY 3-WAY VALVE POSITIONS

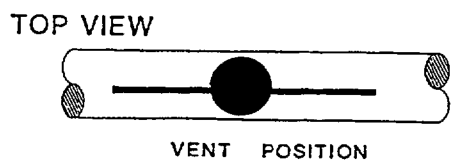
"FILL" POSITION

THE SEAL AIR SUPPLY 3-WAY VALVE IS IN THE FILL POSITION AND THE INFLATABLE SEAL IS PRESSURIZED WHEN VALVE HAND OPERATOR IS POSITIONED PERPENDICULAR TO SERVICE AIR HEADER.



"VENT" POSITION

THE SEAL AIR SUPPLY 3-WAY VALVE IS IN THE VENT POSITION AND THE INFLATABLE SEAL IS DEPRESSURIZED WHEN VALVE HAND OPERATOR IS POSITIONED PARALLEL TO SERVICE AIR HEADER.



LIMITING CONDITION FOR OPERATION

3.1.3.6 All control rods shall be coupled to their drive mechanisms.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 5*.

ACTION:

a. In OPERATIONAL CONDITIONS 1 and 2 with one control rod not coupled to its associated drive mechanism, within 2 hours:

   1. If permitted by the RWM, insert the control rod drive mechanism to accomplish recoupling and verify recoupling by withdrawing the control rod, and:

      a) Observing any indicated response of the nuclear instrumentation, and

      b) Demonstrating that the control rod will not go to the overtravel position.

      Otherwise, be in at least HOT SHUTDOWN within the next 12 hours.

   2. If recoupling is not accomplished on the first attempt or, if not permitted by the RWM, then except as in 3.1.3.6.d or until permitted by the RWM, declare the control rod inoperable, insert the control rod and disarm the associated directional control valves** either:

      a) Electrically, or

      b) Hydraulically by closing the drive water and exhaust water isolation valves.

      Otherwise, be in at least HOT SHUTDOWN within the next 12 hours.

b. In OPERATIONAL CONDITION 5* with a withdrawn control rod not coupled to its associated drive mechanism, within 2 hours either:

   1. Insert the control rod to accomplish recoupling and verify recoupling by withdrawing the control rod and demonstrating that the control rod will not go to the overtravel position, or

   2. If recoupling is not accomplished, insert the control rod and disarm the associated directional control valves** either:

      a) Electrically, or

      b) Hydraulically by closing the drive water and exhaust water isolation valves.

c. The provisions of Specification 3.0.4 are not applicable.

d. For control rod 50-27, for the remainder of Unit 1 Cycle 7, if coupling can not be established the uncoupled rod may be withdrawn when rated thermal power exceeds 10% only if all the following conditions are satisfied:

   1) The uncoupled control rod may not be withdrawn past notch position 46, and

   2) No other uncoupled control rod is withdrawn.

---

* At least each withdrawn control rod. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

** May be rearmed intermittently, under administrative control, to permit testing associated with restoring the control rod to OPERABLE status.

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SURVEILLANCE REQUIREMENTS

4.1.3.6 Each affected control rod shall be demonstrated to be coupled to its drive mechanism by observing any indicated response of the nuclear instrumentation while withdrawing the control rod to the fully withdrawn position and then verifying that the control rod drive does not go to the overtravel position:

a. Prior to reactor criticality after completing CORE ALTERATIONS that could have affected the control rod drive coupling integrity,

b. Anytime the control rod is withdrawn to the "Full out" position in subsequent operation,

c. Following maintenance on or modification to the control rod or control rod drive system which could have affected the control rod drive coupling integrity, and

d. When repositioning the uncoupled control rod per Specification 3.1.3.6.d the uncoupled rod's position shall be verified to have followed the control rod drive by neutron instrumentation (LPRM or TIP). If the control blade can not be verified to have followed the drive out to its final position, then the rod shall be completely inserted and the control rod directional valves disarmed as stated in 3.1.3.6.a.2.

CONTROL ROD POSITION INDICATION

LIMITING CONDITION FOR OPERATION

3.1.3.7 The control rod position indication system shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 5*.

ACTION:

a. In OPERATIONAL CONDITION 1 or 2 with one or more control rod position indicators inoperable, within 1 hour:

  1. Determine the position of the control rod by using an alternate method, or:

     a) Moving the control rod, by single notch movement, to a position with an OPERABLE position indicator,

     b) Returning the control rod, by single notch movement, to its original position, and

     c) Verifying no control rod drift alarm at least once per 12 hours, or

  2. Move the control rod to a position with an OPERABLE position indicator, or

  3. When THERMAL POWER is:

     a) Within the preset power level of the RWM, declare the control rod inoperable.

     b) Greater than the preset power level of the RWM, declare the control rod inoperable, insert the control rod and disarm the associated directional control valves** either:

        1) Electrically, or

        2) Hydraulically by closing the drive water and exhaust water isolation valves.

  Otherwise, be in at least HOT SHUTDOWN within the next 12 hours.

b. In OPERATIONAL CONDITION 5* with a withdrawn control rod position indicator inoperable, move the control rod to a position with an OPERABLE position indicator or insert the control rod.

c. The provisions of Specification 3.0.4 are not applicable.

---

*At least each withdrawn control rod. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

**May be rearmed intermittently, under administrative control, to permit testing associated with restoring the control rod to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.3.7 The control rod position indication system shall be determined OPERABLE by verifying:

a. At least once per 24 hours that the position of each control rod is indicated,

b. That the indicated control rod position changes during the movement of the control rod drive when performing Surveillance Requirement 4.1.3.1.2, and

c. That the control rod position indicator corresponds to the control rod position indicated by the "Full out" position indicator when performing Surveillance Requirement 4.1.3.6b.

3/4.3.7 MONITORING INSTRUMENTATION

RADIATION MONITORING INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.7.1 The radiation monitoring instrumentation channels shown in Table 3.3.7.1-1 shall be OPERABLE with their alarm/trip setpoints within the specified limits.

APPLICABILITY: As shown in Table 3.3.7.1-1.

ACTION:

a. With a radiation monitoring instrumentation channel alarm/trip setpoint exceeding the value shown in Table 3.3.7.1-1, adjust the setpoint to within the limit within 4 hours or declare the channel inoperable.

b. With one or more radiation monitoring channels inoperable, take the ACTION required by Table 3.3.7.1-1.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.7.1 Each of the above required radiation monitoring instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION operations for the conditions and at the frequencies shown in Table 4.3.7.1-1.

TABLE 3.3.7.1-1

RADIATION MONITORING INSTRUMENTATION

INSTRUMENTATION	MINIMUM CHANNELS OPERABLE	APPLICABLE CONDITIONS	ALARM/TRIP SETPOINT	ACTION
1. Main Control Room Normal Fresh Air Supply Radiation Monitor	4	1,2,3,5 and *	1×10^{-5} μCi/cc	70
2. Area Monitors				
a. Criticality Monitors				
1) Spent Fuel Storage Pool	2	(a)	≥ 5 mR/h and ≤20mR/h[(b)]	71
b. Control Room Direct Radiation Monitor	1	At All Times	N.A.[(b)]	73
3. Reactor Enclosure Cooling Water Radiation Monitor	1	At All Times	≤ 3 x Background[(b)]	72

TABLE 3.3.7.1-1 (Continued)

RADIATION MONITORING INSTRUMENTATION

TABLE NOTATIONS

*When irradiated fuel is being handled in the secondary containment.

(a) With fuel in the spent fuel storage pool.

(b) Alarm only.

ACTION STATEMENTS

ACTION 70 - With one monitor inoperable, restore the inoperable monitor to the OPERABLE status within 7 days or, within the next 6 hours, initiate and maintain operation of the control room emergency filtration system in the radiation isolation mode of operation.

With two or more of the monitors inoperable, within one hour, initiate and maintain operation of the control room emergency filtration system in the radiation mode of operation.

ACTION 71 - With one of the required monitor inoperable, assure a portable continuous monitor with the same alarm setpoint is OPERABLE in the vicinity of the installed monitor during any fuel movement. If no fuel movement is being made, perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

ACTION 72 - With the required monitor inoperable, obtain and analyze at least one grab sample of the monitored parameter at least once per 24 hours.

ACTION 73 - With the required monitor inoperable, assure a portable alarming monitor is OPERABLE in the vicinity of the installed monitor or perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

TABLE 4.3.7.1-1

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENTATION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE IS REQUIRED
1. Main Control Room Normal Fresh Air Supply Radiation Monitor	S	Q	R	1, 2, 3, 5 and *
2. Area Monitors				
a. Criticality Monitors				
1) Spent Fuel Storage Pool	S	M	R	(a)
b. Control Room Direct Radiation Monitor	S	M	R	At All Times
3. Reactor Enclosure Cooling Water Radiation Monitor	S	M	R(b)	At All Times

TABLE 4.3.7.1-1 (Continued)

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

*When irradiated fuel is being handled in the secondary containment.

(a) With fuel in the spent fuel storage pool.

(b) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Bureau of Standards (NBS) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NBS. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

Section 3.3.7.2 (Deleted)

THE INFORMATION FROM THIS TECHNICAL SPECIFICATIONS SECTION HAS BEEN RELOCATED TO THE UFSAR. TECHNICAL SPECIFICATIONS PAGES 3/4 3-69 THROUGH 3/4 3-72 OF THIS SECTION HAVE BEEN INTENTIONALLY OMITTED.

Section 3.3.7.3 (Deleted)

THE INFORMATION FROM THIS TECHNICAL SPECIFICATIONS SECTION HAS BEEN RELOCATED TO THE ODCM. TECHNICAL SPECIFICATIONS PAGES 3/4 3-74 THROUGH 3/4 3-75 OF THIS SECTION HAVE BEEN INTENTIONALLY OMITTED.

REMOTE SHUTDOWN SYSTEM INSTRUMENTATION AND CONTROLS

LIMITING CONDITION FOR OPERATION

3.3.7.4 The remote shutdown system instrumentation and controls shown in Table 3.3.7.4-1 shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION:

a. With the number of OPERABLE remote shutdown system instrumentation channels less than required by Table 3.3.7.4-1, restore the inoperable channel(s) to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours.

b. With the number of OPERABLE remote shutdown system controls less than required in Table 3.3.7.4-1, restore the inoperable control(s) to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours.

c. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.7.4.1 Each of the above required remote shutdown monitoring instrumentation channels shall be demonstrated OPERABLE by performance of the CHANNEL CHECK and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.3.7.4-1.

4.3.7.4.2 Each of the above remote shutdown control switch(es) and control circuits shall be demonstrated OPERABLE by verifying its capability to perform its intended function(s) at least once per 24 months.

3/4.6.5 SECONDARY CONTAINMENT

REFUELING AREA SECONDARY CONTAINMENT INTEGRITY

LIMITING CONDITION FOR OPERATION

3.6.5.1.2 REFUELING AREA SECONDARY CONTAINMENT INTEGRITY shall be maintained.

APPLICABILITY: OPERATIONAL CONDITION *.

ACTION:

Without REFUELING AREA SECONDARY CONTAINMENT INTEGRITY, suspend handling of irradiated fuel in the secondary containment, CORE ALTERATIONS and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.6.5.1.2 REFUELING AREA SECONDARY CONTAINMENT INTEGRITY shall be demonstrated by:

a. Verifying at least once per 24 hours that the pressure within the refueling area secondary containment is greater than or equal to 0.25 inch of vacuum water gauge.

b. Verifying at least once per 31 days that:

   1. All refueling area secondary containment equipment hatches and blowout panels are closed and sealed.

   2. At least one door in each access to the refueling area secondary containment is closed.

   3. All refueling area secondary containment penetrations not capable of being closed by OPERABLE secondary containment automatic isolation dampers/valves and required to be closed during accident conditions are closed by valves, blind flanges, slide gate dampers or deactivated automatic dampers/valves secured in position.

c. At least once per 24 months:

   Operating one standby gas treatment subsystem for one hour and maintaining greater than or equal to 0.25 inch of vacuum water gauge in the refueling area secondary containment at a flow rate not exceeding 764 cfm.

*Required when (1) irradiated fuel is being handled in the refueling area secondary containment, or (2) during CORE ALTERATIONS, or (3) during operations with a potential for draining the reactor vessel, with the vessel head removed and fuel in the vessel.

CONTAINMENT SYSTEMS

REACTOR ENCLOSURE SECONDARY CONTAINMENT AUTOMATIC ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.5.2.1 The reactor enclosure secondary containment ventilation system automatic isolation valves shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

With one or more of the reactor secondary containment ventilation system automatic isolation valves inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and within 8 hours either:

a. Restore the inoperable valves to OPERABLE status, or

b. Isolate each affected penetration by use of at least one deactivated valve secured in the isolation position, or

c. Isolate each affected penetration by use of at least one closed manual valve, blind flange or slide gate damper.

Otherwise, in OPERATIONAL CONDITION 1, 2, or 3, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.2.1 Each reactor enclosure secondary containment ventilation system automatic isolation valve shall be demonstrated OPERABLE:

a. Prior to returning the valve to service after maintenance, repair or replacement work is performed on the valve or its associated actuator, control or power circuit by cycling the valve through at least one complete cycle of full travel and verifying the specified isolation time.

b. At least once per 24 months by verifying that on a containment isolation test signal each isolation valve actuates to its isolation position.

c. By verifying the isolation time to be within its limit at least once per 92 days.

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REFUELING AREA SECONDARY CONTAINMENT AUTOMATIC ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.5.2.2 The refueling area secondary containment ventilation system automatic isolation valves shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITION *.

ACTION:

With one or more of the refueling area secondary containment ventilation system automatic isolation valves inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and within 8 hours either:

a. Restore the inoperable valves to OPERABLE status, or

b. Isolate each affected penetration by use of at least one deactivated valve secured in the isolation position, or

c. Isolate each affected penetration by use of at least one closed manual valve, blind flange or slide gate damper.

Otherwise, in OPERATIONAL CONDITION*, suspend handling of irradiated fuel in the refueling area secondary containment, CORE ALTERATIONS and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.6.5.2.2 Each refueling area secondary containment ventilation system automatic isolation valve shall be demonstrated OPERABLE:

a. Prior to returning the valve to service after maintenance, repair or replacement work is performed on the valve or its associated actuator, control or power circuit by cycling the valve through at least one complete cycle of full travel and verifying the specified isolation time.

b. At least once per 24 months by verifying that on a containment isolation test signal each isolation valve actuates to its isolation position.

c. By verifying the isolation time to be within its limit at least once per 92 days.

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*Required when (1) irradiated fuel is being handled in the refueling area secondary containment, or (2) during CORE ALTERATIONS, or (3) during operations with a potential for draining the reactor vessel with the vessel head removed and fuel in the vessel.

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STANDBY GAS TREATMENT SYSTEM - COMMON SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.5.3 Two independent standby gas treatment subsystems shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, and *.

ACTION:

a. With one standby gas treatment subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days, or:

   1. In OPERATIONAL CONDITION 1, 2, or 3, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

   2. In OPERATIONAL CONDITION *, suspend handling of irradiated fuel in the secondary containment, CORE ALTERATIONS and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.3 are not applicable.

b. With both standby gas treatment subsystems inoperable in OPERATIONAL CONDITION *, suspend handling of irradiated fuel in the secondary containment, CORE ALTERATIONS or operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.3. are not applicable.

SURVEILLANCE REQUIREMENTS

4.6.5.3 Each standby gas treatment subsystem shall be demonstrated OPERABLE:

a. At least once per 31 days by initiating, from the control room, flow through the HEPA filters and charcoal adsorbers and verifying that the subsystem operates with the heaters OPERABLE.

*Required when (1) irradiated fuel is being handled in the refueling area secondary containment, or (2) during CORE ALTERATIONS, or (3) during operations with a potential for draining the reactor vessel with the vessel head removed and fuel in the vessel.

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SURVEILLANCE REQUIREMENTS (Continued)

b. At least once per 24* months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the subsystem by:

1. Verifying that the subsystem satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% and uses the test procedure guidance in Regulatory Positions C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978, and the system flow rate is 5764 cfm ± 10%.

2. Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration of less than 0.5% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F), at a relative humidity of 70% and at a face velocity of 66 fpm.

3. Verify that when the fan is running the subsystem flowrate is 2800 cfm minimum from each reactor enclosure (Zones I and II) and 2200 cfm minimum from the refueling area (Zone III) when tested in accordance with ANSI N510-1980.

4. Verify that the pressure drop across the refueling area to SGTS prefilter is less than 0.25 inches water gage while operating at a flow rate of 2400 cfm ± 10%.

c. After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration of less than 0.5% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F), at a relative humidity of 70% and at a face velocity of 66 fpm.

d. At least once per 24 months by:

1. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 9.1 inches water gauge while operating the filter train at a flow rate of 8400 cfm ± 10%.

*Surveillance interval is an exception to the guidance provided in Regulatory Guide 1.52, Revision 2, March 1978.

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SURVEILLANCE REQUIREMENTS (Continued)

2. Verifying that the fan starts and isolation valves necessary to draw a suction from the refueling area or the reactor enclosure recirculation discharge open on each of the following test signals:

   a) Manual initiation from the control room, and

   b) Simulated automatic initiation signal.

3. Verifying that the temperature differential across each heater is ≥ 15°F when tested in accordance with ANSI N510-1980.

e. After each complete or partial replacement of a HEPA filter bank by verifying that the HEPA filter bank satisfies the inplace penetration and leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 while operating the system at a flow rate of 5764 cfm ± 10%.

f. After each complete or partial replacement of a charcoal adsorber bank by verifying that the charcoal adsorber bank satisfies the inplace penetration and leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas while operating the system at a flow rate of 5764 cfm ± 10%.

g. After any major system alteration:

1. Verify that when the SGTS fan is running the subsystem flowrate is 2800 cfm minimum from each reactor enclosure (Zones I and II) and 2200 cfm minimum from the refueling area (Zone III).

2. Verify that one standby gas treatment subsystem will drawdown reactor enclosure Zone I secondary containment to greater than or equal to 0.25 inch of vacuum water gauge in less than or equal to 916 seconds with the reactor enclosure recirculation system in operation and the adjacent reactor enclosure and refueling area zones are in their isolation modes.

3.4.9 REFUELING OPERATIONS

3/4.9.1 REACTOR MODE SWITCH

LIMITING CONDITION FOR OPERATION

3.9.1 The reactor mode switch shall be OPERABLE and locked in the Shutdown or Refuel position. When the reactor mode switch is locked in the Refuel position:

a. The Refuel position one-rod-out interlock shall be OPERABLE.

b. The following Refuel position interlocks shall be OPERABLE:

1. All rods in.
2. Refuel Platform (over-core) position.
3. Refuel Platform hoists fuel-loaded.
4. Service Platform hoist fuel-loaded (with Service Platform installed).

APPLICABILITY: OPERATIONAL CONDITION 5* **, OPERATIONAL CONDITIONS 3 AND 4 when the reactor mode switch is in the Refuel position.

ACTION:

a. With the reactor mode switch not locked in the Shutdown or Refuel position as specified, suspend CORE ALTERATIONS and lock the reactor mode switch in the Shutdown or Refuel position.

b. With the one-rod-out interlock inoperable, verify all control rods are fully inserted and disable withdraw capabilities of all control rods ***, or lock the reactor mode switch in the Shutdown position.

c. With any of the above required Refuel Platform Refuel position interlocks inoperable, take one of the ACTIONS listed below, or suspend CORE ALTERATIONS.

1. Verify control rods are fully inserted and disable withdraw capabilities of all control rods***, or
2. Verify Refuel Platform is not over-core (limit switches not reached) and disable Refuel Platform travel over-core, or
3. Verify that no Refuel Platform hoist is loaded and disable all Refuel Platform hoists from picking up (grappling) a load.

d. With the Service Platform installed over the vessel and any of the above required Service Platform Refuel position interlocks inoperable, take one of the ACTIONS listed below, or suspend CORE ALTERATIONS.

1. Verify all control rods are fully inserted and disable withdraw capabilities of all control rods***, or
2. Verify Service Platform hoist is not loaded and disable Service Platform hoist from picking up (grappling) a load.

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* See Special Test Exceptions 3.10.1 and 3.10.3.

** The reactor shall be maintained in OPERATIONAL CONDITION 5 whenever fuel is in the reactor vessel with the vessel head closure bolts less than fully tensioned or with the head removed.

*** Except control rods removed per Specification 3.9.10.1 or 3.9.10.2.

SURVEILLANCE REQUIREMENTS

4.9.1.1 The reactor mode switch shall be verified to be locked in the Shutdown or Refuel position as specified at least once per 12 hours.

4.9.1.2 Each of the above required reactor mode switch Refuel position interlocks* shall be demonstrated OPERABLE by performance of a CHANNEL FUNCTIONAL TEST at least once per 7 days during control rod withdrawal or CORE ALTERATIONS, as applicable.

4.9.1.3 Each of the above required reactor mode switch Refuel position interlocks* that is affected shall be demonstrated OPERABLE by performance of a CHANNEL FUNCTIONAL TEST prior to resuming control rod withdrawal or CORE ALTERATIONS, as applicable, following repair, maintenance or replacement of any component that could affect the Refuel position interlock.

*The reactor mode switch may be placed in the Run or Startup/Hot Standby position to test the switch interlock functions provided that all control rods are verified to remain fully inserted by a second licensed operator or other technically qualified member of the unit technical staff.

3/4.9.2 INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.9.2 At least two source range monitor (SRM) channels* shall be OPERABLE and inserted to the normal operating level with:

a. Continuous visual indication in the control room,

b. At least one with audible alarm in the control room,

c. One of the required SRM detectors located in the quadrant where CORE ALTERATIONS are being performed and the other required SRM detector located in an adjacent quadrant, and

d. Unless adequate shutdown margin has been demonstrated, the shorting links shall be removed from the RPS circuitry prior to and during the time any control rod is withdrawn.**

APPLICABILITY: OPERATIONAL CONDITION 5.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS and insert all insertable control rods.

SURVEILLANCE REQUIREMENTS

4.9.2 Each of the above required SRM channels shall be demonstrated OPERABLE by:

a. At least once per 12 hours:

1. Performance of a CHANNEL CHECK,

2. Verifying the detectors are inserted to the normal operating level, and

3. During CORE ALTERATIONS, verifying that the detector of an OPERABLE SRM channel is located in the core quadrant where CORE ALTERATIONS are being performed and another is located in an adjacent quadrant.

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*These channels are not required when sixteen or fewer fuel assemblies, adjacent to the SRMs, are in the core. The use of special movable detectors during CORE ALTERATIONS in place of the normal SRM nuclear detectors is permissible as long as these special detectors are connected to the normal SRM circuits.

**Not required for control rods removed per Specification 3.9.10.1 or 3.9.10.2.

SURVEILLANCE REQUIREMENTS (Continued)

b. Performance of a CHANNEL FUNCTIONAL TEST at least once per 7 days.

c. Verifying that the channel count rate is at least 3.0 cps:*

1. Prior to control rod withdrawal,

2. Prior to and at least once per 12 hours during CORE ALTERATIONS, and

3. At least once per 24 hours.

d. Verifying, within 8 hours prior to and at least once per 12 hours during, that the RPS circuitry "shorting links" have been removed during:

1. The time any control rod is withdrawn,** or

2. Shutdown margin demonstrations.

*May be reduced, provided the source range monitor has an observed count rate and signal-to-noise ratio on or above the curve shown in Figure 3.3.6-1. These channels are not required when sixteen or fewer fuel assemblies, adjacent to the SRMs, are in the core.

**Not required for control rods removed per Specification 3.9.10.1 or 3.9.10.2.

3/4.9.3 CONTROL ROD POSITION

LIMITING CONDITION FOR OPERATION

3.9.3 All control rods shall be inserted.*

APPLICABILITY: OPERATIONAL CONDITION 5, during CORE ALTERATIONS.**

ACTION:

With all control rods not inserted, suspend all other CORE ALTERATIONS, except that one control rod may be withdrawn under control of the reactor mode switch Refuel position one-rod-out interlock.

SURVEILLANCE REQUIREMENTS

4.9.3 All control rods shall be verified to be inserted, except as above specified at least once per 12 hours.

*Except control rods removed per Specification 3.9.10.1 or 3.9.10.2.

**See Special Test Exception 3.10.3.

3/4.9.4 DECAY TIME

LIMITING CONDITION FOR OPERATION

3.9.4 The reactor shall be subcritical for at least 24 hours.

APPLICABILITY: OPERATIONAL CONDITION 5, during movement of irradiated fuel in the reactor pressure vessel.

ACTION:

With the reactor subcritical for less than 24 hours, suspend all operations involving movement of irradiated fuel in the reactor pressure vessel.

SURVEILLANCE REQUIREMENTS

4.9.4 The reactor shall be determined to have been subcritical for at least 24 hours by verification of the date and time of subcriticality prior to movement of irradiated fuel in the reactor pressure vessel.

3/4.9.5 COMMUNICATIONS

LIMITING CONDITION FOR OPERATION

3.9.5 Direct communication shall be maintained between the control room and refueling floor personnel.

APPLICABILITY: OPERATIONAL CONDITION 5, during CORE ALTERATIONS.*

ACTION:

When direct communication between the control room and refueling floor personnel cannot be maintained, immediately suspend CORE ALTERATIONS.*

SURVEILLANCE REQUIREMENTS

4.9.5 Direct communication between the control room and refueling floor personnel shall be demonstrated at least once per 12 hours during CORE ALTERATIONS.*

*Except movement of control rods with their normal drive system.

3/4.9.6 REFUELING PLATFORM

LIMITING CONDITION FOR OPERATION

3.9.6 The refueling platform shall be OPERABLE and used for handling fuel assemblies or control rods within the reactor pressure vessel.

