DRAFT ADMIN JPMS-SRO
INITIAL SUBMITTAL

ROBINSON AUG/SEPT 2004
EXAM 05000261/2004301

AUGUST 27, 2004 (written)
AUG. 30 - SEPT. 2004 (op)

Admin Initial Submittal

Facility: Robinson		Date of Examination:	8/30/2004
Examination Level:	SRO	Operating Test Number:	NRC

Administrative Topic (see Note)	Describe activity to be performed.
Conduct of Operations JPM A1 T<K	2.1.2 (4.0) Knowledge of operator responsibility during all modes of plant operation JPM: Monitor nuclear instrumentation during refueling operations *(New JPM)*
Conduct of Operations JPM A2	2.1.25 (3.1) Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data. JPM: Perform a SDM calculation IAW FMP-012. *(Modified JPM)*
Equipment Control JPM A3	2.2.6 (3.3) Knowledge of the process for making changes in procedures as described in the safety analysis report. JPM: Review/approve a temporary change to a procedure IAW PRO-NGGC-0204. *(New JPM)*
Radiation Control JPM A4 T<K	2.3.11 (3.2) Ability to control radiation releases JPM: Adjust a radiation monitor setpoint *(New JPM)*
Emergency Plan JPM A5	2.4.44 (4.0) Knowledge of emergency plan protective action recommendations. JPM: Given a set of conditions, determine the Emergency Action Level (EAL) and make a Protective Action Recommendation (PAR) IAW the Emergency Plan. *(New JPM)*

NOTE: All items (5 total are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.

PERFORMANCE INFORMATION

Facility:	HB ROBINSON	Task No.:	1072101201
Task Title:	Adjust the High Alarm Setpoint for Radiation Monitor R-18	JPM No.:	2004 NRC JPM SRO A4
K/A Reference:	2.3.11 (2.7/3.2)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance: _____

Classroom _____ Simulator _____ Plant X

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:
- The plant is at 100% power.
- A Liquid Waste Release from Monitor Tank "A" has been prepared.

Task Standard: Satisfactory simulation of critical steps.

Required Materials: NONE

General References: OP-920, RADIATION MONITORING SYSTEM, Revision 28

Handouts: Completed, approved EMP-023 - ATTACHMENT 10.3

Initiating Cue: You are the BOP Operator. The CRSS has assigned you to adjust the High Alarm setpoint for RMS Channel R-18 to the value on the approved release form in accordance with OP-920, Section 8.1. **The drawer can be pulled out and returned to the correct position but simulate all other actions. Inform the licensed operators before opening the drawer and again after it is closed.**

Time Critical Task: N/A

Validation Time: 10 Minutes

(Denote Critical Steps with an asterisk)

	Examiner's Cue:	**Provide a completed, approved copy of EMP-023, ATT. 10.3**
	Performance Step: 1	Review ATT. 10.3
	Standard:	Verifies and determines setpoint
	Comment:	
	Performance Step: 2	Obtain procedure for changing the setpoint
	Standard:	References OP-920, Step 8.0
	Comment:	
		OP-920, Step 8.1.1
	Performance Step: 3	Adjusting the High Alarm Setpoint for Monitors R-1, R-2, R-3, R-4, R-5,R-6, R-7, R-8, R-9, R-11, R-12, R-15, R-16, R-17, R-18, R-20, R-21,R-30, R-31A, R-31B, R-31C and R-33
	Standard:	Identifies R-18 on list and 8.1.1 as the correct step to implement
	Comment:	
		OP-920, Step 8.1.1
	Performance Step: 4	Slide out the drawer for the desired monitor.
*	**Standard:**	• Informs licensed operators • Slides out drawer for R-18 *
	Comment:	

OP-920, Step 8.1.1

Performance Step: 5 Adjust the thumbwheels to desired setpoint.

* **Standard:** Points out thumbwheels

- Discusses adjusting thumbwheels to 1.12E+04

Examiner's Cue: **The thumbwheels are adjusted to the setpoint (_____) identified by the Candidate.**

Comment:

OP-920, Step 8.1.1

Performance Step: 6 Push Alarm/Reset button and verify setpoint appears on ratemeter display.

Standard: Simulates pushing the Alarm/Reset button and points out ratemeter display.

Examiner's Cue: **The setpoint identified by the Candidate (_____) is displayed.**

Comment:

OP-920, Step 8.1.1

Performance Step: 7 Return the monitor drawer to its proper position.

Standard:

- Slides drawer back in and secures *
- Informs licensed operators

*

Comment:

Terminating Cue: **The evaluator can inform the Candidate that evaluation on this JPM is complete at any time after the drawer has been returned to the proper position.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2004 NRC JPM SRO A4

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- The plant is at 100% power.
- A Liquid Waste Release from Monitor Tank "A" has been prepared.

INITIATING CUE:

You are the BOP Operator. The CRSS has assigned you to adjust the High Alarm setpoint for RMS Channel R-18 to the value on the approved release form in accordance with OP-920, Section 8.1. **The drawer can be pulled out and returned to the correct position but simulate all other actions. Inform the licensed operators before opening the drawer and again after it is closed.**

CP&L

M
Multiple Use

CAROLINA POWER & LIGHT COMPANY
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 3
PART 2

OPERATING PROCEDURE

OP-920

RADIATION MONITORING SYSTEM

REVISION 28

SUMMARY OF CHANGES
PRR 68035

STEP/SECTION	REVISION COMMENTS
1.1	Added the Yokogawa VR204 View Recorder to the purpose statement.
2.27	Added reference to RST-029, Calibration of R-24A, B, & C.
2.37	Added reference to EMP-034, Operation of R-24A, B, & C.
2.47	Added reference to Yokogawa Instruction Manual for VR200 Wide View Recorder.
4.9	Added precaution to address R-24A, B, & C indication in that the readings are not valid for quantification until the monitor has been adjusted per EMP-034 during an actual primary to secondary tube leak and that the readings are not power compensated with Reactor Power less than 40% and the readings will increase with power until 40% is reached.
5.2.4.3 & 5.2.7.4	Revised step for checking the RM-80 battery to only check voltage if the batteries were disconnected, and if they were disconnected to replace the battery pack if voltage was less than 3.2 volts, and a step to verify the battery leads are connected prior to proceeding. Added note about recharging the replaced battery pack at a constant current of 100Ma for 16 hours. Vendor manual discusses disconnecting battery leads if power secured for greater than 48 hours to preserve the battery but does not require a battery voltage check if power secured for greater than 8 hours as the step originally stated. Additional scheduled maintenance is performed to check the battery voltage every 18 months and replace the battery every 3 years. Deleted old steps 5.2.4.9 (R-19's) & 5.2.7.16 (R-37) for connecting battery leads as this is now performed in step 5.2.4.3.
5.2.6	Added new section for placing the R-24 monitors in service; addressing checking the RM-80 batteries connected, setting the RM-80 switch settings, powering up the RM-80 unit, and reloading the RM-80 database by E&C if necessary.
5.4	Added new section to place the R-24A/B/C Yokogawa recorder in service. Instructions provided to power up the recorder, check the alarm settings are correct, and set the date and time.
6.1.4	Added instructions to check the R-24A/B/C Yokogawa recorder alarm settings.
6.2.4	Added step to address the R-24A, R-24B, and R-24C source check is performed by E&C IAW EMP-034.
6.5	Added section to address normal operation of the R-24A/B/C Yokogawa recorder with instructions to review past (historical) measured data.
7.2.4.4 & 7.2.7.6	Revised step to disconnect RM-80 battery leads from 8 hours to 48 hours per Vendor manual.
7.2.6	Added steps to remove R-24A/B/C from service.
7.4	Added steps to remove the R-24A/B/C Yokogawa recorder from service.
8.3	Added section for adjusting the R-24A/B/C Yokogawa recorder alarm setpoint, with a preceding note stating "Normally the R-24 setpoints for each channel are set to 5 gpd. If primary to secondary Steam Generator leakage is confirmed, the setpoint may be raised as directed by E&C to establish a new threshold value for the alarm:.
Attachment 9.1	Added information of applicable procedures for R-24A/B/C Removed reference to OMM-001-12, which does not perform a channel check, and added reference to OST-020, OST-021, OST-022, and OST-023 for the procedure to reference for the channel check as applicable for the monitor. Removed reference to EMP-024 for calibration and source checks of various monitos.

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SECTION PAGE

1.0 PURPOSE

1.1 Provide instructions for Placing In-Service, Normal Operation, Removing from Service, and Infrequent Operation of the Area Monitors, Process Monitors, the Westronics Series 3000 Recorder, and the Yokogawa VR204 View Recorder.

2.0 REFERENCES

2.1 Improved Technical Specification LCO 3.3.6 and LCO 3.4.15

2.2 ODCM 3.10 and 3.11

2.3 SD-019, Radiation Monitoring System

2.4 OMM-001-12, Minimum Equipment List and Shift Relief

2.5 OMM-014, Radiation Monitor Setpoints

2.6 OP-001, Reactor Control and Protection System

2.7 OP-406, Steam Generator Blowdown/Wet Layup System

2.8 OP-509-1, Condensate Polishing System

2.9 OP-603, Electrical Distribution

2.10 OP-903, Service Water System

2.11 OP-917, Secondary Sampling System

2.12 OST-021, Daily Surveillances

2.13 OST-924-1, Area Radiation Monitoring System

2.14 OST-924-2, Process Radiation Monitoring System

2.15 RST-001, Radiation Monitor Source Checks

2.16 RST-008, Calibration of Radiation Monitor System, Monitors R-1 through R-8

2.17 RST-009, Calibration of Radiation Monitor System, Monitors R-9, R-30, R-31A, B, C and R-33

2.18 RST-010, Calibration of Radiation Monitoring System, Monitor R-11

2.19 RST-011, Calibration of Radiation Monitoring System, Monitors R-12, R-20 and R-21

2.20 RST-012, Calibration of Radiation Monitoring System, Monitor R-14

2.21 RST-013, Calibration of Radiation Monitoring System, Monitor R-15

2.22 RST-014, Calibration of Radiation Monitoring System, Monitor R-16

2.23 RST-015, Calibration of Radiation Monitoring System, Monitor R-17

2.24 RST-016, Calibration of Radiation Monitoring System, Monitor R-18

2.25 RST-017, Calibration of Radiation Monitoring System, Monitors R-37 and R-19A, B, and C

2.26 RST-020, Verification of Electronic Calibration of Radiation Monitoring System Monitors R-32A & B

2.27 RST-029, Calibration of R-24A, B & C

2.28 EMP-013, Operation of R-14 and F-14

2.29 EMP-020, Operation of R-22 and R-38

2.30 EMP-022, Gaseous Waste Release Permits

2.31 EMP-023, Liquid Waste Release and Sampling

2.32 EMP-024, RETS Surveillance

2.33 EMP-026, Calibration of R-22 and R-38

2.34 EMP-027, Operation of GA Monitors R-37 and R-19A, B, and C

2.35 EMP-028, Process Monitor Setpoint Determination

2.36 EMP-031, Operation of the NMC AM-22IF (R-23) Radwaste Building Effluent Monitor

2.37 EMP-034, Operation of R-24A, B & C

2.38 MST-901, Radiation Monitoring System

2.39 CM-738, Configuration of Radiation Monitoring System Channel Ratemeters

2.40 LP-256, Containment High Range Radiation Monitor (Area) RMS 32A & 32B

2.41 PIC-024, Plant Stack Radiation Monitor Channels R-14D and R-14E Dual Interface Card

2.42 PLP-037, Conduct of Infrequently Performed Tests or Evolutions

2.43 Nuclear Measurements Corporation Stack Monitor Operating Instructions (CP&L #728-523-61 and CP&L #736-879-23)

2.44 Updated FSAR, Section 11.5

2.45 GA Technologies Instruction Manual (CP&L #731-040-02 and CP&L #739-126-51)

2.46 Westronics Series 3000 Digital Data Recorder Users Manual

2.47 Yokogawa Instruction Manual for VR200 Wide View Recorder

2.48 Nuclear Research Corporation Operation and Maintenance Manual (CP&L #736-761-32 and CP&L #736-761-57)

2.49 EE 93-184, PPS Solenoid Valve Containment Integrity Concern

2.50 CR 94-01841, Operation of R-11/R-12 Pressure Switch

2.51 CR 97-00542, R-11 OOS When Filter Paper Changed

2.52 NCR 24351, R-11 Count Increase

2.53 NCR 25812, Evaluate Creating an RR-1 Procedure

2.54 NCR 60636, R-11 & R-12 Radiation Monitor Operability Question

2.55 OMM-007, Equipment Inoperable Record

3.0 PREREQUISITES

3.1 The Electrical Distribution System is in service IAW OP-603.

3.2 The Service Water System is in service IAW OP-903.

3.3 Steam Generator Blowdown is in service IAW OP-406.

3.4 The Secondary Sampling System is in service IAW OP-917.

3.5 The Reactor Protection and Control System is in service IAW OP-001.

3.6 The Condensate Polishing System is in service IAW OP-509-1.

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Operate the Radiation Monitor Recorder continuously when the Radiation Monitoring System is in operation.

4.2 The Radiation Monitor Recorder points are divided into the following eight groups for the different Radiation Monitors:

- Group 1: R-9, 11, 12, 14A, 14B, 14C, 15, and 18
- Group 2: R-1, 3, 4, 6, and 8
- Group 3: R-2, 7, 32A, and 32B
- Group 4: R-16 and 17
- Group 5: R-5 and 21
- Group 6: R-19A, 19B, 19C, 31A, 31B, and 31C
- Group 7: R-14D, 14E, and 33
- Group 8: R-20 and 30

Group 1 radiation monitor recorder points are recorded continuously. For groups 2 through 8, the monitor points in the affected group will start recording when one of the monitors in that group exceeds the Warning Alarm setpoint established by the recorder.

