NUCLEAR TRAINING DEPARTMENT

ADMINISTRATIVE JOB PERFORMANCE MEASURE

TITLE: **CALCULATE RCS REFILL VOLUME (WITHOUT VACUUM)**

JPM NO.: **A1**

REVISION: **2**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title: CALCULATE RCS REFILL VOLUME (WITHOUT VACUUM)

JPM No.: A1

Rev. No: 2

STP Task: CRO100000 Perform Vacuum Fill of the RCS per 0POP03-RC-0100.

STP Objective: CRO100000,With the plant in Mode 5, Fill the RCS and Draw a Pressurizer Bubble per 0POP03-RC-01000.

Related K/A Reference: 2.1.25 (3.9) Ability to interpret reference materials, such as graphs, curves, tables, etc.

References: 0POP03-RC-0100, Rev 34, RCS Vacuum Fill

Task Normally Completed By: RO

Location of Testing: N/A

Time Critical Task: NO

Validation Time: 10 minutes

Required Materials (Tools/Equipment):

- Calculator

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU HAVE COMPLETED THE TASK.

INITIAL CONDITIONS:

Unit 2 is performing a fill of the RCS per 0POP03-RC-0100, RCS Vacuum Fill, from the RWST. RCS sightglass level is 32' 9". RWST level is 400,000 gallons.

INITIATING CUE:

PART 1: The Unit Supervisor directs you to calculate the required RCS Floodup Volume, WITHOUT VACUUM, to 50% Pressurizer level.

PART 2: AFTER the RCS fill was completed, RWST level was at 354,000 gallons. Determine if the RWST level change was within 200 gallons of the calculated amount for RCS fill.

The RWST level change WAS / was NOT (circle one) within 200 gallons of the calculated amount for RCS fill.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

PART 1: Correctly calculates the volume of water needed to refill the RCS to 50% Pressurizer level in accordance with 0POP03-RC-0100, Addendum 3.

PART 2: Correctly determines the RWST level change IS within 200 gallons of the calculated amount for RCS fill.

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

Student Handout Copy of 0POP03-RC-0100, RCS Vacuum Fill, Addendum 3

NOTES:

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME _______

SAT/UNSAT Performance Step: 1

Obtain the procedure.

Standard:

Obtains a copy of 0POP03-RC-0100.

Comment:

Provide the Student Handout Copy of 0POP03-RC-0100, Addendum 3.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

<u>SAT/UNSAT</u> Performance Step: 2

Record current RCS level from RCS level sightglass. (Addendum 3 step 1.1)

Standard:

Records RCS sightglass level as 32' 9".

Comment:

Initial sightglass level is given as an initial condition.

Cue:

Notes:

<u>SAT/UNSAT</u> Performance Step: 3 (C)

Determine current RCS volume in gallons. (Addendum 3 step 1.2)

Standard:

Determines current RCS volume is 32,636 gallons using Addendum 3 Table - RCS Floodup Volume ***Without Vacuum*** *column for RCS level at 32' 9".*

Comment:

Both columns show the same RCS Floodup volume until level is raised up to the Rx Vessel Flange.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 4 (C)

Record expected final RCS volume in gallons. (Addendum 3 step 1.3)

Standard:

*Records expected final RCS volume as 78,463 gallons using Addendum 3 Table - RCS Floodup Volume **Without Vacuum** column for Pressurizer level at 50%.*

Comment:

Cue:

Notes:

SAT/UNSAT Performance Step: 5 (C)

Calculate Total RCS volume to be added. (Addendum 3 step 1.4)

Standard:

Determines 45,827 gallons are needed to fill the RCS to 50% Pressurizer level by subtracting the Initial RCS Volume (32,636 gal.) from the Final Floodup Volume (78,463 gal.).

Comment:

This is the information required to complete Part 1 of the JPM.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

<u>SAT/UNSAT</u> Performance Step: 6 (C)

Determine if final RWST LEVEL is within 200 gallons of the calculated amount for RCS fill.
(Addendum 3 Section 2.0)

Standard:

1. *Subtracts the final RWST level from the initial RWST level to obtain a result of 46,000 gallons.*
2. *Determines the RWST level change is within 200 gallons of the calculated amount for RCS fill:*

The RWST level change WAS / was NOT (circle one) within 200 gallons of the calculated amount for RCS fill.

Comment:

Final RWST level is provided in the PART 2 Initiating Cue.

Cue:

Notes:

- TERMINATE THE JPM -

JPM STOP TIME _______

VERIFICATION OF COMPLETION

Job Performance Measure: CALCULATE RCS REFILL VOLUME (WITHOUT VACUUM)

Applicant's Name: ____

Date Performed: ___________________

Time to Complete: _________________

JPM Results: **Sat / Unsat**

Evaluator: ________________________ **Signature** __________________________

Date ____________________

JPM - STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

Unit 2 is performing a fill of the RCS per 0POP03-RC-0100, RCS Vacuum Fill, from the RWST. RCS sightglass level is 32' 9". RWST level is 400,000 gallons.

INITIATING CUE:

PART 1: The Unit Supervisor directs you to calculate the required RCS Floodup Volume, WITHOUT VACUUM, to 50% Pressurizer level.

PART 2: AFTER the RCS fill was completed, RWST level was at 354,000 gallons. Determine if the amount of RWST water used for the RCS fill is within 200 gallons of the calculated amount for RCS fill.

The RWST level change WAS / was NOT (circle one) within 200 gallons of the calculated amount for RCS fill.

REFERENCE	PLANT ELEVATION	RCS FLOODUP VOLUME **WITHOUT VACCUM** (gallons)	RWST LEVEL CHANGE (%)(1)	RCS FLOODUP VOLUME **WITH VACUUM** (gallons)	RWST LEVEL CHANGE (%)(1)
Pressurizer 50% Level	68 ft 10 in	(2) 78,463	2.0	(2) 89,790	2.3
Pressurizer 10% Level	55 ft 6 in	(2) 68,357	4.1	(2) 77,696	5.3
Reactor Vessel Flange (RVWL Sensor Point 2)	39 ft 3 in (39 ft 5 in)	47,389	1.5	50,550	2.1
4.5 ft below Vessel Flange (RVWL Sensor Point 3)	34 ft 10.1 in (34 ft 10.25")	39,589	0.6	39,752	0.7
Top of Hot Leg Nozzle (RVWL Sensor Point 4)	33 ft 5.5 in	36,345	0.2	36,345	0.2
Narrow Range Hot Leg Level +11 inches	33 ft 2 in (33 ft 5.625")	35,468	less than 0.1	35,468	less than 0.1
NR Hot leg Lvl +6 inches (alarm)	32 ft 9 in	32,636	less than 0.1	32,636	less than 0.1
Hot Leg Centerline (RVWL Sensor Pt 5)	32 ft 3 in	30,281	less than 0.1	30,281	less than 0.1
Bottom of Narrow Range Hot Leg Level Indication	31 ft 11.5 in	29,079	---	29,079	---

(1) REFILL - Level change is percent level decrease from increasing RCS level from previous reference point.

(2) VARIANCE - Floodup without vacuum will tend to prevent Steam Generator U-Tubes from filling completely due to entrapped air in the top of the U-Tubes during floodup.

1.0 Calculate gallons to fill RCS to desired level:

1.1 RECORD current RCS level from RCS level sightglass. _____

1.2 DETERMINE current RCS volume in gallons. _____

1.3 RECORD expected final RCS volume in gallons. _____

1.4 CALCULATE Total RCS volume to be added by subtracting Step 1.2 from Step 1.3. _____

2.0 CALCULATE RCS fill water source level change for the applicable tank:

2.1 RECORD start level for RCS fill water source in gallons.

RWST _________ RHT ________

2.2 RECORD stop level for RCS fill water source in gallons.

RWST _________ RHT ________

2.3 CALCULATE RCS fill water source level change by subtracting Step 2.2 from Step 2.1.

RWST _________ RHT ________

3.0 VERIFY RCS fill water source level decrease from Step 2.3 approximately equal to calculated RCS volume added from Step 1.4.

1.0 Calculate gallons to fill RCS to desired level:

1.1 RECORD current RCS level from RCS level sightglass. Should be 32’ 9” ______

1.2 DETERMINE current RCS volume in gallons. Should be 32,636 gal. ______

1.3 RECORD expected final RCS volume in gallons. Should be 78,463 gal. ______

1.4 CALCULATE Total RCS volume to be added by subtracting Step 1.2 from Step 1.3. Should be 45,827 gal. ______

2.0 CALCULATE RCS fill water source level change for the applicable tank:

2.1 RECORD start level for RCS fill water source in gallons.

RWST 400,000 RHT NA

2.2 RECORD stop level for RCS fill water source in gallons.

RWST 354,000 RHT NA

2.3 CALCULATE RCS fill water source level change by subtracting Step 2.2 from Step 2.1.

RWST 46,000 RHT NA

3.0 VERIFY RCS fill water source level decrease from Step 2.3 approximately equal to calculated RCS volume added from Step 1.4.

The difference between the estimated change in RWST level and the actual change in level should be within 200 gallons per the initiating cue.

Estimated change in level:	45,827 gal.
Actual change in level:	46,000 gal.
Difference:	173 gal.

So the actual RWST level change WAS within 200 gallons of the estimated RWST level change.

NUCLEAR TRAINING DEPARTMENT

ADMINISTRATIVE JOB PERFORMANCE MEASURE

TITLE:	**DETERMINE REACTOR VESSEL LEVEL**
JPM NO.:	**A2**
REVISION:	**2**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title:	DETERMINE REACTOR VESSEL LEVEL
JPM No.:	A2
Rev. No.:	2
STP Task:	91008, Knowledge of the purpose and principle of operation of the Reactor Vessel Water Level (RVWL) System
STP Objective:	91008, Explain the purpose and principle of operation of the Reactor Vessel Water Level (RVWL) System
Related K/A Reference:	2.1.20 (4.6) Ability to interpret and execute procedure steps
References:	0POP02-II-0002, Rev. 13, RVWL Monitoring System
Task Normally Completed By:	RO
Method of Testing:	Performance
Location of Testing:	NTF
Time Critical Task:	NO
Validation Time:	15 min
Required Materials (Tools/Equipment):	None

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK

INITIAL CONDITIONS:

Unit 1 has experienced a Loss of Offsite Power. The crew has implemented the Emergency Operating Procedures (EOP's) and is currently in 0POP05-EO-ES03, Cooldown with Steam Void in Vessel.

QDPS indication for RVWL Channel 'C' has been lost. QDPS indication is available for RVWL Channel 'A' and Channel 'A' is operable.

An operator has already collected data from local panel readings for Channel 'C'. Channel 'C' data was obtained in accordance with 0POP02-II-0002, RVWL Monitoring System, Section 6.2, RVWL Test Mode.

INITIATING CUE:

The Unit Supervisor asks you to determine the RVWL from the data recorded for 'C' RVWL Channel by performing 0POP02-II-0002 Section 7.1, Addendum 1, and Data Sheet 2.

DO NOT PERFORM PROCEDURE SECTION 7.2 OR THE TECH SPEC EVALUATION ON DATA SHEET 2, SECTION 4.0. AN SRO WILL PERFORM THESE DURING THE SUPERVISOR REVIEW.

JOB PERFORMANCE MEASURE INFORMATION SHEET (cont'd)

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

Determines RVWL is as follows:

- *Upper Head level is 0%*
- *Plenum level is 100%*

HANDOUTS:

Student Handout copy of procedure 0POP02-II-0002, RVWL Monitoring System

NOTES:

Provide the candidate with the Student Handout copy of 0POP02-II-0002, RVWL Monitoring System.

An Answer KEY is provided for the Evaluator that provides the correct results and the bases of those results.

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME

<u>SAT/UNSAT</u> Performance Step: 1 (C)

Performs Section 7.1, Addendum 1 and Data Sheet 2 0POP02-II-0002, RVWL Monitoring System.

Standard:

Determines the following for Reactor Vessel water level:

- *Upper Head level is 0%*
- *Plenum level is 100%*

Comment:

- Sensors with Delta T's >200 °F should be marked as 'DRY'. Sensors with Delta T's ≤ 200 °F should be marked 'WET'.
- Based on instructions within a NOTE of Addendum 1, the first 'DRY' sensor location is the location of the Reactor Vessel Water level.
- Refer to the KEY for more specific details.

Cue: NONE

Notes:

- TERMINATE THE JPM -

JPM STOP TIME ________

VERIFICATION OF COMPLETION

Job Performance Measure: DETERMINE REACTOR VESSEL LEVEL

Applicant's Name: ____

Date Performed: ____________________

Time to Complete: __________________

JPM Results: **Sat / Unsat**

Evaluator: _________________________ **Signature:** __________________________

Date: ____________________

JPM - HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EXAMINER WHEN YOU'VE COMPLETED THE TASK

INITIAL CONDITIONS:

Unit 1 has experienced a Loss of Offsite Power. The crew has implemented the Emergency Operating Procedures (EOP's) and is currently in 0POP05-EO-ES03, Cooldown with Steam Void in Vessel.

QDPS indication for RVWL Channel 'C' has been lost. QDPS indication is available for RVWL Channel 'A' and Channel 'A' is operable.

An operator has already collected data from local panel readings for Channel 'C'. Channel 'C' data was obtained in accordance with 0POP02-II-0002, RVWL Monitoring System, Section 6.2, RVWL Test Mode.

INITIATING CUE:

The Unit Supervisor asks you to determine the RVWL from the data recorded for 'C' RVWL Channel by performing 0POP02-II-0002 Section 7.1, Addendum 1, and Data Sheet 2.

DO NOT PERFORM PROCEDURE SECTION 7.2 OR THE TECH SPEC EVALUATION ON DATA SHEET 2, SECTION 4.0. AN SRO WILL PERFORM THESE DURING THE SUPERVISOR REVIEW.

STI 32865825	0POP02-II-0002	Rev. 13	Page 1 of 15
RVWL Monitoring System			
Quality	Safety-Related	Usage: **IN HAND**	Effective Date: 05/03/11

Mark Page	Joe Rocha	Crew 2D	Operations
PREPARER	TECHNICAL	USER	COGNIZANT DEPT.

Usage Table of Contents Page

Usage

1 - IN HAND
2 - IN HAND CONTROLLING STATION
3 - REFERENCED
4 - AVAILABLE

1.0 Purpose and Scope

1.1 This procedure provides instructions for determining Reactor Vessel Head and Plenum level directly or indirectly at Reactor Vessel Water Level Panel ZRR-050.

1.2 This procedure provides instructions for determining Reactor Vessel Water Level (RVWL) sensor/channel operability based on Error Codes and data evaluation.

1.3 Performance of this procedure satisfies action statement 41.b.1 of Technical Specification 3.3.3.6, whenever both RVWL channels are inoperable OR indicate inoperable on the QDPS and ERFDADS.

2.0 References

2.1 Technical Specification 3.3.3.6, Table 3.3-10, Instrument 18.

2.2 4379-00094, Operation-Maintenance Instructions for the Heated Junction Thermocouple System

2.3 **(UNIT 2 ONLY)** T2-10-9321-3, Train A RVWL Sensor #4 Heated Junction Thermocouple is disconnected.

2.4 UFSAR Sections:

2.4.1 7.5.6, Qualified Display Processing System

2.4.2 Appendix 7A.II.F.2, Instrumentation for Detection of Inadequate Core Cooling

3.0 Prerequisites

3.1 ENSURE RVWL panel energized:

3.1.1 DP-001, Bkr-2, "REACTOR VESSEL WATER LEVEL SYS" ON. (10 ft EAB CH I Distribution Room 007) ✓

3.1.2 DP-002, Bkr-2, "REACTOR VESSEL WATER LEVEL SYS" ON. (60 ft EAB Train C Battery Charger Room 319) ✓

4.0 Notes and Precautions

4.1 IF this procedure is entered to satisfy the Technical Specification requirements of Section 1.3, THEN all sections of this procedure SHALL be performed.

4.2 Sections 5.1, 5.2, 6.1 or 6.2 of this procedure MAY be performed as independent sections, as required.

4.3 Unless otherwise noted, all steps are performed at Reactor Vessel Water Level Panel ZRR-050, in Relay Room 202, 35 ft EAB.

4.4 IF at least one sensor in the Upper Head region and at least three sensors in the Plenum region are operable, THEN a RVWL Monitoring System channel is considered OPERABLE. (Reference 2.1)

4.5 WHEN RCPs are running and Plenum level is LESS THAN 100%, THEN indicated level MAY differ from actual level and SHOULD be used with caution.

4.6 Backlights behind the Head section and the Plenum section of the "HEAD/PLENUM" pushbutton illuminate to indicate which parameter is displayed on the LED display.

4.7 Upon exiting the test mode, the LED display will count to 35 and then display Plenum level. IF the backlights on the "HEAD/PLENUM" pushbutton are burned out, THEN this MAY be used to determine whether Head or Plenum level is indicated on the LED display.

4.8 Addendum 1, RVWL Sensor Elevations, is provided for general information and data evaluation.

4.9 Addendum 2, HJTC Error Codes, is provided for general information and data evaluation.

4.10 Addendum 3 - RVWL Sensor Graphic, is provided for general information and data evaluation.

5.0 Channel A RVWL

5.1 Determining RVWL in the Normal Mode

5.1.1 OBSERVE the "HEAD" or "PLENUM" level on the LED display. _N/A_

5.1.2 RECORD the applicable "HEAD" or "PLENUM" level on Data Sheet 1, Step 1.0. _N/A_

5.1.3 Momentarily DEPRESS the "HEAD/PLENUM" pushbutton to switch the parameter displayed on the LED display. _N/A_

5.1.4 RECORD the applicable "HEAD" or "PLENUM" level on Data Sheet 1, Step 1.0. _N/A_

5.1.5 IF the LED display for either the "HEAD" OR the "PLENUM" level indicates LESS THAN 100%, THEN NOTIFY the Shift Manager . _N/A_

5.1.6 IF Section 5.2 will **NOT** be performed, THEN RECORD N/A in Steps 2.0 through 4.0 on Data Sheet 1. _N/A_

5.2 RVWL Test Mode

NOTE

- This section collects data for indirect RVWL determination and/or sensor/channel operability determination.
- WHEN the RVWL channel enters the Test Mode, THEN the LED display will immediately indicate the Error Codes, if any, in rapid succession. Error Codes are displayed in the format of E"xx" where E indicates an error and the number following E will indicate the type of failure. The system then performs a test where each digit on the LED display, from right to left, counts from 1 to 9 and returns to 0. WHEN 900.0 is indicated on the LED display, THEN the above sequence will repeat starting with the Error Codes.

5.2.1 IF the "PLENUM" LED is illuminated, THEN DEPRESS the "HEAD/PLENUM" pushbutton three times in LESS THAN two seconds to place the channel in the Test Mode. _N/A_

5.2.2 IF the "HEAD" LED is illuminated, THEN DEPRESS the "HEAD/PLENUM" pushbutton four times in LESS THAN two seconds to place the channel in the Test Mode. _N/A_

5.2.3 IF the channel does **NOT** enter the Test Mode, THEN DEPRESS the "HEAD/PLENUM" pushbutton one time and RETURN TO Step 5.2.1 after at least five seconds have elapsed. _N/A_

5.2.4 RECORD the Error Codes, if any, on Data Sheet 1, Step 2.0. _N/A_

5.2.5 WHEN the LED display has reached 900.0 at least one time, THEN PERFORM the following:

> NOTE
>
> In the Test Mode, when the “HEAD/PLENUM” pushbutton is depressed one time, the LED display will start indicating TEST I.D. No.s from 1 to 35 in rapid succession. Depressing the “HEAD/PLENUM” pushbutton a second time will cause the temperature for the current Test I.D. No. to be indicated on the LED display.

5.2.5.1 DEPRESS the "HEAD/PLENUM" pushbutton one time to display Test I.D. No. 1. _N/A_

5.2.5.2 WHEN Test I.D. No. 1 is displayed, THEN DEPRESS the "HEAD/PLENUM" pushbutton one time to display the temperature associated with Test I.D. No. 1. _N/A_

5.2.5.3 RECORD the temperature associated with Test I.D. No. 1 in the Value column of the table on Data Sheet 1. _N/A_

5.2.5.4 DEPRESS the "HEAD/PLENUM" pushbutton two times in rapid succession to read the temperature associated with the next sequential Test I.D. No. _N/A_

5.2.5.5 RECORD the temperature associated with the Test I.D. No. in the Value column of the table on Data Sheet 1. _N/A_

5.2.5.6 REPEAT Steps 5.2.5.4 and 5.2.5.5 until all temperatures have been recorded. _N/A_

5.2.6 WHEN all temperatures have been recorded, THEN DEPRESS the "HEAD/PLENUM" pushbutton one time. _N/A_

NOTE

The RVWL channel will be in the normal mode following Step 5.2.7.

5.2.7 OBSERVE the LED display count to 35 and then display PLENUM level. _N/A_

5.2.8 IF the temperature(s) for ANY Test I.D. No.(s) was missed, THEN RETURN TO Step 5.2.1 and REPEAT the test to obtain the missing temperature(s). _N/A_

5.2.9 GO TO Section 7.0 for data evaluation. _N/A_

6.0 Channel C RVWL

6.1 Determining RVWL in the Normal Mode

6.1.1 OBSERVE the "HEAD" or "PLENUM" level on the LED display. *N/A*

6.1.2 RECORD the applicable "HEAD" or "PLENUM" level on Data Sheet 2, Step 1.0. *N/A*

6.1.3 Momentarily DEPRESS the "HEAD/PLENUM" pushbutton to switch the parameter displayed on the LED display. *N/A*

6.1.4 RECORD the applicable "HEAD" or "PLENUM" level on Data Sheet 2, Step 1.0. *N/A*

6.1.5 IF the LED display for either the "HEAD" OR the "PLENUM" level indicates LESS THAN 100%, THEN NOTIFY the Shift Manager. *N/A*

6.1.6 IF Section 6.2 will **NOT** be performed, THEN RECORD N/A in Steps 2.0 through 4.0 on Data Sheet 2. _N/A_

6.2 RVWL Test Mode

NOTE

- This section collects data for indirect RVWL determination and/or sensor/channel operability determination.
- WHEN the RVWL channel enters the Test Mode, THEN the LED display will immediately indicate the Error Codes, if any, in rapid succession. Error Codes are displayed in the format of E"xx" where E indicates an error and the number following E will indicate the type of failure. The system then performs a test where each digit on the LED display, from right to left, counts from 1 to 9 and returns to 0. WHEN 900.0 is indicated on the LED display, THEN the above sequence will repeat starting with the Error Codes.

6.2.1 IF the "PLENUM" LED is illuminated, THEN DEPRESS the "HEAD/PLENUM" pushbutton three times in LESS THAN two seconds to place the channel in the Test Mode. √

6.2.2 IF the "HEAD" LED is illuminated, THEN DEPRESS the "HEAD/PLENUM" pushbutton four times in LESS THAN two seconds to place the channel in the Test Mode. √

6.2.3 IF the channel does **NOT** enter the Test Mode, THEN DEPRESS the "HEAD/PLENUM" pushbutton one time and RETURN TO Step 6.2.1 after at least five seconds have elapsed. √

6.2.4 RECORD the Error Codes, if any, on Data Sheet 2, Step 2.0. √

6.2.5 WHEN the LED display has reached 900.0 at least one time, THEN PERFORM the following:

NOTE

In the Test Mode, when the "HEAD/PLENUM" pushbutton is depressed one time, the LED display will start indicating TEST I.D. No.s from 1 to 35 in rapid succession. Depressing the "HEAD/PLENUM" pushbutton a second time will cause the temperature for the current Test I.D. No. to be indicated on the LED display.

6.2.5.1 DEPRESS the "HEAD/PLENUM" pushbutton one time to display Test I.D. No. 1. √

6.2.5.2 WHEN Test I.D. No. 1 is displayed, THEN DEPRESS the "HEAD/PLENUM" pushbutton one time to display the temperature associated with Test I.D. No. 1. √

6.2.5.3 RECORD the temperature associated with Test I.D. No. 1 in the Value column of the table on Data Sheet 2. √

6.2.5.4 DEPRESS the "HEAD/PLENUM" pushbutton two times in rapid succession to read the temperature associated with the next sequential Test I.D. No. √

6.2.5.5 RECORD the temperature associated with the Test I.D. No. in the Value column of the table on Data Sheet 2. √

6.2.5.6 REPEAT Steps 6.2.5.4 and 6.2.5.5 until all temperatures have been recorded. √

6.2.6 WHEN all temperatures have been recorded, THEN DEPRESS the "HEAD/PLENUM" pushbutton one time. √

> NOTE
>
> The RVWL channel will be in the normal mode following Step 6.2.7.

6.2.7 OBSERVE the LED display count to 35 and then display PLENUM level. √

6.2.8 IF the temperature(s) for any Test I.D. No.(s) was missed, THEN RETURN TO Step 6.2.1 and REPEAT the test to obtain the missing temperature. √

6.2.9 GO TO Section 7.0 for data evaluation. √

7.0 RVWL Test Mode Data Evaluation

7.1 DETERMINE RVWL by performing the following:

7.1.1 IF the Delta T is between 25°F and 200°F, THEN RECORD the sensor is "wet" (covered with water) in the Wet/Dry column of the table on Data Sheet 1 or 2. _____

7.1.2 IF the Delta T is GREATER THAN 200°F, THEN RECORD the sensor is "dry" (**NOT** covered with water) in the Wet/Dry column of the table on Data Sheet 1 or 2. _____

7.1.3 DETERMINE the HEAD and PLENUM levels using Addendum 1 and the Sensor Number of the sensors recorded as being "wet" in the table on Data Sheet 1 or 2. _____

7.1.4 RECORD the HEAD and PLENUM levels in the Level column of the table on Data Sheet 1 or 2. _____

7.1.5 IF the HEAD OR PLENUM level recorded is LESS THAN 100%, THEN NOTIFY the Shift Manager. _____

7.2 DETERMINE RVWL sensor/channel operability by performing the following:

7.2.1 IF ANY Error Code(s) between E01 and E24 were recorded in Step 2.0 on Data Sheet 1 or 2, THEN RECORD "**NO**" in the Sensor Operable column for the associated sensor in the table on Data Sheet 1 or 2. _____

NOTE

- IF the Delta T is LESS THAN 25°F, THEN the sensor is shorted or the heater is **NOT** operating.
- IF the Delta T is GREATER THAN 2300°F, THEN the sensor is open.

7.2.2 IF the Delta T is LESS THAN 25°F OR GREATER THAN 2300°F, THEN RECORD "**NO**" in the Sensor Operable column in the table on Data Sheet 1 or 2. _____

7.2.3 IF Steps 7.2.1 OR 7.2.2 do **NOT** apply, THEN RECORD "yes" in the Sensor Operable column in the table on Data Sheet 1 or 2. _____

NOTE

Sensors 1 and 2 are located in the upper Head region and Sensors 3 through 8 are located in the Plenum region.

7.2.4 RECORD the number of operable Head and Plenum sensors in the Sensor Operable column of the table on Data Sheet 1 or 2. _____

NOTE

IF at least one sensor in the Head and at least three sensors in the Plenum are operable, THEN a RVWL system channel is considered OPERABLE. (Reference 2.1)

7.2.5 DETERMINE if the number of operable sensors meets the requirements of Technical Specification 3.3.3.6 and COMPLETE Step 4.0 on Data Sheet 1 or 2. _____

7.2.6 IF Technical Specification 3.3.3.6 is **NOT** satisfied, THEN NOTIFY the Shift Manager. _____

7.3 IF ANY of the following conditions were encountered during performance of this procedure, THEN NOTIFY the System Engineer:

- Any Error Codes displayed _____
- Any Delta T indicated LESS THAN 25°F _____
- Any T Unheated indicated GREATER THAN 700°F _____
- Any Delta T indicated GREATER THAN 2300°F _____

8.0 Support Documents

8.1 Addendum 1, RVWL Sensor Elevations

8.2 Addendum 2, HJTC Error Codes

8.3 Addendum 3 - RVWL Sensor Graphic

8.4 Data Sheet 1, Channel A RVWL System Data Sheet

8.5 Data Sheet 2, Channel C RVWL System Data Sheet

NOTE

- Top of Core is elevation 28 ft 2 inches.
- SG spillover is elevation 34 ft. 3.8 inches.
- IF the Delta T is between 25°F and 200°F, THEN RECORD the sensor is "wet" (covered with water) in the Wet/Dry column of the table on Data Sheet 1 or 2.
- IF the Delta T is GREATER THAN 200°F, THEN RECORD the sensor is "dry" (**NOT** covered with water) in the Wet/Dry column of the table on Data Sheet 1 or 2.
- Example: IF SENSOR No. 3 DRY is circled AND SENSOR No. 4 WET is circled, THEN the RVWL PLENUM INDICATED LEVEL (%) would be 85%, SENSOR Location 34' 10.1" and the LEVEL DESCRIPTION would be Plenum **NOT** Full.

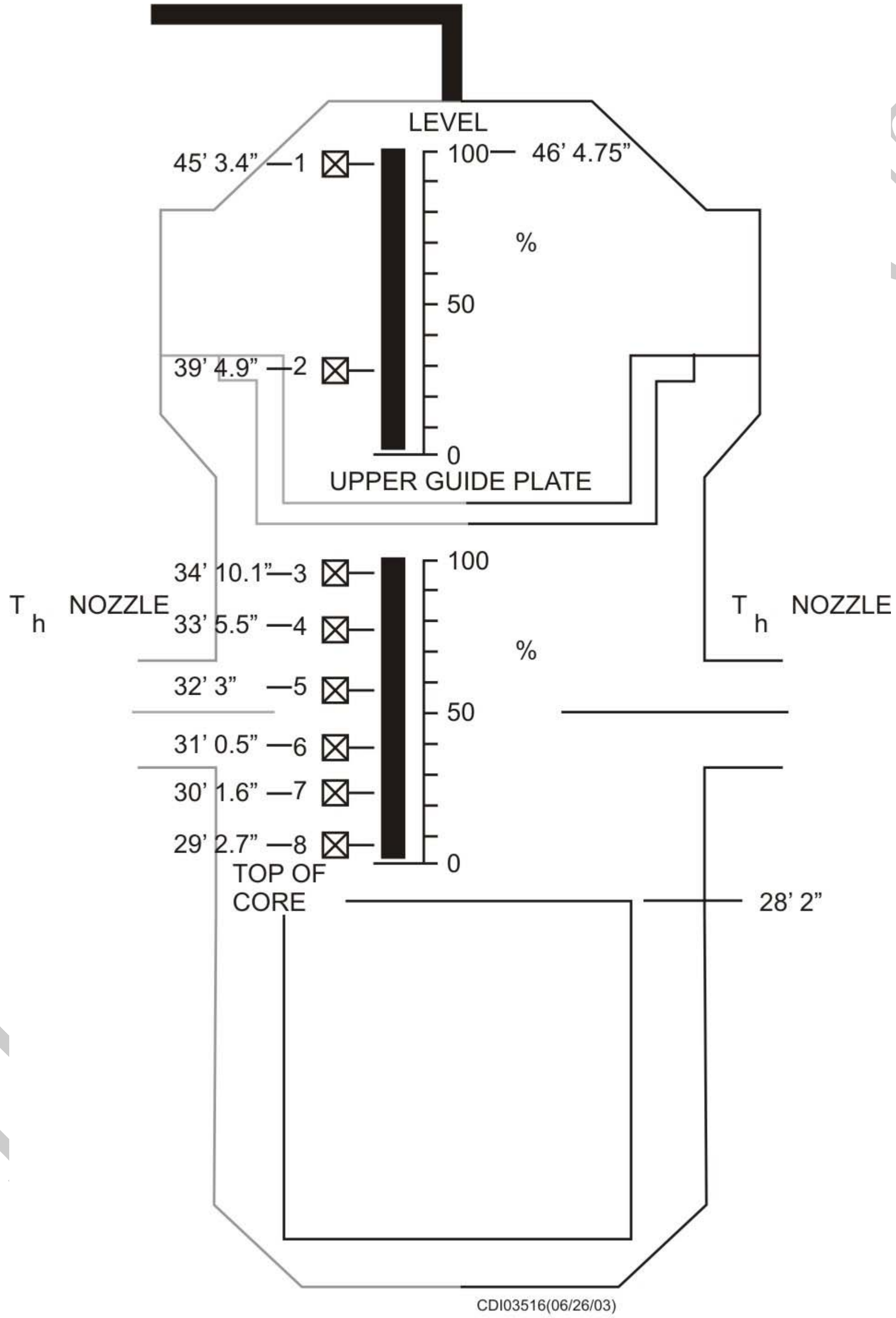
SENSOR No. WET/DRY (circle one)	UPPER HEAD INDICATED LEVEL (%)	PLENUM INDICATED LEVEL (%)	SENSOR	LEVEL DESCRIPTION
All Wet	100	100	46' 4.75"	Upper Head Full
SENSOR No. 1 WET/DRY	64	100	45' 3.4"	Upper Head Partially Drained
SENSOR No. 2 WET/DRY	0	100	39' 4.9"	Plenum Full
SENSOR No. 3 WET/DRY	0	85	34' 10.1"	Plenum **NOT** Full
SENSOR No. 4 WET/DRY	0	66	33' 5.5"	Top of Hot Leg Nozzle
SENSOR No. 5 WET/DRY	0	48	32' 3"	Hot Leg Centerline
SENSOR No. 6 WET/DRY	0	33	31' 0.5"	Bottom of Hot Leg Nozzle
SENSOR No. 7 WET/DRY	0	20	30' 1.6"	Midway between Hot Leg Nozzle and Upper Core Plate
SENSOR No. 8 WET/DRY	0	0	29' 2.7"	Upper Core Plate

(1) **(UNIT 2 ONLY)** T2-10-9321-3 Train A RVWL Sensor #4 Heated Junction Thermocouple is disconnected.

ERROR NO.	DESCRIPTION	ERROR NO.	DESCRIPTION
E01	Delta T_1 low	E17	T_{H6} open or shorted
E02	T_{H1} open or shorted	E18	T_{U6} open or shorted
E03	T_{U1} open or shorted	E19	Delta T_7 low
E04	Delta T_2 low	E20	T_{H7} open or shorted
E05	T_{H2} open or shorted	E21	T_{U7} open or shorted
E06	T_{U2} open or shorted	E22	Delta T_8 low
E07	Delta T_3 low	E23	T_{H8} open or shorted
E08	T_{H3} open or shorted	E24	T_{U8} open or shorted
E09	T_{U3} open or shorted	E25	High temperature in card cage
E10 (1)	Delta T_4 low	E26	High temperature in power supply
E11 (1)	T_{H4} open or shorted	E27	ROM error
E12 (1)	T_{U4} open or shorted	E28	RAM error
E13	Delta T_5 low	E29	Out-of-sequence Head
E14	T_{H5} open or shorted	E30	Out-of sequence Plenum
E15	T_{U5} open or shorted	E31	Top three Unheated sensors open
E16	Delta T_6 low	E32	Data link out of service

Note: Delta T is the difference between T_H and T_U, which together comprise a sensor.
T_H is the Heated Thermocouple.
T_U is the Unheated Thermocouple.

(1) **(UNIT 2 ONLY)** T2-10-9321-3 Train A RVWL Sensor #4 Heated Junction Thermocouple is disconnected. This will create an E30 indication for Train A RVWL Sensor #4.



RVWL Sensor Graphic

Note: (1) **(UNIT 2 ONLY)** T2-10-9321-3 Train A RVWL Sensor #4 Heated Junction Thermocouple is disconnected. This will create an E30 indication for Train A RVWL Sensor #4.

UNIT 1 (circle one) UNIT 2

1.0 HEAD Level __________________PLENUM Level ______________

2.0 Error Codes ___________________

3.0 Test Mode Data Table

TEST I.D. No.	SENSOR No.	PARAMETER	VALUE	WET/DRY	LEVEL	SENSOR OPERABLE	NO. OF OPERABLE SENSORS
1	1	Delta T			HEAD		HEAD
2	1	T Heated					
3	1	T Unheated					
4	2	Delta T					
5	2	T Heated					
6	2	T Unheated					
7	3	Delta T			PLENUM		PLENUM
8	3	T Heated					
9	3	T Unheated					
10 (1)	4	Delta T					
11 (1)	4	T Heated					
12 (1)	4	T Unheated					
13	5	Delta T					
14	5	T Heated					
15	5	T Unheated					
16	6	Delta T					
17	6	T Heated					
18	6	T Unheated					
19	7	Delta T					
20	7	T Heated					
21	7	T Unheated					
22	8	Delta T					
23	8	T Heated					
24	8	T Unheated					

4.0 Technical Specification 3.3.3.6 is SATISFIED: YES ___ NO ___

Performed by: ______________________________ __________ __________

Date Time

Reviewed by: ______________________________ __________

Date

(1) **(UNIT 2 ONLY)** T2-10-9321-3 Train "A" RVWL Sensor #4 Heated Junction Thermocouple is disconnected.

UNIT 1 (circle one) **UNIT 2**

1.0 HEAD Level ____________________PLENUM Level ______________

2.0 Error Codes _______*none*_________

3.0 Test Mode Data Table

TEST I.D. No.	SENSOR No.	PARAMETER	VALUE	WET/DRY	LEVEL	SENSOR OPERABLE	NO. OF OPERABLE SENSORS
1	1	Delta T	*210*		HEAD		HEAD
2	1	T Heated	*467*				
3	1	T Unheated	*257*				
4	2	Delta T	*202*				
5	2	T Heated	*460*				
6	2	T Unheated	*258*				
7	3	Delta T	*193*		PLENUM		PLENUM
8	3	T Heated	*463*				
9	3	T Unheated	*270*				
10	4	Delta T	*198*				
11	4	T Heated	*460*				
12	4	T Unheated	*262*				
13	5	Delta T	*189*				
14	5	T Heated	*455*				
15	5	T Unheated	*266*				
16	6	Delta T	*190*				
17	6	T Heated	*448*				
18	6	T Unheated	*258*				
19	7	Delta T	*195*				
20	7	T Heated	*459*				
21	7	T Unheated	*264*				
22	8	Delta T	*198*				
23	8	T Heated	*469*				
24	8	T Unheated	*271*				

4.0 Technical Specification 3.3.3.6 is SATISFIED: YES ___ NO ___

Performed by: ____*Bill Harley**________________ ___*today*___ Date ___*10 min. ago*___ Time

Reviewed by: ______________________________ __________ Date

**Sections 3, and 6.2 only*

NOTE

- Top of Core is elevation 28 ft 2 inches.
- SG spillover is elevation 34 ft. 3.8 inches.
- IF the Delta T is between 25°F and 200°F, THEN RECORD the sensor is "wet" (covered with water) in the Wet/Dry column of the table on Data Sheet 1 or 2.
- IF the Delta T is GREATER THAN 200°F, THEN RECORD the sensor is "dry" (**NOT** covered with water) in the Wet/Dry column of the table on Data Sheet 1 or 2.
- Example: IF SENSOR No. 3 DRY is circled AND SENSOR No. 4 WET is circled, THEN the RVWL PLENUM INDICATED LEVEL (%) would be 85%, SENSOR Location 34' 10.1" and the LEVEL DESCRIPTION would be Plenum **NOT** Full.

SENSOR No. WET/DRY (circle one)	UPPER HEAD INDICATED LEVEL (%)	PLENUM INDICATED LEVEL (%)	SENSOR	LEVEL DESCRIPTION
All Wet	100	100	46' 4.75"	Upper Head Full
SENSOR No. 1 WET/DRY	64	100	45' 3.4"	Upper Head Partially Drained
SENSOR No. 2 WET/DRY	0	100	39' 4.9"	Plenum Full
SENSOR No. 3 WET/DRY	0	85	34' 10.1"	Plenum **NOT** Full
SENSOR No. 4 WET/DRY	0	66	33' 5.5"	Top of Hot Leg Nozzle
SENSOR No. 5 WET/DRY	0			
SENSOR No. 6 WET/DRY	0			
SENSOR No. 7 WET/DRY	0			
SENSOR No. 8 WET/DRY	0			

EXAMINER INFORMATION

- Sensors 1 and 2 should be marked "DRY" because their Delta T's are > 200 °F.
- Sensors 3 – 8 should be marked 'WET' because their Delta T's are ≤ 200 °F.
- Based on the last bullet in the NOTE above, RVWL is at the location of the first 'DRY' sensor, which is sensor 2 in this case. Therefore RVWL is at the 'Plenum Full' level. The level in the Upper Head is 0% and the level in the Plenum is 100%.

(1) **(UNIT 2 ONLY)** T2-10-9321-3 Train A RVWL Sensor #4 Heated Junction Thermocouple is disconnected.

	0P
RV	
~~Data Sheet 2~~	Chan

UNIT 1

EXAMINER INFORMATION

- Sensors 1 and 2 should be marked "DRY" because their Delta T's are > 200 °F.
- Sensors 3 – 8 should be marked 'WET' because their Delta T's are ≤ 200 °F.
- Based on these results, the level in the Upper Head is 0% and the level in the Plenum is 100%.

1.0 HEAD Level ___*0%*___ PLENUM Level ___*100%*___

2.0 Error Codes ___*none*___

3.0 Test Mode Data Table

TEST I.D. No.	SENSOR No.	PARAMETER	VALUE	WET/DRY	LEVEL	SENSOR OPERABLE	NO. OF OPERABLE SENSORS
1	1	Delta T	*210*		HEAD		HEAD
2	1	T Heated	*467*	*dry*			
3	1	T Unheated	*257*				
4	2	Delta T	*202*		*0%*		
5	2	T Heated	*460*	*dry*			
6	2	T Unheated	*258*				
7	3	Delta T	*193*		PLENUM		PLENUM
8	3	T Heated	*463*	*wet*			
9	3	T Unheated	*270*				
10	4	Delta T	*198*				
11	4	T Heated	*460*	*wet*			
12	4	T Unheated	*262*				
13	5	Delta T	*189*				
14	5	T Heated	*455*	*wet*	*100%*		
15	5	T Unheated	*266*				
16	6	Delta T	*190*				
17	6	T Heated	*448*	*wet*			
18	6	T Unheated	*258*				
19	7	Delta T	*195*				
20	7	T Heated	*459*	*wet*			
21	7	T Unheated	*264*				
22	8	Delta T	*198*				
23	8	T Heated	*469*	*wet*			
24	8	T Unheated	*271*				

4.0 Technical Specification 3.3.3.6 is SATISFIED: YES ___ NO ___

Performed by: ___*Bill Harley**___ ___*today*___ Date ___*10 min. ago*___ Time

Reviewed by: ______________________ ________ Date

**Sections 3, and 6.2 only*

NUCLEAR TRAINING DEPARTMENT

ADMINISTRATIVE JOB PERFORMANCE MEASURE

TITLE: **VERIFY AN EXCORE QPTR CALCULATION**

JPM NO.: **A3**

REVISION: **2**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title:	VERIFY AN EXCORE QPTR CALCULATION
JPM No.:	A3
Rev. No.:	2
STP Task:	37750, Perform a Quadrant Power Tilt Ratio calculation
STP Objective:	37750, Perform a Quadrant Power Tilt Ratio calculation in accordance with 0PSP10-NI-0002.
Related K/A Reference:	2.1.20 (4.6) Ability to interpret and execute procedure steps.
References:	T.S. 3/4.2.4 Quadrant Power Tilt Ratio 0POP09-AN-05M3 (05M3-B-3) PR Lower Det Flux Dev Hi/Auto Def 0PSP10-NI-0002, Rev. 13, Excore QPTR Determination
Task Normally Completed By:	RO
Method of Testing:	Performance
Location of Testing:	Classroom
Time Critical Task:	NO
Validation Time:	15 minutes

Required Materials (Tools/Equipment):

Calculator

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK

INITIAL CONDITIONS:

Unit 2 has been at approximately 100% steady state power for several months. One (1) hr. ago Control Rod M12 (Control Bank 'D') dropped fully into the core. The crew has stabilized the plant and preparations are being made to lower Reactor power.

Control Room Annunciator 05M3 Window B-3, PR LOWER DET FLUX DEV HI/AUTO DEF, has alarmed. The Shift Manager has had a QPTR calculation done using the manual method (i.e. without use of the Plant Computer or RO Calculator).

INITIATING CUE:

The Unit Supervisor instructs you to perform the Independent Verification of the QPTR calculation required by Step 5.2.9 of 0PSP10-NI-0002.

You are expected to correct any errors found, including subsequent entries/calculations, AND, once any corrections are made, determine if the Acceptance Criteria is/are met per step 5.3.

Additional information:

- All Excore Nuclear Instrumentation Channels are operable.
- The U2 Plant Curve Book Figure 5.1 is the latest approved version for purposes of this JPM AND there are no errors in the data of Figure 5.1.
- Reactor Power is stable and meets the requirements of 0PSP10-NI-0002 Step 4.3.
- Reactor Power is 99.7% by U1169, average NI power.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

The applicant must successfully discover an error on Form 3, correct related information, and determine Acceptance Criteria is NOT met.

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

- 0PSP10-NI-0002, Excore QPTR Determination (Student Handout Copy).
- U2 Plant Curve Book Fig. 5.1 (a special copy labeled "EXAM USE ONLY" for use with this JPM).

NOTES:

- Examiner has a "KEY" of Form 3 of 0PSP10-NI-0002, Excore QPTR Determination. DO NOT give applicant copy of the page marked "KEY".

- Examiner has an "EXAM USE ONLY" copy of Figure 5.1, Incore-Excore Cross-Calibration Constants. This is to be provided to the applicant at the start of the JPM. The data on this copy may be different from that contained in the current Plant Curve Book. The calculations performed in the "KEY" are based on the data from the "EXAM USE ONLY" copy of Figure 5.1.

- Actual numerical results will vary somewhat due to rounding and possibly using a 'most conservative' approach. Because of this, there will be a range of numerical results, however the end result should be the same (i.e. numbers within the possible range should all indicate that Tech Spec QPTR Acceptance Criteria is NOT met).

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME

<u>SAT/UNSAT</u> Performance Step: 1

Obtain the procedure and Plant Curve Book Figure 5.1.

Standard:

Applicant obtains handout copy of 0PSP10-NI-0002, Excore QPTR Determination, and the handout copy of U2 Figure 5.1.

Comment:

The Student Handout Copy of 0PSP10-NI-0002, Excore QPTR Determination includes completed procedure steps and applicable forms.

The “EXAM USE ONLY” copy of U2 Figure 5.1, Incore-Excore Cross-Calibration Constants, may not be the current data in the Unit 2 Plant Curve Book, but contains the data applicable to this JPM. The data on this copy of Figure 5.1 should be used in the QPTR calculation.

Cue:

Provide the following to the applicant:

- Student Handout Copy of 0PSP10-NI-0002, Excore QPTR Determination,
  AND
- Student Handout Copy of Figure 5.1 (marked as “EXAM USE ONLY”).

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2 (C)

Standard:

Applicant determines there is an error on the calculation of NI 43 data and recalculates the result.

Comment:

For N43L, the ‘100% Power Detector Current’ should be 440 from Figure 5.1. The value used (462) by the performer is for NI 43 Upper Detector. After performing the division correctly, the result should be 1.032.

Refer to KEY to see details of error.

Cue:

Notes:

SAT/UNSAT Performance Step: 3 (C)

Standard:

Based on the error found for NI 43 data, the applicant corrects subsequent’ error carried forward’ results, and determines the Acceptance Criteria is NOT met.

Comment:

Refer to the KEY to see details of the ‘error carried forward’ data and the final result that is NOT within the Acceptance Criteria of procedure section 6.1.

Cue:

Notes:

- TERMINATE THE JPM -

JPM STOP TIME ________________

VERIFICATION OF COMPLETION

Job Performance Measure: VERIFY AN EXCORE QPTR CALCULATION

Applicant's Name: ____

Date Performed: ____________________

Time to Complete: __________________

JPM Results: **Sat / Unsat**

Evaluator: ________________________ **Signature** __________________________

Date ____________________

JPM - HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EXAMINER WHEN YOU'VE COMPLETED THE TASK

INITIAL CONDITIONS:

Unit 2 has been at approximately 100% steady state power for several months. One (1) hr. ago Control Rod M12 (Control Bank 'D') dropped fully into the core. The crew has stabilized the plant and preparations are being made to lower Reactor power.

Control Room Annunciator 05M3 Window B-3, PR LOWER DET FLUX DEV HI/AUTO DEF, has alarmed. The Shift Manager has had a QPTR calculation done using the manual method (i.e. without use of the Plant Computer or RO Calculator).

INITIATING CUE:

The Unit Supervisor instructs you to perform the Independent Verification of the QPTR calculation required by Step 5.2.9 of 0PSP10-NI-0002.

You are expected to correct any errors found, including subsequent entries/calculations, AND, once any corrections are made, determine if the Acceptance Criteria is/are met per step 5.3.

Additional information:

- All Excore Nuclear Instrumentation Channels are operable.
- The U2 Plant Curve Book Figure 5.1 is the latest approved version for purposes of this JPM AND there are no errors in the data of Figure 5.1.
- Reactor Power is stable and meets the requirements of 0PSP10-NI-0002 Step 4.3.
- Reactor Power is 99.7% by U1169, average NI power.

STI 32493954	**0PSP10-NI-0002**	**Rev. 13**	Page 1 of 14
Excore QPTR Determination			
Quality	Non Safety-Related	Usage: **IN HAND**	Effective Date: 06/30/09

J. E. Eichenlaub	D. C. Bean	J E. Eichenlaub	NF&A
PREPARER	TECHNICAL	USER	COGNIZANT ORGANIZATION

Table of Contents Page

1.0 Purpose and Scope

1.1 The purpose of this procedure is to determine the Quadrant Power Tilt Ratio (QPTR) and verify it satisfies the requirements of Technical Specification 3.2.4.

1.2 This procedure is written to verify QPTR by Plant Computer QPTR Method or by Manual QPTR Method.

1.3 This procedure meets the Surveillance Requirements of Technical Specifications 4.2.4.1.a and 4.2.4.1.b.

2.0 Responsibilities

2.1 The Test Coordinator is responsible for identifying the portions of this procedure that are to be performed to satisfy the test purpose.

2.2 The Test Coordinator SHALL ensure that all requirements of this procedure are completed and determine acceptability of the test results.

2.3 The procedure performer SHALL obtain data as specified in the procedure and prepare the data package.

2.4 The verifier SHALL verify all entries and calculations in the data package as specified in the procedure.

2.5 Shift Supervisor or designee SHALL complete the Second Review of Test Results on Form 1.

2.6 Shift Supervisor SHALL complete the Plant Operations Review of Test Results on Form 1 if acceptance criteria are not met.

3.0 Notes & Precautions

3.1 IF Reactor Power is greater than 75% RTP with one Power Range Nuclear Instrument (NI) inoperable, THEN perform the surveillance requirements of Technical Specification 4.2.4.2 (Reference 7.6).

3.2 When verifying QPTR to support Power Range NIS Axial Flux Difference (AFD) Calibrations, then the manual calculation process should be used to verify QPTR until all four Power Range channels are calibrated.

3.3 When using the manual calculation process to verify QPTR, then the correct current scale should be read for each detector current value.

3.4 When " * " (asterisk) appears in the checkoff space following a step, then sign/initial Data Package to signify step completion.

4.0 Prerequisites

4.1 IF using the Plant Computer QPTR Method, THEN ensure the following Section 4.1 prerequisites are met, Otherwise proceed to Prerequisite 4.2:

4.1.1 All four Power Range NI channels are operable. *NA*

4.1.2 On Plant Curve Book Figure 5.1, the identified Source for the Normalized 100% Power, 0% IAO Excore Detector Currents is either 0PSP10-II-0005 (One Point Incore-Excore Detector Calibration) or 0PSP10-II-0001 (Incore-Excore Detector Calibration). *NA*

4.1.3 All 4 AFD channels have been calibrated with the latest Incore-Excore calibration data. This prerequisite is satisfied if Plant Computer Points K0554, K0552, K0551, and K0553 match the values recorded on Plant Curve Book Figure 5.1. *NA*

4.1.4 The following Plant Computer points are operable. *NA*

- ICYUH0111N QPTR NIS UPPER QUAD A (CH 43)
- ICYUH0112N QPTR NIS UPPER QUAD B (CH 42)
- ICYUH0113N QPTR NIS UPPER QUAD C (CH 44)
- ICYUH0114N QPTR NIS UPPER QUAD D (CH 41)
- ICYUH0121N QPTR NIS LOWER QUAD A (CH 43)
- ICYUH0122N QPTR NIS LOWER QUAD B (CH 42)
- ICYUH0123N QPTR NIS LOWER QUAD C (CH 44)
- ICYUH0124N QPTR NIS LOWER QUAD D (CH 41)

4.1.5 Continue with Prerequisite 4.3. *NA*

4.2 IF using the Manual QPTR Method, THEN ensure that at least three Power Range NI channels are operable. ✓

4.3 Reactor power has not changed by greater than ± 0.5% RTP in the last 5 minutes. ✓

NOTE

IF Reactor Power is greater than 75% RTP with one Power Range Nuclear Instrument (NI) inoperable, THEN perform the surveillance requirements of Technical Specification 4.2.4.2 (Reference 7.6).

4.4 The plant is in Mode 1. ✓

4.5 Notify the Shift Supervisor to review the limiting conditions for operation associated with Technical Specification 3.2.4, Quadrant Power Tilt Ratio. ✓

4.6 Have the Shift Supervisor sign Form 1 giving permission to start the test. * ✓

5.0 Procedure

NOTE

- An approved computer code may be used to perform the calculations on Form 3.
- Computer generated forms may also be used for Form 2 or Form 3.

5.1 IF using the Plant Computer QPTR Method, THEN perform the following Section 5.1 steps, Otherwise proceed to Step 5.2:

5.1.1 Verify the prerequisites have been met and sign Form 1. * *NA*

5.1.2 Record the following information on Excore QPTR Form 2:

5.1.2.1 Unit number, cycle number, date and time. *NA*

5.1.2.2 The current Reactor Power indication being used and its value. *NA*

5.1.3 Record the following QPTR values on Excore QPTR Plant Computer points on Form 2.

Upper Radial Flux Tilts (URFT's) *NA*

- ICYUH0111N QUAD A (CH 43)
- ICYUH0112N QUAD B (CH 42)
- ICYUH0113N QUAD C (CH 44)
- ICYUH0114N QUAD D (CH 41)

Lower Radial Flux Tilts (LRFT's) *NA*

- ICYUH0121N QUAD A (CH 43)
- ICYUH0122N QUAD B (CH 42)
- ICYUH0123N QUAD C (CH 44)
- ICYUH0124N QUAD D (CH 41)

5.1.4 Record the QPTR on Form 2 as the largest numerical value of the URFT or the LRFT Plant Computer points recorded per Step 5.1.3. *NA*

5.1.5 The Test Coordinator SHALL sign Form 2 when complete. * *NA*

5.1.6 Continue with Step 5.3. *NA*

5.2 IF using the Manual QPTR Method, THEN perform the following Section 5.2 steps:

NOTE

Addendum 1 provides guidance for using the RO Calculator.

5.2.1 Verify the prerequisites have been met and sign Form 1. *✓

5.2.2 Record the following information on Excore QPTR Form 3:

5.2.2.1 Unit number, cycle number, date and time. ✓

5.2.2.2 The current Reactor Power indication being used and its value. ✓

CAUTION

Always use the 100% power detector currents from the latest Figure 5.1 in the Plant Curve Book for ALL the NI channels, even if the new values have not yet been set in all of the NI channels.

5.2.2.3 Latest 100% power detector current, in microamps, for each operable upper and lower Power Range NI detector from Figure 5.1 in the Plant Curve Book. ✓

CAUTION

- The reading of the upper and lower detector currents for all of the operable Power Range NI detectors should be done as near the same time as possible to minimize any errors from NI channel oscillations.
- Steps 5.2.3 and 5.2.4 need to be performed concurrently.
- Step 5.2.3 refers to each detector current meter range switch scale setting (0.1, 0.5, 1 and 5 settings).
- Ensure that the correct current scale is being read for each detector current value.

5.2.3 Record each detector current meter range switch scale prior to reading the detector current. ✓

5.2.4 Read the indicated detector current for each operable upper and lower Power Range NI detector from CP-011 to the nearest microamp, e.g. 612 microamps, and record the values on Excore QPTR Form 3. ✓

NOTE

- When one Power Range NI channel is inoperable, the three operable channels SHALL be used to determine QPTR.
- Comments pertaining to the inoperable channel should be recorded in the REMARKS section of Excore QPTR Form 1.

CAUTION

The following calculations in steps 5.2.5 through 5.2.5.4 SHALL be carried out to at least three decimal places.

5.2.5 Calculate the Upper Tilt Ratio (UTR) as follows:

5.2.5.1 Determine the upper normalized current (I_U) for each channel by dividing the indicated detector current by the 100% power detector current. Record the upper normalized current (I_U) on Excore QPTR Form 3. ✓

5.2.5.2 Determine the sum of the upper normalized detector currents (Sum I_U) and record this value on Excore QPTR Form 3. ✓

5.2.5.3 Determine the average upper normalized current (Average I_U) by dividing the sum of the upper normalized currents (Sum I_U) by the number of operable detectors. Record the average upper normalized current (Average I_U) on Excore QPTR Form 3. ✓

5.2.5.4 Calculate the UTR by dividing the maximum upper normalized current (Maximum I_U) by the average upper normalized current (Average I_U). Record the UTR on Excore QPTR Form 3. ✓

5.2.6 Calculate the Lower Tilt Ratio (LTR) as follows:

CAUTION

The following calculations in steps 5.2.6.1 through 5.2.6.4 SHALL be carried out to at least three decimal places.

5.2.6.1 Determine the lower normalized current (I_L) for each channel by dividing the indicated detector current by the 100% power detector current. Record the lower normalized current (I_L) on Excore QPTR Form 3. ✓

5.2.6.2 Determine the sum of the lower normalized current (Sum I_L) and record this value on Excore QPTR Form 3. ✓

5.2.6.3 Determine the average lower normalized current (Average I_L) by dividing the sum of the lower normalized currents (Sum I_L) by the number of operable detectors. Record the average lower normalized current (Average I_L) on Excore QPTR Form 3. ✓

5.2.6.4 Calculate the LTR by dividing the maximum lower normalized current (Maximum I_L) by the average lower normalized current (Average I_L). Record the LTR on Excore QPTR Form 3. ✓

NOTE

QPTR is defined in Technical Specifications as the value of the UTR or the value of the LTR, whichever is greater.

5.2.7 Record the larger numerical value (UTR or LTR) as the QPTR on Form 3. ✓

5.2.8 The Test Coordinator SHALL sign Form 3 when calculations are complete. *✓

5.2.9 Obtain independent verification of all calculations, including verification that all of the recorded 100% detector currents on Form 3 are from the latest approved Figure 5.1 of the Plant Curve Book. Sign for independent verification on Form 3. IV

5.3 Verify the QPTR meets the Acceptance Criteria. ____

NOTE

If the QPTR > 1.02 and Reactor Power is ≤ 50%, then reactor power may be increased above 50% in accordance with the action requirements of Technical Specification 3.2.4.

5.4 IF the test results did not satisfy the Acceptance Criteria, THEN immediately notify the Shift Supervisor. ____

5.5 IF QPTR > 1.02 and Reactor Power > 50%, THEN notify the Reactor Engineering Supervisor to prepare to take action per Technical Specification 3.2.4 action b. ____

5.6 The Test Coordinator SHALL ensure all procedure performers and verifiers print their names, sign and initial Form 1. ____

5.7 Indicate the reason for performing this test on Form 1. ____

5.8 Indicate the test results and sign Form 1. *

5.9 IF the Plant Computer QPTR Method was performed, THEN Form 3 may be discarded. IF the Manual QPTR Method was performed, THEN Form 2 may be discarded. *NA*

5.10 Forward the data package to the Shift Supervisor. ____

5.11 The Shift Supervisor SHALL indicate the results of the second review and sign Form 1. ____*____

5.12 IF Shift Supervisor determines test results do NOT satisfy the acceptance criteria, THEN he SHALL immediately complete the applicable portion of Form 1. ______

5.13 Forward the Data Package for review in accordance with 0PGP03-ZE-0004 (Plant Surveillance Program). ______

6.0 Acceptance Criteria

6.1 The Quadrant Power Tilt Ratio SHALL NOT exceed 1.02.

7.0 References

7.1 STPEGS Technical Specification 3/4.2.4

7.2 0PGP03-ZE-0004, Plant Surveillance Program

7.3 0PSP10-II-0004, Determination of Quadrant Power Tilt Ratio Using Incore Instrumentation

7.4 CR 97-17272 Operator Weakness Reading Wrong Power Range Scale.

7.5 CR 02-18688 The RO Calculator Not Updated for Power Uprate.

7.6 CR 06-15407 Technical Specification Surveillance 4.2.4.2 Not Performed with an Inoperable Power Range NI.

8.0 Support Documents

8.1 Addendum 1 Guidance of the RO Calculator for QPTR

8.2 Form 1 Data Package Cover Sheet

8.3 Form 2 Plant Computer Excore QPTR Data Sheet

8.4 Form 3 Excore QPTR Manually Calculated Data Sheet

This Addendum provides the guidance necessary to use the RO Calculator when performing Section 5.2 the Manual QPTR.

1.0 With the application open, select the appropriate calculator by pressing the button for the correct Unit and calculator.

2.0 Enter correct procedure Revision in the box provided.

3.0 Verify the date is correct for the current date.

4.0 Enter current Reactor Power and the indicator used in boxes provided.

5.0 Verify the scales for all operable channels are the same as those on the instruments. If changing the scale, use the drop down boxes to select the correct scale.

6.0 Verify the 100% Power Currents displayed reflect the values from Plant Curve Book Figure 5.1 Normalized 100% Power, 0% IAO Excore Detector Currents (microamps). If changing the values, click on the UPDATE CONSTANT button and enter the correct values. Then click the SAVE UPDATES button to save the new values.

7.0 Enter the INDICATED DETECTOR CURRENTS in the boxes provided for each channel.

8.0 When all data is entered, click the TIME NOW button to fill in the finish time for the surveillance.

9.0 You may then preview the completed forms or print the completed forms by clicking the appropriate button.

10.0 When the calculation is completed, click the RETURN TO MENU button to save the data to the data base and then click the exit button to exit the application. DO NOT EXIT by closing the screen with the menu bar X button in the upper right hand corner of the window.

Unit 2 Cycle 15	Work Activity Number(s): NA -ST: NA NA -ST: NA		
Tech Spec Reference: 4.2.4.1.a 3.2.4 4.2.4.1.b	Test Interval: 7 days (alm. op.) 12 hrs (alm. inop.)	Modes Required: 1	Test Performance Mode: 1

4.6 Permission to start: Barney Kline — Shift Supervisor   Today — Date

5.7 Reason for Test:

- ☒ For Surveillance Credit
- ☐ Periodic Surveillance Test To Satisfy 4.2.4.1.a
- ☐ Other ______________________________
- ☐ Not for Surveillance Credit
- ☐ Conditional Surveillance to satisfy 4.2.4.1.b

5.8 Test Results:

- ☐ Acceptable (Acceptance Criteria met)
- ☐ Unacceptable (Any Acceptance Criteria NOT met)

Test Completed By: ________________________ Test Coordinator ____________ Date ____________ Time

5.11 Second Review of Test Results:

- ☐ Acceptable (All Acceptance Criteria met)
- ☐ Unacceptable (Any Acceptance Criteria NOT met)

Test Reviewed By: ________________________ Shift Supervisor ____________ Date ____________ Time

5.12 Plant Operations Review of Test Results (if required):

IF test results are unacceptable, IMMEDIATELY inform the Shift Supervisor who SHALL complete the following:

Potential Reportable Occurrence ☐ Yes ☐ No
LCO Action Statement Entered ☐ Yes ☐ No
Corrective Action Taken: ____
____

Test Reviewed By: ________________________ Shift Supervisor ____________ Date ____________ Time

All pages of this Form SHALL be included in the data package. IF the Plant Computer QPTR Method was performed, THEN Form 2 SHALL be included in the data package. IF the Manual QPTR Method was performed, THEN Form 3 SHALL be included in the data package

This form, when completed, SHALL be retained for the life of the plant.

Form 1	Data Package Cover Sheet	Page 2 of 2

Performers and Verifiers:			
Name (Printed)	Signature	Initials	Sections Performed
Bill Davidson	Bill Davidson	BD	various

5.1.1 or 5.2.1 Prerequisites met: Bill Davidson Today

Test Coordinator Date

Remarks: NONE

This form, when completed, SHALL be retained for the life of the plant.

5.1.2.1 Unit ________ Cycle _________ Date _______________ Time _________

5.1.2.2 Reactor Power _______________ Indicator _________________

5.1.3

Point ID	Description	Channel	Value
Upper Radial Flux Tilt (URFT)			
ICYUH0111N	QPTR NIS UPPER QUAD A	CH 43	
ICYUH0112N	QPTR NIS UPPER QUAD B	CH 42	
ICYUH0113N	QPTR NIS UPPER QUAD C	CH 44	
ICYUH0114N	QPTR NIS UPPER QUAD D	CH 41	
Lower Radial Flux Tilt (LRFT)			
ICYUH0121N	QPTR NIS LOWER QUAD A	CH 43	
ICYUH0122N	QPTR NIS LOWER QUAD B	CH 42	
ICYUH0123N	QPTR NIS LOWER QUAD C	CH 44	
ICYUH0124N	QPTR NIS LOWER QUAD D	CH 41	

5.1.4 QPTR = Largest numerical value of the URFT's or LRFT's	

5.1.5 Performed by: _________________________________ Date: _________________

This form, when completed, SHALL be retained for the life of the plant.

5.2.2.1 Unit 2 Cycle 15 Date Today Time 20 minutes ago

5.2.2.2 Reactor Power 99.7% Indicator U1169

UPPER DETECTORS

		N41U	N42U	N43U	N44U	5.2.5.2 Sum I_U	5.2.5.3 Average I_U
5.2.3	Current Meter Range Switch Scale (0.1, 0.5, 1 or 5)	1	1	1	1		
5.2.4	Indicated Detector Current (µA)	488	497	466	473		
5.2.2.3	100% Power Detector Current (µA)	486	495	462	480		
5.2.5	Normalized (I_U) Currents	1.004	1.004	1.009	0.985	4.002	1.0005

5.2.5.4 UPPER TILT RATIO (UTR) = $\frac{\text{Maximum } I_U}{\text{Average } I_U}$ = 1.0085

LOWER DETECTORS

		N41L	N42L	N43L	N44L	5.2.6.2 Sum I_L	5.2.6.3 Average I_L
5.2.3	Current Meter Range Switch Scale (0.1, 0.5, 1 or 5)	1	1	1	1		
5.2.4	Indicated Detector Current (µA)	522	504	454	432		
5.2.2.3	100% Power Detector Current (µA)	520	502	462	450		
5.2.6.1	Normalized (I_L) Currents	1.004	1.004	0.983	0.960	3.951	0.988

5.2.6.4 LOWER TILT RATIO (LTR) = $\frac{\text{Maximum } I_L}{\text{Average } I_L}$ = 1.016

5.2.7 QPTR = Larger numerical value of the UTR or LTR = 1.016

5.2.8 Performed by: Bill Davidson Date: Today

5.2.9 Verified (IV) by: ______________ Date: ________

This form, when completed, SHALL be retained for the life of the plant.

Figure 5.1
Incore-Excore Cross-Calibration Constants
Unit 2 Cycle 15

(Source: 0PSP10-II-0005 performed 02/09/2011)

Normalized 100% Power, 0% IAO Excore Detector Currents (microamps)				
Channel	N41	N42	N43	N44
Upper	486.0	495.0	462.0	480.0
Lower	520.0	502.0	440.0	450.0

Incore vs. Excore Axial Offset Equations	
N41	IAO = 1.390 × EAO + (4.656)
N42	IAO = 1.390 × EAO + (1.022)
N43	IAO = 1.390 × EAO + (-3.387)
N44	IAO = 1.390 × EAO + (-4.484)

EAO is calculated based on Top Detector Current (IT) and Bottom Detector Current (IB) as follows:
EAO = (IT - IB) ÷ (IT + IB) × 100%

Delta-I% is determined by calculating IAO using the calculated EAO in the Incore vs. Excore Axial Offset Equations above and the following:
Delta-I% = IAO × (% Reactor Power) ÷ 100

Plant Computer NIS Accessible Constants								
	Channel N41		Channel N42		Channel N43		Channel N44	
Accessible Constants	K0554	16.677	K0552	16.677	K0551	16.677	K0553	16.677
	K0041T	486.3	K0042T	495.0	K0043T	461.7	K0044T	479.6
	K0041B	520.0	K0042B	502.3	K0043B	439.8	K0044B	449.6

OT-Delta-T Circuitry Summing Amplifier Gains - f(Delta-I%)				
Channel	N41	N42	N43	N44
Gain	1.737	1.737	1.737	1.737

Delta-I% is calculated using the following Yokogawa Recorder Voltage vs. Delta-I% equation:
Delta-I% = 9.6 × (Gain) × (Recorder Delta-V)
where Delta-V is obtained from NR-41, -42, -43, -44 Ch. 3 display

Completed By: Kristin Chesson Date: 02/10/11
Reviewed By: [illegible] Date: 2/15/11
Approved By: [illegible] Date: 2/16/11
Reactor Engineering Supervisor

5.2.2.1 Unit 2 Cycle 15 Date Today Time 20 minutes ago

5.2.2.2 Reactor Power 99.7% Indicator U1169

UPPER DETECTORS

		N41U	N42U	N43U	N44U		
5.2.3	Current Meter Range Switch Scale (0.1, 0.5, 1 or 5)	1	1	1	1		
5.2.4	Indicated Detector Current (µA)	488	497	466	473		
5.2.2.3	100% Power Detector Current (µA)	486	495	462	480	5.2.5.2 Sum I_U	5.2.5.3 Average I_U
5.2.5	Normalized (I_U) Currents	1.004	1.004	1.009	0.985	4.002	1.0005

5.2.5.4 UPPER TILT RATIO (UTR) = $\frac{\text{Maximum } I_U}{\text{Average } I_U}$ = 1.0085

LOWER DETECTORS

This value is incorrect; should be 440 from Figure 5.1. Because of this error, the quotient should be 1.032.

Error carried forward: should be 4.00

Error carried forward: should be 1.00

		[illegible]	N42L	N43L	N44L		
[illegible]	[illegible]	[illegible]	1	1	1		
5.2.4	Indicated Detector Current (µA)	522	504	454	[illegible]		
5.2.2.3	100% Power Detector Current (µA)	520	502	462	450	5.2.6.2 Sum I_L	5.2.6.3 Average I_L
5.2.6.1	Normalized (I_L) Currents	1.004	1.004	0.983	0.960	3.951	0.988

5.2.6.4 LOWER TILT RATIO (LTR) = $\frac{\text{Maximum } I_L}{\text{Average } I_L}$ = 1.017

Final result should be 1.031 – 1.33 which means the Acceptance Criteria is NOT met.
Acceptance Criteria of procedure section 6.1 states "The Quadrant Power Tilt Ratio SHALL NOT EXCEED 1.02.

5.2.7 QPTR = Larger numerical value of the UTR or LTR = 1.017

5.2.8 Performed by: *Bill Davidson* Date: Today

5.2.9 Verified (IV) by: ______________________ Date: ________

This form, when completed, SHALL be retained for the life of the plant.

NUCLEAR TRAINING DEPARTMENT

JOB PERFORMANCE MEASURE

TITLE:	**STAY TIME DETERMINATION WITH ENTRY REQUIREMENTS**
JPM NO.:	**A4**
REVISION:	**2**
LOCATION:	**CLASSROOM**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title:	Stay Time Determination with Entry Requirements
JPM No.:	A4
Rev. No.:	2
Task No.:	99774, Apply Radiation and Contamination safety procedures.
STP Objective:	N91817, STATE the 10CFR20 and STP exposure limitations including extensions for the whole body, skin, and extremities for adults and minors. N91825, CALCULATE total dose based on dose rate and stay time.
Related K/A Reference:	G2.3.4 Radiation Control: Knowledge of radiation exposure limits under normal or emergency conditions. (3.2/3.7)
References:	0PGP03-ZR-0051, Radiological Access Controls/Standards, Rev 25.
Task Normally Completed By:	RO
Method of Testing:	Actual Performance
Location of Testing:	Classroom
Time Critical Task:	NO
Alternate Path JPM:	NO
Validation Time:	15 minutes
Required Materials (Tools/Equipment):	None

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER:

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EXAMINER WHEN YOU HAVE COMPLETED THE TASK

INITIAL CONDITIONS:

Unit 1 is at 100% power. Corrective maintenance is to be performed on the remote operating linkage for CV-0093, Letdown Hx 1A Inlet Isolation Valve, due to binding within the linkage. The valve and linkage are located in the Reactor Coolant Purification Pump Valve Room (Room 049). The dose rate within the vicinity of the valve is 105 mrem/hr.

The individual performing the work is:

- an STP employee
- 40 yrs. old
- has accumulated a Total Effective Dose Equivalent (TEDE) exposure of 1.3 Rem so far this year.

His EPD settings to perform this job will be as follows:

- Total Dose 140 mrem
- Dose Rate Setting 150 mrem/hr.

INITIATING CUE:

1. Determine the MAXIMUM stay time the worker can be at the valve location before he/she would have to leave the Radiological Controlled Area to comply with STP RWP and radiological procedure requirements.
2. Determine the entry requirements for Room 049 based on the dose rate in the vicinity of the valve (105 mrem/hr).

(Assume that the worker's GET002, Radiation Worker Initial Training, is current.)

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

Determines that the maximum stay time for the worker is 80 minutes (1 hour and 20 minutes or 1.333 hr.) based on reaching an EPD alarm that would require him/her to leave the area.

Determines the entry requirements for a High Radiation Area are met as per JPM Step 2.

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

Student Handout Copy of 0PGP03-ZR-0051, Radiological Access Controls/Standards.

NOTES:

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME_______________

Performance Step: 1

Obtain reference material for JPM.

Standard:

Examiner provides the applicant the Student Handout Copy of 0PGP03-ZG-0051, Radiological Access Controls/Standards.

Comment:

Provide the applicant the Student Handout Copy of 0PGP03-ZG-0051, Radiological Access Controls/Standards, if not already done.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2 (C)

Determine the worker's maximum stay time up to the point of receiving an EPD dose alarm.

Standard:

Determines that the maximum stay time is 80 minutes (1 hour and 20 minutes)

Comment:

The STP Administrative Action Level (AAL) is 1500 mr so the worker will still be within this limit when the EPD alarms at a dose of 140 mr., therefore the EPD alarm is the most limiting exposure limit for the worker.

If the worker stays to receive the entire 140 mrem dose allowed by the EPD setting, the worker's EPD will alarm and he/she must then leave the area immediately. Given that the dose rate in the vicinity of CV-0093 is 105 mrem/hr, the worker could receive a total of 140 mrem in 80 minutes (1 hour 20 hours) before he/she had to leave the area.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

<u>SAT/UNSAT</u> Performance Step: 3 (C)

Determines the entry requirements for a High Radiation Area (HRA).

Standard:

Access Control for High Radiation Areas (HRA)

Personnel entering high radiation areas SHALL be:

(Words to the effect of:)

- *Assigned to an RWP that permits entry to a HRA.*
- *Assigned an individual monitoring device (TLD).*
- *Issued an Electronic Personal Dosimeter (EPD).*
- *Made knowledgeable of the radiological conditions in the area to be accessed.*
- *Aware of any additional Radiation Protection controls established by the RWP or RP instructions and have an applicable RCA Entry Card.*

Comment:

The access control requirements for entry into a High Radiation Area are provided in 0PGP03-ZR-0051, Radiological Access Controls/Standards, procedure step 6.6.

Cue:

Notes:

- TERMINATE THE JPM -

JPM STOP TIME_______________

VERIFICATION OF COMPLETION

Job Performance Measure: Stay Time Determination with Entry Requirements

Applicant's Name: ____

Date Performed: ____________________

Time to Complete: __________________

JPM Results: **Sat / Unsat**

Evaluator: _________________________ **Signature:** _________________________

Date: ____________________

JPM - HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EXAMINER WHEN YOU HAVE COMPLETED THE TASK

INITIAL CONDITIONS:

Unit 1 is at 100% power. Corrective maintenance is to be performed on the remote operating linkage for CV-0093, Letdown Hx 1A Inlet Isolation Valve, due to binding within the linkage. The valve and linkage are located in the Reactor Coolant Purification Pump Valve Room (Room 049). The dose rate within the vicinity of the valve is 105 mrem/hr.

The individual performing the work is:

- an STP employee
- 40 yrs. old
- has accumulated a Total Effective Dose Equivalent (TEDE) exposure of 1.3 Rem so far this year.

His EPD settings to perform this job will be as follows:

- Total Dose 140 mrem
- Dose Rate Setting 150 mrem/hr.

INITIATING CUE:

1. Determine the MAXIMUM stay time the worker can be at the valve location before he/she would have to leave the Radiological Controlled Area to comply with STP RWP and radiological procedure requirements.
2. Determine the entry requirements for Room 049 based on the dose rate in the vicinity of the valve (105 mrem/hr).

(Assume that the worker's GET002, Radiation Worker Initial Training, is current.)

RECORD YOUR DATA HERE:

1. Maximum stay time: ____

2. Entry Requirements:

STI 32358494	**0PGP03-ZR-0051**	**Rev. 25**	Page 1 of 39
Radiological Access Controls/Standards			
Quality	Non-Safety-Related	Usage: **Available**	Effective Date: 9/11/2008

Patrick Connell	D Hubenak	Health Physics	Generation Support
PREPARER	TECHNICAL	USER	COGNIZANT DEPT.

Table of Contents Page

1.0 Purpose and Scope

1.1 This procedure describes the program and methods used to control access and work within the Restricted and Radiologically Controlled Areas to maintain exposures to radiation and radioactive materials ALARA.

1.2 Specific areas covered in this procedure include:

- Radiological access controls for the Restricted Area and Radiologically Controlled Areas (RCAs)
- Radiological Postings
- General guidelines for work in the RCA
- Radiation Work Permits
- Radiography Activities
- Expectations and Processes to revoke and reinstate RCA access
- Expectations and Processes to stop and re-start radiological work due to radiological safety concerns

1.3 Portions of this procedure may be performed independently of each other.

2.0 References

2.1 Code of Federal Regulations Title 10, Part 19 and 20.

2.2 INPO 05-008, Guidelines for Radiological Protection at Nuclear Power Stations

2.3 SOER 01-01, Unplanned Radiation Exposures

2.4 SOER 85-03, Excessive Radiation Exposures

2.5 HPPOS -021

2.6 CR 01-16414

2.7 Updated Final Safety Analysis Report, Section 12.1, Ensuring That Occupational Radiation Exposures Are As Low As Is Reasonably Achievable.

2.8 STP Technical Specifications

2.9 Radiography Operating and Emergency Procedure, ROEP-4.0, Instructions for Posting and Restricting Radiographic Areas.

2.10 Radiography Operating and Emergency Procedure, ROEP-3.0, Physical Radiation Survey.

2.11 ANSI N18.1, Selection and Training of Nuclear Power Plant Personnel

2.12 0PGP03-ZR-0044, Contamination Control Program

2.13 0PGP03-ZR-0048, Personnel Dosimetry Program

2.14 0PGP03-ZR-0050, Radiation Protection Program

2.15 0PRP01-ZR-0005, Access Control Point Management

2.16 0PRP07-ZR-0010, Radiation Work Permits/Radiological Work ALARA Reviews

2.17 0PGP09-ZA-0001, Plant Access Authorization Program

3.0 Definitions

NOTE

An area is NOT considered accessible IF tools or other equipment are needed to gain access to an area. Examples of areas NOT considered accessible to individuals include: cubicles with shield plugs installed, tanks with the man-way cover installed or a temporary ladder is needed to access areas. Physically gaining access to an area while circumventing station personal safety, security or radiation protection requirements DOES NOT mean an area is accessible. Once an area is made accessible (e.g., a scaffold is built or ladder installed) THEN all required postings AND other applicable radiological controls must be established.

3.1 ACCESSIBLE AREA: An area that can reasonably be occupied by any portion of the whole body which is defined in 10CFR20.1003, by ordinary means such as walking or climbing without any additional equipment.

3.2 AIRBORNE RADIOACTIVITY AREA: Airborne radioactivity area means an area in which airborne licensed radioactive materials exist in concentrations greater than one derived air concentration (DAC) or an area where an individual, without respiratory protection, could have an intake of 12 DAC-hours in a week.

3.3 ALARMING DOSIMETER: An individual radiation monitoring device capable of measuring accumulated dose and/or dose rate with an alarm which can be preset to a specified dose and/or dose rate.

3.4 ANNUAL (ANNUALLY): Nominally 12 months not to exceed 15 months.

3.5 AUTOMATIC ACCESS CONTROL: A computerized process whereby entry and exit into the RCA is monitored and controlled. An example of automatic access control is RCA entry and exit using the Access Control System.

3.6 CONTAMINATED AREA (CA): An area having loose surface contamination equal to or greater than 1000 dpm/100 cm^2 (100 net counts per minute using a pancake frisker probe) beta-gamma and/or 20 dpm/100 cm^2 alpha.

3.7 HIGH CONTAMINATION AREA: An area having smearable contamination equal to or greater than 100,000 dpm/100 cm^2 (10,000 net counts per minute using a pancake frisker probe) beta-gamma or 1000 dpm/100 cm^2 alpha.

3.8 HIGH RADIATION AREA: An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 100 mrem in 1 hour at 30 cm (12") from the radiation source or from any surface that the radiation penetrates. (10CFR20.1003)

3.9 LOCKED HIGH RADIATION AREA: A High Radiation Area, in which radiation levels from radiation sources external to the body are in excess of 1000 mrem/hour at 30 cm (12") but less than 500 Rads in one hour at one meter from the radiation source or from any surface that the radiation penetrates. Such areas SHALL be controlled in accordance with Technical Specification 6.12.2.

3.10 MANUAL ACCESS: A non-computerized process where Radiation Protection Personnel utilize reports to verify personnel qualifications and logs to record entry and exit dose for RCA access.

3.11 RADIATION AREA: An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5 mrem in 1 hour at 30 cm (12") from the radiation source or from any surface that the radiation penetrates. (10CFR20.1003)

3.12 RADIATION WORK PERMIT (RWP): Document which describes the radiological conditions and radiation protection controls to be used when performing the activities for which the permit was written.

3.13 RADIOLOGICALLY CONTROLLED AREA (RCA): Area designated by Radiation Protection to control personnel access and material movement for Radiation Protection purposes.

3.14 READ: As used in this procedure and supporting procedures, "read" means either read in the conventional sense or to have the provisions of the document presented orally so the content may be understood.

3.15 RESTRICTED AREA: The area enclosed by the security fence surrounding both units. Other areas may be included in the restricted area if designated by the Radiation Protection Manager and with appropriate access controls for the area in place.

3.16 SELF-READING DOSIMETER (SRD) [ALSO DIRECT READING DOSIMETER (DRD)]: An easily readable radiation monitoring device for measuring accumulated dose, designed to be worn by an individual.

3.17 UNAUTHORIZED ACCESS: Entry into an area to which the Radiation Work Permit did not permit access.

3.18 VERY HIGH RADIATION AREA (VHRA): An area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rad in 1 hour at 1 meter (3') from the radiation source or from any surface that the radiation penetrates. (10CFR20.1003)

3.19 RCA VISITOR: An individual who has not met the requirements for working independently in the Radiologically Controlled Area (RCA). The security status of the individual is not a consideration when determining whether the individual is an RCA visitor. The minimum requirements for working independently in the RCA are:

- Successful completion of Radiation Worker Training or equivalent
- An individual monitoring device (TLD) assigned
- A current whole body count

NOTE

- IF all work activities occur outside the RCA, THEN the occupational dose is anticipated to be less than 100 mrem/yr and hence no radiation monitoring or additional training is required or provided.
- Working Visitors are normally limited to seven days access per quarter.

3.19.1 RCA WORKING VISITOR: An individual whose purpose for entry into the RCA is in conjunction with their occupation. Generally, these individuals have specific tasks to perform. Any radiation exposure received is occupational exposure.

Working Visitors SHALL receive additional informal training, be provided with radiation monitoring, and have information entered into the computer system so that requests pursuant to 10CFR19.13 may be honored.

3.19.2 OTHER VISITOR: An individual whose purpose for entry into the RCA is not in conjunction with their occupation. These individuals are members of the public and any radiation dose received is not occupational.

4.0 Responsibilities

4.1 Radiation Protection

4.1.1 Provide necessary radiological information and guidance for workers to maintain their radiation doses As Low As Reasonably Achievable (ALARA).

4.1.2 Monitor radiological aspects of work to ensure good work practices are followed and controls are adequate.

4.2 Job Supervisor/Crew Leader/Planner

4.2.1 Vendors requiring access to the RCA SHOULD receive Formal Radiation Worker Training, i.e., GET II. IF Formal Training cannot be achieved, THEN notify RP Management.

4.2.2 Ensure that an RWP is in place and that workers are cognizant of the RWP number, the appropriate Work Authorization Number and work location prior to sending workers to access the RCA.

4.2.3 Observes radiological work, as appropriate, and reinforces correct radiological protection work standards.

4.2.4 Ensures corrective actions for individual Radworker violations are timely and appropriate.

4.2.5 Set a positive example for radiological work practices.

4.2.6 Support the radiological protection program.

4.2.7 Hold self accountable for radiological performance within their department.

4.2.8 Maintain an uncompromising commitment to radiological safety.

4.2.9 Prepares workers for radiological work e.g. reviews pertinent radiological information and ALARA principles relevant to the work/job.

4.2.10 Reinforce radiation worker expectations and standards.

4.2.11 Utilizing the ALARA Principle, distributes dose evenly among qualified workers.

4.2.12 Maintain an up-to-date status of work.

4.2.13 Use coaching as a teaching tool.

4.2.14 MINIMIZE size of work crew.

4.3 Radiation Workers

4.3.1 Know the following:

- Job location
- RWP and WAN (Use correct 6 digit Work Authorization Number (WAN) for each job unless approved by radiation protection to use generic WAN number)
- RWP requirements including the Special Instructions
- Electronic Personal Dosimeter (EPD) dose and dose rate alarm set points for each job
- Radiological postings in the work area
- Range of dose rates and contamination levels in the work area
- Areas to avoid
- Low Dose Waiting areas
- EPD Placement (EPD in a position where it can be self monitored, e.g. outside the protective clothing).
- EPD monitoring requirements (Approximately every 15 minutes while in the RCA, more frequently if necessary, and to exit the RCA prior to receiving a dose alarm).
- Actions upon an EPD alarm, (Place work in a safe condition, exit the work area, and report the alarm to RP unless the RWP contains instructions allowing for continuation of work after an alarm condition is received or RP gave prior approval for the alarm condition.)

4.3.2 COMMUNICATE the purpose and intention of entering the RCA to RP personnel at RP Access Control or other designated access control points.

4.3.3 Complete the requisite employee radiation protection training for the area to be accessed.

4.3.4 Adhere to good radiological work practices and the guidelines established by Radiation Protection.

4.3.5 Use the appropriate access control system for entering the RCA.

4.3.6 Follow stop work orders and instructions given by Radiation Protection personnel.

4.3.7 Notify Radiation Protection personnel immediately of any abnormalities or changes which could affect radiological conditions.

4.3.8 Review radiological surveys and RWPs or obtain current radiological conditions from Radiation Protection prior to performing work in RCA's.

4.3.9 Monitor for contamination following transport/handling of radioactive materials outside of the Radiologically Controlled Area as soon as practicable or as directed by Radiation Protection.

4.3.10 IDENTIFY needs for vacuum cleaners or HEPA ventilation.

4.3.11 MINIMIZE Radwaste generated by limiting items and quantities needed in the RCA such as:

- Only the parts and tools actually needed for the job are brought into the RCA
- Parts containers or packing materials NOT brought into the RCA, if possible
- Utilize tools and equipment stored in the RCA whenever possible

4.3.12 PERFORM as much prep work as possible outside of the RCA.

4.4 Radiological Escorts

4.4.1 Maintain exposures ALARA at all times and SHALL not allow the visitor(s) exposure to exceed the established exposure limit.

4.4.2 Ensure the radiological safety of the visitor by ensuring the visitor complies with applicable procedures and does not enter any areas not authorized by the RWP.

NOTE

IF an individual is required to be created in the Peoplesoft system (i.e., receive a TLD), THEN verification of true identity is required. Official photo identification (e.g., driver's license; passport; government identification; state, province, or country issued certificate of birth; etc.) with physical characteristics of the applicant is acceptable documentation. (0PGP09-ZA-0001, Plant Access Authorization Program)

A worker is no longer considered to be a visitor as far as entering the RCA is concerned WHEN they have completed the GET II challenge exam, collected a WBC, TLD and been entered into PADS. When these requirements are complete, the individual will exist in the computer system and can use the automated login system on the appropriate RWP.

Individuals accessing the RCA as a visitor SHOULD NOT be permitted to enter Contaminated Areas, High Radiation Areas, or Airborne Radioactivity Areas without RPM approval.

4.4.3 Obtain the Working Visitor RCA Access Form, Form 1, for visitors occupationally exposed or Other Visitor RCA Tour Record, Form 2, and ensure applicable sections are completed.

4.4.4 IF visitor has accessed the RCA to perform work in the other Unit, THEN the escort is responsible for obtaining the completed Form 1 of this procedure from the other Unit.

4.4.5 Notify Radiation Protection of transfer of visitor custody.

4.4.6 Transfer custody of visitor only to another radiation worker qualified individual.

4.4.7 RCA Visitors SHALL:

- Follow instructions of their escort and Radiation Protection personnel.
- Enter only areas for which they are authorized.
- Be prepared to furnish verification of true identity

5.0 Notes and Precautions

5.1 Personnel with open wounds SHOULD obtain Radiation Protection approval before entering a radiologically controlled area.

5.1.1 Open wounds SHOULD be covered before entering a contaminated area. (INPO 05-008)

5.2 The presence of a white crystal substance on plant components or the floor MAY be an indication of a boric acid leak from the primary system. Notify Radiation Protection and obtain Plant Engineering approval prior to decontamination/cleanup in accordance with 0PGP03-ZE-0033, RCS Pressure Boundary Inspection for Boric Acid Leaks.

5.3 Obtain Radiation Protection approval prior to using equipment in the RCA which could spread contamination, e.g., high pressure washers, fans, brooms, blowers, high speed grinders, welding/burning equipment, etc.

6.0 Procedure

6.1 Radiation Work Permits (RWP)

> NOTE
>
> Requirements stated in Step 6.1.1 MAY be placed into appropriate steps of individual work packages. The RWP references the work package for this information when this option is chosen.