APPLICABILITY: During handling of fuel assemblies or control rods within the reactor pressure vessel.

ACTION:

With the requirements for refueling platform OPERABILITY not satisfied, suspend use of any inoperable refueling platform equipment from operations involving the handling of control rods and fuel assemblies within the reactor pressure vessel after placing the load in a safe condition.

SURVEILLANCE REQUIREMENTS

4.9.6.1 The refueling platform main hoist used for handling of fuel assemblies within the reactor pressure vessel shall be demonstrated OPERABLE within 7 days prior to the start of such operations by:

a. Demonstrating operation of the overload cutoff on the main hoist when the load exceeds 1150 ± 50 pounds.

b. Demonstrating operation of the hoist loaded control rod block interlock on the main hoist when the load exceeds 485 ± 50 pounds.

c. Demonstrating operation of the redundant loaded interlock on the main hoist when the load exceeds 550 + 0, - 115 pounds.

d. Demonstrating operation of the uptravel interlock when uptravel brings the top of the active fuel to not less than 8 feet 0 inches below the normal water level.

SURVEILLANCE REQUIREMENTS (Continued)

4.9.6.2 The refueling platform frame-mounted auxiliary hoist used for handling of control rods within the reactor pressure vessel shall be demonstrated OPERABLE within 7 days prior to the use of such equipment by:

a. Demonstrating operation of the overload cutoff on the frame mounted hoist when the load exceeds 500 ± 50 pounds.

b. Demonstrating operation of the uptravel mechanical stop on the frame mounted hoist when uptravel brings the top of a control rod to not less than 6 feet 6 inches below the normal fuel storage pool water level.

4.9.6.3 The refueling platform monorail mounted auxiliary hoist used for handling of control rods within the reactor pressure vessel shall be demonstrated OPERABLE within 7 days prior to the use of such equipment by:

a. Demonstrating operation of the overload cutoff on the monorail hoist when the load exceeds 500 ± 50 pounds.

b. Demonstrating operation of the uptravel mechanical stop on the monorail hoist when uptravel brings the top of a control rod to not less than 6 feet 6 inches below the normal fuel storage pool water level.

3/4.9.7 CRANE TRAVEL-SPENT FUEL STORAGE POOL

LIMITING CONDITION FOR OPERATION

3.9.7 Loads in excess of 1200 pounds shall be prohibited from travel over fuel assemblies in the spent fuel storage pool racks.

APPLICABILITY: With fuel assemblies in the spent fuel storage pool racks.

ACTION:

With the requirements of the above specification not satisfied, place the crane load in a safe condition. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.7 Crane interlocks which prevent crane travel over fuel assemblies in the spent fuel storage pool racks shall be demonstrated OPERABLE within 7 days prior to and at least once per 7 days during crane operation.

3/4.9.8 WATER LEVEL - REACTOR VESSEL

LIMITING CONDITION FOR OPERATION

3.9.8 At least 22 feet of water shall be maintained over the top of the reactor pressure vessel flange.

APPLICABILITY: During handling of fuel assemblies or control rods within the reactor pressure vessel while in OPERATIONAL CONDITION 5 when the fuel assemblies being handled are irradiated or the fuel assemblies seated within the reactor vessel are irradiated.

ACTION:

With the requirements of the above specification not satisfied, suspend all operations involving handling of fuel assemblies or control rods within the reactor pressure vessel after placing all fuel assemblies and control rods in a safe condition.

SURVEILLANCE REQUIREMENTS

4.9.8 The reactor vessel water level shall be determined to be at least its minimum required depth at least once per 24 hours during handling of fuel assemblies or control rods within the reactor pressure vessel.

3/4.9.9 WATER LEVEL - SPENT FUEL STORAGE POOL

LIMITING CONDITION FOR OPERATION

3.9.9 At least 22 feet of water shall be maintained over the top of irradiated fuel assemblies seated in the spent fuel storage pool racks.

APPLICABILITY: Whenever irradiated fuel assemblies are in the spent fuel storage pool.

ACTION:

With the requirements of the above specification not satisfied, suspend all movement of fuel assemblies and crane operations with loads in the spent fuel storage pool area after placing the fuel assemblies and crane load in a safe condition. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.9 The water level in the spent fuel storage pool shall be determined to be at least at its minimum required depth at least once per 7 days.

3/4.9.10 CONTROL ROD REMOVAL

SINGLE CONTROL ROD REMOVAL

LIMITING CONDITION FOR OPERATION

3.9.10.1 One control rod and/or the associated control rod drive mechanism may be removed from the core and/or reactor pressure vessel provided that at least the following requirements are satisfied until a control rod and associated control rod drive mechanism are reinstalled and the control rod is fully inserted in the core.

a. The reactor mode switch is OPERABLE and locked in the Shutdown position or in the Refuel position per Table 1.2 and Specification 3.9.1.

b. The source range monitors (SRM) are OPERABLE per Specification 3.9.2.

c. The SHUTDOWN MARGIN requirements of Specification 3.1.1 are satisfied, except that the control rod selected to be removed;

   1. May be assumed to be the highest worth control rod required to be assumed to be fully withdrawn by the SHUTDOWN MARGIN test, and

   2. Need not be assumed to be immovable or untrippable.

d. All other control rods in a five-by-five array centered on the control rod being removed are inserted and electrically or hydraulically disarmed or the four fuel assemblies surrounding the control rod or control rod drive mechanism to be removed from the core and/or reactor vessel are removed from the core cell.

e. All other control rods are inserted.

APPLICABILITY: OPERATIONAL CONDITIONS 4 and 5.

ACTION:

With the requirements of the above specification not satisfied, suspend removal of the control rod and/or associated control rod drive mechanism from the core and/or reactor pressure vessel and initiate action to satisfy the above requirements.

SURVEILLANCE REQUIREMENTS

4.9.10.1 Within 4 hours prior to the start of removal of a control rod and/or the associated control rod drive mechanism from the core and/or reactor pressure vessel and at least once per 24 hours thereafter until a control rod and associated control rod drive mechanism are reinstalled and the control rod is inserted in the core, verify that:

a. The reactor mode switch is OPERABLE per Surveillance Requirement 4.3.1.1 or 4.9.1.2, as applicable, and locked in the Shutdown position or in the Refuel position with the "one rod out" Refuel position interlock OPERABLE per Specification 3.9.1.

b. The SRM channels are OPERABLE per Specification 3.9.2.

c. The SHUTDOWN MARGIN requirements of Specification 3.1.1 are satisfied per Specification 3.9.10.1c.

d. All other control rods in a five-by-five array centered on the control rod being removed are inserted and electrically or hydraulically disarmed or the four fuel assemblies surrounding the control rod or control rod drive mechanism to be removed from the core and/or reactor vessel are removed from the core cell.

e. All other control rods are inserted.

MULTIPLE CONTROL ROD REMOVAL

LIMITING CONDITION FOR OPERATION

3.9.10.2 Any number of control rods and/or control rod drive mechanisms may be removed from the core and/or reactor pressure vessel provided that at least the following requirements are satisfied until all control rods and control rod drive mechanisms are reinstalled and all control rods are inserted in the core.

a. The reactor mode switch is OPERABLE and locked in the Shutdown position or in the Refuel position per Specification 3.9.1, except that the Refuel position "one-rod-out" interlock may be bypassed, as required, for those control rods and/or control rod drive mechanisms to be removed, after the fuel assemblies have been removed as specified below.

b. The source range monitors (SRM) are OPERABLE per Specification 3.9.2.

c. The SHUTDOWN MARGIN requirements of Specification 3.1.1 are satisfied.

d. All other control rods are either inserted or have the surrounding four fuel assemblies removed from the core cell.

e. The four fuel assemblies surrounding each control rod or control rod drive mechanism to be removed from the core and/or reactor vessel are removed from the core cell.

APPLICABILITY: OPERATIONAL CONDITION 5.

ACTION:

With the requirements of the above specification not satisfied, suspend removal of control rods and/or control rod drive mechanisms from the core and/or reactor pressure vessel and initiate action to satisfy the above requirements.

SURVEILLANCE REQUIREMENTS

4.9.10.2.1 Within 4 hours prior to the start of removal of control rods and/or control rod drive mechanisms from the core and/or reactor pressure vessel and at least once per 24 hours thereafter until all control rods and control rod drive mechanisms are reinstalled and all control rods are inserted in the core, verify that:

a. The reactor mode switch is OPERABLE per Surveillance Requirement 4.3.1.1 or 4.9.1.2, as applicable, and locked in the Shutdown position or in the Refuel position per Specification 3.9.1.

b. The SRM channels are OPERABLE per Specification 3.9.2.

c. The SHUTDOWN MARGIN requirements of Specification 3.1.1 are satisfied.

d. All other control rods are either inserted or have the surrounding four fuel assemblies removed from the core cell.

e. The four fuel assemblies surrounding each control rod and/or control rod drive mechanism to be removed from the core and/or reactor vessel are removed from the core cell.

4.9.10.2.2 Following replacement of all control rods and/or control rod drive mechanisms removed in accordance with this specification, perform a functional test of the "one-rod-out" Refuel position interlock, if this function had been bypassed.

3/4.9.11 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

HIGH WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.11.1 One (1) RHR shutdown cooling subsystem shall be OPERABLE and in operation. *

APPLICABILITY: OPERATIONAL CONDITION 5, when irradiated fuel is in the reactor vessel and the water level is greater than or equal to 22 feet above the top of the reactor pressure vessel flange.

ACTION:

a. With the required RHR shutdown cooling subsystem inoperable:

1. Within one (1) hour, and once per 24 hours thereafter, verify an alternate method of decay heat removal is available.

b. With the required action and associated completion time of Action "a" above not met.

1. Immediately suspend loading of irradiated fuel assemblies into the reactor pressure vessel; and

2. Immediately initiate action to restore REFUELING FLOOR SECONDARY CONTAINMENT INTEGRITY to OPERABLE status; and

3. Immediately initiate action to restore one (1) Standby Gas Treatment subsystem to OPERABLE status; and

4. Immediately initiate action to restore isolation capability in each required Refueling Floor secondary containment penetration flow path not isolated.

c. With no RHR shutdown cooling subsystem in operation:

1. Within one (1) hour from discovery of no reactor coolant circulation, and once per 12 hours thereafter, verify reactor coolant circulation by an alternate method; and

2. Once per hour monitor reactor coolant temperature.

SURVEILLANCE REQUIREMENTS

4.9.11.1 At least one (1) RHR shutdown cooling subsystem, or an alternate method, shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

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* The required RHR shutdown cooling subsystem may be removed from operation for up to two (2) hours per eight (8) hour period.

LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.11.2 Two (2) RHR shutdown cooling subsystems shall be OPERABLE, and one (1) RHR shutdown cooling subsystem shall be in operation. *

APPLICABILITY: OPERATIONAL CONDITION 5, when irradiated fuel is in the reactor vessel and the water level is less than 22 feet above the top of the reactor pressure vessel flange.

ACTION:

a. With one (1) or two (2) required RHR shutdown cooling subsystems inoperable:

   1. Within one (1) hour, and once per 24 hours thereafter, verify an alternate method of decay heat removal is available for each inoperable required RHR shutdown cooling subsystem.

b. With the required action and associated completion time of Action "a" above not met:

   1. Immediately initiate action to restore REFUELING FLOOR SECONDARY CONTAINMENT INTEGRITY to OPERABLE status; and

   2. Immediately initiate action to restore one (1) Standby Gas Treatment subsystem to OPERABLE status; and

   3. Immediately initiate action to restore isolation capability in each required Refueling Floor secondary containment penetration flow path not isolated.

c. With no RHR shutdown cooling subsystem in operation:

   1. Within one (1) hour from discovery of no reactor coolant circulation, and once per 12 hours thereafter, verify reactor coolant circulation by an alternate method; and

   2. Once per hour monitor reactor coolant temperature.

SURVEILLANCE REQUIREMENTS

4.9.11.2 At least one (1) RHR shutdown cooling subsystem, or an alternate method, shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

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* The required operating shutdown cooling subsystem may be removed from operation for up to two (2) hours per eight (8) hour period.

CONTROL ROD DRIVE COUPLING

LIMITING CONDITION FOR OPERATION

3.1.3.6 All control rods shall be coupled to their drive mechanisms.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 5*.

ACTION:

a. In OPERATIONAL CONDITIONS 1 and 2 with one control rod not coupled to its associated drive mechanism, within 2 hours:

   1. If permitted by the RWM, insert the control rod drive mechanism to accomplish recoupling and verify recoupling by withdrawing the control rod, and:

      a) Observing any indicated response of the nuclear instrumentation, and

      b) Demonstrating that the control rod will not go to the overtravel position.

   Otherwise, be in at least HOT SHUTDOWN within the next 12 hours.

   2. If recoupling is not accomplished on the first attempt or, if not permitted by the RWM, then until permitted by the RWM, declare the control rod inoperable, insert the control rod and disarm the associated directional control valves** either:

      a) Electrically, or

      b) Hydraulically by closing the drive water and exhaust water isolation valves.

   Otherwise, be in at least HOT SHUTDOWN within the next 12 hours.

b. In OPERATIONAL CONDITION 5* with a withdrawn control rod not coupled to its associated drive mechanism, within 2 hours either:

   1. Insert the control rod to accomplish recoupling and verify recoupling by withdrawing the control rod and demonstrating that the control rod will not go to the overtravel position, or

   2. If recoupling is not accomplished, insert the control rod and disarm the associated directional control valves** either:

      a) Electrically, or

      b) Hydraulically by closing the drive water and exhaust water isolation valves.

c. The provisions of Specification 3.0.4 are not applicable.

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*At least each withdrawn control rod. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

**May be rearmed intermittently, under administrative control, to permit testing associated with restoring the control rod to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.3.6 Each affected control rod shall be demonstrated to be coupled to its drive mechanism by observing any indicated response of the nuclear instrumentation while withdrawing the control rod to the fully withdrawn position and then verifying that the control rod drive does not go to the overtravel position:

a. Prior to reactor criticality after completing CORE ALTERATIONS that could have affected the control rod drive coupling integrity,

b. Anytime the control rod is withdrawn to the "Full out" position in subsequent operation, and

c. Following maintenance on or modification to the control rod or control rod drive system which could have affected the control rod drive coupling integrity.

CONTROL ROD POSITION INDICATION

LIMITING CONDITION FOR OPERATION

3.1.3.7 The control rod position indication system shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 5*.

ACTION:

a. In OPERATIONAL CONDITION 1 or 2 with one or more control rod position indicators inoperable, within 1 hour:

   1. Determine the position of the control rod by using an alternate method, or:

      a) Moving the control rod, by single notch movement, to a position with an OPERABLE position indicator,

      b) Returning the control rod, by single notch movement, to its original position, and

      c) Verifying no control rod drift alarm at least once per 12 hours, or

   2. Move the control rod to a position with an OPERABLE position indicator, or

   3. When THERMAL POWER is:

      a) Within the preset power level of the RWM, declare the control rod inoperable.

      b) Greater than the preset power level of the RWM, declare the control rod inoperable, insert the control rod and disarm the associated directional control valves** either:

         1) Electrically, or

         2) Hydraulically by closing the drive water and exhaust water isolation valves.

   Otherwise, be in at least HOT SHUTDOWN within the next 12 hours.

b. In OPERATIONAL CONDITION 5* with a withdrawn control rod position indicator inoperable, move the control rod to a position with an OPERABLE position indicator or insert the control rod.

c. The provisions of Specification 3.0.4 are not applicable.

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*At least each withdrawn control rod. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

**May be rearmed intermittently, under administrative control, to permit testing associated with restoring the control rod to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.3.7 The control rod position indication system shall be determined OPERABLE by verifying:

a. At least once per 24 hours that the position of each control rod is indicated,

b. That the indicated control rod position changes during the movement of the control rod drive when performing Surveillance Requirement 4.1.3.1.2, and

c. That the control rod position indicator corresponds to the control rod position indicated by the "Full out" position indicator when performing Surveillance Requirement 4.1.3.6b.

3/4.3.7 MONITORING INSTRUMENTATION

RADIATION MONITORING INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.7.1 The radiation monitoring instrumentation channels shown in Table 3.3.7.1-1 shall be OPERABLE with their alarm/trip setpoints within the specified limits.

APPLICABILITY: As shown in Table 3.3.7.1-1.

ACTION:

a. With a radiation monitoring instrumentation channel alarm/trip setpoint exceeding the value shown in Table 3.3.7.1-1, adjust the setpoint to within the limit within 4 hours or declare the channel inoperable.

b. With one or more radiation monitoring channels inoperable, take the ACTION required by Table 3.3.7.1-1.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.7.1 Each of the above required radiation monitoring instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION operations for the conditions and at the frequencies shown in Table 4.3.7.1-1.

TABLE 3.3.7.1-1

RADIATION MONITORING INSTRUMENTATION

INSTRUMENTATION	MINIMUM CHANNELS OPERABLE	APPLICABLE CONDITIONS	ALARM/TRIP SETPOINT	ACTION
1. Main Control Room Normal Fresh Air Supply Radiation Monitor	4	1,2,3,5 and *	1×10^{-5} µCi/cc	70
2. Area Monitors				
a. Criticality Monitors				
1) Spent Fuel Storage Pool	2	(a)	$\geq$ 5 mR/h and $\leq$20mR/h[(b)]	71
b. Control Room Direct Radiation Monitor	1	At All Times	N.A.[(b)]	73
3. Reactor Enclosure Cooling Water Radiation Monitor	1	At All Times	$\leq$ 3 x Background[(b)]	72

TABLE 3.3.7.1-1 (Continued)

RADIATION MONITORING INSTRUMENTATION

TABLE NOTATIONS

*When irradiated fuel is being handled in the secondary containment.

(a) With fuel in the spent fuel storage pool.

(b) Alarm only.

ACTION STATEMENTS

ACTION 70 - With one monitor inoperable, restore the inoperable monitor to the OPERABLE status within 7 days or, within the next 6 hours, initiate and maintain operation of the control room emergency filtration system in the radiation isolation mode of operation.

With two or more of the monitors inoperable, within one hour, initiate and maintain operation of the control room emergency filtration system in the radiation mode of operation.

ACTION 71 - With one of the required monitor inoperable, assure a portable continuous monitor with the same alarm setpoint is OPERABLE in the vicinity of the installed monitor during any fuel movement. If no fuel movement is being made, perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

ACTION 72 - With the required monitor inoperable, obtain and analyze at least one grab sample of the monitored parameter at least once per 24 hours.

ACTION 73 - With the required monitor inoperable, assure a portable alarming monitor is OPERABLE in the vicinity of the installed monitor or perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

TABLE 4.3.7.1-1

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENTATION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE IS REQUIRED
1. Main Control Room Normal Fresh Air Supply Radiation Monitor	S	Q	R	1, 2, 3, 5 and *
2. Area Monitors				
a. Criticality Monitors				
1) Spent Fuel Storage Pool	S	M	R	(a)
b. Control Room Direct Radiation Monitor	S	M	R	At All Times
3. Reactor Enclosure Cooling Water Radiation Monitor	S	M	R(b)	At All Times

TABLE 4.3.7.1-1 (Continued)

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

*When irradiated fuel is being handled in the secondary containment.

(a) With fuel in the spent fuel storage pool.

(b) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Bureau of Standards (NBS) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NBS. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

Section 3.3.7.2 (Deleted)

THE INFORMATION FROM THIS TECHNICAL SPECIFICATIONS SECTION HAS BEEN RELOCATED TO THE UFSAR. TECHNICAL SPECIFICATIONS PAGES 3/4 3-69 THROUGH 3/4 3-72 OF THIS SECTION HAVE BEEN INTENTIONALLY OMITTED.

Section 3.3.7.3 (Deleted)

THE INFORMATION FROM THIS TECHNICAL SPECIFICATIONS SECTION HAS BEEN RELOCATED TO THE ODCM. TECHNICAL SPECIFICATIONS PAGES 3/4 3-74 THROUGH 3/4 3-75 OF THIS SECTION HAVE BEEN INTENTIONALLY OMITTED.

REMOTE SHUTDOWN SYSTEM INSTRUMENTATION AND CONTROLS

LIMITING CONDITION FOR OPERATION

3.3.7.4 The remote shutdown system instrumentation and controls shown in Table 3.3.7.4-1 shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION:

a. With the number of OPERABLE remote shutdown system instrumentation channels less than required by Table 3.3.7.4-1, restore the inoperable channel(s) to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours.

b. With the number of OPERABLE remote shutdown system controls less than required in Table 3.3.7.4-1, restore the inoperable control(s) to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours.

c. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.7.4.1 Each of the above required remote shutdown monitoring instrumentation channels shall be demonstrated OPERABLE by performance of the CHANNEL CHECK and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.3.7.4-1.

4.3.7.4.2 Each of the above remote shutdown control switch(es) and control circuits shall be demonstrated OPERABLE by verifying its capability to perform its intended function(s) at least once per 24 months.

3/4.6.5 SECONDARY CONTAINMENT

REFUELING AREA SECONDARY CONTAINMENT INTEGRITY

LIMITING CONDITION FOR OPERATION

3.6.5.1.2 REFUELING AREA SECONDARY CONTAINMENT INTEGRITY shall be maintained.

APPLICABILITY: OPERATIONAL CONDITION *.

ACTION:

Without REFUELING AREA SECONDARY CONTAINMENT INTEGRITY, suspend handling of irradiated fuel in the secondary containment, CORE ALTERATIONS and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.6.5.1.2 REFUELING AREA SECONDARY CONTAINMENT INTEGRITY shall be demonstrated by:

a. Verifying at least once per 24 hours that the pressure within the refueling area secondary containment is greater than or equal to 0.25 inch of vacuum water gauge.

b. Verifying at least once per 31 days that:

1. All refueling area secondary containment equipment hatches and blowout panels are closed and sealed.

2. At least one door in each access to the refueling area secondary containment is closed.

3. All refueling area secondary containment penetrations not capable of being closed by OPERABLE secondary containment automatic isolation dampers/valves and required to be closed during accident conditions are closed by valves, blind flanges, slide gate dampers or deactivated automatic dampers/valves secured in position.

c. At least once per 24 months:

Operating one standby gas treatment subsystem for one hour and maintaining greater than or equal to 0.25 inch of vacuum water gauge in the refueling area secondary containment at a flow rate not exceeding 764 cfm.

*Required when (1) irradiated fuel is being handled in the refueling area secondary containment, or (2) during CORE ALTERATIONS, or (3) during operations with a potential for draining the reactor vessel with the vessel head removed and fuel in the vessel.

REACTOR ENCLOSURE SECONDARY CONTAINMENT AUTOMATIC ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.5.2.1 The reactor enclosure secondary containment ventilation system automatic isolation valves shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

With one or more of the reactor secondary containment ventilation system automatic isolation valves inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and within 8 hours either:

a. Restore the inoperable valves to OPERABLE status, or

b. Isolate each affected penetration by use of at least one deactivated valve secured in the isolation position, or

c. Isolate each affected penetration by use of at least one closed manual valve, blind flange or slide gate damper.

Otherwise, in OPERATIONAL CONDITION 1, 2, or 3, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.2.1 Each reactor enclosure secondary containment ventilation system automatic isolation valve shall be demonstrated OPERABLE:

a. Prior to returning the valve to service after maintenance, repair or replacement work is performed on the valve or its associated actuator, control or power circuit by cycling the valve through at least one complete cycle of full travel and verifying the specified isolation time.

b. At least once per 24 months by verifying that on a containment isolation test signal each isolation valve actuates to its isolation position.

c. By verifying the isolation time to be within its limit at least once per 92 days.

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REFUELING AREA SECONDARY CONTAINMENT AUTOMATIC ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.5.2.2 The refueling area secondary containment ventilation system automatic isolation valves shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITION *.

ACTION:

With one or more of the refueling area secondary containment ventilation system automatic isolation valves inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and within 8 hours either:

a. Restore the inoperable valves to OPERABLE status, or

b. Isolate each affected penetration by use of at least one deactivated valve secured in the isolation position, or

c. Isolate each affected penetration by use of at least one closed manual valve, blind flange or slide gate damper.

Otherwise, in OPERATIONAL CONDITION*, suspend handling of irradiated fuel in the refueling area secondary containment, CORE ALTERATIONS and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.6.5.2.2 Each refueling area secondary containment ventilation system automatic isolation valve shall be demonstrated OPERABLE:

a. Prior to returning the valve to service after maintenance, repair or replacement work is performed on the valve or its associated actuator, control or power circuit by cycling the valve through at least one complete cycle of full travel and verifying the specified isolation time.

b. At least once per 24 months by verifying that on a containment isolation test signal each isolation valve actuates to its isolation position.

c. By verifying the isolation time to be within its limit at least once per 92 days.

*Required when (1) irradiated fuel is being handled in the refueling area secondary containment, or (2) during CORE ALTERATIONS, or (3) during operations with a potential for draining the reactor vessel with the vessel head removed and fuel in the vessel.

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STANDBY GAS TREATMENT SYSTEM - COMMON SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.5.3 Two independent standby gas treatment subsystems shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, and *.

ACTION:

a. In OPERATIONAL CONDITION 1, 2, or 3:

1. With the Unit 1 diesel generator for one standby gas treatment subsystem inoperable for more than 30 days, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. The provisions of Specification 3.0.4 are not applicable.

2. With one standby gas treatment subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With one standby gas treatment subsystem inoperable and the other standby gas treatment subsystem with an inoperable Unit 1 diesel generator, restore the inoperable subsystem to OPERABLE status or restore the inoperable Unit 1 diesel generator to OPERABLE status within 72 hours, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4. With the Unit 1 diesel generators for both standby gas treatment system subsystems inoperable for more than 72 hours, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. In OPERATIONAL CONDITION *:

1. With one standby gas treatment subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days, or suspend handling of irradiated fuel in the secondary containment, CORE ALTERATIONS, and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.3 are not applicable.