4.3 Normally, changes to RR-1 Warning Alarm Set points is required due to monitor background changes and is requested by E&RC. Following any recorder program changes, a program printout should be obtained and compared to Attachment 9.2 to verify point parameters.

4.4 R-11/12 filter failure indication only detects the absence of paper at the alarm switch. Problems associated with the paper drive would not be detected by this alarm if the paper were still intact on the rollers. Paper drive problems may be characterized by a slowly increasing radiation trend without any other indications of a problem in the plant.

4.5 The following precautions apply when changing R-11/12 Filter Paper. (IA 97-OP-39)

- R-11/12 Vacuum Pump shall be secured when the Filter Paper is removed.
- R-11 and R-12 are inoperable with the filter housing cover open.
- R-11 is inoperable with the filter paper removed.
- R-12 is inoperable with the Vacuum Pump stopped.

4.6 R-11 shall be declared Inoperable (ITS LCO 3.3.6 & 3.4.15 / ODCM Table 3.10-1 & Table 3.11-1) for a minimum of 25 minutes following operation of the filter drive in fast speed OR following filter paper change out. (NCR 24351)

4.7 For planned or routine activities requiring a radiation monitor to be removed from service where the monitor will be returned to service prior to the end of shift, an EIR is not required. However, any compensatory actions required by the EIR, such as notification to the E&C shift technician of monitor inoperability, must still be performed. Additionally, the component and any compensatory actions should still be logged in the SSO log for tracking purposes.

4.8 The following is the status of indicating lights for RCV-014 located at the Waste Disposal Boron Recycle Panel (WDBR) for various operating conditions:

- During Release - Valve is normally throttled, red light is illuminated, and green and white lights are extinguished.
- No Release in Progress - Valve is closed, green light is illuminated, and red and white lights are extinguished.
- High Alarm on R-14C - Valve closed, white and green lights are illuminated, and red light is extinguished.

To reopen RCV-014 after an R-14C alarm, the Valve Control Wheel (on WDBR panel) must be positioned to "0" and the alarm cleared. The valve can then be positioned as desired.

4.9 The following applies to R-24A, B & C indication:

- Readings are **NOT** valid for quantification of a S/G tube leak until the monitor has been adjusted per EMP-034 to match the actual measured primary to secondary leakage, but can be used for trending to determine if leakage is present **AND** if leakage is increasing.

- Readings are **NOT** power compensated when power is less than 40%. Readings will increase with power below 40%. Trend information may only be useful if the plant is at a constant Reactor power when below 40% power.

4.10 The principles of ALARA shall be used in planning and performing work and operations in the Radiation Control Area.

4.11 This procedure has been screened in accordance with PLP-037 criteria and determined Not Applicable to PLP-037.

8.0 INFREQUENT OPERATION

8.1 Adjusting a Radiation Monitor High Alarm Setpoint

NOTE: The Setpoint Log and Change Record in OMM-014 is used to record adjustment of the High Alarm setpoint of Radiation Monitors R-1, R-2, R-3, R-4, R-5, R-6, R-7, R-8, R-9, R-30, R-31A, R-31B, R-31C, R-32A, R-32B and R-33.

8.1.1 Adjusting the High Alarm Setpoint for Monitors R-1, R-2, R-3, R-4, R-5, R-6, R-7, R-8, R-9, R-11, R-12, R-15, R-16, R-17, R-18, R-20, R-21, R-30, R-31A, R-31B, R-31C and R-33:

1. Slide out the drawer for the desired monitor.
2. Adjust the thumbwheels to desired setpoint.
3. Push Alarm/Reset button and verify setpoint appears on ratemeter display.
4. Return the monitor drawer to its proper position.

8.1.2 Adjustment of the High Alarm Setpoint for Monitors R-14A, R-14B, R-14C, R-14D, and R-14E will be performed by E&C IAW the applicable sections of EMP-022 and/or EMP-028.

8.1.3 Adjustment of the Alert and High Alarm Setpoints for Monitors R-19A, R-19B, and R-19C will be performed by E&C IAW the applicable sections of EMP-023.

8.1.4 Adjustment of the Alert and High Alarm Setpoints for Monitors R-32A and R-32B will be performed by I&C IAW the applicable sections of LP-256.

8.1.5 Adjustment of the High Alarm Setpoint for Monitor R-37 will be performed by E&C IAW the applicable portions of EMP-023.

Facility: HB ROBINSON Task No.: 01000108705

Task Title: Monitor Nuclear Instrumentation During Refueling Operations JPM No.: 2004 NRC JPM SRO A1

K/A Reference: G2.2.303.5 / 3.3

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:
- The plant is in a refueling outage.
- Core off-load is in progress. You are in communication with the Refueling SRO
- Annunciator APP-005-A1 has just alarmed.

Task Standard:
- Refueling terminated.
- Audio Count Rate selected to N32.

Required Materials: None

General References: APP-005-A1, Revision 26
OWP-011
TS 3.9.2

Handouts: None

Initiating Cue: You are the only available licensed Operator in the Control Room. Respond as necessary.

Time Critical Task: N/A

Validation Time: 10 minutes

SIMULATOR SETUP

1. IC 199.
2. Audio Count Rate Channel selected to N31.
3. START UP RATE Channel selected to N31.
4. Insert Malfunction NIS04A to 0 volts
5. FREEZE.
6. RUN when Candidate takes the watch.

(Denote Critical Steps with an asterisk)

Performance Step: 1 Responds to alarm APP-005-A1.

Standard: References procedure APP-005-A1.

Comment:

APP-005-A1 Action 1

Performance Step: 2 If the detector has failed then perform the following:

Standard:

- Monitors control board indication and may check NIS Panel.
- Determines N-31 has failed.

Comment:

NOTE: **The JPM is written as if all actions of APP-005-A1 are completed before N31 is removed from service (OWP-011). If the candidate chooses to complete OWP-011 before completing APP-005-A1 then go to JPM Performance Step 6. Return to JPM Performance Step 4 when OWP-011 has been completed. The JPM is complete when both APP-005-A1 and OWP-011 have been completed.**

APP-005-A1, Action 1.a

Performance Step: 3 Remove the failed Source Range from service in accordance with OWP-011.

Standard: Refers to OWP-011 or completes the actions of APP-005-A1 before proceeding to OWP-011.

Examiner's Note: **It is acceptable to perform the remaining actions of APP-005-A1 before removing the channel from service in accordance with OWP-011.**

Comment:

APP-005-A1, Action 1.b

Performance Step: 4 Refer to Tech Specs 3.8.1 and Table 3.5-2 (ITS Table 3.3.1-1 and ITS LCO 3.9.2).

Standard: Informs CRSS.

Examiner's Cue: **Acknowledge as CRSS.**

Comment:

APP-005-A1, Action 2

Performance Step: 5 IF the detector has failed AND refueling operations are in progress, THEN in addition to Step 1, perform the following:

a. Terminate fuel movement.

b. Log N51 OR N52 as a replacement channel for Control Room indication.

c. Verify the operable Source Range channel is selected to the AUDIO COUNT RATE Drawer.

d. WHEN desired, THEN recommence fuel movement.

* **Standard:**

a. Contacts the Refueling SRO or CRSS to terminate fuel movement. *

b. Discusses a Control Room log entry to identify N51 OR N52 as a replacement channel for Control Room indication.

c. Selects the AUDIO COUNT RATE to N32. *

NOTE: **Selecting the AUDIO COUNT RATE to N32 is critical in either APP-005 or OWP-011.**

Booth Operator Cue:

a. If called as Refueling SRO: Acknowledge need to terminate fuel movement

Examiner's Cue:

a. As CRSS: Acknowledge need to terminate fuel movement

b. Acknowledge need to make log entry.

Comment:

OWP-011 Table

Examiner Cue: **Prior to START of OWP-011:**

- **Assume that you have verified the latest revision of OWP-011.**
- **The CRSS will assign a Work Request Number. Proceed to the VALVE/BREAKER/SWITCH lineup.**

Performance Step: 6

a. REMOVE NI-31 from ERFIS SCAN: NIN0031A.

b. AUDIO COUNT RATE CHANNEL – CHANNEL SELECTOR SWITCH

c. START UP RATE CHANNEL SELECT Switch

d. NIS CHANNEL SELECTOR NR 45 PEN 1

e. NIS CHANNEL SELECTOR NR 45 PEN 2

f. LEVEL TRIP Switch

g. NIS TRIP BYPASS NI-31 Status Light

h. HIGH FLUX AT SHUTDOWN Switch

Standard:

* a. Uses DR command to remove NIN0031A from processing

b. Selects N32 for the AUDIO COUNT RATE CHANNEL using the Channel Selector Switch

c. Selects N32 on the START UP RATE CHANNEL SELECT Switch

d, e. Verifies N32 is selected on at least one pen

f. Turns the LEVEL TRIP Switch to the BYPASS position on the front of the N-31 drawer

g. Verifies status light on RTGB is illuminated

h. Turns the HIGH FLUX AT SHUTDOWN Switch to the BLOCK position on the front of the N-31 drawer

Comment:

Terminating Cue: **When fuel movement has been terminated and N-31 removed from service, inform Candidate that evaluation on this JPM is complete.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2004 NRC JPM SRO A1

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- The plant is in a refueling outage.
- Core off-load is in progress. You are in communication with the Refueling SRO
- Annunciator APP-005-A1 has just alarmed.

INITIATING CUE: You are the only available Licensed Operator in the Control Room. Respond as necessary.

ALARM

SR DET LOSS OF DC *** WILL REFLASH ***

AUTOMATIC ACTIONS

1. None Applicable

CAUSE

1. Loss of DC voltage to Detector
2. Source Range Trip Blocked (expected alarm)
3. Loss of instrument power

OBSERVATIONS

1. Source Range Instruments
2. Source Range Detector Volts
3. Source Range Instrument Power Fuses

ACTIONS

1. **IF** the detector has failed, **THEN** perform the following:
   a. Remove the failed Source Range from service in accordance with OWP-011.
   b. Refer To Tech. Specs. 3.8.1 and Table 3.5-2 (ITS Table 3.3.1-1 and ITS LCO 3.9.2).
2. **IF** the detector has failed **AND** refueling operations are in progress, **THEN** in addition to Step 1, perform the following:
   a. Terminate fuel movement.
   b. Log N51 **OR** N52 as a replacement channel for Control Room indication.
   c. Verify the operable Source Range channel is selected to the AUDIO COUNT RATE Drawer.
   d. **WHEN** desired, **THEN** recommence fuel movement.

DEVICE/SETPOINTS

1. N31 / x 100 volts below normal voltage
2. N32 / x 100 volts below normal voltage

POSSIBLE PLANT EFFECTS

1. Possible entry into Tech Spec LCO Action

REFERENCES

1. ITS Table 3.3.1-1, Item 4 and ITS LCO 3.9.2
2. CWD B-190628, Sh 441 Cable AF, 443 Cable AF
3. OWP-011, Nuclear Instrumentation (NI)

Progress Energy	C Continuous Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 3

PART 10

OWP-011

NUCLEAR INSTRUMENTATION (NI)

REVISION 16

SUMMARY OF CHANGES
PRR 106772

STEP #	REVISION COMMENTS
NI-1, NI-2, NI-3, NI-4,	Added to the 2nd note on L/U for maintenance: restoring NI-41 (42, 43, 44) to ERFIS scan for I&C calibration activities may adversely effect CAOC/DELTA Flux and R-24A, B and C. R-24A, B and C should be declared inoperable when the NI is on ERFIS scan and calibration activities are in progress.

NI-31, Source Range

1. This revision has been verified to be the latest revision available.

   _____ (Print) _____ _____
   Name Signature Date

2. System: NI Work Request No:_____

3. Component: NI-31, Source Range

4. Scope of Work:

   Perform maintenance on Nuclear Instrument NI-31.

5. Testing required on redundant equipment prior to rendering component inoperable:

   N/A

6. Precaution:

   1) Refer to ITS Table 3.3.1-1 for Source Range applicability and operability requirements when not in the Refueling condition (MODE 6)

   2) Reference ITS LCO 3.9.2 during Refueling Operations (MODE 6).

   3) Removal of control power fuses below P-6 will cause a reactor trip signal.

   4) This OWP has been screened in accordance with PLP-037 criteria and determined to be a Case Three activity.

7. Valve/Breaker/Switch lineup has been completed.

   _____/_____
   Signature Date

8. Clearance Issued (If applicable) Clearance No:_____

9. I&C Maintenance lineup complete.

   N/A / N/A
   Signature Date

10. Clearance removed and Valve/Breaker/ Switch lineup restored to normal.

    _____/_____
    Signature Date

11. Source Range NI-31 has been declared operable.

    _____/_____
    Signature Date

VALVE, BREAKER, SWITCH LINEUP

COMPONENT DESCRIPTION	POSITION FOR MAINTENANCE	INIT	RESTORED POSITION	INIT
SOURCE RANGE CHANNEL NI-31				
REMOVE NI-31 from ERFIS SCAN: NIN0031A	REMOVED	____	RESTORED	____
AUDIO COUNT RATE CHANNEL - CHANNEL SELECTOR Switch	Selected to SR 32	____		
START UP RATE CHANNEL SELECT Switch *	NI _____	____		
NIS CHANNEL SELECTOR NR 45 PEN 1 *	NI _____	____		
NIS CHANNEL SELECTOR NR 45 PEN 2 *	NI _____	____		
LEVEL TRIP Switch	BYPASS	____	NORMAL	____
NIS TRIP BYPASS NI-31 Status Light	ILLUM	____	EXTNG	____
HIGH FLUX AT SHUTDOWN Switch	BLOCK	____	NORMAL IF SHUTDOWN OR BLOCK	____

* Switch should be selected to any NI which is NOT removed from service.

3.9 REFUELING OPERATIONS

3.9.2 Nuclear Instrumentation

LCO 3.9.2 Two source range neutron flux monitors shall be OPERABLE.