6.1.1 Radiation work permits provide information to the worker on radiological conditions and controls, which are to be used for applicable work and contain the following information:

- Radiological conditions including general area and work area radiation dose rates, contamination levels, and airborne concentrations as applicable. These levels MAY be in a range format e.g., 100-200 or <500 etc.
- Protective clothing requirements.
- Special instructions describing specific radiological controls and information for the work.
- Dosimetry requirements.

> NOTE
>
> During emergency conditions (e.g., fire, personal injury) an RP Technician escort MAY be used in lieu of an RWP.

6.1.2 An RWP is required for the following:

- Entry/Work in the RCA.
- While handling/escorting radioactive materials outside the main RCAs with radiation levels of ≥ 5 mrem/hr contact on the package.

6.1.3 Work packages, which require a RWP, SHOULD be scheduled through the work control process.

6.1.4 Form 3 RWP Request, OR the information outlined, SHOULD be provided to Radiation Protection via the work control process to assist in RWP development.

6.1.5 For routine surveillances, inspections, or supervisory monitoring in which radiological conditions pose minimal risk, verbal permission may be granted by Radiation Protection to enter under an existing generic WAN number.

6.1.6 When conditions OR work scope change, Radiation Protection SHALL be notified so the RWP conditions can be re-evaluated AND controls revised if appropriate.

6.2 RWP Sign In

6.2.1 For initial entry under a RWP that does NOT require a Pre-Job Meeting OR Mock-Up Training, the individual SHALL:

6.2.1.1 READ the RWP.

6.2.1.2 SIGN the RWP Sign In Sheet, Form 5 of 0PRP07-ZR-0010, Radiation Work Permits/Radiological Work ALARA Reviews OR an appropriate electronic documentation process.

6.2.2 For initial entry under a RWP requiring a Pre-Job Meeting, the individual SHALL:

6.2.2.1 READ the RWP.

6.2.2.2 ATTEND any required pre-job meeting.

6.2.2.3 SIGN the RWP Pre-job Meeting Sheet, Form 1 of 0PRP07-ZR-0010 OR an appropriate electronic documentation process.

6.2.3 For initial entry under a RWP requiring Mock-Up Training, the individual SHALL:

6.2.3.1 READ the RWP.

6.2.3.2 ATTEND any required pre-job meeting and mockup training AND sign the RWP Mock-Up Training Attendance Sheet, Form 4, of 0PRP07-ZR-0010.

6.3 Radiologically Controlled Area Access Requirements

NOTE

Requirements below are independent of security requirements.

6.3.1 Unescorted RCA Access Requirements:

- Complete Radiation Worker Training (RWT) or equivalent annually
- Wear an individual monitoring device and any other dosimetry as specified on the RWP
- Have a current whole body count, unless authorized by the RPM
- Be assigned and logged on an active RWP, using the appropriate Work Authorization Number and attend any required pre-job meeting and mockup training, as applicable
- Have sufficient dose margin to perform specified work
- Complete color coded RCA ACCESS card for applicable area entered

ENTRY AREA:

a. Radiation Area – WHITE

b. High Radiation Area – YELLOW

c. Locked High Radiation Area - RED

NOTE

- IF RCA entry is required, THEN Working Visitors SHALL receive additional informal training, be provided with radiation monitoring, and have information entered into the computer system so that requests under 10CFR19.13 may be honored.
- RCA visitors are NOT required to obtain an RCA ACCESS card, they are covered by their escorts RCA ACCESS card.

6.3.2 Visitors Accessing the RCA

- SHALL complete Form 1 (for Working Visitors) or Form 2 (for Other Visitors), with appropriate approvals.
- Individuals accessing the RCA as a visitor SHOULD be limited to 75 mrem TEDE per year at STPNOC unless additional dose is authorized by the RPM.
- Furnish verification of true identity if requested.
- SHALL be escorted by an individual with unescorted access to the RCA.
- SHALL return any issued TLDs with completed Form 1 to Dosimetry.
- SHOULD obtain a whole body count prior to and after contaminated area access or entry into an Airborne Radioactivity Area (ARA) except for noble gas.
- SHALL be informally trained on the risks associated with exposure to ionizing radiation in accordance with Radiation Protection procedures (for Working Visitors).
- SHALL obtain RPM approval prior to entering the RCA if less than 18 years of age.
- Be provided with Occupational Exposure History upon request IAW 10CFR19.13.

6.3.3 Working Visitors Requiring High Radiation Area Access, in addition to RCA Access;

- SHOULD receive Formal Radiation Worker Training (Informal Training MAY be substituted at the discretion of the Radiation Protection Manager)
- SHALL obtain and wear a TLD in accordance with Reference 2.13 if high radiation area access is required. (10CFR20.1502)
- WHEN requested, be provided with Occupational Exposure History IAW 10CFR19.13.
- WHEN HRA entry is required, contact RPS to attend briefing and verify EPD set points and dose margins are set correctly.

6.4 RCA Entry

6.4.1 For initial entry into the RCA, the individual SHALL;

- Read the RWP,
- Attend any required pre-job meeting and mockup training,
- Sign the RWP Log In / Pre-job Meeting Sheet or applicable electronic sign in process.

NOTE

Personnel responding to an emergency SHOULD obtain a Electronic Personnel Dosimeter (EPD) designated for emergency use prior to entry into the RCA. These personnel MAY be manually entered into the database after the emergency has been resolved.

6.4.2 Individual SHALL then sign into the RCA using the applicable automatic access control system in accordance with Addendum 1.

6.4.3 IF automatic access is unavailable THEN manual access SHALL be performed in accordance with Radiation Protection procedure 0PRP01-ZR-0005, Access Control Point Management.

6.5 General Guidelines for Working in the RCA

6.5.1 Refer to Addendum 2, Radiography Activities, when radiography is to be performed.

6.5.2 Refer to Addendum 3, Revoking/Reinstating RCA Access for Noncompliance with Radiation Protection Requirements, when revoking or reinstating RCA access.

6.5.3 Eating, chewing gum, or use of tobacco products is prohibited while in the RCA. Ingestion of medically required substances is allowed in the RCA.

6.5.4 Drinking or consumption of medically required food products are permitted within the RCA with the following controls:

6.5.4.1 Drinking liquids shall be provided by the work group and stored in one of the following manners:

- Stored in small containers (e.g., sports bottles) that can be sealed to prevent the introduction of radioactive contamination.
- Provided in dispenser approved by RPM.

6.5.4.2 For areas outside of posted contamination areas:

- Individuals shall frisk their hands and face prior to handling/drinking.
- After drinking, liquid containers shall be sealed.

6.5.4.3 For contaminated areas with minimal risk (low contamination levels),

- The associated work group SHALL request permission from RP supervision.
- Personnel shall continue to practice good radiological work practices in their work area. Specifically, if it is suspected that contamination has inadvertently contacted the face while inside of the work area, drinking is prohibited.
- Prior to drinking, personnel shall don clean surgeon gloves to handle the container.
- After drinking, liquid containers shall be sealed.

6.5.5 RWP instructions, RP instructions, radiological postings and barriers, and other warning devices SHALL be adhered to at all times.

6.5.6 Access to overhead areas in the RCA is prohibited unless approved by Radiation Protection.

6.5.7 Prior to passing through building exits to outdoor areas within the RCA, all personnel SHALL monitor for contamination.

6.5.8 Generation of waste SHOULD be minimized e.g., packing materials SHOULD be discarded prior to entry into the RCA.

6.5.9 Used protective clothing and waste SHALL be placed in designated receptacles.

6.5.10 WEAR the TLD and EPD located between the breast pocket and the belt line in close proximity (about a hands breadth) of each other, or as stated by the RWP.

6.5.10.1 IF protective clothing is worn, wear the EPD as follows:

a. EPD in Protective Clothing pocket (if provided) in whirl pack with TLD under protective clothing, OR as specified on the RWP.

b. EPD in a location where it may be self monitored (for example when the protective clothing pocket is not accessible or not provided, the EPD is worn on the outside of the protective clothing).

6.5.10.2 RP must authorize relocating the TLD/EPD to locations other than the front of the torso (keeping them together at all times).

6.5.10.3 IF an EPD malfunctions, PERFORM the following:

- PLACE work in a safe condition.
- EXIT the area.
- NOTIFY RP.

6.5.10.4 IF access across an RP boundary other than at the established entrance point is required, THEN ENSURE to receive direct and immediate authorization from an RP Technician.

6.5.11 IMMEDIATELY exit the work area and inform Radiation Protection **OR** IF in direct communication with Radiation Protection, THEN immediately notify Radiation Protection, when any of the following occur:

- Any indication of an unexpected radiation exposure, e.g., if alarming dosimeter alarms,
- Any dosimetry device is lost or damaged
- An area radiation or air monitor is alarming

6.5.12 NOTIFY RP for the following:

- Known or potential radiological spills
- Job scope changes
- Receipt of any dose or dose rate alarms (dose rate alarms may be expected, IF discussed in the brief)
- Prior to working greater than six feet off the floor/platform
- Need of HEPA filtered vacuum or ventilation unit (refer to Addendum 4, RCA Vacuum Use Guidelines, when a vacuum cleaner is needed to perform work)
- Failure of a HEPA filtered vacuum or ventilation unit
- As specified on the RWP
- Suspected contamination of self e.g. torn PCs, splashing of potentially contaminated water on the body, inadvertent contact with bare skin against items inside the Contaminated Area

6.5.13 ENSURE you understand the protective clothing requirements of the RWP.

6.5.14 IF Protective Clothing (PC) is required, THEN DON PCs per Addendum 5, Guidance for Donning and Removing Protective Clothing.

6.5.15 USE ALARA principles to reduce dose, for example:

- USE low dose waiting areas
- AVOID Do NOT Loiter areas
- LIMIT crew sizes

6.5.16 WHEN job delays occur, EXIT the RCA OR use low dose waiting areas (this is particularly critical when working in High Radiation Areas).

NOTE

ALL leakage within an RCA is to be considered contaminated.

6.5.17 IF system leaks are found in the RCA, PERFORM the following:

- REPORT the leak to the Control Room
- REPORT the leak to RP

6.5.18 ENSURE loose items do NOT cross a Contaminated Area (CA) boundary.

6.5.19 IF the work activity requires breaching (opening) a contaminated system or component, contact RP prior to the breach and PROVIDE them with the system or component you wish to open.

6.5.20 WHEN working on contaminated systems, ENSURE leak collection devices are used as appropriate to prevent the spread of contamination.

6.5.21 Maintain dose ALARA while working in the RCA by routinely monitoring the EPD approximately every 15 minutes.

6.5.22 IF working in High Radiation/Locked High Radiation Areas, MONITOR dose at a frequency appropriate to ensure a dose alarm is NOT received.

6.5.23 EXIT the RCA Prior to receiving a dose alarm.

6.5.24 IF an area or airborne radiation monitor alarms, PERFORM the following;

6.5.24.1 PUT your work in a safe condition.

6.5.24.2 WARN other personnel in the area.

6.5.24.3 LEAVE the area.

6.5.24.4 REPORT all radiation monitor alarms to RP.

6.5.24.5 REMAIN out of the area until RP has performed surveys, assessed the monitor alarm, and authorized access.

6.5.25 All personnel SHOULD perform a hand AND foot frisk at the nearest frisker OR use the nearest personnel contamination monitor upon exiting a contaminated area. (INPO 05-008)

6.5.26 All personnel SHOULD where practical, perform as a minimum a hand and foot frisk OR other monitoring as directed by RP prior to exiting buildings to an out-of-doors RCA.

6.6 Access Control for High Radiation Areas (HRA)

6.6.1 Personnel entering high radiation areas SHALL be:

6.6.1.1 Assigned to an RWP that permits entry to, HRA, LHRA or VHRA.

6.6.1.2 Assigned an individual monitoring device (TLD). (10CFR20.1502)

6.6.1.3 Issued an Electronic Personal Dosimeter (EPD)

6.6.1.4 Made knowledgeable of the radiological conditions in the area(s) to be accessed

6.6.1.5 Aware of additional Radiation Protection controls established by the RWP or RP instructions and have applicable RCA Entry card

6.7 Access Control for Locked High Radiation Areas (LHRA)

6.7.1 LHRAs SHALL be locked or continuously guarded <u>OR</u> enclosed to prevent inadvertent access.

6.7.2 Keys to doors <u>OR</u> access points SHALL be controlled in accordance with Technical Specification 6.12.2.

6.7.3 The HRA entry requirements of Section 6.6 SHALL be met for personnel entering LHRAs along with continuous RP coverage.

6.8 Access Control for Very High Radiation Areas (VHRA)

6.8.1 VHRAs SHALL have all controls prescribed by Sections 6.6 and 6.7 with the following additional constraints:

<u>NOTE</u>

Entries by Radiation Protection personnel into a posted VHRA <u>to perform surveys to remove VHRA postings</u> are exempt from 6.8.3 and 6.8.4 provided the source which created the VHRA has been removed, e.g., fuel transfer tube after refueling and Room 001 after thimble insertion is complete. In these cases only RPM approval is required for entry.

6.8.2 RWPs allowing entry into VHRAs SHALL specify that individuals entering the VHRA are Radiation Protection personnel <u>OR</u> provided with continuous RP coverage providing positive exposure control.

6.8.3 A pre-job ALARA evaluation approved by the ALARA Review Committee SHALL be performed prior to personnel entry into a very high radiation area except for declared emergencies and life saving actions.

6.8.4 The RPM <u>AND</u> the Plant Manager SHALL authorize entries into VHRAs.

6.9 General Radworker Practices

NOTE

Characteristically hazardous materials like oil or flammable solvents, WHEN contaminated may be mixed waste and make disposal difficult and expensive.

6.9.1 MAINTAIN work areas in an organized manner.

6.9.2 IF removing parts and equipment from contaminated systems, appropriately BAG them as they are removed from the system.

6.9.3 When sealing a bag of parts, equipment, or trash, NOTIFY RP for survey of materials, containers, and packages so they may be labeled with pertinent radiological information.

6.9.4 WHEN a job is complete, PERFORM the following as appropriate:

- Parts and equipment should be bagged separately from trash
- CLEAR the work area(s) of debris, tools, parts, and other miscellaneous material
- IF removing items from the Contaminated Area, CONTACT HP for assistance OR use the Clean Bag Transfer technique as follows;
  - ❖ The individual on the outside shall either have gloves on or fold the bag down over their hands to prevent individual from becoming contaminated
  - ❖ Ensure individual on the inside uses gloved hand to pick up tools (cotton liners are unacceptable)
  - ❖ If bag is to be set down in a clean area for any reason, then it should be taped up to prevent the spread of contamination
  - ❖ Ensure the bag remains under their control at all times until survey by RP.

6.9.5 IF leaving bags of material at the work area CONTACT RP to perform surveys.

6.9.6 Do NOT mix wet and dry waste.

6.9.7 MINIMIZE the amount of material brought into the RCA.

6.9.7.1 Prior to RCA entry:

- REMOVE all packaging material except that authorized by RP
- IF using liquids, take only the amount needed for the job
- BRING only those tools and equipment that are NOT already available in the RCA

6.9.8 IF using tools inside of a Contaminated Area, THEN PERFORM the following:

6.9.8.1 USE care to avoid contaminating non-RCA tools.

6.9.8.2 It is a good practice to wipe down items prior to removal from contaminated areas.

6.9.8.3 Cover openings of equipment with the potential for internal contamination prior to removal from a contaminated area.

6.9.9 WHEN removing tools or equipment across a High Contaminated Area boundary, request RP assistance at the Step Off Pad (SOP).

6.9.10 IF an item needs to be returned or controlled, it's a good practice to ATTACH a completed Work In-Progress Tag.

6.9.11 DELIVER the item to the Tool Drop Off location, or as directed by RP.

6.9.11.1 Return contaminated, AND potentially contaminated, tools and equipment checked out of the hot tool room to the hot tool room.

NOTE

Radiation Protection and Tool Room personnel SHOULD coordinate equipment decontamination so equipment is processed in a timely manner and does not accumulate.

6.9.12 For decontamination assistance, the requester may provide an inventory of items to be decontaminated. The Equipment Decontamination Request, (Form 4) MAY be used for this purpose.

6.9.13 When Special/Fragile Equipment is in need of decontamination;

NOTE

Highly sensitive or valuable equipment (e.g., cameras) SHOULD be stored by the equipment owner in a secured area until decontaminated.

An Equipment Decontamination Request is NOT necessary for equipment which is immediately decontaminated in the presence of the equipment owner.

6.9.13.1 Any individual requiring decontamination of special equipment SHOULD bring the equipment to the Decontamination Area.

6.9.13.2 For highly sensitive and delicate equipment the owner SHOULD be present at the time of decontamination.

6.9.13.3 To ensure proper care, the individual may complete an Equipment Decontamination Request, Form 4, providing any special instructions for decontamination.

6.9.13.4 Upon completion of decontamination and monitoring, Radiation Protection may inform the requester, e.g., by contacting the telephone number noted on the request (Form 4).

6.9.13.5 Individuals SHOULD pick up equipment as soon as possible to prevent accumulation of equipment at the Decontamination Area.

6.10 RCA Exit

6.10.1 All materials exiting an RCA SHALL be evaluated for radioactivity. Materials SHALL be either free released or conditionally released and subjected to controls specified by Radiation Protection personnel.

6.10.1.1 All items being considered for free release from the RCA that fit in a tool monitor SHALL be monitored using a tool monitor.

6.10.1.2 Workers may use automated contamination monitoring equipment e.g., a tool monitor, without assistance from RP;

a. For release of items that have not been in a contaminated area (except personal items including lanyards, items attached to lanyards, items attached to belts, hard hats, safety glasses, and items inside pockets)

OR

b. Does not have inaccessible internal surfaces that may be contaminated

NOTE

Some exceptions to Step 6.10.1.3 although not all inclusive, include jewelry worn on the person (such as wrist watches, earrings, rings on fingers, medical devices), contact lenses, retainers worn in the mouth, prosthetics, hair clips, ties, head bands, doo rags all of which were worn on the person while in the RCA.

6.10.1.3 All personal items SHALL be monitored in the tool monitor including lanyards, items attached to lanyards, items attached to belts, hard hats, safety glasses, and items inside pockets.

6.10.1.4 Security officer's equipment carried on routine patrol inside the RCA that DO NOT enter contaminated areas are normally exempt from the requirements of Step 6.10.1.3 but are subject to the same monitoring requirements as personnel, i.e., use of a PCM/PM.

6.10.1.5 Fire Brigade members reporting to the staging area for a fire may be exempt from the requirements of Step 6.10.1.3 but are subject to the same monitoring requirements as personnel, i.e., use of a PCM/PM and they return to the RCA to monitor after casualty is secured.

6.10.1.6 IF while using automated contamination monitoring equipment e.g., a tool monitor, and an alarm is received, THEN immediately contact RP for assistance. DO NOT remove the item from the area. (CR 01-16414)

6.10.1.7 DO NOT remove items from the RCA that are painted with magenta paint OR that have Radioactive Material Labels affixed to them. Contact RP for assistance. (CR 01-16414)

6.10.1.8 IF the item being surveyed for release is a plant component from a contaminated system, OR, IF it is known or suspected that an item was used in a contaminated area, THEN immediately contact RP for assistance.

6.10.2 Perform contamination monitoring using personnel contamination monitor (PCM & PM7) or monitor as directed by Radiation Protection.

NOTE

Personnel MAY stay logged into the RCA IF certain conditions apply, i.e., RP Technicians assisting workers exiting the RCA Egress area, Operators performing watch in the MEAB, personnel performing Fire Watch rounds, and others as determined by the RPM.

6.10.3 Sign out of the RCA using the applicable automatic access control system in accordance with Addendum 1.

6.10.4 IF automatic access is unavailable THEN manual exit SHALL be performed in accordance with 0PRP01-ZR-0005, Access Control Point Management.

7.0 Support Documents

7.1 Form 1, Working Visitor RCA Access Form

7.2 Form 2, Other Visitor RCA Tour Record

7.3 Form 3, RWP Request

7.4 Form 4, Equipment Decontamination Request

7.5 Addendum 1, RCA Entry/Exit

7.6 Addendum 2, Radiography Activities

7.7 Addendum 3, Revoking/Reinstating RCA Access for Noncompliance with Radiation Protection Requirements

7.8 Addendum 4, RCA Vacuum Use Guidelines

7.9 Addendum 5, Guidelines for Donning and Removing Protective Clothing

Form 1 | Working Visitor RCA Access Form (Sample) | Page 1 of 1

VISITOR INFORMATION

Name:______________________________ SSN/Passport:______________________ Greater than 18 years of age? Yes/No ____
Street:______________________________ City:______________________________ State/Zip:__________________________ Company _________________

Is a Contaminated Area (CA) entry required? ☐ NO ☐ YES
Is an Airborne Radioactivity Area (ARA) entry required? ☐ NO ☐ YES
Is a High Radiation Area (HRA) entry required? ☐ NO ☐ YES IF yes, THEN contact RPS for approval for EACH entry.

If any of the above is yes, then a TLD must be issued to the visitor and a Whole Body Count performed prior to entering the RCA

Approved By:________________________________ Date: ____________
RPM (N/A if answer to all questions is NO)

Access Authorized by:________________________________ Date _______ Cost Center _______
STPNOC Department Manager

***IF entry is into the RCB at power, ENSURE NEUTRON EPD is issued**

Escort Name	Escort Oracle #	Escort RWP Number	Visitor EPD Serial Number	Entry Date/Time	Exit Date/Time	Visitor Dose For Entry*	Visitor Remaining Margin
			0000				
			0000				
			0000				
			0000				

Visitor Dose Information (Not Required if a TLD is issued)

To the best of my knowledge:

I certify that my current **annual** dose is _____________mrem **Lifetime** dose is:_____________mrem **Exposure Limit: 75 mrem**

Recent medical radiopharmaceutical procedures (such as cardiac stress testing) may interfere with radiological monitoring at STP

I _____**have** or _____**have not** (initial one) had medical radiopharmaceutical procedure in the past 45 days.

Visitor Informal Training

Prior to informal training, if the visitor is entering a CA, ARA, or HRA, verify visitor is wearing a TLD

I have attended informal training concerning risks involved in exposure to ionizing radiation.
I have been given an opportunity to read Regulatory Guide 8.13, (if applicable) and Regulatory Guide 8.29.
I have had an opportunity to ask questions and have had my questions satisfactorily answered.
I have read and understand the applicable Radiation Work Permits.

____
Visitor Signature and Date

Reminders: Are all approvals signed? Are all entries legible? Is all dose information complete? Does the visitor have a TLD?
Have EPD set points and dose margin been verified by RPS IF HRA entry?

____
RP Supervisor /Designee/ Date (Print and Sign)

FORWARD COMPLETED FORM TO DOSIMETRY
This form, when completed, SHALL be retained in accordance with the Document Type List (DTL).

Name:______________________ Greater than 18 years of age? Yes/No ____ SSN: ______________

Location Visited: ______________ STPNOC Manager Approval: __________ Exposure Limit: __75__ mrem

Dates of Previous Visits This Year ______________

Visitors under 18 years of age requires RPM approval
Entry into ARA (NG) requires RPM approval

* IF ENTRY IS INTO THE **RCB AT POWER**, THEN MULTIPLY EPD READING BY 4 OR ENSURE NEUTRON EPD IS WORN.

Escort Name	Escort Oracle #	Escort RWP Number	Visitor EPD Serial Number	Entry Date/Time	Exit Date/Time	Dose For Entry *	Visitor Remaining Margin
1.			0000				
2.			0000				

Escort Responsibilities

1. Return completed paper work to Radiation Protection.
2. Ensure the radiological safety of visitors being escorted.
3. Ensure that escorted visitors have read and understood the informal briefing provided on this sheet.
4. Ensure that all questions regarding radiological health and safety are satisfactorily answered.
5. Contact Radiation Protection for assistance while in the radiologically controlled area, if necessary.
6. Escort visitor out of the radiologically controlled area SHOULD an emergency occur.
7. Contact Radiation Protection prior to transfer of escort responsibilities.
8. DO NOT allow visitor to enter Contaminated Areas, High Radiation Areas, or Airborne Radioactivity Areas.

1. ______________ Escort Signature ______________ Date

2______________ Escort Signature ______________ Date

Information Regarding Radiation Exposures

The average annual exposure for persons in the United States from background radiation is approximately 360 millirem. During your visit to the South Texas Project, you will be limited to less than 75 millirem and your expected radiation exposure is less than a few millirem. Therefore, the radiation exposure you will receive at STP is a small fraction of your annual background radiation exposure. While not all scientists agree on the risk of low levels of radiation exposure, all agree that radiation exposures of a few millirems carry very small, if any, risk. Additional information on radiation risk can be found in Nuclear Regulatory Commission publications Regulatory Guide 8.13 and 8.29. Copies of these documents are available from Radiation Protection.

While in the radiologically controlled area of STP, you are expected to listen closely and follow all directions provided by your escort. Escorts have been trained on how to minimize their exposure to radiation. They will ensure that your exposure to radiation is kept as low as reasonably achievable (ALARA).

Should you have any questions regarding your tour in the radiologically controlled area, please ask your escort or any person in the Radiation Protection group.

I _____**have** or _____**have not** (initial one) had medical radiopharmaceutical procedure in the past 45 days.

I have been briefed on the hazards of radiation and have had the opportunity to ask questions.

______________ Visitor Signature Or Guardian if under 18 years of age ______________ Date

This record, when completed, SHALL be retained in accordance with the Document Type List (DTL).

This form should be provided to Radiation Protection when requesting an RWP, IF electronic system is not available.

Scheduled Start Date/Time	Anticipated completion Date/Time		Priority Class
Work Activity Number:		Work Request Number (if applicable):	
Unit: Building: Elevation:		Room Number(s):	
TPNS/System Code(s) (e.g. RC Reactor Coolant):			
Total person-hours (including QA, Firewatch, etc) for the portion of the task to be performed in the RCA		Supervisor/Set-up Time	Wrench Time
Supervisor: Extension:	Forman: Extension:	Craft(s)	
Description of work to be performed. (Reference any applicable work or surveillance procedures.)			
Any additional work instructions that may be needed.			

Submitted by:____date_________

This form, WHEN completed, SHALL be retained with the RWP to which it applies.

Form 4	Equipment Decontamination Request (Sample)	Page 1 of 1

Name: ______________________ Ext.: ______________________

Supervisor: ______________________ Ext.: ______________________

Department/Crew: ______________________ Date/Time: ______________________

Equipment: Tool Room ˘ Vendor ˘ Outage

1. ______________________ 9. ______________________
2. ______________________ 10. ______________________
3. ______________________ 11. ______________________
4. ______________________ 12. ______________________
5. ______________________ 13. ______________________
6. ______________________ 14. ______________________
7. ______________________ 15. ______________________
8. ______________________ 16. ______________________

Allowable Decon Techniques

˘ Ultrasonic Bath
˘ Turbulator Bath
˘ Hand Decon (Non-abrasive)
˘ Hand Decon (Abrasive)
˘ Abrasive Blasting

Allowable Decon Solutions

˘ Demineralized Water (Hot)
˘ Demineralized Water (Cold)
˘ Approved Detergents

Special Instructions: ______________________

Decon Results: ______________________ Date/Time: ______________________

Notified: ______________________ Date/Time: ______________________

Received by: ______________________ Date/Time: ______________________

Form retention is at the discretion of Radiation Protection Supervision.

1. **RCA Entry Using Electronic Personal Dosimeter (EPD)**

   1.1 Obtain an Electronic Personal Dosimeter (EPD) from rack.

   1.2 Insert EPD into the READER.

   1.3 Follow prompts on the computer screen.

   1.4 The computer will display information such as the ALARM SET POINT and zero the EPD.

   1.5 Wait until the computer approves access, remove dosimeter, verify EPD is on, and proceed to enter the RCA.

   1.6 Contact Radiation Protection if computer denies access.

2. **RCA Access Card expectations**

   2.1 Required for ALL entries into the RCA.

   2.2 Completed by individual entering the RCA based on RWP and RP briefing.

   2.3 Use the card as a reference when unexpected conditions are encountered or unsure of RWP requirements.

3. **RCA Exit Using Electronic Personal Dosimeter (EPD)**

   3.1 Insert Electronic Personal Dosimeter (EPD) into reader.

   3.2 Follow prompts on the computer screen.

   3.3 Computer will calculate exposure received and provide dose information.

   3.4 Wait until the computer approves exit, then remove dosimeter from reader.

   3.5 Return EPD to storage rack.

   3.6 Contact Radiation Protection if any problems are encountered.

Radiography Activities

NOTE

This addendum DOES NOT apply to activities in the permanent radiography vault, building 16.

1. Notify Radiation Protection of the intention to conduct radiography at least 24 hours prior to radiography in the Owner Controlled Area.

2. Notify the Operations Shift Supervisor and Radiation Protection before any radiography is performed inside the Owner Controlled Area.

3. Notify Radiation Protection AND the Security Force Supervisor prior to transporting any radiography sources into the Protected Area.

4. Conduct all radiography inside the Owner Controlled Area in accordance with radiation protection radiography guidance.

5. RWPs are required when performing radiography inside the RCA only. However, all radiography operations require RP support/monitoring.

6. Report to the affected unit Radiation Protection office to sign on the appropriate Radiation Work Permit prior to conducting radiography inside the RCA.

7. Provide the following types of information when requested by Radiation Protection:
   - Schedule of work to be performed.
   - Types of radiation producing equipment and source strength to be used.
   - Expected area radiation levels and duration of exposures.
   - Radiation area access control methodology.
   - Source storage location and security precautions.
   - Radiographer training and qualification records.
   - Any anticipated difficulties or abnormalities which may justify Radiation Protection support or assistance.

CAUTION

IF the radiography source is electronic (e.g., x-ray machine, etc.), THEN use only survey instruments which operate in current mode (e.g., Eberline RO series ion chambers) and use pencil dosimeters (ion chambers) in lieu of or in addition to direct reading dosimeters for personnel monitoring.

8. Notify the Radiation Protection Manager (RPM) and facility management if any of the following conditions occur:
   - Suspected or potential overexposure to monitored or unmonitored personnel.
   - Failure of workers in the area to follow instructions on radiological postings, barriers, warning signs or radiography boundaries
   - Damaged equipment, which results, or may result, in a radiation or contamination hazard
   - Misplaced or lost source material
9. Radiation Protection Manager approval is required prior to correcting any condition due to source becoming stuck.
10. Report any estimated doses to Radiation Protection (for work performed outside the restricted area) for entry into individual exposure files.
11. DO NOT forward ROEP-3.0-A to the Dosimetry Supervisor IF work was performed under a RWP. Estimated doses were assigned under the RWP Program.

Revoking RCA Access Privileges

> NOTE
>
> In some cases, judgment may be required in making the determination to invoke this section of the procedure. Any Radiological Protection personnel can exercise this process. Minor infractions may best be handled through worker coaching.

1. IF any of the following occur, restrict RCA access authorization:

   - Unauthorized altering of radiological postings and boundaries.
   - Unauthorized alteration / movement of radiological shielding.
   - Violation of High Radiation Area or Locked High Radiation Area postings and boundaries.
   - Receiving a valid electronic dosimeter dose alarm.
   - Receiving an electronic dosimeter rate or dose alarm and NOT promptly exiting the work area and notifying RP. (Unless this was accounted for in briefing or RWP.)
   - Receiving a dose rate alarm and NOT promptly notifying RP (this is intended to apply to situations where the worker heard, or should have heard the alarm, taking into consideration alarm duration and work location).
   - Willful or significant violation of responsibilities involving personnel issued dosimetry e.g. entering radiation work area without a primary dosimeter, altering or actions intent on destroying the primary dosimeter or electronic dosimeter.
   - Failure to report the following to RP, as soon, as possible:
     - Spills of radioactive materials or other changes in radiological conditions
     - Alarm of a continuous air monitor or an area radiation monitor
     - Discovery that you are contaminated
     - Discovery that radiological boundaries are dropped or unrecognizable
   - Any member of Radiation Protection Supervision requesting an individual's RCA access be revoked

2. IF Access is revoked, PERFORM the following:

- INITIATE a CR with the following minimum information:
  - Work group(s) involved
  - Employee ID number of worker(s) involved
  - Radiological safety event for revoking access
  - Appropriate details
  - GENERATE an action to notify the Radiation Worker's Supervision
- IF the event involved violation of High Radiation Area or Locked High Radiation Area postings and boundaries, GENERATE an action for the Radiation Worker's Department Head to share the radiological compliance event with their department to prevent future events in their department.
- NOTIFY the following personnel of the infraction:
  - Worker's direct supervisor
  - RP Supervisor
  - Radiation Protection Manager

3. IF RCA Access is Reinstated, Radiation Worker Supervision ENSURE the following information is documented on the CR:
   - Violation
   - Lessons learned
   - Individual's corrective actions
   - Supervisor's corrective actions and applicability to other workers

4. RP OBTAIN Radiation Protection Manager's approval to reinstate individual's RCA access authorization. Document on CR.

5. Remove restriction by RP.

1. Inspect vacuum for damage prior to use. Notify Radiation Protection of any damage.

2. Potentially hazardous materials SHALL be evaluated prior to vacuuming. Chemistry, Reactor Operations and Personal Safety can assist in evaluations.

3. DO NOT use vacuum cleaners to pick up Flammable or Explosive Material/liquids or in an explosive atmosphere.

4. Use vacuums consistent with their label. Use vacuums marked “WET VAC” for liquids. Use vacuums marked “DRY VAC” for dry solids.

5. Use only on a grounded electrical circuit. DO NOT use any electrical two wire adapters.

6. Vacuum exhaust can stir loose surface contamination causing airborne radioactivity. Contact Radiation Protection prior to using a vacuum in a contaminated area.

7. Vacuums SHALL be used in accordance with an applicable radiation work permit.

8. The vacuum SHOULD normally be returned at the end of the current shift, **HOWEVER**, with permission from Radiation Protection the HEPA vacuum cleaner MAY be left at the work site for an extended period of time.

9. WHEN finished with the vacuum, notify Radiation Protection AND return the vacuum to the storage location.

10. IF a vacuum malfunctions (e.g., becomes clogged, full or damaged) THEN discontinue use and notify Radiation Protection of the vacuum location.

11. The end of the hose SHOULD be covered (if practicable) WHEN NOT in use.

Guidelines for Donning Protective Clothing

1.Don glove liners and inner shoe covers.

2. Don coverall and close openings. Ensure the EPD and lanyard are outside the coveralls.

3. Place EPD on lanyard and in a whirl pack.

4. Close the pocket's Velcro covers (if applicable). The lanyard will run out the cover around your neck.

5. Don the hood. Ensure the lanyard for the EPD is covered by the hood.

6. Don outer shoe covers.

7. Don the rubber gloves. If OREX/PVA coveralls with the double sleeve option, do not tape gloves to sleeves. Tape the ends of the gloves to the outside of the coveralls. Tape bottom of legs if necessary.

8. If a hard hat is required, place the hard hat cover over the top of the hard hat.

Guidelines for Removal of Protective Clothing

1. Remove the tape from your coveralls. Remove the outer shoe covers.

2. Remove the rubber gloves.

3. If wearing a hard hat reach up under the hard hat and remove it from your head. Holding on to the inside harness remove the hard hat cover.

4. Place the hard hat on the step-off pad.

5. Remove your hood.

6. Unfasten the coveralls and remove the EPD from the whirl pack (and coverall pocket if applicable). Place EPD and lanyard under the coveralls.

7. Remove coveralls turning them inside out. Use caution not to handle the outside of the coveralls.

8. Remove the inner shoe covers and step on the step-off-pad one foot at a time.

9. Remove cotton liners after crossing step-off-pad.

NUCLEAR TRAINING DEPARTMENT

ADMINISTRATIVE JOB PERFORMANCE MEASURE

TITLE: **REVIEW A SHUTDOWN MARGIN CALCULATION**

JPM NO.: **A5**

REVISION: **2**

THIS JPM REQUIRES THAT A UNIT 2, CYCLE 15 NDR BE AVAILABLE FOR EACH SRO APPLICANT TAKING THIS TEST AT THE SAME TIME.

JPM Title:	REVIEW A SHUTDOWN MARGIN CALCULATION
JPM No.:	A5
Rev. No:	2
STP Task:	76950 Perform a Shutdown Margin Verification
STP Objective:	76950 Perform a Shutdown Margin Verification in accordance with 0PSP10-ZG-0003
Related K/A Reference:	G2.1.20, Ability to interpret and execute procedure steps. (4.6/4.6)
References:	Unit 2 Plant Curve Book. Nuclear Design Report, Unit 2, Cycle 15. 0PSP10-ZG-0005, Shutdown Margin Verification Modes 1 & 2, Rev. 5
Task Normally Completed By:	SRO
Method of Testing:	Actual Performance
Location of Testing:	Classroom
Time Critical Task:	NO
Alternate Path JPM:	NO
Validation Time:	25 minutes

Required Materials (Tools/Equipment):

- Calculator
- Unit 2 Cycle 15 NDR

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU HAVE COMPLETED THE TASK.

INITIAL CONDITIONS:

Unit 2 is operating at 100% power. During performance of 0PSP03-RS-0001, Monthly Control Rod Operability, all three (3) Control Rods in Control Bank ‘D’, Group 2, failed to move outward after being inserted. I&C has determined that all three (3) Control Rods are being affected by Rod Control logic problems. Further testing has determined that Control Rods D12 and M4 are known to be trippable, but Control Rod H8 has been determined to be untrippable (mechanically stuck).

Plant parameters are stabilized and on program where applicable. Reactor power is 100% by U1169.

A Shutdown Margin Calculation was performed in accordance with 0PSP10-ZG-0005, Shutdown Margin Verification - Modes 1 and 2, using the MANUAL method, to verify compliance with Technical Specifications.

INITIATING CUE:

You are a shift SRO. The Shift Manager has asked you to perform a second review of the test data per step 5.7.12 of 0PSP10-ZG-0005, Shutdown Margin Verification - Modes 1 and 2.

For the purposes of this JPM, use the following instructions:

1. **RCCA positions given on 0PSP10-ZG-0005, Form 2, are correct for use in this JPM.**
2. **RCS boron is given as 100 ppm. For data tables that do not have 100 ppm listed, you can either use 0 ppm or interpolate between 0 ppm and 500 ppm to get a value for 100 ppm.**
3. **Core Burnup is given as 19000 MWD/MTU. Consider this to be End of Life (EOL) and ALWAYS use EOL values.**
4. **You are to use table data where possible, instead of curve data, to minimize interpolation errors from reading the curve data.**
5. **0PSP10-ZG-0005 provides for use of ‘most-conservative values’, however, DO NOT use ‘most-conservative’ values; use EOL values to get the most representative result.**

WHEN YOU’VE COMPLETED YOUR REVIEW, PRESENT YOUR RESULTS TO THE EXAMINER.

JOB PERFORMANCE MEASURE INFORMATION SHEET

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

Determines the SDM calculation is in error. SDM requirements ARE met and a TS entry does NOT have to be made.

HANDOUTS:

Provide the following to the applicant at the start of the JPM:

- Student Handout copy of 0PSP10-ZG-0005, Shutdown Margin Verification – Modes 1 and 2. This handout copy has information filled in to match conditions given in the 'Initial Conditions'.
- Student Handout copy of Unit 2 Plant Curve Book for Cycle 15, Figure 5.4 (this is a special exam copy marked "EXAM USE ONLY" and may not agree with the actual U2 PCB Figure 5.).
- Unit 2 Cycle 15 NDR

NOTES:

The procedure used to perform the Shutdown Margin calculation allows interpretation of data as well as a 'most-conservative' approach. The instructions provided to the applicant specify he/she is to use EOL data and NOT 'most-conservative' data in order to get the best result based on plant conditions.

There is opportunity for interpolation, however, the end result should be the same (i.e. numbers within the interpolation range should still indicate that Tech Spec Shutdown Margin requirements are met).

JOB PERFORMANCE MEASURE CHECK SHEET

> **NOTE:**
>
> - Critical steps are identified by (C).
> - Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME_______________

<u>SAT/UNSAT</u> Performance Step: 1

Procedure Step 5.3: Record the following on Form 2.

- Unit number, Cycle number, date and time
- Reactor Power level (%) and source
- RCCA bank positions from CP-005 step counters or DRPI
- RCS Boron concentration
- The number of inoperable RCCA's due to being immovable due to friction or known to be untrippable.

Standard:

- *The applicant should determine the performer has assumed all inoperable rods are untrippable and has entered '3' as the # of inoperable rods whereas it should be only 1 inoperable rod due to being untrippable.*

Comment:

1) This information is given in the Initial Conditions. If asked by applicant, information provided as the initial conditions is current.

2) The following references should have already been provided to the applicant. If not, provide them now:

   - Unit 2 Cycle 15 Nuclear Design Report (NDR)
   - Student Handout copy of 0PSP10-ZG-0005, Shutdown Margin Verification – Modes 1 and 2.
   - Student Handout copy of Unit 2 Plant Curve Book Figure 5.4
   - Calculator

3) The performer has entered '3' as the number of inoperable RCCA's, however, even though there are 3 RCCA's inoperable, this step requires the number that are inoperable due to being immovable or known to be untrippable which is 1 (one) per the given information.

   - It is this error that was carried forward by the performer to cause an incorrect result (SDM requirements not met).

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2

Procedure Step 5.4: Enter the Cycle Burnup for the date/time entered in Step 5.3.1.

Standard:

Determines the Cycle Burnup is 19000 MWD/MTU from the given information and is correctly entered on Form 2.

Comment:

Notes:

SAT/UNSAT Performance Step: 3

Procedure Step 5.5: If an approved computer application will be used for the data reduction, THEN GO TO Step 5.6, otherwise:

- Sign/date Form 2
- NA Step 5.6

Standard:

Understands from the given information that the SDM calculation was done using the MANUAL method, therefore Form 2 should be signed/dated by the performer and Step 5.6 N/A'd.

Comment:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 4

Procedure Step 5.7.1: Obtain the All Rods Inserted Less Most Reactive Stuck Rod Worth from the NDR. Enter the amount as a positive value on Form 3.

Standard:

Verifies this information is correct on Form 3

Comment:

The value in the NDR is given in % Δp and must be converted to pcm. There's a note in the procedure to this effect.

The EOL value is 7040 pcm, but the most-conservative value is BOL at 6140 pcm. The applicant should use the EOL value per the JPM instructions.

Notes:

SAT/UNSAT Performance Step: 5

Procedure Step 5.7.2: Obtain the Most Reactive Stuck Rod Worth from the NDR. Enter as a positive value on Form 3.

Standard:

Verifies this information is correct on Form 3

Comment:

The EOL value is 970 pcm, but the most-conservative value is at BOL at 1000 pcm. Per the instructions provided to the applicant, he/she should use the EOL value.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 6

Procedure Step 5.7.3: Obtain the Inserted RCCA Bank Worth at the RCCA positions recorded in Step 5.3.3 from the NDR. Enter as a positive value on Form 3.

Standard:

Verifies this information is correct on Form 3

Comment:

Notes:

SAT/UNSAT Performance Step: 7 (C)

Procedure Steps 5.7.4: Determine the Inoperable RCCA Worth by multiplying the Most Reactive Stuck Rod Worth by the number of inoperable RCCA's.

Standard:

Determines the recorded value of Inoperable RCCA Worth is 3 times what it should be.

Comment:

The initial conditions stipulate that 3 rods are inoperable, but only 1 RCCA is untrippable. Per procedure step 5.3.5, only the inoperable rods that are untrippable are to be counted for this data entry.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 8 (C)

Procedure Step 5.7.5: Determine the Available RCCA Worth by subtracting the Inserted RCCA Bank Worth and the Inoperable RCCA Worth from the All Rods Inserted Less Most Reactive Stuck Rod Worth.

Standard:

Determines this step is in error based on using 3 inoperable rods vice 1.

Comment:

Notes:

SAT/UNSAT Performance Step: 9 (C)

Procedure Step 5.7.6: Obtain the Total Power Defect from the NDR.

Standard:

Verifies this information is correct on Form 3.

Comment:

The Total Power Deficit is a function of RCS boron concentration. Per the JPM instructions, the applicant can either use the 0 ppm value or do an interpolation between 0 ppm and 500 ppm. The JPM outcome will be the same regardless of which number the applicant uses.
The range of values is 3003.8 – 3067.6 pcm.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 10 (C)

Procedure Step 5.7.7: Determine the Actual Shutdown Margin..

Standard:

Determines the Actual Shutdown Margin to be 2995 - 3059 pcm depending on the value of Total Power Defect used in JPM Step 9.

Comment:

Notes:

SAT/UNSAT Performance Step: 11

Procedure Step 5.7.8: Obtain the Required Shutdown Margin from Plant Curve Book Figure 5.4.

Standard:

Verifies this information is correct on Form 3.

Comment:

The required SDM is 1300 pcm.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 12 (C)

Procedure Step 5.7.9: Compare the Actual Shutdown Margin to the Required Shutdown Margin.

Standard:

Compares the Actual Shutdown Margin to the Required Shutdown Margin and determines the Acceptance Criteria ARE met. No TS entry is required.

Comment:

There will likely be some differences in the values obtained for the SDM Calculation between the 'KEY' and the applicant, but none of these differences should be sufficient to change the outcome EXCEPT for the intended error OR if the applicant did not go by the instructions on the cue sheet (e.g. used most-conservative values)

Notes:

- TERMINATE THE JPM -

JPM STOP TIME_______________

VERIFICATION OF COMPLETION

Job Performance Measure: REVIEW A SHUTDOWN MARGIN CALCULATION

Applicant's Name: ____

Date Performed: ____________________

Time to Complete: __________________

JPM Results: **Sat / Unsat**

Evaluator: _________________________ **Signature:** __________________________

Date: ____________________

JPM - STUDENT HANDOUT

READ TO PERFORMER:

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU HAVE COMPLETED THE TASK.

INITIAL CONDITIONS:

Unit 2 is operating at 100% power. During performance of 0PSP03-RS-0001, Monthly Control Rod Operability, all three (3) Control Rods in Control Bank 'D', Group 2, failed to move outward after being inserted. I&C has determined that all three (3) Control Rods are being affected by Rod Control logic problems. Further testing has determined that Control Rods D12 and M4 are known to be trippable, but Control Rod H8 has been determined to be untrippable (mechanically stuck).

Plant parameters are stabilized and on program where applicable. Reactor power is 100% by U1169.

A Shutdown Margin Calculation was performed in accordance with 0PSP10-ZG-0005, Shutdown Margin Verification - Modes 1 and 2, using the MANUAL method, to verify compliance with Technical Specifications.

INITIATING CUE:

You are a shift SRO. The Shift Manager has asked you to perform a second review of the test data per step 5.7.12 of 0PSP10-ZG-0005, Shutdown Margin Verification - Modes 1 and 2.

For the purposes of this JPM, use the following instructions:

1. **RCCA positions given on 0PSP10-ZG-0005**, **Form 2, are correct for use in this JPM.**
2. **RCS boron is given as 100 ppm. For data tables that do not have 100 ppm listed, you can either use 0 ppm or interpolate between 0 ppm and 500 ppm to get a value for 100 ppm.**
3. **Core Burnup is given as 19000 MWD/MTU. Consider this to be End of Life (EOL) and ALWAYS use EOL values.**
4. **You are to use table data where possible, instead of curve data, to minimize interpolation errors from reading the curve data.**
5. **0PSP10-ZG-0005 provides for use of 'most-conservative values', however, DO NOT use 'most-conservative' values; use EOL values to get the most representative result.**

WHEN YOU'VE COMPLETED YOUR REVIEW, PRESENT YOUR RESULTS TO THE EXAMINER.

STI 32792967	**0PSP10-ZG-0005**	**Rev. 5**	Page 1 of 12
Shutdown Margin Verification - Modes 1 and 2			
Quality	Non Safety-Related	Usage: **Referenced**	Effective Date: 12/06/10

David Bean	Jay Eichenlaub		NF&A
PREPARER	TECHNICAL	USER	COGNIZANT ORGANIZATION

Table of Contents Page

1.0 Purpose and Scope

1.1 To verify that the SHUTDOWN MARGIN satisfies the requirements of Technical Specification 4.1.1.1.1.a when in Modes 1 or 2 with an inoperable control rod(s).

2.0 Responsibilities

2.1 The procedure performer SHALL perform the procedure and complete the data package.

2.2 The procedure verifier SHALL verify all items in the data package as specified in the procedure.

2.3 The Shift Manager or designee SHALL complete the Second Review of Test Results on Form 1.

2.4 The Shift Manager SHALL complete the Plant Operations Review of Test Results on Form 1 if acceptance criteria are <u>NOT</u> met.

2.5 Performers and Verifiers SHALL individually complete each block of the Performers and Verifiers section of Form 1.

3.0 Precautions and Notes

3.1 Asterisk (*) on the checkoff denotes a step within the procedure that SHALL be signed off in the data package.

3.2 This procedure for calculating Shutdown Margin allows the performer to use conservative values. The use of conservative values can simplify the procedure performance by eliminating some of the interpolations. However, too many conservative assumptions may cause unsatisfactory results. <u>IF</u> unsatisfactory results are obtained using conservatisms, <u>THEN</u> calculations should be re-performed with conservative assumptions removed as required.

3.3 Reactivity and Shutdown Margin values presented in the Nuclear Design Report, Technical Specifications and the Core Operating Limit Report may be provided in units of %Δρ. These values may be converted to units of pcm by multiplying by 1000 pcm/%Δρ (i.e. 0.85 %Δρ = 850 pcm).

3.4 <u>IF</u> test results do <u>NOT</u> satisfy the acceptance criteria, <u>THEN</u> immediately notify the Shift Manager who SHALL complete the applicable portion of Form 1.

3.5 Reactor power should NOT change by more than ± 1.0 % during data collection.

4.0 Prerequisites

4.1 The plant is in Mode 1 or Mode 2. ___√

4.2 Reactor power is stable, drifting at a rate of no more than ± 0.5% per 5 minutes. ___√

4.3 The Nuclear Design Report (NDR) or NDR Startup Package is available. √

4.4 Notify the Shift Manager to review Technical Specifications 3.1.1.1 and 3.1.3.1. √

4.5 Obtain permission from the Shift Manager to commence testing and sign Form 1. * √

5.0 Procedure

5.1 Verify applicable Prerequisites have been met and Precautions and Notes have been read AND sign Form 1. *√

5.2 Ensure the test start is logged into the control room log book AND record the following information on Form 1:

5.2.1 Unit number, Cycle number √

5.2.2 IF this procedure is being performed for surveillance credit, THEN record the applicable Work Activity Number (WAN). NA

5.2.3 Indicate the reason for performing this test. √

5.3 Record the following information on Form 2. √

5.3.1 Unit number, Cycle number, date and time. √

NOTE

- The three typical indications of reactor power are Thermal Power (U1118), Delta-T Power (U0485) and Nuclear Instrumentation (NI) Power (U1169). Delta-T power (U0485) typically gives the most accurate value for power below 30%.
- IF the reliability of the power indications is in question or the indications deviate significantly, THEN a more conservative **HIGH** value for power may be used.

5.3.2 Reactor power level (%) and source. √

5.3.3 RCCA bank positions from CP-005 step counters or DRPI. √

5.3.4 RCS Boron Concentration (ppm). A known conservative RCS Boron Concentration (lower value of RCS Boron Concentration) may be used if a representative RCS Boron Concentration is not available. √

5.3.5 The Number of Inoperable RCCA's which are inoperable due to being immovable as a result of excessive friction or mechanical interference, or known to be untrippable. √

5.4 Enter the Cycle Burnup (MWD/MTU) for the Date and Time recorded in Step 5.3.1 from one of the following methods: √

- Cycle Burnup (MWD/MTU) from BEACON Monitor.
- Cycle Burnup (MWD/MTU) from ICS Computer Point ICYUU0002, "Current Cycle Burnup".

NOTE

Since Reactor Engineering typically updates PHDB once a week, the latest Cycle Burnup in PHDB may be one to two weeks old. Estimated hourly power can be entered to update PHDB to the Date and Time recorded in Step 5.3.1.

- Cycle Burnup from Power History Data Base (PHDB) updated to the Date and Time recorded in Step 5.3.1.

NOTE

Reactor stability requirements (Step 4.2) are NOT required for the remaining steps of this procedure.

5.5 IF an approved computer application will be used for data reduction, THEN GO TO Step 5.6, otherwise perform the following:

5.5.1 Sign and Date Form 2 *√

5.5.2 Mark Step 5.6 with "N/A" and GO TO Step 5.7 √

NOTE

Modes 1 & 2 Shutdown Margin computer application SHOULD be located in the site wide LAN network under Start Menu/Programs/Reactor Engineering/Modes 1&2 SDM - Unit 1 for Unit 1 and under Start Menu/Programs/Reactor Engineering/Modes 1&2 SDM - Unit 2 for Unit 2.

5.6 Computer Method

5.6.1 TRANSFER field data from Form 2 to the approved computer application AND discard the hand written Form 2. NA

5.6.2 Use the approved computer application to print Forms 2 and 3 AND sign Data Entered By and Code Run By spaces on the approved computer application output. * NA

5.6.3 If the Acceptance Criteria is not met, immediately notify the Shift Manager. NA

5.6.4 Obtain verification that Operating Data was correctly entered into the approved computer application and sign Form 2 as Verifier. * NA

5.6.5 Mark Steps 5.7 thru 5.7.12 with "N/A" and continue with Step 5.8. NA

NOTE

- Reactivity values presented in the Nuclear Design Report (NDR) Table 6-3 are typically provided in units of %Δρ. These values SHALL be converted to units of pcm by multiplying by 1000 pcm/%Δρ (i.e. 0.85 %Δρ = 850 pcm).
- Reactivity values used for this procedure should be obtained from Hot Zero Power (HZP) data tables and curves in the NDR.

5.7 Manual Method

5.7.1 Obtain the All Rods Inserted Less Most Reactive Stuck Rod Worth from the NDR. Record the All Rods Inserted Less Most Reactive Stuck Rod Worth on Form 3 as a positive value with units of pcm. √

- The All Rods Inserted Less Most Reactive Stuck Rod Worth is typically located in NDR Table 6-3 (Summary of Control Rod Reactivity Requirements and Shutdown Margin).
- The value should be interpolated between the BOL (assume 150 MWD/MTU) and EOL values provided.
- The LOWER conservative BOL or EOL value may be used.

5.7.2 Obtain the Most Reactive Stuck Rod Worth from the NDR. Record the Most Reactive Stuck Rod Worth on Form 3 as a positive value with units of pcm. √

- The Most Reactive Stuck Rod Worth is typically located in NDR Table 6-3 (Summary of Control Rod Reactivity Requirements and Shutdown Margin.)
- The value should be interpolated between the BOL (assume 0 MWD/MTU) and EOL values provided.
- A HIGHER conservative BOL or EOL value may be used.

5.7.3 Obtain the Inserted RCCA Bank Worth at the RCCA positions recorded in Step 5.3.3 from the NDR. Record the Inserted RCCA Bank Worth on Form 3 as a positive value with units of pcm. √

- The Inserted RCCA Bank Worth should be obtained from the NDR at HZP, HFP Eq. Xenon conditions.
- The Inserted RCCA Bank Worths are typically located in NDR Appendix A Tables A-10, A-11, and A-12 (Differential and Integral Rod Worth vs. Steps Withdrawn, Banks D, C, and B Moving with Overlap at BOL/MOL/EOL, HZP, HFP Eq. Xenon).
- The value should be interpolated between the BOL, MOL and EOL values provided.
- A Conservative LARGER value may be used instead of interpolating.

5.7.4 Determine the Inoperable RCCA Worth by multiplying the Most Reactive Stuck Rod Worth (Step 5.7.2) by the Number of Inoperable RCCA's (Step 5.3.5). Record the Inoperable RCCA Worth on Form 3. √

5.7.5 Determine the Available RCCA Worth by subtracting the Inserted RCCA Bank Worth (Step 5.7.3) and the Inoperable RCCA Worth (Step 5.7.4) from the All Rods Inserted Less Most Reactive Stuck Rod Worth (Step 5.7.1). Record the Available RCCA Worth on Form 3. √

5.7.6 Obtain the Total Power Defect from the NDR. Record the Total Power Defect on Form 3 as a negative value with units of pcm. √

- The Total Power Defect is typically located in NDR Table 5-7 (Total Power Defect versus power Level at BOL, MOL, and EOL, FOP).
- The value should be interpolated to the Reactor Power, Burnup, and Boron Concentration recorded in Step 5.3 and Step 5.4.
- A Conservative MORE NEGATIVE value may be used instead of interpolating.

5.7.7 Determine the Actual Shutdown Margin by adding the Total Power Defect (Step 5.7.6) to the Available RCCA Worth (Step 5.7.5). Record the Actual Shutdown Margin on Form 3. √

5.7.8 Obtain the Required Shutdown Margin from Plant Curve Book Figure 5.4. Record the Required Shutdown Margin on Form 3. √

- The value should be interpolated for the Burnup recorded in Step 5.4.
- A Conservative LARGER value may be used instead of interpolating.

5.7.9 Compare the Actual Shutdown Margin recorded on Form 3 to the Required Shutdown Margin recorded on Form 3. √

5.7.10 Sign the "Completed By" line on completed forms containing calculations. *√

5.7.11 IF the Acceptance Criteria is not met, THEN immediately notify the Shift Manager. √

5.7.12 Forward the test package to a verifier who SHALL perform the following: √

5.7.12.1 Verify all data and calculations on completed forms. ____

5.7.12.2 Sign the "Verified By" line on completed forms containing calculations. *

5.7.12.3 Forward the test package to the test performer. ____

5.8 Evaluate the test results against the acceptance criteria. √

5.9 Indicate the test results, sign, and enter the date and time of test completion on Form 1. *√

5.10 IF test results did NOT satisfy the acceptance criteria, THEN perform the following:

5.10.1 Immediately notify the Shift Manager who SHALL complete the applicable portion of Form 1. √

5.10.2 Initiate a Condition Report. ____

5.11 The test performer SHALL ensure all procedure performers and verifiers print their names, sign, and initial Form 1. ____

5.12 Notify the Shift Manager that testing is complete AND sign Form 1. *

5.13 Ensure this surveillance is logged as complete in the Control Room Log Book. ____

5.14 Mark sections of forms which were NOT completed with N/A or similar notation. ____

5.15 TRANSFER the Data Package to the Shift Manager. ____

5.16 The Shift Manager SHALL:

5.16.1 PERFORM a second review of the test data. ____

5.16.2 SIGN and RECORD the date and time on Form 1. __*__

5.16.3 TRANSFER the Data Package in accordance with 0PGP03-ZA-0055, Plant Surveillance Scheduling. ____

5.17 IF this procedure was performed for surveillance credit, THEN perform the following:

5.17.1 Complete a surveillance Test Completion Notification (TCN). ____

5.17.2 Place a copy of the TCN with the test package AND forward the original to the Surveillance Scheduler. ____

6.0 Acceptance Criteria

The Actual Shutdown Margin shall be greater than or equal to the Required Shutdown Margin (Technical Specifications 3.1.1.1) when the plant is in Mode 1 and 2.

7.0 References

7.1 STPEGS Technical Specification 3/4.1.1.1

7.2 STPEGS Plant Curve Book, applicable unit.

7.3 Nuclear Design Report, applicable unit and cycle.

7.4 0PGP03-ZE-0004, Plant Surveillance Program.

8.0 Support Documents

8.1 Form 1 – Data Package Cover Sheet

8.2 Form 2 – Shutdown Margin Data Input

8.3 Form 3 – Shutdown Margin Calculations

Unit 2 Cycle 15	Work Activity Numbers: NA -ST: NA NA -ST: NA		
Tech Spec Reference: 4.1.1.1.1.a 3.1.3.1 Action a.	Test Interval: Within 1 hour, and At least once per 12 hours, With an Inop. Control Rod	Modes Required: 1 or 2	Test Performance Mode: 1 or 2

Reason for Test:

- ☐ For Surveillance Credit
- ☒ Not for Surveillance Credit
- ☐ Periodic Surveillance Test
- ☒ Other 3.1.3.1.a

Test Results:

- ☐ Acceptable (All Acceptance Criteria met)
- ☒ Unacceptable (Any Acceptance Criteria NOT met)

Test Completed By: Willis Purcell (Test Performer) Today (Date) 10 min. ago (Time)

Second Review of Test Results:

- ☐ Acceptable (All Acceptance Criteria met)
- ☐ Unacceptable (Any Acceptance Criteria NOT met)

Test Reviewed By: ______ Shift Manager ______ Date ______ Time

Plant Operations Review of Test Results (if required):

IF test results are unacceptable, IMMEDIATELY inform the Shift Manager who SHALL complete the following:

Potential Reportable Occurrence	☐ Yes	☐ No
LCO Action Statement Entered	☐ Yes	☐ No

Corrective Action Taken: ______

Reviewed By: ______ Shift Manager ______ Date ______ Time

All pages of this form and Form 2 and 3 SHALL be included in the data package.

Performers and Verifiers			
Name (Printed)	Signature	Initials	Sections Performed
Willis Purcell	*Willis Purcell*	*WP*	*various*

4.5 Shift Manager has given permission to commence testing: *Willis Purcell* Test Performer *today* Date

5.1 Prerequisites have been met and Precautions and Notes have been read: *Willis Purcell* Test Performer *Today/1 hr. ago* Date / Time

5.12 Shift Manager notified of test completion: *Willis Purcell* Test Performer

Remarks: *Performed due to inoperable rods*

Unit 2 Cycle 15

Operating Data

5.3.1 Date today Time 1 hr. ago

5.3.2 Reactor Power Level 100% from U1169

5.3.3 RCCA Bank Positions (Steps)

CBA	CBB	CBC	CBD	S/D Banks
256	256	256	250	256

5.3.4 RCS Boron Concentration 100 ppm

5.3.5 Number of Inoperable RCCA 3

5.4 Cycle Burnup 19000 MWD/MTU

Completed By: Willis Purcell Date: today

Verified By: ______________ Date: ______

Unit 2 Cycle 15

Rod Worths

5.7.1 All Rods Inserted Less Most Reactive Stuck Rod Worth (ARI LMRR) (+) 7040 pcm

5.7.2 Most Reactive Stuck Rod Worth (MRR) (+) 970 pcm

5.7.3 Inserted RCCA Bank Worth (IRW) (+) 7 pcm

5.7.4 Inoperable RCCA Worth (INOP RW) (+) 2910 pcm

= (MRR) × (Number of Inoperable RCCA)
= 5.7.2 × 5.3.5

5.7.5 Available RCCA Worth (+) 4123 pcm

= (ARI LMRR) - (IRW) - (INOP RW)
= 5.7.1 - 5.7.3 - 5.7.4

Power Defect

5.7.6 Total Power Defect (-) 3003.8 pcm

Shutdown Margin Verification

5.7.7 Actual Shutdown Margin (+) 1119 pcm

= (Available RCCA Worth) + (Total Power Defect)
= 5.7.5 + 5.7.6

5.7.8 Required Shutdown Margin (+) 1300 pcm

5.7.9 Actual Shutdown Margin ≥ Required Shutdown Margin?

☐ Yes (Acceptance Criteria Satisfied) ☒ No

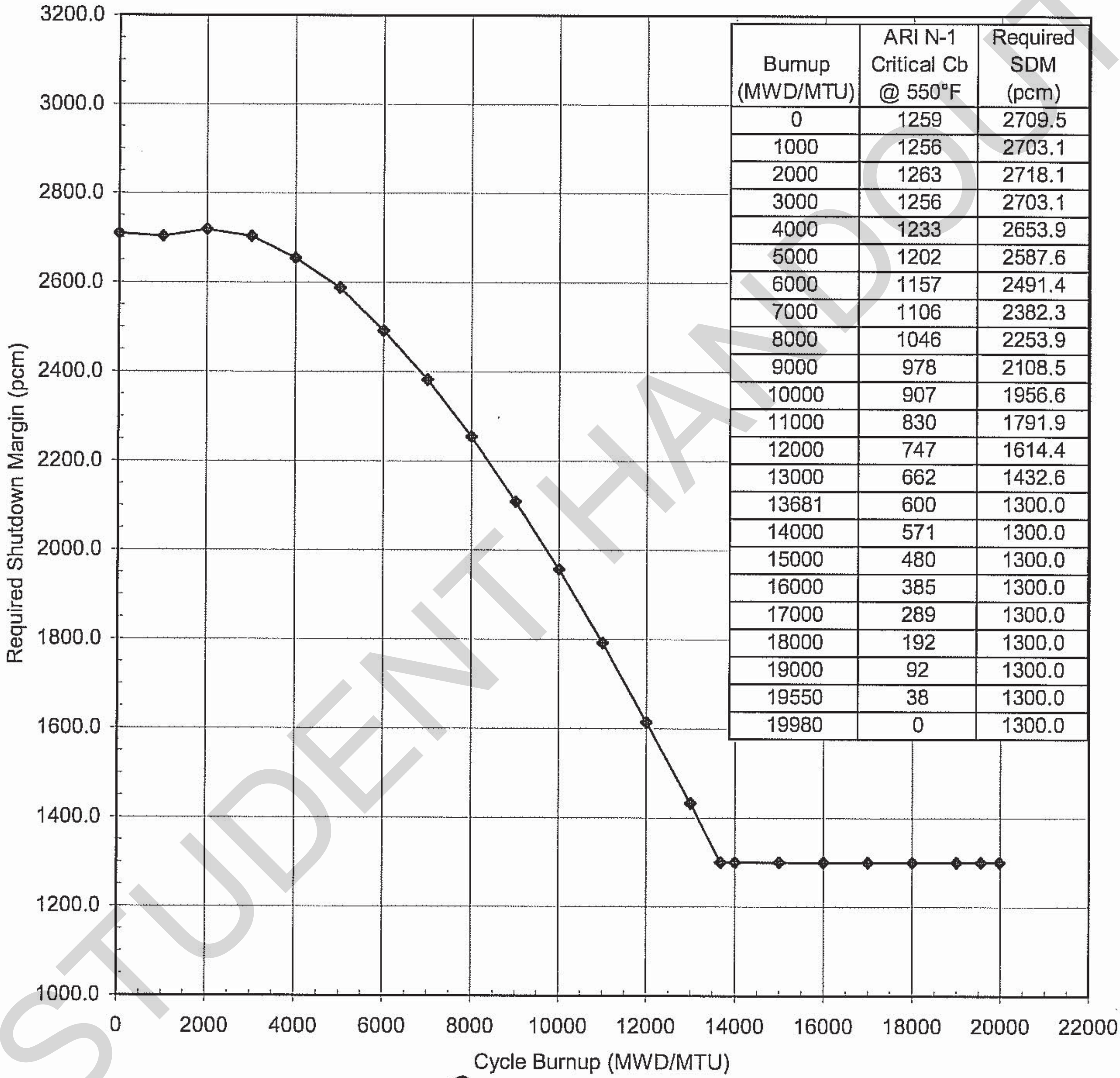
Completed By: Willis Purcell Date: today

Verified By: ______________ Date: ______________

This Form, when completed SHALL be retained for the life of the plant.

Figure 5.4
Mode 1 and 2 Minimum Shutdown Margin Requirements
Unit 2 Cycle 15

(Source: A41010-00580-AUB U2C15 NDR Tables 6-1 and Core Operating Limit Report)



Burnup (MWD/MTU)	ARI N-1 Critical Cb @ 550°F	Required SDM (pcm)
0	1259	2709.5
1000	1256	2703.1
2000	1263	2718.1
3000	1256	2703.1
4000	1233	2653.9
5000	1202	2587.6
6000	1157	2491.4
7000	1106	2382.3
8000	1046	2253.9
9000	978	2108.5
10000	907	1956.6
11000	830	1791.9
12000	747	1614.4
13000	662	1432.6
13681	600	1300.0
14000	571	1300.0
15000	480	1300.0
16000	385	1300.0
17000	289	1300.0
18000	192	1300.0
19000	92	1300.0
19550	38	1300.0
19980	0	1300.0

Performed By: Paul Bean Date: 4/21/10

Verified By: Kristin Chesson Date: 4/21/10

Approved By: Date: 4/21/10
Reactor Engineering Supervisor

Unit 2 Cycle 15

Rod Worths

5.7.1 All Rods Inserted Less Most Reactive Stuck Rod Worth (ARI LMRR) (+) 7040 pcm

5.7.2 Most Reactive Stuck Rod Worth (MRR) (+) 970 pcm

5.7.3 Inserted RCCA Bank Worth (IRW) (+) 7 pcm

Should be 1/3 this value (970 pcm) because only 1 rod is untrippable.

5.7.4 Inoperable RCCA Worth (INOP RW) (+) 2910 pcm

= (MRR) × (Number of Inoperable RCCA)
= 5.7.2 x 5.3.5

Should be 6063 pcm because only 1 rod is untrippable.

5.75 Available RCCA Worth (+) 4123 pcm

= (ARI LMRR) - (IRW) - (INOP RW)
= 5.7.1 – 5.7.3 – 5.7.4

Power Defect

5.7.6 Total Power Defect (-) 3003.8 pcm

Could be 3067.6 pcm if table data wasn't interpolated.

Shutdown Margin Verification

Should be 2995.4 to 3059 pcm depending on the value of Total Power Defect used above.

5.7.7 Actual Shutdown Margin (+) 1119 pcm

= (Available RCCA Worth) + (Total Power Defect)
= 5.7.5 + 5.7.6

5.7.8 Required Shutdown Margin (+) 1300 pcm

5.7.9 Actual Shutdown Margin ≥ Required Shutdown Margin?

☐ Yes (Acceptance Criteria Satisfied) ☒ No

Should be checked instead of "No" because actual SDM is greater than that required.

Completed By: Willis Purcell Date: today

Verified By: ____________ Date: ____________

NUCLEAR TRAINING DEPARTMENT

ADMINISTRATIVE JOB PERFORMANCE MEASURE

TITLE: **REVIEW ESF POWER AVAILABILITY SURVEILLANCE RESULTS**

JPM NO: **NRC A6**

REVISION: **2**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title:	REVIEW ESF POWER AVAILABILITY SURVEILLANCE RESULTS
JPM No.:	A6
Rev. No.:	2
STP Task:	12000, Authorize Start Of And Review Surveillance Tests.
STP Objective:	12000, Authorize the start of surveillance tests, and review completion IAW 0PGP03-ZE-0004, Plant Surveillance Program.
Related K/A Reference:	2.1.33 [4.0], Ability to recognize indications for system operating parameters which are entry level conditions for Technical Specifications.
References:	0PSP03-EA-0002, Rev 25., ESF Power Availability
Task Normally Completed By:	SRO
Method of Testing:	Actual Performance
Location of Testing:	N/A
Time Critical Task:	NO
Validation Time:	30 minutes
Required Materials (Tools/Equipment):	

- Student Handout Copy of 0PSP03-EA-0002.
- Technical Specifications Section 8 and the Bases for Section 8.

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the applicant):

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

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: **Do not operate or alter equipment configuration in the plant without proper authorization.**

INITIAL CONDITIONS:

Unit 1 is at 100% power with a Train "A" outage week in progress. The following plant conditions exist:

- #11 ESF D/G was taken OOS for scheduled maintenance at 0600 yesterday.
- At 1000 today, the breaker from 4.16 KV Bus E1C to 4.16 KV/480 V XFMR E1C1 (4.16 KV/480 Volt E1C1 Transformer primary side breaker) tripped open.
- Operations personnel have cross tied Load Centers E1C1 and E1C2 (cross tie breaker is closed).
- 0PSP03-EA-0002, ESF Power Availability, was performed today at 1200, 30 minutes ago, to satisfy the requirements of Technical Specification 3.8.1.1.b. due to #11 ESF D/G being OOS.

INITIATING CUE:

You are the Unit Supervisor in Unit 1 and you're to perform the "Test Results Second Review" for the completed ESF Power Availability Surveillance, and **document your review by completing Step 5** of the Data Package Cover Sheet. DO NOT PERFORM THE REPORTABILITY REVIEW PORTION OF STEP 5.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

Determines that Surveillance Test results should be 'unacceptable' based on failing to meet surveillance acceptance criteria 6.3, Technical Specification LCO 3.8.3.1.c is not met and LCO 3.8.3.1 Action 'a' should be entered.

JOB PERFORMANCE MEASURE INFORMATION SHEET (cont'd)

HANDOUTS:

Student Handout Copy of PSP03-EA-0002, ESF Power Availability.
Technical Specification Section 8 and the Bases for Section 8.

NOTES:

The evaluator is provided with an ANSWER KEY which is appropriately marked "KEY". The evaluator shall not hand out any page(s) marked as "KEY" to the applicant.

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, …).

JPM START TIME_______________

SAT / UNSAT Performance Step: 1

Obtain completed ESF Power Availability Surveillance.

Standard:

The student obtains a copy of the ESF Power Availability.

Comment:

When student has completed reading the Initiating Cues and has no questions, give the student the Student Copy of PSP03-EA-0002 and Technical Specification Section 8 and the Bases for Section 8.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT / UNSAT Performance Step: 2

Review ESF Power Availability Surveillance.

Standard:

The applicant reviews the ESF Power Availability Surveillance for accuracy.

Comment:

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT / UNSAT Performance Step: 3 (C)*

Complete “Test Results Second Review” section.

Standard:

The student records the following on the “Test Results Second Review” section:

1) ***Test Results –*** *Unacceptable**
2) ***Refer to T.S. –*** *3.8.3.1.c, Action ‘a’ applies**
3) ***Is this condition a potentially reportable occurrence? –*** *N/A per Initiating Cue*
4) ***Should an LCO action statement be entered? –*** *YES*
5) ***Explain –*** *Words to the effect of:*

   Surveillance Acceptance Criteria 6.3 is not satisfied. (480 V Load Center E1C1 is not energized via its respective load center transformer.) Technical Specification LCO action statement 3.8.3.1.c is not met and 3.8.3.1 Action ‘a’ should be entered based on the loss of the normal power supply to the 480 V Load Center E1C1.

Comment:

(*) Denotes the Critical portions. The applicant is expected to determine that the surveillance is unsatisfactory based on failing to meet acceptance criteria 6.3. The applicant should also specify that the LCO Action to be entered is Action ‘a’ of TS 3.8.3.1.

Cue:

If the student begins to pursue a reportability determination, inform him / her that this is not within the identified scope of the JPM.

Notes:

-TERMINATE THE JPM-

JPM STOP TIME_______________

VERIFICATION OF COMPLETION

Job Performance Measure: REVIEW ESF POWER AVAILABILITY SURVEILLANCE RESULT

Student's Name: ____

Date Performed: ____________________

Time to Complete: ____________________

JPM Results: **Sat / Unsat**

Evaluator:_________________________ **Signature:**_________________________

Date: _________________________

JPM – STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

Unit 1 is at 100% power with a Train "A" outage week in progress. The following plant conditions exist:

- #11 ESF D/G was taken OOS for scheduled maintenance at 0600 yesterday.
- At 1000 today, the breaker from 4.16 KV Bus E1C to 4.16 KV/480 V XFMR E1C1 (4.16 KV/480 Volt E1C1 Transformer primary side breaker) tripped open.
- Operations personnel have cross tied Load Centers E1C1 and E1C2 (cross tie breaker is closed).
- 0PSP03-EA-0002, ESF Power Availability, was performed today at 1200, 30 minutes ago, to satisfy the requirements of Technical Specification 3.8.1.1.b. due to #11 ESF D/G being OOS.

INITIATING CUE:

You are the Unit Supervisor in Unit 1 and you're to perform the "Test Results Second Review" for the completed ESF Power Availability Surveillance, and **document your review by completing Step 5** of the Data Package Cover Sheet. DO NOT PERFORM THE REPORTABILITY REVIEW PORTION OF STEP 5.

STI 32860684	**0PSP03-EA-0002**	**Rev. 25**	Page 1 of 36
ESF Power Availability			
Quality	Safety-Related	Usage: **IN HAND**	Effective Date: 4/22/11

M. Foster	N/A	Crew 2E	Operations
PREPARER	TECHNICAL	USER	COGNIZANT DEPT.

Table of Contents Page

1.0 Purpose and Scope

1.1 This procedure satisfies the surveillance requirements (Mode 1, 2, 3 & 4) 4.8.1.1.1.a, 4.8.2.1.a.2, 4.8.3.1, 4.8.3.1 of the following Technical Specifications:

1.1.1 Determination of two physically independent circuits between the offsite transmission network and the onsite class 1E Distribution per Technical Specification 3.8.1.1.a, by verifying breaker alignments and indicated power availability in Modes 1 through 4.

1.1.2 Determine proper energization of ESF buses per Technical Specification 3.8.3.1, by verifying correct breaker alignment and bus voltages in Modes 1 through 4.

1.1.3 Determine operability of ESF battery bank associated chargers per Technical Specification 3.8.2.1, by verifying correct breaker alignment and voltages in Modes 1 through 4.

1.2 This procedure determines the availability of the 138 KV Emergency Transformer for possible use during a Loss of Offsite Power by verifying the Voltage and Breaker Lineup per Data Sheet 2 and 9. This meets commitments made for the SDG, ECW and Essential Chilled Water Technical Specification Change. (Reference 8.10)

1.3 This procedure determines Technical Specification 3.8.1 LCO entry requirements during planned (preventative or corrective maintenance) 345 KV Switchyard North or South Bus outages.

1.4 This procedure determines Technical Specification LCO 3.8.1.1.e entry requirements due to low voltage condition existing on the offsite power system, or a potential low voltage condition that could exist on the offsite power system following a trip of both Units.

1.5 This procedure satisfies the surveillance requirement 4.8.2.1.a at least once per 7 days by verifying that total battery terminal voltage is greater than or equal to the minimum established float voltage.

1.6 This procedure satisfies the surveillance requirement 4.8.2.3.a at least once per 7 days by verifying the float current for each battery is $\leq$ 2 amps when battery terminal voltage is greater than or equal to the minimum established float voltage of surveillance requirement 4.8.2.1.a.

2.0 Prerequisites

2.1 IF recording battery charge current and total battery terminal voltage in Data Sheet 9, THEN obtain the following M&TE (or equivalent):

M&TE	DESCRIPTION	RANGE	TOLERANCE	
Fluke 187	Multimeter/Digital	0 – 500 VDC	±0.1% Reading + 0.02 VDC	*NA*
Amprobe AC/DC 1000	Multimeter/Clamp-On	0 - 199.9 Amps DC	±1% Reading + 5 Digits	*NA*

2.2 IF recording battery charge current and total battery terminal voltage in Data Sheet 9, THEN record M&TE on Data Sheet 9. *NA*

3.0 Notes and Precautions

3.1 Breaker positions SHALL NOT be changed without authorization from the Unit Supervisor or Shift Manager.

3.2 Failure to meet the Acceptance Criteria of this test may require entry into one or more of the following LCO Action Statement's:

- Technical Specification 3.8.1.1
- Technical Specification 3.8.2.1
- Technical Specification 3.8.3.1

3.3 Loss of one 345 KV Switchyard North or South Bus, including a planned (preventative or corrective maintenance) outage, constitutes loss of one required offsite source. (Ref. 8.13)

3.4 Loss of one 13.8 KV Standby Bus to 4.16 KV ESF bus line constitutes loss of one required offsite source. (Reference 8.2)

3.5 Loss of two 13.8 KV Standby busses to 4.16 KV ESF bus lines constitutes loss of two required offsite sources. (Reference 8.2)

3.6 Addendum 2, Two Physically Independent Circuits, provides a drawing of rightaways and offsite circuits to aide in the definition of "two physically independent circuits".

3.7 Refer to 0PSP03-EA-0003, ESF Power Availability Shutdown, for Modes 5 and 6.

3.8 **(MODES 1-4 ONLY)** The transient analysis for the verification of the degraded grid relays is shown in EC5000. The cases show that for an alternate bus line-ups, (I.E. the 13.8KV Auxiliary and Standby Busses being fed from the Standby Transformers) that the minimum switchyard voltage has to be greater than 355KV. IF the switchyard voltage drops to 355 KV or below, THEN enter Technical Specification LCO 3.8.1.1.e for the loss of 2 required offsite A.C. sources.
LCO 3.8.1.1.e can be exited after switchyard voltage returns to above 355KV.

- **(UNIT 1 ONLY)** At least one 13.8 KV motor on Aux bus 1G SHALL be secured for alternate bus line-ups.

3.9 Condition Report Engineering Evaluation (CREE) CR# 00-500-25 states that operability is based upon the existing state of the 345 KV system voltage as well as the potential voltage condition in the event that the STPEGS Unit(s) were to trip. Due to combinations of conditions existing on the grid, the loss of load from a trip of the STPEGS Unit(s) could be the event that creates a degraded voltage condition on the grid. According to General Design Criteria 17, Regulatory Guide 1.93, and the STPEGS UFSAR section 8.0, the offsite power grid must be capable of supplying acceptable voltage levels for operation of the ESF related equipment on the STPEGS site.

3.10 Technical Specification LCO Action 3.8.1.1.e is entered per 0POP04-AE-0005, Offsite Power System Degraded Voltage, when notified by the Master Qualified Scheduling Entity (MSQE) or Transmission Distribution Service Provider (TDSP) that a combination of conditions exist on the 345 KV system that could lead to a low voltage condition (less than 329 KV) in the 345 KV Switchyard subsequent to trip of both Units.

3.11 Based on the analysis in CREE 03-16063-3 from the review of the design, licensing documents, NRC criteria and IEEE standards, STP's offsite power system is in accordance with GDC-17 provided that two separate paths of power are available from the transmission system to the ESF busses. However, adherence to GDC-17 covers the transformers, switchyard and transmission lines as compared to what is provided in STP's Technical Specifications section 3/4.8.1. LCOs for the two independent transmission circuits should include electrical bus line ups, switchyard issues that could cause a loss of offsite power and transmission lines. Should all the electrical safety buses be lined up to one of the three supply transformers, a 72 hour LCO should be entered since there would be a delay in restoring power if the onsite power systems were unavailable (as described in IV.2). A delay in restoring power to a safety bus in this situation would be considered an unanalyzed condition. (Ref. 8.17)

3.12 LCOs for switchyard problems should be entered when equipment failures could cause the loss of one or all offsite power sources. An example of an equipment failure would be the loss of the battery chargers which ultimately provide tripping power for the 345 kV switchyard breakers for the transmission lines. An LCO would not need to be entered immediately since the stored energy in the batteries will provide enough energy to trip breakers for longer than 20 hours after the loss of the battery chargers. Notification of the loss of control of the breakers would have to come from our Transmission Service Provider. (Ref. 8.17)

3.13 LCOs for Transmission lines should be entered when one or both of the required transmission lines is lost. The write up in CREE 99-1981-1 is still valid for the transmission system and switchyard busses. (Ref. 8.17)

3.14 When performing 345 KV Switchyard North and South Bus outages, acceptance criteria 6.2 applies and requires entry into Technical Specification LCO 3.8.1.1.a. Technical Specification LCO 3.8.1.1.a entry is a requirement of CREE 99-1981-1, HL&P Final Report on STP 345 KV Switchyard Transient Stability Impact on Existing CREE 97-4343-8. (Reference 8.13).

3.15 IF 345 KV Switchyard North or South Bus planned (preventative or corrective maintenance) outages are in progress, THEN ENSURE Technical Specification LCO action 3.8.1.1.a has been entered.
(Technical Specification 3.8.1.1.a, 4.8.1.1.1.a, Ref. 8.13, 3.13). (Addendum 1)

3.16 IF notification has been received from the MQSE or TDSP that a degraded voltage condition could exist on the 345 KV system following a trip of both units, THEN ENSURE Technical Specification LCO action 3.8.1.1.e has been entered.
(Technical Specification 3.8.1.1.e, Ref. 8.6, 8.16, 3.10)

3.17 IF notification has been received from the TDSP that power has been lost to both Switchyard battery chargers, THEN ENSURE Technical Specification LCO action 3.8.1.1.e has been entered within 20 hours of notification. (Technical Specification 3.8.1.1.e, Ref. 8.2, 8.17, 3.12)

3.18 IF ALL three ESF 4.16 KV busses are energized from the same Aux or Stby XFMR, THEN ENSURE Technical Specification LCO action 3.8.1.1.a has been entered. (Technical Specification 3.8.1.1.a, Ref. 8.2, 8.17, 3.11)

3.19 Charger and DC Switchboard reading are based on a 59 cell battery. For configurations less than 59 cells, consult the Electrical Setpoint Index.

3.20 Minimum battery terminal voltage Acceptance Criteria on Data Sheet 8 is for a 59 cell battery. For configurations less than 59 cells, the value is 2.17 VDC times the number of connected cells.

3.21 Battery terminal voltage Acceptance Criteria on Data Sheet 9 is based on float voltages. There is not a Technical Specification for equalize voltage. (Reference 1.5, 6.11)

4.0 Pretest Verification

None

5.0 Procedure

> NOTE
>
> - IF this surveillance is being performed to satisfy Technical Specification Surveillance Requirement 4.8.1.1.1.a, THEN Data Sheet 1 through 9 SHALL be performed.
> - IF this surveillance is being performed to satisfy the requirements of Technical Specification 3.8.1.1 ACTION Items a, b, c, or f, THEN ONLY Data Sheet 1, 2, 3, 4, and 9 are required to be performed.

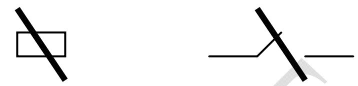
5.1 COMPLETE Required Data Sheet 1, 345 KV Switchyard Alignment by PERFORMING the following steps.

5.1.1 VERIFY data for Data Sheet 1, 345 KV Switchyard Alignment by performing one of the following:

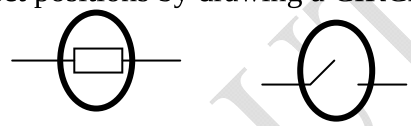
- CONSULT with the STP Coordinator to verify the switchyard status.
- MONITOR the computer link to Centerpoint Switchyard Status AND is updating
- PERFORM a combination of the following:
  (Reference 8.21, 8.22)
  - MONITOR Control Room indication of switchyard breaker status (lack of alarms and position indication lights),
  - MONITOR Switchyard voltage indication,
  - EVALUATION of any STP Interface Coordination Agreement notifications from Transmission Owners,
  - CHECK availability of communication links with the STP Coordinator indicate no change switchyard component status,
  - VERIFY last known status of ALL switchyard breakers as CLOSED.

5.1.2 RECORD actual breaker/disconnect positions for the 345 KV Switchyard breakers and disconnects.

- RECORD “CLOSED” breaker/disconnect positions by drawing a line at an angle through the breaker/disconnect.



- RECORD “OPEN” breaker/disconnect positions by drawing a CIRCLE around the breaker/disconnect.



- RECORD 345 KV North and South Bus Voltage.
- CIRCLE YES or NO for “NORTH AND SOUTH BUS IN SERVICE WITH VOLTAGE > 329KV”.
- CIRCLE YES or NO for “AT LEAST 2 RIGHT OF WAYS AVAILABLE”.
- CIRCLE YES or NO for each 345 KV line in service.

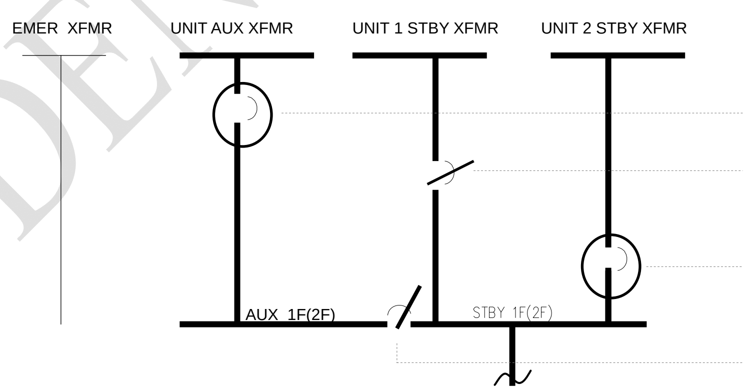
NOTE

- There are 5 possible lineups on Data Sheet 2, 3, and 4 for 13.8 KV XFMRS in the **DESIGNATED** Class 1E 4160 VAC Bus Power Source Table that meet Technical Specification requirements for being a power source for the 4.16 KV Buses:
  - (1) UAT supplying the AUX BUS and STBY BUS
  - (2) UAT supplying the AUX BUS and UNIT 1 STBY XFMR suppying the STBY BUS
  - (3) UNIT 1 STBY XFMR suppyling the STBY BUS and the AUX BUS
  - (4) UAT supplying the AUX BUS and UNIT 2 STBY XFMR suppyling the STBY BUS
  - (5) UNIT 2 STBY XFMR suppyling the STBY BUS and the AUX BUS

5.2 COMPLETE Required ESF Power Train Data Sheet 2 through 4 by performing the following steps.

5.2.1 RECORD actual breaker/disconnect positions for the 13.8 KV XFMRs, AUX BUS, STBY BUSES and from the 13.8 KV STBY BUS to the 480 VAC BUSES.

- RECORD “CLOSED” breaker/disconnect positions by drawing a line at an angle through the breaker.
- RECORD “OPEN” breaker/disconnect positions by drawing a CIRCLE around the breaker.



This example illustrates:
(3) UNIT 1 STBY XFMR suppyling the STBY BUS and the AUX BUS

NOTE

Unit 1 and Unit 2 control board mimics are different. Mimic locations for UNIT 1 STBY XFMR and UNIT 2 STBY XFMR are opposite.

- In Unit 1, UNIT 1 STBY XFMR is on the left.
    - In Unit 2, UNIT 2 STBY XFMR is on the left.

5.2.2 CIRCLE actual breaker positions for the selected XFMR lineup in the **DESIGNATED** Class 1E 4160 VAC Bus Power Source Table.

5.2.3 RECORD a "✓" above the 13.8 KV XFMR lineup designated as the class 1E 4160 VAC bus power source.

DESIGNATE (✓) Class 1E 4160 VAC Bus Power Source (note 2)	(1)	(2)	(3) ✓	(4)	(5)
	(1) UNIT AUX XFMR	(2) UNIT 1 STBY XFMR	(3) UNIT 1 STBY XFMR	(4) UNIT 2 STBY XFMR	(5) UNIT 2 STBY XFMR
UAT TO AUX BUS 1F(2F) SUPLY	CLOSED	CLOSED	OPEN	CLOSED	OPEN
STBY XFMR 1 TO STBY BUS 1F(2F) SUPLY	OPEN	CLOSED	CLOSED	OPEN	OPEN
STBY XFMR 2 TO STBY BUS 1F(2F) SUPLY	OPEN	OPEN	OPEN	CLOSED	CLOSED
AUX TO STBY BUS 1F(2F) TIE	CLOSED	OPEN	CLOSED	OPEN	______

This example illustrates: (3) UNIT 1 STBY XFMR suppyling the STBY BUS and the AUX BUS

5.2.4 ENSURE the 13.8 KV XFMR lineup designated as the class 1E 4160 VAC bus power source meets the acceptance criteria in steps 6.1 for Modes 1, 2, 3 and 4.