2. With both standby gas treatment subsystems inoperable, suspend handling of irradiated fuel in the secondary containment, CORE ALTERATIONS, and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.3 are not applicable.

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*Required when (1) irradiated fuel is being handled in the refueling area secondary containment, or (2) during CORE ALTERATIONS, or (3) during operations with a potential for draining the reactor vessel with the vessel head removed and fuel in the vessel.

SURVEILLANCE REQUIREMENTS

4.6.5.3 Each standby gas treatment subsystem shall be demonstrated OPERABLE:

a. At least once per 31 days by initiating, from the control room, flow through the HEPA filters and charcoal adsorbers and verifying that the subsystem operates with the heaters OPERABLE.

SURVEILLANCE REQUIREMENTS (Continued)

b. At least once per 24* months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the subsystem by:

1. Verifying that the subsystem satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% and uses the test procedure guidance in Regulatory Positions C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978, and the system flow rate is 5764 cfm ± 10%.

2. Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration of less than 0.5% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F), at a relative humidity of 70% and at a face velocity of 66 fpm.

3. Verify that when the fan is running the subsystem flowrate is 2800 cfm minimum from each reactor enclosure (Zones I and II) and 2200 cfm minimum from the refueling area (Zone III) when tested in accordance with ANSI N510-1980.

4. Verify that the pressure drop across the refueling area to SGTS prefilter is less than 0.25 inches water gage while operating at a flow rate of 2400 cfm ± 10%.

c. After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration of less than 0.5% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F), at a relative humidity of 70% and at a face velocity of 66 fpm.

d. At least once per 24 months by:

1. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 9.1 inches water gauge while operating the filter train at a flow rate of 8400 cfm ± 10%.

*Surveillance interval is an exception to the guidance provided in Regulatory Guide 1.52, Revision 2, March 1978.

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SURVEILLANCE REQUIREMENTS (Continued)

2. Verifying that the fan starts and isolation valves necessary to draw a suction from the refueling area or the reactor enclosure recirculation discharge open on each of the following test signals:

   a) Manual initiation from the control room, and

   b) Simulated automatic initiation signal.

3. Verifying that the temperature differential across each heater is ≥ 15°F when tested in accordance with ANSI N510-1980.

e. After each complete or partial replacement of a HEPA filter bank by verifying that the HEPA filter bank satisfies the inplace penetration and leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 while operating the system at a flow rate of 5764 cfm ± 10%.

f. After each complete or partial replacement of a charcoal adsorber bank by verifying that the charcoal adsorber bank satisfies the inplace penetration and leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas while operating the system at a flow rate of 5764 cfm ± 10%.

g. After any major system alteration:

1. Verify that when the SGTS fan is running the subsystem flowrate is 2800 cfm minimum from each reactor enclosure (Zones I and II) and 2200 cfm minimum from the refueling area (Zone III).

2. Verify that one standby gas treatment subsystem will drawdown reactor enclosure Zone II secondary containment to greater than or equal to 0.25 inch of vacuum water gauge in less than or equal to 916 seconds with the reactor enclosure recirculation system in operation and the adjacent reactor enclosure and refueling area zones are in their isolation modes.

3.4.9 REFUELING OPERATIONS

3/4.9.1 REACTOR MODE SWITCH

LIMITING CONDITION FOR OPERATION

3.9.1 The reactor mode switch shall be OPERABLE and locked in the Shutdown or Refuel position. When the reactor mode switch is locked in the Refuel position:

a. The Refuel position one-rod-out interlock shall be OPERABLE.

b. The following Refuel position interlocks shall be OPERABLE:

1. All rods in.
2. Refuel Platform (over-core) position.
3. Refuel Platform hoists fuel-loaded.
4. Service Platform hoist fuel-loaded (with Service Platform installed).

APPLICABILITY: OPERATIONAL CONDITION 5* **, OPERATIONAL CONDITIONS 3 AND 4 when the reactor mode switch is in the Refuel position.

ACTION:

a. With the reactor mode switch not locked in the Shutdown or Refuel position as specified, suspend CORE ALTERATIONS and lock the reactor mode switch in the Shutdown or Refuel position.

b. With the one-rod-out interlock inoperable, verify all control rods are fully inserted and disable withdraw capabilities of all control rods ***, or lock the reactor mode switch in the Shutdown position.

c. With any of the above required Refuel Platform Refuel position interlocks inoperable, take one of the ACTIONS listed below, or suspend CORE ALTERATIONS.

1. Verify control rods are fully inserted and disable withdraw capabilities of all control rods***, or
2. Verify Refuel Platform is not over-core (limit switches not reached) and disable Refuel Platform travel over-core, or
3. Verify that no Refuel Platform hoist is loaded and disable all Refuel Platform hoists from picking up (grappling) a load.

d. With the Service Platform installed over the vessel and any of the above required Service Platform Refuel position interlocks inoperable, take one of the ACTIONS listed below, or suspend CORE ALTERATIONS.

1. Verify all control rods are fully inserted and disable withdraw capabilities of all control rods***, or
2. Verify Service Platform hoist is not loaded and disable Service Platform hoist from picking up (grappling) a load.

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* See Special Test Exceptions 3.10.1 and 3.10.3.

** The reactor shall be maintained in OPERATIONAL CONDITION 5 whenever fuel is in the reactor vessel with the vessel head closure bolts less than fully tensioned or with the head removed.

*** Except control rods removed per Specification 3.9.10.1 or 3.9.10.2.

SURVEILLANCE REQUIREMENTS

4.9.1.1 The reactor mode switch shall be verified to be locked in the Shutdown or Refuel position as specified at least once per 12 hours.

4.9.1.2 Each of the above required reactor mode switch Refuel position interlocks* shall be demonstrated OPERABLE by performance of a CHANNEL FUNCTIONAL TEST at least once per 7 days during control rod withdrawal or CORE ALTERATIONS, as applicable.

4.9.1.3 Each of the above required reactor mode switch Refuel position interlocks* that is affected shall be demonstrated OPERABLE by performance of a CHANNEL FUNCTIONAL TEST prior to resuming control rod withdrawal or CORE ALTERATIONS, as applicable, following repair, maintenance or replacement of any component that could affect the Refuel position interlock.

*The reactor mode switch may be placed in the Run or Startup/Hot Standby position to test the switch interlock functions provided that all control rods are verified to remain fully inserted by a second licensed operator or other technically qualified member of the unit technical staff.

3/4.9.2 INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.9.2 At least two source range monitor (SRM) channels* shall be OPERABLE and inserted to the normal operating level with:

a. Continuous visual indication in the control room,

b. At least one with audible alarm in the control room,

c. One of the required SRM detectors located in the quadrant where CORE ALTERATIONS are being performed and the other required SRM detector located in an adjacent quadrant, and

d. Unless adequate SHUTDOWN MARGIN has been demonstrated, the "shorting links" shall be removed from the RPS circuitry prior to and during the time any control rod is withdrawn.**

APPLICABILITY: OPERATIONAL CONDITION 5.***

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS and insert all insertable control rods.

SURVEILLANCE REQUIREMENTS

4.9.2 Each of the above required SRM channels shall be demonstrated OPERABLE by:

a. At least once per 12 hours:

1. Performance of a CHANNEL CHECK,

2. Verifying the detectors are inserted to the normal operating level, and

3. During CORE ALTERATIONS, verifying that the detector of an OPERABLE SRM channel is located in the core quadrant where CORE ALTERATIONS are being performed and another is located in an adjacent quadrant.

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*These channels are not required when sixteen or fewer fuel assemblies, adjacent to the SRMs, are in the core. The use of special movable detectors during CORE ALTERATIONS in place of the normal SRM nuclear detectors is permissible as long as these special detectors are connected to the normal SRM circuits.

**Not required for control rods removed per Specification 3.9.10.1 or 3.9.10.2.

***See Special Test Exception, Specification 3/4.10.7.

SURVEILLANCE REQUIREMENTS (Continued)

b. Performance of a CHANNEL FUNCTIONAL TEST at least once per 7 days.

c. Verifying that the channel count rate is at least 3.0 cps:*

    1. Prior to control rod withdrawal,

    2. Prior to and at least once per 12 hours during CORE ALTERATIONS, and

    3. At least once per 24 hours.

d. Verifying, within 8 hours prior to and at least once per 12 hours during, that the RPS circuitry "shorting links" have been removed during:

    1. The time any control rod is withdrawn,** or

    2. Shutdown margin demonstrations.

*May be reduced, provided the source range monitor has an observed count rate and signal-to-noise ratio on or above the curve shown in Figure 3.3.6-1. These channels are not required when sixteen or fewer fuel assemblies, adjacent to the SRMs, are in the core.

**Not required for control rods removed per Specification 3.9.10.1 or 3.9.10.2.

3/4.9.3 CONTROL ROD POSITION

LIMITING CONDITION FOR OPERATION

3.9.3 All control rods shall be inserted.*

APPLICABILITY: OPERATIONAL CONDITION 5, during CORE ALTERATIONS.**

ACTION:

With all control rods not inserted, suspend all other CORE ALTERATIONS, except that one control rod may be withdrawn under control of the reactor mode switch Refuel position one-rod-out interlock.

SURVEILLANCE REQUIREMENTS

4.9.3 All control rods shall be verified to be inserted, except as above specified at least once per 12 hours.

*Except control rods removed per Specification 3.9.10.1 or 3.9.10.2.

**See Special Test Exception 3.10.3.

3/4.9.4 DECAY TIME

LIMITING CONDITION FOR OPERATION

3.9.4 The reactor shall be subcritical for at least 24 hours.

APPLICABILITY: OPERATIONAL CONDITION 5, during movement of irradiated fuel in the reactor pressure vessel.

ACTION:

With the reactor subcritical for less than 24 hours, suspend all operations involving movement of irradiated fuel in the reactor pressure vessel.

SURVEILLANCE REQUIREMENTS

4.9.4 The reactor shall be determined to have been subcritical for at least 24 hours by verification of the date and time of subcriticality prior to movement of irradiated fuel in the reactor pressure vessel.

3/4.9.5 COMMUNICATIONS

LIMITING CONDITION FOR OPERATION

3.9.5 Direct communication shall be maintained between the control room and refueling floor personnel.

APPLICABILITY: OPERATIONAL CONDITION 5, during CORE ALTERATIONS.*

ACTION:

When direct communication between the control room and refueling floor personnel cannot be maintained, immediately suspend CORE ALTERATIONS.*

SURVEILLANCE REQUIREMENTS

4.9.5 Direct communication between the control room and refueling floor personnel shall be demonstrated at least once per 12 hours during CORE ALTERATIONS.*

*Except movement of control rods with their normal drive system.

3/4.9.6 REFUELING PLATFORM

LIMITING CONDITION FOR OPERATION

3.9.6 The refueling platform shall be OPERABLE and used for handling fuel assemblies or control rods within the reactor pressure vessel.

APPLICABILITY: During handling of fuel assemblies or control rods within the reactor pressure vessel.

ACTION:

With the requirements for refueling platform OPERABILITY not satisfied, suspend use of any inoperable refueling platform equipment from operations involving the handling of control rods and fuel assemblies within the reactor pressure vessel after placing the load in a safe condition.

SURVEILLANCE REQUIREMENTS

4.9.6.1 The refueling platform main hoist used for handling of fuel assemblies within the reactor pressure vessel shall be demonstrated OPERABLE within 7 days prior to the start of such operations by:

a. Demonstrating operation of the overload cutoff on the main hoist when the load exceeds 1150 ± 50 pounds.

b. Demonstrating operation of the hoist loaded control rod block interlock on the main hoist when the load exceeds 485 ± 50 pounds.

c. Demonstrating operation of the redundant loaded interlock on the main hoist when the load exceeds 550 + 0, - 115 pounds.

d. Demonstrating operation of the uptravel interlock when uptravel brings the top of the active fuel to not less than 8 feet 0 inches below the normal water level.

SURVEILLANCE REQUIREMENTS (Continued)

4.9.6.2 The refueling platform frame-mounted auxiliary hoist used for handling of control rods within the reactor pressure vessel shall be demonstrated OPERABLE within 7 days prior to the use of such equipment by:

a. Demonstrating operation of the overload cutoff on the frame mounted hoist when the load exceeds 500 ± 50 pounds.

b. Demonstrating operation of the uptravel mechanical stop on the frame mounted hoist when uptravel brings the top of a control rod to not less than 6 feet 6 inches below the normal fuel storage pool water level.

4.9.6.3 The refueling platform monorail mounted auxiliary hoist used for handling of control rods within the reactor pressure vessel shall be demonstrated OPERABLE within 7 days prior to the use of such equipment by:

a. Demonstrating operation of the overload cutoff on the monorail hoist when the load exceeds 500 ± 50 pounds.

b. Demonstrating operation of the uptravel mechanical stop on the monorail hoist when uptravel brings the top of a control rod to not less than 6 feet 6 inches below the normal fuel storage pool water level.

3/4.9.7 CRANE TRAVEL-SPENT FUEL STORAGE POOL

LIMITING CONDITION FOR OPERATION

3.9.7 Loads in excess of 1200 pounds shall be prohibited from travel over fuel assemblies in the spent fuel storage pool racks.

APPLICABILITY: With fuel assemblies in the spent fuel storage pool racks.

ACTION:

With the requirements of the above specification not satisfied, place the crane load in a safe condition. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.7 Crane interlocks which prevent crane travel over fuel assemblies in the spent fuel storage pool racks shall be demonstrated OPERABLE within 7 days prior to and at least once per 7 days during crane operation.

3/4.9.8 WATER LEVEL - REACTOR VESSEL

LIMITING CONDITION FOR OPERATION

3.9.8 At least 22 feet of water shall be maintained over the top of the reactor pressure vessel flange.

APPLICABILITY: During handling of fuel assemblies or control rods within the reactor pressure vessel while in OPERATIONAL CONDITION 5 when the fuel assemblies being handled are irradiated or the fuel assemblies seated within the reactor vessel are irradiated.

ACTION:

With the requirements of the above specification not satisfied, suspend all operations involving handling of fuel assemblies or control rods within the reactor pressure vessel after placing all fuel assemblies and control rods in a safe condition.

SURVEILLANCE REQUIREMENTS

4.9.8 The reactor vessel water level shall be determined to be at least its minimum required depth at least once per 24 hours during handling of fuel assemblies or control rods within the reactor pressure vessel.

3/4.9.9 WATER LEVEL - SPENT FUEL STORAGE POOL

LIMITING CONDITION FOR OPERATION

3.9.9 At least 22 feet of water shall be maintained over the top of irradiated fuel assemblies seated in the spent fuel storage pool racks.

APPLICABILITY: Whenever irradiated fuel assemblies are in the spent fuel storage pool.

ACTION:

With the requirements of the above specification not satisfied, suspend all movement of fuel assemblies and crane operations with loads in the spent fuel storage pool area after placing the fuel assemblies and crane load in a safe condition. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.9 The water level in the spent fuel storage pool shall be determined to be at least at its minimum required depth at least once per 7 days.

3/4.9.10 CONTROL ROD REMOVAL

SINGLE CONTROL ROD REMOVAL

LIMITING CONDITION FOR OPERATION

3.9.10.1 One control rod and/or the associated control rod drive mechanism may be removed from the core and/or reactor pressure vessel provided that at least the following requirements are satisfied until a control rod and associated control rod drive mechanism are reinstalled and the control rod is fully inserted in the core.

a. The reactor mode switch is OPERABLE and locked in the Shutdown position or in the Refuel position per Table 1.2 and Specification 3.9.1.

b. The source range monitors (SRM) are OPERABLE per Specification 3.9.2.

c. The SHUTDOWN MARGIN requirements of Specification 3.1.1 are satisfied, except that the control rod selected to be removed;

   1. May be assumed to be the highest worth control rod required to be assumed to be fully withdrawn by the SHUTDOWN MARGIN test, and

   2. Need not be assumed to be immovable or untrippable.

d. All other control rods in a five-by-five array centered on the control rod being removed are inserted and electrically or hydraulically disarmed or the four fuel assemblies surrounding the control rod or control rod drive mechanism to be removed from the core and/or reactor vessel are removed from the core cell.

e. All other control rods are inserted.

APPLICABILITY: OPERATIONAL CONDITIONS 4 and 5.

ACTION:

With the requirements of the above specification not satisfied, suspend removal of the control rod and/or associated control rod drive mechanism from the core and/or reactor pressure vessel and initiate action to satisfy the above requirements.

SURVEILLANCE REQUIREMENTS

4.9.10.1 Within 4 hours prior to the start of removal of a control rod and/or the associated control rod drive mechanism from the core and/or reactor pressure vessel and at least once per 24 hours thereafter until a control rod and associated control rod drive mechanism are reinstalled and the control rod is inserted in the core, verify that:

a. The reactor mode switch is OPERABLE per Surveillance Requirement 4.3.1.1 or 4.9.1.2, as applicable, and locked in the Shutdown position or in the Refuel position with the "one rod out" Refuel position interlock OPERABLE per Specification 3.9.1.

b. The SRM channels are OPERABLE per Specification 3.9.2.

c. The SHUTDOWN MARGIN requirements of Specification 3.1.1 are satisfied per Specification 3.9.10.1c.

d. All other control rods in a five-by-five array centered on the control rod being removed are inserted and electrically or hydraulically disarmed or the four fuel assemblies surrounding the control rod or control rod drive mechanism to be removed from the core and/or reactor vessel are removed from the core cell.

e. All other control rods are inserted.

MULTIPLE CONTROL ROD REMOVAL

LIMITING CONDITION FOR OPERATION

3.9.10.2 Any number of control rods and/or control rod drive mechanisms may be removed from the core and/or reactor pressure vessel provided that at least the following requirements are satisfied until all control rods and control rod drive mechanisms are reinstalled and all control rods are inserted in the core.

a. The reactor mode switch is OPERABLE and locked in the Shutdown position or in the Refuel position per Specification 3.9.1, except that the Refuel position "one-rod-out" interlock may be bypassed, as required, for those control rods and/or control rod drive mechanisms to be removed, after the fuel assemblies have been removed as specified below.

b. The source range monitors (SRM) are OPERABLE per Specification 3.9.2.

c. The SHUTDOWN MARGIN requirements of Specification 3.1.1 are satisfied.

d. All other control rods are either inserted or have the surrounding four fuel assemblies removed from the core cell.

e. The four fuel assemblies surrounding each control rod or control rod drive mechanism to be removed from the core and/or reactor vessel are removed from the core cell.

APPLICABILITY: OPERATIONAL CONDITION 5.

ACTION:

With the requirements of the above specification not satisfied, suspend removal of control rods and/or control rod drive mechanisms from the core and/or reactor pressure vessel and initiate action to satisfy the above requirements.

SURVEILLANCE REQUIREMENTS

4.9.10.2.1 Within 4 hours prior to the start of removal of control rods and/or control rod drive mechanisms from the core and/or reactor pressure vessel and at least once per 24 hours thereafter until all control rods and control rod drive mechanisms are reinstalled and all control rods are inserted in the core, verify that:

a. The reactor mode switch is OPERABLE per Surveillance Requirement 4.3.1.1 or 4.9.1.2, as applicable, and locked in the Shutdown position or in the Refuel position per Specification 3.9.1.

b. The SRM channels are OPERABLE per Specification 3.9.2.

c. The SHUTDOWN MARGIN requirements of Specification 3.1.1 are satisfied.

d. All other control rods are either inserted or have the surrounding four fuel assemblies removed from the core cell.

e. The four fuel assemblies surrounding each control rod and/or control rod drive mechanism to be removed from the core and/or reactor vessel are removed from the core cell.

4.9.10.2.2 Following replacement of all control rods and/or control rod drive mechanisms removed in accordance with this specification, perform a functional test of the "one-rod-out" Refuel position interlock, if this function had been bypassed.

3/4.9.11 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

HIGH WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.11.1 One (1) RHR shutdown cooling subsystem shall be OPERABLE and in operation. *

APPLICABILITY: OPERATIONAL CONDITION 5, when irradiated fuel is in the reactor vessel and the water level is greater than or equal to 22 feet above the top of the reactor pressure vessel flange.

ACTION:

a. With the required RHR shutdown cooling subsystem inoperable:

1. Within one (1) hour, and once per 24 hours thereafter, verify an alternate method of decay heat removal is available.

b. With the required action and associated completion time of Action "a" above not met.

1. Immediately suspend loading of irradiated fuel assemblies into the reactor pressure vessel; and

2. Immediately initiate action to restore REFUELING FLOOR SECONDARY CONTAINMENT INTEGRITY to OPERABLE status; and

3. Immediately initiate action to restore one (1) Standby Gas Treatment subsystem to OPERABLE status; and

4. Immediately initiate action to restore isolation capability in each required Refueling Floor secondary containment penetration flow path not isolated.

c. With no RHR shutdown cooling subsystem in operation:

1. Within one (1) hour from discovery of no reactor coolant circulation, and once per 12 hours thereafter, verify reactor coolant circulation by an alternate method; and

2. Once per hour monitor reactor coolant temperature.

SURVEILLANCE REQUIREMENTS

4.9.11.1 At least one (1) RHR shutdown cooling subsystem, or an alternate method, shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

---

* The required RHR shutdown cooling subsystem may be removed from operation for up to two (2) hours per eight (8) hour period.

LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.11.2 Two (2) RHR shutdown cooling subsystems shall be OPERABLE, and one (1) RHR shutdown cooling subsystem shall be in operation. *

APPLICABILITY: OPERATIONAL CONDITION 5, when irradiated fuel is in the reactor vessel and the water level is less than 22 feet above the top of the reactor pressure vessel flange.

ACTION:

a. With one (1) or two (2) required RHR shutdown cooling subsystems inoperable:

   1. Within one (1) hour, and once per 24 hours thereafter, verify an alternate method of decay heat removal is available for each inoperable required RHR shutdown cooling subsystem.

b. With the required action and associated completion time of Action "a" above not met:

   1. Immediately initiate action to restore REFUELING FLOOR SECONDARY CONTAINMENT INTEGRITY to OPERABLE status; and

   2. Immediately initiate action to restore one (1) Standby Gas Treatment subsystem to OPERABLE status; and

   3. Immediately initiate action to restore isolation capability in each required Refueling Floor secondary containment penetration flow path not isolated.

c. With no RHR shutdown cooling subsystem in operation:

   1. Within one (1) hour from discovery of no reactor coolant circulation, and once per 12 hours thereafter, verify reactor coolant circulation by an alternate method; and

   2. Once per hour monitor reactor coolant temperature.

SURVEILLANCE REQUIREMENTS

4.9.11.2 At least one (1) RHR shutdown cooling subsystem, or an alternate method, shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

---

* The required operating shutdown cooling subsystem may be removed from operation for up to two (2) hours per eight (8) hour period.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Rod Pattern Control

LCO 3.1.6 OPERABLE control rods shall comply with the requirements of the banked position withdrawal sequence (BPWS).

APPLICABILITY: MODES 1 and 2 with THERMAL POWER ≤ 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more OPERABLE control rods not in compliance with BPWS.	A.1 --------NOTE--------- Rod worth minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation." --------------------- Move associated control rod(s) to correct position.	8 hours
	<u>OR</u>	
	A.2 Declare associated control rod(s) inoperable.	8 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Nine or more OPERABLE control rods not in compliance with BPWS.	B.1	--------NOTE--------- RWM may be bypassed as allowed by LCO 3.3.2.1. --------------------- Suspend withdrawal of control rods.	Immediately
	AND		
	B.2	Place the reactor mode switch in the shutdown position.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.6.1	Verify all OPERABLE control rods comply with BPWS.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Standby Liquid Control (SLC) System

LCO 3.1.7 Two SLC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Concentration of boron in solution > 9.82% weight.	A.1 Verify the concentration and temperature of boron in solution and pump suction piping temperature are within the limits of Figure 3.1.7-1. AND A.2 Restore concentration of boron in solution to ≤ 9.82% weight.	8 hours AND Once per 12 hours thereafter 72 hours AND 10 days from discovery of failure to meet the LCO
B. One SLC subsystem inoperable for reasons other than Condition A.	B.1 Restore SLC subsystem to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Two SLC subsystems inoperable for reasons other than Condition A.	C.1	Restore one SLC subsystem to OPERABLE status.	8 hours
D. Required Action and associated Completion Time not met.	D.1	Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify level of sodium pentaborate solution in the SLC tank is ≥ 46%.	24 hours
SR 3.1.7.2	Verify temperature of sodium pentaborate solution is ≥ 53°F.	24 hours
SR 3.1.7.3	Verify temperature of pump suction piping is ≥ 53°F.	24 hours
SR 3.1.7.4	Verify continuity of explosive charge.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.7.5	Verify the concentration of boron in solution is ≤ 9.82% weight and within the limits of Table 3.1.7-1.	31 days AND Once within 24 hours after water or boron is added to solution AND Once within 24 hours after solution temperature is restored within limits
SR 3.1.7.6	Verify each SLC subsystem manual and power operated valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position, or can be aligned to the correct position.	31 days
SR 3.1.7.7	Verify the quantity of B-10 stored in the SLC tank is ≥ 162.7 lbm.	31 days
SR 3.1.7.8	Verify each pump develops a flow rate ≥ 43.0 gpm at a discharge pressure ≥ 1255 psig.	In accordance with the Inservice Testing Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.7.9	Verify flow through one SLC subsystem from pump into reactor pressure vessel.	24 months on a STAGGERED TEST BASIS
SR 3.1.7.10	Verify sodium pentaborate atom percent B-10 enrichment is within the limits of Table 3.1.7-1.	Once within 8 hours after addition to SLC tank

Table 3.1.7-1 (page 1 of 1)
Standby Liquid Control System Boron Concentration,
Pump Flow Rate, and Boron Enrichment Limits

The combination of SLC System boron concentration, pump flow rate, and boron enrichment shall be in accordance with the following equation:

$$\frac{C}{13\%\ \text{weight}} \times \frac{Q}{86\ \text{gpm}} \times \frac{E}{19.8\%\ \text{atom}} \geq 1$$

where,

C = % weight sodium pentaborate solution concentration,

Q = Pump flow rate (gpm) at a discharge pressure of ≥ 1255 psig, and

E = Boron-10 enrichment (% atom Boron-10).