APPLICABILITY: MODE 6.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required source range neutron flux monitor inoperable	A.1	Verify one Post Accident Monitor (PAM) source range neutron flux monitor provides indication in the Control Room.	15 minutes
	AND		
	A.2	Log indicated PAM source range neutron monitor count rate.	30 minutes AND Once per 30 minutes thereafter

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Actions and Completion Times of Condition A not met.	B.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	B.2	Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet boron concentration of LCO 3.9.1.	Immediately
C. Two required source range neutron flux monitors inoperable.	C.1	Initiate action to restore one source range neutron flux monitor to OPERABLE status.	Immediately
	AND		
	C.2	Suspend CORE ALTERATIONS.	Immediately
	AND		
	C.3	Suspend positive reactivity additions.	Immediately
	AND		
	C.4	Perform SR 3.9.1.1.	4 hours AND Once per 12 hours thereafter

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.9.2.2	----------NOTE---------- Neutron detectors are excluded from CHANNEL CALIBRATION. ---------- Perform CHANNEL CALIBRATION.	18 months

PERFORMANCE INFORMATION

Facility:	HB ROBINSON	Task No.:	01001101601
Task Title:	Perform a Manual Shutdown Margin Boron Concentration Calculation Following a Reactor Trip	JPM No.:	2004 NRC JPM SRO A2
K/A Reference:	G2.1.25 2.8 / 3.1		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

- 15 minutes ago an automatic reactor trip occurred when an RCP breaker tripped.
- Control Bank D Rod D-08 failed to insert.

Following are the steady state conditions prior to the trip:

- 100% power
- Bank D: 218 Steps
- RCS Boron Concentration 190 PPM
- Tavg: 574 °F
- Cycle Exposure: 16400 MWD/MTU

Task Standard: Calculations within the band specified.

Required Materials: FMP-012
Plant Curve Book
Calculator

General References:	FMP-012, Manual Determination of Shutdown Margin Boron Concentration, Revision 21 Plant Curve Book
Handouts:	NONE
Initiating Cue:	You are an extra operator. The CRSS has assigned you to complete a Shutdown Margin Boron Concentration Calculation in accordance with FMP-012. The plant will be maintained at 547°F. Powertrax is unavailable
Time Critical Task:	N/A
Validation Time:	30 minutes

(Denote Critical Steps with an asterisk)

Performance Step: 1 Obtain a current copy of the procedure.

Standard: Candidate locates and reviews the procedure.

Examiner Cue: **Provide a copy of FMP-012 and/or tell the Candidate that the procedure obtained/provided is the current copy.**

Comment:

FMP-012, Step 6.2.1

Performance Step: 2 Most recent steady state critical conditions:

1. Using the most recent steady state Critical Data Stamp, COMPLETE Lines 1 through 5 on Attachment 7.2.
2. Record the current Cycle Exposure on Line 6 of Section I on ATTACHMENT 7.2.

Standard: Candidate completes ATT. 7.2, Lines 1-6, using the data in the Initial Conditions.

Comment:

The following steps are under 6.2.2: Boron Concentration Required to Maintain a Minimum of 1.77% k/k Shutdown Margin at 547°F:

FMP-012, Step 6.2.2.1

Performance Step: 3 Using Curve 1.11 and/or Table 1.11 of the Station Curve Book, locate the boron concentration corresponding to the current Cycle Exposure and 547°F, and record in Step II.1, ATTACHMENT 7.2.

* **Standard:** Using either Curve or Table 1.11, determines 1.77% SDM boron concentration to be 350-370 PPM and records it on Att. 7.2, Line II.1.

Examiner's Note: **Table 1.11 is the most accurate – 358 PPM.**

Comment:

FMP-012, Step 6.2.2.2

Performance Step: 4 Using the Curve Book, Table 1.5 or Curve 1.5, determine the Differential Boron Worth based on boron concentration determined in Step II.1, current Cycle Exposure and 547°F, and record in Step II.2, ATTACHMENT 7.2.

Standard: Using Curve 1.5 (EOL 547 Curve line) or Table 1.5, determines Boron Worth to be between 8.9 pcm/PPM and 9.1 pcm/PPM and records it on ATT. 7.2, Line II.2.

Comment:

FMP-012, Step 6.2.2.3

Performance Step: 5 **IF** there are Inoperable/Untrippable control rods, **THEN** determine Inoperable/Untrippable rod worth in ppm by multiplying the number of Inoperable/Untrippable control rods by the most reactive rod worth from Table 1.15 of the Station Curve Book and dividing by Differential Boron Worth determined in Step II.2, and record in Step II.3, ATTACHMENT 7.2.

Standard: Calculates Inoperable/Untrippable rod worth to be between 184 PPM and 188 PPM and records it on ATT. 7.2, Line II.3.

Comment:

FMP-012, Step 6.2.2.4

Performance Step: 6 Calculate the compensated minimum RCS Boron concentration by adding the Inoperable/Untrippable rod worth from Step II.3 to the minimum RCS Boron Concentration and record in Step II.4, ATTACHMENT 7.2.

* **Standard:** Determines the compensated minimum RCS Boron concentration to be between 534 PPM and 558 PPM and records it on ATT. 7.2, Line II.4.

Comment:

Terminating Cue: **When Attachment 7.2 sections I and II are complete and returned to the CRSS, inform the Candidate that evaluation on this JPM is complete.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2004 NRC JPM SRO A2

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

15 minutes ago an automatic reactor trip occurred when an RCP breaker tripped.

Control Bank D Rod D-08 **failed** to insert.

Following are the steady state conditions prior to the trip:

- 100% power
- Bank D: 218 Steps
- RCS Boron Concentration 190 PPM
- Tavg: 574 °F
- Cycle Exposure: 16400 MWD/MTU

INITIATING CUE:

You are an extra operator. The CRSS has assigned you to complete a Shutdown Margin Boron Concentration Calculation in accordance with FMP-012. The plant will be maintained at 547°F. Powertrax is unavailable

Progress Energy

R
Reference Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 6
PART 5

FUEL MANAGEMENT PROCEDURE

FMP-012

MANUAL DETERMINATION OF SHUTDOWN MARGIN BORON CONCENTRATION

REVISION 19

SUMMARY OF CHANGES
PRR 100951

REVISION #	REVISION COMMENTS
19	Converted to XP Steps 3.2 and 4.8: Editorial correction of CRSS title. Step 5.2.2: Added discussion of additional boration required to ensure the reactor is 1% subcritical in Modes 3 through 5 if Shutdown Bank A is inserted instead of Shutdown Bank B. Steps 6.2.2.4, 6.2.3.5, Att 7.2 Step II.4, Att 7.2 Step III.5: Revised the step to include the worth of H-10 if the H-10 ARPI is out of service or if Shutdown Bank A will be inserted instead of Shutdown Bank B.

TABLE OF CONTENTS

SECTION PAGE

1.0 PURPOSE

1.1 To identify the Technical Specification Shutdown Margin requirements and describe how H. B. Robinson complies with those requirements.

1.2 To provide instructions for determining Shutdown Margin in the event of misaligned control rod(s) or inoperable/untrippable control rod(s).

1.3 To provide the necessary information to manually determine a Shutdown Margin boron concentration in order to comply with Technical Specifications for Modes 1, 2, 3, 4, 5, and 6 in the event Powertrax can not be used.

NOTE:	PLP-037 is not applicable to this procedure.

2.0 REFERENCES

2.1 H. B. Robinson - Unit 2 Station Curve Book

2.1.1 Curve 1.1 and Table 1.1, Critical Boron Letdown Curve

2.1.2 Curve 1.3 and Table 1.3, Power Defect vs. Power

2.1.3 Curve 1.5 and Table 1.5, Differential Boron Worth vs. Boron Concentration

2.1.4 Curve 1.9 and Table 1.9, Rod Insertion Limits

2.1.5 Curve 1.11 and Table 1.11, Boron Concentration Required to Maintain A Minimum of 1.77% $\Delta k/k$ Shutdown Margin

2.1.6 Curve 1.14 and Table 1.14, Boron Concentration Required to Maintain 4.0% $\Delta k/k$ Shutdown Margin

2.2 Technical Specifications ITS LCO 3.1.1, LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, LCO 3.4.5, LCO 3.4.6, LCO 3.9.1, ITS SR 3.1.1.1, SR 3.4.5.6, SR 3.9.1.1

2.3 ACR 92-316

2.4 PLP-100, Technical Requirements Manual (TRM)

2.5 FMP-001, Core Operating Limit Report (COLR)

2.6 EC 47804, Cycle 22 Core Design and Analysis

2.7 CR 81249, Incorrect MRR value in FMP-012

2.8 EMF-2781(P), Robinson Nuclear Plant Cycle 22 Safety Analysis Report

2.9 RNP-F/NFSA-0083, RNP Cycle 22 H-10 Rod Worth

3.0 RESPONSIBILITIES

3.1 Manual calculation of shutdown margin boron concentration shall be performed by either Reactor Systems Engineering or Operations personnel.

3.2 The Superintendent - Shift Operations, OR Control Room Shift Supervisor, OR the Supervisor - Reactor Systems shall review and approve each manual shutdown margin calculation prior to its being considered valid.

4.0 DEFINITIONS/ABBREVIATIONS

4.1 Steady state, as used in this procedure, is the point at which power level has not changed for a minimum of 72 hours.

4.2 MWD/MTU - Megawatt-Days/Metric Ton Uranium, a unit of cycle exposure.

4.3 SDM - Shutdown Margin

4.4 RIL - Rod Insertion Limits

4.5 ITS - Improved Technical Specifications

4.6 COLR - Core Operating Limit Report

4.7 SSO - The Superintendent - Shift Operations

4.8 CRSS - Control Room Shift Supervisor

5.0 GENERAL

5.1 SDM is the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition less the untrippable rod(s), if all control rods fully inserted except for the single control rod of highest reactivity worth which is assumed to remain fully withdrawn. SDM is initially maintained by control rods, the existing Reactor Coolant System (RCS) boron concentration and the presence of fission product poisons (xenon and samarium). Additional boron must be added to the RCS to offset the positive reactivity inserted by the decay of the fission product poisons in order to maintain the SDM.

5.2 Determination of the Boron Concentration Required to Provide Shutdown Margin

5.2.1 Modes 1 and 2

If the reactor is critical (Mode 1 and Mode 2 with Keff $\geq$ 1.0), then adequate SDM can be verified by checking that the control rods are above the RILs specified in the COLR. If the control rods are above the RILs and all are trippable, then adequate SDM exists and no other verifications are necessary. However, if any control rod banks are below the RILs, or if any control rod(s)are misaligned and below the RILs, or if any control rod(s) are untrippable, then a SDM verification must be performed by determining the available SDM and comparing it to the required SDM. The available SDM is calculated by first determining the Total Rod Worth based on cycle exposure. The Total Rod Worth includes allowances for an unknown stuck rod (N-1), Power Shape effects, a 10% rod worth design uncertainty and other uncertainties. Once the Total Rod Worth is determined, the Power Defect and inserted D Bank worth for the current plant conditions as well as the worth of any misaligned control rod bank(s) and the worth of any Inoperable/ Untrippable control rod(s) are subtracted from the Total Rod Worth to determine the available SDM. If the available SDM is less than the required SDM, then a potential exists for not having adequate SDM and the RCS must be borated to restore SDM.

5.2.1 (Continued)

During startup (Mode 2 with Keff < 1.0), ITS SR 3.1.6.1 requires verification that the estimated critical control bank position is above the RILs. Adequate SDM is maintained as long as the RCS boron concentration is greater than or equal to the boron concentration which would result in criticality with the control rods at or above the RILs.

5.2.2 Modes 3 through 5

The boron concentration determined from Station Curve Book Curve 1.11 or Table 1.11 or from the POWERTRAX program for a specific RCS temperature will maintain the reactor 1% $\Delta k/k$ subcritical (k_{eff} = 0.99) at that temperature with no xenon, equilibrium samarium and all control rods fully inserted except for Shutdown Bank A and the control rod with the highest reactivity worth. Shutdown Bank A is verified during the core design process to have sufficient negative reactivity to make the reactor subcritical by at least an additional 0.77% $\Delta k/k$ over the entire life of the core. Therefore, the boron concentration determined from Curve 1.11 or Table 1.11 of the Station Curve Book or from the POWERTRAX program will provide at least 1.77% $\Delta k/k$ SDM.

For Cycle 22, if it is elected to insert Shutdown Bank A instead of Shutdown Bank B in Modes 3 through 5 then additional boration will be required to ensure that the reactor is 1% $\Delta k/k$ subcritical (k_{eff} = 0.99) since the worth of Shutdown Bank A is less than Shutdown Bank B. The worth of the H-10 control rod will be used to conservatively bound the difference in the worth between Shutdown Bank A and Shutdown Bank B.

The boron concentration determined from Station Curve Book, Curve 1.14 or Table 1.14 for a specific RCS temperature will provide a SDM as specified in the COLR at that temperature with no xenon, equilibrium samarium and the single control rod of highest reactivity worth fully withdrawn.

The boron concentration required to maintain a specified SDM decreases as the cycle exposure increases; therefore, the boron concentration required for a lower cycle exposure will typically conservatively bound the boron concentration required to maintain that same SDM at a higher cycle exposure. However, this may not always be true at the beginning of a cycle with large amounts of burnable poison in the core. Always verify the shape of the SDM curves versus exposure.

5.2.2 (Continued)

The boron concentration required to maintain a specified SDM typically decreases as the temperature increases. However, during conditions when the boron concentration in the RCS is very high, it is possible that the opposite is true. This is typical in the refueling mode when high boron concentrations are required. So it should not be assumed that the boron concentration required for a lower temperature will conservatively bound the boron concentration required to maintain that same SDM at a higher RCS temperature. A verification of SDM curves within the range of the temperatures and boron concentrations expected during the modes of operation should be performed in order to determine if the boron concentration based on the lower RCS temperature will bound the SDM requirements.