5.2.5 CIRCLE actual breaker positions in the **REQ'D** BREAKER/DISC POSITION column for the Technical Specification electrical lineup from the 13.8 KV STBY BUS to the 480 VAC BUSES.

5.2.6 ENSURE the acceptance criteria in steps 6.3 for Modes 1, 2, 3 and 4 is met by VERIFYING that ALL breakers in the **REQ'D** BREAKER/DISC POSITION column are circled.

5.3 COMPLETE ESF Power Availability Data Sheet 5 through 8 by circling OR recording actual breaker/disconnect positions (e.g. OPEN, CLOSED, ON, OFF, etc.).

5.4 RECORD indicated voltages on Data Sheet 9, Bus and Charger Voltage Data.

6.0 Acceptance Criteria

NOTE

- Addendum 2, Two Physically Independent Circuits, provides a drawing of rightaways and offsite circuits to aide in the definition of "two physically independent circuits".
- Loss of one 13.8 KV Standby Bus to 4.16 KV ESF bus line constitutes loss of one required offsite source. (Reference 8.2)
- Loss of two 13.8 KV Standby busses to 4.16 KV ESF bus lines constitutes loss of two required offsite sources. (Reference 8.2)
- The preceding notes also apply when the 4.16 KV ESF bus is not energized by the 13.8 KV XFMR.
- Step 6.1 applies during standby diesel inoperability.
- Step 6.2 applies during offsite independent circuits inoperability.

6.1 Two physically independent circuits exist between the offsite transmission network and onsite Class 1E Distribution System as determined from Data Sheet 1, 2, 3, 4, and 9. (Technical Specification 3.8.1.1.b, 3.8.1.1.f, 4.8.1.1.1.a).

- North and South Bus in service with voltage > 329KV
- Two Right of Ways with a 345 KV line are available:
  - Western Right of Way (Blessing 44)
  - NW Right Of Way 1 (White Point, Hillje 44)
  - NW Right Of Way 2 (Hillje 64, Elm Creek 27, WA Parish, Elm Creek 18)
  - Eastern Right Of Way (Dow Velasco 27, Dow Velasco 18)
- Two 13.8 KV XFMRs
  - Unit Aux XFMR
  - Unit 1 Stby XFMR
  - Unit 2 Stby XFMR
- Three 13.8 KV Standby Buses energizing the 4.16 KV ESF bus lines.

6.2 One physically independent circuit exists between the offsite transmission network and onsite Class 1E Distribution System as determined from Data Sheet 1, 2, 3, 4, and 9. (Technical Specification 3.8.1.1.a, 3.8.1.1.c, 4.8.1.1.1.a).

- North or South Bus in service with voltage > 329KV (340KV)
- One Right of Way with a 345 KV line is inservice:
  - Western Right of Way (Blessing 44)
  - NW Right Of Way 1 (White Point, Hillje 44)
  - NW Right Of Way 2 (Hillje 64, Elm Creek 27, WA Parish, Elm Creek 18)
  - Eastern Right Of Way (Dow Velasco 27, Dow Velasco 18)
- One 13.8 KV XFMRs
  - Unit Aux XFMR
  - Unit 1 Stby XFMR
  - Unit 2 Stby XFMR
- Three 13.8 KV Standby Buses energizing the 4.16 KV ESF bus lines.

6.3 Each ESF 4.16 KV bus E1A, E1B and E1C (E2A, E2B and E2C) is energized and supplying it's respective 480V Load Centers E1A1, E1A2, E1B1, E1B2, E1C1 and E1C2 (E2A1, E2A2, E2B1, E2B2, E2C1 and E2C2) via it's respective load center transformers as determined from Data Sheet 1, 2, 3, 4, and 9.
(Technical Specification 3.8.3.1a, b, and c , 4.8.3.1).

6.4 345 KV system voltage is greater than degraded voltage conditions requiring LCO Action 3.8.1.1.e entry per 0POP04-AE-0005, Offsite Power System Degraded Voltage per Data Sheet 1. (Technical Specification 3.8.1.1.e, Ref. 8.6, 8.16, 3.10)

6.5 IF notified by the TDSP that switchyard battery chargers are not operating, THEN LCO 3.8.1.1.e has been entered within 20 hours.
(Technical Specification 3.8.1.1.e, Ref. 8.2, 8.17, 3.12)

6.6 IF notified by the TDSP that equipment failures could cause the loss of one or all offsite power sources, THEN LCO 3.8.1.1.e has been entered.
(Technical Specification 3.8.1.1.e, Ref. 8.2, 8.17, 3.12)

6.7 ALL three ESF 4.16 KV busses are **NOT** energized from the same Aux or Stby XFMR.
(Technical Specification 3.8.1.1.a, Ref. 8.2, 8.17, 3.11)

6.8 Each 120 Volt AC Distribution panel DP1201, DP001, DP1202, DP1203, DP1204 and DP002 is energized from its associated inverter AND each inverter is connected to its respective D.C. Bus E1A11, E1D11, E1B11 and E1C11 (E2A11, E2D11, E2B11 and E2C11) as determined from Data Sheet 5, 6, 7, 8, and 9.
(Technical Specification 3.8.3.1d, e, f and g, 4.8.3.1).

6.9 Each 125 Volt DC bus E1A11, E1B11, E1C11 and E1D11 (E2A11, E2B11, E2C11 and E2D11) is energized from its associated battery bank E1A11, E1B11, E1C11 and E1D11 (E2A11, E2B11, E2C11 and E2D11) as determined from Data Sheet 5, 6, 7, 8, and 9. (Technical Specification 3.8.3.1h, i, j and k, 4.8.3.1).

6.10 Channels I, II, III and IV 125V Battery Banks are each being supplied from ONE of their two associated chargers.
(Technical Specification 3.8.2.1, 4.8.2.1.a.2).

6.11 Channels I, II, III and IV 125V total battery terminal voltage is greater than or equal to the minimum established float voltage determined from Data Sheet 9.
(Technical Specification 4.8.2.1.a)

6.12 The float current for each battery is ≤ 2 amps when battery terminal voltage is greater than or equal to the minimum established float voltage as determined from Data Sheet 9. (battery banks E1A11, E1B11, E1C11 and E1D11 (E2A11, E2B11, E2C11 and E2D11)).
(Technical Specification 4.8.2.3.a)

7.0 Documentation

7.1 Data Package Cover Sheet

7.2 Data Sheet 1, 345 KV Switchyard Alignment

7.3 Data Sheet 2, Required ESF Power Train A

7.4 Data Sheet 3, Required ESF Power Train B

7.5 Data Sheet 4, Required ESF Power Train C

7.6 Data Sheet 5, Channel I, 120 VAC and 125 VDC Vital Bus Availability

7.7 Data Sheet 6, Channel II, 120 VAC and 125 VDC Vital Bus Availability

7.8 Data Sheet 7, Channel III, 120 VAC and 125 VDC Vital Bus Availability

7.9 Data Sheet 8, Channel IV, 120 VAC and 125 VDC Vital Bus Availability

7.10 Data Sheet 9, Bus and Charger Voltage Data

8.0 References

8.1 Single Line Diagrams:

8.1.1	9-E-AAAA-01 #1(#2),	Main Generator Unit & Standby Xfmr Protection & Metering
8.1.2	9-E-AAAB-01 #1(#2),	Class 1E 125V DC & 120V Vital AC, Non-Class 1E 48V, 125V, 250V DC & 120V Vital AC, Non-Class 1E Inverter Power for Computer 208/120V AC Regulated Power
8.1.3	9-E-DJAA-01 #1(#2),	125V DC Class 1E Distribution Swbd E1A11(E2A11) (Channel I)
8.1.4	9-E-DJAB-01 #1(#2),	125V DC Class 1E Distribution Swbd E1D11(E2D11) (Channel II)
8.1.5	9-E-DJAC-01 #1(#2),	125V DC Class 1E Distribution Swbd E1B11(E2B11) (Channel III)
8.1.6	9-E-DJAD-01 #1(#2),	125V DC Class 1E Distribution Swbd E1C11(E2C11) (Channel IV)
8.1.7	9-E-VAAA-01 #1(#2),	Vital 120V AC Distribution Panels DP001, DP1201 (Channel I)
8.1.8	9-E-VAAB-01 #1(#2),	Vital 120V AC Distribution Panels DP1202, DP1203 (Channel II & III)
8.1.9	9-E-VAAC-01 #1(#2),	Vital 120V AC Distribution Panels DP002, DP1204 (Channel IV)

8.2 Technical Specifications 3.8.1.1, 3.8.2.1, and 3.8.3.1.

8.3 UFSAR Section 8.3, Onsite Power Systems

8.4 SPR 921204, Class 1E Electrical System Min/Max Voltages

8.5 SR 189442, Class 1E Electrical System Min/Max Voltages

8.6 0POP04-AE-0005, Offsite Power System Degraded Voltage

8.7 0PSP06-DJ-0001, 125 Volt Class 1E Battery 7 Day Surveillance Test

8.8 0PMP05-DJ-0010, 1E Battery Equalizing Charge

8.9 0PSP03-EA-0003, ESF Power Availability Shutdown, for Modes 5 and 6

8.10 ST-AE-HL-94678, South Texas Project, Units 1 and 2 - Amendment NOS. 85 and 72 to Facility Operating License NOS. NPF-76 and NPF-80 (Extended AOT 's for ECW, ECHW and SDG's).

8.11 CREE 96-9996 Capability of the Emergency Transformer.

8.12 CREE 97-4343-8 STP's interpretation of 10CFR50 Appendix A, GDC-17, as related to Offsite Power Sources.

8.13 CREE 99-1981-1, HL&P Final Report on STP 345 KV Switchyard Transient Stability Impact on Existing CREE 97-4343-8.

8.14 CREE 99-3416, Evaluate DC voltage used in 0PSP03-EA-0002.

8.15 LER 99-003, Entry into Technical Specification 3.0.3 following a partial LOOP.

8.16 CREE 00-500-25, Possible conditions on the ERCOT grid that influence voltage or grid stability.

8.17 CREE 03-16063-3, STP Position on GDC 17, Electric Power Systems, in regards to the preferred offsite power system.

8.18 0POP01-ZA-0021, AC Electrical Notes and Precautions

8.19 DCP 04-12263-31, Class 1E Battery Charger Setpoints

8.20 SPR 941413, M&TE Issue Sheets Not Completed

8.21 CAQ-D 11-1354-9, Include a third bullet that allows use of a combination of Control Room indication of switchyard breaker status.

8.22 South Texas Project Nuclear Plant Interface Coordination Agreement (March 22, 2010)

8.23 **(UNIT 1 ONLY)** DCP 05-10905-4, Replace Safety Related Inverters EIV001 & EIV002

9.0 Support Documents

9.1 Addendum 1, 345 KV Switchyard Normal Operation

9.2 Addendum 2, Two Physically Independent Circuits

9.3 Data Package Cover Sheet

9.4 Data Sheet 1, 345 KV Switchyard Alignment

9.5 Data Sheet 2, Required ESF Power Train A

9.6 Data Sheet 3, Required ESF Power Train B

9.7 Data Sheet 4, Required ESF Power Train C

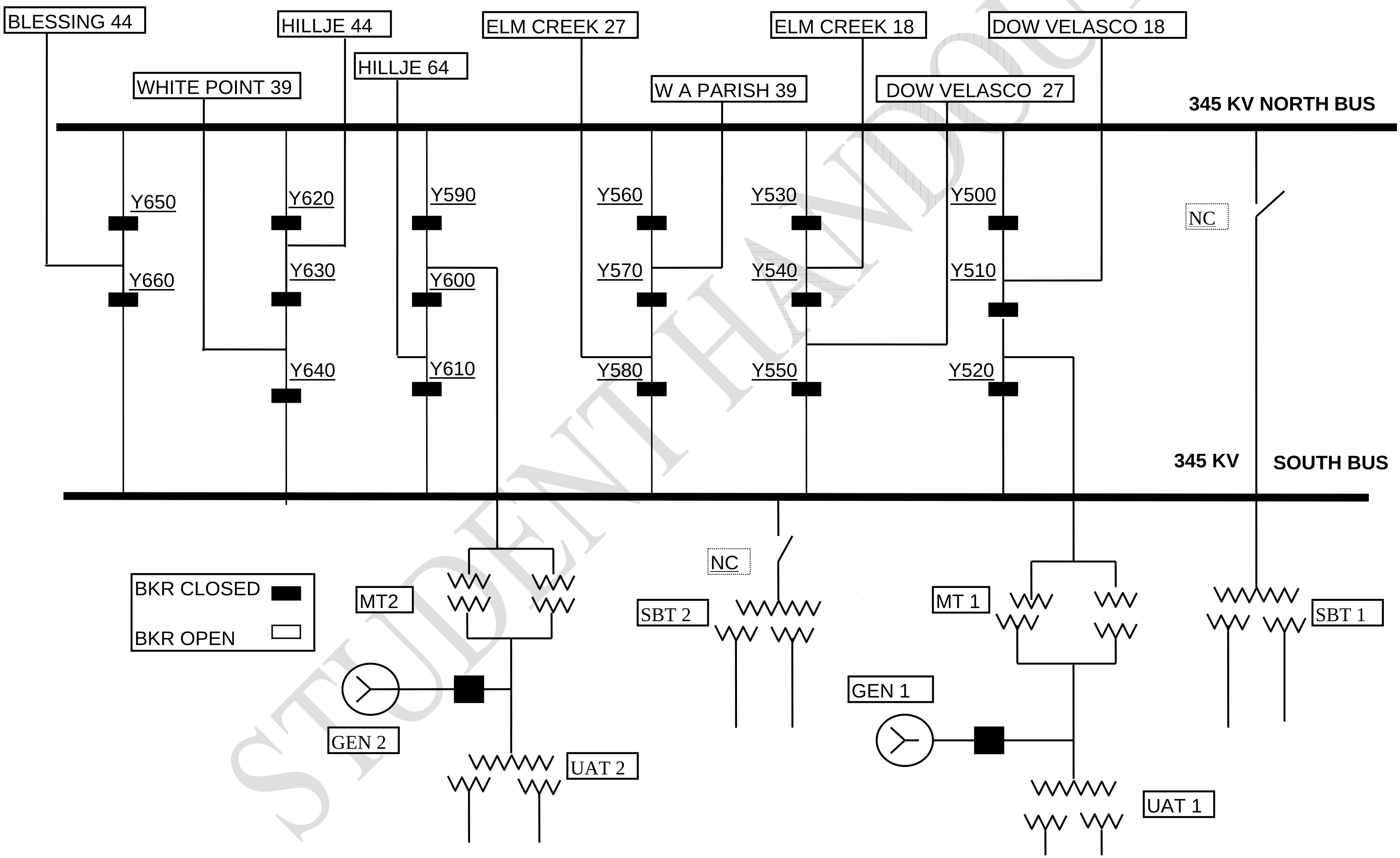
9.8 Data Sheet 5, Channel I, 120 VAC and 125 VDC Vital Bus Availability

9.9 Data Sheet 6, Channel II, 120 VAC and 125 VDC Vital Bus Availability

9.10 Data Sheet 7, Channel III, 120 VAC and 125 VDC Vital Bus Availability

9.11 Data Sheet 8, Channel IV, 120 VAC and 125 VDC Vital Bus Availability

9.12 Data Sheet 9, Bus and Charger Voltage Data



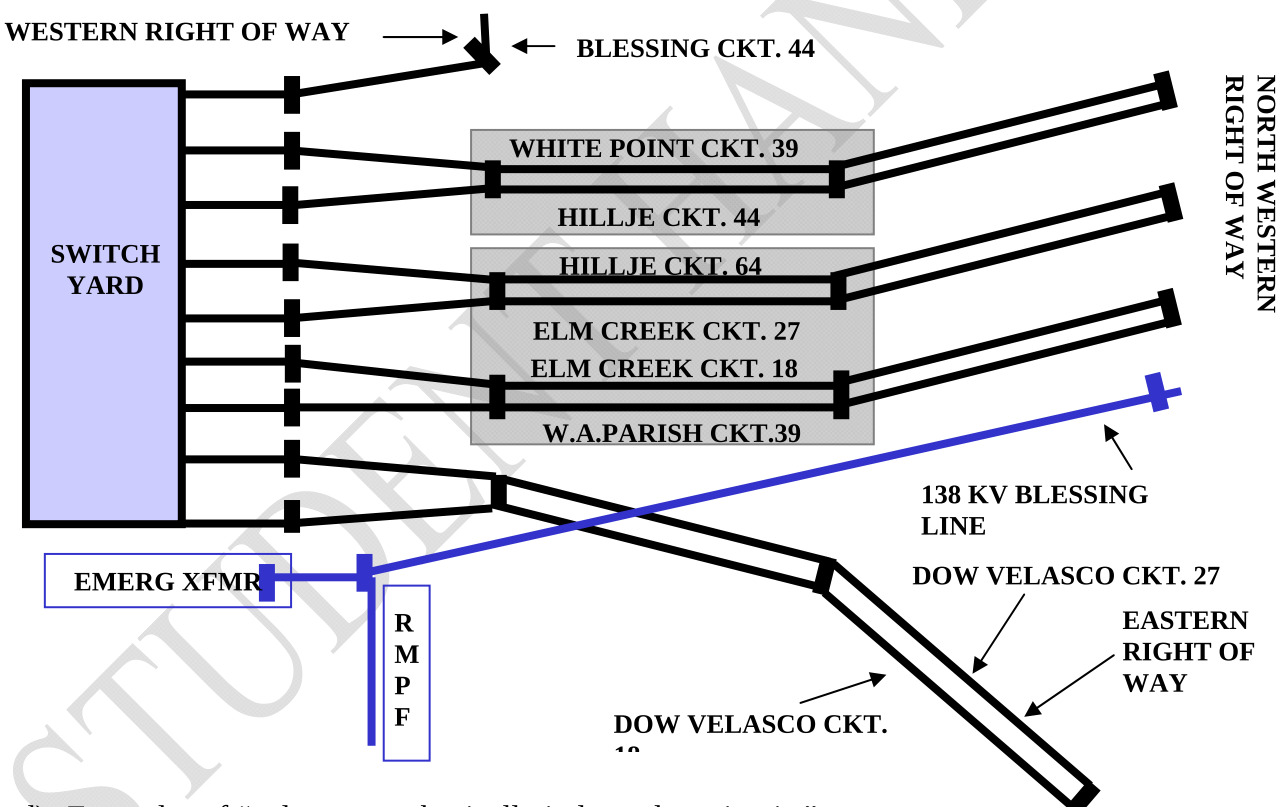
BLESSING 44
HILLJE 44
ELM CREEK 27
ELM CREEK 18
DOW VELASCO 18
HILLJE 64
WHITE POINT 39
W A PARISH 39
DOW VELASCO 27
345 KV NORTH BUS
Y650
Y620
Y590
Y560
Y530
Y500
NC
Y660
Y630
Y600
Y570
Y540
Y510
Y640
Y610
Y580
Y550
Y520
345 KV
SOUTH BUS
NC
BKR CLOSED
BKR OPEN
MT2
SBT 2
MT 1
SBT 1
GEN 1
GEN 2
UAT 2
UAT 1

1) At all times, at least two physically independent circuits must be in service. (Technical Specification 3.8.1.1)

   a) This is an NRC requirement.

   b) Note that the 400 ft. wide "common corridor" right-of-way out of STP property are considered as two independent right-of-ways: one with circuits to White Point and Hillje 44 and the other with circuits to W.A. Parish, Hillje 64, and Elm Creek 27. (Reference UFSAR 8.2.1)

   c) The two transmission lines from Hillje cross under the Elm Creek transmission lines and can not be counted as physically independent circuits.



   d) Examples of "at least two physically independent circuits":

   - White Point Ckt.39 and Elm Creek Ckt. 27 (circuits are in different right-of-ways and the circuits do not share the same towers) (400 ft. wide "common corridor" right-of-way out of STP property can be considered as two independent right-of-ways)

   - White Point Ckt.39 and Dow Velasco Ckt.18 (circuits are in different right-of-ways and the circuits do not share the same towers.)

UNIT 1 **(Circle Unit Performing Lineup)** **UNIT 2**

NOTE

- IF this surveillance is being performed to satisfy Technical Specification Surveillance Requirement 4.8.1.1.1.a, THEN Data Sheet 1 through 9 SHALL be performed.
- IF this surveillance is being performed to satisfy the requirements of Technical Specification 3.8.1.1 ACTION Items a, b, c, or f, THEN ONLY Data Sheet 1, 2, 3, 4, and 9 are required to be performed.
- Permission to start test is required only for manipulation of a system.

1. Data Takers and Procedure Performers:

   John Richards ______________ ______________

   ______________ ______________

2. Reason for Test:

   (Mode 1,2,3 & 4) 4.8.1.1.1.a, 4.8.2.1.a.2, 4.8.3.1, 4.8.3.1

   ________ Periodic Test

   ________ LCO 3.8.1.1.a, With one offsite circuit of the required A.C. electrical power sources inoperable.

   ___√___ LCO 3.8.1.1.b, With a standby diesel generator inoperable.

   ________ LCO 3.8.1.1.c, With one offsite circuit of the required A.C. electrical power sources and one standby diesel generator inoperable.

   ________ LCO 3.8.1.1.f, With two or three of the required standby diesel generators inoperable.

   ________ Other (explain) ______________________________

3. Ensure required information has been recorded on the M&TE Usage form (WOFWOME) in STP IMPACT for each piece of M&TE used. (Reference 8.20) __JR__

4. Test Results:

   ___√___ Acceptable ________ Unacceptable

   IF unacceptable, THEN immediately INFORM the Shift Manager.

   John Richards ____________ Today ____ 30 min. ago ____
   Test Performer Date Time

5. Test Results Second Review:

   ________ Acceptable ________ Unacceptable (complete section below)

   Refer to Technical Specification __________ LCO Action Requirements

   Is this condition a potentially reportable occurrence? _____ Yes

   _____ No

   Should an LCO Action Statement be entered? _____ Yes

   _____ No

   Explain____

   ____

   ____

   ____

   ____

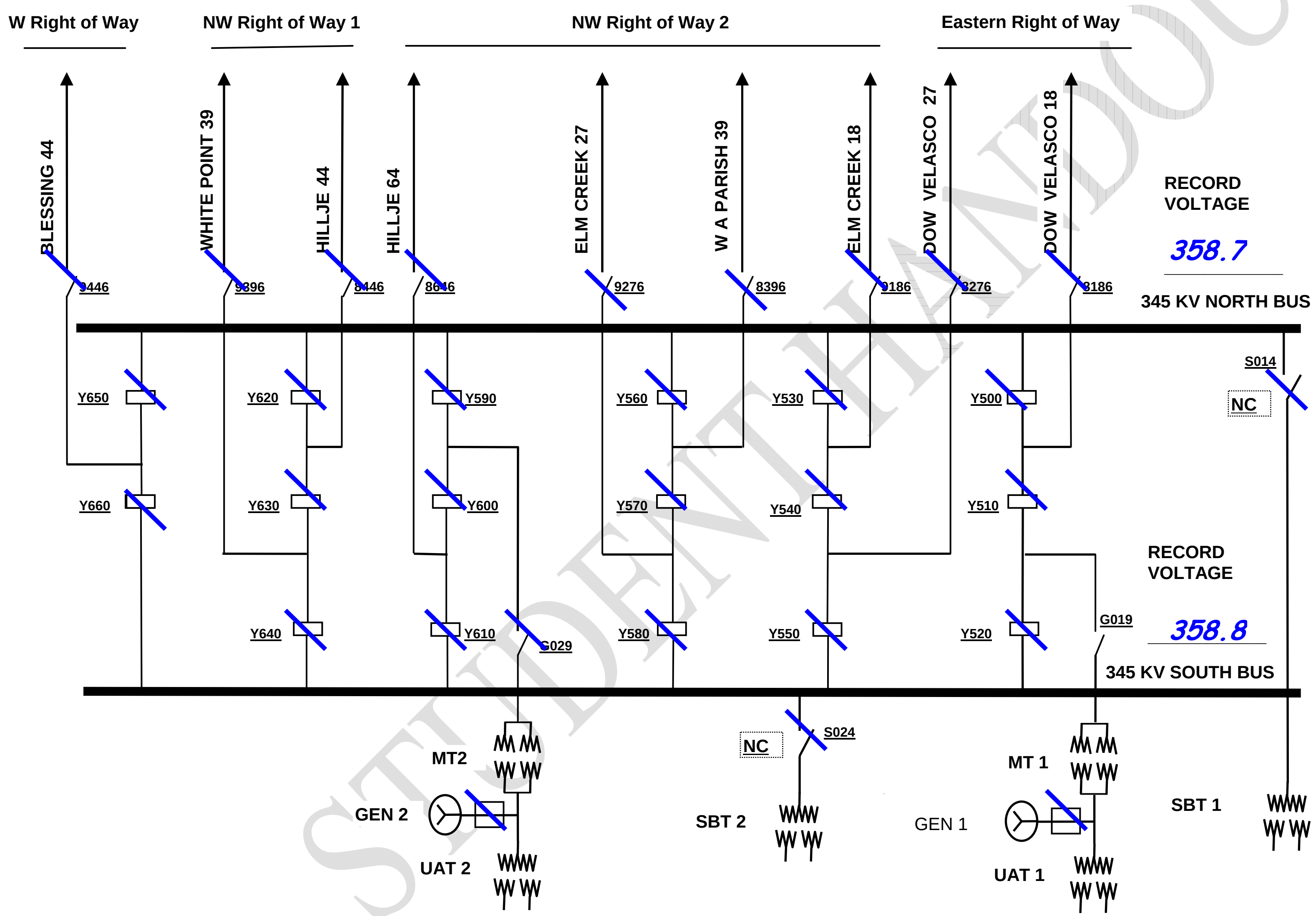
   ____

   ____

   ______________________________ ________ ________
   Shift Manager Date Time

6. Data Review:

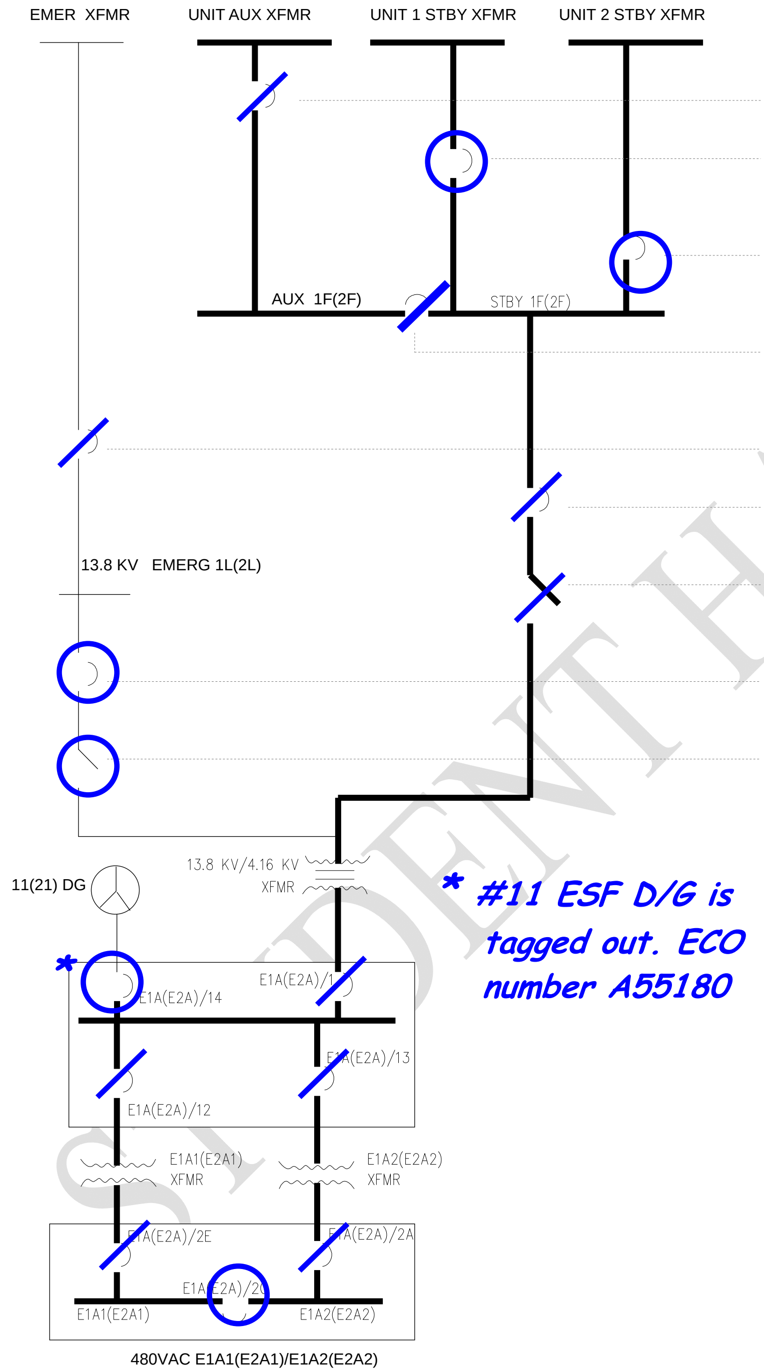
   ______________________________ ________ ________
   Surveillance Coordinator Date Time



345 KV NORTH BUS 345 KV SOUTH BUS NORTH AND SOUTH BUS IN SERVICE WITH VOLTAGE > 329KV	YES	NO
W. RIGHT OF WAY NW RIGHT OF WAY 1 NW RIGHT OF WAY 2 EASTERN RIGHT OF WAY AT LEAST 2 RIGHT OF WAYS AVAILABLE	YES	NO
BLESSING 44	YES	NO
WHITE POINT 39	YES	NO
HILLJE 44	YES	NO
HILLJE 64	YES	NO
ELM CREEK 27	YES	NO
W A PARISH 39	YES	NO
ELM CREEK 18	YES	NO
DOW VELASCO 27	YES	NO
DOW VELASCO 18	YES	NO

	0PSP03-EA-0002	Rev. 25	Page 22 of 36
	ESF Power Availability		
Data Sheet 2	Required ESF Power Train A		Page 1 of 1

UNIT 1 (Circle Unit Performing Data Sheet) UNIT 2



* #11 ESF D/G is tagged out. ECO number A55180

DESIGNATE (✓) Class 1E 4160 VAC Bus Power Source (note 2)	(1) ✓	(2)	(3)	(4)	(5)
	UNIT AUX XFMR	UNIT 1 STBY XFMR	UNIT 1 STBY XFMR	UNIT 2 STBY XFMR	UNIT 2 STBY XFMR
UAT TO AUX BUS 1F(2F) SUPLY	CLOSED	CLOSED	OPEN	CLOSED	OPEN
STBY XFMR 1 TO STBY BUS 1F(2F) SUPLY	OPEN	CLOSED	CLOSED	OPEN	OPEN
STBY XFMR 2 TO STBY BUS 1F(2F) SUPLY	OPEN	OPEN	OPEN	CLOSED	CLOSED
AUX TO STBY BUS 1F(2F) TIE	CLOSED	OPEN	N/A	OPEN	N/A

BREAKER/DISC POSITION

	REQ'D	UNSAT
EMER XFMR TO BUS 1K/1L (2K/2L) SPLY	N/A	N/A
STBY BUS 1F(2F) TO XFMR E1A(E2A) BKR SW-NORM	CLOSED	OPEN
STBY BUS 1F(2F) TO XFMR E1A(E2A) DISC SW-NORM	CLOSED	OPEN
EMER BUS 1L/2L TO XFMR E1A(E2A) BKR SW-EMER	N/A	N/A
EMER BUS 1L/2L TO XFMR E1A(E2A) DISC SW-EMER	N/A	N/A
SPLY BKR E1A(E2A)/1	CLOSED	OPEN
DG OUTP BKR E1A(E2A)/14	N/A	N/A
SPLY BKR E1A(E2A)/12	CLOSED	OPEN
SPLY BKR E1A(E2A)/13	CLOSED	OPEN
OUTP BKR E1A(E2A)/2E	CLOSED	OPEN
OUTP BKR E1A(E2A)/2A	CLOSED	OPEN
CROSS TIE E1A(E2A)/2C	OPEN	CLOSED

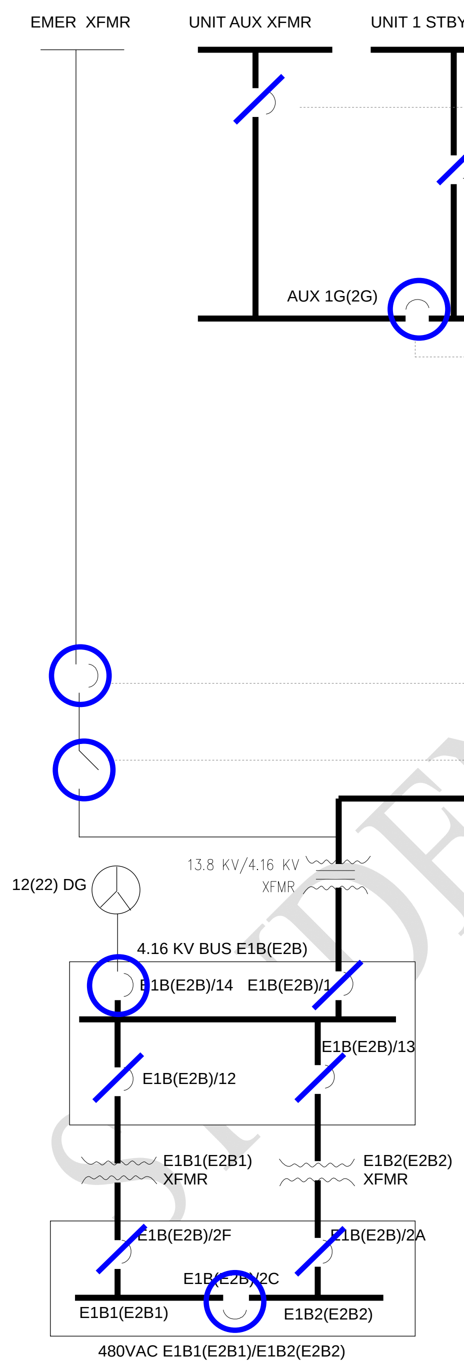
Note 1, ▬▬▬ Indicates Technical Specification related electrical lineup.
Note 2, Required per Technical Specifications, EITHER UNIT AUX XFMR OR UNIT 1 STBY XFMR OR UNIT 2 STBY XFMR **SHALL** be the power source for 4.16 KV Bus E1A(E2A).

John Richards	Today	30 min. ago
PERFORMED BY	DATE	TIME

This procedure, when complete, SHALL be retained for five years.

Data Sheet 3	Required ESF Power Train B	Page 1 of 1

UNIT 1 **(Circle Unit Performing Data Sheet)** **UNIT 2**



DESIGNATE (✓) Class 1E 4160 VAC Bus Power Source (note 2)	(1)	(2) ✓	(3)	(4)	(5)
	UNIT AUX XFMR	UNIT 1 STBY XFMR	UNIT 1 STBY XFMR	UNIT 2 STBY XFMR	UNIT 2 STBY XFMR
UAT TO AUX BUS 1G(2G) SPLY	CLOSED	CLOSED	OPEN	CLOSED	OPEN
STBY XFMR 1 TO STBY BUS 1G(2G) SPLY	OPEN	CLOSED	CLOSED	OPEN	OPEN
STBY XFMR 2 TO STBY BUS 1G(2G) SPLY	OPEN	OPEN	OPEN	CLOSED	CLOSED
AUX TO STBY BUS 1G(2G) TIE	CLOSED	OPEN	N/A	OPEN	N/A

BREAKER/DISC POSITION	REQ'D	UNSAT
STBY BUS 1G(2G) TO XFMR E1B(E2B) BKR SW-NORM	CLOSED	OPEN
STBY BUS 1G(2G) TO XFMR E1B(E2B) DISC SW-NORM	CLOSED	OPEN
EMER BUS 1L(2L) TO XFMR E1B(E2B) BKR SW-EMER	N/A	N/A
EMER BUS 1L(2L) TO XFMR E1B(E2B) BKR DISC SW-EMER	N/A	N/A
SPLY BKR E1B(E2B)/1	CLOSED	OPEN
DG OUTP BKR E1B(E2B)/14	N/A	N/A
SPLY BKR E1B(E2B)/12	CLOSED	OPEN
SPLY BKR E1B(E2B)/13	CLOSED	OPEN
OUTP BKR E1B(E2B)/2F	CLOSED	OPEN
OUTP BKR E1B(E2B)/2A	CLOSED	OPEN
CROSS TIE E1B(E2B)/2C	OPEN	CLOSED

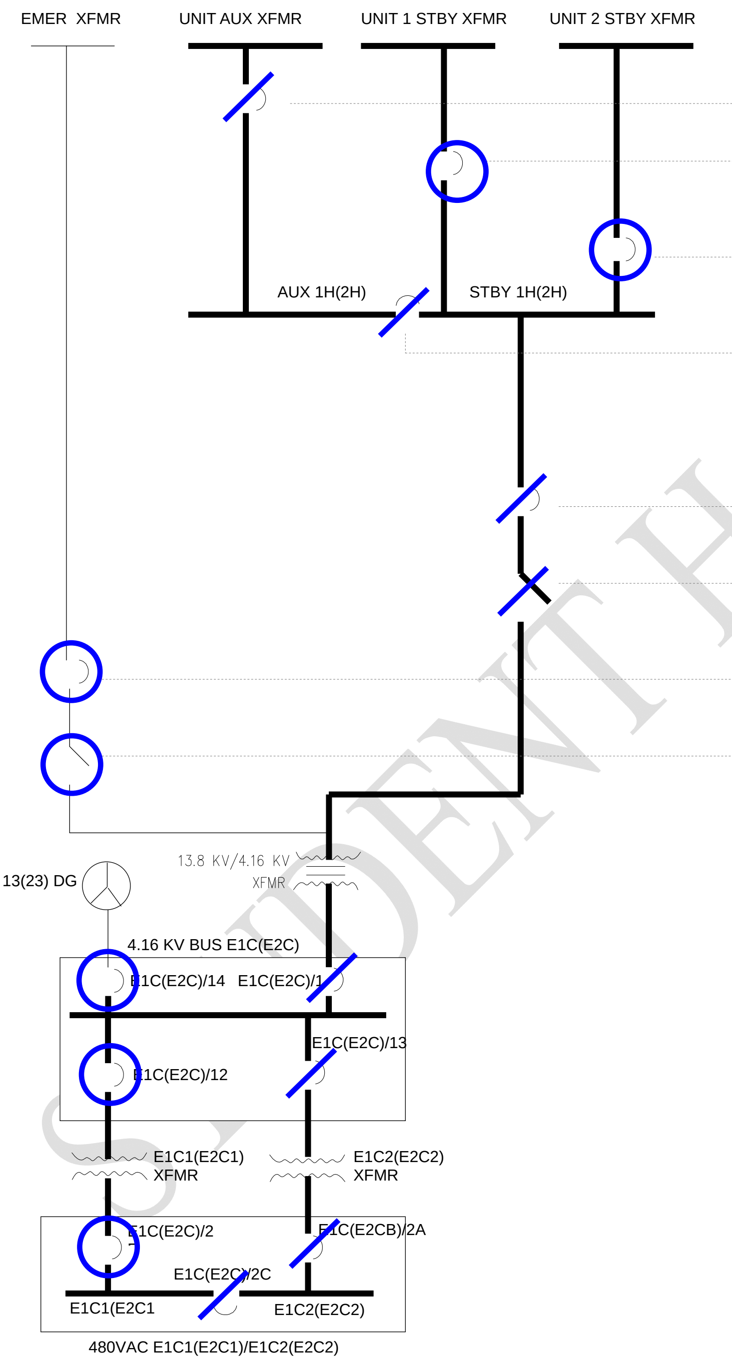
Note 1, ▬▬ Indicates Technical Specification related electrical lineup.
Note 2, Required per Technical Specifications, EITHER UNIT AUX XFMR OR UNIT 1 STBY XFMR OR UNIT 2 STBY XFMR **SHALL** be the power source for 4.16 KV Bus E1B(E2B).

John Richards	Today	30 min ago
PERFORMED BY	DATE	TIME

This procedure, when complete, SHALL be retained for five years.

Data Sheet 4	Required ESF Power Train C	Page 1 of 1

UNIT 1 (Circle Unit Performing Data Sheet) UNIT 2



DESIGNATE (✓) Class 1E 4160 VAC Bus Power Source (note 2)	(1) ✓	(2)	(3)	(4)	(5)
	UNIT AUX XFMR	UNIT 1 STBY XFMR	UNIT 1 STBY XFMR	UNIT 2 STBY XFMR	UNIT 2 STBY XFMR
UAT TO AUX BUS 1H(2H) SPLY	CLOSED	CLOSED	OPEN	CLOSED	OPEN
STBY XFMR 1 TO STBY BUS 1H(2H) SPLY	OPEN	CLOSED	CLOSED	OPEN	OPEN
STBY XFMR 2 TO STBY BUS 1H(2H) SPLY	OPEN	OPEN	OPEN	CLOSED	CLOSED
AUX TO STBY BUS 1H(2H) TIE	CLOSED	OPEN	N/A	OPEN	N/A

BREAKER/DISC POSITION	REQ'D	UNSAT
STBY BUS 1H(2H) TO XFMR E1C(E2C) BKR SW-NORM	CLOSED	OPEN
STBY BUS 1H(2H) TO XFMR E1C(E2C) DISC SW-NORM	CLOSED	OPEN
EMER BUS 1L(2L) TO XFMR E1C(E2C) BKR SW-EMER	N/A	N/A
EMER BUS 1L(2L) TO XFMR E1C(E2C) BKR DISC SW-EMER	N/A	N/A
SPLY BKR E1C(E2C)/1	CLOSED	OPEN
DG OUTP BKR E1C(E2C)/14	N/A	N/A
SPLY BKR E1C(E2C)/12	CLOSED	OPEN
SPLY BKR E1C(E2C)/13	CLOSED	OPEN
OUTP BKR E1C(E2C)/2E	CLOSED	OPEN
OUTP BKR E1C(E2C)/2A	CLOSED	OPEN
CROSS TIE E1C(E2C)/2C	OPEN	CLOSED

Note 1, ▬▬ Indicates Technical Specification related electrical lineup.

Note 2, Required per Technical Specifications, EITHER UNIT AUX XFMR OR UNIT 1 STBY XFMR OR UNIT 2 STBY XFMR **SHALL** be the power source for 4.16 KV Bus E1C(E2C).

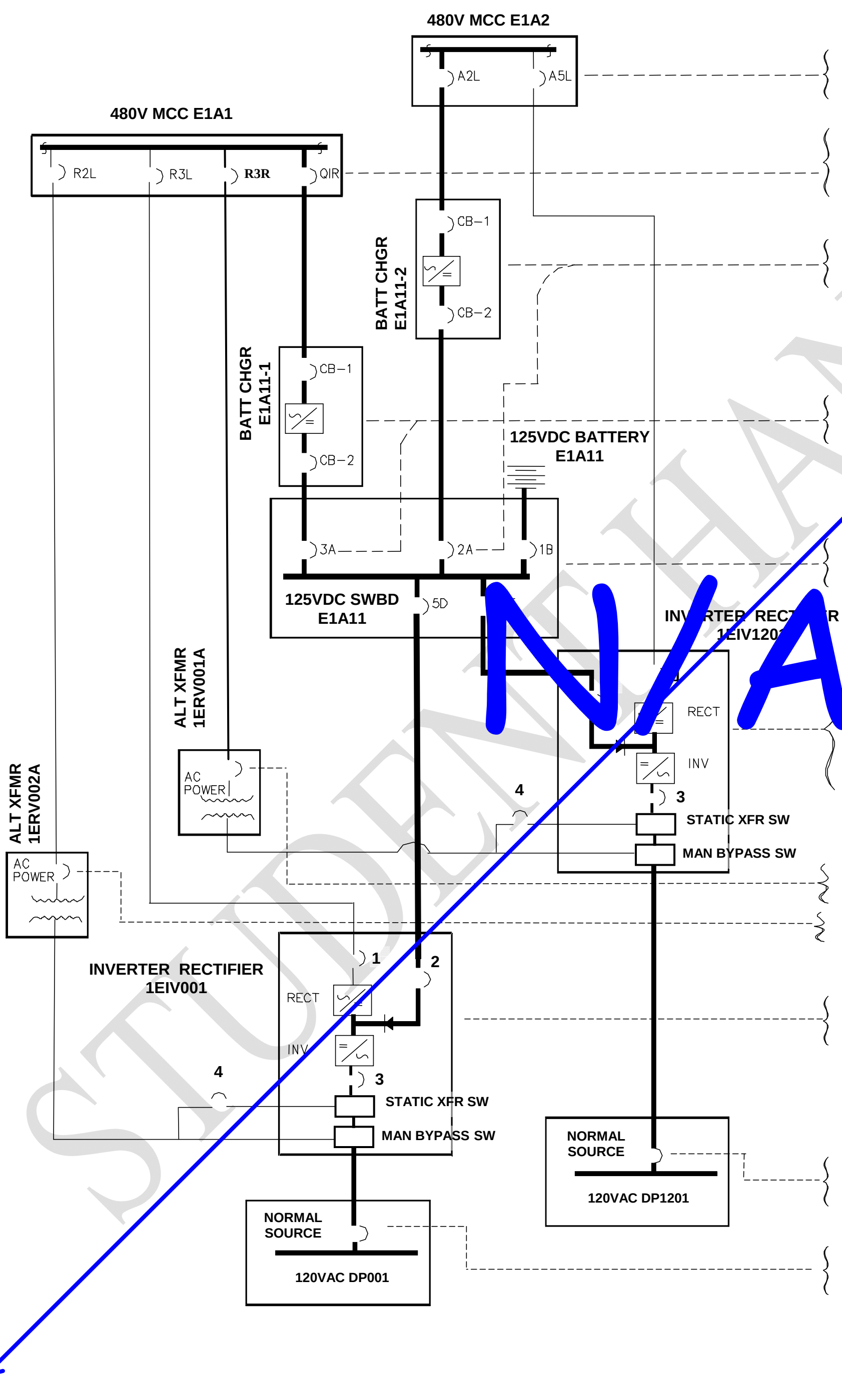
John Richards	Today	30 min ago
PERFORMED BY	DATE	TIME

This procedure, when complete, SHALL be retained for five years.

(UNIT 1 ONLY)

N/A

CHANNEL I VITAL BUS SCHEMATIC



BREAKER POSITION

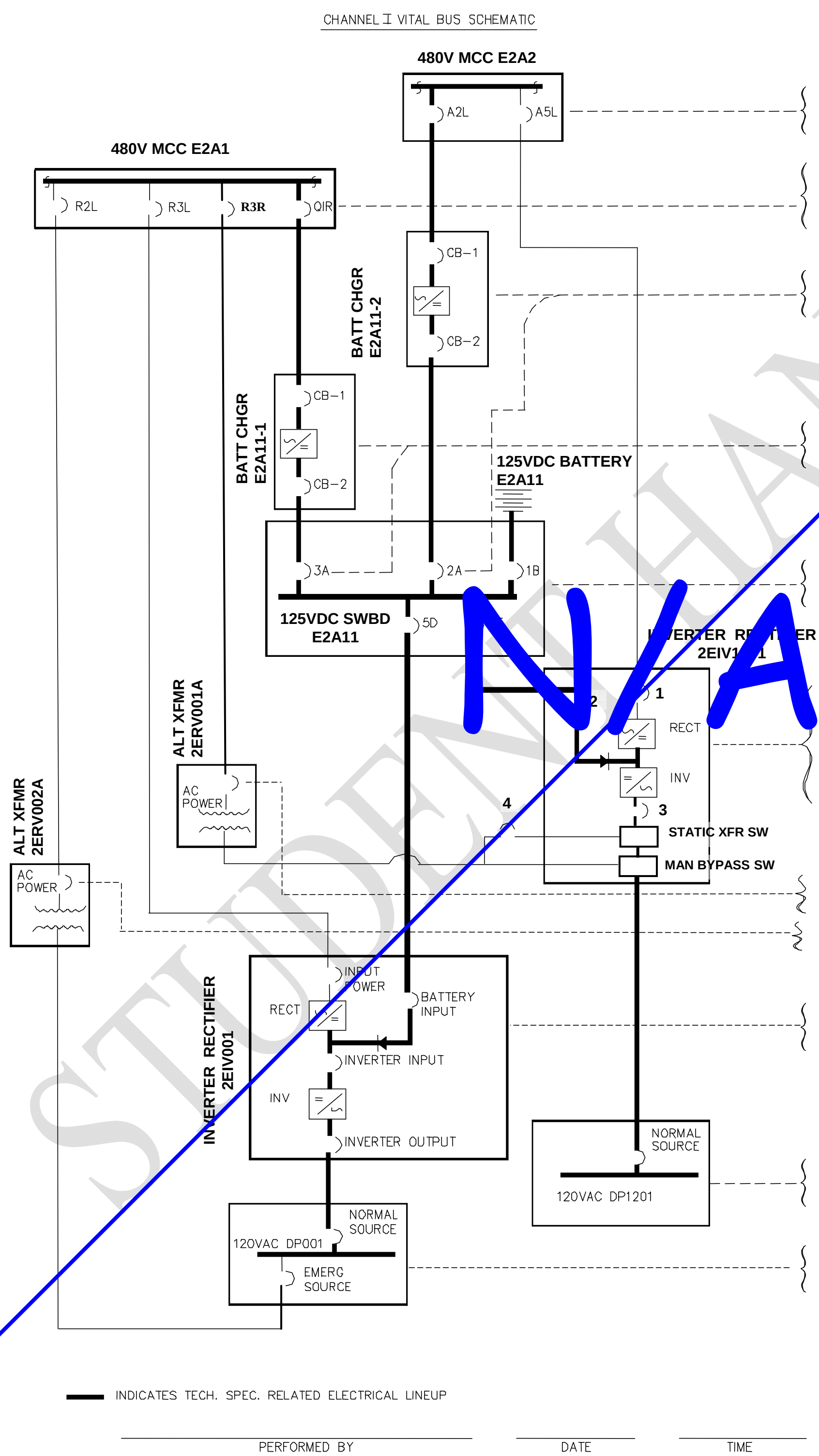
	NORMAL	ABNORMAL
E1A2 /A2L	ON	OFF
E1A2 /A5L	ON	OFF
E1A1 / R2L	ON	OFF
E1A1 / R3L	ON	OFF
E1A1 / Q1R	ON	OFF
E1A1 / R3R	ON	OFF
E1A11-2 “CB-1”	______	______
E1A11-2 “CB-2”	______	______
E1A11-2 /2A	______	______
E1A11-1 “CB-1”	______	______
E1A11-1 “CB-2”	______	______
E1A11-1 /3A	______	______
E1A11 /1B	CLOSED	OPEN
E1A11 /5D	ON	OFF
E1A11 /5E	ON	OFF
1EIV1201		
1 – RECTIFIER AC INPUT	ON	OFF
2 – BATTERY INPUT	ON	OFF
3 – INVERTER OUTPUT	ON	OFF
4 – BYPASS SOURCE AC INPUT	ON	OFF
“INVERTER SUPPLYING LOAD” LIGHT	ON	OFF
“AC INPUT”	ON	OFF
“AC INPUT”	ON	OFF
1EIV001		
1 – RECTIFIER AC INPUT	ON	OFF
2 – BATTERY INPUT	ON	OFF
3 – INVERTER OUTPUT	ON	OFF
4 – BYPASS SOURCE AC INPUT	ON	OFF
“INVERTER SUPPLYING LOAD” LIGHT	ON	OFF
DP1201 “NORMAL SOURCE”	ON	OFF
DP001 “NORMAL SOURCE”	ON	OFF

▬ INDICATES TECH. SPEC. RELATED ELECTRICAL LINEUP

PERFORMED BY ______ DATE ______ TIME ______

ADI00608A

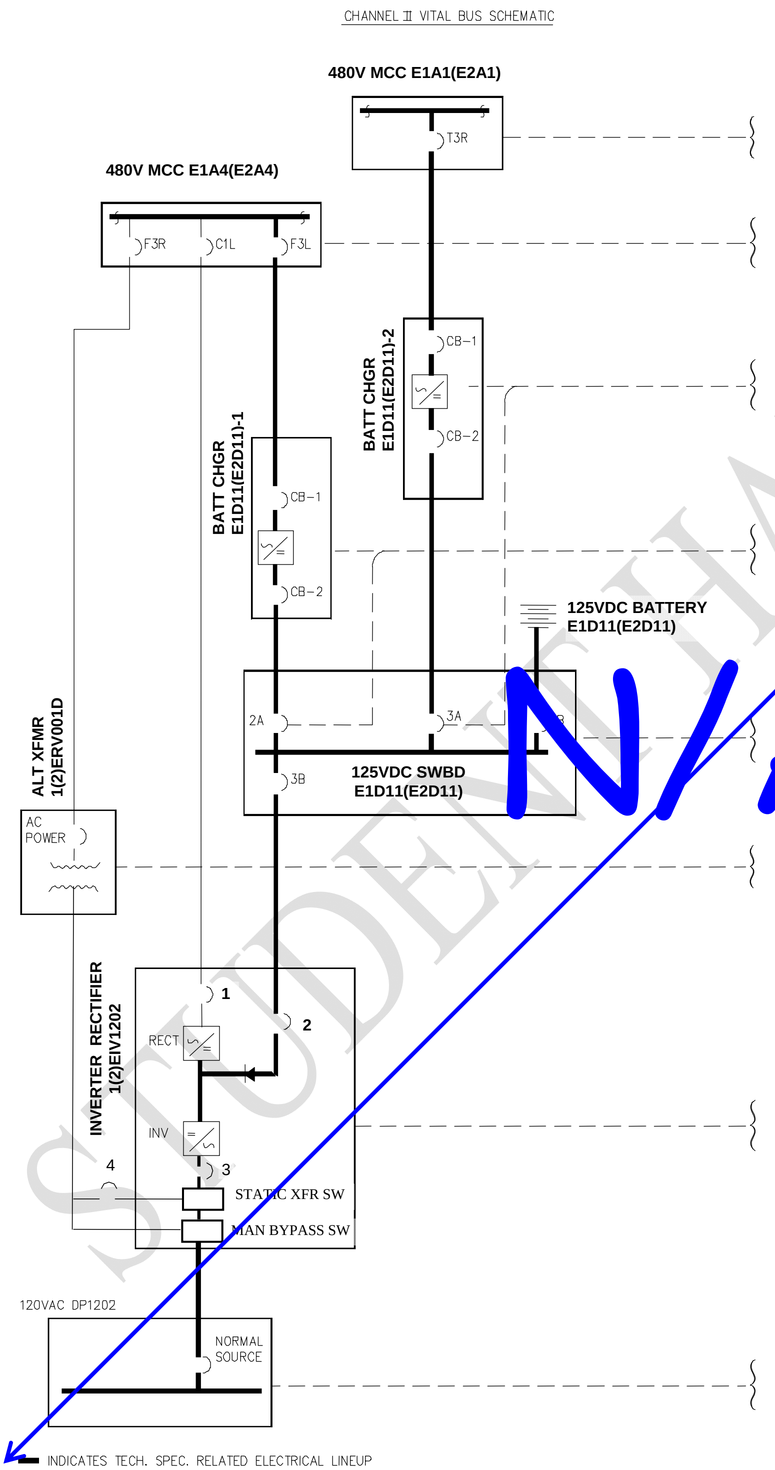
(UNIT 2 ONLY)



BREAKER POSITION

	NORMAL	ABNORMAL
E2A2 /A2L	ON	OFF
E2A2 /A5L	ON	OFF
E2A1 / R2L	ON	OFF
E2A1 / R3L	ON	OFF
E2A1 / Q1R	ON	OFF
E2A1 / R3R	ON	OFF
E2A11-2 "CB-1"	______	______
E2A11-2 "CB-2"	______	______
E2A11-2 /2A	______	______
E2A11-1 "CB-1"	______	______
E2A11-1 "CB-2"	______	______
E2A11-1 /3A	______	______
E2A11 /1B	CLOSED	OPEN
E2A11 /5D	ON	OFF
E2A11 /5E	ON	OFF
2EIV1201		
1 – RECTIFIER AC INPUT	ON	OFF
2 – BATTERY INPUT	ON	OFF
3 – INVERTER OUTPUT	ON	OFF
4 – BYPASS SOURCE AC INPUT	ON	OFF
"INVERTER SUPPLYING LOAD" LIGHT	ON	OFF
"AC INPUT"	ON	OFF
"AC INPUT"	ON	OFF
2EIV001		
"INPUT POWER"	ON	OFF
"BATTERY INPUT"	ON	OFF
"INVERTER INPUT"	ON	OFF
"INVERTER OUTPUT"	ON	OFF
DP1201 "NORMAL SOURCE"	ON	OFF
DP001 "NORMAL SOURCE"	ON	OFF
DP001 "EMERG SOURCE"	OFF	ON

UNIT 1 **(Circle Unit Performing Data Sheet)** **UNIT 2**



N/A

BREAKER POSITION

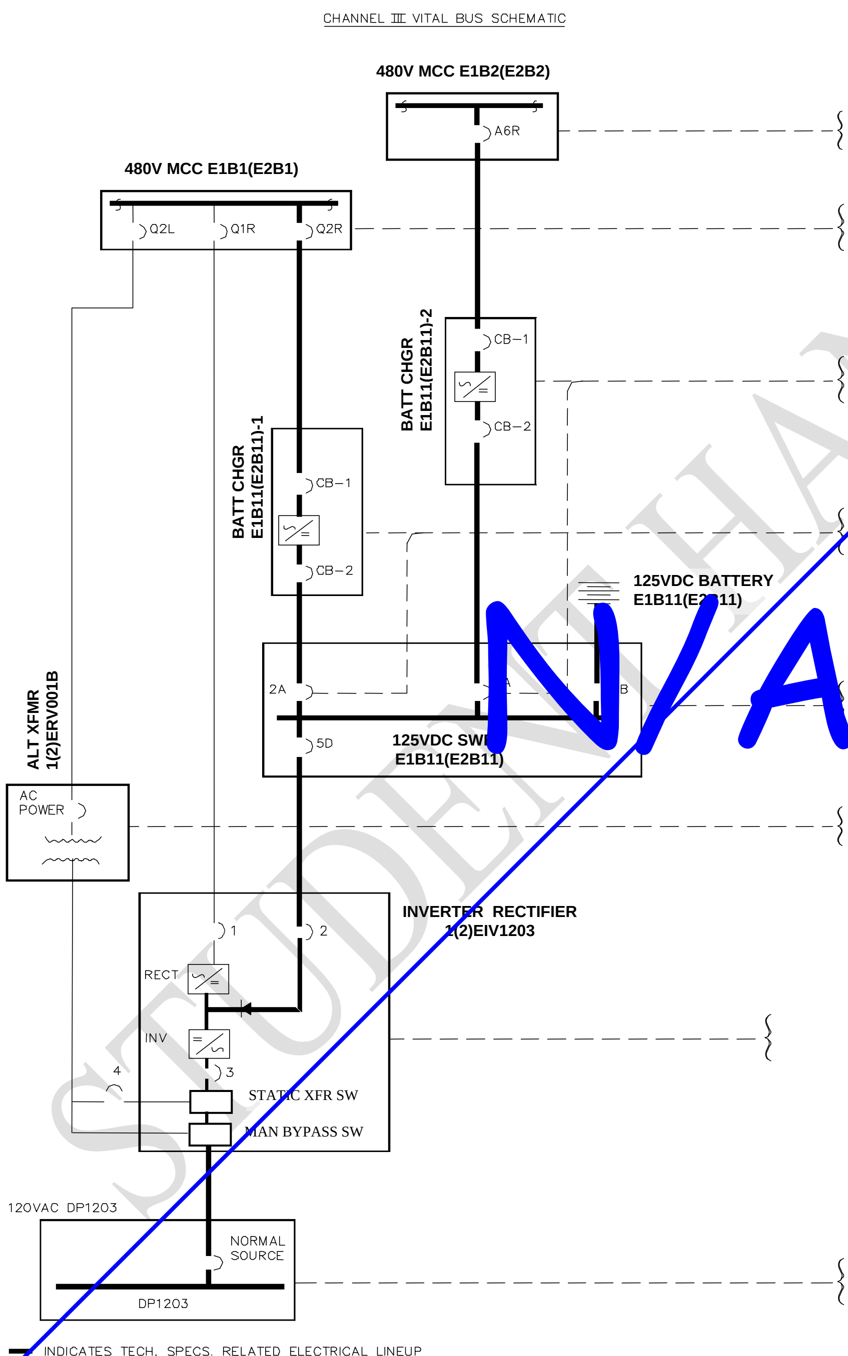
	NORMAL	ABNORMAL
E1A1(E2A1) /T3R	ON	OFF
E1A4(E2A4)/ F3R	ON	OFF
E1A4(E2A4) / C1L	ON	OFF
E1A4(E2A4) / F3L	ON	OFF
E1D11(E2D11)-2 “CB-1”	______	______
E1D11(E2D11)-2 “CB-2”	______	______
E1D11(E2D11)-2 /3A	______	______
E1D11(E2D11)-1 “CB-1”	______	______
E1D11(E2D11)-1 “CB-2”	______	______
E1D11(E2D11)-1 /2A	______	______
E1D11(E2D11) /1B	CLOSED	OPEN
E1D11(E2D11) /3B	ON	OFF
“AC INPUT”	ON	OFF
1(2)EIV1202		
1 – RECTIFIER AC INPUT	ON	OFF
2 – BATTERY INPUT	ON	OFF
3 – INVERTER OUTPUT	ON	OFF
4 – BYPASS SOURCE AC INPUT	ON	OFF
“INVERTER SUPPLYING LOAD” LIGHT	ON	OFF
DP1202 “NORMAL SOURCE”	ON	OFF

______ PERFORMED BY ______ DATE ______ TIME

ADI00608D
REV. 1

UNIT 1 **(Circle Unit Performing Data Sheet)** **UNIT 2**

N/A



BREAKER POSITION

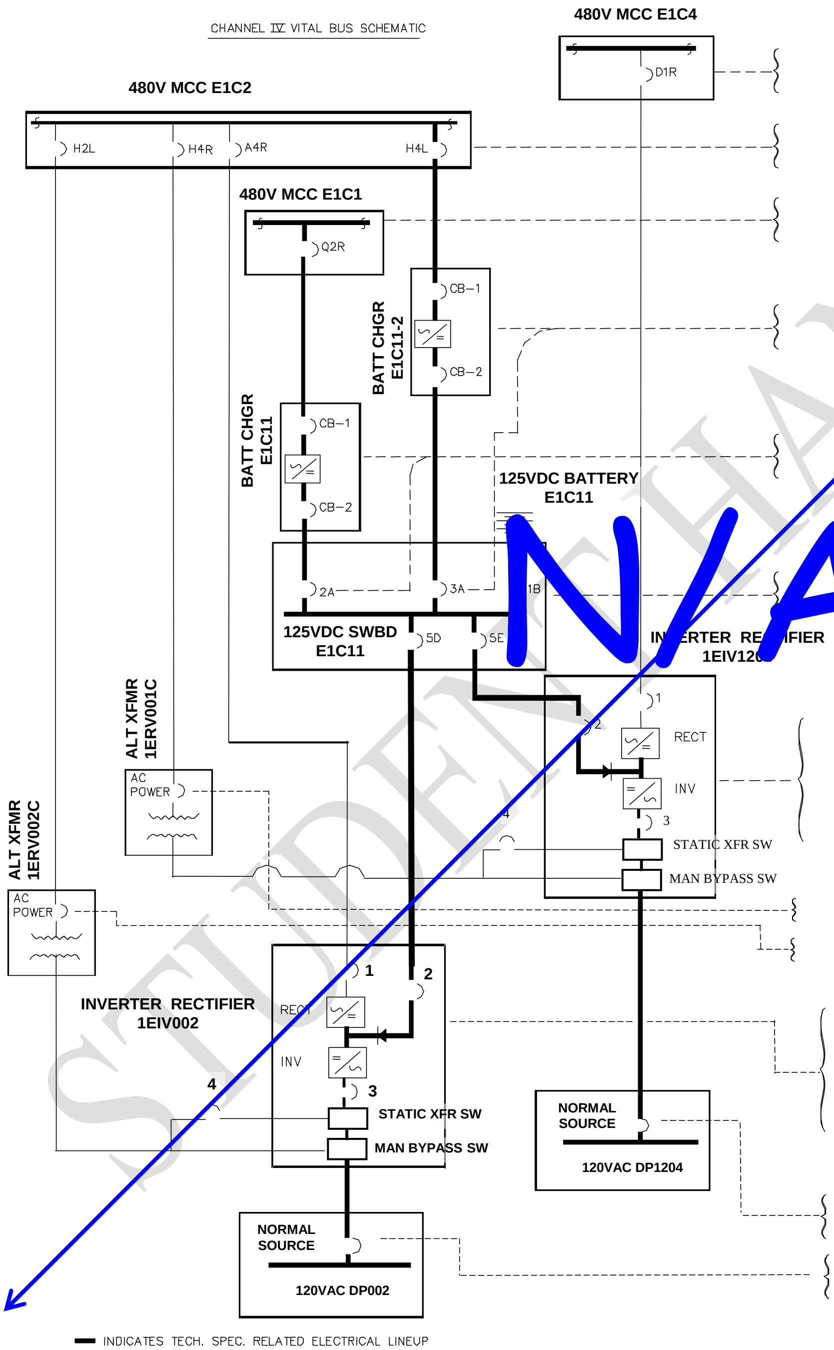
	NORMAL	ABNORMAL
E1B2(E2B2) /A6R	ON	OFF
E1B1(E2B1)/ Q2L	ON	OFF
E1B1(E2B1) / Q1R	ON	OFF
E1B1(E2B1) / Q2R	ON	OFF
E1B11(E2B11)-2 "CB-1"	______	______
E1B11(E2B11)-2 "CB-2"	______	______
E1B11(E2B11)-2 /3A	______	______
E1B11(E2B11)-1 "CB-1"	______	______
E1B11(E2B11)-1 "CB-2"	______	______
E1B11(E2B11)-1 /2A	______	______
E1B11(E2B11) /1B	CLOSED	OPEN
E1B11(E2B11) /5D	ON	OFF
"AC INPUT"	ON	OFF
1(2)EIV1203		
1 – RECTIFIER AC INPUT	ON	OFF
2 – BATTERY INPUT	ON	OFF
3 – INVERTER OUTPUT	ON	OFF
4 – BYPASS SOURCE AC INPUT	ON	OFF
"INVERTER SUPPLYING LOAD" LIGHT	ON	OFF
DP1203 "NORMAL SOURCE"	ON	OFF

PERFORMED BY ______ DATE ______ TIME ______

ADI00608C REV. 1

(UNIT 1 ONLY)

N/A



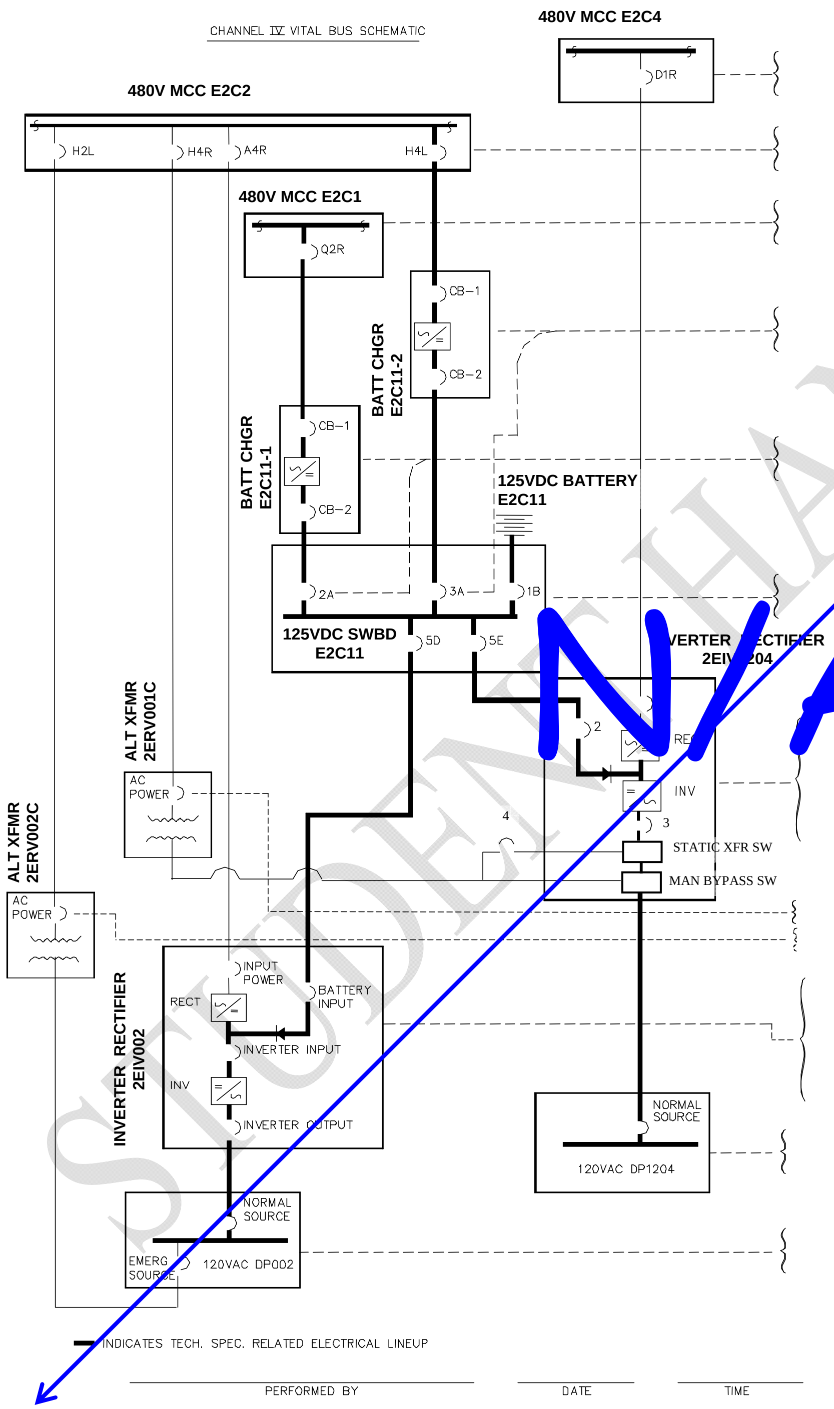
BREAKER POSITION

	NORMAL	ABNORMAL
E1C4 /D1R	ON	OFF
E1C2 / H2L	ON	OFF
E1C2 / H4R	ON	OFF
E1C2 / A4R	ON	OFF
E1C2 / H4L	ON	OFF
E1C1 / Q2R	ON	OFF
E1C11-2 "CB-1"	______	______
E1C11-2 "CB-2"	______	______
E1C11-2 /3A	______	______
E1C11-1 "CB-1"	______	______
E1C11-1 "CB-2"	______	______
E1C11-1 /2A	______	______
E1C11 /1B	CLOSED	OPEN
E1C11 /5D	ON	OFF
E1C11 /5E	ON	OFF
1EIV1204		
1 – RECTIFIER AC INPUT	ON	OFF
2 – BATTERY INPUT	ON	OFF
3 – INVERTER OUTPUT	ON	OFF
4 – BYPASS SOURCE AC INPUT	ON	OFF
"INVERTER SUPPLYING LOAD" LIGHT	ON	OFF
"AC INPUT"	ON	OFF
"AC INPUT"	ON	OFF
1EIV002		
1 – RECTIFIER AC INPUT	ON	OFF
2 – BATTERY INPUT	ON	OFF
3 – INVERTER OUTPUT	ON	OFF
4 – BYPASS SOURCE AC INPUT	ON	OFF
"INVERTER SUPPLYING LOAD" LIGHT	ON	OFF
DP1204 "NORMAL SOURCE"	ON	OFF
DP002 "NORMAL SOURCE"	ON	OFF

ADI00608B

______________________ PERFORMED BY ______________ DATE ______________ TIME

(UNIT 2 ONLY)



BREAKER POSITION

	NORMAL	ABNORMAL
E2C4 /D1R	ON	OFF
E2C2 / H2L	ON	OFF
E2C2 / H4R	ON	OFF
E2C2 / A4R	ON	OFF
E2C2 / H4L	ON	OFF
E2C1 / Q2R	ON	OFF
E2C11-2 "CB-1"	______	______
E2C11-2 "CB-2"	______	______
E2C11-2 /3A	______	______
E2C11-1 "CB-1"	______	______
E2C11-1 "CB-2"	______	______
E2C11-1 /2A	______	______
E2C11 /1B	CLOSED	OPEN
E2C11 /5D	ON	OFF
E2C11 /5E	ON	OFF
2EIV1204		
1 – RECTIFIER AC INPUT	ON	OFF
2 – BATTERY INPUT	ON	OFF
3 – INVERTER OUTPUT	ON	OFF
4 – BYPASS SOURCE AC INPUT	ON	OFF
"INVERTER SUPPLYING LOAD" LIGHT	ON	OFF
"AC INPUT"	ON	OFF
"AC INPUT"	ON	OFF
2EIV002		
"INPUT POWER"	ON	OFF
"BATTERY INPUT"	ON	OFF
"INVERTER INPUT"	ON	OFF
"INVERTER OUTPUT"	ON	OFF
DP1204 "NORMAL SOURCE"	ON	OFF
DP002 "NORMAL SOURCE"	ON	OFF
DP002 "EMERG SOURCE"	OFF	ON

ADI00608B

UNIT 1 **(Circle Unit Performing Data Sheet)** **UNIT 2**

REMARKS

DEVICE NUMBER	DESCRIPTION	REMARKS

M&TE Used:

Description	Range	M&TE No.	Cal. Due Date
NA			
	NA	NA	NA

1. Personnel Participating in Performance of Data Sheet 9.

Personnel	Date	Time
John Richards	30 min ago	Today

2. Data Sheet 9, Bus and Charger Voltage Data Completed By:

John Richards ____ 30 min ago ____ Today ____
Operator Date Time

3. Data Sheet 9, Bus and Charger Voltage Data, Bus and Charger Voltage Data Reviewed By:

____________________ ________ ________
Unit Supervisor Date Time

1. IF this surveillance is being performed to satisfy the requirements of Technical Specification 3.8.1.1 ACTION Items a, b, c, or f, THEN ONLY those readings indicated with an asterisk (*) are required to be completed. Tables 2 thru 5 need not be retained when performing this surveillance to satisfy the requirements of Technical Specification 3.8.1.1 ACTION Items a, b, c, or f. (Reference 8.2).

2. IF any voltage readings are NOT within Satisfactory Range, THEN immediately NOTIFY the Unit Supervisor or Shift Manager. (References 8.4 and 8.5)

3. Determines the availability of the 138 KV Emergency Transformer for possible use during a Loss of Offsite Power. (3) This meets commitments made for the SDG, ECW and Essential Chilled Water Technical Specification Change. (Reference 8.10).

Table 1. 13.8 KV Bus Voltage Data

BUS/CHARGER (LOCATION)	RECORDED TEST VALUE	SATISFACTORY RANGE	INITIAL
* Aux Bus 1F(2F) (CP010)	14.3 KV	12.8 - 14.5 KV	JR
* Stby Bus 1F(2F) (CP010)	14.0 KV	12.8 - 14.5 KV	JR
* Aux Bus 1G(2G) (CP010)	14.2 KV	12.8 - 14.5 KV	JR
* Stby Bus 1G(2G) (CP010)	14.3 KV	12.8 - 14.5 KV	JR
* Aux Bus 1H(2H) (CP010)	14.3 KV	12.8 - 14.5 KV	JR
* Stby Bus 1H(2H) (CP010)	14.2 KV	12.8 - 14.5 KV	JR
(3) Emer Bus 1L(2L) (CP010)	14.4 KV	12.8 - 14.5 KV	JR
* 4.16 KV Bus E1A(E2A) (CP003)	4.25 KV	3.9 - 4.4 KV	JR
* 4.16 KV Bus E1B(E2B) (CP003)	4.29 KV	3.9 - 4.4 KV	JR
* 4.16 KV Bus E1C(E2C) (CP003)	4.30 KV	3.9 - 4.4 KV	JR

1. Electricians assist by measuring the battery charge current at the battery field cable and total battery terminal voltage.

2. IF Battery Chargers are on equalize charge per 0PMP05-DJ-0010, THEN Electricians or MOST PLACE battery chargers on FLOAT charge prior to readings and log time off of equalize charge in 0PMP05-DJ-0010. WHEN readings are complete, THEN return Battery Chargers to equalize and log time on in 0PMP05-DJ-0010.

3. IF any voltage readings are NOT within Satisfactory Range, THEN immediately NOTIFY the Unit Supervisor or Shift Manager. (References 8.4 and 8.5)

Table 2. Channel I Bus and Charger Voltage Data

BUS/CHARGER (LOCATION)	RECORDED TEST VALUE	SATISFACTORY RANGE	INITIAL
480 V LC E1A1(E2A1) (EAB 10' Swgr Rm)	N/A VAC	443 - 506 VAC	N/A
480 V LC E1A2(E2A2) (EAB 10' Swgr Rm)	________VAC	443 - 506 VAC	________
Charger E1A11-1(E2A11-1) (EAB 10', Rm 007)	________VDC	128.5 – 131.6 VDC	________
Charger E1A11-2(E2A11-2) (EAB 10', Rm 007)	________VDC	128.5 – 131.6 VDC	________
DC SWITCHBOARD E1A11(E2A11) (EAB 10', Rm 007)	________ VDC	128.5 – 131.6 VDC	________
Battery E1A11(E2A11) charge current at the battery field cable (EAB 10', Rm 008)	________ AMPS	(1) $\leq$ 2 AMPS	________
Battery E1A11(E2A11) total battery terminal voltage (EAB 10', Rm 008)	________ VDC	(1) $\geq$ 128.03 VDC	________
Vital AC Panel DP001 (EAB 10', Rm 007)	________ VAC	117 - 122 VAC	________
Vital AC Panel DP1201 (EAB 10', Rm 007)	________ VAC	115 - 125 VAC	________

1. Electricians assist by measuring the battery charge current at the battery field cable and total battery terminal voltage.

2. IF any voltage readings are NOT within Satisfactory Range, THEN immediately NOTIFY the Unit Supervisor or Shift Manager. (References 8.4 and 8.5)

Table 3. Channel II Bus and Charger Voltage Data

BUS/CHARGER (LOCATION)	RECORDED TEST VALUE	SATISFACTORY RANGE	INITIAL
Charger E1D11-1(E2D11-1) (EAB 10', Rm 009)	N/A VDC	128.5 – 131.6 VDC	N/A
Charger E1D11-2(E2D11-2) (EAB 10', Rm 009)	________ VDC	128.5 – 131.6 VDC	________
DC SWITCHBOARD E1D11(E2D11) (EAB 10', Rm 009)	________ VDC	128.5 – 131.6 VDC	________
Battery E1D11(E2D11) charge current at the battery field cable (EAB 10', Rm 006)	________ AMPS	(1) ≤ 2 AMPS	________
Battery E1D11(E2D11) total battery terminal voltage (EAB 10', Rm 006)	________ VDC	(1) ≥ 128.03 VDC	________
Vital AC Panel DP1202 (EAB 10', Rm 009)	________ VAC	115 - 125 VAC	________

1. Electricians assist by measuring the battery charge current at the battery field cable and total battery terminal voltage.

2. IF any voltage readings are NOT within Satisfactory Range, THEN immediately NOTIFY the Unit Supervisor or Shift Manager. (References 8.4 and 8.5)

Table 4. Channel III Bus and Charger Voltage Data

BUS/CHARGER (LOCATION)	RECORDED TEST VALUE	SATISFACTORY RANGE	INITIAL
480 V LC E1B1(E2B1) (EAB 35', Swgr Rm)	N/A VAC	443 - 506 VAC	N/A
480 V LC E1B2(E2B2) (EAB 35', Swgr Rm)	________ VAC	443 - 506 VAC	__________
Charger E1B11-1(E2B11-1) (EAB 35', Rm 213)	________ VDC	128.5 – 131.6 VDC	__________
Charger E1B11-2(E2B11-2) (EAB 35', Rm 213)	________ VDC	128.5 – 131.6 VDC	__________
DC SWITCHBOARD E1B11(E2B11) (EAB 35', Rm 213)	________ VDC	128.5 – 131.6 VDC	__________
Battery E1B11(E2B11) charge current at the battery field cable (EAB 35', Rm 214)	________ AMPS	(1) ≤ 2 AMPS	__________
Battery E1B11(E2B11) total battery terminal voltage (EAB 35', Rm 214)	________ VDC	(1) ≥ 128.03 VDC	__________
Vital AC Panel DP1203 (EAB 35', Rm 213)	________ VAC	115 - 125 VAC	__________

1. Electricians assist by measuring the battery charge current at the battery field cable and total battery terminal voltage.

2. IF any voltage readings are NOT within Satisfactory Range, THEN immediately NOTIFY the Unit Supervisor or Shift Manager. (References 8.4 and 8.5)

Table 5. Channel IV Bus and Charger Voltage Data

BUS/CHARGER (LOCATION)	RECORDED TEST VALUE	SATISFACTORY RANGE	INITIAL
480 V LC E1C1(E2C1) (EAB 60' Swgr Rm)	N/A VAC	443 - 506 VAC	N/A
480 V LC E1C2(E2C2) (EAB 60' Swgr Rm)	______ VAC	443 - 506 VAC	______
Charger E1C11-1(E2C11-1) (EAB 60', Rm 319)	______ VDC	128.5 – 131.6 VDC	______
Charger E1C11-2(E2C11-2) (EAB 60', Rm 319)	______ VDC	128.5 – 131.6 VDC	______
DC SWITCHBOARD E1C11(E2C11) (EAB 60', Rm 319)	______ VDC	128.5 – 131.6 VDC	______
Battery E1C11(E2C11) charge current at the battery field cable (EAB 60', Rm 321)	______ AMPS	(1) ≤ 2 AMPS	______
Battery E1C11(E2C11) total battery terminal voltage (EAB 60', Rm 321)	______ VDC	(1) ≥ 128.03 VDC	______
Vital AC Panel DP002 (EAB 60', Rm 319)	______ VAC	117 - 122 VAC	______
Vital AC Panel DP1204 (EAB 60', Rm 319)	______ VAC	115 - 125 VAC	______

4. Test Results:

___√__ Acceptable ________ Unacceptable

IF unacceptable, THEN immediately INFORM the Shift Manager.

John Richards — Test Performer; Today — Date; 30 min. ago — Time

5. Test Results Second Review:

Answer

________ Acceptable ___✓___ Unacceptable (complete section below)

Refer to Technical Specification 3.8.3.1.a LCO Action Requirements

Is this condition a potentially reportable occurrence? _____ Yes _____ No

Should an LCO Action Statement be entered? __✓__ Yes _____ No

Explain (Words to the effect of) Surveillance Acceptance Criteria 6.3 is NOT satisfied. 480 Volt **Load Center E1C1 is NOT energized via its respective Load Center Transformer. This condition does not meet the requirements of Tech Spec LCO 3.8.3.1.c. Action 3.8.3.1.a will need to be entered.**

____

Shift Manager — Date — Time

6. Data Review:

____

Surveillance Coordinator — Date — Time

NUCLEAR TRAINING DEPARTMENT

ADMINISTRATIVE JOB PERFORMANCE MEASURE

TITLE:	**DETERMINE TECH SPEC ACTION FOR ABNORMAL RCS ACTIVITY**
JPM NO.:	**NRC JPM A7**
REVISION:	**2**
LOCATION:	**N/A**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title:	DETERMINE TECH SPEC ACTION FOR ABNORMAL RCS ACTIVITY
JPM No.:	NRC JPM A7
Rev. No.:	2
STP Task:	10300, Interpret Technical Specifications
STP Objective:	10300, Given that a condition exists requiring entry into a Technical Specification action statement, interpret Technical Specifications accurately, such that plant activities occur safely and smoothly, and that contacting superiors for advice is unnecessary.
Related K/A Reference:	2.2.22, Knowledge of limiting conditions for operations and safety limits (SRO 4.1)
References:	Tech Spec Section 3.4.8, Specific Activity
Task Normally Completed By:	SRO
Method of Testing:	Actual Performance
Location of Testing:	NTF
Time Critical Task:	NO
Validation Time:	15 min.
Required Materials (Tools/Equipment):	Technical Specifications

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK

INITIAL CONDITIONS:

Unit 1 was at 100% power when a transmission line disturbance required the unit to be down powered to 80%. The down power was completed in 40 minutes. All systems responded as expected during the down power.

Two (2) hours has elapsed since the completion of the down power and the unit is stable at 80% power. Health Physics reports that radiation readings from RT-8039, CVCS Failed Fuel Monitor, are rising toward the Alert alarm. As Unit Supervisor, you directed Chemistry to sample the RCS.

Chemistry reports the following sample results:

- Gross Radioactivity = 58.5 µCi/gram
- Dose Equivalent Iodine = 75 µCi/gram
- Last Calculated E-bar = 0.92 Mev/disintegration

INITIATING CUE:

Based on the information provided on RCS Activity, determine any applicable Tech Spec requirements.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

- *Determines that Dose Equivalent Iodine is above the acceptable value of TS Figure 3.4-1.*
- *Apply TS 3.4.8 Action a; be in HOT STANBY with Tavg less than 500ºF within 6 hours.*
- *Apply Reactor Coolant Specific Activity Sample and Analysis Program TS Table 4.4-4, item 4.a); Perform an isotopic analysis for iodine once per 4 hours, whenever the specific activity exceeds 1µCi/gram Dose Equivalent I-131 or 100/E-bar µCi/gram of gross radioactivity until the specific activity of the RCS is restored within limits.*

HANDOUTS:

A copy of Technical Specifications must be available in the testing area.

JOB PERFORMANCE MEASURE INFORMATION SHEET

NOTES:

A KEY is not provided. Answers are included in the JPM.

The applicant may indicate that TS Table 4.4-4, item 4.b) applies. This is not required because performance of item 4.a) will satisfy the requirements of 4.b).

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME __________

SAT/UNSAT Performance Step: 1

Reference Tech Spec Section 3.4.8, Reactor Coolant System Specific Activity

Standard:

References Tech Spec Section 3.4.8, Reactor Coolant System Specific Activity

Comment:

Applicant is to use Technical Specifications available in the examination area.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2

Determine if RCS Gross Specific Activity Limits are exceeded.

Standard:

Determines RCS Gross Activity is within limits.

Comment:

The Gross Activity Limit is < 100/E-bar. For the given information, this works out to be 100/0.92 = 108.69 µCi/gram. The actual RCS Gross Activity is 58.5 µCi/gram and so is within limits.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

<u>SAT/UNSAT</u> Performance Step: 3 (C)

Determine if RCS Dose Equivalent I-131 Specific Activity Limits are exceeded.

Standard:

Determines that Dose Equivalent Iodine is above the acceptable value of TS Figure 3.4-1.

Comment:

Action a. limits the DE Iodine to either > 1 µCi/gram for 48 continuous hours OR the limit line of Fig. 3.4-1. For the given information, it has been less than 48 hours so this limit has not yet been reached. For Fig. 3.4-1, since the plant at 80% power, the limit on this figure is 58 µCi/gram. The DE Iodine information given is 75 µCi/gram thus this limit has been exceeded.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 4 (C)

Determine correct TS application.

Standard:

- *Determines that TS 3.4.8 Action a. applies; be in HOT STANBY with Tavg less than 500ºF within 6 hours.*
- *Apply Reactor Coolant Specific Activity Sample and Analysis Program TS Table 4.4-4, item 4.a); Once per 4 hours, whenever the specific activity exceeds 1µCi/gram Dose Equivalent I-131 or 100/E=bar µCI/gram of gross radioactivity until the specific activity of the RCS is restored within limits.*

Comment:

The applicant may indicate that TS Table 4.4-4, item 4.b) applies. This is not required because performance of item 4.a) will satisfy the requirements of 4.b).

Cue:

Notes:

- TERMINATE THE JPM -

JPM STOP TIME __________

VERIFICATION OF COMPLETION

Job Performance Measure: DETERMINE TECH SPEC ACTION FOR ABNORMAL RCS ACTIVITY

Applicant's Name: ____

Date Performed: ___________________

Time to Complete: __________________

JPM Results: **Sat / Unsat**

Evaluator: ________________________ **Signature** __________________________

Date ____________________

JPM - HANDOUT

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK

INITIAL CONDITIONS:
Unit 1 was at 100% power when a transmission line disturbance required the unit to be down powered to 80%. The down power was completed in 40 minutes. All systems responded as expected during the down power.

Two (2) hours has elapsed since the completion of the down power and the unit is stable at 80% power. Health Physics reports that radiation readings from RT-8039, CVCS Failed Fuel Monitor, are rising toward the Alert alarm. As Unit Supervisor, you directed Chemistry to sample the RCS.

Chemistry reports the following sample results:

- Gross Radioactivity = 58.5 μCi/gram
- Dose Equivalent Iodine = 75 μCi/gram
- Last Calculated E-bar = 0.92 Mev/disintegration

INITIATING CUE:
Based on the information provided on RCS Activity, determine any applicable Tech Spec requirements.

PROVIDE ANSWER:

NUCLEAR TRAINING DEPARTMENT

ADMINISTRATIVE JOB PERFORMANCE MEASURE

TITLE:	**DETERMINE PERSONNEL EXPOSURE LIMITS**
JPM NO.:	**A8**
REVISION:	**2**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title: **DETERMINE PERSONNEL EXPOSURE LIMITS**

JPM No.: A8

Rev. No.: 2

STP Task: SRO-12800, Activate the Emergency Plan

STP Objective: EPT-003, Objective #4, Discuss radiation exposure controls associated with emergency conditions. Include emergency dose guidelines and access requirements.

Related K/A Reference: G2.3.4, Knowledge of radiation exposure limits under normal or emergency conditions. (3.2/3.7)

References: 0ERP01-ZV-IN06, Radiological Exposure Guidelines, Rev 5
0PGP03-ZR-0050, Radiation Protection Program, Rev 10

Task Normally Completed By: SRO

Method of Testing: Simulated

Location of Testing: Classroom

Time Critical Task: NO

Validation Time: 15 Minutes

Required Materials (Tools/Equipment): None

JOB PERFORMANCE MEASURE CHECK SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK

INITIAL CONDITIONS:

The site is in a Site Area Emergency (SAE) due to an RCS Loss of Coolant Accident (LOCA) and Loss of Containment integrity.

A Plant Operator from the on-shift crew is assisting with emergency duties and will be required to go into an extremely high radiation area in an attempt to restore Containment integrity.