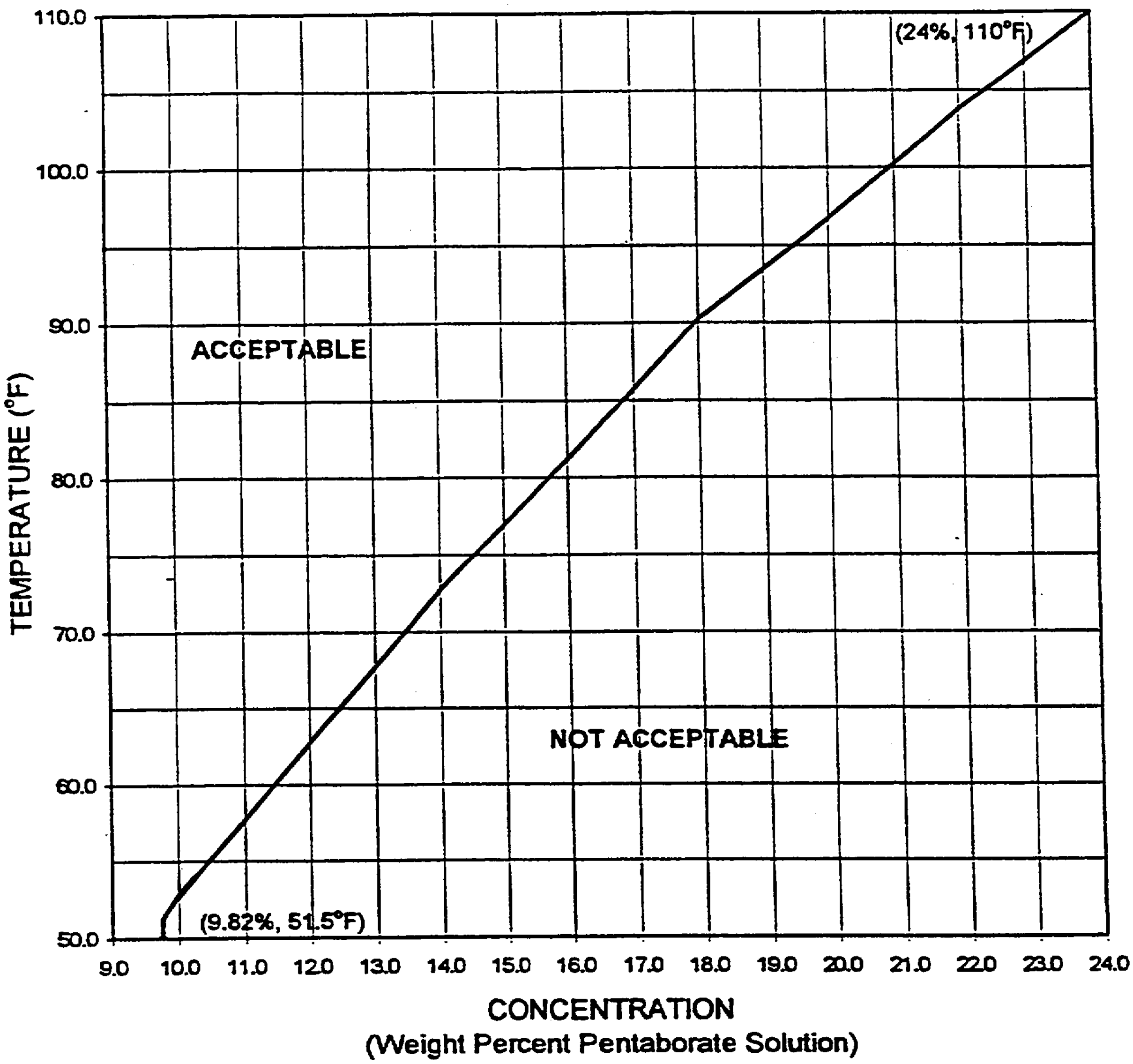

Figure 3.1.7-1 (page 1 of 1)
Sodium Pentaborate Solution Temperature Versus Concentration Requirements

3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 Scram Discharge Volume (SDV) Vent and Drain Valves

LCO 3.1.8 Each SDV vent and drain valve shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----------------------------------NOTE-----------------------------------
Separate Condition entry is allowed for each SDV vent and drain line.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more SDV vent or drain lines with one valve inoperable.	A.1	Restore valve to OPERABLE status.	7 days
B. One or more SDV vent or drain lines with both valves inoperable.	B.1	--------NOTE--------- An isolated line may be unisolated under administrative control to allow draining and venting of the SDV. ---------------------	
		Isolate the associated line.	8 hours
C. Required Action and associated Completion Time not met.	C.1	Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.8.1	-------------------NOTE------------------- Not required to be met on vent and drain valves closed during performance of SR 3.1.8.2 or SR 3.3.1.1.9 for Function 13 of Table 3.3.1.1-1. -- Verify each SDV vent and drain valve is open.	31 days
SR 3.1.8.2	Cycle each SDV vent and drain valve to the fully closed and fully open position.	92 days
SR 3.1.8.3	Verify each SDV vent and drain valve closes in ≤ 15 seconds after receipt of an actual or simulated scram signal.	24 months

3.3 INSTRUMENTATION

3.3.1.2 Wide Range Neutron Monitor (WRNM) Instrumentation

LCO 3.3.1.2 The WRNM instrumentation in Table 3.3.1.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1.2-1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required WRNMs inoperable in MODE 2.	A.1 Restore required WRNMs to OPERABLE status.	4 hours
B. Three required WRNMs inoperable in MODE 2.	B.1 Suspend control rod withdrawal.	Immediately
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One or more required WRNMs inoperable in MODE 3 or 4.	D.1	Fully insert all insertable control rods.	1 hour
	AND		
	D.2	Place reactor mode switch in the shutdown position.	1 hour
E. One or more required WRNMs inoperable in MODE 5.	E.1	Suspend CORE ALTERATIONS except for control rod insertion.	Immediately
	AND		
	E.2	Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

-----NOTE-----

Refer to Table 3.3.1.2-1 to determine which SRs apply for each applicable MODE or other specified conditions.

SURVEILLANCE		FREQUENCY
SR 3.3.1.2.1	Perform CHANNEL CHECK.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.2.2	------------------NOTES------------------ 1. Only required to be met during CORE ALTERATIONS. 2. One WRNM may be used to satisfy more than one of the following. --- Verify an OPERABLE WRNM detector is located in: a. The fueled region; b. The core quadrant where CORE ALTERATIONS are being performed, when the associated WRNM is included in the fueled region; and c. A core quadrant adjacent to where CORE ALTERATIONS are being performed, when the associated WRNM is included in the fueled region.	12 hours
SR 3.3.1.2.3	Perform CHANNEL CHECK.	24 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.2.4	-------------------NOTES------------------- 1. Not required to be met with less than or equal to four fuel assemblies adjacent to the WRNM and no other fuel assemblies in the associated core quadrant. 2. Not required to be met during spiral unloading. --- Verify count rate is: a. ≥ 3.0 cps; or b. Within the limits of Figure 3.3.1.2-1.	12 hours during CORE ALTERATIONS <u>AND</u> 24 hours
SR 3.3.1.2.5	-------------------NOTE------------------- Not required to be performed until 12 hours after WRNMs indicate 125E-5 % power or below. --- Perform CHANNEL FUNCTIONAL TEST and determination of signal to noise ratio.	31 days
SR 3.3.1.2.6	-------------------NOTES------------------- 1. Neutron detectors are excluded. 2. Not required to be performed until 12 hours after WRNMs indicate 125E-5 % power or below. --- Perform CHANNEL CALIBRATION.	24 months

Table 3.3.1.2-1 (page 1 of 1)
Wide Range Neutron Monitor Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1. Wide Range Neutron Monitor	2[(a)]	3[(d)]	SR 3.3.1.2.1 SR 3.3.1.2.4 SR 3.3.1.2.5 SR 3.3.1.2.6
	3,4	2	SR 3.3.1.2.3 SR 3.3.1.2.4 SR 3.3.1.2.5 SR 3.3.1.2.6
	5	2[(b)(c)]	SR 3.3.1.2.1 SR 3.3.1.2.2 SR 3.3.1.2.4 SR 3.3.1.2.5 SR 3.3.1.2.6

(a) With WRNMs reading 125E-5 % power or below.

(b) Only one WRNM channel is required to be OPERABLE during spiral offload or reload when the fueled region includes only that WRNM detector.

(c) Special movable detectors may be used in place of WRNMs if connected to normal WRNM circuits.

(d) Channels must be in 3 of 4 core quadrants.

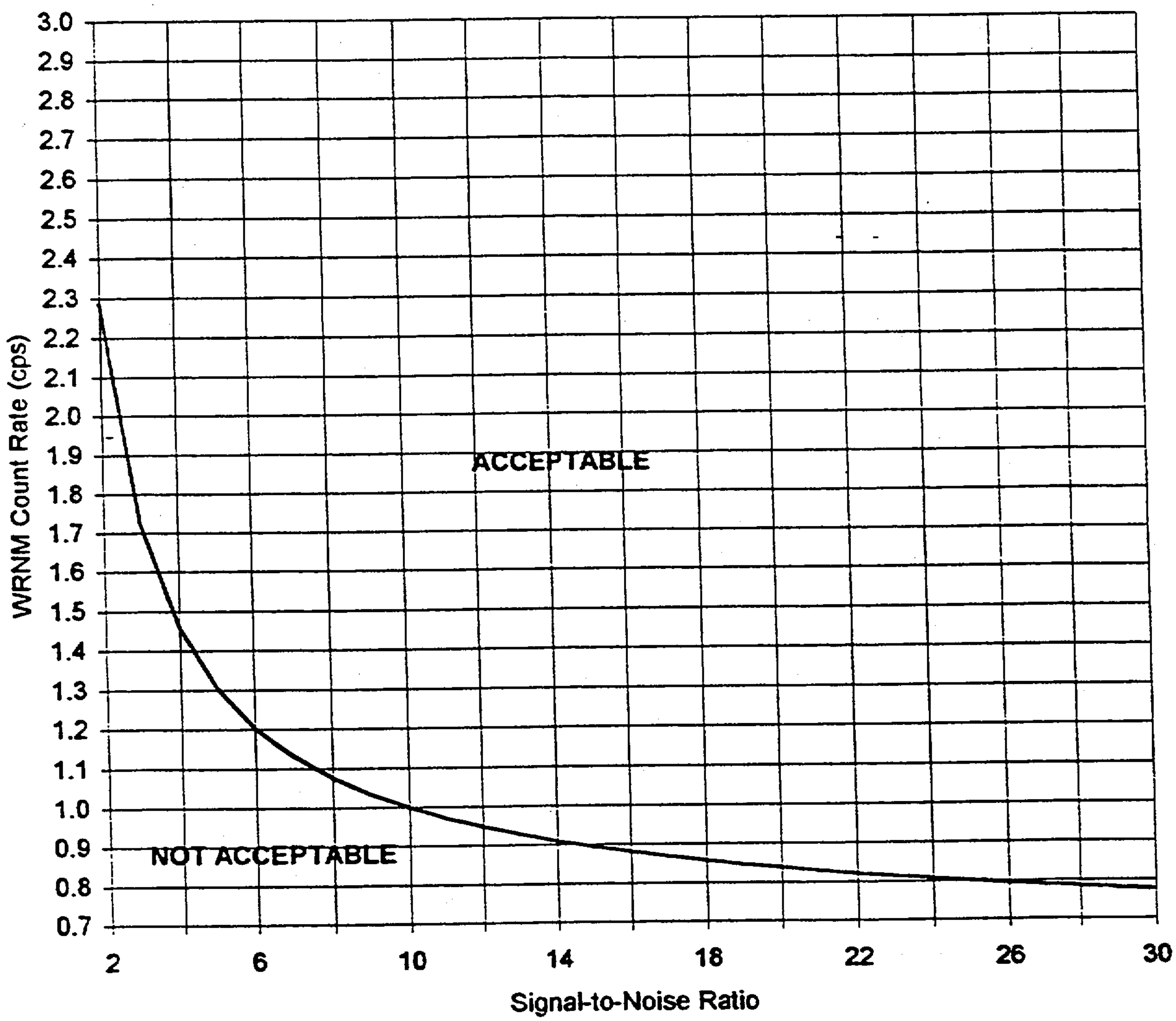

Figure 3.3.1.2-1 (page 1 of 1)
Minimum WRNM Count Rate Versus Signal to Noise Ratio

3.6 CONTAINMENT SYSTEMS

3.6.4.1 Secondary Containment

LCO 3.6.4.1 The secondary containment shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS,
During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Secondary containment inoperable in MODE 1, 2, or 3.	A.1 Restore secondary containment to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours
C. Secondary containment inoperable during movement of irradiated fuel assemblies in the secondary containment, during CORE ALTERATIONS, or during OPDRVs.	C.1 --------NOTE--------- LCO 3.0.3 is not applicable. --------------------- Suspend movement of irradiated fuel assemblies in the secondary containment. AND	 Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	C.3 Initiate action to suspend OPDRVs.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1.1	Verify all secondary containment equipment hatches are closed and sealed.	31 days
SR 3.6.4.1.2	Verify one secondary containment access door in each access opening is closed.	31 days
SR 3.6.4.1.3	Verify each standby gas treatment (SGT) subsystem will draw down the secondary containment to $\geq$ 0.25 inch of vacuum water gauge in $\leq$ 120 seconds.	24 months on a STAGGERED TEST BASIS
SR 3.6.4.1.4	Verify each SGT subsystem can maintain $\geq$ 0.25 inch of vacuum water gauge in the secondary containment for 1 hour at a flow rate $\leq$ 10,500 cfm.	24 months on a STAGGERED TEST BASIS

3.6 CONTAINMENT SYSTEMS

3.6.4.2 Secondary Containment Isolation Valves (SCIVs)

LCO 3.6.4.2 Each SCIV shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS,
During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

-----NOTES-----

1. Penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by SCIVs.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more penetration flow paths with one SCIV inoperable.	A.1	Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	8 hours
	<u>AND</u>		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2	--------NOTE--------- Isolation devices in high radiation areas may be verified by use of administrative means. -------------------- Verify the affected penetration flow path is isolated.	 Once per 31 days
B. ---------NOTE--------- Only applicable to penetration flow paths with two isolation valves. ---------------------- One or more penetration flow paths with two SCIVs inoperable.	B.1	Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	4 hours
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	C.1 __AND__ C.2	Be in MODE 3. Be in MODE 4.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Required Action and associated Completion Time of Condition A or B not met during movement of irradiated fuel assemblies in the secondary containment, during CORE ALTERATIONS, or during OPDRVs.	D.1	--------NOTE--------- LCO 3.0.3 is not applicable. --------------------- Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	<u>AND</u>		
	D.2	Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>		
	D.3	Initiate action to suspend OPDRVs.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.2.1	------------------NOTES------------------ 1. Valves and blind flanges in high radiation areas may be verified by use of administrative means. 2. Not required to be met for SCIVs that are open under administrative controls. --- Verify each secondary containment isolation manual valve and blind flange that is required to be closed during accident conditions is closed.	31 days
SR 3.6.4.2.2	Verify the isolation time of each power operated and each automatic SCIV is within limits.	In accordance with the Inservice Testing Program
SR 3.6.4.2.3	Verify each automatic SCIV actuates to the isolation position on an actual or simulated actuation signal.	24 months

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LCO 3.6.4.3 Two SGT subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS,
During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem inoperable.	A.1 Restore SGT subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the secondary containment, during CORE ALTERATIONS, or during OPDRVs.	------------NOTE------------ LCO 3.0.3 is not applicable. ---------------------------- C.1 Place OPERABLE SGT subsystem in operation. OR	Immediately (continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. (continued)	C.2.1	Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
		AND	
	C.2.2	Suspend CORE ALTERATIONS.	Immediately
		AND	
	C.2.3	Initiate action to suspend OPDRVs.	Immediately
D. Two SGT subsystems inoperable in MODE 1, 2, or 3.	D.1	Enter LCO 3.0.3	Immediately
E. Two SGT subsystems inoperable during movement of irradiated fuel assemblies in the secondary containment, during CORE ALTERATIONS, or during OPDRVs.	E.1	--------NOTE--------- LCO 3.0.3 is not applicable. -------------------- Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	AND		
	E.2	Suspend CORE ALTERATIONS.	Immediately
	AND		
	E.3	Initiate action to suspend OPDRVs.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.3.1	Operate each SGT subsystem for ≥ 15 minutes with heaters operating.	31 days
SR 3.6.4.3.2	Perform required SGT filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.6.4.3.3	Verify each SGT subsystem actuates on an actual or simulated initiation signal.	24 months

3.9 REFUELING OPERATIONS

3.9.1 Refueling Equipment Interlocks

LCO 3.9.1 The refueling equipment interlocks shall be OPERABLE.

APPLICABILITY: During in-vessel fuel movement with equipment associated with the interlocks.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required refueling equipment interlocks inoperable.	A.1 Suspend in-vessel fuel movement with equipment associated with the inoperable interlock(s).	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.1.1	Perform CHANNEL FUNCTIONAL TEST on each of the following required refueling equipment interlock inputs: a. All-rods-in, b. Refuel platform position, c. Refuel platform fuel grapple, fuel loaded, d. Refuel platform frame mounted auxiliary hoist, fuel loaded, e. Refuel platform monorail mounted hoist, fuel loaded.	7 days

3.9 REFUELING OPERATIONS

3.9.2 Refuel Position One-Rod-Out Interlock

LCO 3.9.2 The refuel position one-rod-out interlock shall be OPERABLE.

APPLICABILITY: MODE 5 with the reactor mode switch in the refuel position and any control rod withdrawn.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Refuel position one-rod-out interlock inoperable.	A.1 Suspend control rod withdrawal.	Immediately
	<u>AND</u>	
	A.2 Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.2.1	Verify reactor mode switch locked in refuel position.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.9.2.2	-------------------NOTE------------------- Not required to be performed until 1 hour after any control rod is withdrawn. -- Perform CHANNEL FUNCTIONAL TEST.	7 days

3.9 REFUELING OPERATIONS

3.9.3 Control Rod Position

LCO 3.9.3 All control rods shall be fully inserted.

APPLICABILITY: When loading fuel assemblies into the core.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more control rods not fully inserted.	A.1 Suspend loading fuel assemblies into the core.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.9.3.1 Verify all control rods are fully inserted.	12 hours

3.9 REFUELING OPERATIONS

3.9.4 Control Rod Position Indication

LCO 3.9.4 The control rod "full-in" position indication for each control rod shall be OPERABLE.

APPLICABILITY: MODE 5.

ACTIONS

---------------------------------NOTE---------------------------------
Separate Condition entry is allowed for each required position indication.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required control rod position indications inoperable.	A.1.1 Suspend in-vessel fuel movement.	Immediately
	<u>AND</u>	
	A.1.2 Suspend control rod withdrawal.	Immediately
	<u>AND</u>	
	A.1.3 Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately
	<u>OR</u>	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.1 Initiate action to fully insert the control rod associated with the inoperable position indicator. <u>AND</u> A.2.2 Initiate action to disarm the control rod drive associated with the fully inserted control rod.	Immediately Immediately

SURVEILLANCE REQUIREMENT

SURVEILLANCE		FREQUENCY
SR 3.9.4.1	Verify the required position indication has no "full-in" indication on each control rod that is not "full-in."	Each time the control rod is withdrawn from the "full-in" position

3.9 REFUELING OPERATIONS

3.9.5 Control Rod OPERABILITY—Refueling

LCO 3.9.5 Each withdrawn control rod shall be OPERABLE.

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more withdrawn control rods inoperable.	A.1 Initiate action to fully insert inoperable withdrawn control rods.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.5.1	-------------------NOTE------------------- Not required to be performed until 7 days after the control rod is withdrawn. -- Insert each withdrawn control rod at least one notch.	7 days
SR 3.9.5.2	Verify each withdrawn control rod scram accumulator pressure is ≥ 940 psig.	7 days

3.9 REFUELING OPERATIONS

3.9.6 Reactor Pressure Vessel (RPV) Water Level

LCO 3.9.6 RPV water level shall be ≥ 458 inches above RPV instrument zero.

APPLICABILITY: During movement of irradiated fuel assemblies within the RPV,
During movement of new fuel assemblies or handling of control rods within the RPV, when irradiated fuel assemblies are seated within the RPV.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RPV water level not within limit.	A.1 Suspend movement of fuel assemblies and handling of control rods within the RPV.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.6.1	Verify RPV water level is ≥ 458 inches above RPV instrument zero.	24 hours

3.9 REFUELING OPERATIONS

3.9.7 Residual Heat Removal (RHR)—High Water Level

LCO 3.9.7 One RHR shutdown cooling subsystem shall be OPERABLE and in operation.

---------------------------NOTE---------------------------
The required RHR shutdown cooling subsystem may be removed from operation for up to 2 hours per 8 hour period.

APPLICABILITY: MODE 5 with irradiated fuel in the reactor pressure vessel (RPV) and the water level ≥ 458 inches above RPV instrument zero.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Required RHR shutdown cooling subsystem inoperable.	A.1	Verify an alternate method of decay heat removal is available.	1 hour AND Once per 24 hours thereafter
B. Required Action and associated Completion Time of Condition A not met.	B.1	Suspend loading irradiated fuel assemblies into the RPV.	Immediately
	AND		
	B.2	Initiate action to restore secondary containment to OPERABLE status.	Immediately
	AND		
			(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.3	Initiate action to restore one standby gas treatment subsystem for Unit 2 to OPERABLE status.	Immediately
	<u>AND</u>		
	B.4	Initiate action to restore isolation capability in each required secondary containment penetration flow path not isolated.	Immediately
C. No RHR shutdown cooling subsystem in operation.	C.1	Verify reactor coolant circulation by an alternate method.	1 hour from discovery of no reactor coolant circulation <u>AND</u> Once per 12 hours thereafter
	<u>AND</u>		
	C.2	Monitor reactor coolant temperature.	Once per hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.7.1	Verify one RHR shutdown cooling subsystem is operating.	12 hours

3.9 REFUELING OPERATIONS

3.9.8 Residual Heat Removal (RHR)—Low Water Level

LCO 3.9.8 Two RHR shutdown cooling subsystems shall be OPERABLE, and one RHR shutdown cooling subsystem shall be in operation.

---NOTE---
The required operating shutdown cooling subsystem may be removed from operation for up to 2 hours per 8 hour period.

APPLICABILITY: MODE 5 with irradiated fuel in the reactor pressure vessel (RPV) and the water level < 458 inches above RPV instrument zero.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or two required RHR shutdown cooling subsystems inoperable.	A.1	Verify an alternate method of decay heat removal is available for each inoperable required RHR shutdown cooling subsystem.	1 hour <u>AND</u> Once per 24 hours thereafter
B. Required Action and associated Completion Time of Condition A not met.	B.1 <u>AND</u>	Initiate action to restore secondary containment to OPERABLE status.	Immediately (continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.2	Initiate action to restore one standby gas treatment subsystem for Unit 2 to OPERABLE status.	Immediately
	<u>AND</u>		
	B.3	Initiate action to restore isolation capability in each required secondary containment penetration flow path not isolated.	Immediately
C. No RHR shutdown cooling subsystem in operation.	C.1	Verify reactor coolant circulation by an alternate method.	1 hour from discovery of no reactor coolant circulation <u>AND</u> Once per 12 hours thereafter
	<u>AND</u>		
	C.2	Monitor reactor coolant temperature.	Once per hour

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.9.8.1	Verify one RHR shutdown cooling subsystem is operating.	12 hours

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.6 Rod Pattern Control

BASES

BACKGROUND

Control rod patterns during startup conditions are controlled by the operator and the rod worth minimizer (RWM) (LCO 3.3.2.1, "Control Rod Block Instrumentation"), so that only specified control rod sequences and relative positions are allowed over the operating range of all control rods inserted to 10% RTP. The sequences limit the potential amount of reactivity addition that could occur in the event of a Control Rod Drop Accident (CRDA).

This Specification assures that the control rod patterns are consistent with the assumptions of the CRDA analyses of References 1 and 2.

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the CRDA are summarized in References 1 and 2. CRDA analyses assume that the reactor operator follows prescribed withdrawal sequences. These sequences define the potential initial conditions for the CRDA analysis. The RWM (LCO 3.3.2.1) provides backup to operator control of the withdrawal sequences to ensure that the initial conditions of the CRDA analysis are not violated.

Prevention or mitigation of positive reactivity insertion events is necessary to limit the energy deposition in the fuel, thereby preventing significant fuel damage which could result in the undue release of radioactivity. Since the failure consequences for UO_2 have been shown to be insignificant below fuel energy depositions of 300 cal/gm (Ref. 3), the fuel damage limit of 280 cal/gm provides a margin of safety from significant core damage which would result in release of radioactivity (Refs. 4 and 5). Generic evaluations (Refs. 1 and 6) of a design basis CRDA (i.e., a CRDA resulting in a peak fuel energy deposition of 280 cal/gm) have shown that if the peak fuel enthalpy remains below 280 cal/gm, then the maximum reactor pressure will be less than the required ASME Code limits (Ref. 7) and the calculated offsite doses will be well within the required limits (Ref. 5).