5.2.3 Mode 6

The boron concentration provided in the COLR is verified during the core design process to maintain at least the SDM as specified in the COLR and ITS Bases at temperatures up to and including 140°F.

5.3 Shutdown Margin Requirements

The amount of SDM required by ITS as specified in the COLR varies with plant conditions and core life. The SDM requirements and how H. B. Robinson meets those requirements are described below:

5.3.1 Power Operation, (Mode 1)

When the reactor is in Power Operation (Keff $\geq$ 0.99 and Power > 5%), the SDM requirements are specified in the COLR. The maximum SDM requirement, typically, occurs at the end of core life (low boron concentration) and is based on the value used in the analysis of the hypothetical steamline break accident. The additional SDM is required to suppress the positive reactivity inserted by an uncontrolled cooldown at the end of core life. ITS 3.1.1 is <u>not</u> applicable in Mode 1. However, there are LCOs which require a verification of SDM during certain control rod configurations in Mode 1. The following is a description of such requirements.

5.3.1 (Continued)

LCO 3.1.4 requires for all the control rods to be operable. If one or more rods becomes inoperable then perform required actions A.1.1, Verify SDM is within limits specified in the COLR, OR A.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour. If one rod is not within alignment limits then perform required actions B.2.1.1, Verify SDM is within limits specified in the COLR, OR B.2.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour, AND perform required action B.2.3, Verify SDM is within limits specified in the COLR once per 12 hours. If more than one rod is not within alignment limit then perform required actions D.1.1, Verify SDM is within limits specified in the COLR, OR D.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour.

LCO 3.1.5 requires each shutdown bank shall be within insertion limits specified in the COLR. If one or both shutdown banks not within limits as specified in the COLR, then perform required actions A.1.1, Verify SDM is within limits specified in the COLR, OR A.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour.

LCO 3.1.6 requires control banks shall be within the insertion, sequence, and overlap limits specified in the COLR. If control bank insertion limits are not met, then perform the following required actions A.1.1, Verify SDM is within limits specified in the COLR, OR A.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour. If control bank sequence or overlap limits are not met, then perform required actions B.1.1, Verify SDM is within limits specified in the COLR, OR B.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour.

5.3.2 Startup, (Mode 2)

When the reactor is in Startup (Keff $\geq$ 0.99 and Power $\leq$ 5%), the SDM requirements are specified in the COLR. The maximum SDM requirement, typically, occurs at the end of core life (low boron concentration) and is based on the value used in the analysis of the hypothetical steamline break accident. The additional SDM is required to suppress the positive reactivity inserted by an uncontrolled cooldown at the end of core life. ITS 3.1.1 is not applicable in Mode 2 with Keff $\geq$ 1.0. However, ITS 3.1.1 in mode 2 with Keff < 1.0 is met by maintaining the required SDM as specified in the COLR during the entire fuel cycle and by performing SR 3.1.1.1, Verify SDM every 24 hours.

In addition to the above requirements there are LCOs which require a verification of SDM during certain control rod configurations. The following is a description of such requirements.

LCO 3.1.4 in Mode 2 requires for all the control rods to be operable. If one or more rods becomes inoperable then perform required actions A.1.1, Verify SDM is within limits specified in the COLR, OR A.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour. If one rod is not within alignment limits then perform required actions B.2.1.1, Verify SDM is within limits specified in the COLR, OR B.2.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour, AND perform required action B.2.3, Verify SDM is within limits specified in the COLR once per 12 hours. If more than one rod is not within alignment limit then perform required actions D.1.1, Verify SDM is within limits specified in the COLR, OR D.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour.

LCO 3.1.5 in Mode 2 with any control bank not fully inserted requires each shutdown bank shall be within insertion limits specified in the COLR. If one or both shutdown banks are not within limits as specified in the COLR, then perform required actions A.1.1, Verify SDM is within limits specified in the COLR, OR A.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour.

5.3.2 (Continued)

LCO 3.1.6 in Mode 2 with Keff $\geq$ 1.0 requires control banks shall be within the insertion, sequence, and overlap limits specified in the COLR. If control bank insertion limits are not met, then perform the following required actions A.1.1, Verify SDM is within limits specified in the COLR, OR A.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour. If control bank sequence or overlap limits are not met, then perform required actions B.1.1, Verify SDM is within limits specified in the COLR, OR B.1.2, Initiate boration to restore SDM to within limit, and these actions need to be performed within 1 hour.

5.3.3 Hot Standby, (Mode 3)

When the reactor is in Hot Standby (Keff < 0.99 and $T_{avg} \geq 350^{\circ}F$), the SDM requirements are specified in the COLR. The SDM requirements are based on the Boron Concentration in the RCS and the number of reactor coolant loops in operation. The maximum SDM requirement for $\geq$ 2 reactor coolant loops in operation typically occurs at the end of core life (low boron concentration) and is based on the value used in the analysis of the hypothetical steamline break accident. The additional SDM is required to suppress the positive reactivity inserted by an uncontrolled cooldown at the end of core life. ITS 3.1.1 is met by providing required boron concentrations in Curve Book Curve 1.11 which maintain a SDM of $\geq$ 1.77% $\Delta k/k$ during the entire fuel cycle, and by verifying that the actual RCS boron concentration is greater than or equal to the required boron concentration (ITS SR 3.1.1.1).

With less than two reactor coolant loops in operation AND the rod control system capable of rod withdrawal AND the reactor trip breakers closed AND the lift disconnect switches for all control rods not fully withdrawn closed then additional SDM is required. ITS LCO 3.4.5.d requires that a SDM as specified in the COLR be maintained. ITS LCO 3.4.5.d is met by providing required boron concentrations in Curve Book Curve 1.14 which provide the required SDM and by verifying that the actual RCS boron concentration is greater than or equal to the required boron concentration. (ITS SR 3.4.5.6)

5.3.4 Hot Shutdown, (Mode 4)

When the reactor is in Hot Shutdown (Keff < 0.99 and 200°F < T_{avg} < 350°F), the SDM requirements are specified in the COLR. The SDM requirements are based on the Boron Concentration in the RCS and the number of reactor coolant loops in operation. The maximum SDM requirement for ≥ 2 reactor coolant loops in operation typically occurs at the end of core life (low boron concentration) and is based on the value used in the analysis of the hypothetical steamline break accident. The additional SDM is required to suppress the positive reactivity inserted by an uncontrolled cooldown at the end of core life. ITS 3.1.1 is met by providing required boron concentrations in Curve Book Curve 1.11 which maintain a SDM of ≥ 1.77% Δk/k during the entire fuel cycle, and by verifying that the actual RCS boron concentration is greater than or equal to the required boron concentration (ITS SR 3.1.1.1).

With less than two reactor coolant loops in operation AND the rod control system capable of rod withdrawal AND the reactor trip breakers closed AND the lift disconnect switches for all control rods not fully withdrawn closed then additional SDM is required. ITS LCO 3.4.5.d requires that a SDM as specified in the COLR be maintained. ITS LCO 3.4.5.d is met by providing required boron concentrations in Curve Book Curve 1.14 which provide the required SDM and by verifying that the actual RCS boron concentration is greater than or equal to the required boron concentration. (ITS SR 3.4.5.6)

With less than one loop or train consisting of RCS loops or residual heat removal (RHR) trains in operation AND the rod control system capable of rod withdrawal, ITS LCO 3.4.6, Action C.1 requires that all operations involving a reduction of RCS boron concentration to be suspended immediately.

5.3.5 Cold Shutdown, (Mode 5)

When the reactor is in Cold Shutdown (Keff < 0.99 and $T_{avg} \leq 200°F$), ITS 3.1.1 requires a SDM as specified in the COLR. ITS 3.1.1 is met by administratively requiring a SDM of $\geq 1.77\%$ $\Delta k/k$ for all RCS temperatures and by performing SR 3.1.1.1, Verify SDM every 24 hours.

5.3.6 Refueling, (Mode 6)

When the reactor is in the refueling mode (one or more reactor vessel head closure bolts less than fully tensioned and RCS temperatures $\leq 140°F$ {TRM 1.1}), ITS 3.9.1 requires a Boron Concentration as specified in the COLR. The core design process verifies that an RCS boron concentration as specified in the COLR will provide adequate SDM at RCS temperatures $\leq 140°F$. Therefore, ITS 3.9.1 is met by verifying that the RCS boron concentration is at least as specified in the COLR and is conducted by performing SR 3.9.1.1, Verify SDM every 72 hours.

6.0 PROCEDURE

NOTE: If it is desired to determine the SDM boron concentration for a particular plant mode only, then perform either sections 6.1, 6.2, or 6.3 and complete either ATTACHMENT 7.1, 7.2, or 7.3 respectively and N/A all others. Section 6.1 is performed only as a response to the LCO required action.

NOTE: During Cycle 22, while H-10 ARPI is inoperable, H-10 control rod worth will not be included in the determination of SDM in Modes 1 - 5. Also, Step 6.1.1 and Sections I, II, and III of Attachment 7.1 shall not be performed while H-10 ARPI is OOS

6.1 Mode 1 and 2

6.1.1 If there are only misaligned control rod(s) which are located in Control Banks D or C, then determine current reactor conditions and complete Lines 1 through 6, Section I on Attachment 7.1, otherwise N/A Sections I, II, and III in Attachment 7.1 and continue with Sep 6.1.4 and Section IV of Attachment 7.1.

6.1.2 Using the COLR or Curve Book, Table 1.9 or Curve 1.9 and the power level recorded in Attachment 7.1, Section I, Step 2, determine the RIL for Control Banks D and C and record in Section II, Attachment 7.1.

6.1.3 Determine if all of the control rods in Control Banks C and D are above the rod insertion limit and circle the appropriate response in Section III, Attachment 7.1.

1. If the response is yes, then N/A Sections IV through XI of Attachment 7.1, and continue with Step 6.1.13.

2. If the response is no then continue with Step 6.1.4 and complete the rest of Attachment 7.1.

6.1.4 Determine current reactor conditions and complete Lines 1 through 4, Section IV on Attachment 7.1 .

6.1.5 Determine the Total Power Defect based on the Latest Available RCS Boron Concentration, Power Level, and exposure recorded in Section IV, Attachment 7.1, using Curve Book, Table 1.3 or Curve 1.3, and record in Section V of Attachment 7.1.

6.1.6 Determine the total integral inserted/misaligned rod(s) worth by recording the inches of the lowest inserted rod in Control Banks D and C and lowest misaligned rod within the bank for each misaligned bank in Section VI, Attachment 7.1, then converting the steps of the insertion/misalignment of each bank into worths by using the Table 1 of Attachment 7.4, and record in Section VI, Attachment 7.1, then totaling up the worths and recording in Section VI, Attachment 7.1.

6.1.7 Determine the Total Rod Worths based on the current cycle exposure recorded in Attachment 7.1, Section IV, Step 1, using Table 2 of Attachment 7.4, and record in Section VII, Attachment 7.1.

6.1.8 Determine the number of inoperable/untrippable control rods.

1. If there are inoperable/untrippable control rods, then calculate the worth by multiplying the number of untrippable/inoperable rods by the worth of the Most Reactive Rod, and record in Section VIII, Attachment 7.1, otherwise N/A.

6.1.9 Calculate the available SDM by subtracting the worths of any Inserted/Misaligned Bank(s), Power Defect, any Inoperable/ Untrippable Rod(s), and H-10 rod worth (during Cycle 22 when H-10 ARPI is OOS) from the Total Rod Worths, and record in Section IX, Attachment 7.1.

6.1.10 Determine the required SDM based on the Latest Available RCS boron concentration recorded in Attachment 7.1, Section IV, Step 4, using Figure 5.0 of the COLR (FMP-001), and record in Section X, Attachment 7.1.

6.1.11 Determine if adequate SDM exists by comparing the available SDM calculated in Section IX, Attachment 7.1 to the required SDM determined in Section X, Attachment 7.1.

1. If the available SDM is greater than required SDM, then Adequate SDM exists, circle YES, N/A the rest of Section XI, Attachment 7.1 and proceed to Step 6.1.13.

2. If not, then circle NO and perform Step 6.1.12.

6.1.12 Determine the amount of boron that is needed in order to re-establish the available SDM above the required SDM by subtracting the required SDM determined in Section X, Attachment 7.1 from the available SDM calculated in Section IX, Attachment 7.1 and dividing by the Differential Boron Worth based on the Latest Available RCS Boron Concentration, exposure, and Tavg, and using the Curve Book, Table 1.5 or Curve 1.5. Record in Section XI, Attachment 7.1.

6.1.13 Have the SSO, or CRSS, or Supervisor - Reactor Systems review and approve ATTACHMENT 7.1.

6.1.14 Send the completed ATTACHMENT 7.1 to the Vault for permanent storage.

6.2 Modes 3, 4, 5

6.2.1 Most recent steady state critical conditions:

1. Using the most recent steady state Critical Data Stamp, COMPLETE Lines 1 through 5 on Attachment 7.2.

2. Record the current Cycle Exposure on Line 6 of Section I on ATTACHMENT 7.2.

NOTE: If it is not desired to determine the SDM boron concentration for a particular plant condition, then that section of ATTACHMENT 7.2 may be marked N/A.

6.2.2 Boron Concentration Required to Maintain a Minimum of 1.77% $\Delta k/k$ Shutdown Margin at 547°F:

1. Using Curve 1.11 and/or Table 1.11 of the Station Curve Book, locate the boron concentration corresponding to the current Cycle Exposure and 547°F, and record in Step II.1, ATTACHMENT 7.2.

2. Using the Curve Book, Table 1.5 or Curve 1.5, determine the Differential Boron Worth based on boron concentration determined in Step II.1, current Cycle Exposure and 547°F, and record in Step II.2, ATTACHMENT 7.2.