He has worked at STP for only 4 months. He previously worked as a radiation worker at another facility the prior 6 months. His exposure records are attached.

INITIATING CUE:

Given the personnel exposure history of the operator, determine the maximum amount of additional exposure this operator is allowed WITHOUT requiring Emergency Exposure Approval in accordance with 0ERP01-ZV-IN06, Radiological Exposure Guidelines.

Provide the maximum allowed additional exposure for the following:

1) TEDE – Total Effective Dose Equivalent

2) SDE - Shallow Dose Equivalent

3) LDE – Lens Dose Equivalent

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

Determines the following allowed exposures for the operator:

- ***TEDE = 4440 mrem***
- ***SDE = 44,160 mrem***
- ***LDE = 10,760 mrem***

JOB PERFORMANCE MEASURE CHECK SHEET

HANDOUTS:

- Handout copy of 0ERP01-ZV-IN06, Radiological Exposure Guidelines
- Handout copy of applicable portion of 10CFR20, Standards for Protection against Radiation
- Operator dose record handout (attached to the back of the JPM).

NOTES:

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME ________________.

SAT/UNSAT Performance Step: 1

Obtain applicable reference material

Standard:

Obtains the following from the Examiner:

- *0ERP01-ZV-IN06, Radiological Exposure Guidelines*
- *Applicable portion of 10CFR20, Standards for Protection against Radiation*
- *Operator dose record handout (attached to the back of the JPM).*

Comment:

Cue:

Provide the applicant with the Student Handouts for this JPM:

- Handout copy of 0ERP01-ZV-IN06, Radiological Exposure Guidelines
- Handout copy of applicable portion of 10CFR20, Standards for Protection against Radiation
- Operator dose record handout (attached to the back of the JPM).

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

<u>SAT/UNSAT</u> Performance Step: 2 (C)

Determine allowed exposure limits for TEDE, SDE and LDE.

Standard:

Refers to 0ERP01-ZV-IN06, Radiological Exposure Guidelines, paragraph 3.2 to 3.4 and Step 5.3 to determine that doses up to 10CFR20 limits are authorized by the procedure without Emergency Exposure Approval.

Correctly calculates maximum allowed additional exposure for the operator as follows:

TEDE limit is 5000 mrem for current year.
Calculation: 5000 – (320 + 240) = 4440 mrem
Maximum allowed additional TEDE = 4440 mrem

SDE limit is 50,000 mrem for current year
Calculation: 50,000 – (5600 + 240) = 44,160 mrem
Maximum allowed additional SDE = 44,160 mrem

LDE limit is 15,000 mrem for current year
Calculation: 15,000 – (4000 + 240) = 10,760 mrem
Maximum allowed additional LDE = 10,760 mrem

Comment:

Cue:

Notes:

TERMINATE THE JPM –

JPM STOP TIME ___________

VERIFICATION OF COMPLETION

Job Performance Measure: DETERMINE PERSONNEL EXPOSURE LIMITS

Applicant's Name: ____

Date Performed: ____________________

Time to Complete: __________________

JPM Results: **Sat / Unsat**

Evaluator: ________________________

Signature __________________________

Date ____________________

JPM - HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EXAMINER WHEN YOU'VE COMPLETED THE TASK

INITIAL CONDITIONS:

The site is in a Site Area Emergency (SAE) due to an RCS Loss of Coolant Accident (LOCA) and Loss of Containment integrity.

A Plant Operator from the on-shift crew is assisting with emergency duties and will be required to go into an extremely high radiation area in an attempt to restore Containment integrity.

He has worked at STP for only 4 months. He previously worked as a radiation worker at another facility the prior 6 months. His exposure records are attached.

INITIATING CUE:

Given the personnel exposure history of the operator, determine the maximum amount of additional exposure this operator is allowed WITHOUT requiring Emergency Exposure Approval in accordance with 0ERP01-ZV-IN06, Radiological Exposure Guidelines.

Provide the maximum allowed additional exposure for the following:

1) TEDE – Total Effective Dose Equivalent

2) SDE - Shallow Dose Equivalent

3) LDE – Lens Dose Equivalent

JPM - HANDOUT

OPERATOR DOSE RECORD

Dose report from previous employer:

TEDE = 320 mrem
SDE = 5,600 mrem
LDE = 4,000 mrem

The current dose from STP

TEDE = 240 mrem
SDE = 240 mrem
LDE = 240 mrem

10 CFR 20

20.1201 Occupational dose limits for adults.

(a) The licensee shall control the occupational dose to individual adults, except for planned special exposures under §20.1206, to the following dose limits.

(1) An annual limit, which is the more limiting of—

(i) The total effective dose equivalent being equal to 5 rems (0.05 Sv); or

(ii) The sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems (0.5 Sv).

(2) The annual limits to the lens of the eye, to the skin of the whole body, and to the skin of the extremities, which are:

(i) A lens dose equivalent of 15 rems (0.15 Sv), and

(ii) A shallow-dose equivalent of 50 rem (0.5 Sv) to the skin of the whole body or to the skin of any extremity.

(b) Doses received in excess of the annual limits, including doses received during accidents, emergencies, and planned special exposures, must be subtracted from the limits for planned special exposures that the individual may receive during the current year (see §20.1206(e)(1)) and during the individual's lifetime (see §20.1206(e)(2)).

(c) When the external exposure is determined by measurement with an external personal monitoring device, the deep-dose equivalent must be used in place of the effective dose equivalent, unless the effective dose equivalent is determined by a dosimetry method approved by the NRC. The assigned deep-dose equivalent must be for the part of the body receiving the highest exposure. The assigned shallow-dose equivalent must be the dose averaged over the contiguous 10 square centimeters of skin receiving the highest exposure. The deep-dose equivalent, lens-dose equivalent, and shallow-dose equivalent may be assessed from surveys or other radiation measurements for the purpose of demonstrating compliance with the occupational dose limits, if the individual monitoring device was not in the region of highest potential exposure, or the results of individual monitoring are unavailable.

(d) Derived air concentration (DAC) and annual limit on intake (ALI) values are presented in table 1 of appendix B to part 20 and may be used to determine the individual's dose (see §20.2106) and to demonstrate compliance with the occupational dose limits.

(e) In addition to the annual dose limits, the licensee shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity (see footnote 3 of appendix B to part 20).

(f) The licensee shall reduce the dose that an individual may be allowed to receive in the current year by the amount of occupational dose received while employed by any other person (see §20.2104(e)).

[56 FR 23396, May 21, 1991, as amended at 60 FR 20185, Apr. 25, 1995; 63 FR 39482, July 23, 1998; 67 FR 16304, Apr. 5, 2002; 72 FR 68059, Dec. 4, 2007]

STI 31477147	**0ERP01-ZV-IN06**	**Rev. 5**	Page 1 of 7
Radiological Exposure Guidelines			
Quality	Non Safety-Related	Usage: **N/A**	Effective Date: 08/26/02

Max Keyes	N/A	N/A	Emergency Response Division
PREPARER	TECHNICAL	USER	COGNIZANT ORGANIZATION

Table of Contents Page

1.0 Purpose and Scope

1.1 This procedure provides guidance for authorizing radiological exposures in excess of 10CFR20 limits during response to emergency conditions.

1.2 This procedure implements the requirements of the South Texas Project Electric Generating Station (STPEGS) Emergency Plan specific to radiological exposure guidelines during emergency conditions.

2.0 Responsibilities

2.1 The Emergency Director is responsible for approving ALL requests for exposure extensions above 10CFR20 limits.

2.2 The following individuals are responsible for requesting exposure extensions, and tracking approvals for the following personnel:

2.2.1 Acting Radiological Manager - Onshift personnel until Technical Support Center activation.

2.2.2 Radiological Coordinator – Operations Support Center personnel

2.2.3 Radiological Manager – Technical Support Center, Security and Control Room personnel.

2.2.4 Radiological Director – Emergency Operations Facility and Offsite Field Teams.

3.0 Precautions and Limitations

3.1 An Alert, Site Area Emergency, or General Emergency has been declared by the Emergency Director.

3.2 Administrative dose limits are not applicable.

3.3 Emergency responders shall be authorized an exposure limit of 5 rem TEDE.

3.4 No individual shall knowingly exceed 10CFR20 exposure limits except when authorized to do so by the Emergency Director.

3.5 Upon Assembly and Accountability completion, ensure all personnel remaining in the Protected Area have Thermoluminescent Dosimetry, Document issue using Form 3, TLD Issuance Log.

3.6 Data Sheet 1, Emergency Exposure Approval, Data Sheet 2, Emergency Exposure Approval Log, shall be included in the individual dosimetry files which are forwarded to Records Management for retention. (10CFR20.2106) (ANI 80.IA)

4.0 References

4.1 STPEGS Emergency Plan

4.2 EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents

4.3 NUREG-0654 FEMA REP-1, Rev. 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants

4.4 0PGP05-ZV-0004, Emergency Plan Implementing Procedure Users Guide

5.0 Procedure

5.1 Verify individual(s) have been issued a Thermoluminescent Dosimeter.

5.2 Determine if alternative actions are available to preclude exposure extension. This should include the use of shielding, assignment of personnel with lower exposures, or rotation of personnel on the job.

5.3 To approve exceeding 10CFR20 exposure limits complete Data Sheet 1, Emergency Exposure Approval, for each individual.

5.4 Log individuals' names on Data Sheet 2, Emergency Exposure Approval Log, for all individuals approved to exceed exposure limits.

5.5 Brief individuals expected to receive exposures greater than 25 rem TEDE using Addendum 2, Risks Involved with Exposures Greater Than 25 rem TEDE.

6.0 Support Documents

6.1 Addendum 1, Emergency Cumulative Exposure Limits

6.2 Addendum 2, Risks Involved with Exposures Greater Than 25 rem TEDE

6.3 Data Sheet 1, Emergency Exposure Approval

6.4 Data Sheet 2, Emergency Exposure Approval Log

TEDE Exposure Limit	Required Approval to Exceed 10CFR20 Exposure Limit	Approval Documentation	Special Considerations
5-10 rem	Emergency Director	Data Sheet 1	• Approval to receive exposure in this range must be based on the protection of valuable property, life saving activities or protecting large populations.
10 - 25 rem	Emergency Director	Data Sheet 1	• Approval to receive exposure in this range must be based on life saving activities or protecting large populations.
>25 rem	Emergency Director	Data Sheet 1	• Approval to exceed this limit applies to life saving activities or protecting large populations. • 25 rem TEDE is planned exposure limit and should not be considered a maximum upper limit to removing personnel from life threatening environments. • The individual shall be a volunteer and be aware of the risks involved.

You have indicated that you are volunteering to be part of an emergency repair/damage control team. The nature of your task is such that you will probably receive an exposure to radiation that will be at a level above the normal limits. You need to have full awareness of the radiological risks involved. The purpose of this briefing is to make you aware of these risks.

The Emergency Director has authorized you to receive an emergency exposure. As you might recall from your training, our procedures allow such a once in a lifetime exposure. The emergency limits are based upon recommendations by the EPA.

There are two categories of risk associated with this type of radiological exposure that you should be fully aware of. These two risks are the immediate health effect and the delayed health effect.

IMMEDIATE HEALTH EFFECTS:

The immediate health effect of an acute exposure (a large dose within 24 hours) to radiation will vary with the individual and with the amount of exposure. Generally, as the exposure increases, the immediate health effect is more severe. The exposure you are projected to receive will most likely cause temporary blood changes which may make you temporarily more susceptible to illness. Also, although unlikely, you may experience temporary nausea, vomiting and diarrhea. Your level of exposure is well below the levels that have led to immediate fatalities. As a point of reference, at the 100 rem TEDE whole body dose, without medical treatment, approximately 1% of the exposed population would die. At an exposure of 450 rem TEDE, without medical treatment, 50% would die.

DELAYED HEALTH EFFECTS:

The delayed health effect of an acute exposure to radiation is an increase in the risk of premature death from cancer.

It is hard to estimate the increase in cancer risk; however, it is fair to state that your chance of getting cancer increases with every rem that you receive.

Statistics indicate that if a person 40 to 50 years of age were to receive 25 rem TEDE of exposure, then the risk of premature death due to cancer will increase by approximately 0.5%. Another way of looking at this would be to suppose what would happen if 1000 people were exposed to 25 rem TEDE. These same statistics indicate that we would expect approximately 5 of the 1000 individuals to die prematurely from cancer as a result of the 25 rem TEDE exposure (premature meaning an estimated 15 years of life lost).

In summary, if an individual 45 years old receives a 25 rem TEDE exposure, then it is possible that that person could die prematurely from cancer. The odds are roughly 1 in 200.

Name: ______________________________ SSN: ____________________________________

Date/Time: __________________________ Discipline Group: ___________________________

Reason for Dose Extension Request: ____

____

Current exposure to date: __________ Rem (TEDE) TLD No.: ___________________________

Exposure Authorized to: __________________________ Rem (TEDE)

__________________________________ __________________________________

*Emergency Worker Emergency Director

* Required to exceed 10CFR20 TEDE exposure limit (5 rem).

Name	Approval to Exceed 10CFR20 Exposure limits		
	>5 rem TEDE	>10 - <25 rem TEDE	>25 rem TEDE

WHEN COMPLETED, THIS RECORD SHALL BE RETAINED IN ACCORDANCE WITH THE DOCUMENT TYPE LIST (DTL).

NUCLEAR TRAINING DEPARTMENT

ADMINISTRATIVE JOB PERFORMANCE MEASURE

TITLE:	**DETERMINE APPROPRIATE PROTECTIVE ACTION RECOMMENDATIONS**
JPM NO.:	**A9**
REVISION:	**2**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title:	DETERMINE APPROPRIATE PROTECTIVE ACTION RECOMMENDATIONS
JPM No.:	A9
Rev. No.:	2
STP Task:	SRO-47030, Implement the requirements of 0ERP01-ZV-SH01, Shift Manager
STP Objective:	SRO-47030, Discuss the duties and responsibilities of the Shift Supervisor as delineated in 0ERP01-ZV-SH01, Shift Manager.
Related K/A Reference:	G2.4.44, Knowledge of emergency plan protective action recommendations. (2.4/4.4)
References:	0ERP01-ZV-SH01, Rev 23, Shift Manger
Task Normally Completed By:	SRO
Location of Testing:	CLASSROOM
Time Critical Task:	YES - 15 Minutes
Validation Time:	12 minutes

Required Materials (Tools/Equipment):

None

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU HAVE COMPLETED THE TASK

INITIAL CONDITIONS:

You are the on-duty Shift Manager/Emergency Director. Due to degrading plant conditions you have just declared a General Emergency in Unit 1. Emergency Plan requirements with the exception of Protective Action Recommendations (PARs) are in progress or have been delegated to other individuals.

INITIATING CUE:

This JPM is time-critical. The time limit starts when you (the applicant) understand the Initial Conditions and Initiating Cue.

You are to determine the PARs for the State/County, including downwind Zones and Sectors, in accordance with 0ERP01-ZV-SH01, Shift Manager, Data Sheet 4, General Emergency Checklist, Step 1.9.

Additional Information:

- A radiological release is NOT in progress.
- Current Weather conditions are:
  - ⇒ Wind - Blowing from 150° at 12 mph.
  - ⇒ Temperature - 88°F
  - ⇒ Precipitation - None
- Containment High Range Radiation Monitors RT-8050 and RT-8051 are not reading correctly and are Out Of Service.
- A temporary hatch monitor has been set up and is reading 2100 mr/hr.
- Containment pressure is 4.5 psig.
- Health Physics field team dose assessments currently indicate normal background readings.

JOB PERFORMANCE MEASURE INFORMATION SHEET

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

The applicant determines that the Protective Action Recommendation (PAR) is as follows:

Evacuate 2 Mile Radius and 5 Miles Downwind, Zones 1, 2 and 5. The affected downwind sectors are P, Q, R and A.

HANDOUTS:

1. Student Handout copy of 0ERP01-ZV-SH01, Shift Manager.

NOTES:

1. The Evaluator is provided with an ANSWER KEY which is appropriately marked ("KEY"). The evaluator shall not handout any page(s) marked as "KEY" to the applicant.

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:
• Critical steps are identified by (C).
• Sequenced steps are identified by (S_1, S_2, . . .).

SAT/UNSAT Performance Step: 1 **Start time:________**

Perform Sub Steps of Step 1.9 of 0ERP01-ZV-SH01, Shift Manager.

Standard:

Sub Step 1.9.1 will NOT be performed due to no radiological release in progress.
Sub Step 1.9.2 will be performed. See Performance Step 2.
Sub Step 1.9.3 will NOT be performed due to no radiological release in progress.
Sub Step 1.9.4 will NOT be performed due to no radiological release in progress.
Sub Step 1.9.5 will NOT be performed due dose assessment results indicating normal background reading.
Sub Step 1.9.6 will be performed. See Performance Step 3.

Comment:

Cue:

Provide the applicant with the Student Handout copy of 0ERP01-ZV-SH01, Shift Manager.

Notes:

1. Evaluator should start the time for this JPM when the student indicates understanding of the task to be performed.

2. The applicant will start at the given 0ERP01-ZV-SH01, Shift Manager, Data Sheet 4, General Emergency Checklist, Step 1.9.

3. A key is provided for the evaluator which indicates the steps the applicant should perform and information used to develop the PAR.

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2 (C)

Perform Step 1.9.2 of 0ERP01-ZV-SH01, Data Sheet 4: IF a radiological release is NOT in progress, THEN determine the PAR using Addendum 2, Core/Containment Status Table

Standard:

With the given Initial Conditions, the applicant determines that the Protective Action Recommendation (PAR) is as follows:

- *Evacuate 2 Mile Radius and 5 Miles Downwind.*

Comment:

Cue:

Notes:

Refer to the key for Addendum 2.

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 3 (C)

Perform Step 1.9.6 of 0ERP01-ZV-SH01, Data Sheet 4: Determine affected downwind sectors and zones using Addendum 4, Protective Response Zones. Use Addendum 5, Protective Response Zones Map to assist.

Standard:

With the given Initial Conditions, the applicant determines the following:

- *The affected downwind Zones are 1, 2 and 5.*
- *The affected downwind Sectors are P, Q, R and A.*

Comment:

Cue:

Notes:

1. Refer to the key for Addendum 4.
2. The key also includes Addendum 5 for additional information.

- TERMINATE THE JPM - **Stop time:_________**

VERIFICATION OF COMPLETION

Job Performance Measure: DETERMINE PROTECTIVE ACTION RECOMMENDATIONS

Applicant's Name: ____

Date Performed: _________________

Time to Complete: _______________

JPM Results: **Sat / Unsat**

Evaluator: ________________________ **Signature __________________________**

Date ____________________

JPM - HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EXAMINER WHEN YOU'VE COMPLETED THE TASK

INITIAL CONDITIONS:

You are the on-duty Shift Manager/Emergency Director. Due to degrading plant conditions you have just declared a General Emergency in Unit 1. Emergency Plan requirements with the exception of Protective Action Recommendations (PARs) are in progress or have been delegated to other individuals.

INITIATING CUE:

This JPM is time-critical. The time limit starts when you (the applicant) understand the Initial Conditions and Initiating Cue.

You are to determine the PARs for the State/County, including downwind Zones and Sectors, in accordance with 0ERP01-ZV-SH01, Shift Manager, Data Sheet 4, General Emergency Checklist, Step 1.9.

Additional Information:

- A radiological release is NOT in progress.
- Current Weather conditions are:
  - ⇒ Wind - Blowing from 150° at 12 mph.
  - ⇒ Temperature - 88°F
  - ⇒ Precipitation - None
- Containment High Range Radiation Monitors RT-8050 and RT-8051 are not reading correctly and are Out Of Service.
- A temporary hatch monitor has been set up and is reading 2100 mr/hr.
- Containment pressure is 4.5 psig.
- Health Physics field team dose assessments currently indicate normal background readings.

STI 32585610	**0ERP01-ZV-SH01**	**Rev. 23**	Page 1 of 38
Shift Manager			
Quality	Non Safety-Related	Usage: **N/A**	Effective Date: 12/03/09

S. Korenek	Max Keyes	N/A	Emergency Response Division
PREPARER	TECHNICAL	USER	COGNIZANT ORGANIZATION

Table of Contents Page

1.0 Purpose and Scope

1.1 This procedure specifies the actions to be completed by the Shift Manager in the Control Room during a declared emergency.

2.0 Responsibilities

2.1 The Shift Manager of the affected Unit is responsible for:

2.1.1 Recognizing, classifying and declaring the emergency.

2.1.2 Assuming the responsibilities and authorities of the Emergency Director until relieved by the TSC Manager or EOF Director.

2.1.3 Completing notifications and Protective Action Recommendations (PARs) to offsite agencies until relieved of Emergency Director responsibility and authority.

2.1.4 Directing initial onsite emergency response activities.

2.1.5 Monitoring plant conditions for changes in emergency action levels (EALs) and emergency classification.

2.1.6 Directing Control Room response to mitigate the emergency condition.

2.1.7 Approving departures from license conditions per 10CFR50.54(x) for Control Room Operator actions and equipment manipulations.

2.1.8 Directing notification of the Emergency Response Organization (ERO), until relieved of Emergency Director responsibility and authority.

2.1.9 Approving, or delegating approval of, press releases prior to issuance until relieved of Emergency Director responsibility and authority.

2.2 The Shift Manager of the unaffected Unit is responsible for:

2.2.1 Assuming the responsibilities and authority of Emergency Director if the Shift Manager of the affected Unit is unable to assume or continue to perform the duties of the Emergency Director.

2.3 The Unit 1 Shift Manager is responsible for:

2.3.1 Assuming the responsibilities and authorities of Emergency Director for events common to both Units.

3.0 Precautions and Limitations

3.1 Sheltering[1] may be the appropriate action for releases of radioactive material, if there is assurance that the release is short term (puff release) and the area near the plant cannot be evacuated before the plume arrives. Federal guidance also states that sheltering may be appropriate (when available) for areas not designated for immediate evacuation because: 1) it positions the public to receive additional instructions; and 2) it may provide protection equal to or greater than evacuation.

4.0 References

4.1 STPEGS Emergency Plan

4.2 0ERP01-ZV-IN01, Emergency Classification

4.3 0ERP01-ZV-IN02, Notifications to Offsite Agencies

4.4 0ERP01-ZV-IN03, Emergency Response Organization Notification

4.5 0ERP01-ZV-IN05, Site Evacuation

4.6 0ERP01-ZV-TS01, TSC Manager

4.7 0ERP01-ZV-RE02, Documentation

4.8 0POP04-ZO-0004, Personnel Emergencies

4.9 0POP02-HE-0002, Technical Support Center HVAC System

4.10 0PGP09-ZA-0002, Fitness for Duty Program

4.11 Severe Accident Control Room Guideline Initial Response (SACRG-1)

4.12 NRC Inspection Report 90-10-03 (LCTS #9000789-936)

4.13 0PGP05-ZV-0004, Emergency Plan Implementing Procedure Users Guide

4.14 NRC Regulatory Issue Summary (RIS) 2004-15: Emergency Preparedness Issues - Post 9/11

4.15 NRC Bulletin 2005-02: Emergency Preparedness and Response Actions for Security-Based Events.

[1] Reference 4.14

5.0 Procedure

5.1 If an Unusual Event or higher emergency classification is declared, implement the appropriate Data Sheet (1, 2, 3, or 4) based on the emergency classification declared. Use these Data Sheets to direct emergency activities.

5.2 If the emergency classification changes, then terminate completion of the current Data Sheet and initiate a new Data Sheet (2, 3, 4, or 5) based on the new emergency classification.

5.3 Request a licensed Reactor Operator from the unaffected Unit (if available) be dispatched to assist.

5.4 Consider restricting hand held radio transmissions during security events that include explosive or electronic controlled devices.

5.5 Assume the responsibilities and authorities of the Emergency Director. The Emergency Director is responsible for making certain key decisions and ensuring their implementation. The responsibilities which CANNOT be delegated include:

5.5.1 Declaring a new emergency classification.

5.5.2 Approving Protective Action Recommendations (PARs) issued to State and County authorities.

5.5.3 Approving required notifications to the State and County.

5.5.4 Approving exposures in excess of 10CFR20 limits and authorizing the use of Potassium Iodide (KI).

5.5.5 Approving departure from license conditions per 10CFR50.54(x).

5.5.6 Declaring entry into Severe Accident Management Guidelines.

5.6 The following Emergency Director responsibilities and authorities MAY be delegated:

5.6.1 Requesting federal assistance.

5.6.2 Approving press releases prior to issuance.

5.6.3 Approving commitments to the NRC.

5.6.4 Approving required communications with the NRC.

5.7 If the affected Unit Control Room Emergency Director <u>CAN NOT</u> perform his/her duties, then transfer Emergency Director duties to the unaffected Unit Control Room Shift Manager. (Ref. 4.14)

5.8 Upon arrival of the TSC Manager or EOF Director, provide a turnover briefing per 0ERP01-ZV-TS01, Data Sheet 2, Emergency Director Turnover Briefing.

5.9 When Emergency Director responsibilities have been transferred to the TSC Manager or EOF Director, then the Shift Manager shall perform the following:

5.9.1 Keep the Emergency Director informed of any plant conditions which could change the EAL or PARs.

5.9.2 Provide ongoing assessment and interface with the Operations Manager, including recommending priorities for repair activities.

5.9.3 Approve departure from license conditions per 10CFR50.54(x) for Control Room Operator actions and equipment manipulations.

6.0 Support Documents

6.1 Addendum 1, Initial Protective Action Recommendation Flowchart

6.2 Addendum 2, Core/Containment Status Table

6.3 Addendum 3, Radiological Release Table

6.4 Addendum 4, Protective Response Zones

6.5 Addendum 5, Protective Response Zones Map

6.6 Addendum 6, Onsite Protective Measures

6.7 Addendum 7, ERO Pager Codes

6.8 Data Sheet 1, Unusual Event Checklist

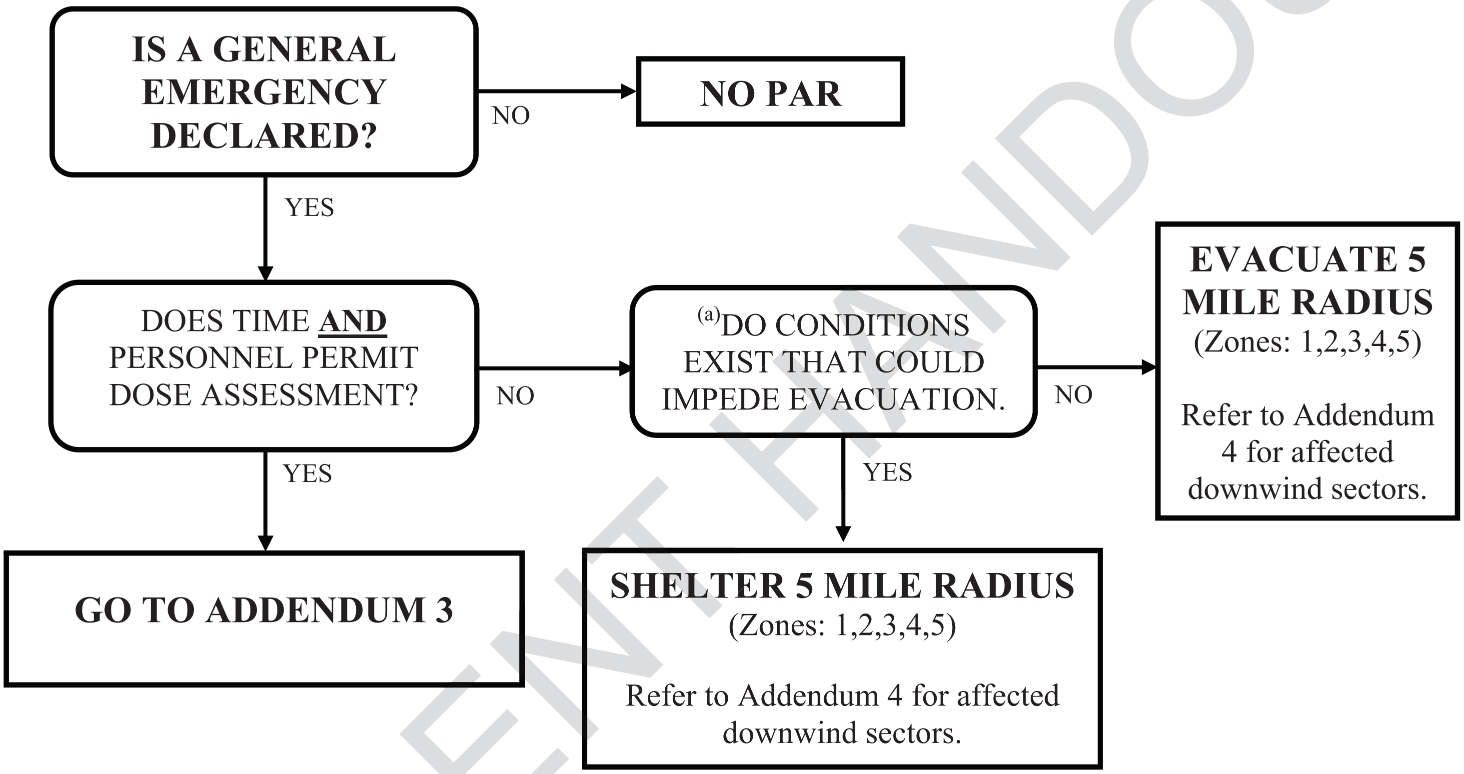
6.9 Data Sheet 2, Alert Checklist

6.10 Data Sheet 3, Site Area Emergency Checklist

6.11 Data Sheet 4, General Emergency Checklist

6.12 Data Sheet 5, Termination Checklist

ENTRY REQUIREMENTS: A General Emergency **AND** a radiological release is in progress **AND** time does not permit the calculation and evaluation of downwind doses **OR** personnel are not available to complete these calculations.



NOTES:

[a] Consider Shelter when environmental conditions could impact evacuation such as flooded or icy roads or if an evacuation can not be completed prior to significant release and transport of radioactive material to the affected areas.

ENTRY REQUIREMENTS: General Emergency **AND** a radiological release is **NOT** in progress.

Containment High Range Radiation Monitor RT-8050/51	[a]Hatch Monitor	Containment Pressure	[b]Evacuation Protective Action Recommendations
Less Than 200 R/hr	Less Than 444 mR/hr	N/A	2 Mile Radius Zone: 1 (Refer to Addendum 4 for affected downwind sectors).
200 R/hr to 1,000 R/hr	444 mR/hr to 2,222 mR/hr	< 5 psig	2 Mile Radius & 5 Miles Downwind (Refer to Addendum 4 for affected downwind zones and sectors).
		≥ 5 psig	5 Mile Radius Zones: 1,2,3,4,5 (Refer to Addendum 4 for affected downwind sectors).
Greater Than 1,000 R/hr	Greater Than 2,222 mR/hr	< 5 psig	5 Mile Radius & 10 Miles Downwind (Refer to Addendum 4 for affected downwind zones and sectors).
		≥ 5 psig	10 Mile Radius Zones: 1,2,3,4,5,6,7,8,9,10,11 (Refer to Addendum 4 for affected downwind sectors).

NOTES:

[a] If the Containment High Range Radiation Monitors (RT-8050 and RT-8051) are out of service then use the Hatch Monitor.

[b] Consider Shelter when environmental conditions could impact evacuation such as flooded or icy roads.

Assumptions used in the calculation of this table are in procedure 0ERP01-ZV-IN07, Offsite Protective Action Recommendations, Addendum 2.

ENTRY REQUIREMENTS: General Emergency **WITH** a radiological release in progress. The below List is in order of preference based on available data.

CONDITION	PROTECTIVE ACTION
I. PROJECTED DOSES (For Short Duration Puffs only < 30 min) a. Projected doses < PAG (1 rem TEDE or 5 rem Thyroid CDE) b. Projected doses ≥ PAG (1 rem TEDE or 5 rem Thyroid CDE)	a. Shelter two mile radius. b. Shelter two mile radius and zones in affected downwind sectors projected to exceed PAGs.
II. PROJECTED DOSES BEYOND EXCLUSION AREA BOUNDARY a. Projected doses < PAG (1 rem TEDE or 5 rem Thyroid CDE) b. Projected doses ≥ PAG 1-5 miles (1 rem TEDE or 5 rem Thyroid CDE) c. Projected doses ≥ PAG 5-10 miles (1 rem TEDE or 5 rem Thyroid CDE) d. Projected doses ≥ PAG at greater than 10-miles and dose projection is supported by field team measurements (1 rem TEDE or 5 rem Thyroid CDE)	a. Evacuate two mile radius. b. Evacuate two mile radius and zones in affected downwind sectors to 5 miles. c. Evacuate five mile radius and zones in affected downwind sectors to 10 miles. d. Evacuate ten mile radius and affected downwind sectors in 2-mile increments until PAG is not exceeded. Note - Shelter if Evacuation is not possible(1)
III. DOSE RATES MEASURED AT PLUME CENTERLINE ON EXCLUSION AREA BOUNDARY a. <100 mR/hr b. 100 mR/hr to 1,000 mR/hr c. >1,000 mR/hr	a. Evacuate two mile radius. b. Evacuate two mile radius and zones in affected downwind sectors to 5 miles. c. Evacuate five mile radius and zones in affected downwind sectors to 10 miles. Note - Shelter if Evacuation is not possible(1)
IV. RELEASE RATES a. ≥ EAL for General Emergency	a. Evacuate five mile radius and zones in affected downwind sectors to 10 miles. Note - Shelter if Evacuation is not possible(1)
V. DEFAULT VALUES (Addendum 1) a. General Emergency	a. Evacuate five mile radius. Note - Shelter if Evacuation is not possible(1)

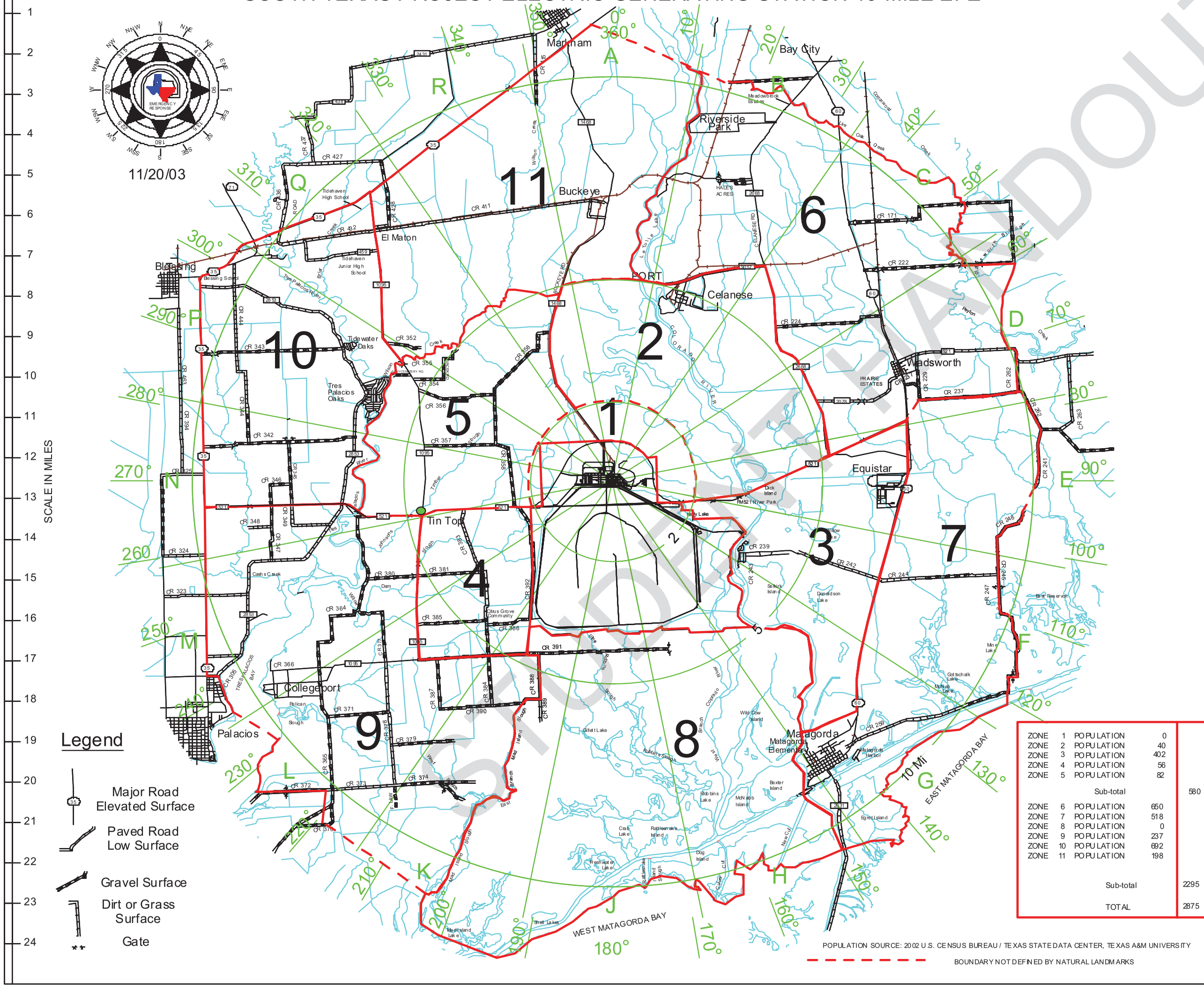
(1) Consider Shelter when environmental conditions could impact evacuation such as flooded or icy roads or if an evacuation can not be completed prior to significant release and transport of radioactive material to the affected areas.

To select the appropriate protective response zones and downwind sectors, refer to Addendum 4, Protective Response Zones.

<u>AFFECTED ZONES</u>: Determine affected sectors and protective response zones and enter onto 0ERP01-ZV-IN02, Data Sheet 1, Offsite Agency Notification Message Form.

WIND DIRECTION FROM IS BETWEEN	AFFECTED DOWNWIND SECTORS	EVACUATE ZONES			EVACUATE KEY HOLE ZONES	
		TWO MILE RADIUS	FIVE MILE RADIUS	TEN MILE RADIUS	2 Mile Radius & 5 Miles Downwind	5 Mile Radius & 10 Miles Downwind
355º to 5º	H, J, K	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1	1, 2, 3, 4, 5, 8, 9
6º to 16º	H, J, K, L	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1	1, 2, 3, 4, 5, 8, 9
17º to 28º	J, K, L	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1	1, 2, 3, 4, 5, 8, 9
29º to 39º	J, K, L, M	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4	1, 2, 3, 4, 5, 8, 9
40º to 50º	K, L, M	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4	1, 2, 3, 4, 5, 8, 9
51º to 61º	K, L, M, N	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4, 5	1, 2, 3, 4, 5, 8, 9, 10
62º to 73º	L, M, N	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4, 5	1, 2, 3, 4, 5, 9, 10
74º to 84º	L, M, N, P	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4, 5	1, 2, 3, 4, 5, 9, 10
85º to 95º	M, N, P	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4, 5	1, 2, 3, 4, 5, 9, 10
96º to 106º	M, N, P, Q	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4, 5	1, 2, 3, 4, 5, 9, 10, 11
107º to 118º	N, P, Q	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 5	1, 2, 3, 4, 5, 9, 10, 11
119º to 129º	N, P, Q, R	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 5	1, 2, 3, 4, 5, 9, 10, 11
130º to 140º	P, Q, R	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 5	1, 2, 3, 4, 5, 10, 11
141º to 151º	P, Q, R, A	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 5	1, 2, 3, 4, 5, 10, 11
152º to 163º	Q, R, A	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 5	1, 2, 3, 4, 5, 10, 11
164º to 174º	Q, R, A, B	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 5	1, 2, 3, 4, 5, 6, 10, 11
175º to 185º	R, A, B	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2	1, 2, 3, 4, 5, 6, 11
186º to 196º	R, A, B, C	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2	1, 2, 3, 4, 5, 6, 11
197º to 208º	A, B, C	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2	1, 2, 3, 4, 5, 6, 11
209º to 219º	A, B, C, D	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2	1, 2, 3, 4, 5, 6, 11
220º to 230º	B, C, D	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2	1, 2, 3, 4, 5, 6
231º to 241º	B, C, D, E	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3	1, 2, 3, 4, 5, 6, 7
242º to 253º	C, D, E	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3	1, 2, 3, 4, 5, 6, 7
254º to 264º	C, D, E, F	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3	1, 2, 3, 4, 5, 6, 7
265º to 275º	D, E, F	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3	1, 2, 3, 4, 5, 6, 7
276º to 286º	D, E, F, G	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3	1, 2, 3, 4, 5, 6, 7
287º to 298º	E, F, G	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 3	1, 2, 3, 4, 5, 7
299º to 309º	E, F, G, H	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 3	1, 2, 3, 4, 5, 7, 8
310º to 320º	F, G, H	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 3	1, 2, 3, 4, 5, 7, 8
321º to 331º	F, G, H, J	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 3	1, 2, 3, 4, 5, 7, 8
332º to 343º	G, H, J	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1	1, 2, 3, 4, 5, 7, 8
344º to 354º	G, H, J, K	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1	1, 2, 3, 4, 5, 7, 8, 9

SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION 10-MILE EPZ



ZONE 1	POPULATION	0		
ZONE 2	POPULATION	40		
ZONE 3	POPULATION	402		
ZONE 4	POPULATION	56		
ZONE 5	POPULATION	82		
	Sub-total		580	
ZONE 6	POPULATION	650		
ZONE 7	POPULATION	518		
ZONE 8	POPULATION	0		
ZONE 9	POPULATION	237		
ZONE 10	POPULATION	692		
ZONE 11	POPULATION	198		
	Sub-total			2295
	TOTAL			2875

PROTECTIVE RESPONSE ZONES AND POPULATIONS

ZONE BOUNDARY DESCRIPTIONS

Zone 1

An area generally north and northeast of the South Texas Project Electric Generating Station and FM 521, running in an arc around the northern portion of the Station.

(Note: No population lives in this area.)

Zone 2

An area generally northeast of the South Texas Project Electric Generating Station within these boundaries: East of FM 1468, south of FM 3057, west of FM 2668, and north of FM 521 East, and which includes Celanese.

Zone 3

An area generally southeast of the South Texas Project Electric Generating Station within these boundaries: East of the Colorado River and Kelly Lake, south of FM 521, west of SH 60, north of the protection levee at Matagorda, and includes Selkirk Island, Exotic Isle, and Equistar.

Zone 4

An area generally west of the South Texas Project Electric Generating Station within these boundaries: East of FM 1095, south of FM 521, west of CR 392, north of CR 391, and which includes Tin Top and Citrus Grove Community.

Zone 5

An area generally northwest of the South Texas Project Electric Generating Station within these boundaries: East of the Tres Palacios River, south of Wilson Creek, west of FM 1468, and north of FM 521.

Zone 6

An area generally northeast of the South Texas Project Electric Generating Station within these boundaries: East of the Colorado River, south and west of Live Oak Creek, west of CR 262, north of FM 521, FM 3057 and includes Riverside Park, Hales Acres, and Meadowbrook Estates.

Zone 7

An area generally east and southeast of the South Texas Project Electric Generating Station within these boundaries: East of SH 60, west of, CR 262, and CR 248, south of CR 237, and south of the protection levy at Matagorda, north of St. Mary's Bayou which includes the town of Matagorda, and the Intracoastal Waterway east of the Colorado River.

Zone 8

An area generally south of the South Texas Project Electric Generating Station within these boundaries: East of Mad Island Slough, south of the South Texas Project Generating Station south property boundary, west of the Colorado River, and north of West Matagroda Bay

Zone 9

An area generally southwest of the South Texas Project Electric Generating Station within these boundaries: East of SH 35, south of FM 521, west of FM 1095, and Mad Island Slough, and which includes Collegeport and the northern portion of Tres Palacios Bay.

Zone 10

An area generally northwest of the South Texas Project Electric Generating Station within these boundaries: East and south of SH 35, west of the northern portion of FM 1095 and the Tres Palacios River, north of FM 521, and which includes Tidewater Oaks, Tres Palacios Oaks.

Zone 11

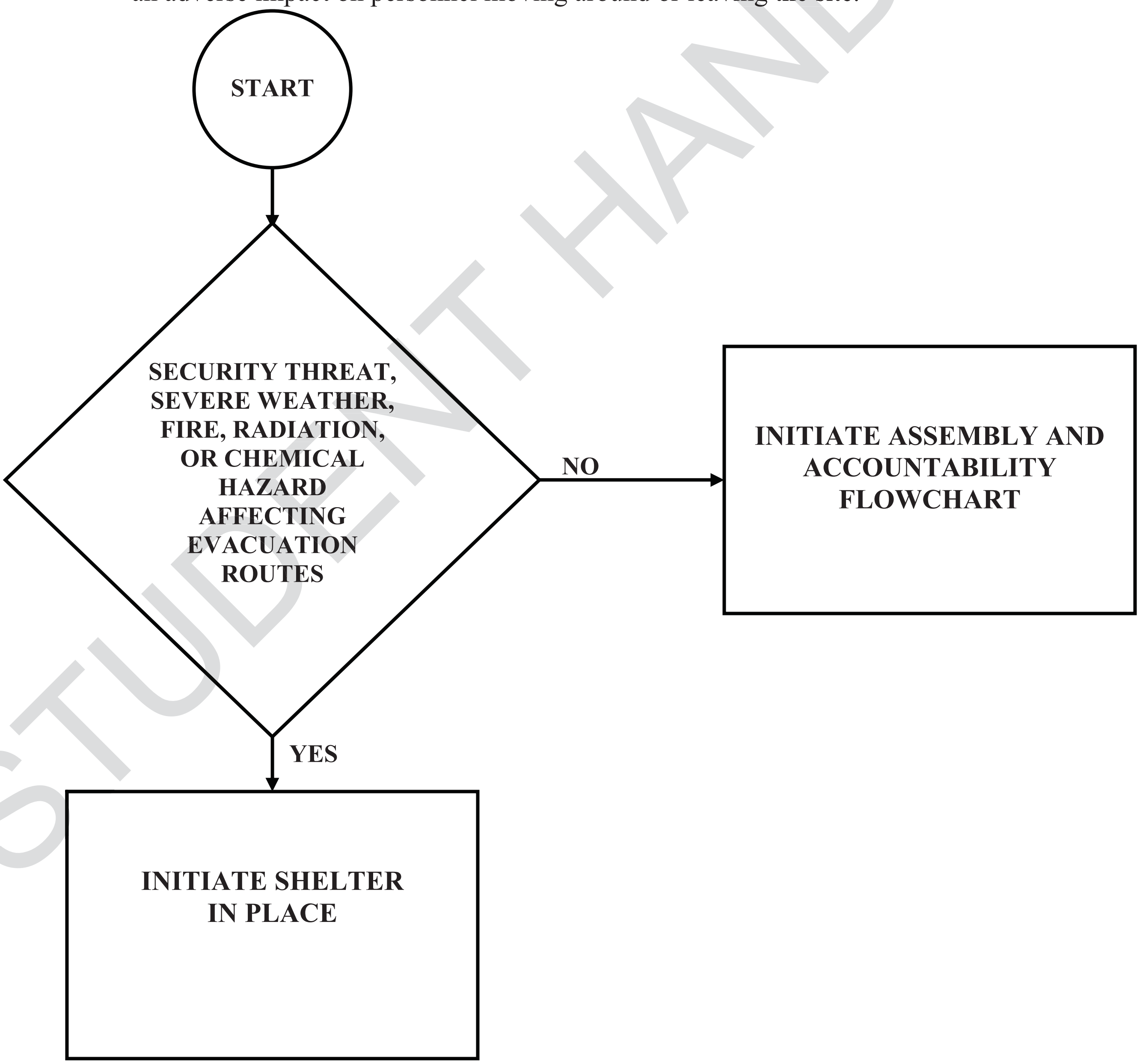
An area generally north of the South Texas Project Electric Generating Station within these boundaries: East of the northern portion of FM 1095, south of SH 35 west of the northern portion of the Colorado River, north of Wilson Creek, and which includes El Maton and Buckeye.

Onsite Protective Measures Decision Flowchart

1.0 Protective measures are required at a Site Area Emergency or if not already done at a General Emergency or anytime at the discretion of the Emergency Director.

1.1 Protective measures consist of shelter in place or assembly and accountability.

1.2 Examples that may require shelter in place include severe weather conditions which could threaten safe transport, a fire obstructing the evacuation route, a significant radiological or chemical hazard which could be encountered, a security threat occurring which could have an adverse impact on personnel moving around or leaving the site.



Shelter In Place

<u>ENTRY REQUIREMENT:</u> A Site Area Emergency or General Emergency has been declared or the Emergency Director has initiated shelter in place.

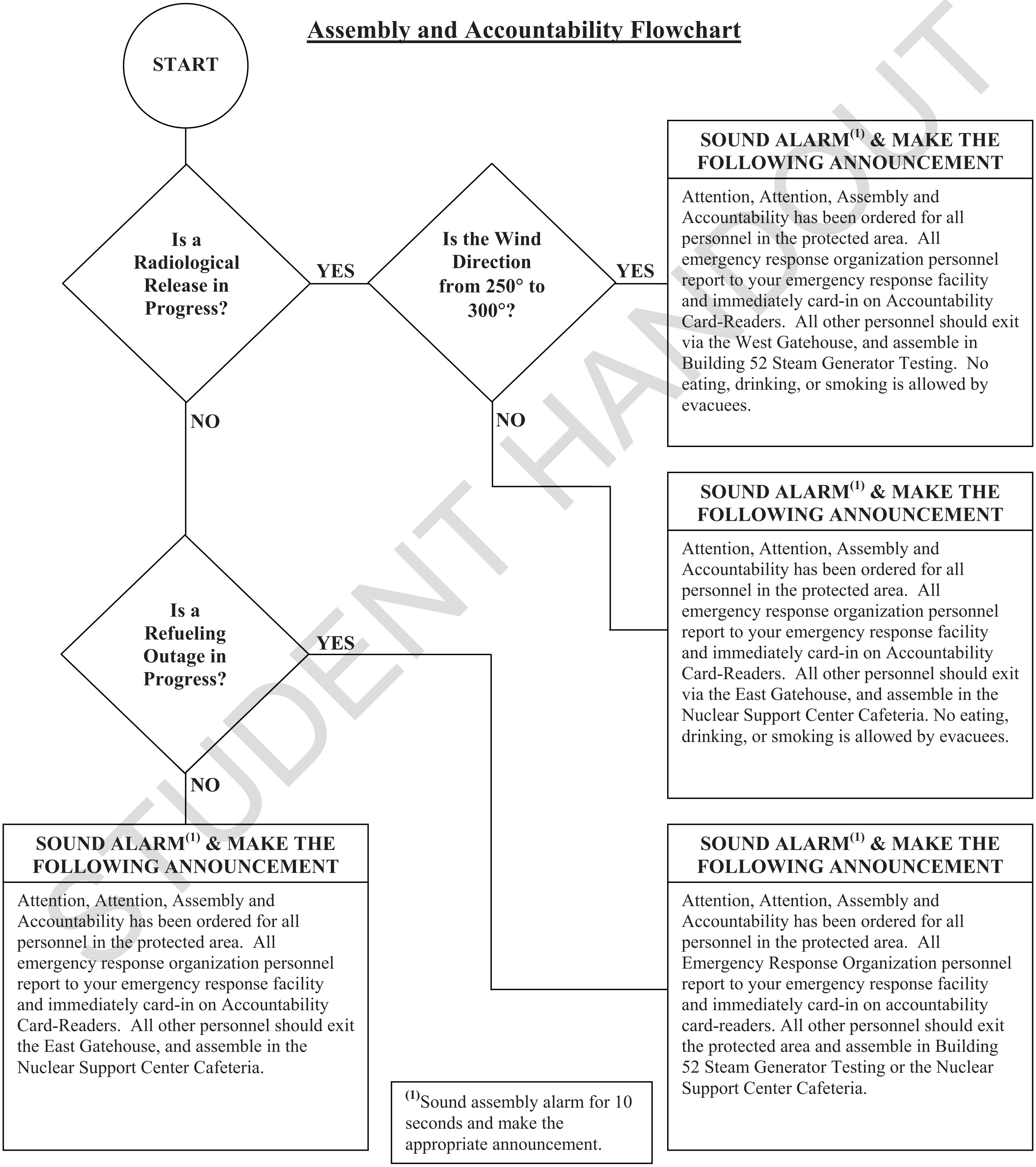
1.0 To initiate Onsite <u>Shelter In Place</u> ensure the following announcement is made over the public address system using the **Unit Override** button:

"Attention all personnel, attention all personnel, take immediate shelter inside the nearest building and remain there until further direction. I repeat take immediate shelter inside the nearest building and remain there until further direction."

2.0 Repeat this message every 30 minutes.

3.0 Once it is safe to conduct assembly and accountability initiate Assembly and Accountability Flowchart.

Assembly and Accountability Flowchart



CODE	MEANING	USAGE & DIRECTIONS
0001	Unusual Event	ENRS is automatically activated by security via the Page Announcement. ERO does not report.
0002	*Unusual Event Security	Used for Initiating Condition HU4 and requires communications with the Alarm Station Operator at extension 6042 or 6455 to initiate this code.
0003	Alert Emergency	ENRS is automatically activated by security via the Page Announcement. TSC & OSC activate, EOF & JIC staff.
0004	Site Area Emergency	ENRS is automatically activated by security via the Page Announcement. TSC, OSC, EOF, and JIC Activate.
0005	General Emergency	ENRS is automatically activated by security via the Page Announcement. TSC, OSC, EOF, and JIC Activate.
0006	Report to EOF, JIC, and Alternate TSC/OSC in the NTF	Used at an Alert or higher classification and you do **NOT** want personnel entering the Protected Area. (Security Event, e.g., Aircraft Attack) Requires communications with the Alarm Station Operator at extension 6042 or 6455 to initiate this code.
0007	Staff ERFs	Used during an Unusual Event Classification but you wish to staff the TSC, OSC, EOF, and JIC. Requires communications with the Alarm Station Operator at extension 6042 or 6455 to initiate this code.
0008	Abort	Used to STOP the ERO Response.
0009	Amplifying Information	Used to advise the ERO, requires communications with the Alarm Station Operator (ASO) at extension 6042 or 6455 to initiate this code. Give the ASO the message you wish ENRS to give the ERO.

*Positions responding to pager code –0002 include the Operations Manager, **TSC**: TSC Manager, Technical Manager, Security Manager. **EOF**: EOF Director, Deputy EOF Director, ED Admin Assistant, Licensing Director, Site Public Affairs Specialist, Site Public Affairs Coordinator, Site Public Affairs Admin Assistant, Support Organization Director, Assistant Support Organization Director, Communications System Supervisor, EOF Liaison, Records Supervisor. **JIC**: Admin Manager, Audio-Visual Tech, JIC Communications Tech, JIC Director, Public Inquiry Manager, Spokesperson, Staff Writer, Technical Spokesperson, Technical Support Liaison.

Action **Time**

1.9 PAR development is expected to be made promptly following indications that conditions have exceeded Protective Action Guides (PAGs). PARs shall be developed within 15 minutes of initial indications. ______________

1.9.1 IF a radiological release is in progress, AND time does not permit the calculation and evaluation of downwind doses OR personnel are not available to complete these calculations, then determine the Protective Action Recommendation using Addendum 1, Initial Protective Action Recommendation Flowchart. ______________

1.9.2 IF a radiological release is NOT in progress, THEN determine the PAR using Addendum 2, Core/Containment Status Table. ______________

1.9.3 IF a radiological release IS in progress, AND STAMPEDE is available, THEN obtain the Protective Action Recommendation from the printout. ______________

1.9.4 IF a radiological release is in progress, AND STAMPEDE is NOT available, THEN use manual dose assessment, actual field readings, or release rates to determine the Protective Action Recommendation using Addendum 3, Radiological Release Table. ______________

1.9.5 IF dose assessment results indicate ≥ 1 rem TEDE or ≥ 5 rem Thyroid CDE (PAGs) are exceeded at 10 miles, and field team measurements verify projected dose, THEN recommend evacuation of 10 mile radius and downwind sectors greater than 10-miles in 2-mile increments until PAGs are not exceeded. ______________

1.9.6 Determine affected downwind sectors and zones using Addendum 4, Protective Response Zones. Use Addendum 5, Protective Response Zones Map to assist. ______________

ENTRY REQUIREMENTS: General Emergency **AND** a radiological release is **NOT** in progress.

Containment High Range Radiation Monitor RT-8050/51	[a]Hatch Monitor	Containment Pressure	[b]Evacuation Protective Action Recommendations
Less Than 200 R/hr	Less Than 444 mR/hr	N/A	2 Mile Radius Zone: 1 (Refer to Addendum 4 for affected downwind sectors).
200 R/hr to 1,000 R/hr	444 mR/hr to 2,222 mR/hr	< 5 psig	2 Mile Radius & 5 Miles Downwind (Refer to Addendum 4 for affected downwind zones and sectors).
		≥ 5 psig	5 Mile Radius Zones: 1,2,3,4,5 (Refer to Addendum 4 for affected downwind sectors).
Greater Than 1,000 R/hr	Greater Than 2,222 mR/hr	< 5 psig	5 Mile Radius & 10 Miles Downwind (Refer to Addendum 4 for affected downwind zones and sectors).
		≥ 5 psig	10 Mile Radius Zones: 1,2,3,4,5,6,7,8,9,10,11 (Refer to Addendum 4 for affected downwind sectors).

The student will determine the PAR and go to Addendum 4 to determine the downwind zones and sectors.

NOTES:

[a] If the Containment High Range Radiation Monitors (RT-8050 and RT-8051) are out of service then use the Hatch Monitor.

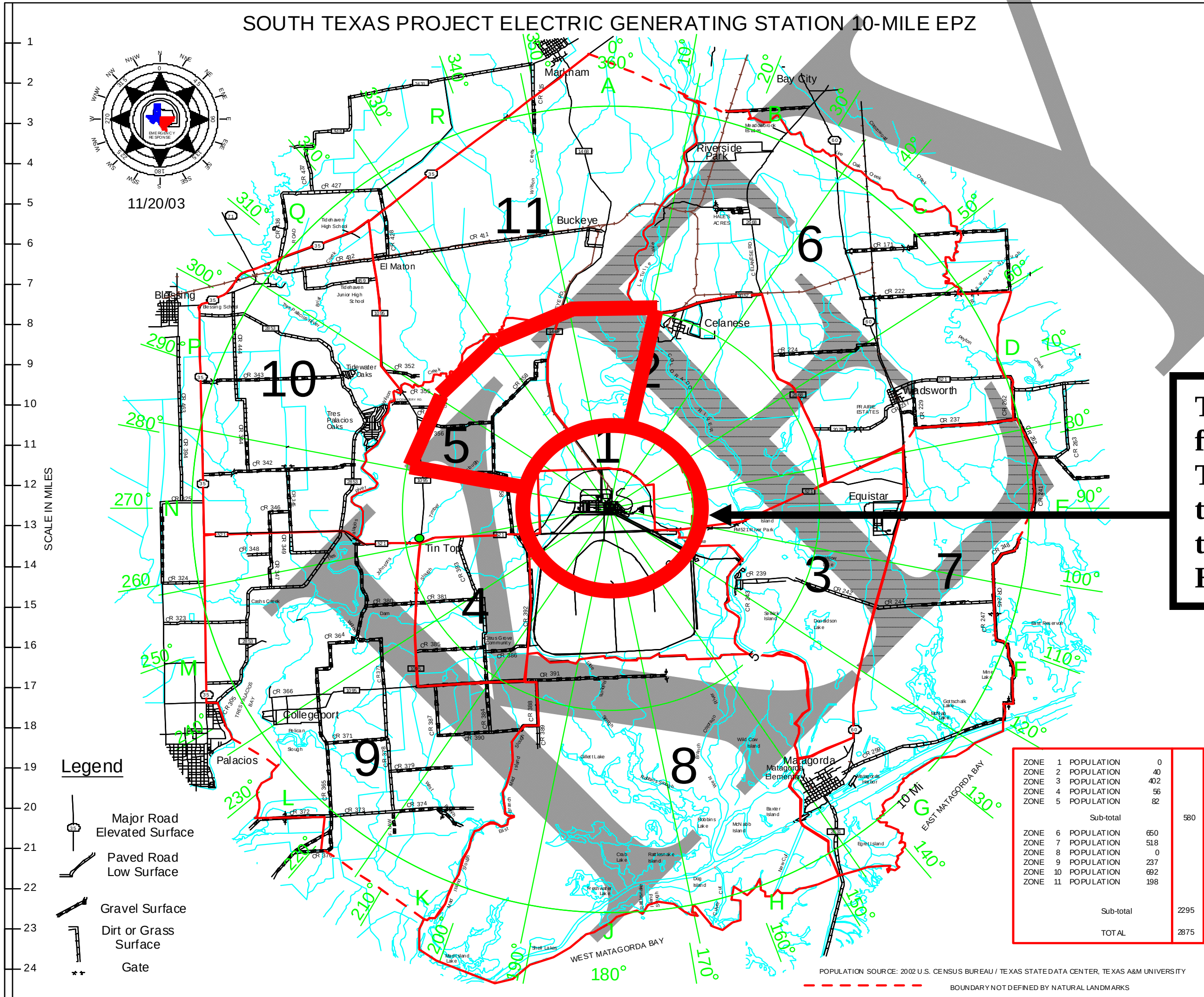
[b] Consider Shelter when environmental conditions could impact evacuation such as flooded or icy roads.

Assumptions used in the calculation of this table are in procedure 0ERP01-ZV-IN07, Offsite Protective Action Recommendations, Addendum 2.

AFFECTED ZONES: Determine affected sectors and protective response zones and enter onto 0ERP01-ZV-IN02, Data Sheet 1, Offsite Agency Notification Message Form.

WIND DIRECTION FROM IS BETWEEN	AFFECTED DOWNWIND SECTORS	EVACUATE ZONES			EVACUATE KEY HOLE ZONES	
		TWO MILE RADIUS	FIVE MILE RADIUS	TEN MILE RADIUS	2 Mile Radius & 5 Miles Downwind	5 Mile Radius & 10 Miles Downwind
355º to 5º	H, J, K	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1	1, 2, 3, 4, 5, 8, 9
6º to 16º	H, J, K, L	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1	1, 2, 3, 4, 5, 8, 9
17º to 28º	J, K, L	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1	1, 2, 3, 4, 5, 8, 9
29º to 39º	J, K, L, M	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4	1, 2, 3, 4, 5, 8, 9
40º to 50º	K, L, M	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4	1, 2, 3, 4, 5, 8, 9
51º to 61º	K, L, M, N	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4, 5	1, 2, 3, 4, 5, 8, 9, 10
62º to 73º	L, M, N	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4, 5	1, 2, 3, 4, 5, 9, 10
74º to 84º	L, M, N, P	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4, 5	1, 2, 3, 4, 5, 9, 10
85º to 95º	M, N, P	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4, 5	1, 2, 3, 4, 5, 9, 10
96º to 106º	M, N, P, Q	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 4, 5	1, 2, 3, 4, 5, 9, 10, 11
107º to 118º	N, P, Q	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 5	1, 2, 3, 4, 5, 9, 10, 11
119º to 129º	N, P, Q, R	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 5	1, 2, 3, 4, 5, 9, 10, 11
130º to 140º	P, Q, R	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 5	1, 2, 3, 4, 5, 10, 11
141º to 151º	P, Q, R, A	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 5	1, 2, 3, 4, 5, 10, 11
152º to 163º	Q, R, A	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 5	1, 2, 3, 4, 5, 10, 11
164º to 174º	Q, R, A, B	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 5	1, 2, 3, 4, 5, 6, 10, 11
175º to 185º	R, A, B	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2	1, 2, 3, 4, 5, 6, 11
186º to 196º	R, A, B, C	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2	1, 2, 3, 4, 5, 6, 11
197º to 208º	A, B, C	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2	1, 2, 3, 4, 5, 6, 11
209º to 219º	A, B, C, D	[illegible]	[illegible]	[illegible]	1, 2	1, 2, 3, 4, 5, 6, 11
220º to 230º	B, C, D	[illegible]	[illegible]	[illegible]	1, 2	1, 2, 3, 4, 5, 6
231º to 241º	B, C, D, E	[illegible]	[illegible]	[illegible]	, 2, 3	1, 2, 3, 4, 5, 6, 7
242º to 253º	C, D, E	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3	1, 2, 3, 4, 5, 6, 7
254º to 264º	C, D, E, F	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3	1, 2, 3, 4, 5, 6, 7
265º to 275º	D, E, F	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3	1, 2, 3, 4, 5, 6, 7
276º to 286º	D, E, F, G	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3	1, 2, 3, 4, 5, 6, 7
287º to 298º	E, F, G	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 3	1, 2, 3, 4, 5, 7
299º to 309º	E, F, G, H	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 3	1, 2, 3, 4, 5, 7, 8
310º to 320º	F, G, H	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 3	1, 2, 3, 4, 5, 7, 8
321º to 331º	F, G, H, J	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 3	1, 2, 3, 4, 5, 7, 8
332º to 343º	G, H, J	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1	1, 2, 3, 4, 5, 7, 8
344º to 354º	G, H, J, K	1	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1	1, 2, 3, 4, 5, 7, 8, 9

Using the given wind direction, the student will determine the affected downwind zones and sectors.



ZONE	1	POPULATION	0	
ZONE	2	POPULATION	40	
ZONE	3	POPULATION	402	
ZONE	4	POPULATION	56	
ZONE	5	POPULATION	82	
		Sub-total		580
ZONE	6	POPULATION	650	
ZONE	7	POPULATION	518	
ZONE	8	POPULATION	0	
ZONE	9	POPULATION	237	
ZONE	10	POPULATION	692	
ZONE	11	POPULATION	198	
		Sub-total		2295
		TOTAL		2875

PROTECTIVE RESPONSE ZONES AND POPULATIONS

ZONE BOUNDARY DESCRIPTIONS

Zone 1

An area generally north and northeast of the South Texas Project Electric Generating Station and FM 521, running in an arc around the northern portion of the Station.

(Note: No population lives in this area.)

Zone 2

An area generally northeast of the South Texas Project Electric Generating Station within these boundaries: East of FM 1468, south of FM 3057, west of FM 2668, and north of FM 521 East, and which includes Celanese.

Zone 3

An area generally southeast of the South Texas Project Electric Generating Station within these boundaries: East of the Colorado River and Kelly Lake, south of FM 521, west of SH 60, north of the protection levee at Matagorda, and includes Selkirk Island, Exotic Isle, and Equistar.

The Student may use this addendum for assistance.
The red "KEY HOLE" represents the effects from the initiating cues of this JPM and is not on the Student Handout.

Electric Generating Station within these boundaries: East of SH 60, west of, CR 262, and CR 248, south of CR 237, and south of the protection levy at Matagorda, north of St. Mary's Bayou which includes the town of Matagorda, and the Intracoastal Waterway east of the Colorado River.

Zone 8

An area generally south of the South Texas Project Electric Generating Station within these boundaries: East of Mad Island Slough, south of the South Texas Project Generating Station south property boundary, west of the Colorado River, and north of West Matagroda Bay

Zone 9

An area generally southwest of the South Texas Project Electric Generating Station within these boundaries: East of SH 35, south of FM 521, west of FM 1095, and Mad Island Slough, and which includes Collegeport and the northern portion of Tres Palacios Bay.

Zone 10

An area generally northwest of the South Texas Project Electric Generating Station within these boundaries: East and south of SH 35, west of the northern portion of FM 1095 and the Tres Palacios River, north of FM 521, and which includes Tidewater Oaks, Tres Palacios Oaks.

Zone 11

An area generally north of the South Texas Project Electric Generating Station within these boundaries: East of the northern portion of FM 1095, south of SH 35 west of the northern portion of the Colorado River, north of Wilson Creek, and which includes El Maton and Buckeye.

Action **Time**

1.9 PAR development is expected to be made promptly following indications that conditions have exceeded Protective Action Guides (PAGs). PARs shall be developed within 15 minutes of initial indications.

1.9.1 IF a radiological release is in progress, AND time does not permit the calculation and evaluation of downwind doses OR personnel are not available to complete these calculations, then determine the Protective Action Recommendation using Addendum 1, Initial Protective Action Recommendation Flowchart.

1.9.2 IF a radiological release is NOT in progress, THEN determine the PAR using Addendum 2, Core/Containment Status Table.

1.9.3 IF a radiological release IS in progress, AND STAMPEDE is available, THEN obtain the Protective Action Recommendation from the printout.

1.9.4 IF a radiologic … is
NOT available … l
field readings, …
Action Recom… l
Release Table …

Based on the initial condition that a radiological release is not in progress, the student will go to Addendum 2, Core/Containment Status Table.
The Student will then go to Addendum 4 to complete the PAR.

1.9.5 IF dose assess… em
Thyroid CDE … eam
measurements verify projected dose, THEN recommend evacuation of 10 mile radius and downwind sectors greater than 10-miles in 2-mile increments until PAGs are not exceeded.

1.9.6 Determine affected downwind sectors and zones using Addendum 4, Protective Response Zones. Use Addendum 5, Protective Response Zones Map to assist.

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE:	**TRANSFER TO HOT LEG RECIRCULATION**
JPM NO.:	**C1**
REVISION:	**2**
LOCATION:	**UNIT 1 OR UNIT 2 CONTROL ROOM OR THE SIMULATOR**

JOB PERFORMANCE MEASURE WORKSHEET
SOUTH TEXAS PROJECT

JPM Title: TRANSFER TO HOT LEG RECIRCULATION

JPM No.: C2

Rev. No.: 2

STP Task: 81637 - Transfer to Hot Leg Recirculation

STP Objective: 81637 - Transfer to Hot Leg Recirculation IAW 0POP05-E0-ES14

Related K/A Reference: 006 A4.05 - Ability to manually operate and/or monitor in the control room: Transfer of ECCS flowpaths prior to recirculation.

References: 0POP05-E0-ES14, Rev. 7, Transfer to Hot Leg Recirculation

Task Normally Completed By: RO

Method of Testing: Static Performance

Location of Testing: Unit 1 or Unit 2 Control Room or the Simulator

Time Critical Task: NO

Alternate Path JPM: NO

Validation Time: 10 minutes

Required Materials (Tools/Equipment): Procedure copy if being done in the plant. None needed if being done in the simulator.

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: **Do not operate or alter equipment configuration in the plant without proper authorization.**

INITIAL CONDITIONS:

A large break LOCA occurred 5.5 hours ago. The control room operators have completed 0POP05-EO-EO10 and are evaluating long term plant status.

- Adverse Containment Conditions exist.
- A lockout has occurred on 4160v Bus E1C
- Only SI Trains 'A' and 'B' are operating

INITIATING CUE:

The Unit Supervisor directs you to transfer SI Train 'A' to Hot Leg recirculation in accordance with 0POP05-EO-ES14, Transfer to Hot Leg Recirculation, Step 3.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

The Performer transfers SI Recirculation Flow from Cold Leg to Hot Leg for SI Train 'A' per 0POP05-EO-ES14.

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

Handout copy of 0POP05-EO-ES14, TRANSFER TO HOT LEG RECIRCULATION, if this JPM is being performed in the plant.

NOTES:

This JPM to be performed statically in either Unit 1 or Unit 2 Control Room or the Simulator

SIMULATOR SETUP (if applicable)

1. Ensure Radio volume for both stations are set to a reasonable level.

2. Ensure the simulator PA buttons on the communications consoles are taped to help eliminate usage.

3. Reset to the 100% power Storepoint and verify:
   - Step counter position annunciator light is out
   - Red light at the end of CP-010 is out
   - ICS annunciators have stopped counting up

4. Check and Clean the following procedures in the simulator (JPM specific)
   - 0POP05-EO-ES14, Transfer to Hot Leg Recirculation

5. Place simulator in run, clear/reset any alarms, then GO TO FREEZE

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE: • Critical steps are identified by (C).   • Sequenced steps are identified by (S_1, S_2, . . .).

SAT/UNSAT Performance Step: 1 **Start time: ________**

Obtain a copy of 0POP05-EO-ES14, Transfer to Hot Leg Recirculation

Standard:

Obtains a copy of 0POP05-EO-ES14, Transfer to Hot Leg Recirculation.

Comment:

A procedural handout is provided if this JPM is being done in the plant. If this JPM is being performed in the Simulator, the applicant will use procedures located there.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

<u>SAT/UNSAT</u> Performance Step: 2(C*)

Align the ‘A’ HHSI pump for Hot Leg Recirculation. (Procedure step 3a)

Standard:

_*_ *Energizes Train ‘A’ HHSI Hot Leg Injection Valve, MOV-0008A, by momentarily placing the PWR LOCKOUT switch to POWER ON.*

_*_ *Opens Train ‘A’ HHSI Hot Leg Injection Valve, MOV-0008A*

_*_ *Closes Train ‘A’ HHSI Cold Leg Injection Valve, MOV-0006A*

___ *Verifies Hot Leg Injection flow on FI-0917.*

___ *De-energizes Train ‘A’ HHSI Hot Leg Injection Valve, MOV-0008A, by momentarily placing its PWR LOCKOUT switch to POWER OFF.*

Comment:

* - Items marked with an “*” are the critical portion of the step.

Cue:

Energizes MOV-0008A with PWR Lockout Sw.:

MOV-0008A Indications	Initial Status	Expected Final Status
PWR Lockout Switch Indication Lights	Green light – LIT Red Light – NOT lit	Green light – NOT lit Red Light – LIT
LOOP A T_h VPI Lights	Green light – LIT Red Light – NOT lit	Green light – LIT Red Light – NOT lit
LOOP A T_h INJ Lights	Green light – NOT lit Red Light – NOT lit	Green light – LIT Red Light – NOT lit

Opens MOV-0008A:

MOV-0008A Indications	Initial Status	Expected Final Status
LOOP A T_h VPI Lights	Green light – LIT Red Light – NOT lit	Green light – NOT lit Red Light – LIT
LOOP A T_h INJ Lights	Green light – LIT Red Light – NOT lit	Green light – NOT lit Red Light – LIT

Cues are continued on next page.

Closes MOV-0006A:

JOB PERFORMANCE MEASURE CHECK SHEET

MOV-0006A Indications	Initial Status	Expected Final Status
LOOP A T_C INJ Lights	Green light – NOT lit Red Light – LIT	Green light – LIT Red Light – NOT lit

Verifies Flow:
- 1500 gpm on FI-0917 for Loop A T_H
- 0 gpm on FI-0901 for Loop A T_C

De-energizes MOV-0008A:

MOV-0008A Indications	Initial Status	Expected Final Status
PWR Lockout Switch Indication Lights	Green light – NOT lit Red Light – LIT	Green light – LIT Red Light – NOT lit
LOOP A T_h VPI Lights	Green light – NOT lit Red Light – LIT	Green light – NOT lit Red Light – LIT
LOOP A T_h INJ Lights	Green light – NOT lit Red Light – LIT	Green light – NOT lit Red Light – NOT lit

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 3(C*)

Align the 'A' LHSI pump for Hot Leg Recirculation. (Procedure step 3b)

Standard:

_*_ *Dispatches an operator to locally unlock and close the LHSI Cold Leg Injection Valve, MOV-0031A, E1A1 (E2A1)/C3 and E1A1 (E2A1/V6L).*

_*_ *Energizes Train 'A' LHSI Hot Leg Injection Valve, MOV-0019A, by momentarily placing the PWR LOCKOUT switch to POWER ON.*

_*_ *Opens LHSI Hot Leg Injection Valve, MOV-0019A*

_*_ *Closes LHSI Cold Leg Injection Valve, MOV-0031A*

___ *Verifies Hot Leg Injection flow on FI-0927*

___ *De-energizes Train 'A' LHSI Hot Leg Injection Valve, MOV-0019A, by momentarily placing the PWR LOCKOUT switch to POWER OFF.*

Comment:

* - Items marked with an "*" are the critical portion of the step.

Cue:

As a Plant Operator, acknowledge the direction to close the breaker for MOV-0031A, then inform the applicant the breakers are closed.

MOV-00031A Indications	Initial Status	Expected Final Status
LOOP A T_c INJ Lights	Green light – NOT lit Red Light – NOT lit	Green light – NOT lit Red Light – LIT

Energizes MOV-0019A with PWR Lockout Sw.:

MOV-00019A Indications	Initial Status	Expected Final Status
PWR Lockout Switch Indication Lights	Green light – LIT Red Light – NOT lit	Green light – NOT lit Red Light – LIT
LOOP A T_h VPI Lights	Green light – LIT Red Light – NOT lit	Green light – LIT Red Light – NOT lit
LOOP A T_h INJ Lights	Green light – NOT lit Red Light – NOT lit	Green light – LIT Red Light – NOT lit

Cues are continued on next page.

Opens MOV-0019A:

JOB PERFORMANCE MEASURE CHECK SHEET

MOV-00019A Indications	Initial Status	Expected Final Status
LOOP A T_h VPI Lights	Green light – LIT Red Light – NOT lit	Green light – NOT lit Red Light – LIT
LOOP A T_h INJ Lights	Green light – LIT Red Light – NOT lit	Green light – NOT lit Red Light – LIT

Closes MOV-0031A:

MOV-00031A Indications	Initial Status	Expected Final Status
LOOP A T_c INJ Lights	Green light – NOT lit Red Light – LIT	Green light – LIT Red Light – NOT lit

Verifies Flow:
- 2900 gpm on FI-0927 for Loop A T_H
- 0 gpm on FI-0851 for Loop A T_C

De-energizes MOV-0019A:

MOV-00019A Indications	Initial Status	Expected Final Status
PWR Lockout Switch Indication Lights	Green light – NOT lit Red Light – LIT	Green light – LIT Red Light – NOT lit
LOOP A T_h VPI Lights	Green light – NOT lit Red Light – LIT	Green light – NOT lit Red Light – LIT
LOOP A T_h INJ Lights	Green light – NOT lit Red Light – LIT	Green light – NOT lit Red Light – NOT lit

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

<u>SAT/UNSAT</u> Performance Step: 4

Dispatch an Operator to open and lock the breakers for the following valves: (Procedure Step 4)

1. LHSI Pump 1A Disch to Loop 1 Cold Leg 1-SI-MOV-0031A
2. LHSI Pump 1B Disch to Loop 2 Cold Leg 1-SI-MOV-0031B
3. LHSI Pump 1C Disch to Loop 3 Cold Leg 1-SI-MOV-0031C

Standard:

A Plant Operator is dispatched to open and lock the breakers for the following valves:

- *LHSI Pump 1A Disch to Loop 1 Cold Leg 1-SI-MOV-0031A*
- *LHSI Pump 1B Disch to Loop 2 Cold Leg 1-SI-MOV-0031B*
- *LHSI Pump 1C Disch to Loop 3 Cold Leg 1-SI-MOV-0031C*

Comment:

Cue:

As Plant Operator, acknowledge the request to open and lock the above breakers.

Notes:

- TERMINATE THE JPM - **Stop time _________**

VERIFICATION OF COMPLETION

Job Performance Measure: C1, TRANSFER TO HOT LEG RECIRCULATION

Performer's Name: ______________________________

Date Performed: ______________

Time to Complete: ______________

JPM Results: Sat/Unsat

Evaluator: ________________ **Signature:** ________________

Date: ________

JPM - STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

A large break LOCA occurred 5.5 hours ago. The control room operators have completed 0POP05-EO-EO10 and are evaluating long term plant status.

- Adverse Containment Conditions exist.
- A lockout has occurred on 4160v Bus E1C
- Only SI Trains 'A' and 'B' are operating

INITIATING CUE:

The Unit Supervisor directs you to transfer SI Train 'A' to Hot Leg recirculation in accordance with 0POP05-EO-ES14, Transfer to Hot Leg Recirculation, Step 3.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

To prevent dead heading the RHR pump, the same train of RHR and LHSI pumps SHALL NOT be operated simultaneously.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
___3	**SELECT SI train for hot leg recirculation**	
	___a. ALIGN selected HHSI for hot leg recirculation:	
	___1) ENERGIZE selected SI train HHSI hot leg injection valve	
	___2) OPEN HHSI hot leg injection valve	
	___3) CLOSE HHSI cold leg injection valve	
	___4) VERIFY hot leg injection flow	4) PERFORM the following: a) OPEN HHSI cold leg injection valve. b) CLOSE HHSI hot leg injection valve -------------------------------------
	___5) DEENERGIZE selected SI train HHSI hot leg injection valve	

Step 3 continued on next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Step 3 continued from previous page.

___b. ALIGN selected LHSI for hot leg recirculation:

___1) DISPATCH Operator To UNLOCK and CLOSE the selected LHSI Cold Leg Injection Valve Breakers:

o "LHSI PUMP 1A(2A) DISCH" "TO LOOP 1 COLD LEG" "1(2)-SI-MOV-0031A" E1A1(E2A1)/C3

<u>AND</u>

E1A1(E2A1)/V6L

o "LHSI PUMP 1B(2B) DISCH" "TO LOOP 2 COLD LEG" "1(2)-SI-MOV-0031B" E1B1(E2B1)/A4

<u>AND</u>

E1B1(E2B1)/W2R

o "LHSI PUMP 1C(2C) DISCH" "TO LOOP 3 COLD LEG" "1(2)-SI-MOV-0031C" E1C1(E2C1)/D1

<u>AND</u>

E1C1(E2C1)/S4R

___2) ENERGIZE selected SI train LHSI hot leg injection valve

Step 3 continued on next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Step 3 continued from previous page.

CAUTION

Following substeps SHALL be performed in rapid sequence to prevent pump runout.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
____3) OPEN LHSI hot leg injection valve	
____4) CLOSE LHSI cold leg injection valve	
____5) VERIFY hot leg injection flow	5) PERFORM the following: a) OPEN LHSI cold leg injection valve. b) CLOSE LHSI hot leg injection valve
____6) DEENERGIZE selected SI train LHSI hot leg injection valve	

STEP ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED

___4 **DISPATCH Operator To OPEN And Lock The Following LHSI Cold Leg Injection Valve Breakers:**

o "LHSI PUMP 1A(2A) DISCH"
"TO LOOP 1 COLD LEG"
"1(2)-SI-MOV-0031A"
E1A1(E2A1)/C3

AND

E1A1(E2A1)/V6L

o "LHSI PUMP 1B(2B) DISCH"
"TO LOOP 2 COLD LEG"
"1(2)-SI-MOV-0031B"
E1B1(E2B1)/A4

AND

E1B1(E2B1)/W2R

o "LHSI PUMP 1C(2C) DISCH"
"TO LOOP 3 COLD LEG"
"1(2)-SI-MOV-0031C"
E1C1(E2C1)/D1

AND

E1C1(E2C1)/S4R

___5 **RETURN TO Procedure And Step In Effect**

-**END**-

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE:	**RESPOND TO RCB HIGH RADIATION**
JPM NO:	**C2**
REVISION:	**2**
LOCATION:	**UNIT 1, UNIT 2, OR SIMULATOR**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title: RESPOND TO RCB HIGH RADIATION

JPM No.: C2

Rev. No.: 2

STP Task: T83791, Respond to High Containment Radiation

STP Objective: CRO 83791, Respond to High Containment Radiation per 0POP05-EO-FRZ3, Response to High Containment Radiation

Related K/A Reference: E16 EA2.1, Ability to determine and interpret the following as they apply to the High Containment Radiation: Facility conditions and selection of appropriate procedures during abnormal and emergency conditions (2.9/3.3)

References: 0POP05-EO-FO05, Rev. 1, Containment Critical Safety Function Status Tree
0POP050-EO-FRZ3, Rev. 2, Response to High Containment Radiation

Task Normally Completed By: RO

Method of Testing: Static Performance

Location of Testing: Unit 1 or Unit 2 Control Room or Simulator

Time Critical Task: NO

Alternate Path JPM: NO

Validation Time: 10 minutes

Required Materials (Tools/Equipment):

- 0POP05-EO-F005, Containment Critical Safety Function Status Tree **(copies are to be in color <u>regardless of whether the applicant is performing in the plant or simulator</u>)**

- 0POP05-EO-FRZ3, Response to High Containment Pressure (This handout is only needed if this JPM is being performed in the plant. This handout is not needed if this JPM is being performed in the Simulator

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the applicant):

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

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

An RCS leak in excess of normal Charging capacity has occurred inside Containment. The crew has manually tripped the Reactor and initiated SI. The crew implemented 0POP05-EO-EO00, Reactor Trip or Safety Injection, then transitioned to 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant (0POP05-EO-EO00, Addendum 5 is complete).

Instrument air has been restored to Containment.

INITIATING CUE:

The Unit Supervisor directs you to evaluate the Containment Critical Safety Function status, using available parameter displays and NOT just using the displayed color for the Critical Safety Function, AND take any appropriate action.

-DO NOT DISCLOSE INFORMATION BELOW THIS LINE-

COMPLETION CRITERIA:

Containment is verified isolated and Containment Carbon Filter Units are placed in service.

JOB PERFORMANCE MEASURE INFORMATION SHEET (cont'd)

HANDOUTS:

THE HANDOUT COPY OF 0POP05-EO-FO05 IS A COLOR DIAGRAM ON WHITE PAPER. THIS IS TO BE HANDED OUT WITH THE OTHER REFERENCE. THESE HANDOUTS ARE LOCATED BEHIND A SEPARATE TAB IN THE EXAMINERS BOOK.

Handout copies of:

- 0POP05-EO-F005, Containment Critical Safety Function Status Tree (copies are to be in color and a sufficient number available regardless of whether the applicant is performing in the plant or simulator)
- 0POP05-EO-FRZ3, Response to High Containment Pressure (only needed for those performing this JPM in the plant)

NOTES:

1) This JPM will be performed statically in either the Unit 1 or Unit 2 Control Room or on a static simulator.

SIMULATOR SETUP (if applicable):

1) Ensure Radio volume for both stations are set to a reasonable level.
2) Ensure the simulator PA buttons on the communications consoles are taped to help eliminate usage.
3) Reset to the 100% power Storepoint and verify:
    - Step counter position annunciator light is out
    - Red light at the end of CP-010 is out
4) Check and clean the following procedures (JPM specific):
    - 0POP05-EO-FRZ3, Response to High Containment Pressure
5) Place simulator in run, Silence/acknowledge/reset alarms as necessary.
6) Place the simulator in FREEZE

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, …).

JPM START TIME_______________

SAT / UNSAT Performance Step: 1

Obtain a copy of 0POP05-EO-FO05, Containment Critical Safety Function Status Tree

Standard:

Obtains a copy of 0POP05-EO-FO05, Containment Critical Safety Function Status Tree.

Comment:

Provide the applicant with a color copy of 0POP05-EO-F005, Containment Critical Safety Function Status Tree.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

<u>SAT / UNSAT</u> Performance Step: 2

Containment Pressure < 56.5 psig?

Standard:

Determines containment pressure is < 56.5 psig.

Comment:

Applicant may check recorders on back panel CP-018 or computer indication (QDPS or ICS).

For this and other steps that involve retrieving information from a computer system the applicant should be able to actually operate the system to get to the page or point of interest. In the Unit 1 or 2 Control Rooms, the applicant should first obtain permission from the watchstander.

It will be difficult for the examiner to indicate values on the electronic recorders due their variation in scaling. All electronic recorders have digital readouts in addition to the history traces. Recommend the examiners provide these values rather than trying to point to the corresponding value on the chart portion of the recorder.

Cue:

If checking a computer screen display, once the applicant correctly shows where to obtain the indication, indicate the reading is 0.3 psig:

- If looking at QDPS, the value will be directly displayed on appropriate screens.
- If looking at ICS, the individual must call up a computer point that displays Containment pressure or a graphic display that has the information on it (like on QDPS).

If checking a recorder indication, use a pointing device to indicate approximately 0.3 psig.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 3

Containment Pressure < 9.5 psig?

Standard:

Determines containment pressure is < 9.5 psig.

Comment:

By performing the actions of JPM Step 2, the applicant will also be able to answer this procedure step.

Cue:

None necessary. Use the cue in JPM step 2 if the applicant wishes to re-check indications.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 4

Containment Water Level < 69 "?

Standard:

Determines Containment Water Level is < 69".

Comment:

Applicant may check recorders on back panel CP-018 or computer indication (QDPS or ICS). Ensure applicant is looking at Wide Range (W/R) Containment level indication and NOT Containment Normal or Secondary Sump levels.

Cue:

If checking a computer screen display, once the applicant correctly shows where to obtain the indication, indicate the reading is 0 or "as you see it":

- If looking at QDPS, the value will be directly displayed on appropriate screens either as a value or bar graph
- If looking at ICS, the individual must call up a computer point that displays Containment water level or a graphic display that has the information on it (like on QDPS)

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 5**(C)**

Containment Radiation < 2E +3 R/Hr?

Standard:

Determines Containment radiation > 2E +3 R/Hr.

Comment:

There are 2 Rad Monitors that can be used to display high range doserate: RT-8050 and RT-8051. These monitors can be read on any of the following computer systems:

- RM-23
- RM-11
- QDPS
- ICS

Cue:

If the applicant obtains the reading from QUAL PAMS display of QDPS this is an average reading of the two monitors. Provide the following indication value:

- 3.1E+3 R/Hr.

If the applicant obtains readings from the individual Radiation Monitors, then provide the following indications:

- RT-8050 3E+3 R/Hr
- RT-8051 3.2E+3 R/Hr

These readings are above the 'Alert' alarm setpoint for these monitors. On the RM-23 modules there will be a yellow 'Alert' alarm light ON. On the RM-11 display, the monitors' icons (blocks) will be yellow.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 6**(C)**

Based on RT-8050 and RT-8051 readings, implement 0POP05-EO-FRZ3, Response to High Containment Radiation Level.

Standard:

Determines radiation levels require entry into 0POP05-EO-FRZ3 and obtains a copy of 0POP05-EO-FRZ3, Response to High Containment Radiation Level.

Comment:

Provide the operator with a copy of 0POP05-EO-FRZ3, Response to High Containment Radiation Level. If performed in the Simulator, applicant may use the controlled copy of the procedure in the Simulator.

Cue:

If the applicant seeks concurrence from the Unit Supervisor to perform FRZ3, inform him/her they have US concurrence.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 7

Verify Containment Atmosphere Radiation Monitor Valves closed. (Procedure step 1a)

Standard:

Verifies the following Containment Atmosphere Radiation Monitor Valves are closed:

- *MOV-0001*
- *MOV-0004*
- *MOV-0003*
- *MOV-0006*

Comment:

In a post-accident condition all these valves will be closed. Indications are on CP-002.