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)	Control rod patterns analyzed in Reference 1 follow the banked position withdrawal sequence (BPWS). The BPWS is applicable from the condition of all control rods fully inserted to 10% RTP (Ref. 2). For the BPWS, the control rods are required to be moved in groups, with all control rods assigned to a specific group required to be within specified banked positions (e.g., between notches 08 and 12). The banked positions are established to minimize the maximum incremental control rod worth without being overly restrictive during normal plant operation. Generic analysis of the BPWS (Ref. 1) has demonstrated that the 280 cal/gm fuel damage limit will not be violated during a CRDA while following the BPWS mode of operation. The generic BPWS analysis (Ref. 8) also evaluates the effect of fully inserted, inoperable control rods not in compliance with the sequence, to allow a limited number (i.e., eight) and distribution of fully inserted, inoperable control rods. Rod pattern control satisfies Criterion 3 of the NRC Policy Statement.
LCO	Compliance with the prescribed control rod sequences minimizes the potential consequences of a CRDA by limiting the initial conditions to those consistent with the BPWS. This LCO only applies to OPERABLE control rods. For inoperable control rods required to be inserted, separate requirements are specified in LCO 3.1.3, "Control Rod OPERABILITY," consistent with the allowances for inoperable control rods in the BPWS.
APPLICABILITY	In MODES 1 and 2, when THERMAL POWER is ≤ 10% RTP, the CRDA is a Design Basis Accident and, therefore, compliance with the assumptions of the safety analysis is required. When THERMAL POWER is > 10% RTP, there is no credible control rod configuration that results in a control rod worth that could exceed the 280 cal/gm fuel damage limit during a CRDA (Ref. 2). In MODES 3, 4, and 5, since the reactor is shut down and only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will remain subcritical with a single control rod withdrawn.

(continued)

BASES (continued)

ACTIONS

A.1 and A.2

With one or more OPERABLE control rods not in compliance with the prescribed control rod sequence, actions may be taken to either correct the control rod pattern or declare the associated control rods inoperable within 8 hours. Noncompliance with the prescribed sequence may be the result of "double notching," drifting from a control rod drive cooling water transient, leaking scram valves, or a power reduction to ≤ 10% RTP before establishing the correct control rod pattern. The number of OPERABLE control rods not in compliance with the prescribed sequence is limited to eight, to prevent the operator from attempting to correct a control rod pattern that significantly deviates from the prescribed sequence. When the control rod pattern is not in compliance with the prescribed sequence, all control rod movement must be stopped except for moves needed to correct the rod pattern, or scram if warranted.

Required Action A.1 is modified by a Note which allows the RWM to be bypassed to allow the affected control rods to be returned to their correct position. LCO 3.3.2.1 requires verification of control rod movement by a second licensed operator or a qualified member of the technical staff (i.e., personnel trained in accordance with an approved training program). This ensures that the control rods will be moved to the correct position. A control rod not in compliance with the prescribed sequence is not considered inoperable except as required by Required Action A.2. The allowed Completion Time of 8 hours is reasonable, considering the restrictions on the number of allowed out of sequence control rods and the low probability of a CRDA occurring during the time the control rods are out of sequence.

B.1 and B.2

If nine or more OPERABLE control rods are out of sequence, the control rod pattern significantly deviates from the prescribed sequence. Control rod withdrawal should be suspended immediately to prevent the potential for further deviation from the prescribed sequence. Control rod insertion to correct control rods withdrawn beyond their allowed position is allowed since, in general, insertion of

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

control rods has less impact on control rod worth than withdrawals have. Required Action B.1 is modified by a Note which allows the RWM to be bypassed to allow the affected control rods to be returned to their correct position.

LCO 3.3.2.1 requires verification of control rod movement by a second licensed operator or a qualified member of the technical staff.

When nine or more OPERABLE control rods are not in compliance with BPWS, the reactor mode switch must be placed in the shutdown position within 1 hour. With the mode switch in shutdown, the reactor is shut down, and as such, does not meet the applicability requirements of this LCO. The allowed Completion Time of 1 hour is reasonable to allow insertion of control rods to restore compliance, and is appropriate relative to the low probability of a CRDA occurring with the control rods out of sequence.

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1

The control rod pattern is verified to be in compliance with the BPWS at a 24 hour Frequency to ensure the assumptions of the CRDA analyses are met. The 24 hour Frequency was developed considering that the primary check on compliance with the BPWS is performed by the RWM (LCO 3.3.2.1), which provides control rod blocks to enforce the required sequence and is required to be OPERABLE when operating at ≤ 10% RTP.

REFERENCES

1. NEDE-24011-P-A-10-US, "General Electric Standard Application for Reactor Fuel, Supplement for United States," Section 2.2.3.1, February 1991.
2. Letter (BWROG-8644) from T. Pickens (BWROG) to G. C. Lainas (NRC), "Amendment 17 to General Electric Licensing Topical Report NEDE-24011-P-A."
3. UFSAR, Section 14.6.2.3.
4. NUREG-0800, Section 15.4.9, Revision 2, July 1981.
5. 10 CFR 100.11.

(continued)

BASES

REFERENCES (continued)

6. NEDO-21778-A, "Transient Pressure Rises Affected Fracture Toughness Requirements for Boiling Water Reactors," December 1978.

7. ASME, Boiler and Pressure Vessel Code.

8. NEDO-21231, "Banked Position Withdrawal Sequence," January 1977.

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.7 Standby Liquid Control (SLC) System

BASES

BACKGROUND

The SLC System is designed to provide the capability of bringing the reactor, at any time in a fuel cycle, from full power and minimum control rod inventory (which is at the peak of the xenon transient) to a subcritical condition with the reactor in the most reactive, xenon free state without taking credit for control rod movement. The SLC System satisfies the requirements of 10 CFR 50.62 (Ref. 1) on anticipated transient without scram using enriched boron.

Reference 1 requires a SLC System with a minimum flow capacity and boron content equivalent in control capacity to 86 gpm of 13 weight percent sodium pentaborate solution. Natural sodium pentaborate solution is 19.8% atom Boron-10. Therefore, the system parameters of concern, boron concentration (C), SLC pump flow rate (Q), and Boron-10 enrichment (E), may be expressed as a multiple of ratios. The expression is as follows:

$$\frac{C}{13\%\ \text{weight}} \times \frac{Q}{86\ \text{gpm}} \times \frac{E}{19.8\%\ \text{atom}}$$

If the product of this expression is ≥ 1, then the SLC System satisfies the criteria of Reference 1. As such, the equation forms the basis for acceptance criteria for the surveillances of concentration, flow rate, and boron enrichment and is presented in Table 3.1.7-1.

The SLC System consists of a boron solution storage tank, two positive displacement pumps, two explosive valves that are provided in parallel for redundancy, and associated piping and valves used to transfer borated water from the storage tank to the reactor pressure vessel (RPV). The borated solution is discharged near the bottom of the core shroud, where it then mixes with the cooling water rising through the core. A smaller tank containing demineralized water is provided for testing purposes.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The SLC System is manually initiated from the main control room, as directed by the emergency operating procedures, if the operator believes the reactor cannot be shut down, or kept shut down, with the control rods. The SLC System is used in the event that enough control rods cannot be inserted to accomplish shutdown and cooldown in the normal manner. The SLC System injects borated water into the reactor core to add negative reactivity to compensate for all of the various reactivity effects that could occur during plant operations. To meet this objective, it is necessary to inject a quantity of boron, which produces a concentration of 660 ppm of natural boron, in the reactor coolant at 68°F. To allow for potential leakage and imperfect mixing in the reactor system, an additional amount of boron equal to 25% of the amount cited above is added (Ref. 2). The minimum mass of Boron-10 (162.7 lbm) needed for injection is calculated such that the required quantity is achieved accounting for dilution in the RPV with normal water level and including the water volume in the residual heat removal shutdown cooling piping and in the recirculation loop piping. This quantity of borated solution is the amount that is above the pump suction shutoff level in the boron solution storage tank. No credit is taken for the portion of the tank volume that cannot be injected. The maximum concentration of sodium pentaborate listed in Table 3.1.7-1 has been established to ensure that the solution saturation temperature does not exceed 43°F.

The SLC System satisfies Criterion 4 of the NRC Policy Statement.

LCO

The OPERABILITY of the SLC System provides backup capability for reactivity control independent of normal reactivity control provisions provided by the control rods. The OPERABILITY of the SLC System is based on the conditions of the borated solution in the storage tank and the availability of a flow path to the RPV, including the OPERABILITY of the pumps and valves. Two SLC subsystems are required to be OPERABLE; each contains an OPERABLE pump, an explosive valve, and associated piping, valves, and instruments and controls to ensure an OPERABLE flow path.

(continued)

BASES (continued)

APPLICABILITY

In MODES 1 and 2, shutdown capability is required. In MODES 3 and 4, control rods are not able to be withdrawn since the reactor mode switch is in shutdown and a control rod block is applied. This provides adequate controls to ensure that the reactor remains subcritical. In MODE 5, only a single control rod can be withdrawn from a core cell containing fuel assemblies. Demonstration of adequate SDM (LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") ensures that the reactor will not become critical. Therefore, the SLC System is not required to be OPERABLE when only a single control rod can be withdrawn.

ACTIONS

A.1 and A.2

If the boron solution concentration is > 9.82% weight but the concentration and temperature of boron in solution and pump suction piping temperature are within the limits of Figure 3.1.7-1, operation is permitted for a limited period since the SLC subsystems are capable of performing the intended function. It is not necessary under these conditions to declare both SLC subsystems inoperable since the SLC subsystems are capable of performing their intended function.

The concentration and temperature of boron in solution and pump suction piping temperature must be verified to be within the limits of Figure 3.1.7-1 within 8 hours and once per 12 hours thereafter (Required Action A.1). The temperature versus concentration curve of Figure 3.1.7-1 ensures a 10°F margin will be maintained above the saturation temperature. This verification ensures that boron does not precipitate out of solution in the storage tank or in the pump suction piping due to low boron solution temperature (below the saturation temperature for the given concentration). The Completion Time for performing Required Action A.1 is considered acceptable given the low probability of a Design Basis Accident (DBA) or transient occurring concurrent with the failure of the control rods to shut down the reactor and operating experience which has shown there are relatively slow variations in the measured parameters of concentration and temperature over these time periods.

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

Continued operation is only permitted for 72 hours before boron solution concentration must be restored to ≤ 9.82% weight. Taking into consideration that the SLC System design capability still exists for vessel injection under these conditions and the low probability of the temperature and concentration limits of Figure 3.1.7-1 not being met, the allowed Completion Time of 72 hours is acceptable and provides adequate time to restore concentration to within limits.

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of concentration out of limits or inoperable SLC subsystems during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, an SLC subsystem is inoperable and that subsystem is subsequently returned to OPERABLE, the LCO may already have been not met for up to 7 days. This situation could lead to a total duration of 10 days (7 days in Condition B, followed by 3 days in Condition A), since initial failure of the LCO, to restore the SLC System. Then an SLC subsystem could be found inoperable again, and concentration could be restored to within limits. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock," resulting in establishing the "time zero" at the time the LCO was initially not met instead of at the time Condition A was entered. The 10 day Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

B.1

If one SLC subsystem is inoperable for reasons other than Condition A, the inoperable subsystem must be restored to OPERABLE status within 7 days. In this condition, the remaining OPERABLE subsystem is adequate to perform the shutdown function. However, the overall reliability is reduced because a single failure in the remaining OPERABLE subsystem could result in the loss of SLC System shutdown capability. The 7 day Completion Time is based on the

(continued)

BASES

ACTIONS

B.1 (continued)

availability of an OPERABLE subsystem capable of performing the intended SLC System function and the low probability of a DBA or severe transient occurring concurrent with the failure of the Control Rod Drive (CRD) System to shut down the plant.

The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of concentration out of limits or inoperable SLC subsystem during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, concentration is out of limits, and is subsequently returned to within limits, the LCO may already have been not met for up to 3 days. This situation could lead to a total duration of 10 days (3 days in Condition A, followed by 7 days in Condition B), since initial failure of the LCO, to restore the SLC System. Then concentration could be found out of limits again, and the SLC subsystem could be restored to OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock," resulting in establishing the "time zero" at the time the LCO was initially not met instead of at the time Condition B was entered. The 10 day Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

C.1

If both SLC subsystems are inoperable for reasons other than Condition A, at least one subsystem must be restored to OPERABLE status within 8 hours. The allowed Completion Time of 8 hours is considered acceptable given the low probability of a DBA or transient occurring concurrent with the failure of the control rods to shut down the reactor.

D.1

If any Required Action and associated Completion Time is not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be

(continued)

BASES

ACTIONS

D.1 (continued)

brought to MODE 3 within 12 hours. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.7.1, SR 3.1.7.2, and SR 3.1.7.3

SR 3.1.7.1 through SR 3.1.7.3 are 24 hour Surveillances verifying certain characteristics of the SLC System (e.g., the level and temperature of the borated solution in the storage tank), thereby ensuring SLC System OPERABILITY without disturbing normal plant operation. These Surveillances ensure that the proper borated solution level and temperature, including the temperature of the pump suction piping, are maintained. Maintaining a minimum specified borated solution temperature is important in ensuring that the boron remains in solution and does not precipitate out in the storage tank or in the pump suction piping. The temperature limit specified in SR 3.1.7.2 and SR 3.1.7.3 and the maximum sodium pentaborate concentration specified in Table 3.1.7-1 ensures that a 10°F margin will be maintained above the saturation temperature. Control room alarms for low SLC storage tank temperature and low SLC System piping temperature are available and are set at 55°F. As such, SR 3.1.7.2 and SR 3.1.7.3 may be satisfied by verifying the absence of low temperature alarms for the SLC storage tank and SLC System piping. The 24 hour Frequency is based on operating experience and has shown there are relatively slow variations in the measured parameters of level and temperature.

SR 3.1.7.4 and SR 3.1.7.6

SR 3.1.7.4 verifies the continuity of the explosive charges in the injection valves to ensure that proper operation will occur if required. Other administrative controls, such as those that limit the shelf life of the explosive charges, must be followed. The 31 day Frequency is based on operating experience and has demonstrated the reliability of the explosive charge continuity.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.7.4 and SR 3.1.7.6 (continued)

SR 3.1.7.6 verifies that each valve in the system is in its correct position, but does not apply to the squib (i.e., explosive) valves. Verifying the correct alignment for manual and power operated valves in the SLC System flow path provides assurance that the proper flow paths will exist for system operation. A valve is also allowed to be in the nonaccident position provided it can be aligned to the accident position from the control room, or locally by a dedicated operator at the valve control. This is acceptable since the SLC System is a manually initiated system. This Surveillance also does not apply to valves that are locked, sealed, or otherwise secured in position since they are verified to be in the correct position prior to locking, sealing, or securing. This verification of valve alignment does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. The 31 day Frequency is based on engineering judgment and is consistent with the procedural controls governing valve operation that ensures correct valve positions.

SR 3.1.7.5

This Surveillance requires an examination of the sodium pentaborate solution by using chemical analysis to ensure that the proper concentration of boron exists in the storage tank. SR 3.1.7.5 must be performed anytime boron or water is added to the storage tank solution to determine that the boron solution concentration is ≤ 9.82% weight and within the limits of Table 3.1.7-1. SR 3.1.7.5 must also be performed anytime the temperature is restored to within limits to ensure that no significant boron precipitation occurred. The 31 day Frequency of this Surveillance is appropriate because of the relatively slow variation of boron concentration between surveillances.

SR 3.1.7.7

Verifying the quantity of Boron-10 (B-10) in the SLC tank ensures the reactor can be shutdown in the event that enough control rods cannot be inserted to accomplish shutdown and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.7.7 (continued)

cooldown in the normal manner. The required quantity contains an additional amount of B-10 equal to 25% of the minimum required amount of B-10 necessary to shutdown the reactor, to account for potential leakage and imperfect mixing. The 31 day frequency is based on operating experience and is appropriate because of the relatively slow variations in the quantity of B-10 between surveillances.

SR 3.1.7.8

Demonstrating that each SLC System pump develops a flow rate ≥ 43.0 gpm at a discharge pressure ≥ 1255 psig ensures that pump performance has not degraded below design values during the fuel cycle. This test is indicative of overall performance. Such inservice inspections confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. In addition, the test results for each pump are used to determine that the limits of Table 3.1.7-1 are satisfied for each SLC subsystem. The Frequency of this Surveillance is in accordance with the Inservice Testing Program.

SR 3.1.7.9

This Surveillance ensures that there is a functioning flow path from the boron solution storage tank to the RPV, including the firing of an explosive valve. The replacement charge for the explosive valve shall be from the same manufactured batch as the one fired or from another batch that has been certified by having one of that batch successfully fired. The pump and explosive valve tested should be alternated such that both complete flow paths are tested every 48 months at alternating 24 month intervals. The Surveillance may be performed in separate steps to prevent injecting boron into the RPV. An acceptable method for verifying flow from the pump to the RPV is to pump demineralized water from a test tank through one SLC subsystem and into the RPV. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components will pass the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.7.9 (continued)

Surveillance when performed at the 24 month Frequency; therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.1.7.10

Enriched sodium pentaborate solution is made by mixing granular, enriched sodium pentaborate with water. In order to ensure the proper B-10 atom percentage (in accordance with Table 3.1.7-1) is being used, calculations must be performed to verify the actual B-10 enrichment within 8 hours after addition of the solution to the SLC tank. The calculations may be performed using the results of isotopic tests on the granular sodium pentaborate or vendor certification documents. The Frequency is acceptable considering that boron enrichment is verified during the procurement process and any time boron is added to the SLC tank.

REFERENCES

1. 10 CFR 50.62.
2. UFSAR, Section 3.8.4.

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.8 Scram Discharge Volume (SDV) Vent and Drain Valves

BASES

BACKGROUND

The SDV vent and drain valves are normally open and discharge any accumulated water in the SDV to ensure that sufficient volume is available at all times to allow a complete scram. During a scram, the SDV vent and drain valves close to contain reactor water. As discussed in Reference 1, the SDV vent and drain valves need not be considered primary containment isolation valves (PCIVs) for the Scram Discharge System. (However, at PBAPS, these valves are considered PCIVs.) The SDV is a volume of header piping that connects to each hydraulic control unit (HCU) and drains into an instrument volume. There are two SDVs (headers) and a common instrument volume that receives all of the control rod drive (CRD) discharges. The instrument volume is connected to a common drain line with two valves in series. Each header is connected to a common vent line with two valves in series for a total of four vent valves. The header piping is sized to receive and contain all the water discharged by the CRDs during a scram. The design and functions of the SDV are described in Reference 2.

APPLICABLE SAFETY ANALYSES

The Design Basis Accident and transient analyses assume all of the control rods are capable of scramming. The acceptance criteria for the SDV vent and drain valves are that they operate automatically to close during scram to limit the amount of reactor coolant discharged so that adequate core cooling is maintained and offsite doses remain within the limits of 10 CFR 100 (Ref. 3).

Isolation of the SDV can also be accomplished by manual closure of the SDV valves. Additionally, the discharge of reactor coolant to the SDV can be terminated by scram reset or closure of the HCU manual isolation valves. For a bounding leakage case, the offsite doses are well within the limits of 10 CFR 100 (Ref. 3), and adequate core cooling is maintained (Ref. 1). The SDV vent and drain valves allow continuous drainage of the SDV during normal plant operation to ensure that the SDV has sufficient capacity to contain the reactor coolant discharge during a full core scram. To automatically ensure this capacity, a reactor scram (LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation") is initiated if the SDV water level in the

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

instrument volume exceeds a specified setpoint. The setpoint is chosen so that all control rods are inserted before the SDV has insufficient volume to accept a full scram.

SDV vent and drain valves satisfy Criterion 3 of the NRC Policy Statement.

LCO

The OPERABILITY of all SDV vent and drain valves ensures that the SDV vent and drain valves will close during a scram to contain reactor water discharged to the SDV piping. Since the vent and drain lines are provided with two valves in series, the single failure of one valve in the open position will not impair the isolation function of the system. Additionally, the valves are required to be opened following scram reset to ensure that a path is available for the SDV piping to drain freely at other times.

APPLICABILITY

In MODES 1 and 2, scram may be required; therefore, the SDV vent and drain valves must be OPERABLE. In MODES 3 and 4, control rods are not able to be withdrawn since the reactor mode switch is in shutdown and a control rod block is applied. This provides adequate controls to ensure that only a single control rod can be withdrawn. Also, during MODE 5, only a single control rod can be withdrawn from a core cell containing fuel assemblies. Therefore, the SDV vent and drain valves are not required to be OPERABLE in these MODES since the reactor is subcritical and only one rod may be withdrawn and subject to scram.

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each SDV vent and drain line. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable SDV line. Complying with the Required Actions may allow for continued operation, and subsequent inoperable SDV lines are governed by subsequent Condition entry and application of associated Required Actions.

(continued)

BASES

ACTIONS (continued)

A.1

When one SDV vent or drain valve is inoperable in one or more lines, the valve must be restored to OPERABLE status within 7 days. The Completion Time is reasonable, given the level of redundancy in the lines and the low probability of a scram occurring during the time the valves are inoperable. The SDV is still isolable since the redundant valve in the affected line is OPERABLE. During these periods, the single failure criterion may not be preserved, and a higher risk exists to allow reactor water out of the primary system during a scram.

B.1

If both valves in a line are inoperable, the line must be isolated to contain the reactor coolant during a scram. When a line is isolated, the potential for an inadvertent scram due to high SDV level is increased. Required Action B.1 is modified by a Note that allows periodic draining and venting of the SDV when a line is isolated. During these periods, the line may be unisolated under administrative control. This allows any accumulated water in the line to be drained, to preclude a reactor scram on SDV high level. This is acceptable since the administrative controls ensure the valve can be closed quickly, by a dedicated operator, if a scram occurs with the valve open.

The 8 hour Completion Time to isolate the line is based on the low probability of a scram occurring while the line is not isolated and unlikelihood of significant CRD seal leakage.

C.1

If any Required Action and associated Completion Time is not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1

During normal operation, the SDV vent and drain valves should be in the open position (except when performing SR 3.1.8.2 or SR 3.3.1.1.9 for Function 13, Manual Scram, of Table 3.3.1.1-1) to allow for drainage of the SDV piping. Verifying that each valve is in the open position ensures that the SDV vent and drain valves will perform their intended functions during normal operation. This SR does not require any testing or valve manipulation; rather, it involves verification that the valves are in the correct position.

The 31 day Frequency is based on engineering judgment and is consistent with the procedural controls governing valve operation, which ensure correct valve positions.

SR 3.1.8.2

During a scram, the SDV vent and drain valves should close to contain the reactor water discharged to the SDV piping. Cycling each valve through its complete range of motion (closed and open) ensures that the valve will function properly during a scram. The 92 day Frequency is based on operating experience and takes into account the level of redundancy in the system design.

SR 3.1.8.3

SR 3.1.8.3 is an integrated test of the SDV vent and drain valves to verify total system performance. After receipt of a simulated or actual scram signal, the closure of the SDV vent and drain valves is verified. The closure time of 15 seconds after receipt of a scram signal is based on the bounding leakage case evaluated in the accident analysis (Ref. 2). The LOGIC SYSTEM FUNCTIONAL TEST in LCO 3.3.1.1 and the scram time testing of control rods in LCO 3.1.3 overlap this Surveillance to provide complete testing of the assumed safety function. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.8.3 (continued)

unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components will pass the Surveillance when performed at the 24 month Frequency; therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. NUREG-0803, "Generic Safety Evaluation Report Regarding Integrity of BWR Scram System Piping," August 1981.

2. UFSAR, Sections 3.4.5.3.1 and 7.2.3.6.

3. 10 CFR 100.

B 3.3 INSTRUMENTATION

B 3.3.1.2 Wide Range Neutron Monitor (WRNM) Instrumentation

BASES

BACKGROUND

The WRNMs are capable of providing the operator with information relative to the neutron flux level at very low flux levels in the core. As such, the WRNM indication is used by the operator to monitor the approach to criticality and determine when criticality is achieved.

The WRNM subsystem of the Neutron Monitoring System (NMS) consists of eight channels. Each of the WRNM channels can be bypassed, but only one at any given time per RPS trip system, by the operation of a bypass switch. Each channel includes one detector that is permanently positioned in the core. Each detector assembly consists of a miniature fission chamber with associated cabling, signal conditioning equipment, and electronics associated with the various WRNM functions. The signal conditioning equipment converts the current pulses from the fission chamber to analog DC currents that correspond to the count rate. Each channel also includes indication, alarm, and control rod blocks. However, this LCO specifies OPERABILITY requirements only for the monitoring and indication functions of the WRNMs.

During refueling, shutdown, and low power operations, the primary indication of neutron flux levels is provided by the WRNMs or special movable detectors connected to the normal WRNM circuits. The WRNMs provide monitoring of reactivity changes during fuel or control rod movement and give the control room operator early indication of unexpected subcritical multiplication that could be indicative of an approach to criticality.