3. **IF** there are Inoperable / Untrippable control rods, **THEN** determine Inoperable / Untrippable rod worth in ppm by multiplying the number of Inoperable / Untrippable control rods by the most reactive rod worth and dividing by Differential Boron Worth determined in Step II.2, and record in Step II.3, ATTACHMENT 7.2.

4. **IF** H-10 ARPI is declared Out of Service **OR IF** Shutdown Bank A will be inserted <u>instead</u> of Shutdown Bank B, **THEN** determine H-10 rod worth in ppm by dividing H-10 rod worth by Differential Boron Worth determined in Step II.2, and record in Step II.4, ATTACHMENT 7.2.

5. Calculate the compensated minimum RCS Boron concentration by adding to the minimum RCS Boron Concentration, Inoperable / Untrippable rod worth from Step II.3, H-10 rod worth from Step II.4, and record in Step II.5, ATTACHMENT 7.2.

6.2.3 Boron Concentration Required to Maintain a Minimum of 1.77% Δk/k Shutdown Margin at reduced Reactor Coolant System temperatures:

1. Determine the lowest anticipated RCS temperature during the shutdown, and record in Step III.1, ATTACHMENT 7.2.

2. Using Curve 1.11 and/or Table 1.11 of the Station Curve Book, locate the boron concentration corresponding to the current cycle exposure and the lowest RCS temperature expected during the Shutdown, and record in Step III.2, ATTACHMENT 7.2.

3. Using the Curve Book, Table 1.5 or Curve 1.5, determine the Differential Boron Worth based on boron concentration determined in Step III.2, current Cycle Exposure and lowest RCS temperature expected during the Shutdown, and record in Step III.3, ATTACHMENT 7.2.

4. **IF** there are Inoperable / Untrippable control rods, **THEN** determine Inoperable / Untrippable rod worth in ppm by multiplying the number of Inoperable / Untrippable control rods by the most reactive rod worth and dividing by Differential Boron Worth determined in Step III.3, and record in Step III.4, ATTACHMENT 7.2.

5. **IF** H-10 ARPI is declared Out of Service **OR IF** Shutdown Bank A will be inserted instead of Shutdown Bank B, **THEN** determine H-10 rod worth in ppm by dividing H-10 rod worth by Differential Boron Worth determined in Step III.3, and record in Step III.5, ATTACHMENT 7.2.

6. Calculate the compensated minimum RCS Boron concentration by adding to the minimum RCS Boron Concentration, Inoperable / Untrippable rod worth from Step III.4, H-10 rod worth from Step III.5, and record in Step III.6, ATTACHMENT 7.2.

6.2.4 Boron Concentration Required to Maintain a Minimum of 4% Δk/k Shutdown Margin:

1. Determine the lowest RCS temperature expected to be achieved during the shutdown with < 2 RCPs in operation, and the rod control system capable of withdrawal (the reactor trip breakers closed and lift coil disconnects closed), and record in Step IV.1, ATTACHMENT 7.2.

2. Using Curve 1.14 and/or Table 1.14 of the Station Curve Book, locate the boron concentration corresponding to the current cycle exposure and the lowest RCS temperature anticipated while the reactor trip breakers are closed, and record in Step IV.2, ATTACHMENT 7.2.

3. Using the Curve Book, Table 1.5 or Curve 1.5, determine the Differential Boron Worth based on boron concentration determined in Step IV.2, current Cycle Exposure and, the lowest RCS temperature anticipated while the reactor trip breakers are closed and record in Step IV.3, ATTACHMENT 7.2.

4. **IF** there are Inoperable / Untrippable control rods, **THEN** determine Inoperable / Untrippable rod worth in ppm by multiplying the number of Inoperable / Untrippable control rods by the most reactive rod worth and dividing by Differential Boron Worth determined in Step IV.3, and record in Step IV.4, ATTACHMENT 7.2.

5. **IF** H-10 ARPI is declared Out of Service, **THEN** determine H-10 rod worth in ppm by dividing H-10 rod worth by Differential Boron Worth determined in Step IV.3, and record in Step IV.5, ATTACHMENT 7.2.

6. Calculate the compensated minimum RCS Boron concentration by adding to the minimum RCS Boron Concentration, Inoperable / Untrippable rod worth from Step IV.4, H-10 rod worth from Step IV.5, and record in Step IV.6, ATTACHMENT 7.2.

6.2.5 Have the SSO, or CRSS, or Supervisor - Reactor Systems review and approve ATTACHMENT 7.2.

6.2.6 Send the completed ATTACHMENT 7.2 to the Vault for permanent storage.

6.3 Mode 6

6.3.1 Refer to the current COLR for the appropriate refueling boron concentration, and record in Section I, Attachment 7.3.

6.3.2 Have the SSO, or CRSS, or Supervisor - Reactor Systems review and approve ATTACHMENT 7.3.

6.3.3 Send the completed ATTACHMENT 7.3 to the Vault for permanent storage.

7.0 ATTACHMENTS

7.1 Shutdown Margin Modes 1,2 Data Form

7.2 Shutdown Margin Boron Concentration Modes 3,4,5 Data Form

7.3 Shutdown Margin Boron Concentration Mode 6 Data Form

7.4 Control Rod Worths

ATTACHMENT 7.1
Page 1 of 3

SHUTDOWN MARGIN MODES 1, 2 DATA FORM

I. Current reactor critical conditions:

1. Date/Time conditions recorded _____/_____
2. Reactor Power _____ % Full Power
3. Demand D Bank Position _____ steps
4. Demand C Bank Position _____ steps
5. Record RPI indication for Control Bank D and convert to steps below

Rod	H-04	D-08	H-12	M-08	H-08
Inches					
Steps (1.6*Inches)					

6. Record RPI indication for Control Bank C and convert to steps below

Rod	K-04	F-04	D-06	D-10	F-12	K-12	M-10	M-06
Inches								
Steps (1.6*Inches)								

II. Based on the Power Level and using Curve Book, Table 1.9 or Curve 1.9, the RIL for

Control Bank D is _____ steps Control Bank C is _____ steps

III. Are the control rods in Control Banks C and D above the RIL,

CIRCLE ONE

YES Adequate SDM exists and no further verification is warranted, and N/A Sections IV through XI, Attachment 7.1.

NO Further verification of SDM is warranted, complete Sections IV through XI, Attachment 7.1.

SHUTDOWN MARGIN MODES 1, 2 DATA FORM

IV. Record the following

1. Current Cycle exposure (from Control Room Status Board) _____MWD/MTU
2. Reactor Power Level _____ %
3. Tavg _____ degrees F
4. Latest Available RCS Boron Concentration _____ ppm

   Sample Time___:____, Date___/__/__

V. Based on the Latest Available RCS Boron Concentration, Power Level, and exposure and using Curve Book, Table 1.3 or Curve 1.3, the Total Power Defect is _____ pcm

NOTE: Data entered into the table below will be based on the lowest indicated RPI in the bank. An untrippable rod should not be counted as a misaligned rod.

VI. Determine the RPI position of the lowest rod in control banks D and C and enter into the table below. If a misaligned rod(s) is in CBB, CBA, SBB, SBA, or if the bank(s) are below RIL, then determine the RPI position of the lowest rod(s) within that bank and enter into the table below. Using Table 1, Attachment 7.4, determine the integral bank worth of the inserted/misaligned rod(s) by filling out the table below:

	CBD	CBC	CBB	CBA	SBB	SBA	Total Worth
Lowest Indicated RPI [Inches]							
WORTH [pcm]							

VII. Based on the current cycle exposure and using the Table 2, Attachment 7.4, the Total Rod Worth is _____ pcm

SHUTDOWN MARGIN MODES 1, 2 DATA FORM

VIII. Number of inoperable/untrippable control rods _____

If there are inoperable/untrippable rods then calculate the worth by performing the following, otherwise N/A.

_____	*	1856 pcm	=	_____ pcm
# of rods		Most Reactive Rod		Inop./Untrip. Rod Worth

IX. The available SDM is calculated by:

_____	-	_____	-	_____	-	_____	-	804 or 0 (NOTE A)	=	_____ pcm
Total Rod Worth		Inserted/ Misaligned Worth		Power Defect Worth		Inop/Untrip Rod Worth		H-10 Rod Worth		Available Shutdown Margin
(Step VII)		(Step VI)		(Step V)		(Step VIII)				

(NOTE: A) Use 804 pcm if H-10 ARPI is OOS, otherwise use 0. Circle the value used in the step above.

X. Based on the Latest Available boron concentration and Figure 5.0, Cycle 22 COLR (FMP-001), the required SDM is _____% * 1000 pcm = _____pcm

XI. Is the available SDM greater than the required SDM?

CIRCLE ONE

YES Adequate Shutdown Margin Exists

NO Adequate Shutdown Margin does not exist; perform the following:

1) Based on the current exposure, Tavg, and latest available Boron Concentration, and using Curve Book, Table 1.5 or Curve 1.5, the Boron Worth is (-)_____ pcm/ppm

2) Borate to restore available SDM. Need to borate at least

(_____pcm	-	_____pcm)/	(-) _____ pcm/ppm	= _____ppm
Available SDM (Step IX)		Required SDM (Step X)	Boron Worth (Step XI.1)	Amount to borate

Performed By:_____ Date:_____

Approved By: _____ Date:_____
SSO or CRSS or Supervisor - Reactor Systems

ATTACHMENT 7.2
Page 1 of 4

SHUTDOWN MARGIN BORON CONCENTRATION MODES 3, 4, 5 DATA FORM

I. Most recent steady state critical conditions:

1. Date/Time conditions recorded _____/_____
2. Reactor Power _____ % Full Power
3. D Bank Position _____ steps
4. RCS Boron Concentration _____ ppm
5. T_{avg} _____ °F
6. Cycle Exposure (from Control Room Status Board)_____ MWD/MTU

II. Boron Concentration Required to Maintain a Minimum of 1.77% Δk/k Shutdown Margin at 547°F:

1) Minimum Reactor Coolant System Boron Concentration = _____ ppm

2) Differential Boron Worth (DBW) = (-)_____pcm/ppm
(Based on RCS Boron Concentration from Step II.1, T_{avg} -547°F, and Cycle Exposure from Step I.6)

IF there are Inoperable / Untrippable rods **THEN** perform Step II.3, **OTHERWISE** N/A

3) Inoperable / Untrippable Rod(s) Worth

_____ * (-) 1856 pcm / (-)_____pcm/ppm = _____ppm
rods Most Reactive Rod DBW (Step II.2)

IF ARPI H-10 is OOS **OR IF** Shutdown Bank A will be inserted instead of Shutdown Bank B **THEN** perform Step II.4, **OTHERWISE** N/A

4) H-10 Rod Worth

(-) 804 pcm / (-)_____ pcm/ppm = _____ppm
H-10 Rod Worth DBW (Step II.2)

5) Compensated Min. RCS Boron Concentration

_____ppm +	_____ppm +	_____ppm = _____ ppm
Min RCS Boron Conc. (Step II.1)	Inop./Untrip Rod Worth (Step II.3)	H-10 Rod Worth (Step II.4)

III. Boron Concentration Required to Maintain a Minimum of 1.77% Δk/k Shutdown Margin at reduced Reactor Coolant System temperatures:

1) Lowest Anticipated RCS Temperature = _____ °F

2) Minimum Reactor Coolant System Boron Concentration = _____ ppm

3) Differential Boron Worth (DBW) = (-)_____pcm/ppm
(Based on RCS Boron Concentration from Step III.2, T_{avg} from Step III.1, and Cycle Exposure from Step I.6)

IF there are Inoperable / Untrippable rods **THEN** perform Step III.4, **OTHERWISE** N/A

4) Inoperable / Untrippable Rod(s) Worth

_____ * (-) 1856 pcm / (-)_____pcm/ppm = _____ppm
rods — Most Reactive Rod — DBW (Step III.3)

IF ARPI H-10 is OOS **OR IF** Shutdown Bank A will be inserted instead of Shutdown Bank B **THEN** perform Step III.5, **OTHERWISE** N/A

5) H-10 Rod Worth

(-) 804 pcm / (-)_____ pcm/ppm = _____ppm
H-10 Rod Worth — DBW (Step III.3)

6) Compensated Min. RCS Boron Concentration

_____ppm + _____ppm + _____ppm = _____ ppm
Min RCS Boron Conc. (Step III.2) — Inop./Untrip Rod Worth (Step III.4) — H-10 Rod Worth (Step III.5)

IV. Boron Concentration Required to Maintain a Minimum of 4% Δk/k Shutdown Margin:

1) Lowest Anticipated RCS Temperature = _____ °F

2) Minimum Reactor Coolant System Boron Concentration = _____ ppm

3) Differential Boron Worth (DBW) = (-)_____pcm/ppm
(Based on RCS Boron Concentration from Step IV.2, T_{avg} from Step IV.1, and Cycle Exposure from Step I.6)

IF there are Inoperable / Untrippable rods **THEN** perform Step IV.4, **OTHERWISE** N/A

4) Inoperable / Untrippable Rod(s) Worth

_____ * (-) 1856 pcm / (-)_____pcm/ppm = _____ppm
rods — Most Reactive Rod — DBW (Step IV.3)

IF ARPI H-10 is OOS **THEN** perform Step IV.5, **OTHERWISE** N/A

5) H-10 Rod Worth

(-) 804 pcm / (-)_____ pcm/ppm = _____ppm
H-10 Rod Worth — DBW (Step IV.3)

6) Compensated Min. RCS Boron Concentration

_____ppm + _____ppm + _____ppm = _____ ppm

Min RCS Boron Conc. (Step IV.2)	Inop./Untrip Rod Worth (Step IV.4)	H-10 Rod Worth (Step IV.5)

Performed By:_____Date:_____

Approved By: _____ Date:_____
SSO or CRSS or Supervisor - Reactor Systems

SHUTDOWN MARGIN BORON CONCENTRATION MODE 6 DATA FORM

I. Current Refueling Outage_____

Minimum Boron Concentration _____ ppm

Performed By:_____ Date:_____

Approved By:_____ Date:_____
SSO or CRSS or Supervisor - Reactor Systems

ATTACHMENT 7.4
Page 1 of 2
CONTROL ROD WORTHS

NOTE: This data is only valid for HB Robinson Unit 2, Cycle 22 due to the use of Cycle specific parameters.