Cue:

For all 4 valves:

- GREEN light ON
- RED light OFF

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 8

Verify Normal Purge Supply and Exhaust Fans stopped. (Procedure step 1b)

Standard:

Verifies Normal Purge Supply and Exhaust Fans are stopped:

Supply Fans	*Exhaust Fans*
SPLY FAN 11A HC-VFN007	*EXH FAN 11A HC-VFN009*
SPLY FAN 11B HC-VFN008	*EXH FAN 11B HC-VFN010*

Comment:

To comply with Tech Specs during power operations, the Normal Purge Supply and Exhaust fans are placed in PTL (indicating lights operable, Green light on, Red light off).

Cue:

RED lights OFF, GREEN lights ON for Normal Purge Supply and Exhaust Fans

Supply Fans

- SPLY FAN 11A HC-VFN007
- SPLY FAN 11B HC-VFN008

Exhaust Fans

- EXH FAN 11A HC-VFN009
- EXH FAN 11B HC-VFN010

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 9

Verify Supplementary Purge Supply and Exhaust Fans stopped. (Procedure step 1c)

Standard:

Verifies Supplementary Purge Supply and Exhaust Fans are stopped:

Supply Fans	*Exhaust Fans*
SPLY FAN 11A HC-VFN011	*EXH FAN 11A HC-VFN013*
SPLY FAN 11B HC-VFN012	*EXH FAN 11B HC-VFN014*

Comment:

Cue:

For all the Supplementary Supply and Exhaust Fans: GREEN light ON, RED light OFF

Supply Fans

- SPLY FAN 11A HC-VFN011
- SPLY FAN 11B HC-VFN012

Exhaust Fans

- EXH FAN 11A HC-VFN013
- EXH FAN 11B HC-VFN014

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 10

Verify Purge Dampers closed. (Procedure step 1d)

Standard:

Verifies Normal and Supplementary Purge Dampers closed.

Comment:

This step includes checking both the Normal and Supplementary Purge Dampers. To comply with Tech Specs during power operations, the Normal Purge dampers have their supply breakers locked open (both indicating lights out).

Cue:

Supplementary Purge Dampers: GREEN light ON, RED light OFF

- FV-9776
- MOV-0003
- FV-9777
- MOV-0005

Normal Purge Dampers: GREEN light OFF, RED light OFF

- MOV-0007
- MOV-0008
- MOV-0009
- MOV-0010

If asked the status of F/ACT lights on Panels 22M04, 22M05 and 22M06 (above and to the right of the purge fans/valves), report that all component F/ACT lights on these panels are extinguished.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 11

Check Containment Air Temperature < 200 Deg. F. (Procedure step 2a)

Standard:

Determines Containment Air Temperature < 200 Deg. F.

Comment:

This information can be retrieved from a computer point or CP-002. There are 2 ways of obtaining the information at CP-002:

1) from the CNTMT Temp meter, TI-9681 on the very left side of CP-002

OR

2) from the RCFC Air Temp meters. There are 6 of these meters and each meter displays 2 temperatures; RCFC inlet and outlet temperature. The inlet temperature (higher reading of the 2) will be the RCB air temperature.

The meters on CP-002 are all edge-wise type meters where a pointing device can be used by the Examiner to indicate a displayed value.

Cue:

Containment Air Temperature reads 185 Deg. F

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 12**(C)**

Start Carbon Filter Units. (Procedure step 3)

Standard:

Starts one fan of each train of Carbon Filter Units by holding the selected fan in START until the associated intake and exhaust dampers indicate full open and the fan starts..

Comment:

Per procedure, must hold the fan control switch in START until the associated intake and exhaust dampers open fully and then the fan starts. In actual operation this will take about 10 seconds.

Per procedure, only one fan per train shall be place in service. Train 'A' fans are Fans 11A and 12A, Train 'B' fans are 11B and 12B.

Cue:

Initially for each train, the intake and exhaust dampers will be closed (GREEN lights ON, RED lights OFF) and the associated fans will not be running (GREEN light ON, RED light OFF). As applicant places a fan control switch to START, the following changes should take place:

- Intake and exhaust damper RED lights come ON immediately when the fan sw. is placed in Start, then, after several seconds, GREEN lights go OFF.
- Fan lights will then change: RED comes ON and GREEN goes OFF.

The applicant should start one fan in each train, thus will see these indications twice.

- Train A - Fan 11A(21A) HC-VFN029 or Fan 12A(22A) HC-VFN030
- Train B - Fan 11B(21B) HC-VFN031 or Fan 12B(22B) HC-VFN032

If the applicant asks which fans to start, respond as the US and direct him/her to start fans 11A and 11B.

Notes:

-TERMINATE THE JPM-

JPM STOP TIME_______________

VERIFICATION OF COMPLETION

Job Performance Measure: RESPOND TO RCB HIGH RADIATION

Performer's Name: ____

Date Performed: ____________________

Time to Complete: ____________________

JPM Results: **Sat / Unsat**

Evaluator:_________________________ **Signature:**_________________________

Date: _________________________

JPM – STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

An RCS leak in excess of normal Charging capacity has occurred inside Containment. The crew has manually tripped the Reactor and initiated SI. The crew implemented 0POP05-EO-EO00, Reactor Trip or Safety Injection, then transitioned to 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant (0POP05-EO-EO00, Addendum 5 is complete).

Instrument air has been restored to Containment.

INITIATING CUE:

The Unit Supervisor directs you to evaluate the Containment Critical Safety Function status, using available parameter displays and NOT just using the displayed color for the Critical Safety Function, AND take any appropriate action.

07-01-08
DATE EFFECTIVE

SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION

0POP05-EO-F005 Rev. 1

CONTAINMENT CRITICAL SAFETY FUNCTION STATUS TREE

DEPARTMENT PROCEDURE

SAFETY RELATED (Q)

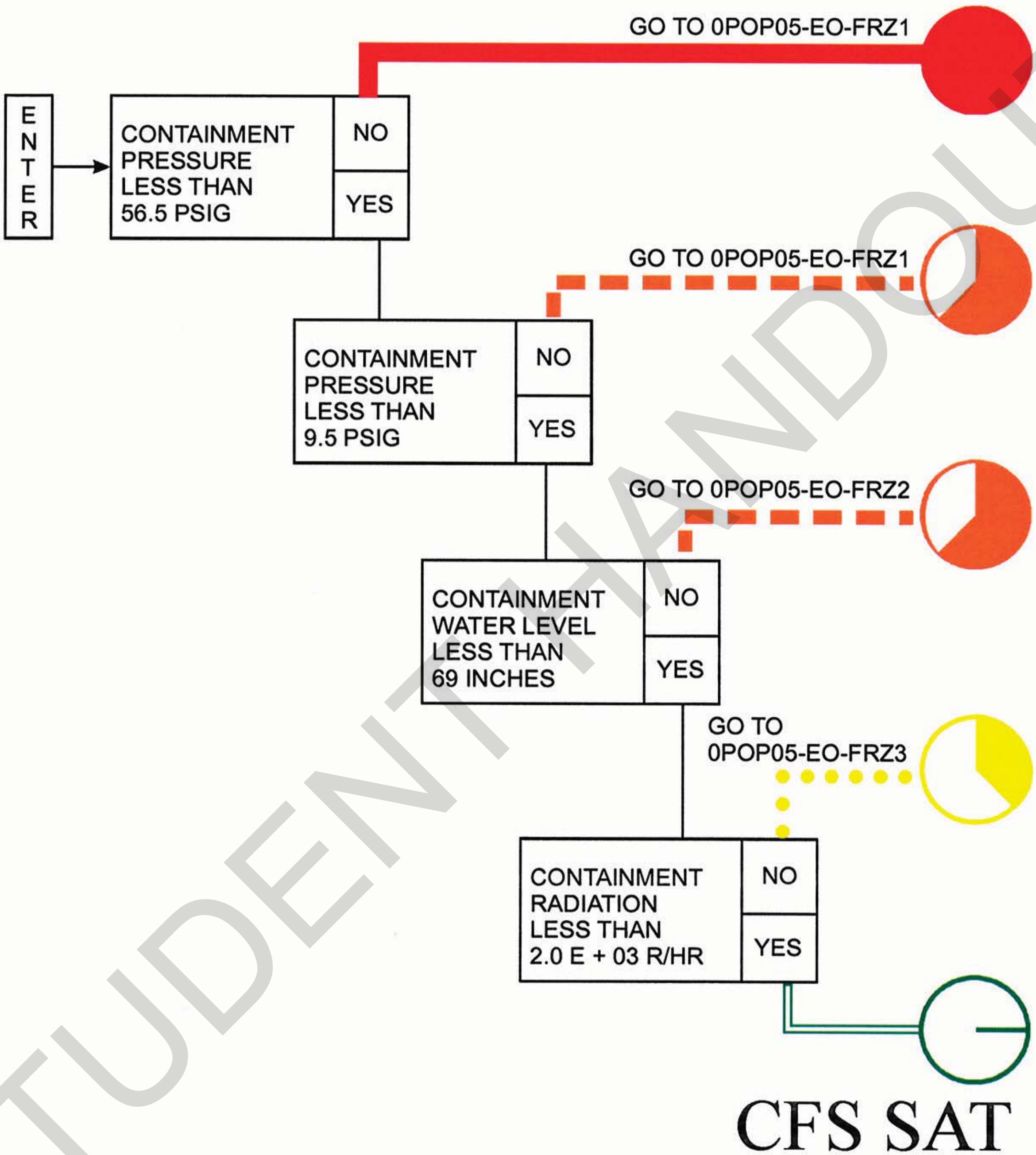
USAGE CONTROL: In Hand Controlling Station

LIST OF ATTACHMENTS:

None

This procedure is applicable in Modes 1, 2, 3, and 4.

STI# 32326168


GO TO 0POP05-EO-FRZ1
ENTER
CONTAINMENT PRESSURE LESS THAN 56.5 PSIG
NO
YES
GO TO 0POP05-EO-FRZ1
CONTAINMENT PRESSURE LESS THAN 9.5 PSIG
NO
YES
GO TO 0POP05-EO-FRZ2
CONTAINMENT WATER LEVEL LESS THAN 69 INCHES
NO
YES
GO TO 0POP05-EO-FRZ3
CONTAINMENT RADIATION LESS THAN 2.0 E + 03 R/HR
NO
YES
CFS SAT

07/01/08
DATE EFFECTIVE

SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION

0POP05-EO-FRZ3 Rev. 2

RESPONSE TO HIGH CONTAINMENT RADIATION LEVEL

DEPARTMENT PROCEDURE

SAFETY RELATED (Q)

USAGE CONTROL: In Hand Controlling Station

LIST OF ATTACHMENTS:

None

This procedure is applicable in Modes 1, 2, 3, and 4.

PURPOSE

This procedure provides actions to respond to high containment radiation level.

SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from 0POP05-EO-FO05, CONTAINMENT CRITICAL SAFETY FUNCTION STATUS TREE, on a YELLOW condition.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
___1	**VERIFY Containment Ventilation Isolation:**	
	___a. Containment atmosphere radiation monitor isolation valves - CLOSED	a. Manually CLOSE valves.
	___b. Normal Purge supply and exhaust fans - STOPPED	b. Manually STOP fans.
	___c. Supplementary Purge supply and exhaust fans - STOPPED	c. Manually STOP fans..
	___d. Purge Dampers - CLOSED	d. Manually CLOSE dampers.
___2	**DETERMINE If Containment Carbon Units Should Be Placed In Service:**	
	___a. CHECK containment air temperature - LESS THAN 200°F	a. GO TO Step 4.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Only one fan per train SHALL be placed in service.

___3 **START Selected Carbon Filter Unit(s) As Follows:**

___a. HOLD selected fan(s) in START until associated intake and exhaust dampers indicate FULL OPEN and fan(s) start:

o TRAIN A

"FAN 11A(21A) HC-VFN029"

"FAN 12A(22A) HC-VFN030"

o TRAIN B

"FAN 11B(21B) HC-VFN031"

"FAN 12B(22B) HC-VFN032"

___4 **NOTIFY TSC Staff Of Containment Radiation Level To Obtain Recommended Action**

___5 **RETURN TO Procedure And Step In Effect**

-**END**-

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE:	**LOCALLY TRIP THE REACTOR**
JPM NO.:	**P1**
REVISION:	**2**
LOCATION:	**Unit 1 or 2**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title:	LOCALLY TRIP THE REACTOR
JPM No.:	P1
Rev. No.:	2
STP Task:	2600, Manually trip the reactor.
STP Objective:	2600, When required, manually trip the reactor.
Related K/A Reference:	002 A2.04, Ability to (a) predict the impacts of the following malfunctions or operations on the RCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of heat sinks. (4.3/4.6)
References:	0POP05-EO-EO00, Rev. 21, REACTOR TRIP OR SAFETY INJECTION and 0POP05-EO-FRS1, Rev. 16, RESPONSE TO NUCLEAR POWER GENERATION - ATWS
Task Normally Completed By:	PO/RO
Method of Testing:	Simulated
Location of Testing:	Plant
Time Critical Task:	NO
Alternate Path JPM:	YES
Validation Time:	15 minutes

Required Materials (Tools/Equipment): None

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: **Do not operate or alter equipment configuration in the plant without proper authorization.**

INITIAL CONDITIONS:

A loss of all feedwater has occurred with the Unit operating at 100% power. The reactor did NOT automatically trip when the Steam Generator LO-LO level setpoint was reached.

INITIATING CUE:

The Unit Supervisor directs you to manually trip the reactor and perform the immediate actions of 0POP05-EO-EO00, Reactor Trip or Safety Injection.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

The operator has SIMULATED opening the Reactor Trip Breakers locally.

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

None

NOTES:

1) This JPM **STARTS** in the Control Room where the applicant attempts to trip the reactor (by removing power to the Rod Drive Power MG Sets).

2) This is an **Alternate Path** JPM due to the fact that the first attempt to trip the reactor by opening the motor generator set feeder breakers does not work as expected. The applicant must then take measures to trip the reactor by locally opening the reactor trip breakers.

3) The actions contained in this JPM are Immediate Actions of 0POP05-EO-EO00, Reactor Trip or Safety Injection, and 0POP05-EO-FRS1, Response to Nuclear Power Generation – ATWS. Applicable pages from these two procedures are given to the Evaluator for reference and are marked with the word **‘KEY’** on the pages. The applicant is **NOT** allowed to consult the procedure.

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME: ____________________

SAT/UNSAT Performance Step: 1

Manually trip the reactor using both reactor trip switches.

Standard:

*The applicant **simulates** tripping the reactor using both trip switches (CP-05 and CP-07).*

Comment:

Cue:

When either RX TRIP switch is taken to the “TRIP” position, nothing occurs (reactor does not trip). Reactor trip breakers remain closed, control rods do not fall and power remains at 100%

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2

Open 480V LC 1K1 (2K1) and 1L1 (2L1) feeder breakers.

Standard:

The applicant simulates opening 480V LC 1K1 (2K1) and 1L1 (2L1) feeder breakers.

Comment:

The pistol grip handles for these load center breakers are painted red.

Cue:

- LC 1K1 (2K1) feeder breaker failed to open (red light ON, green light OFF)
- LC 1L1 (2L1) feeder breaker opens as expected (green light ON, red light OFF)
- If asked by applicant if Reactor is tripped after attempting to open breakers, inform applicant to ask for specific indications to determine if the Reactor is tripped. Applicant should then ask for one or more of the following on Control Panel CP005 in the Control Room:
  - Reactor Power: 100% on all NI channels on CP-005 (also 100% on all RCS delta-T indications, 100% by ICS MW computer point).
  - Reactor Trip Breaker indication: both breakers show red light ON, green light OFF)
  - Reactor Trip Breaker Bistable lights: For normal Rx Trip Breakers; both lights OUT. For Rx Trip Bypass Breakers; both lights ON.
  - Rod position on DRPI Panel: all rod groups show they are in the Full Out Position (FOP) except Control Bank 'D' which is at 240 steps (normal indication for this bank).
- If asked about inserting control rods, inform the applicant that another RO is inserting control rods.
- If questioned by the applicant, or if the applicant attempts to contact a Plant Operator, as the Unit Supervisor, direct the applicant to continue the immediate actions of 0POP05-EO-FRS1 by performing the necessary actions outside of the Control Room.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 3

Go to the Rod Control Equipment Room (60 ft EAB RM 323).

Standard:

The applicant proceeds to the Rod Control Equipment Room on the 60 ft. elevation of the EAB.

Comment:

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 4 (C)

Open the reactor trip breakers.

Standard:

The applicant SIMULATES pushing the red 'TRIP' access slot for the reactor trip breakers.

____ *Reactor Trip Breaker R*

____ *Reactor Trip Breaker S*

Comment:

The Reactor Trip Breakers are adjacent to the Rod Drive MG Set Control Panel. On the Reactor Trip Breaker doors there is a small red 'TRIP' access slot that is inline with the manual trip push button that is behind the door and on the breaker. When this red 'TRIP' access slot is depressed it pushes the manual trip push button on the breaker which will trip the breaker open.

DO NOT OPEN REACTOR TRIP BREAKER DOORS. Allow the applicant to **simulate from a short distance** depressing the red 'TRIP' access slot for the breakers, then provide the cues below.

Currently in Unit 2, the word 'TRIP' is missing from the red access slot on the door of Reactor Trip Breaker S.

Cue:

- As the applicant simulates pushing the red 'TRIP' access slot for each breaker, inform him/her they hear the breaker operate.
- If the applicant wishes to open the doors for the trip breakers, **DO NOT OPEN REACTOR TRIP BREAKER DOORS**. Inform him/her the **RED** flag that says **"SHUT"** has dropped (is not visible) and the **GREEN** flag that says, **"OPEN"** is displayed.
- The control room reports that they have open indication and the reactor is tripped.

Notes:

- TERMINATE THE JPM -

JPM STOP TIME ________

VERIFICATION OF COMPLETION

Job Performance Measure: LOCALLY TRIP THE REACTOR

Performer's Name: ____

Date Performed: ___________________

Time to Complete: ___________________

JPM Results: **Sat / Unsat**

Evaluator:________________________ **Signature:**________________________

Date: ________________________

JPM - STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: **Do not operate or alter equipment configuration in the plant without proper authorization.**

INITIAL CONDITIONS:

A loss of all feedwater has occurred with the Unit operating at 100% power. The reactor did NOT automatically trip when the Steam Generator LO-LO level setpoint was reached.

INITIATING CUE:

The Unit Supervisor directs you to manually trip the reactor and perform the immediate actions of POP05-EO-EO00, Reactor Trip or Safety Injection.

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE: **FILL SFP FROM RWST**

JPM NO.: **P2**

REVISION: **2**

LOCATION: **Unit 1 or 2**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title: FILL SFP FROM RWST

JPM No.: P2

Rev. No.: 2

STP Task: 43650, Respond to Spent Fuel Cooling and Cleanup System alarms.

STP Objective: 43650, When directed by the Control Room or Alarm Condition, respond as the PO to SFPCCS alarms per POP09-AN-22M2 to include: SFP Water Level HI/LO.

Related K/A Reference: 033 A1.01, Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with Spent Fuel Pool Cooling System operating the controls including: Spent Fuel Pool water level. (2.7/3.3)

References: 0POP02-FC-0001, Rev. 61, Spent Fuel Pool Cooling and Cleanup System
TS 3.5.5, Refueling Water Storage Tank

Task Normally Completed By: PO

Method of Testing: Simulated

Location of Testing: Plant

Time Critical Task: NO

Alternate Path JPM: NO

Validation Time: 25 minutes

Required Materials (Tools/Equipment): None

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

A 'SFP WATER LEVEL HI/LO' alarm has been received in the Control Room. Investigation has revealed a low level condition in the Spent Fuel Pool (SFP). The 'SFP LOW LEVEL' alarm is in on Local Panel, ZLP-749. Current SFP level is 66'.

INITIATING CUE:

SFP boron concentration has been evaluated with Chemistry and it has been determined that the SFP needs to be filled to 66'10" from the Refueling Water Storage Tank (RWST) using 0POP02-FC-0001, Spent Fuel Pool Cooling and Cleanup System, Section 9.3.

Plant Operator, Bob Jones, started the task but now has to be relieved to go to Fitness for Duty. Bob Jones completed up to and including step 9.3.4.

The Unit Supervisor requests that you go back and review the highlighted Notes and Precautions of 0POP02-FC-0001, Spent Fuel Pool Cooling and Cleanup System and then continue the task at step 9.3.5.

You have been given the wrench required to operate Reach Rod Valves per Prerequisite step 3.6. A Plant Operator is ready to assist at the Refueling Water Purification Pump (RWPP) and a Plant Operator is stationed at the SFP to monitor level.

The Unit Supervisor requests that you call the Control Room when SFP level starts to go up.

DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

The Spent Fuel Pool is being filled from the Refueling Water Storage Tank.

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

Handout copy of POP02-FC-0001, Spent Fuel Pool Cooling and Cleanup System, which consists of sections 1-4 and 9.3.

A handout copy of TS 3.5.5, Refueling Water Storage Tank, is part of this JPM but can be withheld unless asked for by the performer.

NOTES:

SFP HX Rooms require permission from the Shift Manager prior to entry. Make sure the Examiner has made arrangements with the Shift Manager prior to performing this JPM.

This JPM is written so that two Plant Operators can be used for assistance at JPM step 3(C). One can be used for monitoring the SFP level and one can be used to be at the Refueling Water Purification Pump (RWPP) when it is started.

This JPM can be performed in either Unit.

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME: _________________

SAT/UNSAT Performance Step: 1

Obtain a copy of the procedure, enter as a 'Performer and Verifier on the Procedure Performance Cover Sheet' and review highlighted Notes and Precautions.

Standard:

___*The performer obtains a copy of the procedure, enters as a 'Performer and Verifier' on the 'Procedure Performance Cover Sheet' and reviews the highlighted Notes and Precautions.*

___*The Performer circles the correct Unit on the 'Procedure Performance Cover Sheet.'*

Comment:

The performer may calculate if RWST level will support continuing with this JPM but it is not required as the step in the procedure is already checked as completed. (Procedure Step 9.3.1)

Cue:

Give the applicant the handout copy of 0POP02-FC-0001.

If asked, no Spent Fuel Assemblies are being moved in the SFP and there are no loads over the SFP.

If asked, RWST level is 498,000 gallons.

If asked, RWST boron concentration is 2910 ppm.

If asked, SFP boron concentration is 2809 ppm.

If asked, Chemistry concurs with filling SFP from RWST.

If asked, SFP Purification and RWST Purification have been secured.

Notes:

TS limit on SFP boron concentration is ≥ 2500 ppm but is normally kept at ≥ 2800 ppm.

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2 **(C)***

ENSURE the following valves are OPEN: (Procedure step 9.3.5)

- 1(2)-FC-0033 “SFP PURIFICATION LOOP 1A(2A) NORMAL RETURN TO SFPCCS ISOLATION VALVE”.
- 1(2)-FC-0016A “SPENT FUEL POOL PURIFICATION LOOP 1A(2A) RETURN VALVE”.
- “RWST TO SFP CLEANUP SYS FV-3936”
- “RWST TO SFP CLEANUP SYS FV-3937”

(Procedure step 9.3.5)

Standard:

____ **Locates and OPENS 1(2)-FC-0033**

____ **Locates and OPENS 1(2)-FC-0016A**

____ *Verifies through the Control Room that FV-3936 AND FV-3937 are open.*

Comment:

*** Denotes critical portion of this JPM step.**

Cue:

FC-0033: (41 ft MAB Filter Row Rm 237Q)

Valve FC-0033 will require the use of a wrench. Per the Initiating Cue, the proper wrench has been given to the performer.

FC-0033 has a position indicator on the remote operator for the valve which will move about 1 to 1½ inch when positioning the valve. The position indicator will line up with marks on an ‘OPEN’ or ‘CLOSED’ label to indicate what position the valve is in. The Examiner can cue the performer by pointing to these label marks.

NOTE: The ‘OPEN’ label mark is missing in Unit 2.

JPM Step 2(C) is continued on the next page.

JOB PERFORMANCE MEASURE CHECK SHEET

JPM Step 2(C) continued:

FC-0016A: (36' FHB in SFPC HX Rm)

SFP HX Rooms require Control Room permission prior to entry.

FC-0016A is a globe valve. The Examiner can point to the valve stem as being flush with the valve handle for 'CLOSED' and extended from the valve handle for 'OPEN.'

In Unit 1, FC-0016A handwheel is being worked on and the area around the valve has been roped off as a Contaminated Area. If this is still an issue when the exam takes place, then have the performer simulate operating FC-0016B which is in the adjacent SFP 'B' HX room.

In Unit 2, poor lighting is an issue in both SFP HX rooms. It's hard to see the tag for FC-0016A. A Condition Report has been written for the lighting issue.

FV-3936 and FV-3937: (10' MAB Penetration Space)

These valves are in the penetration area of the 10' MAB. They are located near the RWPP where a Plant Operator is stationed for assistance. Positioning these valves is not part of the critical task because they can only be operated from the Control Room.

If the performer at anytime starts to go to the 10' MAB Penetration area to verify valve position of FV-3936 & FV-3937 locally, request that he/she radio the Control Room and have the RO position these valves using the CRHS.

When contacted, as the Control Room Reactor Operator, report that FV-3936 & FV-3937 have been opened.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 3 **(C)**

START "N1(2)FCHS1419 RWPP 1A(2A)" (Procedure step 9.3.6).

Standard:

___*The performer proceeds to ZLP-749 and places the handswitch for the Refueling Water Purification Pump (RWPP) in the START position.*

Comment:

As on the Initiating Cue, Plant Operators are ready at the SFP to monitor level and at the 10' MAB Penetration Space to monitor RWPP start. In addition the Plant Operator at the RWPP is prepared to throttle flow as needed.

Cue:

If asked, the red LED light for low SFP level is illuminated on ZLP-749.

If asked, the Plant Operator at the RWPP reports that oil level in the RWPP is SAT and the pump is ready for a start.

At Local Panel ZLP-749:

Initial Condition - RWPP indication:	Green light ON, red light OFF
Final Condition- RWPP indication:	Red light ON, green light OFF

When asked about RWPP status, tell the performer as the Plant Operator at the RWPP that the pump is running SAT and flow is 195 gpm. (Step 9.3.7 of the procedure)

If the performer does not ask about SFP level after starting the RWPP, then cue the performer as the Plant Operator at the SFP that level is now 66' ½" and slowly going up.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 4

Per the Initiation Cue, inform the Unit Supervisor that SFP level is slowly going up.

Standard:

___ *The performer contacts the Unit Supervisor to report that SFP level is slowly going up.*

Comment:

The performer can call the Plant Operator at the SFP to verify level is going up or he/she can go up to the FHB 68' and do their own visual check of SFP level after starting the RWPP.

Cue:

If the performer calls the Plant Operator at the SFP, report back that SFP level is 66'1/2" and slowly going up.

If the performer goes up to the FHB 68' to check SFP level, indicate that SFP level is 66'1/2" and slowly going up.

If the performer leaves the FHB to continue with the procedure without checking SFP level, then, as the Unit Supervisor, ask the performer if SFP level is being raised.

Notes:

SFP level can be checked from outside the contaminated area of the SFP by checking the SFP Transfer Canal level indicator at the north end of the SFP Transfer Canal. During non-outage conditions, the SFP Transfer canal gates are removed and the SFP Transfer Canal and SFP are at the same level.

- TERMINATE THE JPM -

JPM STOP TIME ________

VERIFICATION OF COMPLETION

Job Performance Measure: FILL SFP FROM RWST

Performer's Name: ____

Date Performed: ____________________

Time to Complete: ____________________

JPM Results: **Sat / Unsat**

Evaluator:_________________________ **Signature:**_________________________

Date: _________________________

JPM - STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

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INITIATING CUE:

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Plant Operator, Bob Jones, started the task but now has to be relieved to go to Fitness for Duty. Bob Jones completed up to and including step 9.3.4.

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STI 32865593	0POP02-FC-0001	~~Rev. 61~~	Page 1 of 133
Spent Fuel Pool Cooling and Cleanup System			
Quality	Safety-Related	Usage: **IN HAND**	Effective Date: 05/04/2011

R. A. Smith	K. Regis	Crew 2E	Operations
PREPARER	TECHNICAL	USER	COGNIZANT DEPT.

Usage Table of Contents Page

Usage

1 - IN HAND
2 - IN HAND CONTROLLING STATION
3 - REFERENCED
4 - AVAILABLE

Procedure Performance Cover Sheet

UNIT 1 (circle one) UNIT 2

Sections Performed: 3.0, 9.3

Performers and Verifiers:

Name (Print)	Signature	Initials
Bob Jones	Bob Jones	BJ

Remarks:

Completed By: ______________________________ **Date**

Reviewed by: ______________________________
Shift Manager/Unit Supervisor **Date**

1.0 Purpose and Scope

1.1 Provide instructions for operation of the Spent Fuel Pool Cooling and Cleanup System.

2.0 References

2.1 UFSAR Section 9.1.3

2.2 UFSAR Section 4.3.2.6.2.1

2.3 UFSAR Reference 4.3-41 Lesko, J. R., et. al., “South Texas Units 1 and 2 Spent Fuel Rack Criticality Analysis with Credit for Soluble Boron,” Westinghouse Commercial Nuclear Fuel Division, May 1998. Attachment to Letter ST-UB-NOC-1803, J. P. Sechrist, WCNFD, to D.F. Hoppes, STPNOC, dated May 22, 1998.

2.4 Technical Specifications:

2.4.1 3/4.5.5 Refueling Water Storage Tank

2.4.2 3/4.9.1 Boron Concentration

2.4.3 3/4.9.11.1 Spent Fuel Pool Water Level

2.4.4 3/4.9.11.2 In - Containment Storage Pool Water Level

2.4.5 3/4.9.13 Spent Fuel Pool Minimum Boron Concentration

2.4.6 3/4.7.7 Control Room Makeup and Filtration System

2.5 Technical Requirements Manual (TRM):

2.5.1 3.1.2.5 Borated Water Sources - Shutdown

2.5.2 3.1.2.6 Borated Water Sources - Operating

2.6 P&IDs:

2.6.1 5R219F05028, Spent Fuel Pool Cooling and Cleanup System

2.6.2 5R219F05029, Spent Fuel Pool Cooling and Cleanup System

2.6.3 7R189F05010, Boron Recycle System

2.7 Elementary Diagrams:

2.7.1 9-E-FC01-01, Spent Fuel Pool Cooling Pump 1A(2A) and 1B(2B)

2.7.2 9-E-FC02-01, Spent Fuel Pool Skimmer Pump 1A(2A)

2.7.3 9-E-FC03-01, Refueling Water Purification Pump 1A(2A)

2.7.4 9-E-VF05-01, Space Heaters - 120/208V Distribution Panels

2.7.5 9-E-PFAA-01, 480V Motor Control Center 1J1(2J1)

2.8 Logic Diagrams:

2.8.1 9-Z-42140, Spent Fuel Pool Cooling Pump

2.8.2 9-Z-42141, Spent Fuel Pool Refueling Water Purification Pump

2.8.3 9-Z-42142, Spent Fuel Pool Skimmer Pump

2.9 0205(01)00009-WN, Gould Pump Technical Manual

2.10 0946(01)0008B-WN, Rx Cavity Filtration System Tech. Manual

2.11 MATS Item 8500193-866, UFSAR 9.1.3.2 - Filling the SFP6

2.12 MATS Item 8901748-936, IR 89-030 - Discrepancies in SFP P&IDs

2.13 MATS Item 9000733-936, IEN 90-033 - Sources of Unexpected Radiation Exposure at Spent Fuel Pools

2.14 JCO 94-0005, Boraflex Degradation in the Spent Fuel Racks

2.15 SPR 921384, High Out of Spec. Silica Concentration in RCS

2.16 SPR 940429, Manual Positioning of CS Valves in 1PSP03-CS-0001 Will Prevent System from Performing Intended Safety Function

2.17 SPR 940631, 2PSP03-CS-0001 Paperwork Used for RWST Recirculation Using CS Pumps Inadvertently Discarded

2.18 SPR 941164, Requirements for Removal of SFP Train from Service for Maintenance.

2.19 CR 95-10786, Siphoning of the Spent Fuel Pool using a temporary pump and hoses.

2.20 CREE 98-15128-1, Evaluate the proper method of isolating and placing back into service flow instruments.

2.21 USQE 98-17560-3, Adds a new UFSAR Section 9.2.2.3.3 which describes extended outages of SFP Cooling due to maintenance of the CCW System.

2.22 USQE 99-4451-6, Evaluation to allow a SFP Demineralizer to be placed in service both empty and/or bypassed.

2.23 SCAQ 00-2406, Evaluate the Control Room Staff response to the U2 AMSAC actuation and Turbine trip on February 9, 2000.

2.24 Conduct of Operations

2.25 0TOP02-FC-0003, Boric Acid Recovery System Operations

2.26 0POP02-FC-0003, SFP and ICSA Gate Operation

2.27 0POP02-RC-0008, Fill and Drain In-Containment Storage Area and Refueling Canal

2.28 0POP02-BR-0001, Boron Recycle System Operations

2.29 0PCP07-ZS-0006, Sampling Boric Acid and Refueling Water Storage Tanks

2.30 0PRP07-ZR-0009, Performance of High Exposure Work

2.31 0POP04-FH-0001, Fuel Handling Accident

2.32 NC-7106, Rev. 3, Spent Fuel Pool Heatup Analysis For 18-Month Fuel Cycles.

2.33 Plant Curve Book, Figure 5.13A, 5.13B

2.34 CREE 03-13591-1, SFP Pump operation without the associated supplementary cooler.

2.35 CAQ-S 05-4915, RHR Pump was started on RECIRC while the DG was paralleled

2.36 CR 05-14545, Missed Procedure Step Resulting in Boration of RCS From RHT 2B

2.37 CR 05-12504, Spent Fuel Pool Transfer Canal high pressure sodium lights.

2.38 CREE 05-14833-1, Determine the Expected Spent Fuel Pool Level Change for a Given Change in Temperature.

2.39 CREE 08-1529-37, Evaluation of replacing Unit 2 Spent Fuel Pool Pump discharge pressure with flow requirement.

2.40 CR 07-17685, Missed 12 hour SFP reading.

2.41 CR 10-8094, Rise in Reactor Cavity level

2.42 CREE 10-8690-2, Determine the Lowest level in the RWST that will support running the Refueling Water Purification Pump.

3.0 Prerequisites

3.1 ENSURE Component Cooling Water (CCW) System is in service per 0POP02-CC-0001, Component Cooling Water, supplying cooling to the Spent Fuel Pool HX to be placed in service. ✓

3.2 ENSURE SFPCP air handling unit(s) are in service per 0POP02-HF-0001, FHB HVAC, to support running SFPCP(s). ✓

3.3 ENSURE Essential Chilled Water is available to the SFPCP air handling unit(s) to support running SFPCP(s). (References 2.34 and 4.10) ✓

3.4 ENSURE Valve Lineup 1 is completed. ✓

3.5 ENSURE Electrical Lineup 2 is completed. ✓

3.6 OBTAIN a wrench OR ratchet for operation of reach rod operated valves. ✓

4.0 Notes and Precautions

4.1 WHEN securing a train of Spent Fuel Pool Cooling for maintenance, THEN Form 1, Administrative Requirements for Placing a Train of SFPC to Inoperable Condition for Maintenance **SHALL** be performed.

4.2 Spent Fuel Pool Cooling should be in continuous operation except for brief periods of testing or maintenance. IF longer periods of testing or maintenance where SFP cooling is suspended AND SFP temperature approaches T (allowable) per Form 1, Administrative Requirements for Placing a Train of SFPC to Inoperable Condition for Maintenance, THEN actions to restore a SFP train to service should commence AND an Engineering evaluation may be required to be performed.

4.3 ISOLATION or LOSS of CCW constitutes a loss of ALL SFP Cooling, with the exception of planned maintenance performed per Form 2, Administrative Requirements for securing the CCW System for Extended outages of SFP Cooling due to maintenance.

4.4 WHEN securing the CCW System for Extended outages of SFP Cooling due to maintenance, THEN PERFORM Form 2, Administrative Requirements for securing the CCW System for Extended outages of SFP Cooling due to maintenance. (Reference 2.21)

4.5 IF **ALL** SFP cooling is removed from service for other than brief periods of testing or maintenance, THEN MONITOR SFP temperature using a Temporary Operator Log as directed by the Shift Manager/US. Temperature reading **SHALL** be taken at least every 30 minutes.

4.6 IF a loss of all SFP cooling occurs, THEN actions to restore a SFP train to service SHOULD commence.

4.7 It is physically impossible to overflow RHT A to RHT B through line BR1032UD7 as implied on drawing F05010, since the bottom of the upper loop of the RHT A overflow is at lower elevation than the bottom of the overflow line to RHT B.

4.8 At least one SFP cooling train **SHALL** be in operation to ensure SFP temperature remains less than 140°F.

4.9 UFSAR states "Administrative controls ensure the maximum water temperature does not exceed 150.7°F during normal and refueling operations, regardless of fuel cycle length." (References 2.1 and 2.33)

Maximum time to restore SFP Cooling (T_{max}) _____ hrs
T_{max} = time to reach SFP temperature of 150.7 °F

$T_{max} = [150.7 - T_{initial}] / \Phi_{pcb}$

Maximum allowable SFP temperature 150.7 °F
$T_{initial}$ = initial SFP water temperature (°F)
Φ_{pcb} = SFP heatup rate obtained from Plant Curve Book, Figure 5.13A, 5.13B for existing SFP loading.

4.10 Minimum allowable SFP temperature is 60.0 °F. (References 2.2 and 2.3)

4.11 SFP Pumps are capable of performing their function without the use of the SFP Pump Supplementary Coolers. (Reference 2.34)

4.11.1 Without supplementary coolers, periodic monitoring of SFP Pump cubicle temperature will be necessary to ensure that the temperature does **NOT** exceed 120°F design temperature.

4.11.2 IF temperature exceeds 115°F, THEN portable ventilation is required to supplement room cooling for continued SFP Pump operation.

4.12 IF water level over the top of irradiated fuel assemblies seated in storage racks is less than 23 feet (indicated level of 62' 0" OR Low Level Alarm (66'0") on ZLP-749, 22' FHB), THEN the following **SHALL** be performed:

4.12.1 Place any fuel assemblies being moved in a safe position AND suspend any further fuel movement.

4.12.2 Crane operations in fuel storage areas **SHALL** be stopped.

4.12.3 REFER TO Technical Specifications 3.9.11.1 AND 3.9.11.2 for further required actions.

4.13 IF "RWPP SUCT FV-3936" OR "RWPP SUCT FV-3937" closes (e.g., due to a SI), THEN the Refueling Water Purification Pump (RWPP) **SHALL** be secured as soon as possible. The RWPP "ON/OFF" switch is located on ZLP-749 (22 ft FHB). The RWPP is powered from 1K3(2K3)/D2 [10 ft MAB at MCC 1K3(2K3)].

4.14 RWST recirculation with the RWPP is the preferred method for recirculation. Use of Containment Spray Pumps OR LHSI for recirculation of the RWST is permissible.

4.15 IF the Containment Spray Pump to be used for recirculation of RWST is not restored to standby lineup prior to the end of shift, THEN an Operability Assessment System (OAS) entry is required. This will render the affected CS Train INOPERABLE. (Reference 2.16)

4.16 Review Operability Assessment System (OAS) to ensure NO equipment is out of service that could conflict with operation of Containment Spray Pump OR cause unexpected multiple trains to be INOPERABLE. (Reference 2.16)

4.17 Spent Fuel Pool Cooling Pumps are mounted on threaded shafts. Rotation in the reverse direction should be minimized to prevent the pump impeller from becoming loose on the shaft, which could cause pump damage. Reverse rotation also results in high starting currents which could trip the SFP pump breaker.

4.18 IF two train operation is desired, THEN BOTH SFPCPs SHOULD be started SIMULTANEOUSLY to prevent reverse rotation in an idle pump.

4.19 SFP chemistry **SHALL** be maintained per 0PGP03-ZO-0012, Plant Systems Chemistry Control.

4.20 SFP Boron concentration **SHALL** be maintained greater than 2500 ppm. (Reference 2.4.5)

4.21 Chemistry **SHALL** verify the SFP boron concentration prior to adding makeup water to the SFP. It is acceptable to use the most recent sample OR the Tech Spec sample taken following the last known fill. IF the last fill is unknown, THEN a new sample is required. (Reference 2.4.5)

4.22 Samples taken less than 10 hours with one SFP pump running or less than 5 hours with two SFP pumps running after an addition of water or boric acid may not represent actual SFP concentrations due to insufficient mixing.

4.23 IF the SFP Cooling System is used to cool the Reactor Cavity, THEN operational limits for silica may be exceeded in the RCS. Chemistry **SHALL** be notified prior to performing this evolution. (Reference 2.15)

4.24 A demineralizer is determined to be equalized or borated for placing in service any time after the initial flush (to greater than 2500-2800 ppm.) and will NOT cause further deboration. (Reference 2.4.5)

4.25 A new demineralizer bed **SHALL** be flushed from the RWST or SFP to the RHT for the first time to avoid a boron reduction when bed is placed in service. Boron Concentration across the demineralizer bed to be used for Spent Fuel Pool purification **SHALL** be equalized within 25 ppm AND boron concentration **SHALL** be greater than 2500 ppm. Boron Concentration across the demineralizer bed to be used for RWST purification **SHALL** be equalized within 25 ppm AND boron concentration **SHALL** be greater than 2800 ppm. (Reference 2.4.5)

4.26 WHEN flushing demineralizers, THEN a 50 gpm flush is preferred after the initial flowrate of between 190 and 200 gpm to reduce water usage and waste water.

4.27 Spent Fuel Pool purification should be aligned to Spent Fuel Pool Demineralizer 1B(2B) AND RWST purification SHOULD be aligned to demineralizer 1A(2A) to minimize silica contamination of the RWST.

4.28 The preferred alignment of SFP demineralizers is SFP Demineralizer 1B(2B) for SFP purification recirculation and SFP Demineralizer 1A(2A) for RWST recirculation. This alignment minimizes silica contamination of the RWST and is the only system alignment that will allow both SFP demineralizers to be used at the same time.

4.29 Differential pressure across a SFP Demineralizer can be maintained less than 20 psid by reducing flowrate until the Demineralizer resin can be replaced.

4.30 SFP Demineralizer resins will degrade with prolonged exposure to temperatures greater than 140°F. IF SFP temperature increases to greater than 140°F, THEN the SFP purification loop **SHALL** be removed from service until temperature is less than 140°F.

4.31 Plant Operations **SHALL** determine available volume in the RHT AND coordinate affected watchstations prior to pumping the SFP to the RHT.

4.32 Normal configuration for the Fuel Transfer Canal gates is the gates in storage with the Fuel Transfer Canal flooded.

4.33 WHEN filling OR draining spent fuel storage areas, OR the annulus between the gates, THEN the inflatable gate seal pressures **SHALL** be monitored AND adjusted as necessary.

4.34 The annulus between the SFP side gate AND the Fuel Transfer Canal side gate should normally remain filled with water when the transfer canal is filled.

4.35 IF it is desired for the Fuel Transfer Canal to be drained for a period of time, THEN the annulus between the SFP side AND the Fuel Transfer Canal side gates SHOULD be dry to verify that the SFP side gate seals are functioning normally (e.g. no leakage).

4.36 The annulus between the cask area gates should normally be dry to verify gate seals are functioning normally (e.g. no leakage). Some water may exist in the annulus area due to limitations in pumping this area down, however the water level should be low in the annulus (no less than 5 Outer Gate Stiffeners exposed) and should not be increasing.

4.37 IF the transfer canal is to be drained to support maintenance activities in the canal, THEN Health Physics and Nuclear Fuels and Analysis **SHALL** be consulted for safe radiological conditions with fuel in the racks adjacent to the transfer canal gate.

4.38 IF a submersible pump is to be installed, THEN Plant Operations **SHALL** be present to coordinate with Maintenance for the installation and operation of the submersible pump.

4.39 WHEN a portable pump is installed to pump water involving the Fuel Transfer Canal AND the SFP, THEN NO hose **SHALL** extend more than four feet below the surface of the SFP to prevent possible siphon effect which could drain SFP to below indicated level of 62' 0" and the discharge hose end should be positioned above the highest expected water level.

4.40 All hose ends used to transfer water into OR out of the SFP **SHALL** positioned above water level to prevent unwanted siphoning when being left unattended. (Reference 2.19)

4.41 The SFPCCS is contaminated. Personnel **SHALL** take all approved measures to reduce personal exposure while working around the area.

4.42 Health Physics **SHALL** be notified prior to venting potentially contaminated systems.

4.43 WHEN venting potentially contaminated systems, THEN suitable containers OR hoses routed to the Radioactive Vents AND Drains System (ED) **SHALL** be used.

4.44 WHEN performing evolutions that could agitate loose contaminated materials OR contaminated items stored inside the Reactor Cavity, In-Containment Storage Area, Spent Fuel Pool, OR the Refueling Canal, THEN personnel should be aware of the potential for unexpected increases in occupational radiation exposures due to contaminated materials becoming loose AND floating to the surface. (Reference 2.13)

4.45 Maximum allowable differential pressure on Spent Fuel Pool Filters 1A(2A) or 1B(2B) is 35 psid.

4.46 Spent Fuel Pool activities that have the potential for reducing the Spent Fuel Pool inventory (e.g., Spent Fuel Pool filter changeouts, Spent Fuel Pool demineralizer sluicing and flushing operations or Spent Fuel Pool Transfer Canal pumping operations - these examples are not all inclusive) **SHALL** be treated as non-routine evolutions. Special controls shall be applied to heighten awareness and sensitivity in this area. (References 2.23 and 2.24)

4.47 The following evolutions are controlled by 0POP02-FC-0003, SFP and ICSA Gate Operation:

4.47.1 SFP temporary submersible pump operations.

4.47.2 Installation of Spent Fuel Pool (SFP) and In Containment Fuel Storage Area (ICSA) inflatable seal operations.

4.47.3 Removal and Installation of Spent Fuel Pool (SFP) and In Containment Fuel Storage Area (ICSA) Gates.

4.47.4 Operability checks of the SFP Gate seals.

4.48 WHEN multiple trains of CRE HVAC are out of service in MODES 1, 2, 3, and 4, THEN Containment Spray SHALL **NOT** intentionally be made inoperable. (Reference 2.4.6)

4.49 When raising SFP level from 62' to 67' the following values may be used: (All volumes assume 66’6”) (References 2.27 and 2.28)

- Volume of SFP 420,632 gal. at 859 gal/in
- Volume of transfer canal 71,529 at 155 gal/in
- Volume of SFP and transfer canal with gates removed 492,161 gal. at 1014 gal/in
- These values are accurate **ONLY** for level above the fuel racks

4.50 SFP Level is **NOT** expected to increase by more than 1.5 inches for a 10 degree increase in SFP temperature. (Reference 2.38)

4.51 WHEN the DG is being paralleled OR operated in parallel with offsite power, THEN the following associated Trains loads **SHALL NOT** be started or operated: (Reference 2.35)

- “HHSI PUMP”
- “LHSI PUMP”
- “RHR PUMP”
- “CSS PUMP”
- “RCFC FAN”

4.52 The spent fuel pool transfer canal has three 1000 watt high pressure sodium lights installed to be used during normal and refueling operations. These lights were designed to operate in or out of water and during flood up. (Reference 2.37)

4.53 Notification of Chemistry is required prior to operations which affect SFP boron concentration such as adding OR removing water from the SFP.

4.54 The lowest level in the RWST that can support venting the RWPP suction line is 152,970 gallons using ICS for level indication. An RWST level above 131,680 gallons, using ICS, ensures the RWPP suction line can be maintained filled with a leaking vent valve [1(2)-SI-0160]. If the suction line high point has been filled and there is not leakage past vent valve 1(2)-SI-0160, the RWPP can be operated with RWST levels down to 33,000 gallons. (CREE 10-8690-2)

5.0 Limits and Setpoints

COMPONENT	DESCRIPTION	SETPOINT
1(2)-ED-LSLL-8103	FHB CASK POOL LOW/LOW LEVEL SWITCH	21 feet (36 inches)
1(2)-ED-LSL-8103	FHB CASK POOL LOW LEVEL SWITCH	35 feet (204 inches)
1(2)-ED-LSH-8103	FHB CASK POOL HIGH LEVEL SWITCH	67 feet (588 inches)
1(2)-FC-PSL-4400	FUEL POOL GATE SEAL AIR PRESSURE LOW ALARM (ZLP-181)	31 psig
1(2)-FC-PSL-4401	FUEL POOL GATE SEAL AIR PRESSURE LOW ALARM (ZLP-182)	31 psig
1(2)-FC-PSL-4402	FUEL POOL GATE SEAL AIR PRESSURE LOW ALARM (ZLP-183)	31 psig
1(2)-FC-PSL-4403	FUEL POOL GATE SEAL AIR PRESSURE LOW ALARM (ZLP-184)	31 psig
1(2)-FC-PSL-4404	FUEL STORAGE PIT GATE SEAL AIR PRESSURE LOW ALARM (ZLP-187)	31 psig

9.3 Makeup from the RWST

9.3.1 VERIFY RWST water level is sufficient to perform this evolution without reducing RWST level below the Technical Specification 3.5.5 limit. ✓

9.3.2 REQUEST Chemistry to verify BOTH RWST <u>AND</u> SFP boron concentrations are greater than 2500 ppm. (Reference 2.4.5) ✓

9.3.3 <u>IF</u> SFP Purification is in service, <u>THEN</u> SECURE per Section 7.3, <u>OTHERWISE</u> N/A. ✓

9.3.4 <u>IF</u> RWST Purification is in service <u>THEN</u> SECURE per Section 7.5, <u>OTHERWISE</u> N/A. ✓

9.3.5 ENSURE the following valves are OPEN:

- 1(2)-FC-0033 "SFP PURIFICATION LOOP 1A(2A) NORMAL RETURN TO SFPCCS ISOLATION VALVE". (41 ft MAB Filter Row Rm 237Q) ____
- 1(2)-FC-0016A "SPENT FUEL POOL PURIFICATION LOOP 1A(2A) RETURN VALVE". (36' FHB in SFPC HX Rm) ____
- "RWST TO SFP CLEANUP SYS FV-3936" (CP001) ____
- "RWST TO SFP CLEANUP SYS FV-3937" (CP001) ____

9.3.6 START " N1(2)FCHS1419 RWPP 1A(2A)". (22 ft FHB at ZLP-749) ____

9.3.7 THROTTLE 1(2)-FC-0042 "REFUELING WATER PURIF PUMP DISCHARGE THROTTLE VALVE" as necessary to obtain between 190 <u>AND</u> 200 gpm as indicated on "1(2)-FC-FIS-1417". (10' MAB Rm 64 Pen) ____

9.3.8 CHECK SFP Demineralizer 1A(2A) as follows:

9.3.8.1 VERIFY SFP Demineralizer 1A(2A) ΔP is less than 20 psid on "1(2)-FC-PDI-4405". (41' MAB Demin Row Rm 238) _____

9.3.8.2 VERIFY SFP Demineralizer 1A(2A) outlet filter pressure difference between "1(2)-FC-PI-1412" AND "1(2)-FC-PI-1413" is less than 35 psid. (41' MAB Filter Row Rm 237) _____

9.3.8.3 VERIFY SFP Demineralizer 1A(2A) flow is less than 250 gpm on "1(2)-FC-FI-1414". (41 ft MAB Filter Row Rm 237) _____

> NOTE
>
> WHEN filling OR draining the spent fuel storage areas OR ICSA, THEN gate seal pressures should be monitored and adjusted as necessary to maintain between 30 AND 34 psig.

9.3.9 VERIFY the "SFP LOW LEVEL" alarm clears. (22 ft FHB at ZLP-749) _____

9.3.10 WHEN the desired SFP level is reached, THEN STOP "1(2)FCHS1419 RWPP 1A(2A)". (22 ft FHB at ZLP-749) _____

> NOTE
>
> Step 9.3.11 is intended to be used during multiple SFP filling and draining evolutions.

9.3.11 IF performing multiple makeups from the RWST, THEN PERFORM the following, OTHERWISE N/A:

9.3.11.1 CLOSE the following valves:

- "RWST TO SFP CLEANUP SYS FV-3936" valve (CP001) _____
- "RWST TO SFP CLEANUP SYS FV-3937" valve (CP001) _____

9.3.11.2 GO TO Step 9.3.5 _____

9.3.12 CLOSE the following valves:

- 1(2)-FC-0016A "SPENT FUEL POOL PURIFICATION LOOP 1A(2A) RETURN VALVE". (36' FHB in SFPC HX Rm) _____
- 1(2)-FC-0033 "SFP PURIFICATION LOOP 1A(2A) NORMAL RETURN TO SFPCCS ISOLATION VALVE". (41 ft MAB Filter Row Rm 237Q) _____
- "RWST TO SFP CLEANUP SYS FV-3936" valve (CP001) _____
- "RWST TO SFP CLEANUP SYS FV-3937" valve (CP001) _____

9.3.13 VERIFY skimmer strainers are adjusted to maintain water level approximately 3/4 of the way up from the bottom of the swinging gate on the strainer assembly. _____

9.3.14 PERFORM Lineup 12, Restoration of Makeup from the RWST. _____

EMERGENCY CORE COOLING SYSTEMS

3/4.5.5 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

a. A minimum contained borated water volume of 458,000 gallons, and

b. A boron concentration between 2800 ppm and 3000 ppm.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the RWST inoperable, within 1 hour restore the tank to OPERABLE status or apply the requirements of the CRMP, or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE at a frequency in accordance with the Surveillance Frequency Control Program by:

a. Verifying the contained borated water volume in the tank, and

b. Verifying the boron concentration of the water.

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE:	**PERFORM 0POP05-EO-EC00, ADDENDUM 4**
JPM NO.:	**P3**
REVISION:	**2**
LOCATION:	**Unit 1 or 2**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title: PERFORM 0POP05-EO-EC00, ADDENDUM 4

JPM No.: P3

Rev. No.: 2

STP Task: 82044, Respond to a loss of all AC power condition.

STP Objective: 81044, Respond to a loss of all AC power condition in accordance with POP05-EO-EC00.

Related K/A Reference: 062 A4.04, Ability to manually operate and/or monitor in the control room: Local operation of breakers. (2.6/2.7)

References: 0POP05-EO-EC00, Rev. 21, Loss of All AC Power

Task Normally Completed By: PO

Method of Testing: Simulated

Location of Testing: Plant

Time Critical Task: NO

Alternate Path JPM: NO

Validation Time: 20 minutes

Required Materials (Tools/Equipment): JPM keys

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: **Do not operate or alter equipment configuration in the plant without proper authorization.**

INITIAL CONDITIONS:

A loss of all AC power event has occurred. The Control Room crew is performing the actions of 0POP05-EO-EC00, Loss of All AC Power.

INITIATING CUE:

The Unit Supervisor directs you to perform Addendum 4, steps 1-3 of 0POP05-EO-EC00, Loss of All AC Power.

Power is expected to be restored within 3 hours.

There are no battery cells jumpered.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

The operator has <u>*SIMULATED*</u> *performance of steps 1-3 in Addendum 4 of 0POP05-EO-EC00, Loss of All AC Power.*

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

Handout copy of 0POP05-EO-EC00, Loss of All AC Power, Addendum 4.

NOTES:

It will be necessary for the applicant to obtain a set of JPM keys from the Control Room Unit Supervisor for access to the rooms housing the ESF Sequencers.

This JPM includes a Student Handout of pictures to be used to simulate breaker operation.
DO NOT OPEN SEQUENCER OR DISTRUBUTION PANEL DOORS.

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME: ________________

SAT/UNSAT Performance Step: 1

Obtain a copy of the procedure Addendum.

Standard:

The applicant obtains a copy of Addendum 4 to 0POP05-EO-EC00.

Comment:

Cue:

Give the applicant the handout copy of 0POP05-EO-EC00, Addendum 4.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2 **(C)**

Deenergize ESF Load Sequencers A, B and C. (Addendum 4, step 1)

Standard:

The applicant locates the 'A' ESF Load Sequencer and describes how to open the "MAIN POWER BKR" using Student Handout #1 & #2:

____ *A 3N091ZLP801*

Comment:

When the performer goes to the rooms for the sequencers, have them go to Train 'A' first.

The Operator should **NOT** open the sequencer panel door.

After Train 'A' Sequencer is complete, tell the performer that other Plant Operators are completing 'B' & 'C' Trains.

Cue:

Breaker:

Initial position – ON/CLOSED (breaker handle UP)

Final position – OFF/OPEN (breaker handle DOWN)

Notes:

DO NOT OPEN SEQUENCER PANEL DOORS.

Upon arrival at Train 'A' Sequencer, have the performer indicate which door would be opened (left door). Hand the performer Student Handout #1 for the Train 'A' Sequencer and have them indicate which part of the panel that the 'MAIN POWER' breaker is on. (Top, Middle or Lower - Breaker is on lower section.)
Then, using Student Handout #2, have the applicant indicate which breaker is to be manipulated and describe how the breaker is operated to turn power off to the sequencer.

The breaker handle below the "Main Power" label is pushed down to turn power off.

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 3

CHECK if NSSS inverters should be deenergized. (Addendum 4, step 2)

Standard:

Determines that additional action per this step is NOT required.

Comment:

Per the initiating cue, the expected event duration is $\leq$3 hours, and there are no battery cells jumpered (normal condition).

Cue:

If questioned about event duration, as the Unit Supervisor, inform the applicant that the expected event duration is less than 3 hours.

If questioned about jumpered cells or if the applicant attempts to visually verify battery cell status, as the Unit Supervisor, inform the applicant that there are NO jumpered cells.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 4 (C)

Deenergize 120 VAC NON 1E loads. (Addendum 4, step 3)

Standard:

The applicant locates the breaker panels and describes how the following breakers are operated using Student Handout #3:

____ *DP005 / BKR 25 (MN TURB TRIP CAB ZRR037)*

____ *DP006 / BKR 9 (EHC CABINET PWR SUPPLY)*

____ *Unit 1 - DP005 / BKR 26, Unit 2 - DP005 / BKR 28 (TURBINE SUPERVISORY CONTROL CABINET PWR SUPPLY)*

____ *DP006 / BKR 13 (MN TURB EMER TRIP CAB ZRR037)*

____ *DP006 / BKR 15 (REHEAT CONTROL CABINET PWR SPLY)*

Comment:

The Operator should **NOT** open the breaker panel door.
All breakers are normally closed.
Breakers are operated by moving the red handle from the center of the panel towards the outside.

Cue:

All breakers:

Initial position – ON (Breaker Handle toward center of Panel)

Final position – OFF (Breaker Handle toward outside of Panel)

Notes:

The use of the photograph is intended to allow the applicant to describe how these breakers are operated and NOT to determine the exact location of the breaker inside the panel.

When performer has given indication that they are at DP-0005 and DP-0006, give them Student Handout #3 to describe how the breakers would be manipulated.

- TERMINATE THE JPM -

JPM STOP TIME ________

VERIFICATION OF COMPLETION

Job Performance Measure: PERFORM 0POP05-EO-EC00, ADDENDUM 4

Performer's Name: ____

Date Performed: ____________________

Time to Complete: ____________________

JPM Results: **Sat / Unsat**

Evaluator:_________________________ **Signature:**_________________________

Date: _________________________

JPM - STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

A loss of all AC power event has occurred. The Control Room crew is performing the actions of 0POP05-EO-EC00, Loss of All AC Power.

INITIATING CUE:

The Unit Supervisor directs you to perform Addendum 4, steps 1-3 of 0POP05-EO-EC00, Loss of All AC Power.

Power is expected to be restored within 3 hours.

There are no battery cells jumpered.

STUDENT HANDOUT #1

STUDENT HANDOUT #2

STUDENT HANDOUT #3

ADDENDUM 4
VITAL DC BUS MONITORING

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
___1	**DISPATCH operator to deenergize ESF Load Sequencers: (EAB 10')** o "ESF LOAD SEQUENCER" "A 3N091ZLP801" "MAIN POWER BKR" o "ESF LOAD SEQUENCER" "B 3N091ZLP802" "MAIN POWER BKR" o "ESF LOAD SEQUENCER" "C 3N091ZLP803" "MAIN POWER BKR"	

NOTE

The Station Blackout Coping Study assumes that Step 2 will be completed within 30 minutes of the initial blackout event.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
___2	**CHECK if NSSS inverters should be deenergized:**	
	___a. Expected event duration - LESS THAN FOUR HOURS	a. PERFORM the following: 1) DISPATCH operator to **OPEN** breakers: **DP 1201:** Breaker 1 ____ (EAB 10') Breaker 2 ____ Breaker 3 ____ Breaker 4 ____ Breaker 5 ____ Breaker 6 ____ Breaker 7 ____ Breaker 8 ____ Breaker 22 ____

Step 2 continued on next page.

ADDENDUM 4
VITAL DC BUS MONITORING

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Step 2 continued from previous page.

2) ENSURE following breakers - CLOSED:

DP 1201: Breaker 13 ____
(EAB 10') Breaker 15 ____
Breaker 17 ____

3) DISPATCH operator to **OPEN** breakers:

DP 1204: Breaker 1 ____
(EAB 60') Breaker 2 ____
Breaker 3 ____
Breaker 4 ____
Breaker 5 ____
Breaker 6 ____
Breaker 8 ____
Breaker 22 ____

4) ENSURE following breakers - CLOSED:

DP 1204: Breaker 13 ____
(EAB 60') Breaker 15 ____
Breaker 17 ____

5) REFER TO 0POP04-VA-0001, LOSS OF 120 VAC CLASS VITAL DISTRIBUTION, for loads lost.

6) GO TO Step 3 of this Addendum

Step 2 continued on next page.

ADDENDUM 4
VITAL DC BUS MONITORING

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Step 2 continued from previous page.

___b. CHECK Channel I battery, E1A11(E2A11) - NO CELLS JUMPERED OUT	b. PERFORM the following:

1) DISPATCH operator to OPEN the following DP1201 Breakers:

DP 1201: (EAB 10')
- Breaker 1 ____
- Breaker 2 ____
- Breaker 3 ____
- Breaker 4 ____
- Breaker 5 ____
- Breaker 6 ____
- Breaker 7 ____
- Breaker 8 ____
- Breaker 22 ____

2) ENSURE following breakers - CLOSED:

DP 1201: (EAB 10')
- Breaker 13 ____
- Breaker 15 ____
- Breaker 17 ____

3) REFER TO 0POP04-VA-0001, LOSS OF 120 VAC CLASS VITAL DISTRIBUTION, for loads lost.

Step 2 continued on next page.

ADDENDUM 4
VITAL DC BUS MONITORING

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Step 2 continued from previous page.

___c. CHECK Channel IV battery, E1C11(E2C11) - NO CELLS JUMPERED OUT

c. PERFORM the following:

1) DISPATCH operator to OPEN the following DP1204 Breakers:

DP 1204: (EAB 60')

- Breaker 1 ____
- Breaker 2 ____
- Breaker 3 ____
- Breaker 4 ____
- Breaker 5 ____
- Breaker 6 ____
- Breaker 8 ____
- Breaker 22 ____

2) ENSURE following breakers - CLOSED:

DP 1204: (EAB 60')

- Breaker 13 ____
- Breaker 15 ____
- Breaker 17 ____

3) REFER TO 0POP04-VA-0001, LOSS OF 120 VAC CLASS VITAL DISTRIBUTION, for loads lost.

ADDENDUM 4
VITAL DC BUS MONITORING

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
___3	**DISPATCH operator to deenergize the following 120 VAC NON 1E loads:**	

(10 ft EAB hallway)

___o "MN TURB EMER TRIP CAB ZRR037"
DP005 / BKR 25

___o "EHC CABINET PWR SPLY"
DP006 / BKR 9

___o "TURBINE SUPERVISORY CONTROL"
"CABINET PWR SPLY"
DP005 / BKR 26 (DP005 / BKR 28)

___o "MN TURB EMER TRIP CAB ZRR037"
DP006 / BKR 13

___o "REHEAT CONTROL CABINET PWR SPLY"
DP006 / BKR 15

ADDENDUM 4
VITAL DC BUS MONITORING

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

Do NOT allow battery voltages to drop to LESS THAN 105 VDC for plant equipment protection.

NOTE

Train A, B, and C bus voltages should be monitored for the duration of the event, and their respective battery output breakers opened if bus voltages lowers to LESS THAN OR EQUAL TO 105.5 VDC in order to conserve the battery should a STBY DG become available.

___4 **MONITOR Class 1E 125 VDC system Train A, B, & C bus voltage.**

___a. Train A AND B bus voltages - GREATER THAN 105.5 VDC

a. PERFORM the following:

1) DISPATCH operator to perform ADDENDUM 3, FAILING AIR TO MSIVs AND MSIBs for all MSIV(s) and MSIB(s).

2) WHEN ADDENDUM 3, FAILING AIR TO MSIVs AND MSIBs is complete,THEN GO TO Step 4.b of this Addendum.

___b. Train A, B, OR C bus voltages - GREATER THAN 105.5 VDC.

b. DISPATCH operator to open the associated battery output breaker:

o "BTRY E1A11(E2A11) MAIN BKR" E1A11(E2A11) BKR 1B (EAB 10')

o "BTRY E1B11(E2B11) MAIN BKR" E1B11(E2B11) BKR 1B (EAB 35')

o "BTRY E1C11(E2C11) MAIN BKR" E1C11(E2C11) BKR 1B (EAB 60')

___5 **CHECK Sequencer(s) ready for restoration following bus energization**

RETURN TO procedure step in effect.

ADDENDUM 4
VITAL DC BUS MONITORING

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

___6 **DISPATCH an operator to ENERGIZE the affected sequencer as follows:**

___a. ENSURE MAIN POWER breaker for the affected sequencer - OPEN

___b. OPEN CB1 AND CB2 breakers for the affected sequencer

___c. ENSURE associated SWBD breaker - CLOSED:

o "ESF LOAD SEQUENCER" "CABINET A - ZLP801" E1A11(E2A11) BKR 5C

o "ESF LOAD SEQUENCER" "CABINET B - ZLP802" E1B11(E2B11) BKR 5B

o "ESF LOAD SEQUENCER" "CABINET C - ZLP803" E1C11(E2C11) BKR 7B

___d. CLOSE the MAIN breaker for the affected sequencer

___e. CLOSE the CB2 breaker for the affected sequencer

___f. After 2 seconds - CLOSE the CB1 breaker for the affected sequencer

___7 **RETURN TO procedure step in effect**

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE:	**Monthly Control Rod Operability**
JPM NO:	**S1**
REVISION:	**2**
LOCATION:	**Simulator**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title:	MONTHLY CONTROL ROD OPERABILITY
JPM No.:	S1
Rev. No.:	2
STP Task:	2850, Perform Monthly Control Rod Operability Test.
STP Objective:	2850, Perform the Monthly Control Rod Operability Test in Accordance with 0PSP03-RS-0001.
Related K/A Reference:	001 A2.03, Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect of stuck rod or Misaligned rod (3.5/4.2)
References:	0PSP03-RS-0001, Rev. 30, Monthly Control Rod Operability 0PGP03-ZO-0042, Rev. 12, Reactivity Management Program
Task Normally Completed By:	RO
Method of Testing:	Actual Performance
Location of Testing:	Simulator
Time Critical Task:	NO
Alternate Path JPM:	YES
Validation Time:	20 minutes
Required Materials (Tools/Equipment):	0POP04-RS-0001, Control Rod Malfunction – Available 0PGP03-ZO-0042, Reactivity Management Program – Student Copy with applicable sections highlighted <u>and flagged</u> Conduct of Operations Manual – Available Notepad to use as Control Room Log

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the applicant):

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

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

Unit 1 is at 100% power, with Control Bank D at 235 steps. Corrective maintenance has been performed in the 2AC power cabinet and surveillance test 0PSP03-RS-0001, Monthly Control Rod Operability, is required as a retest for the affected Control Bank "C" following the corrective maintenance.

INITIATING CUE:

The Unit Supervisor directs you to perform the required portion of 0PSP03-RS-0001, Monthly Control Rod Operability for Control Bank "C" only. You will **NOT** be moving rods 6 steps in and out prior to moving at least 10 steps in any one direction (0PSP03-RS-0004, Control Rod Operability Test (Six and Ten Steps, is not required)

-DO NOT DISCLOSE INFORMATION BELOW THIS LINE-

COMPLETION CRITERIA:

Operator inserts Control Bank "C" at least 10 steps but not more than 20 steps and then determines that control rod K6 has dropped and performs the Immediate Actions of 0POP04-RS-0001, Control Rod Malfunction.

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

JPM Handout copy of 0PSP03-RS-0001, Monthly Control Rod Operability, and 0PGP03-ZO-0042, Reactivity Management Program.

NOTES:

This JPM is formatted for dynamic simulator performance only. The cues provided are related to communications and other general information needed for dynamic performance. (No indication type cues are provided.)

SIMULATOR SETUP

1) JPMs S1 and S2 are to run together. The following steps will set up the simulator for **BOTH** JPMs.

2) Ensure Radio volume for both stations are set to a reasonable level.

3) Ensure the PA buttons on the communications consoles are taped to help eliminate usage.

4) Ensure a clean notepad is available for student use

5) Reset to IC# 215 and verify:

   - Step counter position annunciator light is out on CP-0005
   - Red light at the end of CP-010 is out.

6) Check and clean the following procedures (JPM specific):

   - 0POP04-RS-0001, Control Rod Malfunction
   - 0POP04-RA-0001, Radiation Monitoring System Alarm Response
   - Conduct of Operations - available
   - Clean JPM handout copy of PGP03-ZO-0042, Reactivity Management Program, with applicable sections highlighted <u>and flagged</u> - available

7) Place simulator in run. Silence/acknowledge /reset alarms as appropriate.

ADDITIONAL INSTRUCTIONS ON NEXT PAGE

JOB PERFORMANCE MEASURE INFORMATION SHEET

8) Verify the following:

9) RT-8035 is in alarm (RM11)
   INSTRUCTOR NOTE: The desired condition for the RM-11 is to have the audible alarm acknowledged and the RT-8035 icon should be red and preferably flashing. If it is not flashing, that's OK as well. Sometimes the Storepoint may not reset to a flashing alarm icon.
   Check no other RM-11 alarms are in.
   - FHB HVAC Exhaust Dampers Closed and in AUTO
   - ICS display of rod position is called up on an RO monitor and monitor is rotated to face CP-005.
     - The screen is accessed by clicking on the "Custom Graphics" arrow, then selecting the "RS" group (may have to select "Top Level Menu" first), then selecting the "RS-001 CONTROL ROD BANK POSITIONS" screen.

10) Place the simulator in "FREEZE" until the examiners are ready to proceed.

11) Simulator Lesson Plan.
   - There is no simulator lesson plan for S1 or S2

INSTRUCTOR ACTIONS

None

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, …).

JPM START TIME_______________

SAT / UNSAT Performance Step: 1

Obtain a copy of 0PSP03-RS-0001, Monthly Control Rod Operability.

Standard:

Obtains 0PSP03-RS-0001, Monthly Control Rod Operability and reviews the Precautions and Notes.

Comment:

Provide the applicant with the Handout copy of 0PSP03-RS-0001.

Applicant should review 0PSP03-RS-0001, Monthly Control Rod Operability, in its entirety prior to performing the test per Step 3.9 of the procedure.

Applicant should review 0POP04-RS-0001, Control Rod Malfunction, per procedure Cautions and Notes Step 3.10.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 2

Ensure Prerequisites have been completed and Notes and Precautions have been read.
(Procedure Step 5.1.1)

Standard:

Ensures that Prerequisites have been completed and Precautions and Notes have been read and that Procedure Step 5.1.1 is initialed.

Comment:

Pre-reqs have already been verified and signed for.

Cue:

If asked, inform the applicant the pre-reqs are still current.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 3

Conduct a prejob briefing. (Procedure Step 5.1.2)

Standard:

Conducts a prejob briefing including a discussion of the following and initials completion of Procedure Step 5.1.2 :

______ *Available Nuclear Instrumentation*

______ *Expected Results*

______ *Primary or backup indications of reactor power*

______ *Reactivity Management guidelines per 0PGP03-ZO-0042, Reactivity Management Program*

______ *Any applicable lessons learned*

Comment:

A prejob brief is normally conducted with all personnel involved in the surveillance test present for the brief.

Due to the nature of conducting a JPM on a one on one basis, the applicants will accomplish this as described below and the cues provided on the next page.

There is a Student Handout copy of 0PGP03-ZO-0042, Reactivity Management Program. Procedure pages that are flagged and the portions that are highlighted are the portions that have been determined to be applicable for the surveillance being performed. The applicant is free to review additional portions as desired.

Applicant should conduct a "Reactivity Briefing" at this point using the provided copy of 0PGP03-ZO-0042, Reactivity Management Program procedure. The requirements of conducting a prejob brief will be satisfied by performing a review of highlighted portions 0PGP03-ZO-0042, Reactivity Management Program procedure AND reviewing the conditions of step 5.1.2 of the surveillance procedure. The cues below provide information for these conditions.

STEP CONTINUED ON NEXT PAGE

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

Cue:

- Provide the applicant with a highlighted copy of 0PGP03-ZO-0042, Reactivity Management Program procedure. The intent of providing a highlighted copy of the procedure is to focus the applicant to the areas that are applicable to the test being performed.

The below conditions are part of the prejob brief referenced in the surveillance procedure (step 5.1.2):

- When the discussion of "Available Nuclear Instrumentation" is conducted, inform the applicant that the Excore Nuclear Instruments and Extended Range Nuclear Instruments are available and in service.

- When the discussion of "Expected Results" is conducted, inform the applicant that it is expected that Control Bank "C" is inserted the required steps per procedure and withdrawn the same number of steps.

- When the discussion of "Primary or Backup indications of reactor power" is conducted, inform the applicant that the Excore Nuclear Instruments will be the primary indication of reactor power and that loop delta T will be the backup indication of reactor power.

- When the discussion of "Reactivity Management Guidelines per 0PGP03-ZO-0042, Reactivity Management Guidelines" is conducted, inform the applicant it is per the highlighted portions of the procedure.

- When the discussion of "Any applicable lessons learned" is conducted, inform the applicant that there will be no lessons learned discussed at this time.

If asked, the examiner will act in the capacity of SRO providing oversight.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 4

Ensure that a Control Room Logbook entry documents the commencement of this surveillance test. (Procedure Step 5.1.3)

Standard:

Completes Control Room Logbook entry documenting the commencement of this surveillance test and initials for completion of Procedure Step 5.1.3.

Comment:

The electronic control room logbook is not available in the simulator. A notepad will be made available to the applicant for making logbook entries.

Cue:

Inform the applicant that the electronic control room logbook is not available and that we will be temporarily making log entries on a notepad until the electronic control room logbook is available.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 5

Ensure that Rod Bank Groups 1 and 2 (Including Control Bank D) Step Demand, are at equal rod positions. (procedure step 5.1.4)

Standard:

At a minimum, ensures that Control Bank D Rod Groups 1 and 2 Step Demand are at equal rod positions.

Comment:

Only Control Bank C would be required to be checked, but the operator may verify all banks.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 6

Call up the Computer display of rod positions on the Plant Computer. (Procedure Step 5.2.1)

Standard:

Calls up the Computer display of rod positions on the Plant Computer.

Comment:

The display, RS-001 CONTROL ROD BANK POSITIONS, will already be up as part of the Instructor Setup. The applicant will just have to check it on the monitor facing panel CP-005.

This screen is found on the ICS computer and is accessed by clicking on the "Custom Graphics" arrow, then selecting the "RS" group (may have to select "Top Level Menu" first), then selecting the "RS-001 CONTROL ROD BANK POSITIONS" screen.

Procedure also allows use of Plant Computer Point Groups as an indication of rod positions.

Cue:

If the applicant doesn't recognize that this display is already available, inform him/her that it is.

If asked, 0PSP03-RS-0003, Control rod Operability (Single Rod) and 0PSP03-RS-0004, Control Rod Operability Test (Six and Ten Steps, are NOT required (procedure steps 5.2.2 and 5.2.3)

If the applicant seeks concurrence from the Unit Supervisor to begin, inform him/her that they have Unit Supervisor concurrence.

Notes:

Steps 5.2.2 and 5.2.3 will be NA'd. Step 5.2.4 just requires the operator to complete Table 1 while performing the rod exercise.

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 7 **(C*)**

Prepares to test Control Bank "C". (Procedure Step 5.2.5 and 5.2.6)

Standard:

Performs the following:

______ * *Selects Control Bank C on ROD BANK SEL SW (CP-0005)*

______ *Records Control Bank C Group Step Counter Demand "As Found" Positions on Table 1. (Rod Movement Verification)*

Comment:

* - Denotes the critical portion of the step.

Steps 5.2.2 and 5.2.3 will be NA'd. Step 5.2.4 just requires the operator to complete Table 1 while performing the rod exercise.

Cue:

If asked, 0PSP03-RS-0003, Control rod Operability (Single Rod) and 0PSP03-RS-0004, Control Rod Operability Test (Six and Ten Steps, are NOT required (procedure steps 5.2.2 and 5.2.3)

If the applicant seeks concurrence from the Unit Supervisor to begin, inform him/her that they have Unit Supervisor concurrence.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 8 **(C*)**

Insert Control Bank C. (Procedure Steps 5.2.7 through 5.2.9)

Standard:

Performs the following:

______ * *Inserts Control Bank "C" at least 10 steps, but not more than 20.*

______ *Verifies DRPI and "STEP DEMAND" indications on the Plant Computer display agree with the DRPI and Group Demand indications on CP005 for each rod in Control Bank "C".*

Comment:

* - Denotes the critical portion of the step.

Inserting Control Bank "C" and Verifying DRPI indicates each rod moved (Procedure Steps 5.2.7 and 5.2.8) are to be performed concurrently.

When Control Bank 'C' has been inserted 9-10 steps, Control Bank Rod K6 will drop. The next JPM step (step 9) determines the response the applicant should take regarding this dropped rod.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 9 **(C*)**

Recognize that Control Rod K6 has dropped into the core and performs the immediate actions of 0POP04-RS-0001, Control Rod Malfunction.

Standard:

Performs immediate actions for a dropped control rod:

______ ** Ensure ROD BANK SEL switch in MANUAL*

______ ** Verifies All Rods – NO ROD MOTION*

______ ** CHECK for Dropped Rods (Checks that only one rod has dropped so a Reactor Trip is not required).*

Comment:

* - Denotes the critical portion of the step.

1. The applicant should immediately stop rod movement. (He/she should inform the SM as directed by the procedure Caution prior procedure step 5.2.7).

2. The entry requirements are met for entry into 0POP04-RS-0001, Control Rod Malfunction, due to dropping Control Rod K6.

3. The applicant should immediately recognize that the conditions exist for entry into 0POP04-RS-0001, Control Rod Malfunction, and perform the Immediate Actions for this procedure.

4. The Immediate Actions of 0POP04-RS-0001 are to be performed from memory.

5. *The student may not verbalize their immediate actions since some or all will be verification steps because of existing plant conditions. The examiner may have to query the student to ensure the student has considered all of the actions to take.*

6. The step for placing the ROD BANK SEL switch to MANUAL is satisfied if the switch is in any position but AUTO.

STEP CONTINUED ON NEXT PAGE

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

Cue:

1) As the Unit Supervisor or Shift Manager, acknowledge the report that control rod K6 has dropped and inform the applicant to perform his/her immediate actions.

2) If the applicant announces that he/she is performing the Immediate Actions for dropped rod, acknowledge that he/she is performing the Immediate Actions.

3) If after a short period of time the applicant does not perform the Immediate Actions for a dropped rod, as the SM/US direct the applicant to:

   "Perform the Immediate Actions of 0POP04-RS-0001, Control Rod Malfunction."

Notes:

-TERMINATE THE JPM-

JPM STOP TIME_______________

VERIFICATION OF COMPLETION

Job Performance Measure: MONTHLY CONTROL ROD OPERABILITY

Performer's Name: ____

Date Performed: ____________________

Time to Complete: ____________________

JPM Results: **Sat / Unsat**

Evaluator:_________________________ **Signature:**_________________________

Date: _________________________

JPM – STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

Unit 1 is at 100% power, with Control Bank D at 235 steps. Corrective maintenance has been performed in the 2AC power cabinet and surveillance test 0PSP03-RS-0001, Monthly Control Rod Operability, is required as a retest for the affected Control Bank "C" following the corrective maintenance.

INITIATING CUE:

The Unit Supervisor directs you to perform the required portion of 0PSP03-RS-0001, Monthly Control Rod Operability for Control Bank "C" only. You will **NOT** be moving rods 6 steps in and out prior to moving at least 10 steps in any one direction (0PSP03-RS-0004, Control Rod Operability Test (Six and Ten Steps, is not required)

STI 32653764	0PSP03-RS-0001	Rev. 30	Page 1 of 15
Monthly Control Rod Operability			
Quality	Safety Related	Usage: **IN HAND**	Effective Date: 04/12/2010

Mike Foster	J. R. Rocha	Crew 2E	Operations
PREPARER	TECHNICAL	USER	COGNIZANT DEPT.

Table of Contents Page

Procedure Performance Data Sheet

Unit Number: *1* | Work Activity Number: *273085* -ST: *86000760*

Technical Specification Reference: 4.1.3.1.2

Test Interval:	Test Performance Allowed in Plant Modes:	Train Reference:
31 days	1, 2, or 3	N/A

Reason for Test:

☐ Periodic Surveillance Test ☐ For Surveillance Credit

☒ Maintenance per CR # *11-26587* ☒ Not for Surveillance Credit

☐ For Surveillance Credit during Reactor Startup per 0POP03-ZG-0004 (Reactor Startup)

☐ For Surveillance Credit during 0PSP03-RI-0001 (Digital Rod Position Indication Operability Test)

☐ For Surveillance Credit during 0PSP10-DM-0003 (Automatic Multiple Rod Drop Time Measurement)

Radiation Work Permit No.:	Fire Hazard Evaluation No.:	Equipment Clearance No.:
N/A	N/A	N/A

Administrative Approval to Perform Test:

Vance Verbeck ______ Shift Manager *Today* ______ Date *15 min ago* ______ Time

Test Results Review:

☐ Acceptable - Each rod (not fully inserted in the core) moved at least 10 steps in any one direction.

☐ Unacceptable - One or more rods (not fully inserted in the core failed to move at least 10 steps in any one direction. (explain in Remarks)

Reviewed by:______________________ Test Coordinator ____________ Date ____________ Time

Plant Operations Review:

All data within acceptance criteria?	☐ Yes	☐ No
Control Rod Drive System in Service?	☐ Yes	☐ No
Potential Reportable Occurrence?	☐ Yes	☐ No
LCO Action Statement Entered?	☐ Yes	☐ No

Corrective Action Taken:____

Reviewed By: ______________________ Shift Manager ____________ Date ____________ Time

Division Surveillance Coordinator Review:

Reviewed By: ______________________ Division Surveillance Coordinator ____________ Date ____________ Time

Procedure Performance Data Sheet

Performers:

Name (Printed)	Signature	Initials	Sections Performed
Billy Herzog	Billy Herzog	BH	4.0

Remarks: ______________________________

1.0 Purpose and Scope

1.1 This procedure tests the shutdown and control rods not fully inserted in the core in order to satisfy the monthly requirements of Technical Specification 4.1.3.1.2.

1.2 This procedure provides instructions for demonstrating the shutdown and control rods not fully inserted in the core are Operable by movement of at least 10 steps in any one direction.

2.0 Responsibilities

2.1 Test Coordinator shall ensure that the procedure revision is correct and that all applicable Field Changes are incorporated.

2.2 Shift Manager shall grant permission to perform this test.

2.3 This procedure shall be performed by Plant Operations.

2.4 WHEN "____" (blank) follows a step, THEN the performer shall enter initials to verify step completion.

NOTE

After completion, procedure routing is per 0PGP03-ZE-0004 (Plant Surveillance Program).

2.5 The following personnel shall review the test results:

- Test Coordinator
- Shift Manager
- Division Surveillance Coordinator

3.0 Precautions and Notes

3.1 IF credit is being taken for this surveillance during ANY of the following:

- Reactor Startup per 0POP03-ZG-0004 (Reactor Startup), or
- 0PSP03-RI-0001 (Digital Rod Position Indication Operability Test), or
- 0PSP10-DM-0003 (Automatic Multiple Rod Drop Time Measurement),

THEN ONLY the following actions are required:

3.1.1 Completion of Steps 5.2.6, 5.2.7 and 5.2.8 on Table 1, Rod Movement Verification.

3.1.2 Completion of the following portions of Procedure Performance Data Sheet (PPDS):

- Unit Number
- Work Activity Number
- Surveillance Test (ST) Number
- Reason for Test
- Performers section

3.1.3 N/A of procedure steps

3.1.4 Forwarding of this procedure to Shift Manager for review

3.2 IF this procedure is being performed to demonstrate post-maintenance operability, THEN N/A the applicable subsection(s) for the component(s) **NOT** being tested. Post-maintenance operability test may be performed in ALL Modes **PERMITTED** by Plant Conditions and Technical Specifications.

3.3 IF this procedure cannot be performed as written, THEN the procedure performer shall stop AND immediately notify Shift Manager.

3.4 IF this procedure is terminated for any reason, THEN immediately notify Shift Manager.

3.5 IF results of this test fail to meet acceptance criteria, THEN perform the following:

3.5.1 Notify Shift Manager immediately.

3.5.2 Record discrepancies and time of discovery in Remarks section of Procedure Performance Data Sheet (PPDS).

3.5.3 Ensure Shift Manager signs in Remarks section of PPDS.

3.6 Rod Bank Groups 1 and 2 (Including Control Bank D) Step Demand, **SHALL** be at equal rod positions prior to commencing this surveillance.

3.7 Reactor Coolant average temperature (Tavg) shall be maintained within plus or minus 1.5 degrees Fahrenheit of Reference Temperature (Tref) during rod movement.

3.8 Axial Flux Difference (AFD) shall be maintained within the allowable target band per Technical Specification 3.2.1. AFD shall be allowed to return to near pretest value between rod movements.

3.9 This procedure should be reviewed in its entirety prior to performing the test.

3.10 Test performer should review 0POP04-RS-0001 (Control Rod Malfunction) prior to moving rods.

3.11 IF shutdown margin verification becomes necessary because of the one hour conditional surveillance requirement of Technical Specification 4.1.1.1.1.a, THEN 0PSP10-ZG-0005 (Shutdown Margin Verification - Modes 1 and 2) should be performed.

3.12 Minimize the time spent with a rod bank inserted from the full out position.

3.13 Do not exceed the full out position on the control banks to prevent adversely affecting the Pulse to Analog Converter. While control rods will not physically move out of the core past 269 steps, if rod motion is attempted past the core full out position the following indications will become inaccurate and need to be reset:

- The associated Step Demand Counter (Control and Shutdown Banks), and
- The Pulse to Analog Converter (for Control Banks only).

3.14 Acceptance criteria steps are annotated with the letters **AC** in the left margin preceding the step.

3.15 Expected alarms:

- Lampbox 5M03, window D-4, "BANK INSRT LO" may alarm during insertion of control bank A, B, C & D if the Rod Insertion LO Limit for any bank is reached. Check the rod insertion recorder on CP 022 for actual rod insertion setpoint.

- Lampbox 5M03 window D-5, “ROD SUPV MNTR ROD POSITION TRBL” may alarm during insertion of all shutdown banks if inserting to less than 240 steps (greater than 18 steps from top) as indicated on DRPI. A DRPI rod deviation alarm will also alarm on the DRPI PANEL. This alarm will alarm while inserting control banks A, B, & C due to a rod sequencing (overlap) error.

Initials

4.0 Prerequisites

4.1 Ensure that the procedure revision is correct and that all applicable Field Changes are incorporated. BH

4.2 This procedure may be performed in Modes 1, 2, or 3. Record current plant mode:

Mode 1 BH

4.3 Review Operability Assessment System (OAS) to ensure no equipment is out of service that could conflict with test completion while performing this test. BH

4.4 Record the following as applicable on PPDS:

- Unit Number
- Work Activity Number
- Surveillance Test (ST) Number
- Reason for Test BH

4.5 Notify Shift Manager to review Technical Specification 3.1.3.1, 3.1.1.1, and 3.1.3.5 for Operability and Limiting Condition for Operation (LCO) requirements. BH

4.6 Obtain Shift Manager's signature for administrative approval to perform test on PPDS. BH

Initials

5.0 Procedure

5.1 **Preparation**

5.1.1 Ensure Prerequisites have been completed and Precautions and Notes have been read. _____

5.1.2 Conduct a prejob briefing, including discussions of the following:

- Available Nuclear Instrumentation
- Expected results
- Primary or backup indications of reactor power or subcritical multiplication
- Reactivity Management guidelines per 0PGP03-ZO-0042, Reactivity Management Program
- Any applicable lessons learned _____

5.1.3 Ensure that a Control Room Logbook entry documents the commencement of this surveillance test. _____

5.1.4 Ensure that Rod Bank Groups 1 and 2 (Including Control Bank D) Step Demand, are at equal rod positions. _____

Initials

5.2 **Rod Movement**

NOTE

- Plant Computer rod positions are shown on the "RS-001 Control Rod Bank Positions" display as well as the multiple displays for each rod bank under the Rod Supervision menu. Additionally, Plant Computer Point Groups may be utilized as an indication of rod positions.
- 0PSP03-RS-0001, Monthly Control Rod Operability, and 0PSP03-RS-0003, Control Rod Operability (Single Rod), may be completed in combination to satisfy surveillance requirement 4.1.3.1.2.
- 0PSP03-RS-0001, Monthly Control Rod Operability, and 0PSP03-RS-0004, Control Rod Operability Test (Six and Ten Steps), may be completed in combination to satisfy surveillance requirement 4.1.3.1.2.
- IF 0PSP03-RS-0003 or 0PSP03-RS-0004 will be performed, THEN return to this procedure at Step 5.2.13.

5.2.1 Call up the Computer display of rod positions on the Plant Computer. _____

5.2.2 IF moving rods individually instead of rod banks, THEN GO TO 0PSP03-RS-0003, Control Rod Operability (Single Rod). _____

5.2.3 IF moving rod banks in 6 steps and out 6 steps prior to moving at least 10 steps in any one direction for operability, THEN GO TO 0PSP03-RS-0004, Control Rod Operability Test (Six and Ten Steps). _____

5.2.4 Complete Table 1, Rod Movement Verification concurrently while performing Steps 5.2.5 through 5.2.12. _____

5.2.5 Select rod bank to be moved with "ROD BANK SEL" handswitch (CP005).

5.2.6 Record As Found demand position of selected rod bank on Table 1, Rod Movement Verification.

CAUTION

IF all rods within selected bank do **NOT** move with the bank, THEN rod movement shall be stopped AND Shift Manager immediately notified.

NOTES

- Steps 5.2.7 and 5.2.8 shall be performed concurrently.
- Group step counters provide readout of bank demanded position only, and must be compared to the Digital Rod Position Indicating System (DRPI) to verify actual rod movement.