APPLICABLE SAFETY ANALYSES

Prevention and mitigation of prompt reactivity excursions during refueling and low power operation is provided by LCO 3.9.1, "Refueling Equipment Interlocks"; LCO 3.1.1, "SHUTDOWN MARGIN (SDM)"; LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation"; WRNM Period-Short and

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)	Average Power Range Monitor (APRM) Startup High Flux Scram Functions; and LCO 3.3.2.1, "Control Rod Block Instrumentation." The WRNMs have no safety function associated with monitoring neutron flux at very low levels and are not assumed to function during any UFSAR design basis accident or transient analysis which would occur at very low neutron flux levels. However, the WRNMs provide the only on-scale monitoring of neutron flux levels during startup and refueling. Therefore, they are being retained in Technical Specifications.
LCO	During startup in MODE 2, three of the eight WRNM channels are required to be OPERABLE to monitor the reactor flux level and reactor period prior to and during control rod withdrawal, subcritical multiplication and reactor criticality. These three required channels must be located in different core quadrants in order to provide a representation of the overall core response during those periods when reactivity changes are occurring throughout the core. In MODES 3 and 4, with the reactor shut down, two WRNM channels provide redundant monitoring of flux levels in the core. In MODE 5, during a spiral offload or reload, a WRNM outside the fueled region will no longer be required to be OPERABLE, since it is not capable of monitoring neutron flux in the fueled region of the core. Thus, CORE ALTERATIONS are allowed in a quadrant with no OPERABLE WRNM in an adjacent quadrant provided the Table 3.3.1.2-1, footnote (b), requirement that the bundles being spiral reloaded or spiral offloaded are all in a single fueled region containing at least one OPERABLE WRNM is met. Spiral reloading and offloading encompass reloading or offloading a cell on the edge of a continuous fueled region (the cell can be reloaded or offloaded in any sequence). In nonspiral routine operations, two WRNMs are required to be OPERABLE to provide redundant monitoring of reactivity changes in the reactor core. Because of the local nature of reactivity changes during refueling, adequate coverage is provided by requiring one WRNM to be OPERABLE for the connected fuel in the quadrant of the reactor core where

(continued)

BASES

LCO (continued)

CORE ALTERATIONS are being performed. There are two WRNMs in each quadrant. Any CORE ALTERATIONS must be performed in a region of fuel that is connected to an OPERABLE WRNM to ensure that the reactivity changes are monitored within the fueled region(s) of the quadrant. The other WRNM that is required to be OPERABLE must be in an adjacent quadrant containing fuel. These requirements ensure that the reactivity of the core will be continuously monitored during CORE ALTERATIONS.

Special movable detectors, according to footnote (c) of Table 3.3.1.2-1, may be used in place of the normal WRNM nuclear detectors. These special detectors must be connected to the normal WRNM circuits in the NMS, such that the applicable neutron flux indication can be generated. These special detectors provide more flexibility in monitoring reactivity changes during fuel loading, since they can be positioned anywhere within the core during refueling. They must still meet the location requirements of SR 3.3.1.2.2 and all other required SRs for WRNMs.

The Table 3.3.1.2-1, footnote (d), requirement provides for conservative spatial core coverage.

For a WRNM channel to be considered OPERABLE, it must be providing neutron flux monitoring indication.

APPLICABILITY

The WRNMs are required to be OPERABLE in MODES 2, 3, 4, and 5 prior to the WRNMs reading 125E-5 % power to provide for neutron monitoring. In MODE 1, the APRMs provide adequate monitoring of reactivity changes in the core; therefore, the WRNMs are not required. In MODE 2, with WRNMs reading greater than 125E-5 % power, the WRNM Period-Short function provides adequate monitoring and the WRNMs monitoring indication is not required.

ACTIONS

A.1 and B.1

In MODE 2, the WRNM channels provide the means of monitoring core reactivity and criticality. With any number of the required WRNMs inoperable, the ability to monitor neutron flux is degraded. Therefore, a limited time is allowed to restore the inoperable channels to OPERABLE status.

Provided at least one WRNM remains OPERABLE, Required Action A.1 allows 4 hours to restore the required WRNMs to OPERABLE status. This time is reasonable because there is adequate capability remaining to monitor the core, there is limited risk of an event during this time, and there is sufficient time to take corrective actions to restore the required WRNMs to OPERABLE status. During this time, control rod withdrawal and power increase is not precluded

(continued)

BASES

ACTIONS

A.1 and B.1 (continued)

by this Required Action. Having the ability to monitor the core with at least one WRNM, proceeding to WRNM indication greater than 125E-5 % power, and thereby exiting the Applicability of this LCO, is acceptable for ensuring adequate core monitoring and allowing continued operation.

With three required WRNMs inoperable, Required Action B.1 allows no positive changes in reactivity (control rod withdrawal must be immediately suspended) due to inability to monitor the changes. Required Action A.1 still applies and allows 4 hours to restore monitoring capability prior to requiring control rod insertion. This allowance is based on the limited risk of an event during this time, provided that no control rod withdrawals are allowed, and the desire to concentrate efforts on repair, rather than to immediately shut down, with no WRNMs OPERABLE.

C.1

In MODE 2, if the required number of WRNMs is not restored to OPERABLE status within the allowed Completion Time, the reactor shall be placed in MODE 3. With all control rods fully inserted, the core is in its least reactive state with the most margin to criticality. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

D.1 and D.2

With one or more required WRNMs inoperable in MODE 3 or 4, the neutron flux monitoring capability is degraded or nonexistent. The requirement to fully insert all insertable control rods ensures that the reactor will be at its minimum reactivity level while no neutron monitoring capability is available. Placing the reactor mode switch in the shutdown position prevents subsequent control rod withdrawal by maintaining a control rod block. The allowed Completion Time of 1 hour is sufficient to accomplish the Required Action, and takes into account the low probability of an event requiring the WRNM occurring during this interval.

(continued)

BASES

ACTIONS (continued)

E.1 and E.2

With one or more required WRNMs inoperable in MODE 5, the ability to detect local reactivity changes in the core during refueling is degraded. CORE ALTERATIONS must be immediately suspended and action must be immediately initiated to fully insert all insertable control rods in core cells containing one or more fuel assemblies. Suspending CORE ALTERATIONS prevents the two most probable causes of reactivity changes, fuel loading and control rod withdrawal, from occurring. Inserting all insertable control rods ensures that the reactor will be at its minimum reactivity given that fuel is present in the core. Suspension of CORE ALTERATIONS shall not preclude completion of the movement of a component to a safe, conservative position.

Action (once required to be initiated) to insert control rods must continue until all insertable rods in core cells containing one or more fuel assemblies are inserted.

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs for each WRNM Applicable MODE or other specified conditions are found in the SRs column of Table 3.3.1.2-1.

SR 3.3.1.2.1 and SR 3.3.1.2.3

Performance of the CHANNEL CHECK ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on another channel. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the plant staff based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the instrument has drifted outside its limit.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.1 and SR 3.3.1.2.3 (continued)

The Frequency of once every 12 hours for SR 3.3.1.2.1 is based on operating experience that demonstrates channel failure is rare. While in MODES 3 and 4, reactivity changes are not expected; therefore, the 12 hour Frequency is relaxed to 24 hours for SR 3.3.1.2.3. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the channels required by the LCO.

SR 3.3.1.2.2

To provide adequate coverage of potential reactivity changes in the core, one WRNM is required to be OPERABLE for the connected fuel in the quadrant where CORE ALTERATIONS are being performed, and the other OPERABLE WRNM must be in an adjacent quadrant containing fuel. Note 1 states that the SR is required to be met only during CORE ALTERATIONS. It is not required to be met at other times in MODE 5 since core reactivity changes are not occurring. This Surveillance consists of a review of plant logs to ensure that WRNMs required to be OPERABLE for given CORE ALTERATIONS are, in fact, OPERABLE. In the event that only one WRNM is required to be OPERABLE, per Table 3.3.1.2-1, footnote (b), only the a. portion of this SR is required. Note 2 clarifies that more than one of the three requirements can be met by the same OPERABLE WRNM. The 12 hour Frequency is based upon operating experience and supplements operational controls over refueling activities that include steps to ensure that the WRNMs required by the LCO are in the proper quadrant.

SR 3.3.1.2.4

This Surveillance consists of a verification of the WRNM instrument readout to ensure that the WRNM reading is greater than a specified minimum count rate, which ensures that the detectors are indicating count rates indicative of neutron flux levels within the core. The signal-to-noise ratio shown in Figure 3.3.1.2-1 is the WRNM count rate at which there is a 95% probability that the WRNM signal indicates the presence of neutrons and only a 5% probability

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.4 (continued)

that the WRNM signal is the result of noise (Ref. 1). With few fuel assemblies loaded, the WRNMs will not have a high enough count rate to satisfy the SR. Therefore, allowances are made for loading sufficient "source" material, in the form of irradiated fuel assemblies, to establish the minimum count rate.

To accomplish this, the SR is modified by Note 1 that states that the count rate is not required to be met on a WRNM that has less than or equal to four fuel assemblies adjacent to the WRNM and no other fuel assemblies are in the associated core quadrant. With four or less fuel assemblies loaded around each WRNM and no other fuel assemblies in the associated core quadrant, even with a control rod withdrawn, the configuration will not be critical. In addition, Note 2 states that this requirement does not have to be met during spiral unloading. If the core is being unloaded in this manner, the various core configurations encountered will not be critical.

The Frequency is based upon channel redundancy and other information available in the control room, and ensures that the required channels are frequently monitored while core reactivity changes are occurring. When no reactivity changes are in progress, the Frequency is relaxed from 12 hours to 24 hours.

SR 3.3.1.2.5

Performance of a CHANNEL FUNCTIONAL TEST demonstrates the associated channel will function properly. SR 3.3.1.2.5 is required in MODES 2, 3, 4 and 5 and the 31 day Frequency ensures that the channels are OPERABLE while core reactivity changes could be in progress. This Frequency is reasonable, based on operating experience, fixed incore detectors, overall reliability, self-monitoring features, and on other Surveillances (such as a CHANNEL CHECK), that ensure proper functioning between CHANNEL FUNCTIONAL TESTS.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.5 (continued)

Verification of the signal to noise ratio also ensures that the detectors are correctly monitoring the neutron flux.

The Note to the Surveillance allows the Surveillance to be delayed until entry into the specified condition of the Applicability (THERMAL POWER decreased to WRNM reading of 125E-5 % power or below). The SR must be performed within 12 hours after WRNMs are reading 125E-5 % power or below. The allowance to enter the Applicability with the 31 day Frequency not met is reasonable, based on the limited time of 12 hours allowed after entering the Applicability. Although the Surveillance could be performed while at higher power, the plant would not be expected to maintain steady state operation at this power level. In this event, the 12 hour Frequency is reasonable, based on the WRNMs being otherwise verified to be OPERABLE (i.e., satisfactorily performing the CHANNEL CHECK) and the time required to perform the Surveillances.

SR 3.3.1.2.6

Performance of a CHANNEL CALIBRATION at a Frequency of 24 months verifies the performance of the WRNM detectors and associated circuitry. The Frequency considers the plant conditions required to perform the test, the ease of

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.6 (continued)

performing the test, and the likelihood of a change in the system or component status. Note 1 excludes the neutron detectors from the CHANNEL CALIBRATION because they cannot readily be adjusted. The detectors are fission chambers that are designed to have a relatively constant sensitivity over the range and with an accuracy specified for a fixed useful life.

Note 2 to the Surveillance allows the Surveillance to be delayed until entry into the specified condition of the Applicability. The SR must be performed in MODE 2 within 12 hours of entering MODE 2 with WRNMs reading 125E-5 % power or below. The allowance to enter the Applicability with the 24 month Frequency not met is reasonable, based on the limited time of 12 hours allowed after entering the Applicability. Although the Surveillance could be performed while at higher power, the plant would not be expected to maintain steady state operation at this power level. In this event, the 12 hour Frequency is reasonable, based on the WRNMs being otherwise verified to be OPERABLE (i.e., satisfactorily performing the CHANNEL CHECK) and the time required to perform the Surveillance.

REFERENCES

1. NRC Safety Evaluation Report for Amendment Numbers 147 and 149 to Facility Operating License Numbers DPR-44 and DPR-56, Peach Bottom Atomic Power Station, Unit Nos. 2 and 3, August 28, 1989.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Rod Pattern Control

LCO 3.1.6 OPERABLE control rods shall comply with the requirements of the banked position withdrawal sequence (BPWS).

APPLICABILITY: MODES 1 and 2 with THERMAL POWER ≤ 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more OPERABLE control rods not in compliance with BPWS.	A.1 --------NOTE--------- Rod worth minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation." --------------------- Move associated control rod(s) to correct position.	8 hours
	<u>OR</u>	
	A.2 Declare associated control rod(s) inoperable.	8 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Nine or more OPERABLE control rods not in compliance with BPWS.	B.1	--------NOTE--------- RWM may be bypassed as allowed by LCO 3.3.2.1. --------------------- Suspend withdrawal of control rods.	Immediately
	AND		
	B.2	Place the reactor mode switch in the shutdown position.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.6.1	Verify all OPERABLE control rods comply with BPWS.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Standby Liquid Control (SLC) System

LCO 3.1.7 Two SLC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Concentration of boron in solution > 9.82% weight.	A.1 Verify the concentration and temperature of boron in solution and pump suction piping temperature are within the limits of Figure 3.1.7-1. AND A.2 Restore concentration of boron in solution to ≤ 9.82% weight.	8 hours AND Once per 12 hours thereafter 72 hours AND 10 days from discovery of failure to meet the LCO
B. One SLC subsystem inoperable for reasons other than Condition A.	B.1 Restore SLC subsystem to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Two SLC subsystems inoperable for reasons other than Condition A.	C.1	Restore one SLC subsystem to OPERABLE status.	8 hours
D. Required Action and associated Completion Time not met.	D.1	Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify level of sodium pentaborate solution in the SLC tank is ≥ 46%.	24 hours
SR 3.1.7.2	Verify temperature of sodium pentaborate solution is ≥ 53°F.	24 hours
SR 3.1.7.3	Verify temperature of pump suction piping is ≥ 53°F.	24 hours
SR 3.1.7.4	Verify continuity of explosive charge.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.7.5	Verify the concentration of boron in solution is ≤ 9.82% weight and within the limits of Table 3.1.7-1.	31 days AND Once within 24 hours after water or boron is added to solution AND Once within 24 hours after solution temperature is restored within limits
SR 3.1.7.6	Verify each SLC subsystem manual and power operated valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position, or can be aligned to the correct position.	31 days
SR 3.1.7.7	Verify the quantity of B-10 stored in the SLC tank is ≥ 162.7 lbm.	31 days
SR 3.1.7.8	Verify each pump develops a flow rate ≥ 43.0 gpm at a discharge pressure ≥ 1255 psig.	In accordance with the Inservice Testing Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.7.9	Verify flow through one SLC subsystem from pump into reactor pressure vessel.	24 months on a STAGGERED TEST BASIS
SR 3.1.7.10	Verify sodium pentaborate atom percent B-10 enrichment is within the limits of Table 3.1.7-1.	Once within 8 hours after addition to SLC tank

Table 3.1.7-1 (page 1 of 1)
Standby Liquid Control System Boron Concentration,
Pump Flow Rate, and Boron Enrichment Limits

The combination of SLC System boron concentration, pump flow rate, and boron enrichment shall be in accordance with the following equation:

$$\frac{C}{13\%\ \text{weight}} \times \frac{Q}{86\ \text{gpm}} \times \frac{E}{19.8\%\ \text{atom}} \geq 1$$

where,

C = % weight sodium pentaborate solution concentration,

Q = Pump flow rate (gpm) at a discharge pressure of ≥ 1255 psig, and

E = Boron-10 enrichment (% atom Boron-10).

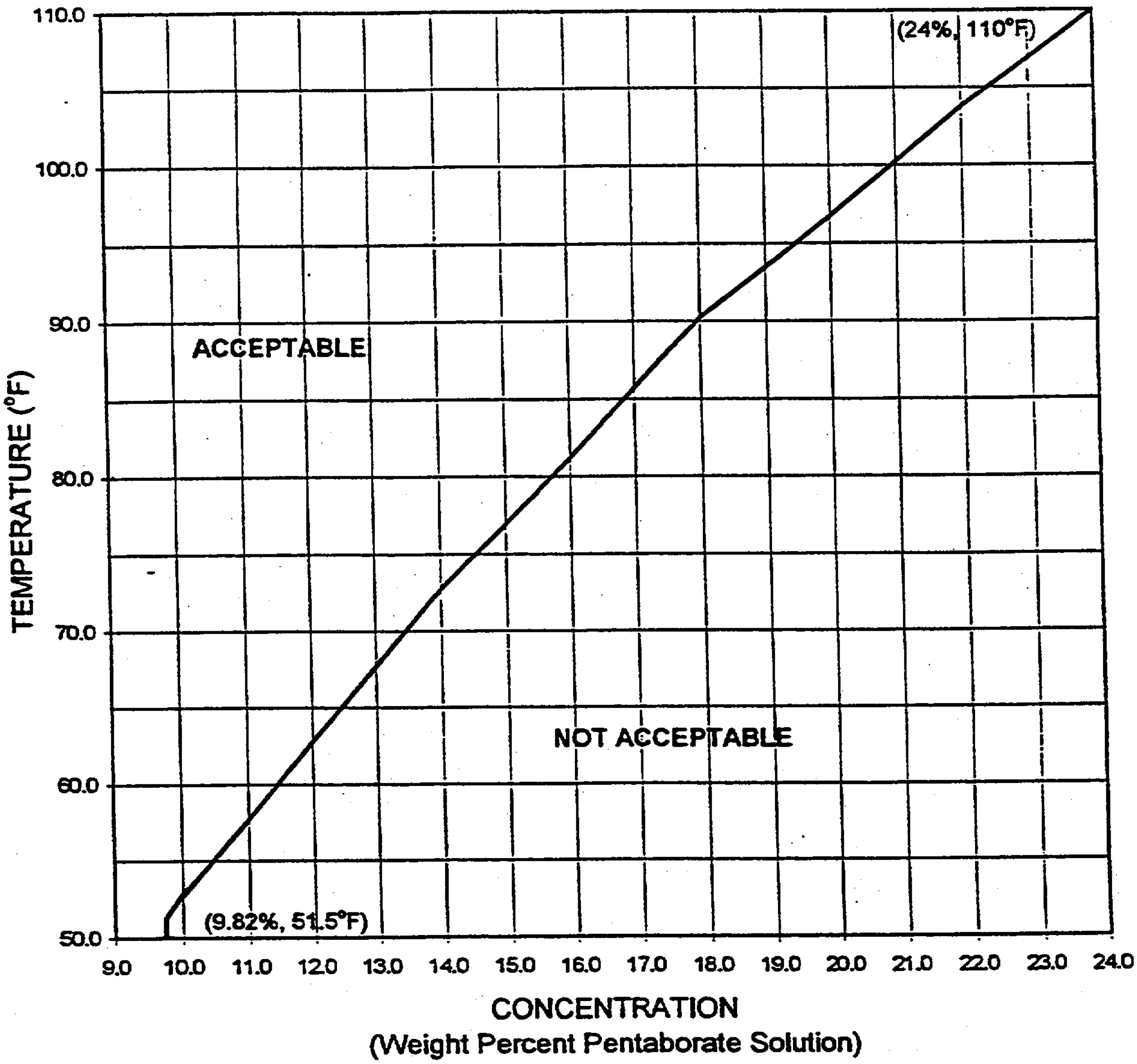

Figure 3.1.7-1 (page 1 of 1)
Sodium Pentaborate Solution Temperature Versus Concentration Requirements

3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 Scram Discharge Volume (SDV) Vent and Drain Valves

LCO 3.1.8 Each SDV vent and drain valve shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----------------------------------NOTE-----------------------------------
Separate Condition entry is allowed for each SDV vent and drain line.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more SDV vent or drain lines with one valve inoperable.	A.1	Restore valve to OPERABLE status.	7 days
B. One or more SDV vent or drain lines with both valves inoperable.	B.1	--------NOTE--------- An isolated line may be unisolated under administrative control to allow draining and venting of the SDV. -------------------- Isolate the associated line.	8 hours
C. Required Action and associated Completion Time not met.	C.1	Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.8.1	-------------------NOTE------------------- Not required to be met on vent and drain valves closed during performance of SR 3.1.8.2 or SR 3.3.1.1.9 for Function 13 of Table 3.3.1.1-1. -- Verify each SDV vent and drain valve is open.	31 days
SR 3.1.8.2	Cycle each SDV vent and drain valve to the fully closed and fully open position.	92 days
SR 3.1.8.3	Verify each SDV vent and drain valve closes in ≤ 15 seconds after receipt of an actual or simulated scram signal.	24 months

3.3 INSTRUMENTATION

3.3.1.2 Wide Range Neutron Monitor (WRNM) Instrumentation

LCO 3.3.1.2 The WRNM instrumentation in Table 3.3.1.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1.2-1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required WRNMs inoperable in MODE 2.	A.1 Restore required WRNMs to OPERABLE status.	4 hours
B. Three required WRNMs inoperable in MODE 2.	B.1 Suspend control rod withdrawal.	Immediately
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One or more required WRNMs inoperable in MODE 3 or 4.	D.1	Fully insert all insertable control rods.	1 hour
	AND		
	D.2	Place reactor mode switch in the shutdown position.	1 hour
E. One or more required WRNMs inoperable in MODE 5.	E.1	Suspend CORE ALTERATIONS except for control rod insertion.	Immediately
	AND		
	E.2	Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

-----------------------------------NOTE-----------------------------------
Refer to Table 3.3.1.2-1 to determine which SRs apply for each applicable MODE or other specified conditions.

SURVEILLANCE		FREQUENCY
SR 3.3.1.2.1	Perform CHANNEL CHECK.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.2.2	------------------NOTES------------------ 1. Only required to be met during CORE ALTERATIONS. 2. One WRNM may be used to satisfy more than one of the following. --- Verify an OPERABLE WRNM detector is located in: a. The fueled region; b. The core quadrant where CORE ALTERATIONS are being performed, when the associated WRNM is included in the fueled region; and c. A core quadrant adjacent to where CORE ALTERATIONS are being performed, when the associated WRNM is included in the fueled region.	12 hours
SR 3.3.1.2.3	Perform CHANNEL CHECK.	24 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
.4	-------------------NOTES------------------- 1. Not required to be met with less than or equal to four fuel assemblies adjacent to the WRNM and no other fuel assemblies in the associated core quadrant. 2. Not required to be met during spiral unloading. --- Verify count rate is: a. ≥ 3.0 cps; or b. Within the limits of Figure 3.3.1.2-1.	12 hours during CORE ALTERATIONS <u>AND</u> 24 hours
SR 3.3.1.2.5	-------------------NOTE------------------- Not required to be performed until 12 hours after WRNMs indicate 125E-5 % power or below. --- Perform CHANNEL FUNCTIONAL TEST and determination of signal to noise ratio.	31 days
SR 3.3.1.2.6	-------------------NOTES------------------- 1. Neutron detectors are excluded. 2. Not required to be performed until 12 hours after WRNMs indicate 125E-5 % power or below. --- Perform CHANNEL CALIBRATION.	24 months

Table 3.3.1.2-1 (page 1 of 1)
Wide Range Neutron Monitor Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1. Wide Range Neutron Monitor	2[(a)]	3[(d)]	SR 3.3.1.2.1 SR 3.3.1.2.4 SR 3.3.1.2.5 SR 3.3.1.2.6
	3,4	2	SR 3.3.1.2.3 SR 3.3.1.2.4 SR 3.3.1.2.5 SR 3.3.1.2.6
	5	2[(b)(c)]	SR 3.3.1.2.1 SR 3.3.1.2.2 SR 3.3.1.2.4 SR 3.3.1.2.5 SR 3.3.1.2.6

(a) With WRNMs reading 125E-5 % power or below.

(b) Only one WRNM channel is required to be OPERABLE during spiral offload or reload when the fueled region includes only that WRNM detector.

(c) Special movable detectors may be used in place of WRNMs if connected to normal WRNM circuits.

(d) Channels must be in 3 of 4 core quadrants.