TABLE 1
Inserted/Misaligned Bank Worths

Steps	Inches	Control Bank D (pcm)	Control Bank C (pcm)	Control Bank B (pcm)	Control Bank A (pcm)	Shutdown Bank B (pcm)	Shutdown Bank A (pcm)
225	141	0	0	0	0	0	0
213	133	43	47	30	51	54	47
201	126	165	246	57	228	263	224
189	118	322	479	115	437	501	422
177	111	462	680	167	616	700	586
165	103	569	849	208	767	865	722
153	96	657	987	236	888	997	828
141	88	720	1093	255	979	1102	905
129	81	764	1178	268	1050	1184	962
117	73	791	1243	275	1099	1247	1001
105	66	809	1291	280	1132	1292	1025
93	58	821	1322	282	1154	1321	1040
81	51	827	1341	284	1167	1339	1048
69	43	861	1352	285	1175	1349	1053
57	36	909	1360	285	1228	1356	1056
45	28	940	1364	285	1302	1360	1076
33	21	961	1369	285	1342	1360	1091
21	13	970	1369	285	1360	1366	1097
9	6	974	1369	286	1366	1366	1099
0	0	975	1369	286	1367	1366	1100

CONTROL ROD WORTHS

NOTE: This data is only valid for HB Robinson Unit 2, Cycle 22 due to the use of Cycle specific parameters.

TABLE 2
Total Rod Worth

Exposure (MWD/MTU)	Total Rod Worth (pcm)
0	5932
1000	5919
2000	5906
3000	5893
4000	5880
5000	5868
6000	5855
7000	5842
8000	5829
9000	5816
10000	5803
11000	5790
12000	5777
13000	5764
14000	5752
15000	5739
16000	5726
17000	5713
18000	5700

PERFORMANCE INFORMATION

Facility: HB ROBINSON Task No.: 02341101603

Task Title: Review (For Approval) A Completed Temporary Procedure Change Form JPM No.: 2004 NRC JPM SRO A3

K/A Reference: G2.2.6 3.3

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: _____

Classroom __X__ Simulator _____ Plant __X__

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:
- The unit is in Mode 3.
- EDG Surveillance testing is scheduled.

Task Standard: Identifies all errors and returns Attachment 6 unapproved.

Required Materials: NONE

General References: PRO-NGGC-0204, Procedure Review and Approval, Revision 5
OST-409-1, EDG "A" Fast Speed Start, Revision 20

Handouts:
- PRO-NGGC-0204, Attachment 6, completed to SSO signature
- OST-409-1 with "a" added after REVISION and Rev. on the title page and the following added on Page 9 after P&L 5.4: "if the unit is in Mode 1 or Mode 2, as defined in ITS" and "a" added after Rev.

Initiating Cue: You are acting as the Superintendent-Shift Operations. Review the PRO-NGGC-0204, Attachment 6, Temporary Change Form that is being submitted for your approval.

Time Critical Task: N/A

Validation Time: 10 Minutes

(Denote Critical Steps with an asterisk)

PRO-NGGC-0204 Attachment 6, OST-409-1 Handout

Examiner's Cue: **Provide the Candidate with the completed PRO-NGGC-0204 Attachment 6 and OST-409-1 Handout.**

Performance Step: 1 Reviews handout.

Standard:
- Obtains/refers to a copy of PRO-NGGC-0204, Section 9.3.
- Obtains/refers to a copy of OST-409-1.
- He/she may refer to ITS.

Comment:

PRO-NGGC-0204 Attachment 6

Performance Step: 2 Compares PRO-NGGC-0204 Section 9.3 requirements to the completed Attachment 6.

* **Standard:** Determines that "Temp Chg Expires on (Date)" is incorrect. A date no later than 21 days from the "Interim Approval Date" must be entered.

Examiner's Cue: **If necessary: "I will change the date. Review the rest of Attachment 6".**

Comment:

PRO-NGGC-0204 Attachment 6

Performance Step: 3 Compares PRO-NGGC-0202 Section 9.3 requirements to the completed Attachment 6.

* **Standard:** Rejects the change for either or both the following reasons:
- Concurrent testing would make both Diesels inoperable at certain points of the testing.
- Concurrent testing would subject the Diesels to a possible "common mode failure".

Comment:

Terminating Cue: **When the document has been returned, inform the candidate that evaluation on this JPM is complete.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2004 NRC JPM SRO A3

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- The unit is in Mode 3.
- EDG Surveillance testing is scheduled.

INITIATING CUE: You are acting as the Superintendent-Shift Operations. Review the PRO-NGGC-0204, Attachment 6, Temporary Change Form that is being submitted for your approval.

ATTACHMENT 6
PAGE 1 of 1
TEMPORARY CHANGE FORM

FORM PRO-NGGC-0204-6 (4/03)

Description			
Procedure No. OST-409-1	Revision No 20.a	Minor Change No N/A	Temp Chg Expires on (Date) Next Permanent Rev.
Procedure Title EDG "A" FAST SPEED START			NCR No. N/A
Type of Action (Check Applicable Box) ☐ Temp Change Permanent to Follow ☑ Temp Change No Permanent to Follow		Affected Page Nos. 9	
Description of Procedure Action: Change PRECAUTION AND LIMITATION 5.4 to read: Only one Diesel shall be tested at a time if the unit is in Mode 1 or Mode 2 as defined in ITS.			
Basis for the Procedure Action: Expedite EDG surveillance testing and reduce manpower requirements when the unit is not Critical.			
Originator (Print Name) J.K. Lloyd			Date TODAY
Job Supervisor (Print Name) J. Arsenault			Date TODAY
Interim Approval			
1st Approver (Print) J.A. Smith	1st Approver (Sign) J.A. Smith		Date TODAY
2nd Approver (SSO) (Print)	2nd Approver (SSO) (Sign)		Date
Tech and REG-NGGC-0010 Reviews			
Technical Reviewer (Print)	Technical Reviewer (Sign)		Date Completed
REG-NGGC-0010 (Check Applicable Box) ☐ Exempt ☐ Screening ☐ Evaluation			Date Completed
Final Approval [BNP, HNP]			
Final Approval Required by (Date)	☐ Approved		☐ Rejected
Final Approval (Print)	Final Approval (Sign)		Date
PNSC Chairman (Print) (if applicable)	PNSC Chairman (Sign)		Date
Removal/Early Expiration [ALL]			
Early Expiration Date	Approval (Sign)		Date

QA RECORD

Progress Energy	C Continuous Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 3

PART 9

OST-409-1

EDG "A" FAST SPEED START

REVISION 20, *a*

5.0 PRECAUTIONS AND LIMITATIONS

5.1 This test can be performed during any phase of plant operation.

5.2 CCW Pump "B" will not auto start during Low CCW Header Pressure condition if EDG "A" Output Breaker is shut. Manual Operator action may be required to start a second CCW pump.

5.3 While EDG "A" output breaker is shut, MDAFW Pump "A" is out of service and will not auto start on Lo-Lo S/G level, AMSAC or both MFP breakers open. Manual action will be required to start the affected MDAFW pump.

5.4 Only one Diesel shall be tested at a time if the unit is in Mode 1 or Mode 2, as defined in ITS.

5.5 Maintain a minimum fuel oil storage of 19,000 gallons in the Diesel Fuel Oil Tank plus an additional 15,000 gallons in the I.C. Turbine Fuel Oil Tank. (ESR 96-00375 & ITS LCO 3.8.3)

5.6 Coolant discharge pressure fluctuations on the jacket water system shall be observed. Fluctuations of greater than 3 psig indicate a possible water leak between the jacket water system and the cylinder liner. A water leak of this type could lead to erosion of both the cylinder liner and pistons.

5.7 The performance of this OST must be coordinated with other plant evolutions such that the minimum equipment operability requirements of TECH SPECS are met.

5.8 When taking the vibration readings, use the magnetic holder instead of the straight probe whenever possible.

5.9 When Raising or Lowering the load on the EDG using the Speed Control Lever on the Generator Panel allow approximately 15 seconds between Raise or Lower actions to enable the Governor time to respond to the new load demand especially when approaching the 2500 KW rating so as not to exceed it.

5.10 Diesel Generator load shall not exceed ratings of 2500 KW for continuous operation.

- Do **NOT** exceed 2750 KW.
- Do **NOT** operate at 2750 KW for more than 2 hours within a 24 hour period.
- Do **NOT** exceed 4,000 amps on the Generator.

PERFORMANCE INFORMATION

Facility: HB ROBINSON Task No.: 02344100403

Task Title: Classify an Event/PAR JPM No.: 2004 NRC JPM SRO A5

K/A Reference: G2.4.44 4.0

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

1. The plant tripped when an automatic safety injection occurred.
2. CV pressure relief was in progress. Pressure relief valves failed to close
3. Containment pressure peaked at 27 psig and is now reading 12 psig, slowly lowering.
4. RCS leakage is much greater than charging pump capacity.
5. The steam generators and steam side of the plant are intact.
6. Core Exit Thermocouples are reading approximately 225°F.
7. Containment water level is 287 inches.
8. There is a RED PATH on CSF-4 (RCS Integrity) and an ORANGE PATH on CSF-5 (Containment).
9. Bus E-2 de-energized on electrical fault and has not been restored.
10. Bus E-1 is powered from off-site.
11. RHR Pump A did not start.
12. It is August 31. The weather is sunny and clear.
13. Wind is from 140° @ 8 mph.
14. Off-site dose projections are not available at this time.
15. Following is the status of selected Radiation Monitors. R-11 and R-12 are aligned to the CV. All are in alarm:
    - R-2 – 52 R/hr
    - R-7 – 55 R/hr

- R-11 – 3.0 E6 CPM
- R-12 – 8.5 E4 CPM
- R-32A - 48 R/hr
- R-32B – 45 R/hr
- R-14E – 3.5 E5 CPM

Task Standard:	Classifies as GE and makes PAR.
Required Materials:	Copies of EAL-1/2 EPCLA-01 for Candidate
General References:	EAL-1/2 Revision 12 EPCLA-01 Revision 15
Handouts:	EPCLA-01
Initiating Cue:	You are the SSO. Classify this event and enter the appropriate procedure.
Time Critical Task:	15 Minutes to Classify
Validation Time:	10 Minutes

(Denote Critical Steps with an asterisk)

CLASSIFICATION TIME START _____

Performance Step: 1 Implement EAL-1 Flow Chart.

Standard: Enters EAL-1 at "OFF NORMAL CONDITION INDICATED OR OBSERVED".

Comment:

EAL-1

Performance Step: 2 Determines Fuel FPB Status.

Standard: Answers YES based on "R-11 RAD MONITOR >1M CPM" and "R-12 RAD MONITOR > 40K". Marks FUEL BREACHED on FPB Status Board.

Comment:

EAL-1

Performance Step: 3 Determine RCS FPB Status.

Standard: Answers YES based on "RCS LEAKAGE / CHARGING CAPABILITY" initial conditions. Indicates SAE on EAL Status Board and marks RCS BREACHED on FPB Status Board.

Comment:

EAL-1

Performance Step: 4 PRIMARY TO SECONDARY LEAKAGE > TECH SPECS?

Standard: Answers NO, from INITIAL CONDITIONS.

Comment:

EAL-1

Performance Step: 5 Determine CV FPB Status.

Standard: Answers YES based on R-14E reading and CV pressure relief valves open to "PATHWAY EXISTS FROM CV ATMOSPHERE TO ENVIRONMENT". Indicates CV BREACHED on FPB Status Board.

Comment:

EAL-1

* **Performance Step: 6** 3FPB's BREACHED OR JEOPARDIZED?

Standard: Answers YES, declares GE and exits to EPCLA-01.

CLASSIFICATION TIME STOP _____

Comment:

Performance Step: 7 Obtain EPCLA-01.

Examiner's Cue:

- **Provide a copy of EPCLA-01.**
- **For the purpose of this JPM assume EPCLA-01 has been completed through Step 8.1.3.9. Beginning at Step 8.1.3.10, perform the steps of EPCLA-01.**

Standard: Enters and reviews EPCLA-01.

Comment:

EPCLA-01 Step 8.1.3.10

This step and any other announcements can be simulated by pointing out the necessary actuating device(s) and discussing the announcement.

Performance Step: 8

Sound applicable alarms and perform a PA announcement with the "VLC" switch in "Emergency" position:

a. Announce "**Attention all personnel, attention all personnel, at (state time of declaration) a(n) (give emergency declared) has been declared**."

If Emergency Response Facilities are being activated, then announce:

"All EOF/TSC/OSC and JIC personnel report to your designated facility."

If external hazards require sheltering on site, then announce directions for taking shelter and isolating and/or placing the facility ventilation in the emergency mode.

b. Repeat announcement(s) and alarm (if sounded).

Standard:

Sounds alarm and announces GE.

Examiner's Cue:

- **The EOF/TSC/OSC and JIC personnel have been notified to report.**
- **Assume that on site sheltering actions have been completed.**

Comment:

EPCLA-01 Step 8.1.3.11

Examiner's Cue: **A site evacuation has already been initiated.**

Performance Step: 9 If a Site Area Emergency or General Emergency has been declared, then a site evacuation is mandatory unless doing so will jeopardize the safety of plant personnel. To evacuate the site, sound the site evacuation alarm for approximately 15 seconds, and announce "**All Non-Emergency Response personnel report to (give appropriate upwind location) immediately.**

- Repeat announcement(s) and alarm (if sounded).
- If a site evacuation has been ordered at an earlier event declaration, it is not necessary to order another site evacuation. To avoid confusion, a site evacuation should only be initiated once.