AC 5.2.7 Perform the following to demonstrate control rod movement:

- Insert selected rod bank at least 10 steps, but NOT more than 20 steps, OR
- IF taking credit during performance of 0POP03-ZG-0004, 0PSP03-RI-0001 or 0PSP10-DM-0003, THEN:
  - o Insert or withdrawal selected rod bank at least 10 steps, OR
  - o Verify selected rod bank was inserted or withdrawn at least 10 steps.

AC 5.2.8 Verify DRPI indicates each rod within selected bank moved.

NOTE

IF any discrepancies exist between DRPI and Plant Computer rod position indications, THEN a Condition Report shall be initiated. Agreement between DRPI and Plant Computer rod position indications, however, is **NOT** acceptance criteria for this surveillance test.

5.2.9 Verify the DRPI and "STEP DEMAND" indications on the Plant Computer display agree with the actual DRPI and Group Demand indications on CP005 for each rod within the selected bank.

5.2.10 Move selected rod bank back to As Found position on Table 1, Rod Movement Verification.

5.2.11 Verify from DRPI that selected bank rods are aligned within ± 12 steps of group step counter demand position.

5.2.12 Verify the DRPI and "STEP DEMAND" indications on the Plant Computer screen agree with the actual DRPI and Group Demand indications on CP005 for each rod within the selected bank.

Table 1, Rod Movement Verification

Rod Bank	**As Found Demand Position (steps)** Step 5.2.6		**Bank Movement At Least 10 Steps In One Direction** $\boxed{\textbf{AC}}$ **(initials)** Step 5.2.7	**Movement Of Each Rod Verified By DRPI** $\boxed{\textbf{AC}}$ **(initials)** Step 5.2.8
	Group 1	**Group 2**		
Shutdown Bank A	N/A	N/A	N/A	N/A
Shutdown Bank B	N/A	N/A	N/A	N/A
Shutdown Bank C	N/A		N/A	N/A
Shutdown Bank D	N/A		N/A	N/A
Shutdown Bank E	N/A		N/A	N/A
Control Bank A	N/A	N/A	N/A	N/A
Control Bank B	N/A	N/A	N/A	N/A
Control Bank C				
Control Bank D	N/A	N/A	N/A	N/A

<u>NOTE</u>

Step 5.2.13 is a return entry step from the following:

- 0PSP03-RS-0003, Control Rod Operability (Single Rod)
- 0PSP03-RS-0004, Control Rod Operability Test (Six and Ten Steps)

Returning to Step 5.2.13 allows performing Steps 5.2.2 through 5.2.12 for any rods not tested in 0PSP03-RS-0003 or 0PSP03-RS-0004. If all rods have been tested, then continue at Step 5.2.14.

5.2.13 Repeat Steps 5.2.2 through 5.2.12 for each remaining rod bank to be tested.

Initials

5.2.14 Place "ROD BANK SEL" handswitch to AUTO or MANUAL as directed by Shift Manager. _____

5.3 **Restoration and Documentation**

5.3.1 IF 0PSP03-RS-0003 was performed, THEN N/A rod banks in Table 1, Rod Movement Verification, that were performed per 0PSP03-RS-0003, Control Rod Operability (Single Rod). _____

5.3.2 IF 0PSP03-RS-0004 was performed, THEN N/A rod banks in Table 1, Rod Movement Verification, that were performed per 0PSP03-RS-0004, Control Rod Operability Test (Six and Ten Steps). _____

5.3.3 Notify Shift Manager that testing is complete. _____

5.3.4 Complete Test Results section of PPDS. _____

5.3.5 Ensure Performers section of PPDS is complete. _____

5.3.6 IF any problems occurred, THEN initiate Condition Report(s) and log Condition Report number(s) in the Remarks section of PPDS, OTHERWISE N/A this step. _____

5.3.7 Forward procedure to Shift Manager for review. _____

6.0 Acceptance Criteria

6.1 Each rod shall be moved at least 10 steps in one direction with rod movement verified by DRPI.

6.1.1 Performance of any of the following:

- Table 1, Rod Movement Verification
- 0PSP03-RS-0003, Control Rod Operability (Single Rod)
- 0PSP03-RS-0004, Control Rod Operability Test (Six and Ten Steps)

7.0 References

7.1 Technical Specifications

7.1.1 Technical Specification 3.1.1.1

7.1.2 Technical Specification 3.1.3.1

7.1.3 Technical Specification 3.2.1

7.1.4 Technical Specification 4.1.3.1.2

7.1.5 Technical Specification 4.1.1.1.1.a

7.2 Regulatory Guides and Standards

None

7.3 UFSAR

7.3.1 7.7.1.2 (Rod Control System)

7.3.2 7.7.1.3.2 (Rod Position Monitoring)

7.4 Commitments

None

7.5 Technical Standards and Manuals

7.5.1 Westinghouse Nuclear Energy Systems Rod Control Technical Manual, Volume 1, VTD-W351-0101

7.5.2 Westinghouse Nuclear Energy Systems Rod Control Technical Manual, Volume 2, VTD-W351-0102

7.5.3 Westinghouse Nuclear Energy Systems Rod Control Technical Manual, Volume 3, VTD-W351-0103

7.5.4 Westinghouse Nuclear Energy Systems Digital Rod Position Indicating System Technical Manual, VTD-W351-0040

7.6 Drawings

None

7.7 STPEGS Procedures and Policies

7.7.1 0PGP03-ZE-0004 (Plant Surveillance Program)

7.7.2 0PAP01-ZA-0101 (Plant Procedure Writer's Guide)

7.7.3 0PGP03-ZO-0042 (Reactivity Management Program)

7.7.4 0POP03-ZG-0004 (Reactor Startup)

7.7.5 0POP04-RS-0001 (Control Rod Malfunction)

7.7.6 0PSP03-RI-0001, Digital Rod Position Indication Operability Test

7.7.7 0PSP03-RS-0003, Control Rod Operability (Single Rod)

7.7.8 0PSP03-RS-0004, Control Rod Operability Test (Six and Ten Steps)

7.7.9 0PSP10-DM-0003, Automatic Multiple Rod Drop Time Measurement

7.7.10 0PSP10-ZG-0005 (Shutdown Margin Verification - Modes 1 and 2)

7.7.11 CREE 10-4150-4, Engineering Evaluation

8.0 <u>Support Documents</u>

None

STI 32812263	**0PGP03-ZO-0042**	**Rev. 12**	Page 1 of 35
Reactivity Management Program			
Quality	Non Safety-Related	Usage: **Available**	Effective Date: 01/27/11

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Table of Contents Page

1.0 Purpose and Scope

1.1 The purpose of this procedure is to:

1.1.1 Establish the South Texas Project (STP) Reactivity Management Program (RMP).

1.1.2 Establish roles and responsibilities associated with the importance of conservative actions relating to the control of reactivity to ensure safe and reliable operation.

1.1.3 Provide guidance to ensure that all evolutions affecting reactivity will be controlled, safe, and conservative

1.1.4 Provide reactivity management elements that should be addressed by plant procedures, processes, and personnel to achieve conservative reactivity control and monitoring practices.

1.2 Reactivity Management applies to those individuals involved with operation, maintenance, testing, and modification of plant systems and equipment that control, monitor, or otherwise affect the reactivity of nuclear fuel during reactor core operation or in storage.

2.0 Definitions

2.1 Reactivity: The fractional change in neutron population from one neutron generation to the next, or the measure of departure from criticality. (INPO-06-006)

2.2 Reactivity Control: Manipulation of equipment that affects the reactivity of nuclear fuel in the reactor core or in storage.

2.3 Reactivity Management: The systematic and philosophical direction given to controlling conditions that affect reactivity. This includes all activities that ensure core reactivity and stored nuclear fuel (where the potential for criticality can occur) are monitored and controlled consistent with fuel design and operating limits. It is a key factor in ensuring maintenance of barriers to fission product release. (INPO-06-006)

2.4 Reactivity Management Program: The program that defines the roles and responsibilities for the monitoring and control of reactivity to ensure safe and reliable operation. It provides the guidance to ensure that all plant evolutions that affect reactivity will be controlled, safe, and conservative. (INPO-06-006)

NOTE

IF an issue can be classified at more than one Significance Levels (SL), THEN the highest level is used. Management discretion can be used to raise the level of an issue but not to lower it.

2.5 Reactivity Management Issue: Any plant issue that does not meet expectations of the Reactivity Management Program. There are five different Significance Levels (SL) for Reactivity Management Issues based on plant impact.

SL	Plant Impact	Short Description
1	Highest	Fundamental Organizational Breakdown
2		Violation of Design or Licensing Basis
3		Violation of Process / Procedural requirements
4		Precursor
5	Lowest	Concern

- SL 1 through SL 3 events are lagging indications of performance. SL 4 and SL 5 issues, in general, may be precursors to more significant events and are considered leading indications of performance.
- A plant may trend reactivity related issues that do not meet the criteria defined for SL 1 through SL 5 issues. RECM-0001, Reactivity Management Guidelines, provides examples of these types of reactivity related issues.
- This guideline deals only with Reactivity Management Issues. Since almost any plant issue can be at least loosely tied to an impact on reactivity, this threshold can be difficult to determine. Issues with mainly radiological, reliability or generation aspects may have insufficient Reactivity Management impact to be designated Reactivity Management Issues.

2.6 Reactivity Management Event (SL 1 - 5): A Reactivity Management Issue that results in a significant plant impact or indicates a high potential for future significant events. There are five different classifications for Reactivity Management Events based on severity. Since almost all reactivity-related activities are protected by at least two barriers, a Reactivity Management Event normally involves the failure of at least two barriers. Barriers include, but are not limited to, redundant indications, potential or actual operator actions, procedures, and control systems.

- Reactivity Management Event (SL 1)

  A Reactivity Management Event that results in a severe adverse effect on plant safety, a substantial hazard to the safety and welfare of the public or plant personnel, a major deficiency in the implementation of the quality program, or indicates a high potential for future significant events. In any case, the event was caused by or aggravated by a fundamental organizational breakdown. In addition to the failure of multiple barriers, the event indicates a broader problem over multiple work groups and/or processes. These issues normally require a Root Cause to identify Corrective Actions and to resolve the organizational issues.

- Reactivity Management Event (SL 2)

  A Reactivity Management Event that places the plant outside of the Design, Analysis, or Licensing Basis or significant events that compromise fuel-related limits, or directly result in fuel failure.

- Reactivity Management Event (SL 3)

  A Reactivity Management Event that represents a violation of process or procedures.

- Reactivity Management Event (SL 4)

  A Reactivity Management Issue that indicates degradation of a barrier to proper Reactivity Management or creates an elevated potential for the occurrence of a Reactivity Management Event.

- Reactivity Management Event (SL 5)

  A Reactivity Management Issue that indicates less than optimal Reactivity Management, but does not classify as a SL 1 through SL 4 issue.

2.7 Reactor Power: “Reactor Power” and “Core Thermal Power” are used interchangeably to represent the actual core power. The most accurate, diverse, and redundant indications of power should be used to determine actual core power. A “Reactor Power” change has occurred if the indications are outside of the normal range of fluctuations (e.g. an observable change).

2.8 Mislocated Fuel Assembly or Control Component: A nuclear fuel-related component (e.g. fuel assembly, secondary source, control rod, or burnable poison assembly) that has been placed in a wrong location. A component has been “placed” in a location if the bottom of the component has broken the plane of either the top of the basket (for casks), the top of the fuel storage racks (for spent fuel pool), or the top of the fuel assembly (for the core).

2.9 Degraded Condition: A condition in which the qualification of a Structure, System, or Component (SSC), or its functional capability is reduced, but meets the Current Licensing Basis (CLB). Examples of degraded conditions are failures, malfunctions, deficiencies, deviations, and defective material and equipment. Examples of conditions that can reduce the capability of a system are aging, erosion, corrosion, improper operation, and maintenance.

2.10 Fundamental Organizational Breakdown: A failure of multiple diverse barriers involving multiple groups.

2.11 Reactivity Manipulations: Changes made in reactor or fuel parameters that can result in a measurable increase or decrease in reactor power level or neutron population. Examples of direct reactivity manipulations are as follows:

- Boration/dilution of the RCS (including the boration/dilution effects of changing the temperature of a fluid flowing through a CVCS demineralizer),
- Any control rod motion,
- Changes in turbine load,
- Changes in Balance of Plant status that result in a change of steam demand or secondary temperature (e.g., RHDT, High Pressure Feedwater Heaters, etc.) that could result in an actual power change of such magnitude to be indicated by U1118.
- Moderator or reactor coolant chemistry changes
- Refueling operations (Refer to 0POP08-FH-0009, Core Refueling)

2.12 Approach to Criticality: Dilution of the Reactor Coolant System (RCS) or withdrawal of control rods in order to achieve criticality.

3.0 Responsibilities

3.1 The Plant General Manager ensures that Reactivity Management philosophy is used in the conduct of plant business.

3.2 The Operations Manager is responsible for implementation of the Reactivity Management Program, which includes the direct control of reactivity to ensure conservative actions with regard to nuclear fuel integrity during operations, fuel handling, and storage.

3.3 The Unit Operations Managers are responsible for determining reactivity management event classification and communicating any reactivity management challenges to plant management.

3.4 The Shift Manager is responsible for the daily application of Reactivity Management philosophies, elements, guidelines and procedures.

3.5 Plant Operations personnel are responsible for control of reactivity and taking conservative actions to safeguard the integrity of nuclear fuel.

3.6 Systems Engineering provides engineering support for operating, testing, and maintenance of reactivity control and monitoring systems.

3.7 Reactor Engineering serves as the plant's technical authority on reactivity control.

3.8 Chemistry is responsible for accurate boron concentration analyses and RCS sampling for fuel integrity trending.

3.9 Design Engineering ensures modifications will not adversely affect the ability of the operators to monitor or control reactivity, or adversely affect the accident analyses.

3.10 Nuclear Training is responsible for incorporating Reactivity Management philosophy and guidance into appropriate training programs.

3.11 Maintenance is responsible for maintaining and calibrating reactivity control and monitoring systems to ensure operability and functionality.

3.12 Operating Experience and Vender Equipment Technical Information program coordinators should distribute Reactivity Management-related industry experience or recommendations to Reactor Engineering, Plant Operations, and Nuclear Training.

3.13 Shutdown Risk Assessment and Outage Planning groups should use applicable Reactivity Management elements during review of outage activities.

3.14 Reactivity Management Review Board (RMRB) is responsible for the review of reactivity events, adverse trends, corrective actions, and Reactivity Management Program improvements. The RMRB is also responsible to develop and implement reactivity management performance indicators.

3.15 Reactivity Management Working Group (RMWG) will provide insights and recommendations to the RMRB on reactivity events. Assist Operations management in resolving reactivity challenges in the station. Be their respective department spokesman for reactivity management issues. Accept actions as determined by the group.

4.0 Management Philosophy

Nuclear fuel shall always be operated or handled in a manner that is consistent with design and operational limits. Operations personnel will ensure that all planned reactivity changes, or evolutions with potential to affect reactivity, are conducted in a controlled deliberate manner, with the effects of any reactivity changes being known and monitored, and that any anomalous indication is met with prompt conservative action.

Reactivity Management Program is the program that defines the roles and responsibilities for the monitoring and control of reactivity to ensure safe and reliable operation. It provides the guidance to ensure that all plant evolutions that affect reactivity will be controlled, safe, and conservative.

4.1 Attributes of an effective Reactivity Management Program are:

- Station policies and procedures establish defined roles and responsibility for controlling work activities and plant evolutions that affect reactivity.
- Station personnel are aware of operating margins and limits related to core design and demonstrate conservative decision-making in maintaining core operating limits.
- Procedures define clear lines of responsibility among work groups regarding the control of activities affecting reactivity.
- Initial and continuing training programs include a focus on reactivity management fundamentals and issues.
- Human performance error reduction tools are rigorously applied to activities associated with monitoring and controlling reactivity.
- Equipment deficiencies affecting reactivity control or monitoring are resolved in a timely manner.
- Reactivity management performance measures are in place and trends are monitored to prevent events.
- Self-assessments and operating experience are used to strengthen the reactivity management program.

4.2 Proper control and management of reactivity helps to ensure the following:

- Fuel integrity
- Sufficient shutdown margin
- Operations within assumptions in the safety analysis
- Compliance with technical specification
- Reduced challenges to the reactor protection system
- Acceptable core power distributions
- Operation of the plant within acceptable fuel design limits

4.3 Station personnel must be aware of how their actions affect reactivity or the ability to monitor and control reactivity. A questioning attitude and a heightened awareness of reactivity management issues can prevent challenges to the reactor core.

4.4 Strict procedural adherence is essential to the safe operation of the reactor.

4.5 Expected responses to reactivity changes are identified and fully understood prior to any action being initiated that affects reactivity. Reactivity changes are closely monitored to verify the expected magnitude, direction, and effects. During the performance of actions affecting reactivity, appropriate indications are monitored to ensure expected response.

4.6 Licensed operators retain full responsibility for the safe operation of the reactor core at all times. Licensed operators performing reactivity manipulations are dedicated to the task. Distractions are minimized and controlled. Operations personnel remain alert for situations that could affect reactivity and initiate appropriate conservative corrective action as required.

4.7 Reactor core operating parameters shall be maintained within established limits. Any personnel identifying conditions that would challenge an operating limit shall notify the Shift Manager immediately of the condition.

4.8 Licensed operators shall take prompt conservative action to prevent any established operating limit from being exceeded. Licensed operators are authorized to reduce reactor power or trip the reactor.

4.9 Shift Management shall notify operations management of any significant discrepancy between expected and actual reactivity conditions and ensure the discrepancy is appropriately documented.

4.10 Reactivity can be affected by system or component changes or personnel actions that directly or indirectly affect nuclear fuel conditions or environment. Examples of conditions or environments that affect reactivity include the following: (Lists are not all inclusive.)

4.10.1 Reactor Operations

- Departure from Nucleate Boiling parameters (reactor coolant flow and pressure, core temperature)
- Core peaking factors
- Reactor coolant temperature
- Secondary steam flow and pressure
- Feedwater flow and temperature
- Feedwater heater level adjustment
- Fuel placement
- Control rod position
- Fuel enrichment or burnup
- Poison concentration (boron, xenon, and samarium)
- Reactor coolant water chemistry
- Reactor protection system performance
- Chemical and Volume Control System parameters

4.10.2 Fuel Storage

- Spent fuel pool water level, temperature, and chemistry
- Fuel rack storage configuration
- Fuel conditions (enrichment, burnup, physical damage)

5.0 Procedure

5.1 Events that challenge Reactivity Management philosophy shall be reported to the Shift Manager promptly.

5.2 Prior to reactor startup after a refueling, Reactor Engineering shall review changes to nuclear instrumentation and core behavior. Reactor Engineering shall inform Plant Operations of those changes that affect core monitoring and core behavior, and provide appropriate guidance for achieving a conservative, error-free startup.

5.3 Planned plant activities, including testing, maintenance, and operational evolutions, that significantly change reactivity [approximately greater than ±100 pcm or ± 2% RTP], or degrade reactivity control or monitoring, should be reviewed by on-shift Senior Reactor Operators or Reactor Engineering and approved by operations management prior to starting the activity.

5.4 Nuclear Training shall provide Reactivity Management training as identified in job task analyses for the appropriate training programs, and as determined by the curriculum review committees for those training programs.

NOTE

Addenda 3 through 13 provide a summary of good practices and information that incorporate reactivity management philosophy. The elements provided by these addenda should be used by plant personnel to improve reactivity control practices; however, required actions are contained in implementing procedures and Technical Specifications, not in this program procedure. The Reactivity Management review process provides a systematic method to incorporate these elements into the appropriate implementing procedures. In addition, the Reactivity Management elements do not prevent use of more conservative practices.

5.5 The appropriate Reactivity Management elements provided in Addenda 3 through 13 and Reactivity Management philosophy should be used as a primary reference during Reactivity Management reviews.

5.6 RMRB shall notify site organizations of changes or improvements identified during Reactivity Management reviews.

5.7 Reactivity Management Work Activity Levels (RMWAL) are used in the evaluation of work when determining the associated Work Activity Risk. The RMWAL does not directly drive the Work Activity Risk.

5.7.1 The conditions necessary to support the maintenance of many components/systems, with respect to Reactivity Management impact, have been identified, developed, and captured in procedures. In evaluating the Work Risk Assessment, the screener should consider not only the impact of the activity but also existing procedures.

5.7.2 If compensatory measures have been developed, then the Work Risk Assessment should take these measures into consideration and credit should be given for the compensatory actions. These credited compensatory actions, in most cases, will substantially reduce or totally eliminate any Reactivity Management risk associated with the maintenance state.

5.7.3 If procedural guidance does not exist, then the Work Risk Assessment should include compensatory measures to address the Reactivity Management aspects with the appropriate management controls.

5.7.4 The RMWAL communicates to site personnel the actual or potential impact of the work on Reactivity Management **AND** enhances their understanding of the significance of the activity. The RMWAL for affected jobs should be included in the authorized work schedule.

6.0 Reactivity Management Review Board

6.1 The charter of the RMRB is to ensure that the Reactivity Management Program evaluates the best practices of the industry and promotes reactivity management excellence.

6.2 The RMRB should have regular meetings of the core members, typically once per quarter. Members or their designated alternates should attend to review meeting agenda items and provide assessments pertinent to their areas of responsibility.

6.2.1 The following are members of the RMRB:

- Operations Manager – Chairman *
- Nuclear Fuel and Analysis Manager *
- Performance Improvement Manager *
- Maintenance Manager *
- Operations Training Manager
- Systems Engineering Manager
- Licensing Manager
- Work Control Manager

* Member required for board quorum.

6.2.2 The RMRB activities include, but are not limited to, the following:

6.2.2.1 Develop, implement and monitor reactivity management performance indicators.

6.2.2.2 Review the following areas for reactivity events, adverse trends, needed corrective actions or opportunities for Reactivity Management Program improvements:

- plant performance indicators
- condition reports and event trend records
- industry operating experience
- station material condition challenges
- license operator initial and continuing training

6.2.2.3 Review categorization and classification of Reactivity Management Events using Section 6.4.

6.2.2.4 Recommend additional training or qualification for groups that can affect reactivity to improve performance.

6.3 RMRB may direct the Reactivity Management Working Group to perform periodic reviews of the following: (Reference 7.29)

6.3.1 Procedures that potentially affect reactivity, reactivity control, or reactivity monitoring. (Refer to Addendum 1)

6.3.2 Design changes or temporary modifications to systems that potentially affect reactivity, reactivity control, or reactivity monitoring. (Refer to Addendum 2)

6.3.3 Interpretations to the reactivity control, power distribution, instrumentation, limiting safety system settings, or refueling Technical Specifications.

6.3.4 Reactivity Management-related operating experience and vendor information.

6.3.5 Condition Reports for those events involving Reactivity Management issues.

6.4 Reactivity Management Events

6.4.1 In addition to the requirements of Step 6.2, the RMRB will meet as needed to classify and categorize any reported reactivity event or precursor. Reactivity Management Events are normally dispositioned by operations management as outlined in RECM-0001, Reactivity Management Guidelines.

6.4.1.1 At a minimum the following members or designated alternates of the RMRB are required to review and concur with the classification of reported reactivity events.

- Operations Manager – Chairman
- Nuclear Fuel and Analysis Manager
- Performance Improvement Manager
- Maintenance Manager

6.4.2 The following guidance may be used when dealing with Reactivity Management Events or precursors:

6.4.2.1 Any plant condition or question believed to be a reactivity management concern shall be documented in a Condition Report (CR) and become a "pending" condition for review by the respective unit operations manager.

6.4.2.2 The unit operations manager will then review any referred CR and determine whether or not the condition fits the definition of a Reactivity Management Event.

a. If yes, then classify event level in accordance with the level definitions in Step 2.6 and examples in RECM-0001, Reactivity Management Guidelines. Document the classification in the CR.

b. If not, then document a short basis in the CR.

6.4.2.3 The RMRB will review any condition report referred by the chairman of the RMRB and determine whether or not it agrees with Operations Management's assessment of the reactivity management event.

6.4.2.4 The RMRB will document the conclusions of the review in the CR.

6.4.2.5 Operations Management will make any final reactivity management classifications based on RMRB input and recommendations.

6.4.3 RECM-0001, Reactivity Management Guidelines, should be used to assist in classifying events as "Level 1", "Level 2", "Level 3", "Level 4" or "Level 5" Reactivity Management Events that challenge plant/personnel safety, radiological safety, plant reliability or reactivity management.

6.4.4 A failure to resolve repetitive lower level events may be classified as a higher-level event as determined by the RMRB Chairman, e.g., repetitive unresolved Level 2 events may be classified as a Level 1 event.

6.4.5 All Reactivity Management Events shall be documented in accordance with 0PGP03-ZX-0002, Condition Reporting Process

6.4.6 Reactivity Management Events shall be categorized as one of the following causes:

- Equipment malfunction
- Procedure/process problem
- Human error

7.0 References

7.1 0PGP03-ZA-0506, "Tests or Evolutions Requiring Additional Controls"

7.2 Precautions, Limitations, and Setpoints for Nuclear Steam Supply Systems, STP Specification 5Z010ZS1101

7.3 Policy Number O-0017, "Reactivity Management", Operations Policies and Practices, Rev. 2, pages 10, 11

7.4 INPO SOER 88-02, "Premature Criticality Events During Reactor Startup"

7.5 INPO SOER 90-03, "Nuclear Instrumentation Miscalibration"

7.6 INPO SOER 91-02, "Infrequently Performed Tests or Evolutions"

7.7 INPO SOER 94-01, "Non-conservative Decisions and Equipment Performance Problems Result in a Reactor Scram, Two Safety Injections, and Water-Solid Conditions"

7.8 INPO SOER 94-02, "Boron Dilution Events in Pressurized Water Reactors"

7.9 INPO SOER 96-01, "Control Room Supervision, Operational Decision-Making, and Teamwork"

7.10 INPO SOER 96-02, "Design and Operating Considerations for Reactor Cores"

7.11 INPO SER 91-025, "Inadequate Analysis of Unexpected Neutron Flux Indications"

7.12 INPO SER 93-014, "Inappropriate Blocking of Safety Injection During an Overcooling Transient"

7.13 INPO SER 95-013, "Reactivity Excursion During Low Power Reactor Physics Testing"

7.14 INPO SER 96-015, "Inappropriate Operator Actions During Low-Power Operations"

7.15 INPO SER 97-09, "Unrecognized Reactivity Mismanagement During a Reactor Shutdown"

7.16 INPO 89-007, "Material for a Case Study on Reactivity Mismanagement"

7.17 INPO 91-008, "In-reactor Fuel-damaging Events, A Chronology 1945 - 1990"

7.18 NSAC 183, "Risk of PWR Inadvertent Criticality During Shutdown and Refueling"

7.19 INPO 87-015, "Control Rod Mispositioning and Reactivity Events"

7.20 OTH 93-160, "Waterford 3 Unexpected Boron Dilution Following Boration with RCP's Secured"

7.21 SPR 91-0326, "Incorrect Alignment of Unit 1 Nuclear Instrumentation Due to Use of Outdated Reactor Performance Data"

7.22 SPR 92-0128, "Unit 1 Excessive RCS Cooldown Event"

7.23 SPR 92-0588, "Unmonitored Dilution of the Unit 1 Spent Fuel Pool"

7.24 SPR 93-0582, "Unit 2 BTRS Dilution of the RCS"

7.25 SPR 93-2154, "Inoperability of Both Shutdown Monitors NY-45 and NY-46"

7.26 CR 95-10015, "Reactor Power Transient Caused by the Boron Thermal Regeneration System Being Operated to Deborate the Reactor Coolant System for too Long"

7.27 CR 98-446, "RCS Deboration Causing Reactor Power and Tavg Increase following Component Cooling Water Pump Surveillance Testing"

7.28 INPO 06-006, Guidelines for Effective Reactivity Management

7.29 RECM-0001, Reactivity Management Guidelines

7.30 0PGP03-ZO-0035, RCS Reduced Inventory Operations

7.31 0PGP03-ZO-0047, Fuel Assembly and Fuel Insert Transfer Program

7.32 UFSAR Section 4.3.2.6.2.1

7.33 UFSAR Section 4.3.2.6.3

7.34 UFSAR reference 4.3-41 Lesko, J. R., et. al., "South Texas Units 1 and 2 Spent Fuel Rack Criticality Analysis with Credit for Soluble Boron," Westinghouse Commercial Nuclear Fuel Division, May 1998. Attachment to Letter ST-UB-NOC-1803, J. P. Sechrist, WCNFD, to D.F. Hoppes, STPNOC, dated May 22, 1998.

7.35 PA-PSC-0578, PWROG Program, Reactivity Management Performance Indicator, Revision 1, September 2009.

8.0 Support Documents

8.1 Addendum 1, Reactivity Management Procedures

8.2 Addendum 2, Reactivity Management Systems

8.3 Addendum 3, Reactivity Management Elements - Reactor Shutdown

8.4 Addendum 4, Reactivity Management Elements - Reactor Startup

8.5 Addendum 5, Reactivity Management Elements - Power Ascension

8.6 Addendum 6, Reactivity Management Elements - RCS Loops Not Filled and Level Below Vessel Flange (Fuel in Vessel)

8.7 Addendum 7, Reactivity Management Elements - Core Refueling

8.8 Addendum 8, Reactivity Management Elements - Rapid Refueling Rod Lockout

8.9 Addendum 9, Reactivity Management Elements - Fuel Handling and Storage

8.10 Addendum 10, Reactivity Management Elements - Planned Reactivity Changes

8.11 Addendum 11, Reactivity Management Elements - Off Normal Operations

8.12 Addendum 12, Reactivity Management Elements - Post-Refueling Initial Startup

8.13 Addendum 13, Reactivity Management Elements – Other

0PGP03-ZA-0101	Shutdown Risk Assessment
0PGP03-ZO-0047	Fuel Assembly and Fuel Insert Transfer Program
0PSP03-CV-0014	CVCS Equipment Verification
0PSP03-RI-0001	Digital Rod Position Indication Operability Test
0PSP03-RS-0001	Monthly Control Rod Operability
0PSP03-NI-0001	Power Range NI Channel Calibration
0PSP10-DM-0001	Rod Drop Time Measurement
0PSP10-DM-0003	Automatic Multiple Rod Drop Time Measurement
0POP02-AS-0001	Auxiliary Steam System
0POP02-BR-0001	Boron Recycle System Operations
0POP02-CV-0001	Makeup to the Reactor Coolant System
0POP02-CV-0002	Boron Thermal Regeneration System
0POP02-FC-0001	Spent Fuel Pool Cooling and Cleanup System
0POP03-ZG-0001	Plant Heat-up
0POP03-ZG-0004	Reactor Startup
0POP03-ZG-0005	Plant Startup to 100%
0POP03-ZG-0006	Plant Shutdown from 100% to Hot Standby
0POP03-ZG-0007	Plant Cooldown
0POP03-ZG-0008	Power Operations
0POP03-ZG-0009	Mid-Loop Operation
0POP03-ZG-0010	Refueling Operations
0POP03-ZG-0012	Rapid Refueling Rod Lockout Operations
0POP04-AC-0003	Loss Of Closed Loop Auxiliary Cooling Water
0POP04-CD-0001	Loss of Condensate Flow
0POP04-CR-0001	Loss of Condenser Vacuum
0POP04-CV-0003	Emergency Boration
0POP04-CW-0001	Loss of Circulating Water Flow
0POP04-FC-0001	Loss of Spent Fuel Pool Level or Cooling
0POP04-FC-0002	Refueling LOCA
0POP04-FH-0001	Fuel Handling Accident
0POP04-FW-0002	Steam Generator Feed Pump Trip
0POP04-MS-0001	Excessive Steam Demand
0POP04-NI-0001	Nuclear Instrument Malfunction
0POP04-OC-0001	Loss of Open Loop Auxiliary Cooling Water
0POP04-RC-0006	Shutdown LOCA
0POP04-RC-0008	Boron Dilution Event
0POP04-RS-0001	Control Rod Malfunction
0POP04-TM-0001	Turbine Load Rejection
0POP04-TM-0005	Fast Load Rejection
0POP05-EO-ES01	Reactor Trip Response

0POP07-RS-0001	Control Rod Exercise
0POP08-FH-0001	Refueling Machine Operating Instruction
0POP08-FH-0002	Fuel Handling Machine
0POP08-FH-0009	Core Refueling
0POP08-FH-0010	Uncoupling of Control Rods
0POP08-FH-0011	Coupling of Control Rods
0PEP02-RS-0001	Control Rod Axial Repositioning
0PEP02-ZM-0005	Internal Transfer of Fuel Assemblies
0PEP02-ZG-0008	Estimated Critical Position Calculation
0PEP02-ZX-0002	Initial Criticality and Low Power Testing
0PEP02-ZX-0010	Reload Initial Startup Testing
0PMP07-DM-0003	Rapid Refueling Rod Holdout Operation
0PMP08-RS-0001	Control Rod Drive Mechanism Timing Test
0PSP05-NI-0031/32	Source Range Neutron Flux Channel Calibrations
0PSP05-NI-0035/36	Intermediate Range Neutron Flux Channel Calibrations
0PSP05-NI-0041/42/43/44	Power Range Neutron Flux Channel Calibrations
0PSP05-NI-0041A/42A/43A/44A	NIS Axial Flux Difference Calibrations
0PSP02-NI-0040	Power Range Channels N-0041, N-0042, N-0043 and N-0044 Overpower Trip High Range Setpoint Adjustment
0PSP02-NI-0050	Nuclear Instrumentation Startup and Physics Testing ACOT
0PSP05-NI-0045/46	Extended Range Neutron Flux Channel Calibrations
0PSP05-NI-0045A/46A	Extended Range NI Full Power Alignment

Nuclear Instrumentation (NI)
Incore Instrumentation (II) - MIDS, CET's, RVWL
Reactor Coolant System (RC)
Chemical and Volume Control (CV)
Boron Thermal Regeneration (BTRS)
BR (Boron Recycle System)
Reactor Makeup Water (RMW)
Demineralized Water (DW)
Rod Control (RS)
Rod Position Indication (RI)
Reactor Protection (SP)
Fuel Handling and Fuel Storage Racks (FH)
Spent Fuel Pool Cooling and Cleanup (FC)
Reactor Vessel (RX)
Safety Injection (SI)
Residual Heat Removal (RH)
Plant Computer (CU)
Feedwater (FW)
Main Steam (MS)
Power Distribution Monitoring System (BEACON)

1.0 Margin to criticality should be preserved when RCCA's are withdrawn for reasons other than an approach to criticality evolution. This can be achieved by boration of the RCS to prevent Keff from increasing above 0.99.

2.0 Evolutions which decrease or have the potential to decrease RCS boron concentration by more than 10 ppm should include periodic boron sampling to confirm the expect results. Examples include chemical addition to the RCS, addition of water to the RCS during a planned dilution prior to reactor startup, and placing CVCS/BTRS demineralizers into service.

3.0 Borate to the appropriate xenon-free SDM boron limit prior to initiating a plant cooldown from the Mode 3 normal operating temperature band.

4.0 Minimize the use of xenon-credit in SDM calculations.

5.0 Do not take credit for samarium build in after shutdown/trip in operational and design SDM calculations.

6.0 Daily RCS boron concentration measurements are required to verify shutdown margin.

7.0 An audible count rate from source range nuclear instrumentation shall be available to the reactor operators in the control room. If an audible count rate is not available, then initiate monitoring of neutron count rate or borate the RCS to the cold, ARO, 0.95 Keff value, and increase RCS boron concentration sampling frequency.

8.0 Increased monitoring of source range NI's should be conducted during conditions or evolutions affecting reactivity.

9.0 The RCS should be borated above the required shutdown margin value by at least 25 ppm to increase boron dilution margin.

10.0 Following a reactor trip, the BTRS should be secured and isolated to prevent inadvertent dilution of the RCS (Reference 7.2).

11.0 Only one operator-controlled source of positive reactivity shall be added at a time, except that a heatup and dilution OR a heatup and rod motion may be performed concurrently in Modes 3, 4, and 5.

12.0 The minimum analyzed RCS temperature is 68°F with fuel in the reactor vessel.

13.0 Rapid Boron Dilutions - sudden addition of a volume of boron-free or nearly boron-free water into the core region. These events can cause core damage (Reference 7.8).

13.1 Possible event initiators:

- Injecting a diluted tank volume of water (e.g., from inadvertent dilution of VCT, SI accumulators, or RWST) into the RCS
- Start of a RCP and subsequent injection of a water slug into the core, e.g., following SG, RCS piping, or CVCS maintenance
- Refueling cavity draindown with cavity wall wash down
- Boration after shutting off RCP's
- Loss of AC power during an RCS dilution operation
- SG tube leak/rupture and subsequent backfill cooldown
- Leaking RCP thermal barrier

13.2 Mitigative actions:

- Identify activity/event initiators, and use Reactivity Management practices
- Sample tanks during or after filling operations
- Sample RCS piping prior to RCP start; local grab samples may be required
- If low boron concentrations are observed, drain and refill with borated water
- Monitor nuclear instrumentation
- If drain and refill is not an option, develop a conservative action plan to mitigate a reactivity transient. The plan may include emergency boration and alternate drain/refill strategies.
- If a rapid dilution is detected, insert control rods and emergency borate

1.0 Following extended plant shutdowns (> 30 days with no refueling), the accuracy of estimated critical condition calculations (ECC's) should be compared against core design predictions prior to reactor startup.

2.0 Following each reactor startup, the accuracy of ECC's should be assessed by Reactor Engineering to determine if any changes in methodology are required.

3.0 ECC's are only an estimate of critical conditions of the reactor at a given period in time; they shall be used as a reference only, not a strict target. Criticality must be anticipated at any time during control bank withdrawal or dilution for an approach to criticality evolution.

4.0 Inverse count rate ratio (ICRR or "1/M") plots shall be used during every reactor startup.

5.0 Do not dilute and withdraw control rods simultaneously below the point of adding nuclear heat or during an approach to criticality.

6.0 The Reactor Operator and the Shift Technical Advisor or Reactor Engineer should not be distracted during the approach to criticality.

1.0 Compare alternate indications of reactor power versus NI indications to prevent non-conservative Hi flux reactor trip settings and prevent exceeding the licensed power level. Alternate indications include average RCS loop ΔT, plant computer calorimetric estimates, turbine impulse pressure, and turbine-generator load.

2.0 Due to the importance of nuclear instrumentation calibration on reactor protection, initial and subsequent adjustments of power range NI gains shall be reviewed and approved by the Unit Supervisor or Shift Manager. Unusually large gain adjustments in the non-conservative direction (adjusting NI indication downward by more than 2%RTP) should be reviewed by the Shift Technical Advisor or Reactor Engineer prior to making the adjustment.

3.0 Observe and review expected indications of RPS interlocks, setpoints, and alarms, e.g., P-8/P-9/P-10, IR NIS trip bistables, QPTR alarm, and AFD penalty monitor, to identify potential miscalibrations.

4.0 Observe fuel and RCCA pre-conditioning requirements and approved power ramp rates.

5.0 Changes in Tavg, axial and radial power distribution, and control bank position affect the accuracy of excore NI detectors; the reactor should be stabilized and the Power Range NI's calibrated if indicating non-conservatively (NI's indicate lower than calorimetric estimates) by more than 2% RTP.

6.0 After refueling outages or extended outages (> 30 days), inputs to the plant computer calorimetric estimates shall be reviewed to ensure accuracy has not been degraded.

1.0 RCS Level Below Vessel Flange with Fuel in Vessel

1.1 When RCS level is lowered below the reactor vessel flange, the safety margin for boron dilution and loss of shutdown cooling events is reduced.

- The time RCS level is below the reactor vessel flange should be minimized.

- When RCS level is lowered to greater than 3 feet below the reactor vessel flange, additional plant operational restrictions are provided in 0PGP03-ZO-0035, RCS Reduced Inventory Operations.

1.2 Activities affecting the control and monitoring of reactor vessel inventory, boron concentration, subcritical multiplication, and decay heat removal shall be strictly controlled.

1.3 All RCCA's should be fully inserted. If this can not be achieved due to preparations for a rapid refueling reactor vessel head movement evolution, then the time that RCCA's are withdrawn should be minimized.

1.4 Maintain RCS boron concentration greater than the cold, ARO, 0.95 Keff value during mid-loop operations.

1.5 At least two source range NI detectors (N31, N32, N45 or, N46) should be operable during reduced inventory operations. It is preferable to have both N45 and N46 operable, and at least N31 or N32 which provide an audible count rate in the control room.

2.0 RCS Loops Not Filled with Fuel in Vessel

2.1 RCS dilution paths must be isolated when RCS is in a "LOOPS NOT FILLED" condition.

1.0 All fuel and core component movements, which are considered CORE ALTERATIONS, shall be reviewed by a Reactor Engineer and approved by the on-duty Core Loading, Unit Supervisor, or Shift Manager.

2.0 Upon replacing the reactor vessel head on the vessel flange (with fuel present) after a rapid refueling head removal, the RCCA's should be expeditiously unlocked and inserted prior to the first stud tensioning pass.

3.0 A core inventory verification shall be performed after each core reload or in-core shuffle. Fuel assembly (F/A) identification shall be verified against an approved core loading pattern by two individuals. Fuel insert types shall also be verified, if they were not identified in the upender during reload in accordance with 0POP08-FH-0009 (Core Refueling).

4.0 For core reload following a full core offload, the first set of F/A moves should be used to verify response of the TS 3.9.2 source range NI's.

5.0 STP fuel misplacement events have occurred in the SFP during core offload; therefore, the following FHB controls should be implemented for core offload:

5.1 SFP fuel placement verifier should not be overburdened with collateral duties.

5.2 The fuel handler on the FH Machine should be in direct communication with the control room.

5.3 The fuel handler, prior to lowering and prior to unlatching the F/A, should directly observe the SFP rack index marks, then read off the marks to the control room for verification.

5.4 The fuel handler, prior to lowering and prior to unlatching the F/A, should also obtain verification from the SFP fuel placement verifier.

6.0 F/A identification and contained insert type should be checked against the approved core loading plan prior to transfer into containment during core reload.

7.0 The reactor cavity, refueling canal, SFP, and FHB transfer canal boron concentration shall be maintained at greater than the TS 3.9.1 required value.

8.0 The FHB and RCB upenders use demineralized water as a hydraulic fluid; leaking underwater tubing connections or seals should be recognized as a dilution source.

9.0 Controls shall exist to prevent fueling a more reactive condition than previously analyzed when placing a F/A in a core location other than defined by the approved core loading pattern. It is possible for two fresh and unpoisoned fuel assemblies at 4 wt. % U235 enrichment to become critical if they are placed adjacent to each other in the reactor vessel at 0 ppm boron concentration (Reference 7.18).

10.0 During reactor cavity draindown following core reload, the potential exists for introducing low boron concentration water into the RCS from decontamination activities. This can be a significant positive reactivity insertion (Reference 7.18) and degradation of shutdown margin. Therefore, the following controls shall exist during cavity draindown:

10.1 The addition of unborated water to the refueling cavity shall be authorized by a licensed senior reactor operator to minimize the amount of RCS dilution.

10.2 At least two source range NI detectors (N31, N32, N45, or N46) shall be operable with at least one providing an audible count rate in the control room.

10.3 Monitor neutron count rate during reactor cavity draindown.

10.4 Measure boron concentration at the surface level of the refueling cavity prior to and during cavity draindown.

11.0 Coupling and uncoupling of control rods shall be performed using dual verification methods.

12.0 RCS dilution paths shall be isolated in Mode 6.

1.0 Rapid refueling rod lockout operations with the reactor vessel head installed and fuel present require the following controls:

1.1 RCS dilution paths shall be isolated.

1.2 RCS is borated to greater than the cold, ARO, 0.95 Keff value.

1.3 Equipment necessary to allow unlocking and re-insertion of RCCA's must be functional.

1.4 If all source range NI detectors (N31, N32, N45, and N46) are nonfunctional, the RCCA's should be re-inserted into the core.

1.5 RCS boron sampling frequency should be increased to at least once per 12 hours (TS 3.1.1.1).

1.6 Time in this condition should be minimized.

1.0 Verification (dual or independent) of fuel assembly (F/A) and core component placement is required per 0PGP03-ZO-0047, Fuel Assembly and Fuel Insert Transfer Program.

2.0 Fuel assembly movements require an approved fuel transfer form (FTF). The FTF shall be directly referred to during F/A placement activities.

3.0 A SFP level increase can be an indication of an inadvertent dilution.

4.0 SFP boron concentration should be sampled at least once per seven days to detect inadvertent dilutions.

5.0 The minimum analyzed water temperature in the SFP or ICSA is 50°F. A lower limit of 60°F is used to provide a margin above our analyzed limit. (Ref. 7.32, 7.33 & 7.34)

6.0 The addition of unborated water to the spent fuel storage areas shall be approved by a licensed senior reactor operator to minimize dilution.

7.0 Controls shall exist to prevent an unanalyzed F/A storage configuration in the spent fuel pool storage racks, in-containment storage area, and new fuel vault.

1.0 Pre-evolution briefings should be performed prior to non-routine tasks with potential to change reactivity, or degrade reactivity control or monitoring systems. These briefings should discuss available nuclear instrumentation, expected results, primary and backup indications of reactor power or subcritical multiplication, and any applicable lessons learned.

2.0 Operation of mechanisms, temporary modifications, or test equipment which may indirectly affect reactivity or reactor power level shall be accomplished with the knowledge and approval of an on-duty licensed operator.

3.0 Boron concentration analyses should be used as an available plant indication to confirm the results of intended boron concentration changes to the RWST, SI Accumulator, BAT, SFP, or RCS.

4.0 Reactivity changes should be closely monitored using available reactor power or subcritical multiplication indications; the reactor controls should not be left unattended.

5.0 Reactivity changes should be properly supervised by a SRO.

6.0 At least one RCP should be in service with a minimum of one pressurizer spray open when changing boron concentration (dilution or boration) until the desired boron concentration is reached and verified by periodic sampling.

- With no RCP's running and RHR in service, the active RCS mixing volume is reduced by approximately 50%, and mixing in the steam generator U-tubes is reduced or nonexistent.

- This will provide a larger mixing volume and therefore reduce the reactivity change for a specific amount of water added to the RCS. In addition, this can mitigate dilutions during startup of unmixed portions of the RCS.

1.0 Fuel Mishandling

1.1 Fuel assembly (F/A) misplacement has the potential to invalidate the criticality analysis or reload safety evaluation. Any F/A misplacement event shall be considered a Reactivity Management challenge and appropriate controls must be in place prior to resuming F/A movement.

1.2 A misplaced F/A which violates core loading reactivity controls or TS 5.6.1 requirements should be moved to a safe storage location.

1.3 Misplacement of a F/A during a fuel transfer evolution requires restart permission from the Shift Manager, Reactor Engineering Supervisor, and Plant General Manager.

2.0 Dropped/Misaligned/Stuck RCCA's

2.1 If two or more RCCA's drop in Modes 1 or 2, then the reactor shall be manually tripped.

2.2 If two or more RCCA's are misaligned by greater than ±12 steps in Modes 1 or 2, then a reactor shutdown is required per technical specifications.

2.3 If one RCCA is dropped or misaligned by more than ±12 steps, then reactor power should be reduced to less than 75% RTP prior to recovery. Further reactor power reductions and RCCA recovery controls may be required depending on RCCA misalignment duration. These controls are established in 0POP04-RS-0001 to mitigate localized power peaking and potential fuel damage during RCCA recovery.

3.0 Nuclear Instrumentation

3.1 Increase RCS boron sampling frequency to at least once per 12 hours when either N45 or N46 shutdown monitors are inoperable in plant Modes 3, 4, or 5.

3.2 If both N45 and N46 shutdown monitors are inoperable in plant Modes 3, 4, or 5, then appropriate RCS dilution paths should be isolated (in addition to item 3.1 above and applicable TS actions) (Reference 7.25).

3.3 During reactor shutdown conditions (Modes 3, 4, and 5) with only one source range NI channel operable, i.e., N31 or N32 or N45 or N46, the RCS should be borated to greater than the cold, ARO, 0.95 Keff boron concentration value.

4.0 RCS Cooldown Events

4.1 Reactor Subcritical

- Inadvertent or unanticipated RCS cooldowns can reduce shutdown margin and therefore should be promptly secured. The cooldown could cause a rapid return to power.

- The reactor operator should ensure RCS boron concentration is increased as necessary to maintain the required shutdown margin boron concentration; emergency boration is the preferred method until the RCS cooldown is secured.

4.2 Approach to Criticality - If Tavg decreases to ≤ 561°F, the startup should be terminated by opening the reactor trip breakers, borating the RCS to maintain the required shutdown margin boron concentration, and promptly terminating the cooldown.

4.3 Reactor Critical

- Do not add positive reactivity by dilution or control rod withdrawal during an unplanned RCS cooldown below the point of adding nuclear heat.

- With a negative temperature coefficient of reactivity, a RCS cooldown will cause reactor power to increase. The reactor operator shall prevent exceeding the licensed power level during a cooldown event and should not block NI reactor trip functions, i.e., a power excursion due to an RCS cooldown will be mitigated by the low power reactor trips if they are not blocked when operating below the P-6 or P-10 permissive setpoints.

- NI's will indicate lower than actual reactor power due to cooler water (denser) in the reactor vessel downcomer - neutron leakage will decrease due to increased shielding between the fuel and the detectors.

5.0 Rod Position Degradation

5.1 If more than one digital rod or demand position indicator per bank does not meet the operability requirement of TS 3.1.3.2, then a reactor shutdown is required.

5.2 Axial and radial power distribution should be closely monitored when reactor power is reduced during degraded rod position indication or misaligned RCCA conditions.

6.0 Rapid Down Power Transients

- During a fast turbine load reduction or rejection, nuclear instrument indications of reactor power (power/intermediate/extended range NI's) will be lower than actual reactor power. This is primarily due to decreased neutron leakage to the excore detectors caused by denser vessel downcomer water and deeper control rod insertion (rod shadowing).

- The magnitude of the rod "shadowing" effect is dependent on control rod position and axial geometry of the detector. For example, the Intermediate Range NI's should experience a greater effect due to Control Bank C insertion.

- Following the down power transient, the reactor should be stabilized and the Power Range NI's calibrated if indicating non-conservatively (NI's indicate lower than calorimetric estimates) by more than 2% RTP.

7.0 Xenon oscillations mainly result in changes to axial power distribution as indicated by NI axial flux difference ("ΔI") instrumentation. Significant axial power oscillations can cause local F/A power peaking that could result in fuel rod damage. Initial startup tests at STP have determined that xenon oscillations are divergent (amplitude increases with no operator action) but controllable using rod movement. To mitigate a divergent axial xenon oscillation, reactor operators should maintain ΔI within a target band as prescribed by Constant Axial Offset Control methodology and TS 3.2.1. Control banks, Tavg, and reactor power changes may be used to control axial power distribution. (Reference 7.7).

8.0 Do not block ESF or RPS actuation's during off normal plant conditions, e.g., inadvertent RCS cooldown or depressurization, unless per an approved plant procedure. (Reference 7.12).

9.0 Do not become over-reliant on reactor protection or engineered safeguard systems during plant transients and other events involving reactivity changes. Although these safety systems are designed to automatically mitigate accident consequences, operator action should be taken prior to reaching an actuation setpoint to preserve margin of safety and reduce the consequences of an event.

1.0 Low power physics testing per 0PEP02-ZX-0002, Initial Criticality and Low Power Physics Testing, shall be conducted using 0PGP03-ZA-0506 controls.

2.0 Power range NI Hi Flux trip setpoints shall be reduced to less than 85% until a reactor power calorimetric is satisfactorily performed between 25% and 30% RTP.

3.0 The NI pre-alignment process shall consider the predicted reactor core leakage characteristics.

4.0 The predicted Intermediate Range NI Flux trip setpoint shall include 2.5 %RTP conservatism.

5.0 Reactor engineers, licensed operators, and shift technical advisors shall be trained on changes that affect core monitoring and reactor core behavior (i.e., information required by Step 5.2) (Reference 7.9).

- For reactor engineers, the training shall be completed prior to initial criticality on the new reactor core.
- For licensed operators and shift technical advisors, the training shall be completed prior to assuming Modes 1 and 2 ("at-power") Control Room duties on the new reactor core.

6.0 The new reactor core shall be carefully monitored to ensure compliance with technical specifications and design review criteria. Until the reactor core has been fully tested by completion of 0PEP02-ZX-0010, unexpected reactor response shall be resolved with a conservative action plan.

1.0 CVCS, BTRS, and FC demineralizer status shall be maintained with respect to saturated boron concentration level. Placing a demineralizer into service has the potential to significantly change RCS or SFP boron concentration.

2.0 Reactor operators should anticipate the possibility of unexpected control rod movement whenever maintenance is being performed on the rod control system.

3.0 The opening of the RCS and connecting systems shall be strictly controlled to prevent the introduction of foreign or loose objects into the reactor vessel. The refueling cavity and Spent Fuel Pool are considered connected systems. Debris inside the reactor vessel is the most common cause of fuel cladding failure ("leakers").

4.0 Valving in previously unused primary fluid systems which can communicate with the RCS have the potential for changing boron concentration.

5.0 Changes in CVCS letdown temperature have the potential to change RCS boron concentration when the CVCS demineralizers are in service, and thereby cause a reactor power/temperature transient. When performing evolutions which potentially change CVCS letdown temperature, temporary bypass of the CVCS demineralizers should be considered prior to starting the evolution (Reference 7.27).

6.0 Excessive or continuous control rod withdrawal during reactor core operation (at any reactor power level) has the potential to cause fuel cladding damage (Reference 7.14).

- During reactor core operation in Modes 1 and 2, a large number of rod withdrawal steps over a short time period, or sustained continuous rod withdrawal, should be avoided unless specifically allowed by an approved procedure, for example, rod worth or rod exercise testing.

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE:	Respond to FHB Rad Monitor Alarm
JPM NO.:	S2
REVISION:	2
LOCATION:	Simulator

JOB PERFORMANCE MEASURE INFORMATION SHEET

JPM Title:	Respond to FHB Rad Monitor Alarm
JPM No.:	S2
Rev. No:	2
STP Task:	T86200, Respond to Radiation Monitoring System Alarms
STP Objective:	CRO-86203, Determine the cause of the high radiation and take corrective action
Related K/A Reference:	072.A3.01, Ability to monitor automatic operation of the ARM system, including: Changes in ventilation alignment. (2.9/3.1)
References:	0POP04-RA-0001, Radiation Monitoring System Alarm Response, Rev. 27
Task Normally Completed By:	RO
Method of Testing:	Actual Performance
Location of Testing:	Simulator
Time Critical Task:	No
Alternate Path JPM:	Yes
Validation Time:	10 min.

Required Materials (Tools/Equipment): None

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: **Do not operate or alter equipment configuration in the plant without proper authorization.**

INITIAL CONDITIONS:

The Unit is operating at 100% power. Fuel shuffling is being performed in the Spent Fuel Pool in anticipation for receipt of new fuel.

INITIATING CUE:

An alarm has come in on Rad Monitor Panel RM-11. The Unit Supervisor directs you to investigate the Rad Monitor that's in an alarm condition in accordance with 0POP04-RA-0001, Radiation Monitoring System Alarm Response, and take appropriate action.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

Places the Fuel Handling Bldg. HVAC in Emergency Mode in accordance with 0POP04-RA-0001, Radiation Monitoring System Alarm Response

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

Simulator copy of 0POP04-RA-0001, Radiation Monitoring System Alarm Response

NOTES:

This JPM is formatted for dynamic simulator performance only. The cues provided are related to communications and other general information needed for dynamic performance. (No indication type cues are provided.)

SIMULATOR SETUP

1) JPMs S1 and S2 are to run together. The following steps will set up the simulator for **BOTH** JPMs.

2) Ensure Radio volume for both stations are set to a reasonable level.

3) Ensure the PA buttons on the communications consoles are taped to help eliminate usage.

4) Ensure a clean notepad is available for student use

5) Reset to IC# 215 and verify:
   - Step counter position annunciator light is out on CP-0005
   - Red light at the end of CP-010 is out.

6) Check and clean the following procedures (JPM specific):
   - 0POP04-RS-0001, Control Rod Malfunction
   - 0POP04-RA-0001, Radiation Monitoring System Alarm Response
   - Conduct of Operations - available
   - Clean JPM handout copy of PGP03-ZO-0042, Reactivity Management Program, with applicable sections highlighted <u>and flagged</u> - available

7) Place simulator in run. Silence/acknowledge /reset alarms as appropriate.

ADDITIONAL INSTRUCTIONS ON NEXT PAGE

JOB PERFORMANCE MEASURE INFORMATION SHEET

8) Verify the following:

- RT-8035 is in alarm (RM11)
  INSTRUCTOR NOTE: The desired condition for the RM-11 is to have the audible alarm acknowledged and the RT-8035 icon should be red and preferably flashing. If it is not flashing, that's OK as well. Sometimes the Storepoint may not reset to a flashing alarm icon.
  Check no other RM-11 alarms are in.
- FHB HVAC Exhaust Dampers Closed and in AUTO
- ICS display of rod position is called up on an RO monitor <u>and</u> monitor is rotated to face CP-005.

  – The screen is accessed by clicking on the "Custom Graphics" arrow, then selecting the "RS" group (may have to select "Top Level Menu" first), then selecting the "RS-001 CONTROL ROD BANK POSITIONS" screen.

9) Place the simulator in "FREEZE" until the examiners are ready to proceed.

10) Simulator Lesson Plan.

- There is no simulator lesson plan for S1 or S2.

INSTRUCTOR ACTIONS

None

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME __________

SAT/UNSAT Performance Step: 1

Obtain the procedure.

Standard:

Obtains a copy of 0POP04-RA-0001, Radiation Monitoring System Alarm Response.

Comment:

The applicant should use the simulator copy of 0POP04-RA-0001, Radiation Monitoring System Alarm Response.

Cue:

If asked, another operator is performing steps in 0POP04-FH-0001, Fuel Handling Accident.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2 **(C*)**

Investigates the alarm on the RM-11. (procedure steps 1-4)

Standard:

- ** Determines RT-8035 is in alarm (Alert or High)*
- *Calls up a Trend and Status display for RT-8035*
- *Goes to Addendum 10 of the procedure (RT-8035 and RT-8036 FHB Response)*

* Denotes critical portion of the step

Comment:

Per a procedure NOTE, the initial actions before going to Addendum 10 are considered skill of the craft and may be performed before entering the procedure.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 3

Check High alarm exists on RT-8035 or RT-8036. (addendum 10, step 1)

Standard:

Determines a High Alarm exists on RT-8035

Comment:

Cue:

Notes:

SAT/UNSAT Performance Step: 4

Check FHB HVAC operating in Emergency Mode. (addendum 10, step 2)

Standard:

Determines FHB HVAC is NOT operating in Emergency Mode and goes to procedure Addendum 28.

Comment:

The candidate will have to evaluate the FHB HVAC status on Control Room Panel CP-022 to determine the system is not operating in Emergency Mode.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 5 **(C)**

Open the Inlet Isolation Damper for one FHB Exhaust Filter Train to be placed in service. (addendum 28, step 1)

Standard:

Opens FV-9549 (Train 'A') or FV-9549A (Train 'B')

Comment:

- Only one Filter Train is to be placed into service per the procedure.
- Note which Train is being placed in service at this step as this information will be used to evaluate subsequent JPM steps.

Cue:

If asked which filter train to place in service, as the Unit Supervisor, indicate that you have no preference.

Various alarms will come in and clear on the panel where the candidate is performing procedure steps. If the student wishes to consult Annunciator Response procedures, inform him/her that can be done for any alarms still present after all steps have been completed.

Notes:

SAT/UNSAT Performance Step: 6

Ensure two FHB Main Exhaust Fans are running. (addendum 28, step 2)

Standard:

Ensures two FHB Main Exhaust Fans are running

Comment:

Two Exhaust Fans are normally in service.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

<u>SAT/UNSAT</u> Performance Step: 7 **(C)**

Start two FHB Exhaust Booster Fans. (addendum 28, step 3)

Standard:

Starts two FHB Exhaust Booster Fans

Comment:

Any two booster fans may be started:

- EXH BOOSTER FAN 11A
- EXH BOOSTER FAN 11B
- EXH BOOSTER FAN 11C

Cue:

Notes:

<u>SAT/UNSAT</u> Performance Step: 8 **(C)**

Place the FHB Exhaust Flow Controller in Manual and manually close outlet damper for the Exhaust Filter train NOT being placed in service. (addendum 28, step 4)

Standard:

Places the controller in "Manual" using the Manual/Auto button and depresses the CLOSE button until the exhaust air damper is closed for the Exhaust Train NOT being placed in service.:

- *Train 'A' - HV-9507*
- *Train 'B' - HV-9507A*

Comment:

The controller placed in Manual and Closed should <u>be the opposite</u> of the train whose Inlet Isolation Damper was opened in JPM step 5.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 9 **(C)**

Place the FHB Exhaust Filter Train Outlet Damper in the AUTO after MOD position for the Exhaust Filter Train being placed in service. (addendum 28, step 5)

Standard:

Places the FHB Exhaust Filter Train Outlet Damper control in the MOD position and then returns the switch to AUTO on the Exhaust Train to be placed in service:

- *Train 'A' - HV-9507*
- *Train 'B' - HV-9507A*

Comment:

The FHB Exhaust Filter Train Outlet Damper should be in the same Train as JPM step 5 and the opposite train selected in JPM step 8.

Cue:

Notes:

SAT/UNSAT Performance Step: 10 **(C)**

Close both FHB Exhaust Filter Bypass Dampers. (addendum 28, step 6)

Standard:

Closes FHB Exhaust Filter Bypass Dampers FV-9549D and FV-9549C

Comment:

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 11

Ensure the FHB Exhaust Air Flow Controller for the train placed in service modulating to maintain flow between 26,100 and 31,900 CFM. (addendum 28, step 7)

Standard:

Determines the FHB Exhaust Air Flow Controller on the train that is in service is controlling 26,100 – 31,900 cfm.

- *Train 'A' - HV-9507*
- *Train 'B' - HV-9507A*

Comment:

This should be the same train placed in service in JPM steps 5 and 9.

Cue:

Notes:

SAT/UNSAT Performance Step: 12

Open a Relief Damper. (addendum 28, step 8)

Standard:

Opens Relief Damper FV-9500 or FV-9500A

Comment:

Either damper may be opened

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 13

Verify all FHB Main Supply Fans stopped. (addendum 28, step 9)

Standard:

Verifies all FHB Main Supply Fans are stopped

Comment:

These fans should have automatically stopped when a relief damper was opened in JPM step 12.

Cue:

Notes:

SAT/UNSAT Performance Step: 14

Ensure all FHB Main Supply Fan Inlet Isolation Dampers closed. (addendum 28, step 10)

Standard:

Ensures FHB Main Supply Fan Inlet Isolation Dampers are closed:

- *FV-9510/9510A*
- *FV-9520/9520A*
- *FV-9530/9530A*

Comment:

Cue:

Notes:

- TERMINATE THE JPM -

JPM STOP TIME ____________

VERIFICATION OF COMPLETION

Job Performance Measure: RESPOND TO FHB RAD MONITOR ALARM

Performer's Name: ____

Date Performed: __________________

Time to Complete: __________________

JPM Results: **Sat / Unsat**

Evaluator:______________________ **Signature:**______________________

Date: ______________________

JPM – STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

The Unit is operating at 100% power. Fuel shuffling is being performed in the Spent Fuel Pool in anticipation for receipt of new fuel.

INITIATING CUE:

An alarm has come in on Rad Monitor Panel RM-11. The Unit Supervisor directs you to investigate the Rad Monitor that's in an alarm condition in accordance with 0POP04-RA-0001, Radiation Monitoring System Alarm Response, and take appropriate action.

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE:	**ISOLATE SI ACCUMULATORS**
JPM NO.:	**S3**
REVISION:	**2**
LOCATION:	**SIMULATOR**

JOB PERFORMANCE MEASURE INFORMATION SHEET

JPM Title: ISOLATE SI ACCUMULATORS

JPM No.: S3

Rev. No: 2

STP Task: T81063, Respond to a LOCA Involving a Break Size in Which Reactor Coolant System Pressure Remains Above High Head Safety Injection Pump Shutoff Head.

STP Objective: CRO81063, Respond to a LOCA Involving a Break Size in Which Reactor Coolant System Pressure Remains Above High Head Safety Injection Pump Shutoff Head per POP05-EO-EO10.

Related K/A Reference: 006 A4.02, Ability to manually operate and/or monitor in the control room: Valves. (4.0/3.8)

References: 0POP03-ZG-0007, Plant Cooldown Rev 62
0POP02-SI-0001, Safety Injection Accumulators Rev 31

Task Normally Completed By: RO

Method of Testing: Actual Performance

Location of Testing: Simulator

Time Critical Task: NO

Alternate Path JPM: YES

Validation Time: 15 minutes

Required Materials (Tools/Equipment): None

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

A plant cooldown is in progress. The Unit is in Mode 3 with RCS Temperature between 440ºF and 450ºF. RCS Pressure is between 900 and 1000 psig. Steps of 0POP03-ZG-0007, Plant Cooldown have been completed through Step 5.37.

INITIATING CUE:

The Unit Supervisor directs you to CLOSE Safety Injection Accumulator Discharge Valves in accordance with 0POP03-ZG-0007, Plant Cooldown, Step 5.38.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

Safety Injection Accumulator Discharge Valves MOV-0039A and MOV-0039B are closed.

Safety Injection Accumulator 1C venting is in progress.

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

- None, the applicant will use the simulator copies of required procedures.

NOTES:

1) This JPM is formatted for dynamic simulator performance only. The cues provided are related to communications and other general information needed for dynamic performance. (NO Indication type Cues are provided).

SIMULATOR SETUP:

1) JPMs S3 and S4 are to run together. The following steps will set up the simulator for **BOTH** JPMs.

2) Ensure Radio volume for both stations are set to a reasonable level.

3) Ensure the PA buttons on the communications consoles are taped to help eliminate usage.

4) Reset to IC #216 and verify:
    - Step counter position Annunciator light is out
    - Red light at the end of CP-010 is out

5) Check and clean the following procedures (JPM specific):
    - 0POP03-ZG-0007, Plant Cooldown
    - 0POP02-SI-0001, Safety Injection Accumulators
    - 0POP02-AE-0002, Transformer Normal Breaker and Switch Lineup

6) Ensure the breaker control sw. target flags agree with breaker positions on CP-003 and CP-010.

7) Place simulator in run. Silence/acknowledge/reset alarms as appropriate.

8) Place the simulator in ‘FREEZE’ until the examiners are ready to proceed.

9) There is no simulator lesson for S3 or S4.

INSTRUCTOR ACTIONS:

None

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME__________

SAT/UNSAT Performance Step: 1

Obtain a copy of 0POP03-ZG-0007, Plant Cooldown and transition to Step 5.38.

Standard:

Obtains a copy of 0POP03-ZG-0007, Plant Cooldown and transitions to Step 5.38, close safety injection accumulator discharge valves.

Comment:

The applicant should use the simulator copy of the procedure. No working copy is to be provided by the evaluator.

The applicant may choose to review the notes and precautions again, however it is intended that he/she transition to Step 5.38 as quickly as possible for time considerations. Provide cues as necessary to ensure this occurs.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2(C*)

CLOSE accumulator discharge valve breakers using the power lockout switches:

- ACC 1A PWR LOCKOUT MOV-0039A
- ACC 1B PWR LOCKOUT MOV-0039B
- ACC 1C PWR LOCKOUT MOV-0039C

(POP03-ZG-0007, step 5.38.1)

Standard:

Closes the Accumulator Discharge Valve Breakers by momentarily taking the Accumulator Power Lockout Switches to the Power On position:

______ * *ACC 1A PWR LOCKOUT MOV-0039A*
______ * *ACC 1B PWR LOCKOUT MOV-0039B*
______ *ACC 1C PWR LOCKOUT MOV-0039C*

* - Denotes the critical portion of the step.

Comment:

When the applicant turns the Power Lockout Sw. for MOV-0039C to ON, the lower set of lights will not function as they did for the Train ‘A’ and ‘B’ Valves because the Train ‘C’ valve controller has a failure and will not energize. This is the malfunction that will drive the JPM to its alternate path.

See comment on next page (JPM Step 3) for a more detailed description of the position indicating lights for the Accumulator Outlet Valves, MOV-0030A/B/C.

Cue:

If the applicant wants to change light bulbs on Train ‘C’ MOV-0039C position indication, inform him/her that they were just checked and are known to be good. See comment above.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 3(C*)

Close accumulator discharge valves (POP03-ZG-0007, Step 5.38.2)

- ACC 1A DISCH ISOL MOV-0039A
- ACC 1B DISCH ISOL MOV-0039B
- ACC 1C DISCH ISOL MOV-0039C

Standard:

Closes the Accumulator Discharge Valve by momentarily taking the Accumulator Discharge Isolation Valve Switches to the close position:

______ * *ACC 1A DISCHARGE ISOL MOV-0039A**
______ * *ACC 1B DISCHARGE ISOL MOV-0039B**
______ *ACC 1C DISCHARGE ISOL MOV-0039C (Fails to close)*

* Denotes critical portion of step

Comment:

Accumulator 1C Discharge Isolation Valve MOV-0039C will fail to close. Applicant should inform the Unit Supervisor that MOV-0039C has failed to close.

The Accumulator Outlet Valves have 2 sets of position lights, one set above the other on the Control Board. The motor controllers for the valves are normally de-energized once the valves have been positioned, therefore one set of position lights (the lower set) is not functional unless power is available to the motor controller. The other set is always energized thereby providing valve position indication even when the motor controller is de-energized. The motor controllers each have a Power Lockout Sw. located above the sets of position indication lights that is used to energize or de-energize the respective motor controller. The Power Lockout Sw. have their own set of lights for indicating the position of the MCC breaker to the motor controller. When a Power Lockout Sw. is placed to the POWER ON position, the MCC supply breaker to the respective motor controller closes to energize the motor controller to allow operation of the valve from the Control Room. The position light for the Power Lockout Sw. will now be red.

Cue:

If asked, as the Unit Supervisor direct the operator to attempt to close MOV-0039C

When informed by the applicant that MOV-0039C has failed to close, as Unit Supervisor inform him/her to vent Accumulator 1C in accordance with 0POP02-SI-0001, Safety Injection Accumulators.

If the applicant requests to open Accumulator 1A, 1B, or 1C Discharge Isolation Valve Breakers by taking their Power Lockout Switches to POWER OFF, as Unit Supervisor, inform him/her that you concur.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 4

Verify Prerequisites and review Notes and Precautions for 0POP02-SI-0001, Safety Injection Accumulators. (POP02-SI-0001, sections 3 and 4) and transition to procedure section 8.0

Standard:

- *Verifies Prerequisites section 3.0*
- *Reviews Section 4.0, Notes and Precautions*
- *Transitions to procedure section 8.0*

Comment:

Cue:

- If asked about procedure prerequisites, as Unit Supervisor, inform the applicant that Prerequisites 3.1, 3.2 and 3.3 are satisfied. Prerequisite 3.4 is not applicable for this evolution.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 5

Establish/verify conditions in containment for venting. (POP02-SI-0001, Step 8.1)

Standard:

- *Dispatches an operator to ensure the local area is clear of personnel not involved in the activity. (Step 8.1.2)*
- *Stations an operator/Safety Rep in the area with an oxygen monitor. (Step 8.1.3)*
- *Simulates a Plant announcement stating "Venting the Safety Injection Accumulators. (Step 8.1.4)*

Comment:

Cue:

- If asked about the need for placing Normal or Supplementary Purge in service or starting additional RCFCs, as Unit Supervisor, inform the applicant that supplemental purge is in service and starting additional RCFCs is not necessary for the venting of one accumulator.
- If asked about personnel in containment, as the Unit Supervisor, inform the applicant that there are numerous workers in containment.
- If asked about installation of an elbow downstream of the vent valve, as Unit Supervisor, inform the applicant that the use of an elbow is not necessary.
- When dispatched, as Plant Operator, inform the applicant that you are stationed with an oxygen monitor and the area is clear of personnel.
- **Do not allow applicant to make an actual PA announcement.** When applicant indicates that they would make a PA announcement informing personnel to stand clear of Safety Injection Accumulator 1C, inform him/her that the announcement has been made and personnel have been informed of Safety Injection Accumulator 1C venting.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 6

MONITOR Accumulator pressure for Safety Injection Accumulator 1C:

- ACC 1C PRESS 1-SI-PI-0964/0965

(POP02-SI-0001, Step 8.2)

Standard:

Monitors Safety Injection Accumulator Pressure on pressure indicators PI-0964/0965.

Comment:

Cue:

Notes:

SAT/UNSAT Performance Step: 7(C)

OPEN the ACC 1C N2 SPLY/VENT valve PV-3928. (POP02-SI-0001, Step 8.3)

Standard:

Opens ACC 1C N2 SPLY/VENT valve PV-3928.

Comment:

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 8(C)

OPEN a header vent valve to establish desired venting rate. (POP02-SI-0001, Step 8.4)

Standard:

Opens HDR Vent HCV-0900 or HV-0899 to start venting Safety Injection Accumulator 1C.

Comment:

- A procedure note states that opening HCV-0900 is preferred since it is a throttle valve.
- A considerable amount of time will be needed to completely vent Safety Injection Accumulator completely.

Cue:

When a pressure decrease begins on Safety Injection Accumulator 1C, as "Unit Supervisor", inform the applicant to continue with Step 5.38 of 0POP03-ZG-0007, Plant Cooldown Procedure while Safety Injection Accumulator 1C Vents.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 9

OPEN accumulator discharge valve breakers using the power lockout switches:

- ACC 1A PWR LOCKOUT MOV-0039A
- ACC 1B PWR LOCKOUT MOV-0039B
- ACC 1C PWR LOCKOUT MOV-0039C

(POP03-ZG-0007, Step 5.38.3)

Standard:

Opens the Accumulator Discharge Valve Breakers by momentarily taking the Accumulator Power Lockout Switches to the Power Off position:

______ *ACC 1A PWR LOCKOUT MOV-0039A*
______ *ACC 1B PWR LOCKOUT MOV-0039B*
______ *ACC 1C PWR LOCKOUT MOV-0039C*

Comment:

This step may have been performed earlier (see JPM step 3 cues).

Cue:

If applicant questions whether he/she should de-energize 1C Accumulator Discharge Isolation Valve, as Unit Supervisor inform him/her to do so.

Notes:

- TERMINATE THE JPM -

JPM STOP TIME__________

VERIFICATION OF COMPLETION

Job Performance Measure: ISOLATE SI ACCUMULATORS

Applicant's Name: ____

Date Performed: ____________________________

Time to Complete: ___________________________

JPM Results: Sat / Unsat

Evaluator: ________________________ Signature: ___________________________

Date: ____________________________

JPM STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

A plant cooldown is in progress. The Unit is in Mode 3 with RCS Temperature between 440ºF and 450ºF. RCS Pressure is between 900 and 1000 psig. Steps of 0POP03-ZG-0007, Plant Cooldown have been completed through Step 5.37.

INITIATING CUE:

The Unit Supervisor directs you to CLOSE Safety Injection Accumulator Discharge Valves in accordance with 0POP03-ZG-0007, Plant Cooldown, Step 5.38.

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE:	**ROLL 13.8 KV ELECTRICAL BUSES**
JPM NO:	**S4**
REVISION:	**2**
LOCATION:	**SIMULATOR**

JOB PERFORMANCE MEASURE WORKSHEET

JPM Title:	ROLL 13.8 KV ELECTRICAL BUSES
JPM No.:	S4
Rev. No.:	2
STP Task:	62800, Shift Auxiliary Busses between the Unit Aux XFMR and the Standby XFMR.
STP Objective:	62800, Shift Auxiliary Busses between the Unit Aux XFMR and the Standby XFMR per POP02-AE-0002.
Related K/A	
Reference:	062 A4.07, Ability to manually operate and/or monitor in the control room: Synchronizing and paralleling of different AC supplies. (3.1/3.1)
References:	0POP02-AE-0002, Rev 33, Transformer Normal Breaker and Switch Lineup
Task Normally Completed By:	RO
Method of Testing:	Actual Performance
Location of Testing:	Simulator
Time Critical Task:	NO
Alternate Path JPM:	NO
Validation Time:	15 minutes
Required Materials (Tools/Equipment):	None

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the applicant):

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

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

A plant shutdown is in progress. The Unit is in Mode 3 with RCS Temperature at approximately 445 ºF and RCS Pressure at approximately 950 psig.

INITIATING CUE:

In preparation for a main transformer outage, the Unit Supervisor directs you to Transfer the 13.8 KV Buses to the Standby Transformers in accordance with Section 17.0 of 0POP02-AE-0002, Transformer Normal Breaker and Switch Lineup. The Prerequisites of 0POP02-AE-0002, Transformer Normal Breaker and Switch Lineup have been verified.

-DO NOT DISCLOSE INFORMATION BELOW THIS LINE-

COMPLETION CRITERIA:

Performs the following 13.8 KV bus transfers without causing an automatic breaker actuation:

- *13.8 KV Aux Bus 1F and 13.8 KV STBY Bus 1F from the UAT to STBY XFMR 1*
- *13.8 KV Aux Bus 1G from the UAT to STBY XFMR 1*
- *13.8 KV Aux Bus 1H and 13.8 KV STBY Bus 1H from the UAT to STBY XFMR 2*
- *13.8 KV Aux Bus 1J from the UAT to STBY XFMR 2*

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

Signed procedure Addendum 4.

NOTES:

This JPM is formatted for dynamic simulator performance only. The cues provided are related to communications and other general information needed for dynamic performance. (No indication type cues are provided.)

SIMULATOR SETUP:

1) JPMs S3 and S4 are to run together. The following steps will set up the simulator for **BOTH** JPMs.

2) Ensure Radio volume for both stations are set to a reasonable level.

3) Ensure the PA buttons on the communications consoles are taped to help eliminate usage.

4) Reset to IC #216 and verify:
   - Step counter position Annunciator light is out
   - Red light at the end of CP-010 is out

5) Check and clean the following procedures (JPM specific):
   - 0POP03-ZG-0007, Plant Cooldown
   - 0POP02-SI-0001, Safety Injection Accumulators
   - 0POP02-AE-0002, Transformer Normal Breaker and Switch Lineup

6) Ensure the breaker control sw. target flags agree with breaker positions on CP-003 and CP-010.

7) Place simulator in run. Silence/acknowledge/reset alarms as appropriate.

8) Place the simulator in 'FREEZE' until the examiners are ready to proceed.

9) There is no simulator lesson for S3 or S4.

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:
• Critical steps are identified by (C). • Sequenced steps are identified by (S_1, S_2, …).

JPM START TIME_______________

SAT / UNSAT Performance Step: 1

Obtain a copy of 0POP02-AE-0002, Transformer Normal Breaker and Switch Lineup, and transitions to Section 17.0.

Standard:

Obtains a copy of 0POP02-AE-0002, Transformer Normal Breaker and Switch Lineup, and transitions to Section 17.0, Transferring 13.8 KV Bus Power.

Comment:

The applicant should use the simulator copy of the procedure. No working copy is to be provided by the evaluator.

The applicant should review the Notes and Precautions.

Cue:

If applicant seeks US approval to proceed, inform the applicant that they have permission to proceed.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT / UNSAT Performance Step: 2

IF transferring 13.8 KV AUX Buses to STBY XFMRs while preparing to close the Main Generator Breaker, THEN ENSURE at least one 13.8 KV motor on Aux bus 1G secured. (Procedure step 17.1)

Standard:

NA's this step since we are not preparing to close the main generator breaker.

Comment:

A procedure note prior to Step 17.1 stipulates that at least one 13.8 kV motor on Aux Bus 1G SHALL be secured for alternate lineups. The applicant should verify that at least one 13.8 kV motor supplied from Aux Bus 1G is secured (not running). There are at least 3 motor loads from Aux Bus 1G that are not running: an RCP, a Condensate Pump and a Circ Water Pump

Cue:

Notes:

SAT / UNSAT Performance Step: 3

IF transferring 13.8 KV AUX Buses to STBY XFMRs while preparing to close the Main Generator Breaker, THEN COMPLETE Addendum 5 or Addendum 7 and GO TO Step 17.6. (Procedure step 17.2).

Standard:

NA's this step since we are not preparing to close the main generator breaker.

Comment:

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT / UNSAT Performance Step: 4

IF returning 13.8 KV AUX Buses to AUX XFMR after closing the Main Generator Breaker, THEN COMPLETE Addendum 6 or Addendum 8 and GO TO Step 17.6. (Procedure step 17.3).

Standard:

NA's this step since we are not preparing to close the main generator breaker.

Comment:

Cue:

Notes:

SAT / UNSAT Performance Step: 5

Obtain and complete form as shown in Addendum 4 (Procedure step 17.4, 17.5 and 17.6)

Standard:

Obtains a completed Addendum 4 and ensure the Unit Supervisor has reviewed and given permission to perform the breaker manipulation.

Comment:

The Unit Supervisor signature at the bottom of Addendum 4 is evidence that the Addendum has been reviewed and permission granted for the manipulation.

Cue:

Provide the applicant with the completed Addendum 4 attached to this JPM if not yet done.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT / UNSAT Performance Step: 6 **(C*)**

Perform the breaker manipulations for transferring the 1F Aux Bus and Standby Bus from the UAT to the STBY XFMR #1. (Procedure Step 17.7)

Standard:

Performs the following steps on Addendum 5 ***IN SEQUENCE****:*

_____	**Step 1*	*"SPLY BKR SYNC SW ST-0120"*	*ON*
_____	**Step 2*	*"STBY XFMR 1 TO STBY BUS 1F SPLY ST-0120"*	*CLOSED*
_____	**Step 3*	*"UAT TO AUX BUS 1F SPLY P-0120"*	*OPEN*
_____	*Step 4*	*"SPLY BKR SYNC SW ST-0120"*	*OFF*

* - Denotes the critical portion of the step.

Comment:

As the applicant performs breaker operations for this and subsequent steps he/she should check current meters as breakers are operated as a backup indication that the breakers are operating as expected.
For example, using the above steps, when breaker ST-0120 is closed the current for the UAT supply will lower and the current for the STBY XFMR supply will rise. Then, when breaker P-0120 is opened, the current for the UAT supply will go to zero and the current for the STBY XFMR supply will rise further.

If the supply breaker from the UAT is not opened within 15 seconds of closing the STBY XFMR 1 to STBY BUS 1F SPLY breaker, a 13KV BUS BKR PARALLELED alarm will annunciate. After 30 seconds, the 1F bus-tie breaker trips. If any breaker automatically trips, the student will fail to meet the requirements of this step.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 7 **(C*)**

Perform the breaker manipulations for transferring the 1G Aux Bus from the UAT to the STBY XFMR #1. (Procedure Step 17.7)

Standard:

Performs the following steps on Addendum 5 ***IN SEQUENCE****:*

_____	**Step 5*	*"TIE BKR SYNC SW T-0140"*	*ON*
_____	**Step 6*	*"AUX TO STBY BUS 1G TIE BKR T-0140"*	*CLOSED*
_____	**Step 7*	*"UAT TO AUX BUS 1G SPLY P-0140"*	*OPEN*
_____	*Step 8*	*"TIE BKR SYNC SW T-0140"*	*OFF*

* - Denotes the critical portion of the step.

Comment:

Cue:

Notes:

If the supply breaker from the UAT is not opened within 15 seconds of closing the AUX TO STBY Bus 1G Tie Breaker, a 13KV BUS BKR PARALLELED alarm will annunciate. After 30 seconds, the 1G bus-tie breaker trips. If any breaker automatically trips, the student will fail to meet the requirements of this step.

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

<u>SAT / UNSAT</u> Performance Step: 8 **(C*)**

Perform the breaker manipulations for transferring the 1H Aux Bus and Standby Bus from the UAT to the STBY XFMR #2. (Procedure Step 17.7)

Standard:

Performs the following steps on Addendum 5 ***IN SEQUENCE****:*

_____	**Step 9*	*"SPLY BKR SYNC SW ST-0150"*	*ON*
_____	**Step 10*	*"STBY XFMR 2 TO STBY BUS 1H SPLY ST-0150"*	*CLOSED*
_____	**Step 11*	*"UAT TO AUX BUS 1H SPLY P-0130"*	*OPEN*
_____	*Step 12*	*"SPLY BKR SYNC SW ST-0150"*	*OFF*

* - Denotes the critical portion of the step.

Comment:

Cue:

Notes:

If the supply breaker from the UAT is not opened within 15 seconds of closing the STBY XFMR 2 to STBY Bus 1H SPLY breaker, a 13KV BUS BKR PARALLELED alarm will annunciate. After 30 seconds, the UAT to Aux Bus 1H SPLY breaker will trip. If any breaker automatically trips, the student will fail to meet the requirements of this step.

JOB PERFORMANCE MEASURE CHECK SHEET (cont'd)

SAT / UNSAT Performance Step: 9 **(C*)**

Perform the breaker manipulations for transferring the 1J Aux Bus from the UAT to the STBY XFMR #2. (Procedure Step 17.7)

Standard:

Performs the following steps on Addendum 5 ***IN SEQUENCE****:*

_____	**Step 13*	*"SPLY BKR SYNC SW ST-0190"*	*ON*
_____	**Step 14*	*"STBY XFMR 2 TO AUX BUS 1J SPLY ST-0190"*	*CLOSED*
_____	**Step 15*	*"UAT TO AUX BUS 1J SPLY P-0150"*	*OPEN*
_____	*Step 16*	*"SPLY BKR SYNC SW ST-0190"*	*OFF*

* - Denotes the critical portion of the step.

Comment:

Cue:

Notes:

If the supply breaker from the UAT is not opened within 15 seconds of closing the STBY XFMR 2 to STBY Bus 1J SPLY breaker, a 13KV BUS BKR PARALLELED alarm will annunciate. After 30 seconds, the UAT to Aux Bus 1J SPLY breaker will trip. If any breaker automatically trips, the student will fail to meet the requirements of this step.

-TERMINATE THE JPM-

JPM STOP TIME_______________

VERIFICATION OF COMPLETION

Job Performance Measure: ROLL 13.8 KV ELECTRICAL BUSES

Performer's Name: ____

Date Performed: __________________

Time to Complete: __________________

JPM Results: **Sat / Unsat**

Evaluator:______________________ **Signature:**______________________

Date: ______________________

JPM USE ONLY

	0POP02-AE-0002	Rev. 33	Page 46 of 96
Transformer Normal Breaker and Switch Lineup			
Addendum 4	Transferring 13.8 KV Bus Power Supply Checklist		Page 3 of 3

Transferring 13.8 KV Bus Power Supply Checklist

DATE: *Today*

TYPICAL

EVOLUTION	*Transferring 13.8 KV AUX Buses to Standby XFMRs*	
STEP NUMBER	BREAKER	FINAL POSITION
1	“SPLY BKR SYNC SW ST-0120”	ON
2	“STBY XFMR 1 TO STBY BUS 1F SPLY ST-0120”	CLOSED
3	“UAT TO AUX BUS 1F SPLY P-0120”	OPEN
4	“SPLY BKR SYNC SW ST-0120”	OFF
5	“TIE BKR SYNC SW T-0140”	ON
6	“AUX TO STBY BUS 1G TIE BKR T-0140”	CLOSED
7	“UAT TO AUX BUS 1G SPLY P-0140”	OPEN
8	“TIE BKR SYNC SW ST-0140”	OFF
9	“SPLY BKR SYNC SW ST-0150”	ON
10	“STBY XFMR 2 TO STBY BUS 1H SPLY ST-0150”	CLOSED
11	“UAT TO AUX BUS 1H SPLY P-0130”	OPEN
12	“SPLY BKR SYNC SW ST-0150”	OFF
13	“SPLY BKR SYNC SW ST-0190”	ON
14	“STBY XFMR 2 TO AUX BUS 1J SPLY ST-0190”	CLOSED
15	“UAT TO AUX BUS 1J SPLY P-0150”	OPEN
16	“SPLY BKR SYNC SW ST-0190”	OFF

REVIEWED BY : *Billy Herzog* — Unit Supervisor   *Today* / *Now* — Date / Time

No Retention Required

JPM – STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

A plant shutdown is in progress. The Unit is in Mode 3 with RCS Temperature at approximately 445 ºF and RCS Pressure at approximately 950 psig.

INITIATING CUE:

In preparation for a main transformer outage, the Unit Supervisor directs you to Transfer the 13.8 KV Buses to the Standby Transformers in accordance with Section 17.0 of 0POP02-AE-0002, Transformer Normal Breaker and Switch Lineup and the provided Addendum 4. The Prerequisites of 0POP02-AE-0002, Transformer Normal Breaker and Switch Lineup have been verified.

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE: **Transfer MFW from MFRV to LPFRV**

JPM NO.: **S5**

REVISION: **2**

LOCATION: SIMULATOR

JOB PERFORMANCE MEASURE WORKSHEET
SOUTH TEXAS PROJECT

JPM Title:	XFER MFW FROM MFRV TO LPFRV
JPM No.:	S5
Rev. No:	2
STP Task:	20950 - Place the Low Power Feed Reg Valves in auto.
STP Objective:	20950 - Place the Low Power Feed Reg Valves in auto so that the Steam Generator levels are being controlled at their normal operating levels in accordance with POP03-ZG-0005 or POP03-ZG-0006
Related K/A Reference:	059 A4.03, Ability to manually operate and monitor in the control room: Feedwater control during power increase and decrease (2.9/2.9).
References:	0POP03-ZG-0006, Rev. 45, Plant Shutdown From 100% to Hot Standby
Task Normally Completed By:	RO
Method of Testing:	Actual Performance
Location of Testing:	Simulator
Time Critical Task:	NO
Alternate Path JPM:	NO
Validation Time:	15 minutes

Required Materials (Tools/Equipment):

None

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

CAUTION: **Do not operate or alter equipment configuration in the plant without proper authorization.**

INITIAL CONDITIONS:

A plant shutdown is in progress per 0POP03-ZG-0006, Plant Shutdown From 100% to Hot Standby.

- Reactor power is at ~15%.
- The Turbine is on the grid and the Startup Feedwater Pump is in service.

INITIATING CUE:

The Unit Supervisor directs you to transfer Steam Generator water level control **from the Main Feedwater Regulating Valve to the Low Power Feedwater Regulating Valve** for ‘A’ Steam Generator in accordance with Addendum 8 of 0POP03-ZG-0006, Plant Shutdown From 100% to Hot Standby.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

Steam Generator ‘A’ water level control has been transferred to the low power feedwater regulating valve in accordance with 0POP03-ZG-0006, Plant Shutdown From 100% to Hot Standby.