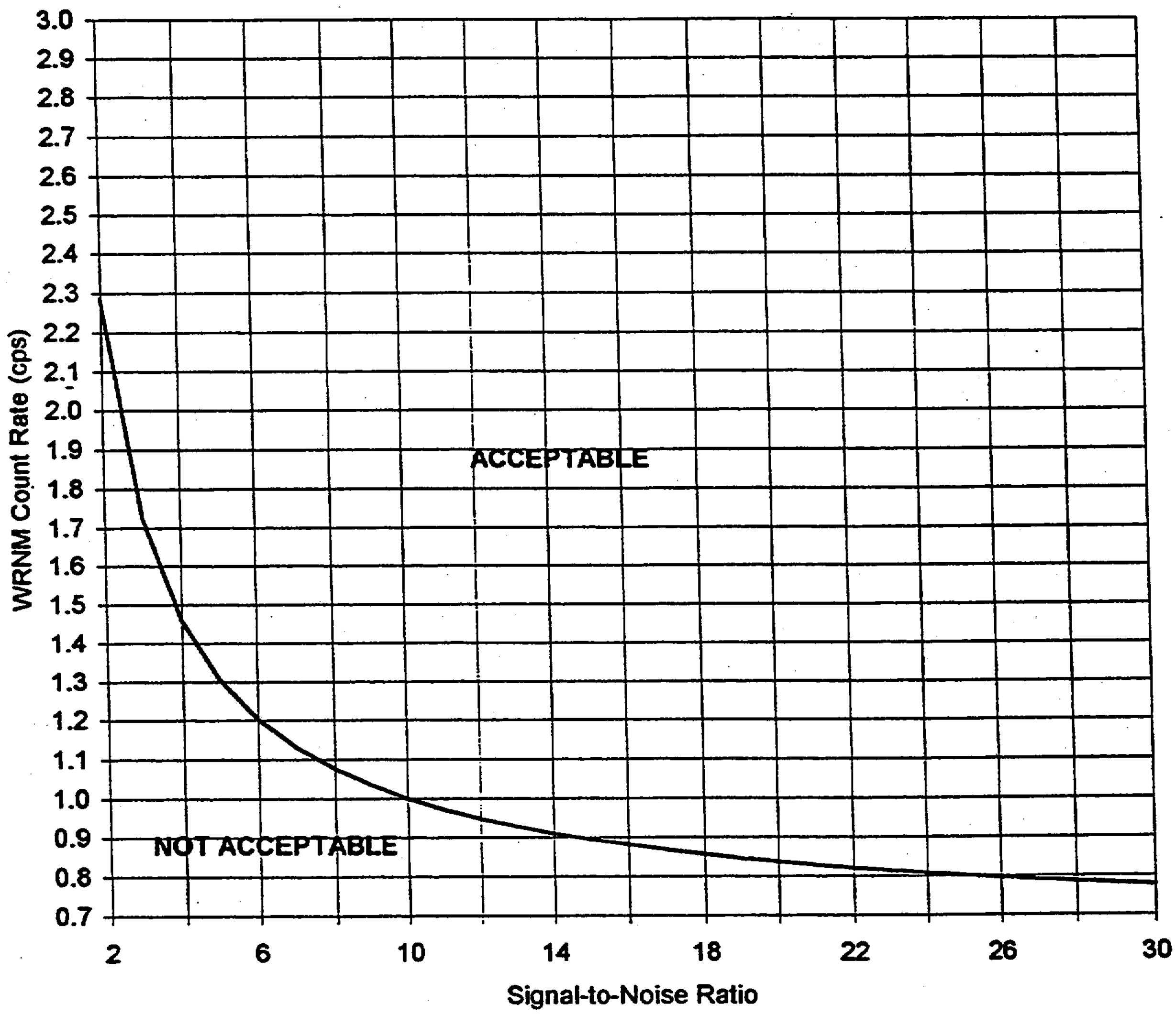

Figure 3.3.1.2-1 (page 1 of 1)
Minimum WRNM Count Rate Versus Signal to Noise Ratio

3.6 CONTAINMENT SYSTEMS

3.6.4.1 Secondary Containment

LCO 3.6.4.1 The secondary containment shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS,
During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Secondary containment inoperable in MODE 1, 2, or 3.	A.1	Restore secondary containment to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	12 hours
	<u>AND</u>		
	B.2	Be in MODE 4.	36 hours
C. Secondary containment inoperable during movement of irradiated fuel assemblies in the secondary containment, during CORE ALTERATIONS, or during OPDRVs.	C.1	--------NOTE--------- LCO 3.0.3 is not applicable. --------------------- Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	<u>AND</u>		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. (continued)	C.2	Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>		
	C.3	Initiate action to suspend OPDRVs.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1.1	Verify all secondary containment equipment hatches are closed and sealed.	31 days
SR 3.6.4.1.2	Verify one secondary containment access door in each access opening is closed.	31 days
SR 3.6.4.1.3	Verify each standby gas treatment (SGT) subsystem will draw down the secondary containment to ≥ 0.25 inch of vacuum water gauge in ≤ 120 seconds.	24 months on a STAGGERED TEST BASIS
SR 3.6.4.1.4	Verify each SGT subsystem can maintain ≥ 0.25 inch of vacuum water gauge in the secondary containment for 1 hour at a flow rate ≤ 10,500 cfm.	24 months on a STAGGERED TEST BASIS

3.6 CONTAINMENT SYSTEMS

3.6.4.2 Secondary Containment Isolation Valves (SCIVs)

LCO 3.6.4.2 Each SCIV shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS,
During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

------------------------------------NOTES------------------------------------

1. Penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by SCIVs.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more penetration flow paths with one SCIV inoperable.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange. AND	8 hours (continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2	--------NOTE--------- Isolation devices in high radiation areas may be verified by use of administrative means. --------------------- Verify the affected penetration flow path is isolated.	 Once per 31 days
B. ---------NOTE--------- Only-applicable to penetration flow paths with two isolation valves. --------------------- One or more penetration flow paths with two SCIVs inoperable.	B.1	Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	4 hours
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	C.1 AND C.2	Be in MODE 3. Be in MODE 4.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Required Action and associated Completion Time of Condition A or B not met during movement of irradiated fuel assemblies in the secondary containment, during CORE ALTERATIONS, or during OPDRVs.	D.1	--------NOTE-------- LCO 3.0.3 is not applicable. -------------------- Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	<u>AND</u>		
	D.2	Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>		
	D.3	Initiate action to suspend OPDRVs.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.2.1	------------------NOTES------------------ 1. Valves and blind flanges in high radiation areas may be verified by use of administrative means. 2. Not required to be met for SCIVs that are open under administrative controls. --- Verify each secondary containment isolation manual valve and blind flange that is required to be closed during accident conditions is closed.	31 days
SR 3.6.4.2.2	Verify the isolation time of each power operated and each automatic SCIV is within limits.	In accordance with the Inservice Testing Program
SR 3.6.4.2.3	Verify each automatic SCIV actuates to the isolation position on an actual or simulated actuation signal.	24 months

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LCO 3.6.4.3 Two SGT subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS,
During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem inoperable.	A.1 Restore SGT subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 4.	12 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the secondary containment, during CORE ALTERATIONS, or during OPDRVs.	------------NOTE------------ LCO 3.0.3 is not applicable. ---------------------------- C.1 Place OPERABLE SGT subsystem in operation. <u>OR</u>	 Immediately (continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. (continued)	C.2.1	Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
		AND	
	C.2.2	Suspend CORE ALTERATIONS.	Immediately
		AND	
	C.2.3	Initiate action to suspend OPDRVs.	Immediately
D. Two SGT subsystems inoperable in MODE 1, 2, or 3.	D.1	Enter LCO 3.0.3	Immediately
E. Two SGT subsystems inoperable during movement of irradiated fuel assemblies in the secondary containment, during CORE ALTERATIONS, or during OPDRVs.	E.1	--------NOTE--------- LCO 3.0.3 is not applicable. --------------------- Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	AND		
	E.2	Suspend CORE ALTERATIONS.	Immediately
	AND		
	E.3	Initiate action to suspend OPDRVs.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.3.1	Operate each SGT subsystem for ≥ 15 minutes with heaters operating.	31 days
SR 3.6.4.3.2	Perform required SGT filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.6.4.3.3	Verify each SGT subsystem actuates on an actual or simulated initiation signal.	24 months

3.9 REFUELING OPERATIONS

3.9.1 Refueling Equipment Interlocks

LCO 3.9.1 The refueling equipment interlocks shall be OPERABLE.

APPLICABILITY: During in-vessel fuel movement with equipment associated with the interlocks.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required refueling equipment interlocks inoperable.	A.1 Suspend in-vessel fuel movement with equipment associated with the inoperable interlock(s).	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.1.1	Perform CHANNEL FUNCTIONAL TEST on each of the following required refueling equipment interlock inputs: a. All-rods-in, b. Refuel platform position, c. Refuel platform fuel grapple, fuel loaded, d. Refuel platform frame mounted auxiliary hoist, fuel loaded, e. Refuel platform monorail mounted hoist, fuel loaded.	7 days

3.9 REFUELING OPERATIONS

3.9.2 Refuel Position One-Rod-Out Interlock

LCO 3.9.2 The refuel position one-rod-out interlock shall be OPERABLE.

APPLICABILITY: MODE 5 with the reactor mode switch in the refuel position and any control rod withdrawn.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Refuel position one-rod-out interlock inoperable.	A.1	Suspend control rod withdrawal.	Immediately
	AND		
	A.2	Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.2.1	Verify reactor mode switch locked in refuel position.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.9.2.2	-------------------NOTE------------------- Not required to be performed until 1 hour after any control rod is withdrawn. -- Perform CHANNEL FUNCTIONAL TEST.	7 days

3.9 REFUELING OPERATIONS

3.9.3 Control Rod Position

LCO 3.9.3 All control rods shall be fully inserted.

APPLICABILITY: When loading fuel assemblies into the core.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more control rods not fully inserted.	A.1 Suspend loading fuel assemblies into the core.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.9.3.1 Verify all control rods are fully inserted.	12 hours

3.9 REFUELING OPERATIONS

3.9.4 Control Rod Position Indication

LCO 3.9.4 The control rod "full-in" position indication for each control rod shall be OPERABLE.

APPLICABILITY: MODE 5.

ACTIONS

-----------------------------------NOTE-----------------------------------
Separate Condition entry is allowed for each required position indication.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required control rod position indications inoperable.	A.1.1 Suspend in-vessel fuel movement.	Immediately
	AND	
	A.1.2 Suspend control rod withdrawal.	Immediately
	AND	
	A.1.3 Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately
	OR	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2.1	Initiate action to fully insert the control rod associated with the inoperable position indicator.	Immediately
	<u>AND</u>		
	A.2.2	Initiate action to disarm the control rod drive associated with the fully inserted control rod.	Immediately

SURVEILLANCE REQUIREMENT

SURVEILLANCE		FREQUENCY
SR 3.9.4.1	Verify the required position indication has no "full-in" indication on each control rod that is not "full-in."	Each time the control rod is withdrawn from the "full-in" position

3.9 REFUELING OPERATIONS

3.9.5 Control Rod OPERABILITY—Refueling

LCO 3.9.5 Each withdrawn control rod shall be OPERABLE.

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more withdrawn control rods inoperable.	A.1	Initiate action to fully insert inoperable withdrawn control rods.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.5.1	-------------------NOTE------------------- Not required to be performed until 7 days after the control rod is withdrawn. -- Insert each withdrawn control rod at least one notch.	7 days
SR 3.9.5.2	Verify each withdrawn control rod scram accumulator pressure is $\geq$ 940 psig.	7 days

3.9 REFUELING OPERATIONS

3.9.6 Reactor Pressure Vessel (RPV) Water Level

LCO 3.9.6 RPV water level shall be ≥ 458 inches above RPV instrument zero.

APPLICABILITY: During movement of irradiated fuel assemblies within the RPV,
During movement of new fuel assemblies or handling of control rods within the RPV, when irradiated fuel assemblies are seated within the RPV.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RPV water level not within limit.	A.1 Suspend movement of fuel assemblies and handling of control rods within the RPV.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.9.6.1 Verify RPV water level is ≥ 458 inches above RPV instrument zero.	24 hours

3.9 REFUELING OPERATIONS

3.9.7 Residual Heat Removal (RHR)—High Water Level

LCO 3.9.7 One RHR shutdown cooling subsystem shall be OPERABLE and in operation.

---------------------------NOTE---------------------------
The required RHR shutdown cooling subsystem may be removed from operation for up to 2 hours per 8 hour period.

APPLICABILITY: MODE 5 with irradiated fuel in the reactor pressure vessel (RPV) and the water level ≥ 458 inches above RPV instrument zero.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required RHR shutdown cooling subsystem inoperable.	A.1 Verify an alternate method of decay heat removal is available.	1 hour AND Once per 24 hours thereafter
B. Required Action and associated Completion Time of Condition A not met.	B.1 Suspend loading irradiated fuel assemblies into the RPV. AND B.2 Initiate action to restore secondary containment to OPERABLE status. AND	Immediately Immediately (continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.3	Initiate action to restore one standby gas treatment subsystem for Unit 3 to OPERABLE status.	Immediately
	AND		
	B.4	Initiate action to restore isolation capability in each required secondary containment penetration flow path not isolated.	Immediately
C. No RHR shutdown cooling subsystem in operation.	C.1	Verify reactor coolant circulation by an alternate method.	1 hour from discovery of no reactor coolant circulation AND Once per 12 hours thereafter
	AND		
	C.2	Monitor reactor coolant temperature.	Once per hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.7.1	Verify one RHR shutdown cooling subsystem is operating.	12 hours

3.9 REFUELING OPERATIONS

3.9.8 Residual Heat Removal (RHR)—Low Water Level

LCO 3.9.8 Two RHR shutdown cooling subsystems shall be OPERABLE, and one RHR shutdown cooling subsystem shall be in operation.

---------------------------NOTE---------------------------
The required operating shutdown cooling subsystem may be removed from operation for up to 2 hours per 8 hour period.

APPLICABILITY: MODE 5 with irradiated fuel in the reactor pressure vessel (RPV) and the water level < 458 inches above RPV instrument zero.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or two required RHR shutdown cooling subsystems inoperable.	A.1	Verify an alternate method of decay heat removal is available for each inoperable required RHR shutdown cooling subsystem.	1 hour AND Once per 24 hours thereafter
B. Required Action and associated Completion Time of Condition A not met.	B.1 AND	Initiate action to restore secondary containment to OPERABLE status.	Immediately (continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.2	Initiate action to restore one standby gas treatment subsystem for Unit 3 to OPERABLE status.	Immediately
	<u>AND</u>		
	B.3	Initiate action to restore isolation capability in each required secondary containment penetration flow path not isolated.	Immediately
C. No RHR shutdown cooling subsystem in operation.	C.1	Verify reactor coolant circulation by an alternate method.	1 hour from discovery of no reactor coolant circulation <u>AND</u> Once per 12 hours thereafter
	<u>AND</u>		
	C.2	Monitor reactor coolant temperature.	Once per hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.8.1	Verify one RHR shutdown cooling subsystem is operating.	12 hours

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.6 Rod Pattern Control

BASES

BACKGROUND

Control rod patterns during startup conditions are controlled by the operator and the rod worth minimizer (RWM) (LCO 3.3.2.1, "Control Rod Block Instrumentation"), so that only specified control rod sequences and relative positions are allowed over the operating range of all control rods inserted to 10% RTP. The sequences limit the potential amount of reactivity addition that could occur in the event of a Control Rod Drop Accident (CRDA).

This Specification assures that the control rod patterns are consistent with the assumptions of the CRDA analyses of References 1 and 2.

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the CRDA are summarized in References 1 and 2. CRDA analyses assume that the reactor operator follows prescribed withdrawal sequences. These sequences define the potential initial conditions for the CRDA analysis. The RWM (LCO 3.3.2.1) provides backup to operator control of the withdrawal sequences to ensure that the initial conditions of the CRDA analysis are not violated.

Prevention or mitigation of positive reactivity insertion events is necessary to limit the energy deposition in the fuel, thereby preventing significant fuel damage which could result in the undue release of radioactivity. Since the failure consequences for UO_2 have been shown to be insignificant below fuel energy depositions of 300 cal/gm (Ref. 3), the fuel damage limit of 280 cal/gm provides a margin of safety from significant core damage which would result in release of radioactivity (Refs. 4 and 5). Generic evaluations (Refs. 1 and 6) of a design basis CRDA (i.e., a CRDA resulting in a peak fuel energy deposition of 280 cal/gm) have shown that if the peak fuel enthalpy remains below 280 cal/gm, then the maximum reactor pressure will be less than the required ASME Code limits (Ref. 7) and the calculated offsite doses will be well within the required limits (Ref. 5).

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Control rod patterns analyzed in Reference 1 follow the banked position withdrawal sequence (BPWS). The BPWS is applicable from the condition of all control rods fully inserted to 10% RTP (Ref. 2). For the BPWS, the control rods are required to be moved in groups, with all control rods assigned to a specific group required to be within specified banked positions (e.g., between notches 08 and 12). The banked positions are established to minimize the maximum incremental control rod worth without being overly restrictive during normal plant operation. Generic analysis of the BPWS (Ref. 1) has demonstrated that the 280 cal/gm fuel damage limit will not be violated during a CRDA while following the BPWS mode of operation. The generic BPWS analysis (Ref. 8) also evaluates the effect of fully inserted, inoperable control rods not in compliance with the sequence, to allow a limited number (i.e., eight) and distribution of fully inserted, inoperable control rods.

Rod pattern control satisfies Criterion 3 of the NRC Policy Statement.

LCO

Compliance with the prescribed control rod sequences minimizes the potential consequences of a CRDA by limiting the initial conditions to those consistent with the BPWS. This LCO only applies to OPERABLE control rods. For inoperable control rods required to be inserted, separate requirements are specified in LCO 3.1.3, "Control Rod OPERABILITY," consistent with the allowances for inoperable control rods in the BPWS.

APPLICABILITY

In MODES 1 and 2, when THERMAL POWER is ≤ 10% RTP, the CRDA is a Design Basis Accident and, therefore, compliance with the assumptions of the safety analysis is required. When THERMAL POWER is > 10% RTP, there is no credible control rod configuration that results in a control rod worth that could exceed the 280 cal/gm fuel damage limit during a CRDA (Ref. 2). In MODES 3, 4, and 5, since the reactor is shut down and only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will remain subcritical with a single control rod withdrawn.

(continued)

BASES (continued)

ACTIONS

A.1 and A.2

With one or more OPERABLE control rods not in compliance with the prescribed control rod sequence, actions may be taken to either correct the control rod pattern or declare the associated control rods inoperable within 8 hours. Noncompliance with the prescribed sequence may be the result of "double notching," drifting from a control rod drive cooling water transient, leaking scram valves, or a power reduction to ≤ 10% RTP before establishing the correct control rod pattern. The number of OPERABLE control rods not in compliance with the prescribed sequence is limited to eight, to prevent the operator from attempting to correct a control rod pattern that significantly deviates from the prescribed sequence. When the control rod pattern is not in compliance with the prescribed sequence, all control rod movement must be stopped except for moves needed to correct the rod pattern, or scram if warranted.

Required Action A.1 is modified by a Note which allows the RWM to be bypassed to allow the affected control rods to be returned to their correct position. LCO 3.3.2.1 requires verification of control rod movement by a second licensed operator or a qualified member of the technical staff (i.e., personnel trained in accordance with an approved training program). This ensures that the control rods will be moved to the correct position. A control rod not in compliance with the prescribed sequence is not considered inoperable except as required by Required Action A.2. The allowed Completion Time of 8 hours is reasonable, considering the restrictions on the number of allowed out of sequence control rods and the low probability of a CRDA occurring during the time the control rods are out of sequence.

B.1 and B.2

If nine or more OPERABLE control rods are out of sequence, the control rod pattern significantly deviates from the prescribed sequence. Control rod withdrawal should be suspended immediately to prevent the potential for further deviation from the prescribed sequence. Control rod insertion to correct control rods withdrawn beyond their allowed position is allowed since, in general, insertion of

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

control rods has less impact on control rod worth than withdrawals have. Required Action B.1 is modified by a Note which allows the RWM to be bypassed to allow the affected control rods to be returned to their correct position.

LCO 3.3.2.1 requires verification of control rod movement by a second licensed operator or a qualified member of the technical staff.

When nine or more OPERABLE control rods are not in compliance with BPWS, the reactor mode switch must be placed in the shutdown position within 1 hour. With the mode switch in shutdown, the reactor is shut down, and as such, does not meet the applicability requirements of this LCO. The allowed Completion Time of 1 hour is reasonable to allow insertion of control rods to restore compliance, and is appropriate relative to the low probability of a CRDA occurring with the control rods out of sequence.

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1

The control rod pattern is verified to be in compliance with the BPWS at a 24 hour Frequency to ensure the assumptions of the CRDA analyses are met. The 24 hour Frequency was developed considering that the primary check on compliance with the BPWS is performed by the RWM (LCO 3.3.2.1), which provides control rod blocks to enforce the required sequence and is required to be OPERABLE when operating at ≤ 10% RTP.

REFERENCES

1. NEDE-24011-P-A-10-US, "General Electric Standard Application for Reactor Fuel, Supplement for United States," Section 2.2.3.1, February 1991.
2. Letter (BWROG-8644) from T. Pickens (BWROG) to G. C. Lainas (NRC), "Amendment 17 to General Electric Licensing Topical Report NEDE-24011-P-A."
3. UFSAR, Section 14.6.2.3.
4. NUREG-0800, Section 15.4.9, Revision 2, July 1981.
5. 10 CFR 100.11.

(continued)

BASES

REFERENCES (continued)

6. NEDO-21778-A, "Transient Pressure Rises Affected Fracture Toughness Requirements for Boiling Water Reactors," December 1978.

7. ASME, Boiler and Pressure Vessel Code.

8. NEDO-21231, "Banked Position Withdrawal Sequence," January 1977.

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.7 Standby Liquid Control (SLC) System

BASES

BACKGROUND

The SLC System is designed to provide the capability of bringing the reactor, at any time in a fuel cycle, from full power and minimum control rod inventory (which is at the peak of the xenon transient) to a subcritical condition with the reactor in the most reactive, xenon free state without taking credit for control rod movement. The SLC System satisfies the requirements of 10 CFR 50.62 (Ref. 1) on anticipated transient without scram using enriched boron.

Reference 1 requires a SLC System with a minimum flow capacity and boron content equivalent in control capacity to 86 gpm of 13 weight percent sodium pentaborate solution. Natural sodium pentaborate solution is 19.8% atom Boron-10. Therefore, the system parameters of concern, boron concentration (C), SLC pump flow rate (Q), and Boron-10 enrichment (E), may be expressed as a multiple of ratios. The expression is as follows:

$$\frac{C}{13\%\ \text{weight}} \times \frac{Q}{86\ \text{gpm}} \times \frac{E}{19.8\%\ \text{atom}}$$

If the product of this expression is ≥ 1, then the SLC System satisfies the criteria of Reference 1. As such, the equation forms the basis for acceptance criteria for the surveillances of concentration, flow rate, and boron enrichment and is presented in Table 3.1.7-1.

The SLC System consists of a boron solution storage tank, two positive displacement pumps, two explosive valves that are provided in parallel for redundancy, and associated piping and valves used to transfer borated water from the storage tank to the reactor pressure vessel (RPV). The borated solution is discharged near the bottom of the core shroud, where it then mixes with the cooling water rising through the core. A smaller tank containing demineralized water is provided for testing purposes.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The SLC System is manually initiated from the main control room, as directed by the emergency operating procedures, if the operator believes the reactor cannot be shut down, or kept shut down, with the control rods. The SLC System is used in the event that enough control rods cannot be inserted to accomplish shutdown and cooldown in the normal manner. The SLC System injects borated water into the reactor core to add negative reactivity to compensate for all of the various reactivity effects that could occur during plant operations. To meet this objective, it is necessary to inject a quantity of boron, which produces a concentration of 660 ppm of natural boron, in the reactor coolant at 68°F. To allow for potential leakage and imperfect mixing in the reactor system, an additional amount of boron equal to 25% of the amount cited above is added (Ref. 2). The minimum mass of Boron-10 (162.7 lbm) needed for injection is calculated such that the required quantity is achieved accounting for dilution in the RPV with normal water level and including the water volume in the residual heat removal shutdown cooling piping and in the recirculation loop piping. This quantity of borated solution is the amount that is above the pump suction shutoff level in the boron solution storage tank. No credit is taken for the portion of the tank volume that cannot be injected. The maximum concentration of sodium pentaborate listed in Table 3.1.7-1 has been established to ensure that the solution saturation temperature does not exceed 43°F.

The SLC System satisfies Criterion 4 of the NRC Policy Statement.

LCO

The OPERABILITY of the SLC System provides backup capability for reactivity control independent of normal reactivity control provisions provided by the control rods. The OPERABILITY of the SLC System is based on the conditions of the borated solution in the storage tank and the availability of a flow path to the RPV, including the OPERABILITY of the pumps and valves. Two SLC subsystems are required to be OPERABLE; each contains an OPERABLE pump, an explosive valve, and associated piping, valves, and instruments and controls to ensure an OPERABLE flow path.

(continued)

BASES (continued)

APPLICABILITY

In MODES 1 and 2, shutdown capability is required. In MODES 3 and 4, control rods are not able to be withdrawn since the reactor mode switch is in shutdown and a control rod block is applied. This provides adequate controls to ensure that the reactor remains subcritical. In MODE 5, only a single control rod can be withdrawn from a core cell containing fuel assemblies. Demonstration of adequate SDM (LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") ensures that the reactor will not become critical. Therefore, the SLC System is not required to be OPERABLE when only a single control rod can be withdrawn.

ACTIONS

A.1 and A.2

If the boron solution concentration is > 9.82% weight but the concentration and temperature of boron in solution and pump suction piping temperature are within the limits of Figure 3.1.7-1, operation is permitted for a limited period since the SLC subsystems are capable of performing the intended function. It is not necessary under these conditions to declare both SLC subsystems inoperable since the SLC subsystems are capable of performing their intended function.

The concentration and temperature of boron in solution and pump suction piping temperature must be verified to be within the limits of Figure 3.1.7-1 within 8 hours and once per 12 hours thereafter (Required Action A.1). The temperature versus concentration curve of Figure 3.1.7-1 ensures a 10°F margin will be maintained above the saturation temperature. This verification ensures that boron does not precipitate out of solution in the storage tank or in the pump suction piping due to low boron solution temperature (below the saturation temperature for the given concentration). The Completion Time for performing Required Action A.1 is considered acceptable given the low probability of a Design Basis Accident (DBA) or transient occurring concurrent with the failure of the control rods to shut down the reactor and operating experience which has shown there are relatively slow variations in the measured parameters of concentration and temperature over these time periods.

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

Continued operation is only permitted for 72 hours before boron solution concentration must be restored to ≤ 9.82% weight. Taking into consideration that the SLC System design capability still exists for vessel injection under these conditions and the low probability of the temperature and concentration limits of Figure 3.1.7-1 not being met, the allowed Completion Time of 72 hours is acceptable and provides adequate time to restore concentration to within limits.

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of concentration out of limits or inoperable SLC subsystems during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, an SLC subsystem is inoperable and that subsystem is subsequently returned to OPERABLE, the LCO may already have been not met for up to 7 days. This situation could lead to a total duration of 10 days (7 days in Condition B, followed by 3 days in Condition A), since initial failure of the LCO, to restore the SLC System. Then an SLC subsystem could be found inoperable again, and concentration could be restored to within limits. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock," resulting in establishing the "time zero" at the time the LCO was initially not met instead of at the time Condition A was entered. The 10 day Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

B.1

If one SLC subsystem is inoperable for reasons other than Condition A, the inoperable subsystem must be restored to OPERABLE status within 7 days. In this condition, the remaining OPERABLE subsystem is adequate to perform the shutdown function. However, the overall reliability is reduced because a single failure in the remaining OPERABLE subsystem could result in the loss of SLC System shutdown capability. The 7 day Completion Time is based on the

(continued)

BASES

ACTIONS

B.1 (continued)

availability of an OPERABLE subsystem capable of performing the intended SLC System function and the low probability of a DBA or severe transient occurring concurrent with the failure of the Control Rod Drive (CRD) System to shut down the plant.