Standard: No action required.

Comment:

Performance Step: 10 If a General Emergency has been declared, formulate a Protective Action Recommendation (PAR).

a. Use guidance in Attachments 8.1.5.1, Initial Protective Action Recommendation Flowchart and Attachment 8.1.5.3, PAR Affected Zones Based on Wind Direction to formulate the initial recommendation and zones to be evacuated based on wind direction.

* **Standard:** Completes Attachment 8.1.5.1.

- Evacuate Sectors A-0, A-1, D-1 and E-1.
- Shelter Sectors A-2, B-2, C-2, D-2, E-2, B-1, C-1.

Comment:

Performance Step: 11 Signs as SEC.

Standard: Provides Attachment 8.1.5.1 to Evaluator.

Comment:

Terminating Cue: **When Attachment 8.1.5.1 has been completed, inform the Candidate that evaluation on this JPM is complete.**

STOP TIME: _____ **TIME CRITICAL STOP TIME:** _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2004 NRC JPM SRO A5

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

1. The plant tripped when an automatic safety injection occurred.
2. CV pressure relief was in progress. Pressure relief valves failed to close
3. Containment pressure peaked at 27 psig and is now reading 12 psig, slowly lowering.
4. RCS leakage is much greater than charging pump capacity.
5. The steam generators and steam side of the plant are intact.
6. Core Exit Thermocouples are reading approximately 225°F.
7. Containment water level is 287 inches.
8. There is a RED PATH on CSF-4 (RCS Integrity) and an ORANGE PATH on CSF-5 (Containment).
9. Bus E-2 de-energized on electrical fault and has not been restored.
10. Bus E-1 is powered from off-site.
11. RHR Pump A did not start.
12. It is August 31. The weather is sunny and clear.
13. Wind is from 140° @ 8 mph.
14. Off-site dose projections are not available at this time.
15. Following is the status of selected Radiation Monitors. R-11 and R-12 are aligned to the CV. All are in alarm:
    - R-2 – 52 R/hr
    - R-7 – 55 R/hr
    - R-11 – 3.0 E6 CPM
    - R-12 – 8.5 E4 CPM
    - R-32A - 48 R/hr
    - R-32B – 45 R/hr
    - R-14E – 3.5 E5 CPM

INITIATING CUE: You are the SSO. Classify this event and enter the appropriate procedure.

Progress Energy

R
Reference
Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 2

PART 5

EPCLA-01

EMERGENCY CONTROL

REVISION 15

SUMMARY OF CHANGES
PRR 96981

Step	Description of Change
8.1.3.7.d.2	Changed the location of the alternate EOF assembly area from the National Guard Armory to the Darlington County Emergency Operations Center.

TABLE OF CONTENTS

CR EMERGENCY CONTROL QUICK START GUIDE

NOTE:	This is a summary level guide and does not replace the procedure steps. EPCLA-01 is to be used with this guide.

1. Implement EALs as necessary. It is the expectation that the time between exceeding an EAL and declaration of event will not exceed 15 minutes unless extraordinary conditions prevail. Annotate time of the off normal condition on the top of the EAL board. Continue through the flowpath until a General Emergency has been identified or until the end of the flowpath.
2. Direct an Emergency Communicator to report to the Control Room at this time. This will support communication activities and augmentation of the ERO.
3. The EAL board will direct you to EPCLA-01, "Emergency Control" or to AP-030 if there is no event classification. EPCLA-01,Section 8.1.3 provides guidance for classifying emergencies and control.
4. Declare the highest event classification identified by announcing the event to the Control Room and your assuming role as the SEC. This ends the 15 minute clock for the event declaration, and starts the 15 minute clock to notify the appropriate State and County agencies. Announce classification to the Site per EPCLA-01.

NOTE: The development of the Emergency Notification Form should include the status of the fission product barriers.

5. Develop, approve, and FAX/communicate the Emergency Notification Form. Notify State and County agencies via Selective Signaling System or an alternate means. The notification clock stops after the first voice contact is established with an approved form. This is the time entered on Attachment 8.1.5.1 of EPNOT-01 page 2 of 7.
6. Fill out the Emergency Notification Form. Detailed instructions are in EPNOT-01, Attachment 8.1.5.1, page 3 through 7.
   - Click on "Emergency Preparedness Function Menu.
   - Click on "Log into Network data Base and log in as CRSS.
   - Click on Declare Event, then OK.
   - At top of screen type ER to bring up Environmental Data and print screen.
   - Click on Event Notification Form (ENF).
   - Click "ADD" on ENF.
7. Assess EALs for changing plant conditions. Attachment 8.1.5.4 in EPCLA-01 contains the checklist for turnover to the TSC.

8.1.1 PURPOSE

1. To provide consolidated guidance for classifying emergencies from the Control Room or Technical Support Center (TSC).

8.1.2 RESPONSIBILITIES

1. The Site Emergency Coordinator (SEC) has immediate and unilateral authority to implement this procedure.

2. The SEC may not delegate:

   a. The decision to notify offsite authorities;

   b. Making offsite Protective Action Recommendations (PAR); and

   c. Reclassifying or terminating the emergency.

3. The responsibility to notify offsite authorities and making offsite Protective Action Recommendations transfer to the Emergency Response Manager (ERM) upon activation of the Emergency Operations Facility (EOF).

4. The SEC may authorize exposure in excess of routine yearly limits for saving of life or protecting valuable equipment per EPOSC-04, Emergency Work Control.

8.1.3 INSTRUCTIONS

1. Enter the Emergency Action Level (EAL) flowpath, EAL-1, at the first step and determine the appropriate classification.

2. Declare or validate the highest classification of emergency determined.

   a. Announce to Control Room or TSC personnel that you are assuming the position of SEC.

8.1.3 (Continued)

3. Direct the Emergency Communicator to prepare for communication activities in accordance with EPNOT-01, CR/EOF Emergency Communicator.

4. Determine if there are any personnel injuries;

   a. Give priority to lifesaving activities over radiological exposure control; authorize exposures in excess of normal limits if required.

   b. Refer to EPSPA-02, First Aid and Medical Care, for additional guidance on first aid and transportation of contaminated injured personnel.

5. Determine if onsite protective actions are necessary;

   a. Evaluate radiological, chemical and other situations which may require evacuation or sheltering.

   b. If evacuation or administration of potassium iodide is necessary, implement EPSPA-01, Evacuation and Accountability, or EPSPA-03, Administration of Potassium Iodide, respectively. If sheltering is required onsite (such as for external gas hazard); Make a plant announcement directing personnel to shelter in the nearest facility. Ensure ventilation is isolated/secured in the OSC and other facilities/buildings that are not equipped with emergency/re-circulation modes (Control Room, TSC/EOF). (AR #57330)

   c. Evaluate possible severe weather protective actions. (CR 22292)

6. Request any offsite assistance necessary;

   a. The Unit 2 Control Room should contact Darlington County 911 Center for fire, police or ambulance service.

   b. Logistics personnel may contact the 911 Center if Control Room staff are unable to request assistance.

8.1.3.6 (Continued)

c. Contact other agencies as necessary, selected offsite agency numbers are maintained in the Emergency Response Organization (ERO) phone book.

7. Activate appropriate Emergency Response Facilities (ERFs) as noted below:

a. **IF** all of the following occurs;

- The Start-up Transformer is lost.
- Backfeed through the Auxiliary Transformer is possible.
- Only 1 (one) Emergency Diesel is powering its respective bus.

THEN staff all of the **onsite** Emergency Response Facilities to assist with back feed logistics.

b. For Unusual Event - no activation is required; facilities may be activated at SEC discretion.

c. For Alert or above activate TSC, EOF, OSC and JIC.

d. Consider the following when choosing facilities to activate.

1. Alternate TSC is Control Room
2. Alternate EOF Assembly Area is the Darlington County Emergency Operations Center, 1625 Harry Byrd Highway (Highway 151), Darlington, SC.
3. Alternate/Back-up OSC is as defined in EPOSC-01.
4. Remote Facility may be activated for any event, normally for Security Events where reporting to the site may not be safe for the ERO.

8. Determine habitability of facilities for directing ERO personnel to the primary or alternate location via PA, pager code, etc.

9. For an Alert only, if the casualty has abated prior to or during notification of offsite agencies, ERO pagers and facilities need not be activated.

a. If no facility activation is desired, modify the upcoming Public Address (PA) announcement with **DO NOT** activate the Emergency Response Facilities.

8.1.3 (Continued)

10. Sound applicable alarms and perform a PA announcement with the "VLC" switch in "Emergency" position;

    a. Announce "**Attention all personnel, attention all personnel, at (state time of declaration) a(n) (give emergency declared) has been declared.**"

NOTE: Discretion should be exercised when announcing the cause of the emergency due to a security event.

The cause of the emergency is _____
_____
_____
_____.

If Emergency Response Facilities are being activated, then announce:

"All EOF/TSC/OSC and JIC personnel report to your designated facility."

If external hazards require sheltering on site, then announce directions for taking shelter and isolating and/or placing the facility ventilation in the emergency mode.

    b. Repeat announcement(s) and alarm (if sounded).

11. If a Site Area Emergency or General Emergency has been declared, then a site evacuation is mandatory unless doing so will jeopardize the safety of plant personnel. To evacuate the site, sound the site evacuation alarm for approximately 15 seconds, and announce "**All Non-Emergency Response personnel report to (give appropriate upwind location) immediately.**

    - Repeat announcement(s) and alarm (if sounded).
    - If a site evacuation has been ordered at an earlier event declaration, it is not necessary to order another site evacuation. To avoid confusion, a site evacuation should only be initiated once.

8.1.3.11 (Continued)

- Designated locations are: (others may be used if necessary)

  East - Building 110 next to Lake Robinson or parking lot.

  West - Unit 2 Administrative Building Cafeteria or parking lot.

12. If a General Emergency has been declared, formulate a protective Action Recommendation (PAR).

    a. Use guidance in Attachments 8.1.5.1, Initial Protective Action Recommendation Flowchart and Attachment 8.1.5.3, PAR Affected Zones Based on Wind Direction to formulate the initial recommendation and zones to be evacuated based on wind direction.

    b. Use guidance in Attachment 8.1.5.5, Plant -Based Protective Action Recommendations, to recommend extended protective action recommendations based on plant conditions.

    c. Subsequent PARs are made by comparing dose projections and environmental monitoring results to Attachment 8.1.5.2, Protective Action Guidelines (PAG) and upgrading the initial recommendations as necessary.

    d. If conditions indicate the PAR needs upgrading, then the 15 minute notification standard applies as this will be a new initial message.

13. Develop and transmit an initial Emergency Notification Form to at least one State and County agency within 15 minutes of emergency declaration.

    a. Follow up notifications are required at least every 30-60 minutes.

14. Within one hour of an Alert (or above) declaration, activate the Emergency Response Data System (ERDS) as noted below:

    a. If the ERDS is not currently operational (ERDS = NORMAL is not displayed at the bottom of an ERFIS terminal), the SEC will ensure that ERDS is activated. Any problems should be reported to Information Technology personnel.

8.1.3 14 (Continued)

b. Display the ERDS activation screen by:

- Depressing the ERDS key on the ERFIS keyboard, or
- Typing the Turn-On-Code "ERDS" at the input field, or
- Selecting ERDS from the EP Menu.

c. When the ERDS Control and Status Display window appears, click on the green "Start ERDS" button.

- An "Are You Sure" message is displayed. Click yes to initiate ERDS, click no to cancel.
- Observe the "Start ERDS" button changes to a yellow "Starting..." button.
- When ERDS connects to the NRC Operations Center the yellow "Starting..." button will change to a red "Stop ERDS" button.
- Other buttons are provided to review system status and data transmissions.
- It may take several minutes for the system status in the Control and Status Display window or at the bottom of the screen to update.

d. Within five minutes after activation, the ERDS function should become operational. This is determined by ERDS = NORMAL message displayed at the bottom of an ERFIS terminal.

e. If ERDS fails to become operational (ERDS = NORMAL is not displayed on an ERFIS Terminal) within five minutes, stop the ERDS function by clicking the red "Stop ERDS" button and notify onsite Information Technology.

8.1.3 (Continued)

15. If the Emergency Response Facility Information System/Electronic Display System (ERFIS/EDS) is out of service initiate manual transfer of safety parameter and other relevant data.

    a. Forms for recording data are located in EPNOT-01, "Notification and Emergency Communications.

16. Continue to assess the plant status against the EALs to confirm, upgrade or downgrade the emergency classification.

    a. If the State and County facilities have been activated, they should be consulted prior to any downgrade of emergency classification.

17. If the TSC is activating, perform a turnover with the TSC SEC.

    a. A turnover checklist is provided as Attachment 8.1.5.4, Turnover Checklist.

18. Perform PA announcements periodically to update personnel in the field of any changing plant conditions.

19. When appropriate based on plant conditions, coordinate with any offsite agencies which have activated and terminate the emergency.

    a. Direct the Emergency Communicator to make termination notifications to all agencies.

        – Termination, as a change in classification, has a 15 minute time requirement.

    b. If not previously terminated by the Nuclear Regulatory Commission (NRC), coordinate the termination of ERDS.