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

None, the applicant is expected to use the simulator copy of the procedure.

NOTES:

This JPM is formatted for dynamic simulator performance only. The cues provided are related to communications and other general information needed for dynamic performance. NO indication type cues are provided.

SIMULATOR SETUP:

JPMs S5 and S6 are to be run together. The following steps will set up the simulator for **BOTH** JPMs:

1) Ensure Radio volume for both stations are set to a reasonable level.

2) Ensure the PA buttons on the communications consoles are taped to help eliminate usage.

3) Reset to IC #217 and verify:

- Step Counter position annunciator light on CP-005 is out.
- Red Light at the end of CP-010 is out.
- ICS Annunciators have stopped counting up.
- Target flag for DG # 11 Output Breaker matches breaker position (open)
- 'B' Train ECW/CCW are secured

4) Check and clean the following procedures (JPM specific):

- 0POP02-EW-0001, Essential Cooling Water Operations
- 0POP09-AN-02M3, Annunciator Lampbox 2M03 Response Instructions
- 0POPO3-ZG-0006, Plant Shutdown from 100% to Hot Standby.

5) Place simulator in run. Silence/acknowledge /reset alarms as appropriate.

6) Place the simulator in "FREEZE" until the examiners are ready to proceed.

7) There is no Simulator Lesson Plan associated with EITHER JPM.

INSTRUCTOR ACTIONS

None

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

SAT/UNSAT Performance Step: 1 **Start time:** _______

Obtain the procedure.

Standard:

Obtains a copy of Addendum 8 of 0POP03-ZG-0006, Plant Shutdown From 100% to Hot Standby.

Comment:

The applicant should use the simulator copy of 0POP03-ZG-0006, Plant Shutdown From 100% to Hot Standby.

Cue:

Notes:

SAT/UNSAT Performance Step: 2

IF SU SGFP 14 is NOT operating, THEN PERFORM the following: (Addendum 8, step 1)

- ENSURE SGFP MASTER SPEED controller in the MAN position
- ENSURE SGFP pump speed approximately 5200 rpm

Standard:

Determines that SU SGFP 14 is in service and NA's this step.

Comment:

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 3

ENSURE main turbine load stabilized and the SG narrow range level stabilized within the normal control band. (Addendum 8, step 2)

Standard:

Verifies that main turbine load and SG levels are stable.

Comment:

Cue:

Notes:

SAT/UNSAT Performance Step: 4

ENSURE the selected SG low power feedwater regulating valve (LPRV) is the MAN position. (Addendum 8, step 3)

Standard:

Verifies that SG 1A "LOW PWR FCV-7151" LPRV is in manual.

Comment:

Controller is in Manual when the orange MAN light at the bottom of the controller is on and the white AUTO light at the top of the controller is off.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 5 **(C*)**

PLACE the selected SG main feedwater regulating valve (MFRV) in the MAN position. (Addendum 8, step 4)

Standard:

**Depresses the MAN pushbutton for NORM FCV-0551.*

* - Denotes the critical portion of the step.

Comment:

Cue:

Notes:

SAT/UNSAT Performance Step: 6

VERIFY the selected SG feedwater flow at steady state values. (Addendum 8, step 5)

Standard:

Notes SG 1A Flowrate by recording or marking flow.

Comment:

Recording or marking flow is optional, but helps the operator keep track of flow changes as the transfer is done. Other methods such as grease mark on the control board flow instrument may be used (as approved by the Unit Supervisor).

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 7 **(C*)**

- Slowly THROTTLE OPEN the selected SG low power feedwater regulating valve (LPRV) ≈ 1% OR until an increase is noticed in the feedwater flow.
- Slowly THROTTLE CLOSED the selected SG main feedwater regulating valve until SG feedwater flow has returned to the steady state values observed earlier
- PERFORM these steps, UNTIL the selected SG main feedwater regulating valve (MFRV) is CLOSED

(Addendum 8, steps 6, 7, and 8)

Standard:

Maintains SG 1A Feedwater flowrate approximately constant while transferring control as follows:

___ ** Throttles open LOW PWR FV-7151 or until feed flow increase is noticed.*

___ ** Throttles closed NORM FCV-0551 until feed flow returns to initial value.*

___ ** Repeats these steps until NORM FCV-0551 is closed.*

* - Denotes the critical portion of the step.

Comment:

Cue:

If permission is requested to use 2 handed operations, as the Unit Supervisor, give permission to use 2 handed operation.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 8 **(C*)**

PLACE the selected SG low power feedwater regulating valve (LPRV) in the AUTO position and monitors for proper operation. (Addendum 8, step 9 and 10)

Standard:

_*_ *Places LOW PWR FV-7151 in AUTO*

____ *Monitors for proper operation.*

Comment:

* Denotes critical portion of the step

Cue:

Notes:

- TERMINATE THE JPM - **Stop time:** ________

VERIFICATION OF COMPLETION

Job Performance Measure: XFER MFW FROM MFRV TO LPFRV

Performer's Name: ____

Date Performed: ____________________

Time to Complete: ____________________

JPM Results: **Sat / Unsat**

Evaluator:_________________________ **Signature:**_________________________

Date: _________________________

JPM - STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: **Do not operate or alter equipment configuration in the plant without proper authorization.**

INITIAL CONDITIONS:

A plant shutdown is in progress per 0POP03-ZG-0006, Plant Shutdown From 100% to Hot Standby.

- Reactor power is at ~15%.
- The Turbine is on the grid and the Startup Feedwater Pump is in service.

INITIATING CUE:

The Unit Supervisor directs you to transfer Steam Generator water level control **from the Main Feedwater Regulating Valve to the Low Power Feedwater Regulating Valve** for 'A' Steam Generator in accordance with Addendum 8 of 0POP03-ZG-0006, Plant Shutdown From 100% to Hot Standby.

NUCLEAR TRAINING DEPARTMENT

OPERATING JOB PERFORMANCE MEASURE

TITLE:	**RESPOND TO ECW LOW DISCHARGE PRESSURE**
JPM NO.:	**S6**
REVISION:	2
LOCATION:	**SIMULATOR**

JOB PERFORMANCE MEASURE INFORMATION SHEET

JPM Title:	RESPOND TO ECW LOW DISCHARGE PRESSURE
JPM No.:	S6
Rev. No:	2
STP Task:	T75050, Respond to ESF DG Alarms
STP Objective:	CRO 45200, Respond to a DG Trbl Alarm
Related K/A:	008 A4.01, Ability to manually operate and/or monitor in the control room: CCW indications and controls. (3.3/3.1)
References:	0POP02-EW-0001, Essential Cooling Water Operations, Rev. 56 0POP09-AN-02M3, Annunciator Lampbox 2M03 Response Instructions, Rev. 24
Task Normally Completed By:	RO
Method of Testing:	Actual Performance
Location of Testing:	Simulator
Time Critical Task:	No
Alternate Path JPM:	Yes
Validation Time:	10 minutes
Required Materials (Tools/Equipment):	None

JOB PERFORMANCE MEASURE INFORMATION SHEET

READ TO PERFORMER (a copy of this information is included at the end of the JPM as a tear-away sheet to be given to the student):

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

A plant shutdown is being performed in Unit 1 in accordance with 0POP03-ZG-0006, Plant Shutdown from 100% to Hot Standby. Reactor Power is at approximately 15%

11 ESF Diesel Generator is running unloaded in Emergency Mode for a maintenance test run.

INITIATING CUE:

CCW and ECW Trains need to be shifted to accommodate upcoming maintenance. As part of this evolution, the Unit Supervisor directs you to place 'B' ECW Train in service in accordance with 0POP02-EW-0001, Essential Cooling Water Operations, Section 5.7, ECW Pump Startup For Product Lubricated Pumps.

- A major overhaul has NOT been performed on ECW Pump 'B' (fill and vent is NOT required).
- An uncoupled run on the ECW pump motor will NOT be done.

- DO NOT DISCLOSE INFORMATION BELOW THIS LINE -

COMPLETION CRITERIA:

#11 ESF Diesel Generator is stopped following indication of a loss of cooling water (ECW).

JOB PERFORMANCE MEASURE INFORMATION SHEET

HANDOUTS:

None required. The student should use the procedure copy in the simulator.

NOTES:

This JPM is formatted for dynamic simulator performance only. The cues provided are related to communications and other general information needed for dynamic performance. (No indication type cues are provided.)

SIMULATOR SETUP:

JPMs S5 and S6 are to be run together. The following steps will set up the simulator for **BOTH** JPMs:

1) Ensure Radio volume for both stations are set to a reasonable level.

2) Ensure the PA buttons on the communications consoles are taped to help eliminate usage.

3) Reset to IC #217 and verify:

- Step Counter position annunciator light on CP-005 is out.
- Red Light at the end of CP-010 is out.
- ICS Annunciators have stopped counting up.
- Target flag for DG # 11 Output Breaker matches breaker position (open)
- 'B' Train ECW/CCW are secured

4) Check and clean the following procedures (JPM specific):

- 0POP02-EW-0001, Essential Cooling Water Operations
- 0POP09-AN-02M3, Annunciator Lampbox 2M03 Response Instructions
- 0POPO3-ZG-0006, Plant Shutdown from 100% to Hot Standby.

5) Place simulator in run. Silence/acknowledge /reset alarms as appropriate.

6) Place the simulator in "FREEZE" until the examiners are ready to proceed.

7) There is no Simulator Lesson Plan associated with EITHER JPM.

INSTRUCTOR ACTIONS

None

JOB PERFORMANCE MEASURE CHECK SHEET

NOTE:

- Critical steps are identified by (C).
- Sequenced steps are identified by (S_1, S_2, . . .).

JPM START TIME ________

SAT/UNSAT Performance Step: 1

Obtain a copy of 0POP02-EW-0001, Essential Cooling Water Operations.

Standard:

Obtains a copy of 0POP02-EW-0001, Essential Cooling Water Operations.

Comment:

The student should use the simulator copy of the procedure. No working copy will be provided by the Examiner.

The student should review Notes and Precautions.

Cue:

If the applicant asks if the Prerequisites are met, inform him/her that they are met.

If the applicant wants to know if applicable Tech Spec sections have been reviewed, inform him/her the Unit Supervisor has reviewed the Tech Spec.

If the applicant seeks to contact Chemistry Dept. to ensure the Chlorine Process Analyzer is aligned to a running ECW pump, respond that the Chlorine Analyzer is aligned to Train ‘A’.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 2

If a major overhaul has been performed on an ECW Pump, THEN PERFORM' Section 9.0 for the affected ECW Pump. (procedure step 5.7.1)

Standard:

Determines a major overhaul of 'B' ECW Pump has not occurred (from initial conditions) and NA's the step.

Comment:

Cue:

If asked if a major overhaul has been done on 'B' ECW Pump, inform the applicant that there has been NO MAJOR OVERHAUL ON 'B' ECW PUMP.

Notes:

SAT/UNSAT Performance Step: 3

If uncoupled operations of the ECW Pump Motor is desired, THEN GO TO Addendum 2, Uncoupled Run of ECW Pump Motors. (procedure step 5.7.2)

Standard:

Determines an uncoupled run will NOT be performed and NA's the step.

Comment:

Cue:

If asked if an uncoupled run is needed, as the Unit Supervisor, inform the applicant that an uncoupled run will NOT be required.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 4 **(C)**

Start the desired ECW Pump. (Procedure step 5.7.3)

Standard:

Starts ECW Pump 1B.

Comment:

45 seconds after the start of ECW Pump ‘B’, a low discharge pressure alarm will come in for ECW Pump ‘A’. This is the alternate path portion of the JPM. Appropriate actions for the applicant to take begin at JPM step 9.

Cue:

If asked as a Plant Operator to check ‘B’ ECW Pump ready for start, inform the applicant that it is ready for start.

If asked as a Plant Operator to check ‘B’ ECW Pump after start, report it is running satisfactory.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 5

Performs the following to verify proper ECW Pump Operation:

- Verify associated ECW Pump discharge valve starts to open within 11 seconds after the ECW Pump starts.
- Verify the associated ECW pump discharge pressure increases to a nominal value of 45 psig (40 to 55 psig).

(Procedure step 5.7.4)

Standard:

- *Verifies 'B' ECW Pump discharge valve starts to open within 11 seconds after the ECW Pump starts (MOV-0137).*
- *Verify the 'B' ECW pump discharge pressure increases to a nominal value of 45 psig (40 to 55 psig).*

Comment:

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 6

IF the ECW pump is started for maintenance (e.g. PMT, continuity check) or weekly chlorination AND will **NOT** remain running, THEN N/A Steps 5.7.6 through 5.7.8 as determined by the Unit Supervisor/Shift Manager. (Procedure step 5.7.5)

Standard:

Determines the pump will remain running and NA's this step..

Comment:

Cue:

If asked if this is a maintenance start, as the Unit Supervisor, inform the applicant that the pump will remain in service.

Notes:

SAT/UNSAT Performance Step: 7

Notify I&C Maintenance to perform instrument venting per Instrument Vent Lineup 23 for the ECW Train started. (Procedure step 5.7.6)

Standard:

Notifies I&C Maintenance to perform instrument venting per Instrument Vent Lineup 23 for 'B' ECW Train.

Comment:

Cue:

When asked to perform the venting lineup for 'B' ECW Train, report that it is complete.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 8

When I&C Maintenance has completed Instrument Vent Lineup 23, then verify flow to the following components is within the specified range for the ECW Train started.

- CCW HX - 14,040 to 17, 400 gpm (QDPS)
- STBY DG HX – 1486 to 1743 gpm (QDPS)

(Procedure step 5.7.7)

Standard:

Verifies flows are within specified ranges by checking the QDPS screen for 'B' Train ECW

Comment:

This is essentially the final step to placing 'B' Train ECW in service. The low discharge pressure alarm should have come in by now. Appropriate actions for the candidate to take begin at JPM step 9.

Cue:

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 9

ECW PUMP 1A DISCH PRESS LO alarm annunciates.

Standard:

Acknowledges and responds to the ECW PUMP 1A DISCH PRESS LO alarm by referencing the Annunciator Response procedure.

Comment:

Cue:

- If asked about #11 Diesel Trouble alarm, as Plant Operator respond that the local alarm is 'Raw Water Pressure Low'.
- If the applicant seeks to inform the Unit Supervisor of the alarm condition, acknowledge this information as the Unit Supervisor.
- If the applicant doesn't take action for the alarm, as the Unit Supervisor, inform him/her to take appropriate action for the alarm.

Notes:

JOB PERFORMANCE MEASURE CHECK SHEET

SAT/UNSAT Performance Step: 10 (C*)

Performs the following in accordance with 0POP09-AN-02M3, Window D-7, ECW PUMP 1A DISCH PRESS LO: (POP09-AN-02M3, step 1)

If ECW header pressure decreased to less than or equal to 30 psig, then perform the following:

- Ensure the standby ECW/CCW train running
- Stop ECW Train 'A' Pump
- Place Standby DG 11 (21) "EMERG STOP" plunger in the PULL TO STOP position to prevent diesel operation without cooling water.

Standard:

- *Ensures the standby ECW/CCW train running*
- *Stop ECW Train A Pump*
- **Place Standby DG 11 "EMERG STOP" plunger in the PULL TO STOP position to prevent diesel operation without cooling water.*

* denotes critical actions.

Comment:

The Diesel Generator has a trip feature of high Jacket water temperature, but this feature is bypassed when in Emergency Mode as it is on the JPM.

To stop ECW Pump 'A', the applicant will have to place the pump control switch in Pull-To-Lock (PTL) instead of just going to STOP because the Mode Sw. for that Train is in RUN so the pump will restart if not placed in PTL.

Cue:

Notes:

- TERMINATE THE JPM -

STOP TIME ____________

VERIFICATION OF COMPLETION

Job Performance Measure: RESPOND TO ECW LOW DISCHARGE PRESSURE

Performer's Name: ____

Date Performed: ____________________

Time to Complete: ____________________

JPM Results: **Sat / Unsat**

Evaluator:_________________________ **Signature:**_________________________

Date: _________________________

JPM – STUDENT HANDOUT

READ TO PERFORMER:

The evaluator will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

YOU ARE TO INFORM THE EVALUATOR WHEN YOU'VE COMPLETED THE TASK.

CAUTION: Do not operate or alter equipment configuration in the plant without proper authorization.

INITIAL CONDITIONS:

A plant shutdown is being performed in Unit 1 in accordance with 0POP03-ZG-0006, Plant Shutdown from 100% to Hot Standby. Reactor Power is at approximately 15%

11 ESF Diesel Generator is running unloaded in Emergency Mode for a maintenance test run.

INITIATING CUE:

CCW and ECW Trains need to be shifted to accommodate upcoming maintenance. As part of this evolution, the Unit Supervisor directs you to place 'B' ECW Train in service in accordance with 0POP02-EW-0001, Essential Cooling Water Operations, Section 5.7, ECW Pump Startup For Product Lubricated Pumps. A major overhaul has NOT been performed on ECW Pump 'B' (fill and vent is NOT required).

Facility: South Texas Project Date of Examination: 9/26/2011

Examination Level (circle one): RO / SRO Operating Test Number: 1 (NRC)

Administrative Topic (see Note)	Type Code*	Describe activity to be performed:
A1-Conduct of Operations	R, M	Calculate RCS refill volume (without vacuum) 2.1.25 (3.9) Ability to interpret reference materials, such as graphs, curves, tables, etc.
A2-Conduct of Operations	R, D	Determine Reactor Vessel water level 2.1.23 (4.3) Ability to perform specific system and integrated plant procedures during all modes of operation.
A3-Equipment Control	R, N	Verify an Excore QPTR calculation 2.2.12 (3.7) Knowledge of surveillance procedures
A4-Radiation Control	R, P, D	Stay time determination with entry requirements 2.3.4 (3.2) Knowledge of radiation exposure limits under normal or emergency conditions.
Emergency Plan		

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.

*Type Codes and Criteria: (C)ontrol Room; (S)imulator; Class(R)oom
(D)irect from bank (≤ 3 for ROs; (≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: South Texas Project   Date of Examination: 9/26/2011

Examination Level (circle one): RO / SRO   Operating Test Number: 1 (NRC)

Administrative Topic (see Note)	Type Code*	Describe activity to be performed:
A5-Conduct of Operations	R, D	Review SDM calculation 2.1.20 (4.6) Ability to interpret and execute procedure steps.
A6-Conduct of Operations	R, D	Review ESF Power Availability Surveillance Results 2.1.20 (4.6) Ability to interpret and execute procedure steps.
A7-Equipment Control	R, M	Determine Technical Specification action for abnormal RCS activity 2.2.22 (4.7) Knowledge of limiting conditions for operation and safety limits.
A8-Radiation Control	R, P, D	Determine personnel exposure limits 2.3.4 (3.7) Knowledge of radiation exposure limits under normal or emergency conditions.
A9-Emergency Plan	R, N	Determine appropriate Protective Action Recommendation 2.4.44 (4.4) Knowledge of emergency plan protective action recommendations.

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.

*Type Codes and Criteria: (C)ontrol Room; (S)imulator; Class(R)oom
(D)irect from bank (≤ 3 for ROs; (≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

ES-301-1

(A1) Determine the volume of water needed to fill the RCS from a mid-loop condition and the expected final RWST level. This task was modified to be performed using data with the RCS not under vacuum.

(A2) Determine Reactor Vessel water level in accordance with 0POP02-II-0002, RVWL Monitoring System.

(A3) Perform an independent verification of a Quadrant Power Tilt Ratio surveillance in accordance with 0PSP010-NI-0002, Excore QPTR Determination.

(A4) Determine stay-time based on administrative limits for a job in a high radiation area. Entry requirements will also be incorporated into the task.

(A5) Review a completed shutdown margin calculation.

(A6) Review a completed ESF Power Availability surveillance and determine Tech Spec applicability based on the results.

(A7) Determine required Tech Spec actions based on given RCS activity. This task is modified such that a different parameter in the activity spec is out of tolerance.

(A8) Determine personnel exposure margins during an emergency.

(A9) Determine the correct Protective Action Recommendation in accordance with the emergency plan procedures based on the given conditions.

Facility: South Texas Project **Date of Examination:**

Exam Level: RO ☑ SRO-I ☐ SRO-U ☐ **Operating Test No.:** LOT 18 NRC Exam

Control Room Systems (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. (S1) Monthly Control Rod Operability KA: 001 A2.03 (3.5/4.2)	A,D,S	1
b. (S2) Respond to FHB Rad Monitor Alarm KA: 072 A3.01 (2.9*/3.1)	A,D,EN,S	7
c. (S3) Isolate SI Accumulators KA: 006 A4.02 (4.0*/3.8)	A,D,L,S	2
d. (S4) Roll 13.8KV Electrical Buses KA: 062 A4.07 (3.1*/3.1*)	D,L,S	6
e. (S5) Xfer MFW from MFRV to LPFRV KA: 059 A4.03 (2.9*/2.9)	N,S	4S
f. (S6) Respond to ECW Low Disc. Press. KA: 008 A4.01 (3.3/3.1)	A,D,EN,S	8
g. (C1) Transfer to Hot Leg Recirc. KA: 006 A4.05 (3.9/3.8)	C,D,EN,P	3
h. (C2) Respond to RCB High Rad. KA: W/E16 EA2.1 (2.9/3.1)	C,D,L	9

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. (P1) Locally Trip the Reactor KA: 002 A2.04 (4.3/4.6)	A,D,E	4P
j. (P2) Fill SFP from RWST KA: 033 A1.01 (2.7/3.3)	N,R	8
k. (P3) Perform 0POP05-EO-EC00 Add. #4 KA: 062 A4.04 (2.6/2.7)	E,L,N	6

All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SROU systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

*Type Codes	Criteria for RO/SRO-I/SRO-U
(A)lternate Path	4-6 / 4-6 / 2-3
(C)ontrol Room	
(D)irect from Bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN) gineered Safety Features	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: South Texas Project **Date of Examination:**

Exam Level: RO ☐ SRO-I ☑ SRO-U ☐ **Operating Test No.:** LOT 18 NRC Exam

Control Room Systems (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. (S1) Monthly Control Rod Operability KA: 001 A2.03 (3.5/4.2)	A,D,S	1
b. (S2) Respond to FHB Rad Monitor Alarm KA: 072 A3.01 (2.9*/3.1)	A,D,EN,S	7
c. (S3) Isolate SI Accumulators KA: 006 A4.02 (4.0*/3.8)	A,D,L,S	2
d.		
e. (S5) Xfer MFW from MFRV to LPFRV KA: 059 A4.03 (2.9*/2.9)	N,S	4S
f. (S6) Respond to ECW Low Disc. Press. KA: 008 A4.01 (3.3/3.1)	A,D,EN,S	8
g. (C1) Transfer to Hot Leg Recirc. KA: 006 A4.05 (3.9/3.8)	C,D,EN,P	3
h. (C2) Respond to RCB High Rad. KA: W/E16 EA2.1 (2.9/3.1)	C,D,L	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. (P1) Locally Trip the Reactor KA: 002 A2.04 (4.3/4.6)	A,D,E	4P
j. (P2) Fill SFP from RWST KA: 033 A1.01 (2.7/3.3)	N,R	8
k. (P3) Perform 0POP05-EO-EC00 Add. #4 KA: 062 A4.04 (2.6/2.7)	E,L,N	6

All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SROU systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

*Type Codes	Criteria for RO/SRO-I/SRO-U
(A)lternate Path	4-6 / 4-6 / 2-3
(C)ontrol Room	
(D)irect from Bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN) gineered Safety Features	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: South Texas Project Date of Examination:

Exam Level: RO ☐ SRO-I ☐ SRO-U ☑ Operating Test No.: LOT 18 NRC Exam

Control Room Systems (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. (S1) Monthly Control Rod Operability KA: 001 A2.03 (3.5/4.2)	A,D,S	1
b. (S2) Respond to FHB Rad Monitor Alarm KA: 072 A3.01 (2.9*/3.1)	A,D,EN,S	7
c.		
d.		
e.		
f.		
g.		
h.		

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. (P1) Locally Trip the Reactor KA: 002 A2.04 (4.3/4.6)	A,D,E	4P
j. (P2) Fill SFP from RWST KA: 033 A1.01 (2.7/3.3)	N,R	8
k. (P3) Perform 0POP05-EO-EC00 Add. #4 KA: 062 A4.04 (2.6/2.7)	E,L,N	6

All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SROU systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

*Type Codes	Criteria for RO/SRO-I/SRO-U
(A)lternate Path	4-6 / 4-6 / 2-3
(C)ontrol Room	
(D)irect from Bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN) gineered Safety Features	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

<u>S1 and S2 Simulator Setup (IC-215)</u> - 100% Power with all systems in a normal alignment. RT-8035 is in alarm (RM11) (ACKNOWLEDGE the AUDIBLE Alarm but DO NOT ACKNOWLEDGE the flashing light for RT-8035). No other RM-11 alarms are in.

S1 - Perform 0PSP03-RS-0001, Monthly Control Rod Operability, on Control Bank (C) following the corrective maintenance. Determine that Control Bank Rod K-6 drops and performs the Immediate Actions of 0POP04-RS-0001, Control Rod Malfunction. This is an Alternate Path JPM.

S2 - Respond to FHB Rad Monitor Alarm per 0POP04-RA-0001, Radiation Monitoring System Alarm Response, and take appropriate action. Determine that FHB HVAC has not properly actuated and manually align FHB HVAC. This is an Alternate Path JPM.

<u>S3 and S4 Simulator Setup (IC-216)</u> - Mode 3 with RCS Temperature between 440ºF and 450ºF. RCS Pressure is between 900 and 1000 psig.

S3 - CLOSE Safety Injection Accumulator Discharge Valves in accordance with 0POP03-ZG-0007, Plant Cooldown. SI Accumulator Discharge Valves for 'A' and 'B' Accumulators will close Accumulator 'C' has to be vented. This is an Alternate Path JPM.

S4 - Roll Electrical Buses in preparation for de-energizing the 13.8KV Main and Aux Transformers.

<u>S5 and S6 Simulator Setup (IC-217)</u> - About 18% Power with Main Turbine still on line. Start-Up SGFP 14 Running. All SGFPTs on turning gear. 'A' and 'C' ECW in service. ESF D/G #11 is running at the 25% load hold point for a Surveillance Test.

S5 - Transfer Main Feedwater from MFRVs to LPFRVs per Step 5.21 and Addendum 8 of 0POP03-ZG-0006, Plant Shutdown from 100% to Hot Standby.

S6 - Start ECW Pump 'B' in preparation to secure 'C' for maintenance. While starting ECW Pump 'B', ECW Pump 'A' develops a sheared shaft. Perform actions of 0POP09-AN-02M3, Window D-7, 'ECW PUMP 1A DISCH PRESS LO' and secure ESF D/G #11. This is an Alternate Path JPM.

<u>C1</u> - Transfer to Hot Leg Recirculation on SI Train 'A' in accordance with 0POP05-EO-ES14, Transfer to Hot Leg Recirculation.

<u>C2</u> - Respond to an RCB High Rad condition using 0POP05-EO-FRZ3, Response to High Containment Radiation Level, verifies Containment is isolated and places Containment Carbon Filter Units in service.

<u>P1</u> - Perform the remainder of Immediate Action Step 1.0 of 0POP05-EO-FRS1, Response to Nuclear Power Generation - ATWS, and SIMULATE opening the Reactor Trip Breakers. This is an Alternate Path JPM.

<u>P2</u> - Perform a fill of the SFP per 0POP02-FC-0001, SFP Cooling and Cleanup System, using the RWST.

<u>P3</u> - Perform 0POP05-EO-EC00, Loss of all AC Power, Addendum #4, Vital DC Bus Monitoring.

LOT 18 INITIAL LICENSE EXAM

OPERATING TEST #1

SCENARIO #1

Revision #2

Week of 09/26/2011

SCENARIO OUTLINE

Facility: STPNOC **NRC Exam Scenario No.:** 1 **Op-Test No.:** LOT 18 NRC

Examiners: ____________________ **Operators:** ____________________

____________________ ____________________

____________________ ____________________

Initial Conditions: 90% Power and Stable

Turnover: At step 7.52 of 0POP03-ZG-0005. Commence raising power to 98% at 10%/hr.

Event No.	Malf. No.	Event Type*	Event Description
1 (0 min)	N/A	RO (R) BOP (R) SRO (N)	Raise power from 90% to 98%
2 (10 min)	11-01-02 (1) 11-01-06 (1)	BOP (C) SRO (C)	OLACW Pump #12 Trips and OLACW Pump #13 fails to auto start.
3 (20 min)	02-20-01 (1)	RO (I) SRO (I, TS)	PRZ Level Channel LT-465 fails high.
4 (30 min)	07-04-02 (1) 08-12-05 (1)	BOP (C) SRO (C)	SGFPT #12 trips and SU SGFP #14 fails to auto start.
5 (50 min)	02-13-01 (0.6)	RO (C) SRO (C, TS)	PRZ PORV leakage (isolable) after SG levels stabilize.
6 (60 min)	05-03-02 (0.35)	ALL (M)	SGTR on B Steam Generator (~350 gpm) after PORV isolated/Tech Specs addressed. **(CT)**
7 (N/A)	10-02-02 (1) 10-09-02 (1)	RO (C) BOP (C) SRO (C)	Loss of 13.8KV Standby Bus 1G and Train B Sequencer failure. (loss of standby bus occurs on RX Trip - integral) **(CT)**

*** (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor.**

SCENARIO MISCELLANEOUS INFORMATION

INSTRUCTOR NOTES:

Refer to the Instructor Guide for directions on Simulator Setup, Expected Booth Communications and Expected Booth Actions.

CRITICAL PARAMETERS:

The following parameters may be of value in evaluating crew performance and should be automatically recorded during the scenario. Once the scenario is complete for each crew, printout the Critical Parameters and label the printout with date, time, Crew # and scenario #.

- CET Temperatures
- RCS Subcooling
- ECW Pump 1B Pressure
- ESF DG #12 speed
- SG ‘B’ NR level
- RCS Wide Range Pressure

OPERATOR ACTIONS TABLE NOTES:

1. Critical Tasks are indicated by "C" in the position column and indicated in bold type.

2. Actions required throughout the event are indicated as "(continuous)" in the position column.

3. Shaded cells indicate procedural entry points.

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 1

Event 1 Description: Raise Power to 98%

Time	Position	Required Operator Actions	Notes
	SRO (continuous)	Directs the RO and BOP to commence raising power to 98% at 10% per hour.	*Normal evolution with no malfunctions.*
	RO	Uses 0POP02-CV-0001, Makeup to the Reactor Coolant System to begin dilution of RCS to raise Tave. • Places the RC M/U CONT SYS ON switch to STOP. • Places the RC M/U CONT switch to DILUTE. • Ensure the TOT M/U BATCH GALLONS FY-0111B flow integrator is set for the desired # of gallons of dilution water. • Ensures RMW FLOW CONT FK-0111 is set for the desired flowrate. • Places RC M/U CONT SYS ON switch to START. • Verifies RMW PUMP 1A OR RMW PUMP 1B starts. • When the desired gallons of dilution water have been added, ensure makeup is stopped. • Informs the BOP operator when Tave is at a point to allow turbine load to be raised. • Repeats the above steps as required to control RCS Tave during the power increase. • Co-ordinates with the RO to raise load while maintaining Tave within prescribed limits.	*During the brief before the scenario begins the crew will determine how they will perform the power change including amounts of dilution water to be added.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 1

Event 1 Description: Raise Power to 98%

Time	Position	Required Operator Actions	Notes
	BOP	Sets up Main Turbine to raise load and begins raising load: • Uses the SETPOINT CONTROL ↑ PB to set a target load in the SETPOINT display. • Selects the desired load change rate with the LOAD RATE thumbwheel • When RCS Tave is at an appropriate value to commence raising load on the turbine, commences raising load by pushing the GO PB. • Monitors Generator Load change. • Co-ordinates with the RO to raise load while maintaining Tave within prescribed limits.	*Manipulation of the Main Turbine controls is skill of the craft. The operator may refer to 0POP01-TM-0001, Main Turbine/Generator Operations Guidelines, as necessary.* ***Event #2*** *can occur once Lead Examiner sees the crew raise Reactor Power and Main Turbine Load.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 2

Event 2 Description: OLACW Pump #12 Trips and OLACW Pump #13 fails to auto start.

Time	Position	Required Operator Actions	Notes
	BOP	Acknowledges and announces annunciators: • 0POP09-AN-09M1/D3 "ACW OPEN LOOP PUMP TRIP" • 0POP09-AN-09M1/F8 "BASEMENT SHELTER PANEL TRBL"	*Annunciators listed are not inclusive.*
	SRO/BOP	Determines that OLACW Pump #12 tripped and OLACW Pump #13 failed to auto start. • Manually starts OLACW Pump #13.	
	SRO (continuous)	Directs actions of 0POP04-OC-0001, Loss of Open Loop Auxiliary Cooling Water, or 0POP09-AN-09M1/D3, "ACW OPEN LOOP PUMP TRIP."	***NOTE:*** *The steps of 0POP09-AN-09M1/D3, "ACW OPEN LOOP PUMP TRIP." are similar to the steps in 0POP04-OC-0001, Loss of Open Loop Auxiliary Cooling Water, which ensure that OLACW Pump #13 is running.*
	SRO/BOP	Checks OLACW Pump status to determine if any OLACW Pump is running; determines OLACW Pump #11 is running (and possibly # 13 also).	*#13 OLACW Pump is the Standby Pump that must be started manually.*
	BOP	Contacts Plant Operator to secure any liquid waste releases in progress.	*Per the turnover, no liquid releases are in progress.*
	BOP	MONITOR OL-ACW Pressure - GREATER THAN 68 PSIG	*If the Standby Pump (#13) has not yet been started, OLACW pressure will be < 68 psig.*
	BOP	Dispatches an Operator to check the following: • Signs of OL-ACW System leakage inside Protected Area • Seal water flow to the Circ Pumps and seal water pressure for the OLACW pumps. • OLACW discharge strainer DP • Cause of OLACW Pump #12 trip	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 2

Event 2 Description: OLACW Pump #12 Trips and OLACW Pump #13 fails to auto start.

Time	Position	Required Operator Actions	Notes
	BOP	MONITOR The designated Plant Computer Points for system temperatures to determine if any are in alarm.	***Event #3*** *can occur on signal from Lead Examiner once the crew has determined that no leakage exists in the system and that system pressures have returned to normal after the start of OLACW Pump #13.*
	SRO	GO TO Appropriate Plant Procedure As Directed By Shift Manager/Unit Supervisor	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 3

Event 3 Description: Controlling PZR Level Channel LT-0465 fails high. (Tech Spec)

Time	Position	Required Operator Actions	Notes
	RO	Acknowledges and announces annunciators: • 0POP09-AN-04M8/A6 "PRZR LEVEL HI RX TRIP ALERT" • 0POP09-AN-04M8/C6 "PRZR LEVEL DEV HI B/U HTRS ON"	*Annunciators listed are not inclusive.*
	SRO/RO	Determines PZR Level Channel LT-0465 failed high. Performs immediate actions of 0POP04-RP-0002: • PLACES "CHG FLOW CONT FK-0205" in Manual and controls PZR Level on Program.	
	SRO (continuous)	Directs actions of 0POP04-RP-0002, Loss of Automatic Pressurizer Level Control.	*SRO should direct RO and BOP to stop raising RX Power if power change is still in progress..*
	RO	Verifies Letdown is in service.	
	RO	Checks if all Pressurizer Level Channels are operable and determines LT0465 has failed high.	
	RO	Positions the Pressurizer level control selector switch to remove failed channel from service.	*Selects L467/466*
	RO	Positions the Pressurizer level recorder selector switch to an operable channel.	
	RO	Places Pressurizer "HTR CONT GRP 1C to ON.	
	SRO	Notifies I&C to bypass or trip the Pressurizer low level for the failed channel, using plant surveillance procedure listed in procedure Addendum 4.	
	RO	Checks All Tavg Channels are operable.	
	RO/BOP	Checks Tavg is within 1.5°F of Tref. • If needed, the crew can adjust RCS Boron, Turbine Load, Steam Loads and/or Control Rod position.	
	RO	Checks Pressurizer Level is > 17%	
	RO	Checks Normal Letdown is in service.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 3 continued

Event 3 Description: Controlling PZR level Channel LT-0465 fails high. (Tech Spec)

Time	Position	Required Operator Actions	Notes
	RO	Checks “CHG FLOW CONT FK-0205” – is operable.	
	RO	Checks PZR Level Controller LK-0665 is operable.	
	RO	Places PZR Level Controller LK-0665 and “CHG FLOW CONT FK-0205” In Automatic.	*RO will optimize both the demand signals on LK-0665 and FK-0205 prior to placing in Auto.*
	RO	Checks Pressurizer Level is being maintained on Pressurizer Program Level.	
	RO	Checks Excess Letdown is isolated.	
	SRO	Refers to Addendum 7 For Applicable Technical Specifications. TS 3.3.1 Item 12 Action 6 (trip bistable within 72 hours); 3.3.3.5 (NA); 3.3.3.6 (NA)	***Event #4*** *can occur once SRO has reviewed TS for this event.*
	SRO	Initiates corrective action for failed channel.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 4

Event 4 Description: SGFPT #12 Trips and SU SGFP #14 Fails to Auto Start.

Time	Position	Required Operator Actions	Notes
	BOP	Acknowledges and announces annunciators: • 0POP09-AN-06M4/B1 "SGFPT 12 TRIP"	*Annunciators listed are not inclusive.*
	SRO/BOP	Determines that SGFPT #12 has tripped and performs required immediate actions of 0POP04-FW-0002, SGFPT Trip: • Starts Startup Feedpump • Starts the Standby FW Booster Pump	
	SRO (continuous)	Directs actions of 0POP04-FW-0002, SGFPT Trip.	
		Determines the required number of SGFPT's are not running and performs the required immediate actions.	*These are the same actions listed above for necessary immediate actions.*
	BOP	Checks SGFP Master Controller: • Operable in Automatic • Steam Hdr. Pressure PT-557 operable • Feed Hdr. Pressure PT-558 operable • Controlling Steam Flow channels operable	
	BOP	Checks and determines Feedwater Flow is adequate for the current steam demand.	*Crew should not have to perform a down power.*
	BOP	Checks SGFP Recirculation Valve Status: • Valves on operating SGFPT's will be responding automatically (likely closed at this time). • Valve on the tripped SGFPT will be closed.	
	BOP	Monitors Reactor Power and determines it's greater than 15%.	
	BOP	Monitors SG NR Levels trending to program level.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 4

Event 4 Description: SGFPT #12 Trips and SU SGFP #14 Fails to Auto Start.

Time	Position	Required Operator Actions	Notes
	SRO/BOP	Checks for adequate Feed to Steam DP: • DP is greater than that required from Addendum 3, OR • SGFP Master Speed Controller at 100% demand in Auto. • If DP is low, places the SGFPT in Manual and manually controls SGFPT speed to attain the required DP.	*If DP is slightly low, the US may not take the SGFPT Master Controller to manual until he/she has determined the secondary system is no longer in a transient condition.*
	SRO/RO	Checks ΔI within prescribed band or SGFP Master Controller at 100% demand.	
	SRO/BOP	Checks Steam Dumps are in Tavg mode and monitors: • UI-0555 demand is minimum • Steam Dumps are closed. Resets Steam Dump Controller C-7 by placing MODE SEL Sw. to RESET. • Checks C7, Turbine Impulse Pressure Steam Dump Permissive light is out. • Checks Steam Dump Unblock Available light is out.	
	BOP	Checks SGFP Speed - ≤, 5400 RPM OR 5,500 RPM with a flow > 8250 GPM.	*If limits cannot be met, a load reduction may be necessary.*
	BOP	INITIATE Corrective Action For SGFPT #12.	***Event #5*** *can occur on signal from Lead Examiner or just prior to completing the steps of 0POP04-FW-0002, Steam Generator Feed Pump Trip.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 5

Event 5 Description: PRZ PORV leakage.

Time	Position	Required Operator Actions	Notes
	RO	Acknowledges and announces annunciators: • 0POP09-AN-04M7/D1 "PRT PRESS HI" • 0POP09-AN-04M7/E1 "PRT TEMP HI" • 0POP09-AN-04M8/C8 "PRZR PORV DISCH TEMP HI"	*Annunciators listed are not inclusive.* ***NOTE:*** *0POP09-AN-04M8/B5 "PRZR DNBR PRESS LOW" and 0POP09-AN-04M8/B8 "PRZR SFTY RLFV TEMP HI" may also come in depending on the timing of operator actions.*
	RO	Determines that one of the PZR PORVS is leaking past the seat.	*RO Based this on elevated PZR PORV Discharge Temperatures.*
	SRO (continuous)	Directs performance of 0POP04-RC-0003, Excessive RCS Leakage, or 0POP09-AN-04M8/C8 "PRZR PORV DISCH TEMP HI"	• *From CIP of 0POP04-RC-0004, SRO can go directly to Addendum 4, RCS Leakage to the PRT. 0POP09-AN-04M8/C8 "PRZR PORV DISCH TEMP HI" has similar steps as 0POP04-RC-0003, Add 4.* • *The actions listed below are those the crew would perform from 0POP04-RC-0004, Addendum 4.*
	RO	Ensures all Reactor Head Vent Isolation Valves are closed.	
	RO	Ensures RCP Seal Return ICIV and OCIV closed.	
	RO	Checks if PRZR PORV Discharge Temperature is > 150°F (Lampbox 4M08 Window C-8, "PRZR PORV DISCH TEMP HI" - LIT)	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 5

Event 5 Description: PRZ PORV leakage.

Time	Position	Required Operator Actions	Notes
	RO	Checks PRZR PORV(s) for seat Leakage: • Closes both Pzr PORV Isolation Valves. • Opens one PORV Isolation Valve and monitors PORV discharge temperature for a rising trend. • Re-closes PORV Isolation Valve just opened. • Opens other PORV Isolation Valves and monitors PORV discharge temperature for a rising trend. • Final outcome should be the Isolation Valve for the leaking PORV will be closed and the Isolation Valve for the PORV that is not leaking will be opened.	• *The PORV Isolation Valve on whichever PORV shows signs of leakage when its Isolation Valve is opened will be closed and remain closed.* • *The PORV Isolation Valve on whichever PORV does not show signs of leakage will be opened to provide PORV operability.*
	SRO	REFER TO Addendum 7 For Technical Specification Actions. TS 3.4.4 Action A (1 hr action to close PORV Block Valve); 3.4.6.2 (NA once PORV is isolated); 3.4.9.3 (NA)	
	SRO	CONSULT System Engineering and Plant Management To Determine a Plan of Action.	***Event #6*** *can occur once SRO and RO determine which PZR PORV has seat leakage and TS have been evaluated.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 6

Event 6 Description: SGTR on SG 1B. (250 GPM)

Time	Position	Required Operator Actions	Notes
	RO/BOP	Acknowledges and announces radiation monitoring alarms and begins an investigation into possible tube leak.	
	SRO	Begins investigation of SG tube leakage by directing RO/BOP to monitor RCS leakage and identify the affected SG.	
	SRO/RO/ BOP	Identifies the affected SG as 1B SG.	
	SRO (continuous)	Directs/ensures operator actions of 0POP04-RC-0004, Steam Generator Tube Leakage.	*Only a few actions of 0POP04-RC-0004 will be performed because the leak rate quickly escalates to a point requiring a Reactor trip and SI.*
	ALL	Monitor the following to identify affected SG: • Feedflow vs. Steamflow • High radiation in SG samples • High Main Steamline radiation • High SG Blowdown radiation • High leakrate indication on N-16 monitors.	
	SRO	Maintain contact With Health Physics to evaluate radiological conditions in the Secondary Plant prior to performing local operator actions.	
	SRO	Notifies Chemistry to: a. Sample SGs for activity b. Monitor RT-8041 and RT-8042.	• *RT-8041 monitors TGB drains.* • *RT-8042 monitors Condensate Polisher Discharge.*
	BOP	Checks if SG Blowdown Demineralizers are in service.	*The Demineralizers are not in service so crew will contact a Plant operator to place them in service.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 6 continued

Event 6 Description: SGTR on SG 1B. (250 GPM)

Time	Position	Required Operator Actions	Notes
	RO	Maintains Pressurizer Level On Program by: • Lowering Letdown flow • Raising charging flow • Start an additional Charging Pump	• *Trip the Rx and enter EO00 if can't maintain greater than 17%.* • *The crew may use charging flow as an indication of when to trip the Reactor. Maximum charging flow is 200 gpm per pump. If charging flow is at 200 gpm and Pzr level is still lowering, then the leak is beyond the capacity of the normal volume control system and the Reactor should be tripped and a manual Safety Injection actuated.*
	RO	Maintain VCT Level - > 15% with charging pump suction aligned to VCT by using: • Automatic makeup • Manual makeup	*Trip the Rx and enter EO00 if can't maintain greater than 15%.*
	SRO	Determines whether a normal shutdown or fast load reduction is required based on leakage rate and rate of change.	*By this time the SRO will have determined that a Manual RX Trip and SI are needed otherwise an automatic RX Trip and SI will occur. Refer to the next page for actions beginning with the Reactor Trip.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 6 continued and 7

Event 6 Description: SGTR on SG 1B. (250 GPM), 13.8 KV STBY BUS 1H Lockout with Train 'B' Sequencer Failure.
Event 7 Description: Loss of 13.8KV Standby Bus 1G and Train B Sequencer failure (loss of standby bus occurs on RX Trip - integral)

Time	Position	Required Operator Actions	Notes
	SRO (continuous)	Enters 0POP05-EO-EO00, Reactor Trip or Safety Injection, and directs the crew to perform their immediate actions.	***Event #7*** *will automatically occur when the RX is Tripped.*
	RO/BOP	Completes immediate actions of EO00. Reactor Trip/SI: • Reactor Tripped. • Turbine Tripped. • AC ESF Busses energized. • SI is actuated.	• *RO will announce status of immediate action steps as he/she performs them.* • *BOP Operator will monitor the plant and make an announcement of the Reactor trip.* • *ESF DG #12 will be running loaded to ESF 4.16 KV Bus 'B' and ECW Pump 'B' will not be running.*
	SRO	Directs/ensures the immediate actions of EO00, Reactor Trip/SI have been completed by performing a procedure read through of them.	*Before beginning the verification of immediate actions, the US may direct the BOP operator to throttle AFW flow to limit RCS cooldown and/or have RO start ECW Pump 'B' to supply cooling water to ESF DG #12.*
	SRO/BOP (C)* * denotes critical item	Directs BOP to perform Addendum 5, Verification of SI Equipment Operation • FW Isolation • Check for Steamline Isolation • AFW Status • Phase 'A' Containment Isolation • **ECW*** and CCW • Containment Cooling • ECCS pump and valve status • Containment Ventilation Isolation • HVAC systems (CR/EAB/FHB)	• *If not already done, will start ECW Pump 'B' to supply cooling to ESF DG #12.* • *Will have to manually start all 'B' Train Equipment due to Sequencer failure (Event 7).* ***CT – Start ECW Pump 'B' prior to or during performance of 0POP05-EO-EO00, Addendum 5***

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 6 and 7 continued

Event 6 Description: SGTR on SG 1B. (250 GPM)

Time	Position	Required Operator Actions	Notes
	SRO/RO	Check plant status: • Containment pressure: normal • RCP Seal cooling: 6-13 gpm • RCS cooldown: at or trending to 567 °F • Pzr PORV and Spray valve status: closed • Excess Letdown Isol Valves: closed • Monitor RCP trip criteria to determine if RCP's should be stopped: criteria will NOT be met. • Selected Cntmt Isolation Valves: closed.	*RCP trip conditions: at least 1 HHSI Pump is running and RCS pressure is < 1430 psig.*
	ALL	Check if there's a faulted SG – none are faulted.	
	ALL	Check if SG tubes are intact and determines SG "B" is ruptured.	*Crew should place AFW Pump #12 in PTL once 'B' SG NR level is > 14%.*
	BOP	Completes Addendum 5. Reports manually starting 'B' Train components.	*May not complete until after transition to EO30.*
	SRO	Informs crew of transition to 0POP05-EO-EO30, Steam Generator Tube Rupture, and to monitor Critical Safety Functions	
	ALL (continuous)	Monitors the status of Critical Safety Functions when the crew transitions to 0POP05-EO-EO30.	*Cannot implement FRP's until Addendum 5 of 0POP05-EO-EO00, Reactor Trip or Safety Injection, is completed.*
	SRO/RO (continuous)	Checks RCP trip criteria. Ensures RCPs are tripped if RCS pressure drops to less than 1430 psig	
	BOP	Identifies Ruptured SG as SG 1B.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 6 and 7 continued

Event 6 Description: SGTR on SG 1B. (250 GPM)

Time	Position	Required Operator Actions	Notes
	SRO/BOP (C)* *** denotes critical item**	**ISOLATES SG 1B BY:** • ***ADJUSTING SG 1B PORV SETPOINT TO BETWEEN 1260 AND 1265 PSIG.** • ***VERIFIES 1B SG PORV IS IN AUTOMATIC AND CLOSED**. • Verifies Blowdown isolated. • Check SG 1D Ruptured (it is not). • ***CLOSES SG 1B MSIV AND MSIB.** • Verifies SG 1B level is >14% then isolates AFW to SG 1B. ○ ***RESET SI AND SG LO-LO LEVEL SIGNALS.** ○ ***CLOSE SG 1B AFW OCIV.**	***CT - Isolates the ruptured SG prior to commencing cooldown in 0POP05-EO-EO30, SGTR.***
	SRO/BOP	Determines SG 1B pressure is > 468 psig	
	SRO/RO	Checks Pzr PORV availability: • Power to Isolation Valves • PORV's closed • At least one PORV Isolation Valve open.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 1 **Event No.:** 6 and 7 continued

Event 6 Description: SGTR on SG 1B. (250 GPM)

Time	Position	Required Operator Actions	Notes
	SRO/BOP	INITIATES RCS COOLDOWN • Determines target temperature • Blocks Low Steamline Pressure SI when RCS pressure <1985 psig • Determines condenser is available • Places Steam Dumps in Steam Pressure Mode: o Places Steam Dump Controller to Manual with zero demand. o Places Steam Dump Mode Sel. Sw. to Steam Pressure mode. • Places Steam Dump 'INTLK SEL' switches to Bypass Interlock when RCS Tavg is < 563ºF. • Dumps steam to condenser at max rate. • Stops cooldown when target temp reached. • Maintains RCS temperature < target temperature.	• *If 'B' SG pressure is 1100-1150 psig (expected range), target temperature will be 512 °F. If pressure is not within this range the Evaluator will have to note what SG pressure is and check if correct target temperature was used after scenario termination.* • *Terminate scenario after cooldown is commenced.*

CRITICAL TASK SUMMARY

POSITION	EXPECTED RESPONSE	ACCEPTANCE CRITERIA	SAT/ UNSAT
SRO/BOP or RO (C)	**MANUALLY STARTS 1B ECW PUMP TO SUPPLY COOLING WATER TO ESF DG #12.**	Manually start 1B ECW Pump prior to ESF DG #12 stopping due to damage from overheating or prior to completing Addendum 5 of 0POP05-EO-EO00, RX Trip or SI.	
SRO/BOP (C)* * denotes critical item	**ISOLATES SG 1B BY:** • ***ADJUSTING SG 1B PORV SETPOINT TO BETWEEN 1260 AND 1265 PSIG.** • ***VERIFIES 1B SG PORV IS IN AUTOMATIC AND CLOSED**. • Verifies Blowdown isolated. • Check SG 1D Ruptured (it is not). • ***CLOSES SG 1B MSIV AND MSIB.** • Verifies SG 1B level is >14% then isolates AFW to SG 1B. ○ ***RESET SI AND SG LO-LO LEVEL SIGNALS.** ○ ***CLOSE SG 1B AFW OCIV.**	Isolates the ruptured SG prior to commencing cooldown in 0POP05-EO-EO30, SGTR.	

TURNOVER INFORMATION

- Reactor Power is 90%.
- Plans are to raise power to 98% per 0POP03-ZG-0005, Plant Startup to 100%, Step 7.52. The fuel has been conditioned.
- All systems are operable and in a normal lineup.
- Cycle Burnup is 150 MWD/MTU. (BOL)
- RCS Boron Concentration is 1416 ppm.
- Boric Acid Tank ‘A’ is at 7315 ppm and ‘B’ is at 7309 ppm.
- No liquid waste discharges are in progress or planned.
- No personnel are in containment.
- FHB Truck Bay doors are closed.
- No ESF DG FOST’s are on recirc.
- Unit 1 is the Load Control Unit.

SIMULATOR SETUP

1. Check and Clean the following procedures:
   - 0POP03-ZG-0005, Rev. 69, Plant Startup to 100%, Step 7.52.
   - 0POP02-CV-0001, Rev. 34, Makeup to the Reactor Coolant System
   - 0POP04-OC-0001, Rev. 15, Loss of Open Loop Auxiliary Cooling Water
   - 0POP09-AN-09M1/D3, Rev, 28, 'ACW OPEN LOOP PUMP TRIP'
   - 0POP04-RP-0002, Rev. 20, Loss Of Automatic Pressurizer Level Control
   - 0POP04-FW-0002, Rev. 25, Steam Generator Feed Pump Trip
   - 0POP04-RC-0003, Rev. 16, Excessive RCS Leakage
   - 0POP09-AN-04M8/C8, Rev. 35, 'PRZR PORV DISCH TEMP HI'
   - 0POP04-RC-0004, Rev. 27, Steam Generator Tube Leakage
   - 0POP05-EO-EO00, Rev. 21, Reactor Trip or SI
   - 0POP05-EO-EO30, Rev. 23, Steam Generator Tube Rupture

   - Additional Annunciator Response Procedures: Refer to those listed in the Scenario Outline.

   <u>ALL</u> Annunciator Response Procedures (ARP's) must be checked if this scenario is the first to be run on this day. Setup for subsequent runs of this scenario only requires those ARP's that were actually marked-in to be checked. Instructors running the scenario must keep track of which ARP's these are, otherwise, all will have to be checked for subsequent scenarios as well.

2. Log into Instructor Workstation as 'lotnrc' user, open Orchid (nstps server), then 'Unlock' Initial Conditions Group 'lotnrc'.

3. Reset to IC #210 and verify:
   - Step Counter positions (CP-005 annunciator window cleared)
   - Red light on end of CP-010 off
   - ICS Annunciators have stopped counting up
   - Ensure the proper FOP/BO sign is posted at CP-005. Should be: FOP 249 steps/BO 112 steps.

4. Go to RUN and perform the following:
   - Annunciators are acknowledged, reset, silenced.
   - RM-11 is functional; alarms are acknowledged (stop flashing). Ensure all grids are checked.
   - Control Switch FLAGS aligned appropriately to breaker position on CP-003, CP-007 and CP-010.
   - Verify both FHB Filter Outlet Damper controllers are in AUTO <u>and</u> CLOSED (HV-9507 and 9507A).
   - Verify Divert Valve, TCV-0143, control sw. on CP-004 is in the AUTO position.
   - Verify the Reactor Makeup Water Non-essential Valves, FV-7663, FV-7659, are both in the AUTO position.

SIMULATOR SETUP (cont'd.)

NOTE

THE SCENARIO LESSON PLAN MUST BE RUN FROM THE LEFT MOST INSTRUCTOR STATION TO ALLOW FOR RECORDING AND STORING CRITICAL PARAMETER DATA.

5. Open lesson plan for 'Scenario 1' in 'lotnrc' directory, then execute lesson plan. These actions will set up any initial conditions for the scenario. Run the scenario in accordance with the next section, 'Scenario Instructions'.
6. Set TOTAL M/U BATCH integrator to 10 gallons. **(CHECK BEFORE EACH SCENARIO)**
7. Verify BA Controller Pot setting is 3.87 **(CHECK BEFORE EACH SCENARIO)**
8. Place the simulator in FREEZE
9. Open 0POP03-ZG-0005, Plant Startup to 100%, at Step 7.52.

SCENARIO INSTRUCTIONS

1. Provide Shift Turnover sheets to the crew and review the information. Ensure the candidates don't have any questions.

2. Ensure the Beacon book from the simulator is available to the crew in the briefing room.

3. Review the Simulator Differences list with the crew.

4. Have the crew perform their board walkdown and inform the floor instructor when ready to take the watch.

5. Note START TIME when the crew takes the watch and place the simulator in RUN. Verify simulator clock is set correctly.

START TIME: ________ (time crew takes the watch)

ALWAYS 'TRIGGER' EVENTS IN THE SIMULATOR SCENARIO LESSON PLANS. THIS WAY, ANY TIME DELAYS ASSOCIATED WITH EVENTS WILL TAKE PLACE AS INTENDED.

REFER TO 'EXPECTED BOOTH COMMUNCATIONS' AND 'EXPECTED BOOTH ACTIONS' SECTIONS FOR INSTRUCTOR ACTIONS DURING THE SCENARIO.

6. Trigger the step titled 'Start Chart' and ensure specified Critical Parameters for the scenario begin recording as the scenario runs.

NOTE: ***Events (Lesson Plan Steps) are triggered upon the Lead Examiners cues or at the times listed below (time from last event).***

7. Time + **10 MIN.** – Trigger **STEP 2** (OLACW Pump #12 Trip)

8. Time **+ 20 MIN**. - Trigger **STEP 3** (LT-0465 fails high)

9. Time **+ 30 MIN**. - Trigger **STEP 4** (SGFPT #12 Trips)

10. Time + **50 MIN**. - Trigger **STEP 5** (PZR PORV Leakage)

11. Time + **60 MIN**. – Trigger **STEP 6** (SGTR on 'B' SG)

12. Place simulator in FREEZE when cued by the Lead Examiner to terminate scenario.

13. DO NOT RESET simulator until <u>all</u> Examiners have completed Follow-Up Questioning.

SCENARIO INSTRUCTIONS (cont'd.)

14. Saving Critical Parameters data:

- Click on the 'Charts' icon on the left side of the screen
- Select 'Pause', then select 'All'
- Click on the 'Print' icon, then select 'All'
- This will bring up a file save window. Enter a filename that identifies the crew and scenario (e.g. 'crewA_N1' could be a filename for Crew 'A', NRC scenario 1).
- Save the new file to the Desktop.

NOTE: Some scenarios will have more than one chart. For these, each chart file must be separately saved with a unique filename.

EXPECTED BOOTH COMMUNICATIONS

EVENT 1: RAISE POWER TO 88-90%

If any calls are made to management, transmission & distribution, etc., acknowledge that power is being raised to 98%.

EVENT 2: OLACW PUMP #12 TRIPS AND OLACW PUMP #13 FAILS TO AUTO START

As a Plant Operator,

- When asked to check the OLACW system inside the Protected Area for leakage, inform the Control Room you'll check for leakage. After a short time or, if the Control Room contacts you again for a status update, inform the Control Room you've just completed your walkdown and there are no signs of leakage.

- When asked to check Circ Water Pump seal water flow and OLACW Pump seal pressure, after a short time inform the Control Room that CW Pump seal water flow is approximately 12-14 gpm (normally approx. 12 gpm) and OLACW Pump seal pressure is 40 psig (can be 30-70 psig & is normally 40 psig).

- When asked to check the OLACW discharge strainer DP, after a short time report DP is 6 psid.

- If asked to investigate the cause of the pump trip, report back that the breaker for OLACW Pump #12 has an Overcurrent Relay flag. Report that locally OLACW Pump #12 has no signs of why it tripped.

- If asked about OLACW Pump #13 seal water pressure or if the pump is running satisfactory, then report that OLACW Pump #13 has adequate seal water pressure and/or that the pump is running SAT.

- When asked to check "Basement Shelter Panel TRBL," clear the local ZLP150 alarm from the Instructor station, then report back that the alarm was "OLACW Press Low." The alarm came in and cleared.

- When if asked if there are any liquid waste discharges in progress, report there are none in progress.

EVENT 3: LT-0465 FAILS HIGH

As I&C Maintenance or the Duty Maintenance Supervisor, if notified to place the channel in trip or bypass, acknowledge the request. No further action is necessary.

EVENT 4: SGFPT #12 TRIPS AND SU SGFP #14 FAILS TO AUTO START

When asked to investigate, report back as the Plant Operator that there are no obvious signs locally of why SGFPT #12 tripped. Report that SU SGFP #14 and FWBP #13 are running SAT if they were manually started from the Control Room.

EVENT 5, PZR PORV SEAT LEAKAGE

As the Duty Maintenance Supervisor, acknowledge that there is seat leakage from PZR PORV RC-PCV-0655A and that the associated block valve is closed.

EVENT 6, SGTR ON ‘B’ SG

If asked, report as the Plant Operator that SG Blowdown Demins are not in service.

If contacted by the Control Room to inform you to stay clear of ‘B’ Train IVC (due to SG tube leak), acknowledge the direction. No further action is needed.

EVENT 7, LOSS OF 13.8 KV STBY BUS 1G WITH TRAIN ‘B’ SEQUENCER FAILURE

Due to escalating events, there will probably be no communications made on this event prior to the end of the scenario.

EXPECTED BOOTH ACTIONS

1. DA High Level Dump Valves

If asked to open the DA High Level Dump Valves, perform the following or Trigger Step 8:

- Select ‘Remotes’
- Select ‘Condensate System’
- Select ‘Page 1 of 2’
- Scroll down to locate remotes CD-27 and CD-28
- Insert a value of 0.3 for each valve
- Report to the Control Room that the DA High Level Dump Bypass Valves are open X turns (X = the # of turns requested).

2. AFWST Makeup

If asked to initiate makeup to the AFWST, perform the following or Trigger Step 9:

- Select ‘Remotes’
- Select ‘Auxiliary Feedwater System’
- Scroll down to locate remote for AF-17
- Change value from ‘Norm’ to ‘Open’
- Select ‘Insert’
- Report to the Control Room you’re filling the AFWST

LOT 18 INITIAL LICENSE EXAM

OPERATING TEST #1

SCENARIO #2

Revision #2

Week of 09/26/2011

SCENARIO OUTLINE

Facility: STPNOC **NRC Exam Scenario No.:** 2 **Op-Test No.:** LOT 18 NRC

Examiners: ____________________ **Operators:** ____________________

____________________ ____________________

____________________ ____________________

Initial Conditions: 48% power and stable. Condensate Pump #13 OOS for Maintenance.

Turnover: Tornado Watch is in effect. 0POP04-ZO-0002, Addendum 1 has been completed to step 10. Management has made the decision to hold reactor power at 48% until a current line of thunderstorms moves through the area. Start Train A and secure Train C Control Room HVAC for surveillance testing later in the shift.

Event No.	Malf. No.	Event Type*	Event Description
1 (0 min)	POSBBA RP08433 TCC (0)	RO (C) SRO (C, TS)	Swap running CRE HVAC trains. Train A Supply fan trips on overcurrent after starting.
2 (15 min)	05-14-01 (0.6)	BOP (I) SRO (I)	Feedwater Header Pressure PT-557 fails to an intermediate position. (Ramps in over 5 minutes)
3 (25 min)	04-01-01 (1)	RO (C) SRO (C, TS)	CCW Pump 1A Trips and CCW Pump 1C fails to Auto Start.
4 (45 min)	AST1 & AST3 (1)	RO (C) BOP (C) SRO (C)	Main Turbine trip below P-9
5 (N/A)	02-01-02 (.0007) (.4)	ALL (M)	308 gpm SBLOCA on Loop B. **(CT)**. Leak rate rises after sequencers are reset in POP05-EO-EO10. **(CT)**
6 (N/A)	01-12-16,17,18, 19,22,23, (1)	BOP (C) SRO (C)	Automatic Feedwater Isolation fails following the SI actuation (Integral)

*** (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor.**

SCENARIO MISCELLANEOUS INFORMATION

INSTRUCTOR NOTES:

Refer to the Instructor Guide for directions on Simulator Setup, Expected Booth Communications and Expected Booth Actions.

CRITICAL PARAMETERS:

The following parameters may be of value in evaluating crew performance and should be automatically recorded during the scenario. Once the scenario is complete for each crew, printout the Critical Parameters and label the printout with date, time, Crew # and scenario #.

- Containment Spray Pump Flows (all 3)
- All SG Pressures
- Containment Pressure
- WR RCS Pressure

OPERATOR ACTIONS TABLE NOTES:

1. Critical Tasks are indicated by "C" in the position column and indicated in bold type.

2. Actions required throughout the event are indicated as "(continuous)" in the position column.

3. Shaded cells indicate procedural entry points.

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 1

Event 1 Description: Start Train 'A' and Secure Train 'C' CRE HVAC Trains. Train 'A' Supply fan will develop a sheared shaft after starting.

Time	Position	Required Operator Actions	Notes
	SRO (continuous)	Directs the RO to start Train 'A' CRE HVAC and secure Train 'C' CRE HVAC per 0POP02-HE-0001, Electrical Auxiliary Building HVAC System.	*RO will start at step 5.1.2 of 0POP02-HE-0001, Electrical Auxiliary Building HVAC System.*
	RO	OPEN Train A "INL ISOL DMPR FV-9670 and 9671" by holding handswitch in "OPEN" until the damper indicates fully OPEN.	
	RO	OPEN Train A "RET DMPR FV-9698" by holding handswitch in "OPEN" until the damper indicates fully OPEN.	
	RO	START Train A "RET FAN 11A".	
	RO	START Train A "SPLY AHU 11A(21A)".	*Train 'A' Supply Fan will trip on overcurrent after starting.*
	RO	Acknowledges and announces annunciators: • 22M12 Bypass INOP Alarm "SPLY FAN 11A"	
	SRO/RO	Determines that Train 'A' Supply Fan tripped after starting. Dispatches a Plant Operator to investigate.	*Plant Operator calls back with information that the Train 'A' Control Room Supply Fan motor is hot to the touch.*
	SRO/RO	Determines that Train 'A' CRE HVAC needs to be secured.	*It is OK if the crew does not secure Train 'A' CRE HVAC prior to moving on to next event.*
	SRO	INITIATE Corrective Action For Failed Component.	
	SRO	Determines applicable Technical Specification Actions for Train 'A' Control Room Supply Fan. TS 3.7.7 Action A. (Restore within 7 days)	***Event #2*** *can occur once SRO has reviewed TS for this event.* • *Event #2 ramps in over 5 minutes.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 2

Event 2 Description: Steam Header Pressure PT-0557 fails to an intermediate position.

Time	Position	Required Operator Actions	Notes
	BOP	Acknowledges and announces annunciators: • 0POP09-AN-06M3/E3 & E7 • 0POP09-AN-06M4/E3 & E7 • "SG STM/FW FLOW MSMTCH" on ≥ SG's.	*Annunciators listed are not inclusive.*
	SRO/BOP	Determines Steam Header Pressure PT-0557 has failed. Performs required immediate actions of 0POP04-FW-0002: • Checks SGFP Master Speed Controller and determines it is NOT responding appropriately in Automatic. • Takes manual control of SGFP Master Speed Controller and adjusts output to restore SG levels to 68-74%.	*PT-0557 will fail to approximately mid-scale over 5 min. so crew may not immediately diagnose why SG Feed Pumps are slowing down.*
	SRO (continuous)	Directs performance of 0POP04-FW-0002, Steam Generator Feed Pump Trip.	
	BOP	Checks SGFPT's – required number running.	
	BOP	Checks SGFP Master Speed Controller: • Operable in Automatic – determines it is not. • Places the controller in manual and adjusts output to raise feedflow.	*The PT-557 failure should be revealed during this step if not already done.*
	BOP	Checks if Feedflow is adequate for current steam demand.	*By now, the BOP operator should have raised the output of the SGFP Master Speed Controller sufficiently to raise feedflow above steam flow.*
	BOP	Checks SGFP Recirc Valves status – should be responding in Automatic	
	BOP	Monitors SG Levels trending to program.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 2

Event 2 Description: Steam Header Pressure PT-0557 fails to an intermediate position.

Time	Position	Required Operator Actions	Notes
	BOP	Checks Feedwater/Steam Header DP per Addendum 3 requirements	*BOP may have to make manual adjustments to SGFP Master Speed Controller to maintain Feedwater/Steam Header DP per Addendum 3.*
	RO	Checks Delta-I is within the required band.	
	BOP	Checks Steam Dumps status: • in Tave mode • Steam Dump Controller UI-0555 at minimum demand and Steam Dumps are closed. • Reset C7 by momentarily placing the Steam Dump Mode Sel Sw. to RESET. • Check C7 TURB IMP PRESS STM DUMP PERMISSIVE light is extinguished. • Check STEAM DUMP UNBLOCK AVAILABLE light is extinguished.	
	BOP	Checks SGFP speeds are: • ≤ 5400 rpm OR • ≤ 5500 rpm with a flow > 8250 gpm	***Event #3*** *can occur here since SRO and BOP have essentially completed the steps of 0POP04-FW-0002, Steam Generator Feed Pump Trip.*
	SRO	INITIATE Corrective Action For Failed Component.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 3

Event 3 Description: CCW Pump 1A Trips and CCW Pump 1C fails to auto start.

Time	Position	Required Operator Actions	Notes
	RO	Acknowledges and announces annunciators: • 0POP09-AN-02M3/A5 "CCW PUMP 1A TRIP"	*Annunciators listed are not inclusive.*
	SRO/BOP	Determines that CCW Pump 1A tripped and CCW Pump 1C failed to auto start.	
	SRO	Directs RO to perform the Annunciator Response Procedure for the trip of CCW Pump 1A.	*0POP09-AN-02M3 02M3-A-5, CCW PUMP 1A TRIP*
	RO	IF CCW header pressure decreased to less than or equal to 76 psig, then ensure the standby ECW/CCW train running.	• *ECW Pump 1A is already running. The RO will have to manually start CCW Pump 1C.* • *Depending on the CCW pressure perturbation, the crew may also have to implement 0POP04-RC-0002, RCP Off Normal, to re-open the CCW Thermal Barrier Isolation Valves.*
	RO	EnsureCCW is available to the in service charging pump.	*CCP 1A is in service.*
	RO	IF standby ECW/CCW pumps started, then check for proper operation and alignment per: • 0POP02-CC-0001, Component Cooling Water o Supply and return header valves are open. o Checks system pressure ≥ 80 psig o Checks flow 7500-15000 gpm o Supplementary Cooler is running o CCW Train Mode Switches are positioned appropriately. o CCW System temperature is 60 °F to 105 °F. • 0POP02-EW-0001 – Train 'C' ECW was already in service so no actions should be required.	*The Mode Switches have 3 positions: OFF, STANDBY, and RUN. They will likely be positioned as follows:* *Train 'A' – OFF* *Train 'B' – STANDBY* *Train 'C' – RUN*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 3

Event 3 Description: CCW Pump 1A Trips and CCW Pump 1C fails to auto start.

Time	Position	Required Operator Actions	Notes
	RO	Place CCW PUMP 1A handswitch in PULL TO LOCK.	
	RO	Place the remaining ECW/CCW train in standby per 0POP02-CC-0001, Component Cooling Water.	*This action may have already been done by aligning the CCW Train Mode Switches described earlier.*
	RO	ENSURE CCW Train A secured per 0POP02-CC-0001, Component Cooling Water: • CCW aligned to its Train RHR Hx • CCW Rad Monitor aligned to an operating train. • Places all CCW Train Mode Switches to OFF • Close Train RHR Hx Outlet Valve • Checks system pressure ≥ 80 psig • Checks flow 7500-15000 gpm • Places CCW Train Mode Switches in desired positions. • Stops CCW Pump 1A Supplementary Cooler • Ensures CCW Flow Control Valve MOV-0642 is closed. • Ensures CCW Temperature Control Valve MOV-0643 is open.	
	SRO	TAKE appropriate action per Technical Specification 3.7.3 Action A. (Restore within 7 days)	***<u>Event #4</u>*** *can occur once the SRO has addressed Tech Specs for CCW Pump 1A.*
	SRO	INVESTIGATE cause of CCW Pump 1A trip.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 4

Event 4 Description: Main Turbine Trip Below P-9.

Time	Position	Required Operator Actions	Notes
	RO/BOP	Determines that the Main Turbine has tripped.	
	SRO (continuous)	Directs performance of 0POP04-TM-0003, Main Turbine Trip Below P-9.	
	BOP	VERIFY Main Turbine tripped: • All Throttle Valves closed • Main Generator output breaker open	
	RO	CHECK if Rod Control System in Automatic. • Determines Rod Control is in Manual and places it in Automatic.	
	RO	Monitor Rod Control System is responding to RCS Tave/Tref deviation.	
	BOP	Monitor Steam Dump Valves are responding to RCS Tave/Tnoload deviation.	
	RO	Checks if RCS Tave is between 572°F and 577°F. • When Tave is within the above range, places Rod Control in Manual.	
	BOP	Checks for AMSAC actuation – should not be actuated.	*AMSAC – ATWS Mitigation Actuation Circuit*
	BOP	Checks Steam Generator NR Levels at or trending to 68 – 74%.	*SGFPT control will still be in MANUAL so there's a possibility a Reactor trip on SG level may occur. If a Rx trip does occur, Event 5 (SBLOCA) will be activated at that time.*
	RO	Checks Pressurizer Level at or trending to Program level.	
		Checks Pressurizer Pressure at or trending to 2220 – 2250 psig.	
	RO	Checks Reactor Power is < 35%	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 4

Event 4 Description: Main Turbine Trip Below P-9.

Time	Position	Required Operator Actions	Notes
	BOP	Checks SGFPT Status – two in service	*Will end up with 1 SGFPT running.*
	BOP	Checks SGFPT Master Controller in Automatic	*Controller will be in Manual due to previous failure of PT-557.*
	BOP	Secures one SGFPT: • Places respective speed controller in Manual. • Reduces speed to 3300 rpm • Checks SGFP Master Speed Controller is in Manual. • Adjusts speed of IN-SERVICE SGFPT to approximately 5200 rpm. • Secure unnecessary SGFP's per direction of Unit Supervisor.	*US may leave SGFPT at 3300 rpm so there's an immediate backup available if the operating SGFPT fails for some reason.*
	BOP	Monitor the following for Main Turbine coastdown: • Proper Turning Gear operation • Turbing Bearing Lift Pump starts at Main Turbine speed of 600 rpm.	
	BOP	Starts the Main Turbine "L.O./SEAL OIL BACKUP PUMP"	*Pump may have already started by the time this step is reached.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 4

Event 4 Description: Main Turbine Trip Below P-9.

Time	Position	Required Operator Actions	Notes
	BOP	Places Steam Dumps in Steam Pressure Mode: • Places Steam Dump Header pressure Controller PK-0557 in Manual. • Adjusts PK-0557 output to match the demand on meter UI-0555. • Places Steam Dump MODE SEL Sw. to STM PRESSURE. • Adjusts PK-0557 setpoint dial to current header pressure. • Uses PK-0555 in Manual to control steam header pressure.	***Event #5*** *can occur once the Steam Dumps are placed in the Steam Pressure Mode and upon a signal from the Lead Examiner.* *Steam Dumps should not be placed in Automatic because of the PT-557 failure that occurred earlier.*
	BOP	Checks AFW System Status • AFW secured • AFW system alignment is in Standby status.	
	RO	Checks RCS Tave is within 1.5 °F of Program Tave per Addendum 2.	
	BOP	Perform the following for the Main Generator: • Place "GEN BKR" in the PULL TO LOCK position • Place Main Generator Exciter "FLD BKR" in the PULL TO LOCK position • Place the "VOLT REG CONT" switch in the OFF position • Ensure the "BASE ADJUSTER" and "VOLTAGE ADJUSTER" control in the full counterclockwise position.	
	BOP	Place “TURB STM LN DRN VLV” in the OPEN Position.	
	SRO	REVIEW Applicable Technical Specifications.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 5

Event 5 Description: 308 gpm SBLOCA on Loop B. Leak rate rises 1 minute after Sequencers are reset in POP05-EO-EO10.

Time	Position	Required Operator Actions	Notes
	RO/BOP	Acknowledges and announces annunciators: • RM-11 Radiation Monitor alarms in Containment.	*Annunciators listed are not inclusive.*
	All	Determine that an RCS leak has developed in the RCB.	
	SRO (continuous)	Directs performance of 0POP04-RC-0003, Excessive RCS Leakage.	
	SRO/RO	Determine an RCS leak rate amount.	*The SRO may elect to go straight to 0POP05-EO-EO00, Rx Trip or SI due to escalating leakage.*
	RO	Maintains Pressurizer Level On Program Level by: • Lowering Letdown flow • Raising Charging flow • Start an additional Charging Pump	
	RO	Maintain VCT Level – greater than 15% with Charging Pump suction aligned to VCT by: • Auto Makeup OR • Manual Makeup	• *Once the leak has been identified as being inside Containment, the US should go to Addendum #3.* • *SRO will eventually be required to go to 0POP05-EO-EO00, Rx Trip or SI, when PZR and/or VCT level can not be maintained.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 5 continued and 6

Event 5 Description: 308 gpm SBLOCA on Loop B. Leak rate rises 1 minute after Sequencers are reset in POP05-EO-EO10.

Event 6 Description: Automatic Feedwater Isolation fails following the SI actuation. (Integral)

Time	Position	Required Operator Actions	Notes
	SRO (continuous)	Enters 0POP05-EO-EO00, Reactor Trip or Safety Injection, and directs the crew to perform their immediate actions.	***<u>Event #6</u>*** *will automatically occur when SI is actuated.*
	RO/BOP	Completes immediate actions of EO00. Reactor Trip/SI: • Reactor Tripped. • Turbine Tripped. • AC ESF Busses energized. • SI is actuated.	• *RO will announce status of immediate action steps as he/she performs them.* • *BOP Operator will monitor the plant and make an announcement of the Reactor trip.*
	SRO	Directs/ensures the immediate actions of EO00, Reactor Trip/SI have been completed by performing a procedure read through of them.	*Before beginning the verification of immediate actions, the US may direct the BOP operator to throttle AFW flow to limit RCS cooldown.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 5 continued and 6

Event 5 Description: 308 gpm SBLOCA on Loop B. Leak rate rises 1 minute after Sequencers are reset in POP05-EO-EO10.

Event 6 Description: Automatic Feedwater Isolation fails following the SI actuation. (Integral)

Time	Position	Required Operator Actions	Notes
	SRO/BOP	Directs BOP to perform Addendum 5, Verification of SI Equipment Operation • FW Isolation; must manually close or check closed the following: o FW Isolation Valves o FW Isolation Bypass Valves o FW Preheater Bypass Valves o FW Reg Valves o Low Power FW Reg Valves o SG Blowdown Isolation Valves o SG Sample Isolation Valves • Check for Steamline Isolation • AFW Status • Phase 'A' Containment Isolation • ECW and CCW • Containment Cooling • ECCS pump and valve status • Containment Ventilation Isolation • HVAC systems (CR/EAB/FHB)	***Event #6*** *BOP will have to manually perform Feedwater Isolation by manually closing or checking closed the appropriate valves.* *RCFC – Reactor Containment Fan Cooler.*
	SRO/RO	Check plant status: • Containment pressure: normal • RCP Seal cooling: 6-13 gpm • RCS cooldown: at or trending to 567 °F • Pzr PORV and Spray valve status: closed • Excess Letdown Isol Valves: closed • Monitor RCP trip criteria to determine if RCP's should be stopped: criteria will NOT be met. • Selected Cntmt Isolation Valves: closed.	*RCP trip conditions: at least 1 HHSI Pump is running and RCS pressure is < 1430 psig.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 5 continued

Event 5 Description: 308 gpm SBLOCA on Loop B. Leak rate rises 1 minute after Sequencers are reset in POP05-EO-EO10.

Time	Position	Required Operator Actions	Notes
	All	Checks for Faulted SG – all SG pressures are controlled and > Containment pressure.	
	All	Checks if SG Tube are intact: • Main Steamline Rad Monitors • SG Blowdown Rad Monitors • CARS Pump Rad Monitor • No SG level rising in an uncontrolled manner.	*No evidence of tube leakage will exist.* *CARS – Condenser Air Removal System*
	All	Determines that there is an active RCS leak in containment.	
	SRO (continuous)	Informs crew of transition to 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant.	
	RO	Monitors if RCP's should be stopped.	*RCP trip conditions: at least 1 HHSI Pump is running and RCS pressure is < 1430 psig.*
	SRO/BOP (C)	**DEPRESSURIZE Intact SG's To 1000 PSIG** • Check RCS pressure - > 415 PSIG • Check Pressurizer pressure <1985 psig • Block Low Steamline Pressure SI • Check condenser is available • Checks Steam Dumps in steam pressure mode • Ensures "HDR PRESS CONT PK-0557" is in MANUAL • Adjusts "HDR PRESS CONT PK-0557" setpoint to between 7.0 (980 PSIG) and 7.1 (994 PSIG). • Depressurize intact SG's to between 980 PSIG and 994 PSIG using steam dumps in Manual • Checks RCS TAVG - < 563ºF **ACTIONS CONTINUED ON NEXT PAGE**	*Steam Dumps were placed in Steam Pressure Mode following Turbine trip.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 5 continued

Event 5 Description: 308 gpm SBLOCA on Loop B. Leak rate rises 1 minute after Sequencers are reset in POP05-EO-EO10.

Time	Position	Required Operator Actions	Notes
	BOP	• Places Steam Dump "INTLK SEL" switches to BYPASS INTERLCK. • Ensures "HDR PRESS CONT PK-0557" is in Automatic. • Control Steam Dumps manually to control SG pressures ≤ to 994 PSIG • Adjusts intact SG PORV controller setpoints to between 995 PSIG and 1000 PSIG (QDPS PRI/SEC). • Ensures SG PORV controllers are in Automatic	• *These actions are a continuation from the previous page.* • *PK-0557cannot be placed in Auto due to the failure of PT-557 earlier.*
	BOP	Monitors if SG Secondary Pressure Boundaries are intact: SG pressures controlled or rising and > Containment pressure.	
	RO	• Resets SI • Resets ESF Load Sequencers • Resets Containment Isolation Phase 'A' • Resets Containment Isolation Phase 'B'	*1 minute after the Sequencers are reset, the RCS leak will become a LBLOCA.*
	BOP	Monitor Intact SG Levels 22-50% NR • Controls AFW to maintain NR levels within this band	
	BOP	CHECK Secondary Radiation: • Reset SG LO-LO level actuations. • Reset SG Blowdown and Sample Isolations. • Notify Chemistry to sample SG's. • Monitor secondary radiation: o Main Steamline Rad Monitors o SG Blowdown Rad Monitors o CARS Pump Rad Monitor	
	ALL	Determines the RCS LOCA has gotten worse and notes an Orange Path on the Containment Integrity CSF.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 2 **Event No.:** 5 continued

Event 5 Description: 308 gpm SBLOCA on Loop B. Leak rate rises 1 minute after Sequencers are reset in POP05-EO-EO10.

Time	Position	Required Operator Actions	Notes
	SRO (continuous)	Informs crew of transition to 0POP05-EO-FRZ1, Response to Containment High Pressure.	
	RO	Verifies Containment Spray established: • Containment pressure < 56.5 psig • Determines NO Containment Spray Pumps are running.	*CS Pumps will not start on Containment Pressure above 9.5 psig because the ESF Sequencers have been reset.*
	RO	Verifies Containment Isolation Phase A Valves - CLOSED, REFER TO ADDENDUM 1, PHASE A ISOLATION VERIFICATION.	
	RO	Verifies Containment Ventilation Isolation: Purge Fans stopped, dampers closed.	
	SRO/RO (C)	Check if Containment Spray is required: • Determines Containment pressure has exceeded 9.5 PSIG • Stops ALL RCP's • **Manually starts 2 Containment Spray Pumps** • **Verifies proper Containment Spray valve alignment:** ○ **Containment Sump to SI Suction Header Valve closed.** ○ **RWST to SI Suction Header Valve open** ○ **CS Pump Discharge Valves open**	*Terminate the scenario when Containment Spray Pumps are started and spray flow is verified.*

CRITICAL TASK SUMMARY

POSITION	EXPECTED RESPONSE	ACCEPTANCE CRITERIA	SAT/ UNSAT
SRO/BOP (C)	**Depressurize intact SG's to 1000 psig.**	Depressurize intact SG's to less than 1000 psig within 45 minutes of the initiation of the SBLOCA.	
SRO/RO (C)	• **Manually starts 2 Containment Spray Pumps** • **Verifies proper Containment Spray valve alignment:** o **Containment Sump to SI Suction Header Valve closed.** o **RWST to SI SI Suction Header Valve open** **CS Pump Discharge Valves open**	Manually starts 2 CS Pumps and verifies valve alignment prior to exiting 0POP05-EO-FRZ1.	

TURNOVER INFORMATION

- 48% power and stable.
- Condensate Pump #13 OOS for Maintenance.
- Tornado Watch is in effect. 0POP04-ZO-0002, Natural or Destructive Phenomena Guidelines, Addendum 1 has been completed to step 10.
- Management has made the decision to hold reactor power at 48% until a current line of thunderstorms moves through the area.
- Upon taking the watch, start Train ‘A’ and secure Train ‘C Control Room HVAC for surveillance testing later in the shift.
- All other systems are operable and in a normal lineup.
- Cycle Burnup is 150 MWD/MTU. (BOL)
- RCS Boron Concentration is 1544 ppm.
- Boric Acid Tank ‘A’ is at 7316 ppm and ‘B’ is at 7305 ppm.
- No liquid waste discharges are in progress or planned.
- No personnel are in containment.
- FHB Truck Bay doors are closed.
- No ESF DG FOST’s are on recirc.
- Unit 1 is the Load Control Unit.

SIMULATOR SETUP

1. Check and Clean the following procedures:

   - 0POP03-ZG-0005, Rev. 69, Plant Startup to 100%, Step 7.42.
   - 0POP04-ZO-0002, Rev 42, Natural or Destructive Phenomena Guidelines (**NOTE TO INSTRUCTOR:** Check off procedure steps 1 and 2 and steps 1-10 of Addendum 1 of ZO-0002 to indicate they've been done per the turnover sheet information).
   - 0POP02-HE-0001, Rev 33, Electrical Auxiliary Building HVAC System
   - 0POP04-FW-0002, Rev 24, Steam Generator Feed Pump Turbine Trip
   - 0POP04-TM-0003, Rev 20, Turbine Trip Below P-9
   - 0POP04-RC-0003, Rev 16, Excessive RCS Leakage
   - 0POP05-EO-EO00, Rev 21, Reactor Trip or Safety Injection
   - 0POP05-EO-EO10, Rev 19, Loss of Reactor or Secondary Coolant
   - 0POP05-EO-FRZ1, Rev 8, Response to Containment High Pressure

   - Annunciator Response Procedures: Refer to those listed in the Scenario Outline.

   <u>ALL</u> Annunciator Response Procedures (ARP's) must be checked if this scenario is the first to be run on this day. Setup for subsequent runs of this scenario only requires those ARP's that were actually marked-in to be checked. Instructors running the scenario must keep track of which ARP's these are, otherwise, all will have to be checked for subsequent scenarios as well.

2. Log into Instructor Workstation as 'lotnrc' user, open Orchid (nstps server), then 'Unlock' Initial Conditions Group 'lotnrc'.

3. Reset to IC #211 and verify:
   - Step Counter positions (CP-005 annunciator window cleared)
   - Red light on end of CP-010 off
   - ICS Annunciators have stopped counting up
   - Ensure the proper FOP/BO sign is posted at CP-005. Should be: FOP 249 steps/BO 112 steps.

4. Go to RUN and perform the following:
   - Annunciators are acknowledged, reset, silenced.
   - RM-11 is functional; alarms are acknowledged (stop flashing). Ensure all grids are checked.
   - Control Switch FLAGS aligned appropriately to breaker position on CP-003, CP-007 and CP-010.
   - Verify both FHB Filter Outlet Damper controllers are in AUTO <u>and</u> CLOSED (HV-9507 and 9507A).
   - Verify Divert Valve, TCV-0143, control sw. on CP-004 is in the AUTO position.
   - Verify the Reactor Makeup Water Non-essential Valves, FV-7663, FV-7659, are both in the AUTO position.
   - Tag out Condensate Pump #13

SIMULATOR SETUP (cont'd.)

NOTE

THE SCENARIO LESSON PLAN MUST BE RUN FROM THE LEFT MOST INSTRUCTOR STATION TO ALLOW FOR RECORDING AND STORING CRITICAL PARAMETER DATA.

5. Open lesson plan for 'Scenario 2' in 'lotnrc' directory, then execute lesson plan. These actions will set up any initial conditions for the scenario. Run the scenario in accordance with the next section, 'Scenario Instructions'.
6. Set TOTAL M/U BATCH integrator to 10 gallons. **(CHECK BEFORE EACH SCENARIO)**
7. Verify BA Controller Pot setting is 4.22 **(CHECK BEFORE EACH SCENARIO)**
8. Place the simulator in FREEZE
9. Open 0POP03-ZG-0005, Plant Startup to 100%, at Step 7.42.

SCENARIO INSTRUCTIONS

1. Provide Shift Turnover sheets to the crew and review the information. Ensure the candidates don't have any questions.

2. Review the Simulator Differences list with the crew.

3. Have the crew perform their board walkdown and inform the floor instructor when ready to take the watch.

4. Note START TIME when the crew takes the watch and place the simulator in RUN. Verify simulator clock is set correctly.

START TIME: ________ (time crew takes the watch)

> ***ALWAYS 'TRIGGER' EVENTS IN THE SIMULATOR SCENARIO LESSON PLANS. THIS WAY, ANY TIME DELAYS ASSOCIATED WITH EVENTS WILL TAKE PLACE AS INTENDED.***

REFER TO 'EXPECTED BOOTH COMMUNCATIONS' AND 'EXPECTED BOOTH ACTIONS' SECTIONS FOR INSTRUCTOR ACTIONS DURING THE SCENARIO.

5. Trigger the step titled 'Start Chart' and ensure specified Critical Parameters for the scenario begin recording as the scenario runs.

NOTE: ***Events (Lesson Plan Steps) are triggered upon the Lead Examiners cues or at the times listed below (time from last event).***

6. Time **+ 15 MIN**. - Trigger **STEP 2** (PT-0557 fails to an intermediate position)

7. Time **+ 25 MIN**. - Trigger **STEP 3** (CCW Pump 1A Trips and CCW Pump 1C fails to auto start)

8. Time + **45 MIN**. - Trigger **STEP 4** (Main Turbine Trip below P-9) – IF THE REACTOR TRIPS DURING THIS EVENT IMMEDIATLEY ACTIVATE STEP 5 (SBLOCA).

9. Time + (NA) – Trigger **STEP 5** (SBLOCA) on signal from Lead Examiner unless the Reactor Trips during Event 4 (Main Turbine Trip below P-9). If this occurs, immediately activate Step 5 when the Reactor trips.

10. Place simulator in FREEZE when cued by the Lead Examiner to terminate scenario.

11. DO NOT RESET simulator until all Examiners have completed Follow-Up Questioning.

SCENARIO INSTRUCTIONS (cont'd.)