The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of concentration out of limits or inoperable SLC subsystem during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, concentration is out of limits, and is subsequently returned to within limits, the LCO may already have been not met for up to 3 days. This situation could lead to a total duration of 10 days (3 days in Condition A, followed by 7 days in Condition B), since initial failure of the LCO, to restore the SLC System. Then concentration could be found out of limits again, and the SLC subsystem could be restored to OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock," resulting in establishing the "time zero" at the time the LCO was initially not met instead of at the time Condition B was entered. The 10 day Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

C.1

If both SLC subsystems are inoperable for reasons other than Condition A, at least one subsystem must be restored to OPERABLE status within 8 hours. The allowed Completion Time of 8 hours is considered acceptable given the low probability of a DBA or transient occurring concurrent with the failure of the control rods to shut down the reactor.

D.1

If any Required Action and associated Completion Time is not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be

(continued)

BASES

ACTIONS

D.1 (continued)

brought to MODE 3 within 12 hours. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.7.1, SR 3.1.7.2, and SR 3.1.7.3

SR 3.1.7.1 through SR 3.1.7.3 are 24 hour Surveillances verifying certain characteristics of the SLC System (e.g., the level and temperature of the borated solution in the storage tank), thereby ensuring SLC System OPERABILITY without disturbing normal plant operation. These Surveillances ensure that the proper borated solution level and temperature, including the temperature of the pump suction piping, are maintained. Maintaining a minimum specified borated solution temperature is important in ensuring that the boron remains in solution and does not precipitate out in the storage tank or in the pump suction piping. The temperature limit specified in SR 3.1.7.2 and SR 3.1.7.3 and the maximum sodium pentaborate concentration specified in Table 3.1.7-1 ensures that a 10°F margin will be maintained above the saturation temperature. Control room alarms for low SLC storage tank temperature and low SLC System piping temperature are available and are set at 55°F. As such, SR 3.1.7.2 and SR 3.1.7.3 may be satisfied by verifying the absence of low temperature alarms for the SLC storage tank and SLC System piping. The 24 hour Frequency is based on operating experience and has shown there are relatively slow variations in the measured parameters of level and temperature.

SR 3.1.7.4 and SR 3.1.7.6

SR 3.1.7.4 verifies the continuity of the explosive charges in the injection valves to ensure that proper operation will occur if required. Other administrative controls, such as those that limit the shelf life of the explosive charges, must be followed. The 31 day Frequency is based on operating experience and has demonstrated the reliability of the explosive charge continuity.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.7.4 and SR 3.1.7.6 (continued)

SR 3.1.7.6 verifies that each valve in the system is in its correct position, but does not apply to the squib (i.e., explosive) valves. Verifying the correct alignment for manual and power operated valves in the SLC System flow path provides assurance that the proper flow paths will exist for system operation. A valve is also allowed to be in the nonaccident position provided it can be aligned to the accident position from the control room, or locally by a dedicated operator at the valve control. This is acceptable since the SLC System is a manually initiated system. This Surveillance also does not apply to valves that are locked, sealed, or otherwise secured in position since they are verified to be in the correct position prior to locking, sealing, or securing. This verification of valve alignment does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. The 31 day Frequency is based on engineering judgment and is consistent with the procedural controls governing valve operation that ensures correct valve positions.

SR 3.1.7.5

This Surveillance requires an examination of the sodium pentaborate solution by using chemical analysis to ensure that the proper concentration of boron exists in the storage tank. SR 3.1.7.5 must be performed anytime boron or water is added to the storage tank solution to determine that the boron solution concentration is ≤ 9.82% weight and within the limits of Table 3.1.7-1. SR 3.1.7.5 must also be performed anytime the temperature is restored to within limits to ensure that no significant boron precipitation occurred. The 31 day Frequency of this Surveillance is appropriate because of the relatively slow variation of boron concentration between surveillances.

SR 3.1.7.7

Verifying the quantity of Boron-10 (B-10) in the SLC tank ensures the reactor can be shutdown in the event that enough control rods cannot be inserted to accomplish shutdown and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.7.7 (continued)

cooldown in the normal manner. The required quantity contains an additional amount of B-10 equal to 25% of the minimum required amount of B-10 necessary to shutdown the reactor, to account for potential leakage and imperfect mixing. The 31 day frequency is based on operating experience and is appropriate because of the relatively slow variations in the quantity of B-10 between surveillances.

SR 3.1.7.8

Demonstrating that each SLC System pump develops a flow rate ≥ 43.0 gpm at a discharge pressure ≥ 1255 psig ensures that pump performance has not degraded below design values during the fuel cycle. This test is indicative of overall performance. Such inservice inspections confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. In addition, the test results for each pump are used to determine that the limits of Table 3.1.7-1 are satisfied for each SLC subsystem. The Frequency of this Surveillance is in accordance with the Inservice Testing Program.

SR 3.1.7.9

This Surveillance ensures that there is a functioning flow path from the boron solution storage tank to the RPV, including the firing of an explosive valve. The replacement charge for the explosive valve shall be from the same manufactured batch as the one fired or from another batch that has been certified by having one of that batch successfully fired. The pump and explosive valve tested should be alternated such that both complete flow paths are tested every 48 months at alternating 24 month intervals. The Surveillance may be performed in separate steps to prevent injecting boron into the RPV. An acceptable method for verifying flow from the pump to the RPV is to pump demineralized water from a test tank through one SLC subsystem and into the RPV. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components will pass the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.7.9 (continued)

Surveillance when performed at the 24 month Frequency; therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.1.7.10

Enriched sodium pentaborate solution is made by mixing granular, enriched sodium pentaborate with water. In order to ensure the proper B-10 atom percentage (in accordance with Table 3.1.7-1) is being used, calculations must be performed to verify the actual B-10 enrichment within 8 hours after addition of the solution to the SLC tank. The calculations may be performed using the results of isotopic tests on the granular sodium pentaborate or vendor certification documents. The Frequency is acceptable considering that boron enrichment is verified during the procurement process and any time boron is added to the SLC tank.

REFERENCES

1. 10 CFR 50.62.

2. UFSAR, Section 3.8.4.

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.8 Scram Discharge Volume (SDV) Vent and Drain Valves

BASES

BACKGROUND

The SDV vent and drain valves are normally open and discharge any accumulated water in the SDV to ensure that sufficient volume is available at all times to allow a complete scram. During a scram, the SDV vent and drain valves close to contain reactor water. As discussed in Reference 1, the SDV vent and drain valves need not be considered primary containment isolation valves (PCIVs) for the Scram Discharge System. (However, at PBAPS, these valves are considered PCIVs.) The SDV is a volume of header piping that connects to each hydraulic control unit (HCU) and drains into an instrument volume. There are two SDVs (headers) and a common instrument volume that receives all of the control rod drive (CRD) discharges. The instrument volume is connected to a common drain line with two valves in series. Each header is connected to a common vent line with two valves in series for a total of four vent valves. The header piping is sized to receive and contain all the water discharged by the CRDs during a scram. The design and functions of the SDV are described in Reference 2.

APPLICABLE SAFETY ANALYSES

The Design Basis Accident and transient analyses assume all of the control rods are capable of scramming. The acceptance criteria for the SDV vent and drain valves are that they operate automatically to close during scram to limit the amount of reactor coolant discharged so that adequate core cooling is maintained and offsite doses remain within the limits of 10 CFR 100 (Ref. 3).

Isolation of the SDV can also be accomplished by manual closure of the SDV valves. Additionally, the discharge of reactor coolant to the SDV can be terminated by scram reset or closure of the HCU manual isolation valves. For a bounding leakage case, the offsite doses are well within the limits of 10 CFR 100 (Ref. 3), and adequate core cooling is maintained (Ref. 1). The SDV vent and drain valves allow continuous drainage of the SDV during normal plant operation to ensure that the SDV has sufficient capacity to contain the reactor coolant discharge during a full core scram. To automatically ensure this capacity, a reactor scram (LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation") is initiated if the SDV water level in the

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

instrument volume exceeds a specified setpoint. The setpoint is chosen so that all control rods are inserted before the SDV has insufficient volume to accept a full scram.

SDV vent and drain valves satisfy Criterion 3 of the NRC Policy Statement.

LCO

The OPERABILITY of all SDV vent and drain valves ensures that the SDV vent and drain valves will close during a scram to contain reactor water discharged to the SDV piping. Since the vent and drain lines are provided with two valves in series, the single failure of one valve in the open position will not impair the isolation function of the system. Additionally, the valves are required to be opened following scram reset to ensure that a path is available for the SDV piping to drain freely at other times.

APPLICABILITY

In MODES 1 and 2, scram may be required; therefore, the SDV vent and drain valves must be OPERABLE. In MODES 3 and 4, control rods are not able to be withdrawn since the reactor mode switch is in shutdown and a control rod block is applied. This provides adequate controls to ensure that only a single control rod can be withdrawn. Also, during MODE 5, only a single control rod can be withdrawn from a core cell containing fuel assemblies. Therefore, the SDV vent and drain valves are not required to be OPERABLE in these MODES since the reactor is subcritical and only one rod may be withdrawn and subject to scram.

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each SDV vent and drain line. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable SDV line. Complying with the Required Actions may allow for continued operation, and subsequent inoperable SDV lines are governed by subsequent Condition entry and application of associated Required Actions.

(continued)

BASES

ACTIONS (continued)

A.1

When one SDV vent or drain valve is inoperable in one or more lines, the valve must be restored to OPERABLE status within 7 days. The Completion Time is reasonable, given the level of redundancy in the lines and the low probability of a scram occurring during the time the valves are inoperable. The SDV is still isolable since the redundant valve in the affected line is OPERABLE. During these periods, the single failure criterion may not be preserved, and a higher risk exists to allow reactor water out of the primary system during a scram.

B.1

If both valves in a line are inoperable, the line must be isolated to contain the reactor coolant during a scram. When a line is isolated, the potential for an inadvertent scram due to high SDV level is increased. Required Action B.1 is modified by a Note that allows periodic draining and venting of the SDV when a line is isolated. During these periods, the line may be unisolated under administrative control. This allows any accumulated water in the line to be drained, to preclude a reactor scram on SDV high level. This is acceptable since the administrative controls ensure the valve can be closed quickly, by a dedicated operator, if a scram occurs with the valve open.

The 8 hour Completion Time to isolate the line is based on the low probability of a scram occurring while the line is not isolated and unlikelihood of significant CRD seal leakage.

C.1

If any Required Action and associated Completion Time is not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1

During normal operation, the SDV vent and drain valves should be in the open position (except when performing SR 3.1.8.2 or SR 3.3.1.1.9 for Function 13, Manual Scram, of Table 3.3.1.1-1) to allow for drainage of the SDV piping. Verifying that each valve is in the open position ensures that the SDV vent and drain valves will perform their intended functions during normal operation. This SR does not require any testing or valve manipulation; rather, it involves verification that the valves are in the correct position.

The 31 day Frequency is based on engineering judgment and is consistent with the procedural controls governing valve operation, which ensure correct valve positions.

SR 3.1.8.2

During a scram, the SDV vent and drain valves should close to contain the reactor water discharged to the SDV piping. Cycling each valve through its complete range of motion (closed and open) ensures that the valve will function properly during a scram. The 92 day Frequency is based on operating experience and takes into account the level of redundancy in the system design.

SR 3.1.8.3

SR 3.1.8.3 is an integrated test of the SDV vent and drain valves to verify total system performance. After receipt of a simulated or actual scram signal, the closure of the SDV vent and drain valves is verified. The closure time of 15 seconds after receipt of a scram signal is based on the bounding leakage case evaluated in the accident analysis (Ref. 2). The LOGIC SYSTEM FUNCTIONAL TEST in LCO 3.3.1.1 and the scram time testing of control rods in LCO 3.1.3 overlap this Surveillance to provide complete testing of the assumed safety function. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.8.3 (continued)

unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components will pass the Surveillance when performed at the 24 month Frequency; therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. NUREG-0803, "Generic Safety Evaluation Report Regarding Integrity of BWR Scram System Piping," August 1981.
2. UFSAR, Sections 3.4.5.3.1 and 7.2.3.6.
3. 10 CFR 100.

B 3.3 INSTRUMENTATION

B 3.3.1.2 Wide Range Neutron Monitor (WRNM) Instrumentation

BASES

BACKGROUND

The WRNMs are capable of providing the operator with information relative to the neutron flux level at very low flux levels in the core. As such, the WRNM indication is used by the operator to monitor the approach to criticality and determine when criticality is achieved.

The WRNM subsystem of the Neutron Monitoring System (NMS) consists of eight channels. Each of the WRNM channels can be bypassed, but only one at any given time per RPS trip system, by the operation of a bypass switch. Each channel includes one detector that is permanently positioned in the core. Each detector assembly consists of a miniature fission chamber with associated cabling, signal conditioning equipment, and electronics associated with the various WRNM functions. The signal conditioning equipment converts the current pulses from the fission chamber to analog DC currents that correspond to the count rate. Each channel also includes indication, alarm, and control rod blocks. However, this LCO specifies OPERABILITY requirements only for the monitoring and indication functions of the WRNMs.

During refueling, shutdown, and low power operations, the primary indication of neutron flux levels is provided by the WRNMs or special movable detectors connected to the normal WRNM circuits. The WRNMs provide monitoring of reactivity changes during fuel or control rod movement and give the control room operator early indication of unexpected subcritical multiplication that could be indicative of an approach to criticality.

APPLICABLE SAFETY ANALYSES

Prevention and mitigation of prompt reactivity excursions during refueling and low power operation is provided by LCO 3.9.1, "Refueling Equipment Interlocks"; LCO 3.1.1, "SHUTDOWN MARGIN (SDM)"; LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation"; WRNM Period-Short and

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Average Power Range Monitor (APRM) Startup High Flux Scram Functions; and LCO 3.3.2.1, "Control Rod Block Instrumentation."

The WRNMs have no safety function associated with monitoring neutron flux at very low levels and are not assumed to function during any UFSAR design basis accident or transient analysis which would occur at very low neutron flux levels. However, the WRNMs provide the only on-scale monitoring of neutron flux levels during startup and refueling. Therefore, they are being retained in Technical Specifications.

LCO

During startup in MODE 2, three of the eight WRNM channels are required to be OPERABLE to monitor the reactor flux level and reactor period prior to and during control rod withdrawal, subcritical multiplication and reactor criticality. These three required channels must be located in different core quadrants in order to provide a representation of the overall core response during those periods when reactivity changes are occurring throughout the core.

In MODES 3 and 4, with the reactor shut down, two WRNM channels in two different quadrants provide redundant monitoring of flux levels in the core.

In MODE 5, during a spiral offload or reload, a WRNM outside the fueled region will no longer be required to be OPERABLE, since it is not capable of monitoring neutron flux in the fueled region of the core. Thus, CORE ALTERATIONS are allowed in a quadrant with no OPERABLE WRNM in an adjacent quadrant provided the Table 3.3.1.2-1, footnote (b), requirement that the bundles being spiral reloaded or spiral offloaded are all in a single fueled region containing at least one OPERABLE WRNM is met. Spiral reloading and offloading encompass reloading or offloading a cell on the edge of a continuous fueled region (the cell can be reloaded or offloaded in any sequence).

In nonspiral routine operations, two WRNMs are required to be OPERABLE to provide redundant monitoring of reactivity changes in the reactor core. Because of the local nature of reactivity changes during refueling, adequate coverage is provided by requiring one WRNM to be OPERABLE for the connected fuel in the quadrant of the reactor core where

(continued)

BASES

LCO (continued)

CORE ALTERATIONS are being performed. There are two WRNMs in each quadrant. Any CORE ALTERATIONS must be performed in a region of fuel that is connected to an OPERABLE WRNM to ensure that the reactivity changes are monitored within the fueled region(s) of the quadrant. The other WRNM that is required to be OPERABLE must be in an adjacent quadrant containing fuel. These requirements ensure that the reactivity of the core will be continuously monitored during CORE ALTERATIONS.

Special movable detectors, according to footnote (c) of Table 3.3.1.2-1, may be used in place of the normal WRNM nuclear detectors. These special detectors must be connected to the normal WRNM circuits in the NMS, such that the applicable neutron flux indication can be generated. These special detectors provide more flexibility in monitoring reactivity changes during fuel loading, since they can be positioned anywhere within the core during refueling. They must still meet the location requirements of SR 3.3.1.2.2 and all other required SRs for WRNMs.

The Table 3.3.1.2-1, footnote (d), requirement provides for conservative spatial core coverage.

For a WRNM channel to be considered OPERABLE, it must be providing neutron flux monitoring indication.

APPLICABILITY

The WRNMs are required to be OPERABLE in MODES 2, 3, 4, and 5 prior to the WRNMs reading 125E-5 % power to provide for neutron monitoring. In MODE 1, the APRMs provide adequate monitoring of reactivity changes in the core; therefore, the WRNMs are not required. In MODE 2, with WRNMs reading greater than 125E-5 % power, the WRNM Period-Short function provides adequate monitoring and the WRNMs monitoring indication is not required.

ACTIONS

A.1 and B.1

In MODE 2, the WRNM channels provide the means of monitoring core reactivity and criticality. With any number of the required WRNMs inoperable, the ability to monitor neutron flux is degraded. Therefore, a limited time is allowed to restore the inoperable channels to OPERABLE status.

(continued)

BASES

ACTIONS

A.1 and B.1 (continued)

Provided at least one WRNM remains OPERABLE, Required Action A.1 allows 4 hours to restore the required WRNMs to OPERABLE status. This time is reasonable because there is adequate capability remaining to monitor the core, there is limited risk of an event during this time, and there is sufficient time to take corrective actions to restore the required WRNMs to OPERABLE status. During this time, control rod withdrawal and power increase is not precluded by this Required Action. Having the ability to monitor the core with at least one WRNM, proceeding to WRNM indication greater than 125E-5 % power, and thereby exiting the Applicability of this LCO, is acceptable for ensuring adequate core monitoring and allowing continued operation.

With three required WRNMs inoperable, Required Action B.1 allows no positive changes in reactivity (control rod withdrawal must be immediately suspended) due to inability to monitor the changes. Required Action A.1 still applies and allows 4 hours to restore monitoring capability prior to requiring control rod insertion. This allowance is based on the limited risk of an event during this time, provided that no control rod withdrawals are allowed, and the desire to concentrate efforts on repair, rather than to immediately shut down, with no WRNMs OPERABLE.

C.1

In MODE 2, if the required number of WRNMs is not restored to OPERABLE status within the allowed Completion Time, the reactor shall be placed in MODE 3. With all control rods fully inserted, the core is in its least reactive state with the most margin to criticality. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

D.1 and D.2

With one or more required WRNMs inoperable in MODE 3 or 4, the neutron flux monitoring capability is degraded or nonexistent. The requirement to fully insert all insertable control rods ensures that the reactor will be at its minimum reactivity level while no neutron monitoring capability is

(continued)

BASES

ACTIONS

D.1 and D.2 (continued)

available. Placing the reactor mode switch in the shutdown position prevents subsequent control rod withdrawal by maintaining a control rod block. The allowed Completion Time of 1 hour is sufficient to accomplish the Required Action, and takes into account the low probability of an event requiring the WRNM occurring during this interval.

E.1 and E.2

With one or more required WRNMs inoperable in MODE 5, the ability to detect local reactivity changes in the core during refueling is degraded. CORE ALTERATIONS must be immediately suspended and action must be immediately initiated to fully insert all insertable control rods in core cells containing one or more fuel assemblies. Suspending CORE ALTERATIONS prevents the two most probable causes of reactivity changes, fuel loading and control rod withdrawal, from occurring. Inserting all insertable control rods ensures that the reactor will be at its minimum reactivity given that fuel is present in the core. Suspension of CORE ALTERATIONS shall not preclude completion of the movement of a component to a safe, conservative position.

Action (once required to be initiated) to insert control rods must continue until all insertable rods in core cells containing one or more fuel assemblies are inserted.

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs for each WRNM Applicable MODE or other specified conditions are found in the SRs column of Table 3.3.1.2-1.

SR 3.3.1.2.1 and SR 3.3.1.2.3

Performance of the CHANNEL CHECK ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on another channel. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or something even more serious.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.1 and SR 3.3.1.2.3 (continued)

A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the plant staff based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the instrument has drifted outside its limit.

The Frequency of once every 12 hours for SR 3.3.1.2.1 is based on operating experience that demonstrates channel failure is rare. While in MODES 3 and 4, reactivity changes are not expected; therefore, the 12 hour Frequency is relaxed to 24 hours for SR 3.3.1.2.3. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the channels required by the LCO.

SR 3.3.1.2.2

To provide adequate coverage of potential reactivity changes in the core, one WRNM is required to be OPERABLE for the connected fuel in the quadrant where the CORE ALTERATIONS are being performed, and the other OPERABLE WRNM must be in an adjacent quadrant containing fuel. Note 1 states that the SR is required to be met only during CORE ALTERATIONS. It is not required to be met at other times in MODE 5 since core reactivity changes are not occurring. This Surveillance consists of a review of plant logs to ensure that WRNMs required to be OPERABLE for given CORE ALTERATIONS are, in fact, OPERABLE. In the event that only one WRNM is required to be OPERABLE, per Table 3.3.1.2-1, footnote (b), only the a. portion of this SR is required. Note 2 clarifies that more than one of the three requirements can be met by the same OPERABLE WRNM. The 12 hour Frequency is based upon operating experience and supplements operational controls over refueling activities that include steps to ensure that the WRNMs required by the LCO are in the proper quadrant.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.2.4

This Surveillance consists of a verification of the WRNM instrument readout to ensure that the WRNM reading is greater than a specified minimum count rate, which ensures that the detectors are indicating count rates indicative of neutron flux levels within the core. The signal-to-noise ratio shown in Figure 3.3.1.2-1 is the WRNM count rate at which there is a 95% probability that the WRNM signal indicates the presence of neutrons and only a 5% probability that the WRNM signal is the result of noise (Ref. 1). With few fuel assemblies loaded, the WRNMs will not have a high enough count rate to satisfy the SR. Therefore, allowances are made for loading sufficient "source" material, in the form of irradiated fuel assemblies, to establish the minimum count rate.

To accomplish this, the SR is modified by Note 1 that states that the count rate is not required to be met on a WRNM that has less than or equal to four fuel assemblies adjacent to the WRNM and no other fuel assemblies are in the associated core quadrant. With four or less fuel assemblies loaded around each WRNM and no other fuel assemblies in the associated core quadrant, even with a control rod withdrawn, the configuration will not be critical. In addition, Note 2 states that this requirement does not have to be met during spiral unloading. If the core is being unloaded in this manner, the various core configurations encountered will not be critical.

The Frequency is based upon channel redundancy and other information available in the control room, and ensures that the required channels are frequently monitored while core reactivity changes are occurring. When no reactivity changes are in progress, the Frequency is relaxed from 12 hours to 24 hours.

SR 3.3.1.2.5

Performance of a CHANNEL FUNCTIONAL TEST demonstrates the associated channel will function properly. SR 3.3.1.2.5 is required in MODES 2,3,4 and 5 and the 31 day Frequency ensures that the channels are OPERABLE while core reactivity

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.5 (continued)

changes could be in progress. This Frequency is reasonable, based on operating experience, fixed incore detectors, overall reliability, self-monitoring features, and on other Surveillances (such as a CHANNEL CHECK), that ensure proper functioning between CHANNEL FUNCTIONAL TESTS.

Verification of the signal to noise ratio also ensures that the detectors are correctly monitoring the neutron fux.

The Note to the Surveillance allows the Surveillance to be delayed until entry into the specified condition of the Applicability (THERMAL POWER decreased to WRNM reading of 125E-5 % power or below). The SR must be performed within 12 hours after WRNMs are reading 125E-5 % power or below. The allowance to enter the Applicability with the 31 day Frequency not met is reasonable, based on the limited time of 12 hours allowed after entering the Applicability. Although the Surveillance could be performed while at higher power, the plant would not be expected to maintain steady state operation at this power level. In this event, the 12 hour Frequency is reasonable, based on the WRNMs being otherwise verified to be OPERABLE (i.e., satisfactorily performing the CHANNEL CHECK) and the time required to perform the Surveillances.

SR 3.3.1.2.6

Performance of a CHANNEL CALIBRATION at a Frequency of 24 months verifies the performance of the WRNM detectors and associated circuitry. The Frequency considers the plant conditions required to perform the test, the ease of performing the test, and the likelihood of a change in the system or component status. Note 1 excludes the neutron detectors from the CHANNEL CALIBRATION because they cannot readily be adjusted. The detectors are fission chambers that are designed to have a relatively constant sensitivity over the range and with an accuracy specified for a fixed useful life.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.6 (continued)

Note 2 to the Surveillance allows the Surveillance to be delayed until entry into the specified condition of the Applicability. The SR must be performed in MODE 2 within 12 hours of entering MODE 2 with WRNMs reading 125E-5 % power or below. The allowance to enter the Applicability with the 24 month Frequency not met is reasonable, based on the limited time of 12 hours allowed after entering the Applicability. Although the Surveillance could be performed while at higher power, the plant would not be expected to maintain steady state operation at this power level. In this event, the 12 hour Frequency is reasonable, based on the WRNMs being otherwise verified to be OPERABLE (i.e., satisfactorily performing the CHANNEL CHECK) and the time required to perform the Surveillance.

REFERENCES

1. NRC Safety Evaluation Report for Amendment Numbers 147 and 149 to Facility Operating License Numbers DPR-44 and DPR-56, Peach Bottom Atomic Power Station, Unit Nos. 2 and 3, August 28, 1989.