8.1.4 **RECORDS**

N/A

8.1.5 ATTACHMENTS

8.1.5.1 Initial Protective Action Recommendation Flowchart

8.1.5.2 EPA Protective Action Guide (PAGs) for the Early Phase

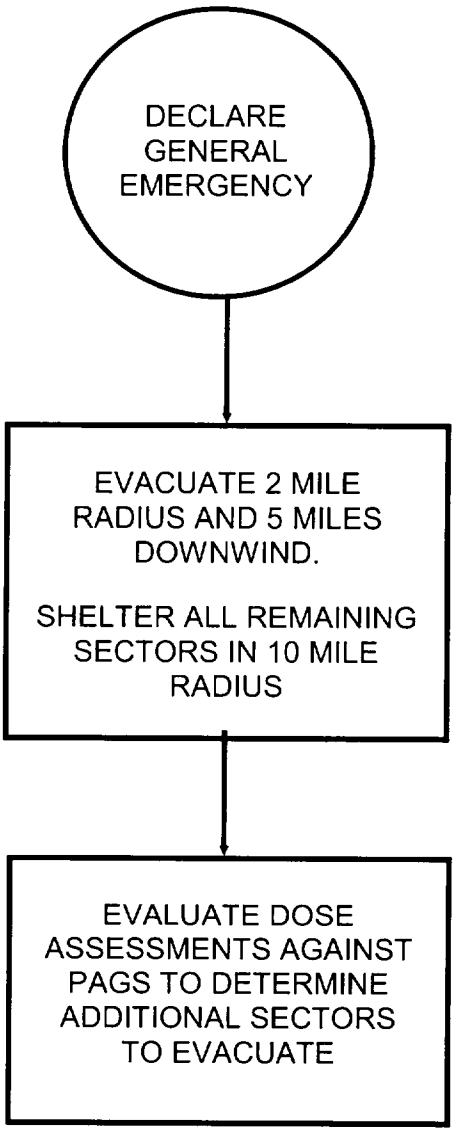
8.1.5.3 PAR Affected Zones Based on Wind Direction

8.1.5.4 Turnover Checklist

8.1.5.5 Plant-Based Protective Action Recommendations

ATTACHMENT 8.1.5.1
Page 1 of 2

INITIAL PROTECTIVE ACTION RECOMMENDATION FLOWCHART



INITIAL PROTECTIVE ACTION RECOMMENDATION FLOWCHART
PAR REFERENCE GUIDE AND DOCUMENTATION FORM

RULES FOR PROTECTIVE ACTION RECOMMENDATIONS

1. SHELTER ALL REMAINING SECTORS IN THE 10 MILE RADIUS NOT EVACUATED.

2. A PROTECTIVE ACTION RECOMMENDATION MAY NOT BE REDUCED FROM THE INITIAL RECOMMENDATION FOR ANY SECTOR UNTIL THE RELEASE IS TERMINATED AND THE DECISION IS COORDINATED WITH THE STATE AND COUNTIES.

3. A PROTECTIVE ACTION REQUIRED FOR ANY PORTION OF A SECTOR REQUIRES THAT ACTION BE IMPLEMENTED FOR THE ENTIRE SECTOR.

RECOMMENDATION

PLACE A √ IN THE APPROPRIATE BLANK FOR EACH SECTOR.

----------2 MILE RADIUS----------		
EVACUATE	SHELTER	SECTOR
_____	_____	A-0
----------5 MILE RADIUS----------		
_____	_____	A-1
_____	_____	B-1
_____	_____	C-1
_____	_____	D-1
_____	_____	E-1

----------10 MILE RADIUS----------		
EVACUATE	SHELTER	SECTOR
_____	_____	A-2
_____	_____	B-2
_____	_____	C-2
_____	_____	D-2
_____	_____	E-2

RECOMMENDED BY /DATE@TIME: _____ / _____ @ _____
RCD OR RCM

APPROVED BY /DATE@TIME: _____ / _____ @ _____
SEC OR ERM

ATTACHMENT 8.1.5.2
Page 1 of 1

EPA PROTECTIVE ACTION GUIDE (PAGS)

FOR THE EARLY PHASE*

PROTECTIVE ACTION	PAG	COMMENTS
Evacuate	1 Rem TEDE	Change any sheltering subzones/sectors to evacuate if the Total Effective Dose Equivalent dose within any area exceeds PAG.
Evacuate	5 Rem CDE	Change any sheltering subzones/sectors to evacuate if the Committed Dose Equivalent dose to the thyroid within any area exceeds PAG.

*The Early Phase is the time between the beginning of an incident and when the incident source and releases have been brought under control.

Reference: EPA 400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," U.S. Environmental Protection Agency, Washington, D.C., May 1992

ATTACHMENT 8.1.5.3
Page 1 of 1

PAR AFFECTED ZONES BASED ON WIND DIRECTION

(EVACUATION TIME IN MINUTES)[2]

WIND FROM	POTENTIALLY[1] AFFECTED SECTORS	WINTER WEEKDAY, FAIR WEATHER	WINTER WEEKNIGHT, FAIR WEATHER	SUMMER WEEKDAY, FAIR WEATHER	WINTER WEEKDAY, ADVERSE WEATHER
North (338° - 022°)	A-0, B-1, B-2, C-1, C-2, D-1, D-2	225	180	210	295
Northeast (023° - 067°)	A-0, C-1, C-2, D-1, D-2, E-1, E-2	225	180	210	295
East (068° - 112°)	A-0, D-1, D-2, E-1, E-2	225	180	210	295
Southeast (113° - 157°)	A-0, A-1, A-2, D-1, E-1, E-2	225	180	210	295
South (158° - 202°)	A-0, A-1, A-2, B-1, B-2, E-1, E-2	225	180	210	295
Southwest (203° - 247°)	A-0, A-1, A-2, B-1, B-2, E-1, E-2	225	180	210	295
West (248° - 292°)	A-0,A-1, A-2, B-1, B-2, C-1, C-2	225	180	210	295
Northwest (293° - 337°)	A-0, B-1, B-2, C-1, C-2, D-2	225	180	210	295
	ALL ZONES (10 MILE RADIUS)	240	180	215	315

1. Minimum recommendation for General Emergency is A-0 (2 mile radius) and affected (downwind) 5 mile radius sectors. Shelter all remaining sectors in the 10 mile radius.

2. Times listed are estimates based on evacuation times listed in the Emergency Plan.

NOTE:	Conditions identified represent most limiting conditions.

TURNOVER CHECKLIST

This checklist is guidance for turning over Emergency Response activities from one facility to another or between personnel holding Emergency Response positions.

NOTE:	Blanks are provided for place keeping √'s only, logs are the official record.

A. ONSITE SITUATION

1. Review Emergency Classification, basis for declaration, and mitigating actions. Suspend turnover if plant conditions exist that change the classification, notification, or PARs. _____

   a. Review status of safety equipment and systems.
   b. Review status of fission product barriers.
   c. Review condition/stability of reactor.
   d. Review any Emergency Action Levels exceeded.
   e. Review cause, history, initiating events leading to declaration of emergency.

2. Review onsite protective actions taken. _____

   a. Assembly
   b. Shelter
   c. Evacuations (Local, Protected Area, Site, Exclusion Area)

NOTE:	If there is a Site Evacuation, Unit 1 may need to continue operating.

   d. Potassium Iodide Administration
   e. Complete PLP-015 Overtime Form for ERO as appropriate.

TURNOVER CHECKLIST

3. Review status of offsite assistance requested for the site. _____

   a. Fire Department

   b. Rescue Squad

   c. Local Law Enforcement Agency

B. OFFSITE SITUATION

1. Review Status of Offsite Notifications. _____

   – State and County initial and any follow-up messages

   – NRC (including status of ERDS activation)

   – Other: ANI, INPO, Westinghouse

   – Any needed notifications that have not been made

2. Review Protective Action Recommendations made and notifications made to the State and Counties. _____

3. Review any status received from the State or Counties regarding activation, readiness, protective actions, or requests for information. _____

4. Review data on any projected or actual radiological releases. _____

5. Review the time and content of any press releases or media briefing. _____

TURNOVER CHECKLIST

C. EMERGENCY RESPONSE

1. Review status of Emergency Response Organization Activation. _____

   – Notifications made to off-duty and offsite personnel. _____

   – Emergency Response Facilities that are activated. _____

   – Emergency Response Facilities that will be activated. _____

   – Other notifications needed. _____

2. Review outside organizations requested to mobilize. _____

3. Review assistance needed. _____

4. After the TSC-SEC assumes responsibilities for the event declaration, the CR-SEC maintains responsibility to keep the TSC updated of changing conditions and the urgency of declaring events based on the changing conditions. _____

D. TURNOVER COMPLETED _____

ATTACHMENT 8.1.5.5
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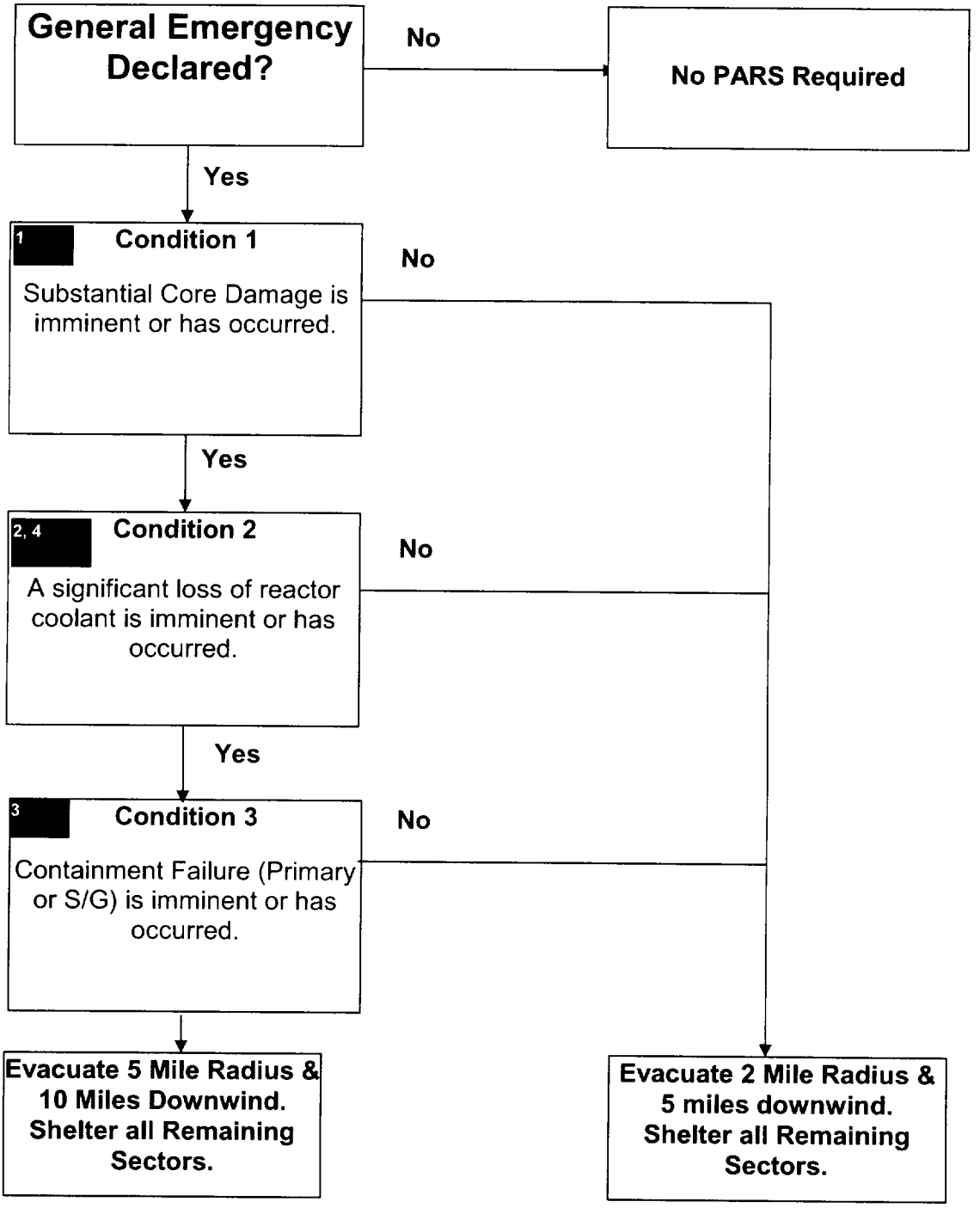
Plant-Based Protective Action Recommendations



Plant-Based Protective Action Recommendations

1. Substantial core damage is imminent or has occurred. Indications that substantial core damage is imminent or has occurred include:
   a. Core damage estimates greater than 1% Melt.
   b. Core Exit Thermocouples readings > 2300 degrees F°.
   c. Core uncovered > 30 minutes.

2. A significant loss of reactor coolant is imminent or has occurred. Indications that a significant loss of reactor coolant is imminent or has occurred include:
   a. Containment Radiation Monitors reading >10,000 R/hr with no containment spray or >4,000 R/hr with containment spray on.
   b. Containment hydrogen gas concentration >1%.
   c. Rapid vessel depressurization.
   d. A large break loss of coolant accident.

3. Containment failure (primary or S/G) is imminent or has occurred. Indications that containment failure (primary or S/G) is imminent or has occurred include:
   a. A release of radioactivity cannot be maintained below General Emergency EAL criteria.
   b. Primary Containment pressure cannot be maintained below the design basis pressure of 42 psig.
   c. Primary containment H_2 gas concentration cannot be maintained below combustible limits of 4% by volume.
   d. Faulted/ruptured steam generator with a relief valve open.

4. Accidents which result in a direct release pathway to the environment (for example, a faulted and ruptured S/G with water level below the tube bundles, S/G Narrow Range < 25% normal containment conditions or < 40% adverse containment conditions, and a relief valve open would provide such a pathway) will most likely be thyroid dose limiting. For circumstances involving this type of accident sequence:

   a. Consider **any** Fuel Breach sufficient to warrant the determination that substantial core damage has occurred.

   b. Consider **any** RCS Breach sufficient to warrant the determination that a significant loss of reactor coolant has occurred.

Containment monitors can provide indication of both core damage and RCS breach. Monitor values used to determine a specific amount of core damage are dependent on plant conditions, power history and time after shutdown. Monitor readings used to quantify an amount of damage or coolant leakage should be complimented by other indications and engineering judgment.