12. Saving Critical Parameters data:

- Click on the 'Charts' icon on the left side of the screen
- Select 'Pause', then select 'All'
- Click on the 'Print' icon, then select 'All'
- This will bring up a file save window. Enter a filename that identifies the crew and scenario (e.g. 'crewA_N1' could be a filename for Crew 'A', NRC scenario 1).
- Save the new file to the Desktop.

NOTE: Some scenarios will have more than one chart. For these, each chart file must be separately saved with a unique filename.

EXPECTED BOOTH COMMUNICATIONS

EVENT 1: START TRAIN 'A' CRE HVAC AND SECURE TRAIN 'C'

As Duty Maintenance Supervisor, if contacted by the Control Room to investigate the trip of CRE HVAC Train 'A' Supply Fan, inform them you'll contact Electrical Maintenance.

As a Plant Operator, when asked to investigate the cause of the fan trip, report back the following, as applicable to what you were directed to do:

- CRE HVAC Train 'A' Supply Fan motor is hot to the touch.
- CRE HVAC Train 'A' Supply Fan breaker (MCC E1A4, cubicle K3) is in the tripped-free postion.

EVENT 2: PT-0557 FAILS TO AN INTERMEDIATE POSITION

As I&C Maintenance or the Duty Maintenance Supervisor, acknowledge by saying personnel will be sent to the control room to help troubleshoot the problem. No further action is necessary.

EVENT 3: CCW PP 1A TRIPS AND CCW PP 1C FAILS TO AUTO START

When asked to investigate, report back as the Plant Operator that there are no obvious signs locally of why CCW Pump 1A tripped. Report that CCW Pump 1A breaker has an over current relay flag actuated. Report that CCW Pump 1C is running SAT if it was manually started from the Control Room.

EVENT 4: MAIN TURBINE TRIP BELOW P-9

Due to escalating events, there will probably be no communications made on this event prior to the end of the scenario.

EVENT 5: SBLOCA ON LOOP 'B'

If asked, report as Plant Operator that you will check with HP about a possible containment entry. However, due to escalating events, there will probably be no communications made on this event prior to the end of the scenario.

EVENT 6: AUTO FEEDWATER ISOLATION FAILS FOLLOWING SI

Due to escalating events, there will probably be no communications made on this event prior to the end of the scenario.

EXPECTED BOOTH ACTIONS

1. DA High Level Dump Valves

If asked to open the DA High Level Dump Valves, perform the following or Trigger Step 7:

- Select ‘Remotes’
- Select ‘Condensate System’
- Select ‘Page 1 of 2’
- Scroll down to locate remotes CD-27 and CD-28
- Insert a value of 0.3 for each valve
- Report to the Control Room that the DA High Level Dump Bypass Valves are open X turns (X = the # of turns requested).

2. AFWST Makeup

If asked to initiate makeup to the AFWST, perform the following or Trigger Step 8:

- Select ‘Remotes’
- Select ‘Auxiliary Feedwater System’
- Scroll down to locate remote for AF-17
- Change value from ‘Norm’ to ‘Open’
- Select ‘Insert’
- Report to the Control Room you’re filling the AFWST

INITIAL LICENSE EXAM

OPERATING TEST # 1

NRC SCENARIO # 3

Revision 2

Week of 9/26/2011

SCENARIO OUTLINE

Facility: South Texas Project **Scenario No.: 3** **Op-Test No.: LOT18 NRC**

Examiners: ______________________ **Operators:** ____________________

______________________ ____________________

______________________ ____________________

Initial Conditions: 100% Power and Stable. Three (3) Condensate Pumps are in service to support maintenance on LPHD Pump #13. LPHD Pump #13 and RCFC 12A are OOS.

Turnover: LPHD Pump #13 has been repaired and is ready to be placed back in service. When LPHD Pump #13 is in service, secure Condensate Pump #13.

Event No.	Malf. No.	Event Type*	Event Description
1 (0 min)	(N/A)	BOP (N) SRO (N)	Return a Low Pressure Heater Drip Pump to service.
2 (15 min)	09-02-01 (true)	RO (C) SRO (C, TS)	RCFC Fan 11A Low DP.
3 (25 min)	06-16-02 (0)	RO (I) BOP (I) SRO (I, TS)	PT-505 (Turbine Impulse Pressure) fails low. **(CT)**
4 (35 min)	03-10-01 (0.1)	RO (C) SRO (C)	Charging line leak in Containment.
5 (50 min)	10-06-01 (1)	RO (C) BOP (C) SRO (C)	Reactor trip due to loss of load (Generator output breaker opens) 2 minutes after the charging line isolation valve is closed (integral).
6 (N/A)	05-04-01 (1)	ALL (M)	Steam Generator 1A Safety Valve fails open 10 seconds after the reactor trips. (Integral) **(CT)**
7 (N/A)	01-12-04A (1)	BOP (I) SRO (I)	Phase ‘A’, Train ‘A’ fails to actuate. (auto and manual)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification

SCENARIO MISCELLANEOUS INFORMATION

INSTRUCTOR NOTES:

Refer to the Instructor Guide for directions on Simulator Setup, Expected Booth Communications and Expected Booth Actions.

CRITICAL PARAMETERS:

The following parameters may be of value in evaluating crew performance and should be automatically recorded during the scenario. Once the scenario is complete for each crew, printout the Critical Parameters and label the printout with date, time, Crew # and scenario #.

- Turbine Impulse Pressure, PT-505
- Control Bank ‘D’ Rod Position (DRPI)*
- AFD
- SG 1A pressure
- SG 1A AFW flow
- SG 1A Steamflow

* Only 1 rod in CB ‘D’ is being recorded and that rod will serve to represent all CB ‘D’ rods.

OPERATOR ACTIONS TABLE NOTES:

1. Critical Tasks are indicated by "C" in the position column and indicated in bold type.

2. Actions required throughout the event are indicated as "(continuous)" in the position column.

3. Shaded cells indicate procedural entry points.

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 1

Event Description: Return a Low Pressure Heater Drip Pump to service

Time	Position	Required Operator Actions	Notes
	SRO	Directs the BOP operator to place LPHD Pump #13 in service and restore associated LPH Drips per 0POP02-HV-0001, then secure Condensate Pump #13 per 0POP02-CD-0001.	
	BOP	Records the following: • Reactor Power, U1118 • MWe, Q0340 • FW Temp, U0490 • First Stage IMP Pressure, MSPA0505 • Deaerator (DA) Level Control Signal (%) • Circ Water Inlet Temp, UG0330 • Condensate Flow, F7030	*All data is taken from the Plant Computer (ICS) except DA level controller signal.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 1

Event Description: Return a Low Pressure Heater Drip Pump to service (cont'd.)

Time	Position	Required Operator Actions	Notes
	BOP	Starts LPHD Pump #13.	• *BOP Operator may contact a Plant Operator to check LPHD Pump #13 is ready for start before starting pump.* • *BOP Operator may check for proper interlocks for pump start:* o *Flash Tk. Level > 7.5"* o *Seal Water Pressure >30 psig.* o *FW Htrs. 15C & 16C levels < High level trip.* o *Pump Discharge Valve is closed.* • *A Control Room operator should make a plant announcement prior to starting the pump.* • *After pump start, BOP operator may contact a Plant Operator to determine if start was satisfactory (i.e. no noted issues).* • ***Event #2*** *can occur after Flash Tank Controller #13 is placed in Auto and upon signal from the Lead Examiner.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 1

Event Description: Return a Low Pressure Heater Drip Pump to service (cont'd.)

Time	Position	Required Operator Actions	Notes
	BOP	Slowly opens Flash Tank # 13's Level Control Valve using Controller FK-7361 on CP-008 until Flash Tank level is normal and stable.	*The Control Room may contact Chemistry to ask if chemistry of LPH Drips for Flash Tank #13 is satisfactory to send to Condensate. Chemistry IS good and this information was given as part of the turnover information, but operators may check again.*
	BOP	When Flash Tank #13 level is normal and stable, the operator will place Level Controller in AUTO at CP-008.	
	BOP	Refers to 0POP02-CD-0001 to secure Condensate Pump #13.	
	BOP	Closes Condensate Pump #13 Discharge Valve, MOV-0088 at CP-008.	
	BOP	Ensures Condensate Pump #13 Miniflow Recirc Valve, FV-7016, opens at CP-008.	
	BOP	Stops Condensate Pump #13 at CP-008.	

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 2

Event Description: RCFC Fan 11A Low DP

Time	Position	Required Operator Actions	Notes
	All	Recognize and respond to RCFC FAN DP LO alarm on Annunciator Panel 02M2 at CP-002.	
	SRO/RO	Ensures/Implements appropriate Annunciator Response.	
	RO	Checks computer points and determines the affected fan is RCFC Fan 11A.	• *The referenced computer points are for the DP across each RCFC Fan.* • *An ICS alarm will also occur that identifies the affected RCFC.*
	SRO/RO	Directs/Stops RCFC Fan 11A	*Crew will probably put Fan control in PTL to prevent further operation until issue is investigated.*
	SRO	• Evaluates whether to start an additional RCFC Fan. • Directs the RO to start another RCFC Fan.	*If another fan is not started, RCB pressure will slowly rise and may reach a high pressure alarm at 0.3 psig which is a TS entry condition.*
	RO	Refers to 0POP02-HC-0001 and starts RCFC 11C: • Ensure CCW valves MOV-0197 and MOV-0210 are CLOSED. • Ensures Chilled Water valves MOV-0199, MOV-0209, and FV-0864 are OPEN. • Ensures ESF DG #13 is not being paralleled, or is paralleled to the grid. • Starts RCFC 11C	

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 2

Event Description: RCFC Fan 11A Low DP

Time	Position	Required Operator Actions	Notes
	SRO	Refers to Tech Spec 3.6.2.3, Containment Cooling, and determines Action 'A' applies which requires restoration of the required group of RCFC within 7 days or apply the requirements of the Configuration Risk Management Program or be in Hot Standby within the next 6 hrs. and in Cold Shutdown within the following 30 hrs.	• *One of the required groups of RCFC's is inoperable because there are now 2 RCFC's inoperable since RCFC 12A was OOS as a pre-existing condition to the scenario.* • ***<u>Event 3</u>*** *will occur on Lead Examiners signal once another RCFC is started and TS have been consulted.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 3

Event Description: PT-505 (Turbine Impulse Pressure) fails LOW

Time	Position	Required Operator Actions	Notes
	RO/BOP	Recognize and respond to the following alarms at CP-005 and indication at CP-006: • TREF/AUCT TAVG DEV • TURB IMP PRESS ROD WTHDRWL BLKD • PI-505 indicating off scale LOW • Control Rods stepping inward automatically.	*Listing of symptoms is not inclusive.*
	RO	• Consults appropriate Annunciator Response procedures for alarms that are present. • Determines inward rod motion is due to an inst failure and places Rod Control in MANUAL. • Informs US to enter 0POP04-TM-0004, Failure of Turbine Impulse Pressure Transmitter (PT-505/506).	*The instrument failure will cause rods to drive inward in Automatic.*
	SRO	Implements 0POP04-TM-0004, Failure of Turbine Impulse Pressure Transmitter (PT-505/506).	
	SRO/RO (C)	**Directs/Places Rod Control in MANUAL.**	
	SRO/RO	Directs/Verifies RCS Tave is within 1.5 °F of Tref.	• *Must use a procedure Addendum to obtain Tref value.* • *Rod withdrawal is limited to the number of steps they inserted due to the instrument failure.* • *Other means of controlling Tavg allowed by the procedure are adjusting RCS boron concentration and/or turbine load.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 3

Event Description: PT-505 (Turbine Impulse Pressure) fails LOW

Time	Position	Required Operator Actions	Notes
	SRO/BOP	Directs/Checks Steam Dumps in Pressure Control Mode; determines Steam Dumps are NOT in Pressure Control Mode.	
	SRO/BOP	Directs/Places Steam Dumps in Pressure Control Mode: • Adjust Steam Dump HDR PRESS CONT PK-0557 setpoint for 1185 psig (8.46 on controller setting). • Place INTLK SEL Sw. to OFF/RESET for Train 'A' OR Train 'B'. • Places Steam Dump MODE SEL Sw. in the STEAM PRESS position. • Ensures Steam Dump DEMAND on UI-0555 is 0% using PK-0557. • Ensures INTLK SEL. Sw. is ON for Train 'A' AND 'B'. • Ensures Steam Dump HDR PRESS CONT PK-0557 in AUTO. • Ensures all Steam Dumps are closed.	*All controls are on CP-007.*
	SRO/BOP	Directs/Select the failed channel to DEFEAT on the IMP SEL Sw.	*Sw. is located on CP-007.*
	SRO/RO	Checks TURB IMP PRESS WTHDRWL BLKD Annunciator on CP-005 is EXTINGUISED	

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 3

Event Description: PT-505 (Turbine Impulse Pressure) fails LOW

Time	Position	Required Operator Actions	Notes
	SRO	Verifies Permissive P-13 is in the correct state for the current plant conditions.	• *This action fulfills a 1 hr. Tech Spec requirement; Table 3.3.1, Item 19.f.* • *SRO may not refer to the actual TS since the procedure step fulfills the requirements of the TS.* • *Permissive Status light P-13 TURB LOAD LESS THAN 10 PRCT should be EXTINQUISHED for the current plant conditions and it will be during the instrument failure, therefore P-13 is in the correct state.* • ***Event 4*** *can occur once this procedure step has been completed and on Lead Examiners signal.*

OPERATOR ACTIONS

Op-Test No.: # 1	**Scenario No.:** # 3	**Event No.:** 4	
Event Description: Charging Line Leak inside Containment			

Time	Position	Required Operator Actions	Notes
	ALL	Recognize and respond to the following alarms and indications at CP-004: • Containment Atmosphere Rad Monitor RT-8011 alarms • Lowering Pressurizer level and pressure • Charging flow rising.	
	SRO	Enters 0POP04-RC-0003, Excessive RCS Leakage.	*T he Conditional Information Page (CIP) allows isolation steps to be performed out of order if the leak location is diagnosed providing the remainder of the procedure is completed to identify any other leak locations.*
	SRO/RO	Directs/Maintains Pressurizer Level at program by: • Lowering Letdown flow (changing orifices) (crew may isolate Letdown since cooling to the Regen Hx is no longer present) • Raising Charging Flow • Starting an additional Charging Pump	*The CIP directs a Manual Reactor trip and Safety Injection be performed if any of the following exist:* • *RCS leakrate is >200 gpm and Pzr level is lowering.* • *Pzr level cannot be maintained >17%.* • *VCT level cannot be maintained >15%.* • *RCB pressure cannot be maintained <3 psig.* *It is NOT expected for any of the above conditions to exist at this time.*
	SRO/RO	• Directs/Maintains VCT level >15% by Auto OR manual makeup.	
	SRO/RO	Directs/Estimates RCS Leakrate by: • Performing a leakrate surveillance. • Using Charging flow, Letdown flow, Pzr Level and VCT level to estimate leakrate.	• *Actual leakrate is approximately 130 gpm.* • *Difficult to get a leakrate from charging & letdown flows due to instabilites.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 4

Event Description: Charging Line Leak inside Containment (cont'd.)

Time	Position	Required Operator Actions	Notes
	SRO/RO	Directs/Checks for leakage to the MAB: • MAB Radiation levels • MAB Floor Drain Tank (FDT) level • Recycle Holdup Tank (RHT) and Waste Holdup Tank (WHT) Levels. • BTRS Chiller Surge Tank level • Plant Computer points for CVCS Letdown Area Temperatures (2 points).	• **The crew may quickly diagnose the leakage is into the RCB and immediately transition to the appropriate procedure Addendum (which is allowed by the CIP). If so, refer to the actions on the next page associated with leakage into the RCB.** • *All indications for leakage into MAB are normal (i.e. no leakage indicated).* • *FDT, RHT, and WHT levels must be checked locally.* • *BTRS Surge Tk. Level is checked by Annunciator 4M07 - Window F4, BTR CHLR SRG TK LEVL HI/LO, NOT in alarm.*
	SRO/RO or BOP	Directs/Contacts Chemistry to sample all SG's for activity.	
	SRO/RO or BOP	Directs/Checks the following for signs of leakage: • Condenser Air Removal System (CARS) Radiation • SG Blowdown Radiation • Main Steamline Radiation • N-16 Monitors	• *All indications for leakage into a SG are normal (i.e. no leakage indicated).* • *All checks are done at the Rad Monitor Panel, RM-11.*
	SRO/RO	Directs/Checks Reactor Coolant Drain Tank level is < 90%.	

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 4

Event Description: Charging Line Leak inside Containment (cont'd.)

Time	Position	Required Operator Actions	Notes
	SRO/RO	Directs/Checks RCS leakage to the Reactor Coolant Drain Tank is normal: • RCDT Level Control Valve, LV-4911 is closed. • Monitor RCDT level to determine in-leakage using Plant Curve Book Figure 10.9.	*Fig. 10.9 is a Tank level vs. volume data sheet for the RCDT.*
	SRO/BOP	Directs/Checks Incore Instrumentation Panel Leak Alarm is CLEAR at CP-012.	*The leak alarm is an indicating light located in the lower half of the Incore Panel.*
	SRO/RO	Directs/Checks for **RCS Leakage to the RCB:** • Containment Radiation – will NOT be normal. • Containment Normal and Secondary sump levels checked by: o Computer points for Containment Sump Inflows (3 points). o Computer point for Unidentified 1 Hr. Average Leak Rate. • Containment Sump level chart recorders at CP-018 – shows RISING level. • Containment Temperature – normal • Containment Dew Point - normal • Containment Pressure < 0.3 psig - normal	• *There will be multiple indications there is leakage to the RCB therefore the US will transition to procedure Addendum 3.* • *RCB Normal sump level will be rising.* • *Containment pressure, temperature and dew point indications will be normal since charging water is relatively cool.*
	SRO	Directs a Control Room Operator to notify Health Physics of the problem and request assistance.	• *The HP assistance should be to help with making a Containment entry and for escorting a Plant Operator so he/she can locate and isolate the leak.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 4

Event Description: Charging Line Leak inside Containment (cont'd.)

Time	Position	Required Operator Actions	Notes
	SRO/RO	Directs/Checks RCP Seal parameters are normal: • Individual Seal Injection flows • Seal Inlet temperature • Seal Injection Filter DP	• *All seal injection parameters will be normal.* • *Seal injection Filter DP can be checked by the absence of Annunciator SEAL WTR INJ FLTR DP HI alarm on panel CP-004 (Lampbox 4M08, Window D-1).* • *A Plant Operator may be dispatched to check Seal Injection filter DP locally.*
	SRO/RO	Directs/Removes normal Charging and Letdown from service: • Closes FV-0011, LTDN ORIF HDR ISOL valve. • Closes FCV-0205, CHG FLOW CONT VLV. • Opens Charging Pump recirc valve for operating Charging Pump. • Adjusts HCV-0218 to maintain RCP seal injection flow between 6 and 13 gpm. • Close orifice isolation valves: o FV-0012 o FV-0013 o MOV-0014 • Closes LCV-0465 and LCV-0468, LETDN ISOL valves. • Closes MOV-0025, OCIV Charging Valve.	*Only FV-0012 will require closing because only that orifice path is normally in service.* • *Closing MOV-0025 will isolate the leak.* • *2 minutes after MOV-0025 is closed, **Event #5** will occur automatically.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 4

Event Description: Charging Line Leak inside Containment (cont'd.)

Time	Position	Required Operator Actions	Notes
	SRO/RO	Directs/Places Excess Letdown in service per 0POP02-CV-0004, CVCS Subsystem: • Ensures adequate RCDT volume exists to receive Excess Letdown. • Notify HP of changes in Letdown flowpath. • Notify Chemistry of changes in CVCS Letdown and/or charging. • Ensures CCW is in service to the Excess Letdown Hx. • Checks Charging is isolated because Normal Letdown has been isolated. • Checks the mini-flow recirc on the operating Charging Pump is open. • Places Excess Letdown DIVERT FV-3123 in the RCDT position. • Ensure EXCESS/NORMAL LETDN CROSS CONNECTION HS-0469 in the CLOSE position. • Opens Letdown Hx inlet isolation valve 'LOOP D ISOL MOV-0083. • Opens Letdown Hx inlet isolation valve 'LOOP D ISOL MOV-0082. • Slowly opens Excess Letdown TEMP CONT HCV-0227. • Adjusts Seal Injection flow and Excess Letdown flow to maintain desired: o Pressurizer level o RCDT level o RCDT pressure	***<u>Event 5</u>*** *will likely occur before Excess Letdown is entirely placed in service.* *Will have to contact a Plant Operator to check the position of this switch.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 4

Event Description: Charging Line Leak inside Containment (cont'd.)

Time	Position	Required Operator Actions	Notes
	SRO/RO	Directs/Determines if RCS leakage has been isolated by any of the following methods: • Monitor RCB Parameters • Monitor RCS leakrate by performing a surveillance. • Determine RCS leakrate using Pressurizer level, VCT level, seal injection flows.	• *Crew should determine the leakage has stopped.* • *Crew can use any one of the three listed methods to monitor if leakage has stopped.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 5, 6, and 7

Event Description: Loss of Main Generator Load/Reactor trip (Event 5)
SG 1A Safety Valve Fails Open (Event 6)
Failure of Train 'A' of Phase 'A' Isolation to actuate (Event 7)

Time	Position	Required Operator Actions	Notes
	ALL	Recognize and respond to indications the Reactor has tripped.	
	SRO	Enters 0POP05-EO-EO00, Reactor Trip or Safety Injection, and directs the crew to perform their immediate actions.	***Event #6*** *will occur 10 seconds after the Reactor trip.*
	RO	Completes immediate actions of 0POP05-EO-EO00 and determines: • Reactor is tripped • Turbine is tripped • AC ESF Busses are energized • SI is actuated	• *RO will announce status of immediate action steps as he/she performs them.* • *BOP Operator will monitor the plant and make an announcement of the Reactor trip.* • *The failed open Safety Valve on 'A' SG* ***(Event #6)*** *will be difficult to diagnose using steam pressure because all the SG's are still x-tied at this time because the MSIV's are still open.* • ***Event #6*** *will cause RCS pressure and Pzr level to lower eventually creating a need to trip the Reactor and initiate SI.* • *If crew doesn't diagnose the stuck open Safety Valve by the time they leave EO00, they will transition to 0POP05-EO-ES01, Reactor Trip Response*
	SRO/BOP	Determine SG 1A is faulted. SRO directs the BOP operator to place AFW Pump #11 in PTL.	*These actions should occur shortly after the Reactor trip*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 5, 6, and 7

Event Description: Loss of Main Generator Load/Reactor trip (Event 5)
SG 1A Safety Valve Fails Open (Event 6)
Failure of Train 'A' of Phase 'A' Isolation to actuate (Event 7)

Time	Position	Required Operator Actions	Notes
	SRO	Directs/ensures the immediate actions of EO00, Reactor Trip/SI have been completed by performing a procedure read through of them.	• *Before beginning the verification of immediate actions, the US may direct the BOP operator to throttle AFW flow to limit RCS cooldown.* • *The Unit Supv. may transition to 0POP05-EO-ES01, Reactor Trip Response, if the crew hasn't yet diagnosed the faulted SG. If a transition to ES01 occurs*
	SRO/BOP	Directs/Performs 0POP05-EO-EO00, Addendum 5, Verification of SI Equipment Operation: • FW Isolation • Check for Steamline Isolation • AFW Status • Phase 'A' Containment Isolation • ECW and CCW • Containment Cooling • ECCS pump and valve status • Containment Ventilation Isolation • HVAC systems (CR/EAB/FHB)	*This procedure action will not apply until a Safety Injection occurs.* *Should place # 11 AFWP in PTL to stop feeding the faulted SG if not already done* *BOP operator should note Train 'A' of Phase 'A' Isolation failed to actuate. This is* ***Event #7.*** *See specific actions on next page.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 5, 6, and 7

Event Description: Loss of Main Generator Load/Reactor trip (Event 5)
SG 1A Safety Valve Fails Open (Event 6)
Failure of Train 'A' of Phase 'A' Isolation to actuate (Event 7)

Time	Position	Required Operator Actions	Notes
	BOP	Determines Train 'A' of Phase 'A' Isolation has failed to actuate and performs the following: • Attempts manual actuation, but does not work. • Individually closes or checks closed the following valves as a minimum: ○ FV-3653 ○ MOV-0312 ○ FV-4920 ○ FV-7800 ○ MOV-0025 ○ FV-1025 ○ FV-1026 ○ FV-1027 ○ FV-1028	***<u>This is Event #7</u>*** *Operator may perform the entire addendum instead of just checking Train 'A' valves.*
	SRO/RO	Check plant status: • Containment pressure: normal • RCP Seal cooling: 6-13 gpm • RCS cooldown: at or trending to 567 °F • Pzr PORV and Spray valve status: closed • Excess Letdown Isol Valves: closed • Monitor RCP trip criteria to determine if RCP's should be stopped: criteria will NOT be met. • Selected Cntmt Isolation Valves: closed.	• *The Excess Letdown Isolation Valves will be open if RO placed Excess LD in service before the Rx trip occurred.* • *RCP trip conditions: RCS pressure is < 1430 psig and at least 1 HHSI Pump is running.*
	SRO/RO or BOP	Determines SG "A" is faulted	

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 5, 6, and 7

Event Description: Loss of Main Generator Load/Reactor trip (Event 5)
SG 1A Safety Valve Fails Open (Event 6)
Failure of Train 'A' of Phase 'A' Isolation to actuate (Event 7)

Time	Position	Required Operator Actions	Notes
	BOP	Completes Addendum 5, reports the failure of Train 'A' of Phase 'A' Isolation to actuate, but all valves were closed individually to complete the Phase 'A' Isolation.	*Addendum 5 will likely not be completed until after transition to EO20.*
	SRO	Informs crew of transition to 0POP05-EO-EO20, Faulted SG Isolation, and to monitor Critical Safety Functions	
	SRO/BOP (C)* * denotes critical portion of step	Directs/Checks MSIV's and MSIB's closed including ***'A' SG MSIV and MSIB are closed.**	
	SRO/BOP	Checks pressures in all SG's and determines: • Pressure is controlled or rising in at least one SG • 'A' SG is faulted.	• *SG's 'B', 'C', and 'D' pressures are 'controlled'.* • *SG 'A' pressure is NOT controlled.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 5, 6, and 7

Event Description: Loss of Main Generator Load/Reactor trip (Event 5)
SG 1A Safety Valve Fails Open (Event 6)
Failure of Train 'A' of Phase 'A' Isolation to actuate (Event 7)

Time	Position	Required Operator Actions	Notes
	SRO/BOP (C) * * denotes critical portion of step	**Isolates the faulted SG ("A")** • Verifies all FWIV's closed. • Verifies all FWIB's closed. • Verifies all FW Preheater bypass valves closed. • Verifies all FW Regulating and Low Power FW Regulating Valves closed. • **Isolates AFW flow to 'A' SG*** o **Resets SI*** o **Resets ESF load sequencers*** o **Resets SG LO-LO level AFW actuations*** o Checks SG 1D intact o **Closes 'A' SG AFW OCIV*** • Verifies SG "A" PORV closed • Verifies SG 'A' Blowdown and sample isolation valves closed	** indicates critical portion of step – only those items bolded.*
	SRO/BOP or RO	Check Secondary Radiation: • Resets SI • Resets ESF load sequencers • Resets SG LO-LO level AFW actuations • Resets SG Blowdown and Sampling Isolations • Notifies Chemistry to sample all SG's hourly for activity. • Checks the following Rad Monitors: o Main Steamline o SG Blowdown o CARS Pump	• *The first 3 resets have already been done so the operator will just check that they are still reset.* *CARS = Condenser Air Removal System.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 3 **Event No.:** 5, 6, and 7

Event Description: Loss of Main Generator Load/Reactor trip (Event 5)
SG 1A Safety Valve Fails Open (Event 6)
Failure of Train 'A' of Phase 'A' Isolation to actuate (Event 7)

Time	Position	Required Operator Actions	Notes
	ALL	Check is SI flow should be terminated • RCS subcooling - >35° F • Secondary heat sink – NR level in one SG > 14% OR total AFW Flow > 576 gpm. • RCS pressure > 1745 psig and stable or rising • Pressurizer level > 8%	• *If conditions are met, a transition to 0POP05-EO-ES11, SI Termination, will be made.* • *Conditions will likely NOT be met for transition at this time.* • *If not met (expected), the crew will transition to 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant.*
	SRO	Announces transition from 0POP05-EO-EO20 (to ES11 or E010, as appropriate).	*Terminate the scenario*

CRITICAL TASK SUMMARY

POSITION	EXPECTED RESPONSE	ACCEPTANCE CRITERIA	SAT/ UNSAT
SRO/RO	**Directs/Places Rod Control in MANUAL**.	Place Rod Control in MANUAL prior to receiving an automatic Reactor trip following the failure of PT-505.	
SRO/BOP	**Isolates the Faulted SG ('A'):** • **'A' SG MSIV and MSIB are closed.** • **Isolates AFW flow to 'A' SG*** ○ **Resets SI*** ○ **Resets ESF load sequencers*** ○ **Resets SG LO-LO level AFW actuations*** ○ **Closes 'A' SG AFW OCIV***	Isolate SG 1A feed and steam lines prior to exiting 0POP05-EO-EO20, Faulted SG Isolation.	

TURNOVER INFORMATION

- Reactor Power is 100%
- Cycle Burnup is 150 MWD/MTU (BOC)
- RCS Boron Concentration is 1351 ppm
- Hourly dilutions to maintain current power are approximately 10 gallons. Total Batch Integrator set at 10 gallons, getting 11. Xenon is at equilibrium conditions.
- Boric Acid Tanks ‘A’ and ‘B’ are at 7485 ppm.
- No liquid waste discharges are in progress or planned.
- No personnel are in containment.
- FHB Truck Bay doors are closed
- No ESF DG FOST’s are on recirc.
- This IS the load control unit.
- #13 Low Pressure Heater Drip Pump and RCFC 12A are OOS.
- Three (3) Condensate Pumps are in service to support the maintenance on LPHD #13.
- Repairs have just been completed on LPHD #13 and it is ready to be returned to service.
- Upon assuming the watch, place LPHD #13 in service and restore associated LPH Drips per 0POP02-HV-0001, then secure #13 Condensate Pump per 0POP02-CD-0001.
  Additional Information associated with returning LPH Drips to service:
  - Chemistry results are satisfactory for returning LPH Drips to Condensate.
  - I&C has NOT adjusted the settings for the High Level Dump Controller on Flash Tank #13.

SIMULATOR SETUP

1. Check and Clean the following procedures:

    - 0POP02-CD-0001 (R37)
    - 0POP02-HV-0001 (R42)
    - 0POP02-HC-0001 (R18)
    - 0POP02-CV-0004 (62)
    - 0POP09-AN-02M2 (R18)
    - 0POP09-AN-04M8 (R35)
    - 0POP04-TM-0004 (R15)
    - 0POP04-RC-0003 (R16)
    - 0POP05-EO-EO00 (R21)
    - 0POP05-EO-EO20 (R10)

2. Annunciator Response Procedures:

    ALL Annunciator Response Procedures (ARP's) must be checked if this scenario is the first to be run on this day. Setup for subsequent runs of this scenario only requires those ARP's that were actually marked-in to be checked. Instructors running the scenario must keep track of which ARP's these are, otherwise all will have to be checked for subsequent scenarios as well.

3. Log into Instructor Workstation as <lotnrc> user, open Orchid (nstps server), then 'Unlock' Initial Conditions Group <lotnrc>.

4. Reset to IC # 212 and verify:

    - Step Counter positions (CP-005 annunciator window cleared)
    - Red light on end of CP-010 off
    - ICS Annunciators have stopped counting up
    - Ensure the proper FOP/BO sign is posted at CP-005. Should be: FOP 249 steps/BO 112 steps.

CONTINUED ON NEXT PAGE

SIMULATOR SETUP

5. Go to RUN and perform the following:

    - Annunciators are acknowledged, reset, silenced.
    - RM-11 is functional; alarms are acknowledged (stop flashing). Ensure all grids are checked.
    - Control Switch FLAGS aligned appropriately to breaker position on CP-003 and CP-010.
    - Verify both FHB Filter Outlet Damper controllers are in AUTO <u>and</u> CLOSED (HV-9507 and 9507A).
    - Tag out the following components:
        - RCFC 12A
    - If Annunciator 5M03-D-5, ROD SUPV MONITOR ROD POSTION TRBL, comes in, take ICS point YCO400 off scan.

6. Execute Lesson Plan for <LOT 18 NRC Scn #3> in <LOT NRC/2011> directory. These actions will set up any initial conditions for the scenario. Run the scenario in accordance with the next section, Scenario Instructions'.

7. Set TOTAL M/U BATCH integrator to 10 gallons. **(CHECK BEFORE EACH SCENARIO)**

8. Verify BA Controller Pot setting is 3.61 **(CHECK BEFORE EACH SCENARIO)**

9. Place the simulator in FREEZE

SCENARIO INSTRUCTIONS

1. Provide Shift Turnover sheets to the crew and review the information. Ensure the candidates don't have any questions.

2. Review the Simulator Differences list with the crew.

3. Have the crew perform their board walkdown and inform the floor instructor when ready to take the watch.

4. Note START TIME when the crew takes the watch and place the simulator in RUN. Verify simulator clock is set correctly.

START TIME: ________ (time crew takes the watch)

> ***ALWAYS 'TRIGGER' EVENTS IN THE SIMULATOR SCENARIO LESSON PLANS. THIS WAY, ANY TIME DELAYS ASSOCIATED WITH EVENTS WILL TAKE PLACE AS INTENDED.***

REFER TO 'EXPECTED BOOTH COMMUNCATIONS' AND 'EXPECTED BOOTH ACTIONS' SECTIONS FOR INSTRUCTOR ACTIONS DURING THE SCENARIO.

5. Trigger the step titled 'Start Chart' and ensure specified Critical Parameters for the scenario begin recording as the scenario runs.

NOTE: ***Events (Lesson Plan Steps) are triggered upon the Lead Examiners cues or at the times listed below (time from last event).***

6. Time **+ 15 MIN**. - Trigger **STEP** 2, RCFC Fan 11A Low DP

7. Time **+ 25 MIN**. -Trigger **STEP** 3, PT-505 Fails Low

8. Time **+ 10 MIN**. - Trigger **STEP** 4, Charging Line leak in Containment

9. Place simulator in FREEZE when cued by the Lead Examiner to terminate scenario.

10. DO NOT RESET simulator until all Examiners have completed Follow-Up Questioning.

SCENARIO INSTRUCTIONS (cont'd.)

11. Ensure the following prior to printing out the Critical Parameters:

    - Each parameter is labeled with its descriptive name (e.g. 'RCS Subcooling').
    - The time range is set to 3000 seconds. Select 'View', Select 'Page', note 'Time Range', change to 3000 sec if necessary.
    - Each parameter has an appropriate range to facilitate a display of variation during the scenario. If the range has to be adjusted, go to 'View', Select 'Variables', then change the range of the desired parameter.

12. After Critical Parameters have been retrieved and verified as satisfactory, perform the following:

    - Clear Critical Parameters trend data for this simulator session.
    - Label the printout with the date, time, Crew #, and Scenario #.

EXPECTED BOOTH COMMUNICATIONS

EVENT # 1, RETURN A LPHD PUMP TO SERVICE

As Chemistry:

If contacted by the Control Room regarding chemistry for LPH Drips associated with Flash Tank # 13 (LPHD Pump #13), report that chemistry is satisfactory to send LPH Drips to the Condensate System (i.e. forward feed).

As TGB Watch:

- If contacted by the Control Room to check LPHD Pump #13 ready for start, after a short time, report that it is ready for starting.

- If contacted by the Control Room to check the following (conditions for starting interlocks for a LPHD Pump), after a short time, report the indicated value:

    - Flash Tank #13 Level – report level is 32 inches (High Level Dump is controlling level).
    - LPHD Pump #13 Seal Water Pressure – report Seal Water pressure is 38 psig.
    - FW Htrs. 15C & 16C level – report levels are 9 and 10 inches respectively (also, if asked, the High Level Dump Valves are NOT open).

- If contacted by the Control Room to determine if the start of LPHD Pump #13 was satisfactory, report that it was.

- If contacted by the Control Room to check the operation of the normal level control valve for Flash Tank #13, after a short time, report it is operating correctly.

As CP Watch:

If contacted by the Control Room to monitor Condensate Pump #13 recirc valve operation as the pump discharge valve is closed, acknowledge the request. After a short time, report to the Control Room you are on station. When the pump discharge valve is almost fully closed, the recirc valve should open.

As I&C:

If contacted by the Control Room to determine if the settings for the High Level Dump Controller for Flash Tank #13 were adjusted after LPHD Pump #13 was secured, report the settings were NOT adjusted. They are the same settings as before LPHD Pump #13 was secured.

EXPECTED BOOTH COMMUNICATIONS (cont'd.)

EVENT #4, CHARGING LINE LEAK INSIDE CONTAINMENT

As any Plant Operator

When contacted by the Control Room to make an RCB entry with Health Physics, acknowledge the request and inform the Control Room you'll be getting with an HP to make an entry.

NOTE: RCB conditions should be favorable to making an entry, but we don't want to actually simulate doing one so keep stalling if the Control Room continues to call you for an update to making an entry.

As MAB Watch:

- When contacted by the Control Room to check the following tank levels, after a short time, report back they are normal and do not show any signs of in-leakage since last checked:

    - MAB Floor Drain Tank
    - RHT
    - Waste Holdup Tanks
    - BTRS Chiller Surge Tank

- If contacted by the Control Room to check Seal Injection Filter DP, after a short time, report it is normal (10 psi if asked). The low filter DP alarm (4M08, Window D-1) comes in at 27 psid.

- If contacted by the Control Room to ENSURE the position of HS-0469 in the EAB Relay Room is in the CLOSE position, after a short time, report that it is in CLOSE.

As Chemistry:

When contacted by the Control Room to sample all SG's for activity, acknowledge the request, no further action is necessary.

If contacted by the Control Room to inform Chemistry of changes in CVCS Normal Letdown, Charging and/or Excess Letdown, acknowledge the information. No further action is required.

EVENT #4, CHARGING LINE LEAK INSIDE CONTAINMENT is continued on the next page.

EXPECTED BOOTH COMMUNICATIONS (cont'd.)

EVENT #4, CHARGING LINE LEAK INSIDE CONTAINMENT (cont'd.)

As Health Physics:

- When contacted by the Control Room to provide assistance for the RCS leak in the RCB, acknowledge the request. The assistance requested should be for making an entry into the RCB and escorting a Plant Operator as he/she locates and isolates the leak.
  - If the US doesn't specify what assistance is needed, ask the US what assistance he/she needs.

- If contacted by the Control Room to inform HP of changes in CVCS Normal Letdown, Charging and/or Excess Letdown, acknowledge the information. No further action is required.

EVENT #7, SG 1A Safety Valve fails open

As Chemistry:

If contacted by the Control Room to sample all SG's for activity, acknowledge the request, no further action is necessary.

EXPECTED BOOTH ACTIONS

1. DA High Level Dump Valves: If asked to open the DA High Level Dump Valves, trigger Step 7 or perform the following:

   - Select 'Remotes'
   - Select 'Condensate System'
   - Scroll down to locate remotes CD-27 and CD-28
   - Insert a value of 0.3 for each valve
   - Report to the Control Room that the DA High Level Dump Bypass Valves are open X turns (X = the # of turns requested).

2. AFWST Fill: If asked to fill the AFWST, trigger Step 8 or perform the following:

   - Select 'Remotes'
   - Select 'Auxiliary Feedwater System'
   - Scroll down to locate remote for AF-17
   - Change value from 'Norm' to 'Open'
   - Select 'Insert'
   - Report to the Control Room you're filling the AFWST

INITIAL LICENSE EXAM

OPERATING TEST # 1

NRC SCENARIO # 4

Revision 2

Week of 09/26/2011

SCENARIO OUTLINE

Facility: South Texas Project **Scenario No.: 4** **Op-Test No.: LOT18 NRC**

Examiners: ______________________ **Operators:** ______________________

______________________ ______________________

______________________ ______________________

Initial Conditions: 100% Power and Stable at BOC. Train 'B' work week with ECW Pump, D/G, CCW Pump, LHSI and HHSI Pumps, and AFW Pump inoperable. SG 'B' LT-0528 (CH 3) is in the Tripped condition.

Turnover: All Tech Spec actions associated with ESF DG #12 being out of service are complete. ESF Power Availability surveillance (PSP03-EA-0002) is due in 6 hours. Continuing Train 'B' Work Week. I&C is continuing to trouble shoot SG 'B' LT-0528. The level transmitter has been inoperable for the last 4 days and is currently in the Tripped condition per Tech. Specs. After taking the watch, secure SGFPT #12.

Event No.	Malf. No.	Event Type*	Event Description
1 (1 min)	NA	SRO (N) BOP (N)	Shutdown SGFPT # 12
2 (11 min)	02-19-03 (0)	RO (I) SRO (I, TS)	PRZ Pressure Channel PT0457 fails low
3 (25 min)	05-22-01 (1)	BOP (I) SRO (I, TS)	SG 1A Steam Pressure PT-0514 fails high.
4 (40 min)	10-11-01 (1)	ALL (C)	Lockout of 4.16KV Bus E1A
5 (N/A)	05-20-08 (0)	ALL (M)	Inadvertent FWI when SG 'B' CH 4 HI-Hi Bistable comes in. (7 minutes after DG 11 is placed in PTS - integral)
6 (N/A)	06-02-01 (1)	RO (C) SRO (C)	Main Turbine fails to auto trip and doesn't trip with Manual Trip PB. (integral) **(CT)**
7 (N/A)	08-03-03 (1) 08-02-01 (1)	ALL (C)	AFW Pump 13 trips 3 minutes after start and AFW Pump 14 overspeeds upon starting creating a Loss of Heat Sink condition. (integral) **(CT)**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification

SCENARIO MISCELLANEOUS INFORMATION

INSTRUCTOR NOTES:

Refer to the Instructor Guide for directions on Simulator Setup, Expected Booth Communications and Expected Booth Actions.

CRITICAL PARAMETERS:

The following parameters may be of value in evaluating crew performance and should be automatically recorded during the scenario. Once the scenario is complete for each crew, printout the Critical Parameters and label the printout with date, time, Crew # and scenario #.

- SG 1A NR level
- Main Turbine Throttle Valve positions (all 4)
- RCS Wide Range Pressure
- HHSI Flow in Train ‘C’
- PRT Pressure
- Pressurizer PORV tailpipe temperatures

OPERATOR ACTIONS TABLE NOTES:

1. Critical Tasks are indicated by "C" in the position column and indicated in bold type.

2. Actions required throughout the event are indicated as "(continuous)" in the position column.

3. Shaded cells indicate procedural entry points.

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 4 **Event No.:** 1

Event Description: Shutdown of SGFPT #12

Time	Position	Applicant's Actions or Behavior	Notes
	SRO	Directs the BOP Operator to shutdown SGFPT #12.	
	BOP	The BOP Operator goes to 0POP02-FW-0002, SGFP Turbine, to perform a shutdown of SGFPT #12	
	BOP	Checks “STM LN DRAIN” switch in Auto.	
	BOP	Ensures the ‘SPEED’ Controller in the ‘MAN’ position.	*Controller will originally be in Auto so operator will have to place the Controller to ‘MAN’.*
	BOP	Slowly reduces turbine speed to 3300 rpm by repeatedly depressing the ‘SPEED’ Controller ‘LOWER’ pushbutton.	
	BOP	Closes Discharge Valve MOV-0072	
		Depresses the SGFP “TRIP” pushbutton and verifies the following: • “TRIP” light is lit. • “LATCH/ALM RST” light is extinguished. • SGFPT HP stop valves closed. • SGFPT LP stop valves closed.	
	BOP	Momentarily depresses the ‘LATCH/ALM RST’ pushbutton and verifies the following: • “LATCH/ALM RST” lit • “TRIP” light extinguished • SGFP 12 “RECIRC” valve FV-7109, is open.	

OPERATOR ACTIONS

Op-Test No.: 1	**Scenario No.:** 4	**Event No.:** 1
Event Description: Shutdown of SGFPT #12		

Time	Position	Applicant's Actions or Behavior	Notes
	BOP	Depresses the SGFP "TRIP" pushbutton and verifies the following: • "HP GOV VLV" closed • "LP GOV VLV" closed • "HP STOP VALVE" closed • "LP STOP VALVE" closed • "TRIP" light lit	
	BOP	Ensures the Startup Feedpump Hand Switch is in Auto.	*The Startup Feedpump will be running.*
	BOP	Ensures the "STM LN DRAIN" valves are open for SGFPT #12: • FV-7952 • FV-7953 • FV-7974	***Event 2*** *can occur here on Lead Examiner's signal.*
	BOP	Contacts a Plant Operator to have him/her ensure SGFPT #12 goes on its Turning Gear once turbine speed has reached zero rpm.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 4 **Event No.:** 2

Event Description: Pressurizer pressure controlling channel (PT-457) fails LOW.

Time	Position	Applicant's Actions or Behavior	Notes
	ALL	Identify and respond to annunciators on CP004 indicative of a failed Pressurizer pressure channel: • PRZR PRESS DEV LO B/U HTRS ON • PRZR PRESS LO RX TRIP ALERT • PRZR PRESS LO SI ALERT	*Annunciator list is not inclusive.*
	RO	Identifies the failed pressure channel as PT-0457 failed low and performs immediate actions.	
	SRO (continuous)	Enters 0POP04-RP-0001, Loss of Automatic Pressurizer Pressure Control, and ensures RO is performing immediate actions.	
	RO	Places Pressurizer Master Pressure Controller in MANUAL.	*Immediate action*
	RO	Removes failed channel PT-0457 from control by selecting 455/456 or 455/458.	*Immediate action*
	RO	Adjusts Pressurizer pressure Controller to control between 2220 and 2250 psig.	• *Immediate action* • *Failure will result in actual pressure rising.*
	RO	Checks Pressurizer Pressure Controller operable.	
	RO	Checks Pressurizer PORV's closed: • PCV-0655A • PCV-0656A	

OPERATOR ACTIONS

Op-Test No.: 1	**Scenario No.:** 4	**Event No.:** 2
Event Description: Pressurizer pressure controlling channel (PT-457) fails LOW		

Time	Position	Applicant's Actions or Behavior	Notes
	RO	Checks: • Normal spray valves closed (PCV-0655B and PCV-0655C) • Spray line temperature normal. • Auxiliary spray valve closed (LV-3119).	
	RO	Checks Pressurizer pressure > 2210 psig. If not, ensures Pzr. Heaters are on.	
	RO	Checks Pressurizer pressure is < 2250 psig. If not: • Places Variable Heaters in PTL • Ensures Pzr. Spray Valves are modulating open to control pressure. • Checks Pzr pressure stable or trending lower. If not: o Checks Pzr PORV Isolation Valves are open. o If pressure is >2335 psig, ensures at least one PORV is open. o If pressure reduces to less that 2315 psig, ensures the PORV's are closed or isolated.	
	RO	Ensures an operable Pressurizer Pressure channel is selected on CP-005 Pressure Recorder.	
	RO	Checks Pressurizer Pressure Controller is operable.	
	RO	Checks Pressurizer pressure is between 2220 and 2250 psig.	
	RO	Checks Pressurizer Pressure Controller demand is normal for existing plant conditions.	*Nominal Pressurizer Pressure Controller output (demand) is approximately 15%-35%.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** # 4 **Event No.:** 2

Event Description: Pressurizer Pressure Channel PT-0457 fails LOW

Time	Position	Required Operator Actions	Notes
	RO	Checks the following Pressurizer Pressure features: • Spray Valves in Auto • Heaters in Auto • PORV's in Auto • PORV Isolation Valves open • Pzr Pressure Controller in Auto • Pzr Pressure being maintained 2220-2250 psig	• *Pressure controller will still be in Manual, but placed in Auto at this step.*
	SRO/RO	Checks Pzr Pressure channels operable and determines PT0457 has failed low, then performs the following: • NOTIFIES I&C to trip or bypass bistables for the failed channel Addendum 1. • Determine if Permissive P-11 status is appropriate for plant conditions.	*The action to check Permissive P-11 is for Tech Spec compliance. The status light should be out indicating Permissive P-11 is NOT present. The P-11 permissive should be present only if Pzr. Pressures is <1985 psig.*
	SRO	Refers to Technical Specifications and determines that Table 3.3.1, items 8, 10 and 11 (action 6) and Table 3.3-3, item 1e (action 20), currently apply for the failed channel. The specified actions of both TS table 3.3-1 and 3.3-3 indicate the channel MAY be bypassed, but MUST be tripped within 72 hr.	***Event # 3*** *will occur here after TS consulted and Lead Examiner indicates to proceed.* *Tech Spec Table 3.3-3, item 9.a is for Permissive P-11 which was checked in an action above.*

OPERATOR ACTIONS (Cont')

Op-Test No.: 1	**Scenario No.** 4	**Event No.** 3
Event Description:	SG 'A' Steam Pressure Channel PT-514 fails HIGH	

Time	Position	Applicant's Actions or Behavior	Notes
	BOP	Acknowledges and reports annunciators on Control Panel CP006: • SG 'A' STM/FW FLOW MSMTCH	
	SRO/BOP	Performs immediate actions of 0POP04-FW-0001: • Places SG 'A' Feedwater Main Feed Reg. Valve (MFRV) Controller in Manual. • Adjusts Controller output to restore SG 'A' level to program. • Determines SGFPT Master and Individual Speed Controllers are responding in Auto.	*The Steam Pressure instrument failure will result in 'A' SG level rising.*
	SRO (continuous)	Directs/ensures actions of 0POP04-FW-0001, Loss of Steam Generator Level Control.	
	SRO	Ensures immediate actions are taken: • Manual control of 'A' MFRV, SG level being returned to 68-74%. • Determines SGFPT Master and Individual Speed Controllers are responding in Auto.	
	SRO/BOP	Determines MFRV's are in service and 'A' Main. Reg Valve is in Manual and is responding in Manual.	
	BOP	Determines the Low Power Feed Reg Valves (LPFRV's) are not in service.	
	BOP	Checks if SGFP Master Speed Controller is in Manual.	*Controller will be in Auto.*
		Checks if Master and individual SGFP Speed Controllers are in Manual.	*All SGFP Controller will be in Auto.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.** 4 **Event No.** 3

Event Description: SG ‘A’ Steam Pressure Channel PT-514 fails HIGH

Time	Position	Applicant’s Actions or Behavior	Notes
	SRO/BOP	• Ensure appropriate Feed to steam DP OR SGFP Master Speed Controller at 100% demand in Auto. • If DP is too low, BOP operator may take manual control of the SGFPT Master Speed Controller to raise DP.	• *DP should be 169 psid at 100% power.* • *If DP is too low, but close to required value, the US may elect to first monitor DP since the Feedwater System is still in a state of change.*
	BOP	Restore SG ‘A’ NR level 68-74%	*BOP continues to manually adjust ‘A’ SG MFRV to establish and maintain ‘A’ SG level 68-74%.*
	SRO/BOP	Ensure all SG NR levels > 20%, but < 87.5%	
	BOP	Checks SG water level control instruments for failures: • Level • Feed Flow • Steam Flow – determines the selected Steamflow channel has failed (due to failure of steam pressure input) and selects an alternate channel for SG ‘A’ level control. • Steam Pressure – determines that PT-0514 has failed high. An alternate Steamflow channel has already been selected.	• *‘B’ SG Level channel LT-0528 is in a tripped condition with I&C troubleshooting in progress per turnover info.* • *A procedure note indicates that a steam pressure inst. failure could affect the computer secondary heat balance results (computer point U1118) and the operator should check alternate computer points to determine if it has been affected.*

OPERATOR ACTIONS

Op-Test No.: 1	**Scenario No.** 4	**Event No.** 3
Event Description:	SG 'A' Steam Pressure Channel PT-514 fails HIGH	

Time	Position	Applicant's Actions or Behavior	Notes
	SRO/BOP	Performs the following: • Verifies ALL SG levels between 68% and 74%. • Checks all SG Main and Low Power FWRV's Automatic Control is operable. • Checks MFRV's OR LPRV's – in Automatic control. • Determines SG 'A' MFRV Controller is operable, but not in Automatic and places SG 'A' MFRV Controller in AUTO if SG 'A' NR level is 68-74%, then monitors for proper operation.	*FWRV's = Feedwater Reg Valves* *This is where the operator returns 'A' SG MFRV to Automatic control.*
	BOP	Checks Feedpump Master Speed Controller in Auto. • If the controller is in Manual, but it's desired to place it in Auto, adjust the controller to provide the required Feed-to-Steam DP. • Place the Controller in Auto Monitor for proper operation (i.e. maintains required DP).	*SGFP Master Speed Controller may be in Manual to maintain desired DP from an earlier step.*
	SRO	Checks Tech Specs and determines the following apply: • Table 3.3-3, items 1.f, 4.c and 4.e (Action 20 for all 3) • Action 20: failed channel MAY be bypassed, but MUST be tripped within 72 hrs.	***Event # 4*** *can occur after TS have been consulted and on signal from Lead Evaluator.*
	SRO	Notifies I&C to trip or bypass the failed channel.	

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 4 **Event No.:** 4

Event Description: Lockout of 4.16 kV Bus E1A

Time	Position	Required Operator Actions	Notes
	RO/BOP	Acknowledges and reports the following alarms (partial list): • 4KV E1A SPLY BKR TRIP • 4KV E1A UNDERVOLT ALERT	*Annunciator list is not inclusive*
	RO	Determines 4160v Bus E1A is de-energized due to an overcurrent lockout condition.	
	SRO	Directs/ensures actions of 0POP04-AE-0001, First Response to Loss of Any or All 13.8 kV or 4.16 kV Bus.	*There's direction on the CIP to place SG PORV's associated with any de-energized 4160v Bus in Manual. A loss of 4160v Bus E1A will require SG PORV's for 'A' and 'D' SG's be placed in MANUAL. This action can be done anytime and up to and including the step to perform it.*
	SRO	Determines plant is in Mode 1 and all RCP's are running.	
	SRO/RO	Determines 4160v Bus E1A is NOT energized from offsite power and #11 ESF DG is running, but the output breaker is not closed due to overcurrent lockout.	*Operators will not close breaker due to lockout on bus.*
	RO	Places # 11 ESF DG in Pull-to-Stop	• *This action may be done sooner if the crew diagnoses the need.* • ***Event #5*** *will occur 7 minutes after the DG is placed in Pull-to-Stop.*

OPERATOR ACTIONS

Op-Test No.: 1	**Scenario No.:** 4	**Event No.:** 4
Event Description: Lockout of 4.16 kV Bus E1A (cont'd)		

Time	Position	Required Operator Actions	Notes
	SRO/BOP	Checks/determines the following: • At least 1 Closed Loop Auxiliary Cooling Water (CL-ACW) Pump running. • At least 1 Instrument Air Compressor is running. • At least 1 Condensate Pump Running • TSC DG is not running and LC 1W is energized. • Lighting DG is not running and MCC 12K3 is energized.	
	SRO/RO	Check the following: • RCP Seal Cooling exists from either Thermal Barrier CCW or Seal Injection flow. • One Charging Pump (CCP) is running and it's CCP 1A.	*Both Seal Injection and Thermal Barrier cooling exist.*
	SRO/RO	Determines the following: • 'C' Train CCW Pump is in service. • CCP 1B is NOT running	***Event #5*** *should be occurring at about this point if it hasn't already occurred.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 4 **Event No.:** 4

Event Description: Lockout of 4.16 kV Bus E1A

Time	Position	Required Operator Actions	Notes
	SRO/RO	Determines Normal Letdown is NOT in service then implements 0POP04-CV-0004, Loss of Normal Letdown, to attempt to return Letdown to service. • Verifies Letdown valves LCV-0465 and LCV-0468 are open. • Verifies Letdown Containment Isolation Valves MOV-0023 and MOV-0024 are open. • Verifies LD Orifice Header Isolation Valve FV-0011, is open. • Determines no LD Orifice Isolation Valves are open and performs the following: o Closes FV-0011 o Closes Chg Flow Valve FV-205 o Opens CCP Recirc Valve o Goes to Addendum 4 to restore LD • Ensures RCP seal injection in service. • Ensures CCW supplying Excess and Normal LD Hx's. • Ensures Divert Valve TCV-0143 is in the 'VCT' position. • Opens Excess LD Isolation Valve MOV-0083. • Determines Excess LD Isolation Valve MOV-0082 has no power so it cannot be opened. • Determines neither Normal LD or Excess LD can be placed in service and performs the following: o Isolates Charging o Controls RCP Seal Injection Flow to 6-8 gpm per pump.	*All actions for 0POP04-CV-0004 are within the shaded area. The steps for continuing in 0POP04-AE-0001 begin again on the next page.* • *Only LCV-0468 will have power, but LCV-0465 was open before the power loss.* • *Letdown flow was isolated when Orifice Isolation Valve FV-0012 closed due to the loss of power.* • *Normal Letdown cannot be re-established quickly because there is no power to one of the MOV's required to be operated and it's in the RCB.* • *The loss of power to MOV-0082 will prevent placing either Normal <u>OR</u> Excess Letdown in service quickly because it's located inside the RCB.*

OPERATOR ACTIONS

Op-Test No.: 1 **Scenario No.:** 4 **Event No.:** 4

Event Description: Lockout of 4.16 kV Bus E1A

Time	Position	Required Operator Actions	Notes
	SRO	Continues in 0POP04-AE-0001, First Response to Loss Of Any Or All 13.8KV Or 4.16 KV Bus	
	SRO/RO	Verifies at least one RCP is running.	
	SRO/RO	Checks the following in their normal range: • RCS pressure • RCS temperature • Pressurizer level	*Will not be able to stabilize Pressurizer level until some form of Letdown is re-established.*
	SRO/BOP	Maintain SG levels 68-74% using Main or Auxiliary Feedwater.	*Normal Feedwater will still be in service.*
	SRO/BOP	Checks if all 4160v ESF Busses are energized and determine 4160v Bus E1A is de-energized, then: • places ‘A’ and ‘D’ SG PORV’s in MANUAL.	• *This action can be done at anytime from the CIP.* • *If the Unit Supv. desires to restore Control of the SG PORV’s to the Control Room, he must dispatch an operator to operate switches in the plant.*
	SRO	Determines the following are energized: • All 13.8 kV Standby Buses • All 13.8 kV Auxiliary Buses • Non-1E 4160v Buses 1D1 and 1D2.	***Event # 5*** *should have automatically occurred by this step. If not, it should occur soon.*

Op-Test No.: # 1 **Scenario No.:** # 4 **Event No.:** 5 and 6

Event Description: Inadvertent Feedwater Isolation/Reactor Trip/Turbine fails to trip

Time	Position	Required Operator Actions	Notes
	ALL	Respond to multiple alarms due to Inadvertent Feedwater Isolation.	*If plant conditions are diagnosed soon enough, the crew will perform a manual Reactor trip. Otherwise they will respond to an automatic Reactor trip.*
	SRO	Directs/ensures crew enters 0POP05-EO-EO00, Reactor Trip or Safety Injection	
	RO (C)* * - denotes critical portion of step.	Completes immediate actions of 0POP05-EO-EO00 and determines: • Reactor is tripped • ***Turbine has NOT automatically tripped, attempts a turbine trip using the TURB TRIP PB; but turbine does not trip.** ○ **Places both EH Pumps in PTL** ○ **Manually runs back turbine to cause turbine to trip.** • AC ESF Busses are energized except 4160v Bus E1A. • SI may or may not have actuated – depends on fast turbine got tripped – see 'Notes' to the right →	• *RO will announce status of immediate action steps as he/she performs them.* • *BOP Operator will monitor the plant and make an announcement of the Reactor trip.* • *Once the Turbine EH Pumps are placed in PTL, a turbine trip will eventually occur, but running the turbine back will cause it to occur sooner because EH pressure is bled down faster.* • *The delay in tripping the Main Turbine after the Reactor has tripped may result in a large RCS over-cooling and depressurization which results in an SI actuation (expected response) If this occurs, RCS pressure will quickly recover.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 4 **Events No.:** 5 and 6

Event Description: Inadvertent Feedwater Isolation/Reactor Trip/Turbine fails to trip (cont'd.)

Time	Position	Required Operator Actions	Notes
	SRO	Directs/ensures the immediate actions of EO00, Reactor Trip/SI have been completed by performing a procedure read through of them. **NOTE TO EXAMINER:** • If an SI has occurred, continue with the operator actions on this page. • If an SI has NOT occurred, go to page 19 of this scenario guide for operator actions.	*AFW will automatically start immediately after the Rx trip due to SG level shrink. **Event # 7** consists of AFW Pump #14 tripping on overspeed while starting and AFW Pump #13 tripping 3 minutes after starting. This will create a Loss of Heat Sink condition because AFW Pumps 11 and 12 are already OOS.*
	SRO/BOP	Directs/Performs 0POP05-EO-EO00, Addendum 5, Verification of SI Equipment Operation: • FW Isolation • Check for Steamline Isolation • AFW Status • Phase 'A' Containment Isolation ○ MOV-0025 will have to be closed manually due to loss of power on 'A' Train. • ECW and CCW • Containment Cooling • ECCS pump and valve status • Containment Ventilation Isolation • HVAC systems (CR/EAB/FHB)	• *If SI did not actuate, the crew will transition to 0POP05-EO-ES01, Reactor Trip Response, then transition to the Loss of Heat Sink FRP when all AFW is lost.* • *Crew should diagnose the loss of all AFW which creates a Red Path on the Heat Sink CSF. Implementation of the appropriate FRP cannot be done until Addendum 5 has been completed.* • *Some Containment Isolation Valves have no power, but there are usually redundant valves that will act to isolate the penetration. The only exception in this scenario is the Charging Line OCIV, MOV-0025.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 4 **Events No.:** 5 and 6

Event Description: Inadvertent Feedwater Isolation/Reactor Trip/Turbine fails to trip (cont'd.)

Time	Position	Required Operator Actions	Notes
	SRO/RO	Check plant status: • Containment pressure < 9.5 psig • RCP Seal cooling: 6-13 gpm • RCS cooldown: Tave at or trending to 567 °F • Pzr PORV and Normal and Auxiliary Spray valve status: closed • Excess Letdown Isol Valves: closed • Monitor RCP trip criteria to determine if RCP's should be stopped: criteria will NOT be met. • The following Containment Isolation Valves are closed: o RCP Seal Return Valves (2) o Containment Rad Monitor Isolation Valves (4)	*When AFW Pump #13 trips a Red Path will occur in the Heat Sink Critical Safety Function. The SRO should then transition to 0POP05-EO-FRH1, Loss of Secondary Heat Sink IF ADDENDUM 5 IS COMPLETE. Go to page 20 of this scenario guide for associated operator actions.* *RCP trip criteria: RCS pressure is < 1430 psig and at least 1 HHSI Pump is running.*
	ALL	Diagnose plant conditions to determine appropriate procedure to implement next: • Check SG pressures to determine if they are controlled or rising and are > Containment pressure; all SG pressures will be controlled/rising. • Check for SG tube leak/rupture with Rad Monitor and SG level trends; no SG tube leak/rupture exists. • Check if RCS is intact with Containment radiation, pressure, and water level trends; RCS is intact.	
	ALL	Monitors if SI flow can be terminated based on the following conditions: • RCS subcooling > 35 °F – this condition will be met. • Secondary Heat Sink based on AFW flow OR SG NR levels – this condition will NOT be met because there are no AFW Pumps running.	

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 4 **Events No.:** 5 and 6

Event Description: Inadvertent Feedwater Isolation/Reactor Trip/Turbine fails to trip (cont'd.)

Time	Position	Required Operator Actions	Notes
	SRO	Transitions to 0POP05-EO-ES01, Reactor Trip Response	*This procedure transition will apply if an SI DID NOT occur after the Reactor trip.*
	SRO/RO	Monitor RCS Tave to determine if it's stable or trending to 567 °F. If not: • Ensures AFW is appropriately throttled. • Isolate steam dump drains • Isolate steam chest drains • Isolate steam to MSR's and steam line drains to MSR's. • Trip all SGFPT's • Stop dumping steam • Isolate SG Blowdown • If cooldown continues, close all MSIV's and MSIB's.	*When AFW Pump #13 trips a Red Path will occur in the Heat Sink Critical Safety Function. The SRO should then transition to 0POP05-EO-FRH1, Loss of Secondary Heat Sink. Go to page 20 of this scenario guide for associated operator actions.*
	SRO/BOP	Checks FW status if Tave < 574 °F: • FWIV's and FWIB's closed • FW Preheater Bypass Valves closed • FW Main and Low Power Feed Reg Valves closed. • Trip all SGFPT's	
	SRO/BOP	Verifies feedflow to ≥ 3 SG's from either MFW or AFW and determines there is only 1 AFW pump providing water to 1 SG. Directs BOP operator to either cross-tie AFW systems to be able to feed 3 SG's OR establish MFW by performing procedure Addendum 6.	*At this time, only #13 AFW Pump is running supplying feedwater to 'C' SG (IF it hasn't yet tripped)*
	SRO/RO	Verifies all control rods are fully inserted.	
	SRO/RO	Check Standby DG status	***Event # 7*** *should have occurred by this step. If not, it should occur soon.*

OPERATOR ACTIONS

Op-Test No.: # 1	**Scenario No.:** # 4	**Event No.:** 7
Event Description: Loss of Heat Sink		

Time	Position	Required Operator Actions	Notes
	ALL	Initiate monitoring of Critical Safety Functions.	• *A Red Path on Heat Sink will be present.* • *Crew cannot implement any FRP's until Addendum 5 is complete.*
	SRO continuous	Once Addendum 5 is complete, transitions to 0POP05-EO-FRH1, Response to Loss of Secondary Heat Sink, and directs operator actions.	
	ALL	Determine if a Secondary heat sink is required due to: • RCS pressure is > all SG pressures and no SG are faulted. • RCS Wide Range Thot is > 350 °F	• *The crew should first evaluate if a Secondary Heat Sink exists per the CIP of the procedure.* • *The plant conditions for this step will be present therefore a Secondary Heat Sink IS required.*
	SRO/BOP	Checks if Secondary Heat Sink exists: • SG WR level in ≥ 3 SG's is > 50%. • Pressurizer Pressure is < 2335 psig.	• *At this time, there will NOT be sufficient level in ≥ 3 SG's so crew will have to implement an alternate method of RCS heat removal which will be Bleed and Feed.* • *These conditions are also on the procedure CIP therefore the crew may directly evaluate the conditions upon entering the procedure.*
	SRO/RO	Directs/Trips all Reactor Coolant Pumps.	*This action removes a heat source to the RCS.*

OPERATOR ACTIONS

Op-Test No.: # 1	**Scenario No.:** # 4	**Event No.:** 7
Event Description: Loss of Heat Sink		

Time	Position	Required Operator Actions	Notes
	SRO/RO	Directs/Actuates Safety Injection	*SI may have actuated earlier due to the RCS cooldown after the Reactor trip and may have been reset. If so, the Manual SI Actuation Sw. can be used to re-actuate SI.*
	SRO/RO (C)	**Directs/Verifies RCS Feed path:** • **At least one HHSI Pump running** • **HHSI Valve alignment:** ○ **HHSI Pump suction valves from RWST – OPEN** ○ **HHSI Pump discharge valves – OPEN** ○ **HHSI Cold Leg Injection valves - OPEN**	*Only 'C' Train HHSI Pump will be running; 'A' has no power due to bus lockout and 'B' was OOS at start of scenario.*
	SRO/RO (C)	**Direct/Establishes an RCS Bleed Path:** • **Verifies power to both Pressurizer PORV Isolation Valves.** • **Verifies both Pressurizer PORV Isolation Valves are open.** • **Opens both Pressurizer PORV's** **OR see next page for alternate actions if crew considers only 1 PORV Isolation Valve is open.**	*Only one PORV Isolation Valve (MOV-0001B) has power (valve indication). The one without power can be verified open by:* • *Noting it was open before 4160V Bus E1A lost power.* • *Use of ICS graphic display.* *Crew may conservatively consider the PORV Isolation valve without power to be not full open and implement an alternate bleed path. See next page for steps.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Scenario No.:** # 4 **Event No.:** 7

Event Description: Loss of Heat Sink

Time	Position	Required Operator Actions	Notes
	SRO/RO (C)* *** - denotes critical portion**	Verify Adequate RCS Bleed Path: • Both Pressurizer PORV's OPEN. • Both Pressurizer PORV's Isolation Valves OPEN. OR ***if crew assumes only 1 PORV Isolation Valve is open, they perform the following steps to ensure an adequate RCS Bleed Path exists:** ○ ***Open Rx Vessel Head Vent Valves: 4 Isolation Valves and 2 Throttle valves to give 2 vent paths.**	*Terminate the scenario once the RCS Bleed path has been verified by having either:* • *Both Pzr PORV's and PORV Isolation Valves open.* *OR* • *1 Pzr PORV and PORV Isolation Valve open and 2 Rx Vessel Head Vent paths open.*

CRITICAL TASK SUMMARY

POSITION	EXPECTED RESPONSE	ACCEPTANCE CRITERIA	SAT/ UNSAT
SRO/RO (C)	***Turbine is has NOT automatically tripped, attempts a turbine trip using the TURB TRIP PB; but turbine does not trip.** • **Places both EH Pumps in PTL** • **Manually runs back turbine to cause turbine to trip.**	Turbine is manually tripped prior to transitioning from 0POP05-EO-EO00, Reactor Trip or Safety Injection.	
SRO/RO (C)	**Directs/verifies RCS Feed path:** • **At least one HHSI Pump running** • **HHSI Valve alignment:** ○ **HHSI Pump suction valves from RWST – OPEN** ○ **HHSI Pump discharge valves – OPEN** • **HHSI Cold Leg Injection valves – OPEN** **Direct/Establishes an RCS Bleed Path:** • **Verifies power to both Pressurizer PORV Isolation Valves.** • **Verifies both Pressurizer PORV Isolation Valves are open.** • **Opens both Pressurizer PORV's** **OR** **if crew assumes only 1 PORV Isolation Valve is open, they perform the following steps to ensure an adequate RCS Bleed Path exists:** • **Open Rx Vessel Head Vent Valves: 4 Isolation Valves and 2 Throttle valves to give 2 vent paths.**	Establishes feed and bleed of the RCS prior to transition from 0POP05-EO-FRH1.	

TURNOVER INFORMATION

- Reactor Power is 100%
- Cycle Burnup is 150 MWD/MTU (BOC)
- RCS Boron Concentration is 1351 ppm
- Hourly dilutions to maintain current power are approximately 10 gallons. Total Batch Integrator set at 10 gallons, getting 11. Xenon is at equilibrium conditions.
- Boric Acid Tanks ‘A’ and ‘B’ are at 7410 ppm.
- No liquid waste discharges are in progress or planned.
- No personnel are in containment.
- FHB Truck Bay doors are closed
- No ESF DG FOST’s are on recirc.
- ‘B’ Train work week is in progress with the following out of service:
  - ‘B’ ECW Pump
  - ‘B’ CCW Pump
  - #12 AFW Pump
  - ‘B’ HHSI Pump
  - ‘B’ LHSI Pump
  - #12 ESF DG
- ESF Power Availability surveillance, 0PSP03-EA-0002, is due to be performed in 6 hrs.
- There are no jumpered cells on any of the 1E 125 VDC Batteries.
- I&C is troubleshooting SG ‘B’ Level Transmitter, LT-0528. LT-0528 has been inoperable for 4 days and the channel is in the tripped condition to comply with Tech Spec requirements.
- All FWBP’s and the SUFP are operating in preparation to secure SGFPT #12.
- After taking the watch, secure SGFPT #12 to allow repair of a steam leak on the bonnet of a manual Main Steam valve associated with SGFPT #12**.** The Shift Manager has directed that the following tests NOT BE PERFORMED when securing SGFPT #12:
  - 0POP02-FW-0002, Step 16.1.4, Mechanical overspeed test
  - 0POP02-FW-0002, Step 16.1.7, Turbine Stop Valves.
  - 0POP02-FW-0002, Step 16.1.12, Main Oil Pump Swap Test

SIMULATOR SETUP

1. Check and Clean the following procedures:

   - 0POP02-FW-0002 (R54)
   - 0POP04-RP-0001 (R15)
   - 0POP04-FW-0001 (R24)
   - 0POP04-AE-0001 (R39)
   - 0POP04-CV-0004 (R11)
   - 0POP05-EO-EO00 (R21)
   - 0POP05-EO-ES01 (R24)
   - 0POP05-EO-FRH1 (R19)

   - Annunciator Response Procedures:

   ALL Annunciator Response Procedures (ARP's) must be checked if this scenario is the first to be run on this day. Setup for subsequent runs of this scenario only requires those ARP's that were actually marked-in to be checked. Instructors running the scenario must keep track of which ARP's these are, otherwise all will have to be checked for subsequent scenarios as well.

2. Log into Instructor Workstation as <lotnrc> user, open Orchid (nstps server), then 'Unlock' Initial Conditions Group <lotnrc>.

3. Reset to IC # 213 and verify:
   - Step Counter positions (CP-005 annunciator window cleared)
   - Red light on end of CP-010 off
   - ICS Annunciators have stopped counting up
   - Ensure the proper FOP/BO sign is posted at CP-005. Should be: FOP 249 steps/BO 112 steps.

4. Go to RUN and perform the following:

   - Annunciators are acknowledged, reset, silenced.
   - RM-11 is functional; alarms are acknowledged (stop flashing). Ensure all grids are checked.
   - Control Switch FLAGS aligned appropriately to breaker position on CP-003 and CP-010.
   - Verify both FHB Filter Outlet Damper controllers are in AUTO and CLOSED (HV-9507 and 9507A).

SIMULATOR SETUP IS CONTINUED ON NEXT PAGE

SIMULATOR SETUP (cont'd.)

- Tag out the following components:
  - 'B' ECW Pump
  - 'B' ECW Traveling Screen
  - 'B' ECW Screen Wash Booster Pump
  - 'B' CCW Pump
  - #12 AFW Pump
  - 'B' HHSI Pump
  - 'B' LHSI Pump
  - #12 ESF DG (output breaker in PTL and Emerg. Stop Plunger pulled up)

- If Annunciator 5M03-D-5, ROD SUPV MONITOR ROD POSTION TRBL, comes in, take ICS point YCO400 off scan.

5. Execute Lesson Plan for <NRC_Scenario_4> in <lotrnc/2011> directory. These actions will set up any initial conditions for the scenario. Run the scenario in accordance with the next section, Scenario Instructions'.

6. Set TOTAL M/U BATCH integrator to 10 gallons. **(CHECK BEFORE EACH SCENARIO)**

7. Verify BA Controller Pot setting is 3.65 **(CHECK BEFORE EACH SCENARIO).**

8. Place the simulator in FREEZE

SCENARIO INSTRUCTIONS

1. Provide Shift Turnover sheets to the crew and review the information. Ensure the candidates don't have any questions.

2. Review the Simulator Differences list with the crew.

3. Have the crew perform their board walkdown and inform the floor instructor when ready to take the watch.

4. Note START TIME when the crew takes the watch and place the simulator in RUN. Verify simulator clock is set correctly.

***START TIME:* ________** (time crew takes the watch)

ALWAYS 'TRIGGER' EVENTS IN THE SIMULATOR SCENARIO LESSON PLANS. THIS WAY, ANY TIME DELAYS ASSOCIATED WITH EVENTS WILL TAKE PLACE AS INTENDED.

REFER TO 'EXPECTED BOOTH COMMUNCATIONS' AND 'EXPECTED BOOTH ACTIONS' SECTIONS FOR INSTRUCTOR ACTIONS DURING THE SCENARIO.

5. Trigger the step titled 'Start Chart' and ensure specified Critical Parameters for the scenario begin recording as the scenario runs.

NOTE: ***Events (Lesson Plan Steps) are triggered upon the Lead Examiners cues or at the times listed below (time from last event).***

6. Time **+ 10 MIN**. -Trigger **STEP** 2 (Pzr Press Instrument PT-0457 fails LOW)

7. Time **+ 14 MIN**. - Trigger **STEP** 3 (Steam Pressure Instrument PT-0514 fails HIGH)

8. Time **+ 15 MIN**. - Trigger **STEP** 4 (Lockout on 4160v Bus E1A)

9. Place simulator in FREEZE when cued by the Lead Examiner to terminate scenario.

10. DO NOT RESET simulator until all Examiners have completed Follow-Up Questioning.

CONTINUED ON NEXT PAGE

SCENARIO INSTRUCTIONS (cont'd.)

11. Ensure the following prior to printing out the Critical Parameters:

    - Each parameter is labeled with its descriptive name (e.g. 'RCS Subcooling').
    - The time range is set to 3000 seconds. Select 'View', Select 'Page', note 'Time Range', change to 3000 sec if necessary.
    - Each parameter has an appropriate range to facilitate a display of variation during the scenario. If the range has to be adjusted, go to 'View', Select 'Variables', then change the range of the desired parameter.

12. After Critical Parameters have been retrieved and verified as satisfactory, perform the following:

    - Clear Critical Parameters trend data for this simulator session.
    - Label the printout with the date, time, Crew #, and Scenario #.

EXPECTED BOOTH COMMUNICATIONS

Event 1, Shutdown SGFPT #12

As TGB Watch:

If contacted by the Control Room to verify SGFPT #12 goes on the Turning Gear, acknowledge the request. Once SGFPT #12 reaches zero speed (Panel Graphics), contact the Control Room to inform them SGFPT #12 is on the Turning Gear.

Event 2, Pressurizer Pressure transmitter failure

As I&C:

If asked to trip or bypass the failed channel, either acknowledge the request or report to the Control Room, whichever is requested. Once either of these is done no further action is required.

Event 3, SG 1A Steam Pressure PT-0514 fails high

As I&C:

If asked to trip or bypass the failed channel, either acknowledge the request or report to the Control Room, whichever is requested. Once either of these is done no further action is required.

EXPECTED BOOTH COMMUNICATIONS ARE CONTINUED ON NEXT PAGE WITH EVENT #4.

EXPECTED BOOTH COMMUNICATIONS

Event 4, Lockout of 4160v Bus E1A

As TGB Watch:

If contacted by the Control Room to verify at least one Instrument Air Compressor is in service, report that the Instrument Air Compressors are lined up for normal operation and there is currently one Instrument Air Compressor running.

As Yard Watch:

If contacted by the Control Room to determine if the TSC DG is running and/or if LC 1W is energized, acknowledge the request then, after a short time, report that the TSC DG is NOT running and LC 1W is energized from its normal source.

If contacted by the Control Room to determine if the Lighting DG is running and/or if MCC 12K3 is energized, acknowledge the request then, after a short time, report that the Lighting DG is NOT running and MCC 12K3 is energized from its normal source.

As MAB Watch:

If contacted by the Control Room to locally close MOV-0025, acknowledge the request then refer to ‘Expected Booth Actions’ for the lesson plan step that will do this action.

As EAB Watch:

If contacted by the Control Room to place the Station Blackout Pwr. Switches for ‘A’ and ‘D’ SG PORV’s in BYP, acknowledge the request then refer to ‘Expected Booth Actions’ for the lesson plan step that will do this action.

NOTE TO INSTRUCTOR: Upon loss of power to E1A, SG PORV’s ‘A’ and ‘D’ will fail closed (recent plant mod). To restore control of the SG PORV’s to the Control Room, a lesson plan step must be triggered which will perform the same action as operating the ‘Station Blackout Power Switches’ to BYP in the plant.

As any Plant Operator

If contacted by the Control Room to make a Containment entry to open Excess Letdown Isolation Valve MOV-0082, acknowledge the request and inform the Control Room you’ll be making an entry shortly. No further action is needed.

Event 4, Lockout of 4160v Bus E1A, communications are continued on the next page

EXPECTED BOOTH COMMUNICATIONS (cont'd.)

Event 4, Lockout of 4160v Bus E1A (cont'd)

As Duty Maintenance Supervisor or Electrical Maintenance:

If contacted by the Control Room to investigate the lock out of 4160V Bus E1A, acknowledge the request and inform them you'll look into it. No further action is needed. If called again, inform the Control Room that Electrical Maintenance is investigating and there's no additional information yet.

Event 5, Inadvertant Feedwater Isolation/Reactor Trip

As TGB Watch:

If contacted by the Control Room to investigate the overspeed trip of AFW Pump #14 or to reset the overspeed trip, acknowledge the order, then after a few minutes report that the Trip/Throttle Valve linkage is bent and it appears it cannot be reset.

If contacted by the Control Room to check AFW Pump # 13, acknowledge the order, then after a few minutes report there is an acrid smell around AFW Pump #13's motor.

As EAB Watch,

If contacted by the Control Room to investigate the trip of AFW Pump #13 breaker, acknowledge the order, then after a few minutes, report there is a 50G device flag on the breaker.

As Duty Maintenance Supervisor:

If contacted by the Control Room to determine the status of AFW Pump #12 maintenance, acknowledge the request, then after a few minutes, report the only maintenance being performed on the pump by Electrical Maintenance. The motor is de-termed for meggar readings, but Electrical Maintenance can restore the pump to operation in about 2 hrs.

If contacted by the Control Room to investigate the problem with #14 AFW Pump Trip/Throttle Valve linkage, acknowledge the request and inform them you'll get in touch with Mechanical Maintenance to take a look. After several minutes, inform the Control Room that the Trip/Throttle Valve linkage is bent and it appears the overspeed device has failed in some way because the trip plunger cannot be reset.

As MAB Watch:

When contacted by the Control Room to locally close MOV-0025, acknowledge the request then refer to EXPECTED BOOTH ACTIONS.

EXPECTED BOOTH ACTIONS

1. DA High Level Dump Valves: If asked to open the DA High Level Dump Valves, trigger lesson plan **Step 6** or perform the following:

   - Select 'Remotes'
   - Select 'Condensate System'
   - Scroll down to locate remotes CD-27 and CD-28
   - Insert a value of 0.3 for each valve
   - Report to the Control Room that the DA High Level Dump Bypass Valves are open X turns (X = the # of turns requested).

2. AFWST Fill: If asked to fill the AFWST, trigger lesson plan **Step 8** or perform the following:

   - Select 'Remotes'
   - Select 'Auxiliary Feedwater System'
   - Scroll down to locate remote for AF-17
   - Change value from 'Norm' to 'Open'
   - Select 'Insert'
   - Report to the Control Room you're filling the AFWST

3. Locally close MOV-0025, Charging Line OCIV

   When contacted by the Control Room to locally close MOV-0025, wait a short time then trigger lesson plan **Step 7**. After this action, call the Control Room and report MOV-0025 is closed.

4. Restoring SG PORV's (Placing the Station Blackout Pwr. Switches for 'A' and 'D' SG PORV's in BYP).

   If contacted by the Control Room to place the Station Blackout Pwr. Switches for 'A' and 'D' SG PORV's in BYP, wait a short time then trigger lesson plan **Step 9**. After this action, call the Control Room and report the switches for 'A' and 'D' SG PORV's are in BYP.

INITIAL LICENSE EXAM

OPERATING TEST # 1

NRC BACKUP SCENARIO

Revision 2

Week of 9/26/2011

SCENARIO OUTLINE

Facility: South Texas Project **Backup Scenario** **Op-Test No.: 1**

Examiners: ______________________ **Operators:** __________________________

______________________ __________________________

______________________ __________________________

Initial Conditions: BOC conditions, 75% power and holding for completion of FWBP work to correct a common mode motor problem. Circulating Water Pump #11 and Containment Spray Pump 'A' are out of service for maintenance.

Turnover: Start FWBP #13 and secure FWBP #11 to allow maintenance on the last FWBP motor.

Event No.	**Malf. No.**	**Event Type***	**Event Description**
1 (0 min)	N/A	SRO (N) BOP (N)	Swap Feedwater Booster Pumps
2 (18 min)	05-12-03 (0)	SRO (I, TS) BOP (I)	SG 'C' controlling level channel (LT-0539) fails low **(CT)**
3 (32 min)	Thermal OL (true)	SRO (C) RO (R) BOP (C)	Loss of Iso-phase cooling results in down power
4 (47 min)	14-08-01 (true)	SRO (C, TS) RO (C)	Essential Cooling Water Pump "'A' trips without auto start of the standby train.
5 (51 min)	02-07-02 (true)	All (M)	RCP 'B' sheared shaft (after initial response to Event 4)
6 (N/A)	52-LI-37 (18) 52-LI-57 (96)	SRO (C) RO (C)	2 control rods stuck partially out of the core following reactor trip (Integral) **(CT)**
7 (N/A)	10-08-01 10-11-02 (true)	SRO (M) RO (M)	Loss of offsite power and all ESF diesel generators (Loss of All AC) after boration started in ES01 (Integral) **(CT)**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification

SCENARIO MISCELLANEOUS INFORMATION

INSTRUCTOR NOTES:

Refer to the Instructor Guide for directions on Simulator Setup, Expected Booth Communications and Expected Booth Actions.

CRITICAL PARAMETERS:

The following parameters may be of value in evaluating crew performance and should be automatically recorded during the scenario. Once the scenario is complete for each crew, printout the Critical Parameters and label the printout with date, time, Crew # and scenario #.

- Reactor Power
- ‘C’ SG Narrow Range Level
- Charging Flow FI-0205A
- Alt Borate Flow FI-0120A
- 4160V Bus E1A Voltage
- 4160V Bus E1B Voltage
- 4160V Bus E1C Voltage

OPERATOR ACTIONS TABLE NOTES:

1. Critical Tasks are indicated by "C" in the position column and indicated in bold type.

2. Actions required throughout the event are indicated as "(continuous)" in the position column.

3. Shaded cells indicate procedural entry points.

OPERATOR ACTIONS

Op-Test No.: # 1 **Backup Scenario** **Event No.:** 1

Event Description: Swap Feedwater Booster Pumps

Time	Position	Required Operator Actions	Notes
	SRO	Directs the BOP to start FWBP #13, then secure FWBP #11 in accordance with 0POP02-FW-0001, Main Feedwater.	*Crew has briefed this evolution prior to taking the watch.*
	BOP	Contacts a Plant Operator to verify FWBP #13 Lube Oil and Seal Water are in service for FWBP #13.	
	BOP	Verifies adequate Lube Oil conditions for FWBP # 13 by observing Annunciator FW BOOST PMP 13 L.O. AUX PMP TRBL is cleared (not in an alarm condition).	*Annunciator is on Annunciator Panel 07M3, Window E-6.*
	BOP	Verifies Deareator Storage Tank level is > 30%	*There are 2 DA Storage Tanks. Levels are displayed on LI-7175/7175A at CP-008.*
	BOP	May contact a Plant Operator to verify FWBP #13 Lube Oil Reservoir temperatures are > 60 °F.	*This action comes from a procedure NOTE and is not an actual step.*
	BOP	Verifies FWBP #13 is within 50 °F of Deareator and downstream temperatures.	*Operator will obtain these temperatures from plant computer points.*
	BOP	May contact a Plant Operator to monitor seal water outlet temperatures once FWBP #13 is started.	• *Seal water outlet temperatures should be maintained relatively constant due to the action of temperature control valves.* • *BOP operator may not perform this step until after FWBP has been started.*
	BOP	Ensures discharge valve MOV-0456 for FWBP #13 is closed.	*Valve will have to be closed since FWBP was lined up as the Standby pump with the valve open.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Backup Scenario** **Event No.:** 1

Event Description: Swap Feedwater Booster Pumps (cont'd.)

Time	Position	Required Operator Actions	Notes
	BOP	Verifies the FWBP #13 Start Permissive circuit indicates start permissives are met by: • Checking Annunciator FW BOOST PUMP TRIP/TROUBLE is NOT in alarm. • Blue Permissive light is ON at 13.8 kV Swgr. 1J, Cubicle 9. • Plant computer point for FWBP #13 TRIP/TROUBLE indicates "Norm".	*Annunciator is Window A8 on Annunciator Panel 07M3.* *Will have to contact a Plant Operator for status of Blue light.*
	BOP	Starts FWBP #13 using CP-008 control sw. and informs Unit Supervisor Pump has been started.	• *The BOP operator may contact a Plant Operator to ensure the FWBP is ready for starting before actually starting it.* • *The discharge valve will automatically open when the pump starts.* • *Once the discharge valve opens there will be some increase in feedflow to the SGs so the BOP operator should monitor SG levels and Feed Reg Valves to determine the SG Water level control system is responding as expected.*
	BOP	Contacts Plant Operator to verify the status of certain auxiliary systems on FWBP #13: • Aux Oil Pump and Shaft-driven oil pump • Recirc valve • Lube Oil Temperature • Seal Water Temperature Control Valves.	*This is the last action associated with starting FWBP #13. Stopping FWBP #11 begins on next page.*

OPERATOR ACTIONS (Cont')

Op-Test No.: # 1 **Backup Scenario** **Event No.:** 1

Event Description: Swap Feedwater Booster Pumps (cont'd.)

Time	Position	Required Operator Actions	Notes
	BOP	Contacts the Plant Operator to ensure FWBP #11 Aux. Oil Pump is available for securing FWBP #11.	*There are several procedure steps associated with this action. The BOP may read them to the Plant Operator individually or direct him to perform the required steps using his own procedure and report back the results.*
	BOP	Closes FWBP #11 discharge valve, MOV-0458.	*Discharge valve control sw. is located just below the pump control sw. on CP-008*
	BOP	After FWBP #11 discharge valve is closed, BOP stops FWBP #11 and informs Unit Supervisor Pump has been stopped.	***Event # 2*** *can occur here on signal from Lead Examiner.*
	BOP	Contacts Plant Operator to ensure FWBP #11 Aux Oil Pump has started.	*There are several steps that must be performed in the field to accomplish this action.*
	BOP	Ensures FWBP #11 discharge valve MOV-0458 is closed.	
	BOP	Directs the Plant Operator to cycle FWBP strainer per procedure section 18.	

OPERATOR ACTIONS

Op-Test No.: #1	**Backup Scenario**	**Event No.:** 2
Event Description: SG 'C' Controlling Level Channel LT-539 Fails Low (Tech Spec)		

Time	Position	Required Operator Actions	Notes
	BOP	Acknowledges and reports Annunciators on Control Panel CP-006: • SG 1C LVL DEV HI/LO • SG 1C LVL LO • SG 1C LVL LO-LO ALERT	*Annunciators listed are not inclusive.*
	SRO/BOP **C*** *** - denotes critical portion of step**	**Performs immediate actions of 0POP04-FW-0001:** • ***PLACES SG 1C MAIN FEEDWATER REGULATING VALVE CONTROLLER IN MANUAL** • ***ADJUSTS CONTROLLER OUTPUT TO MATCH FEED/STEAM FLOW AND RESTORE SG 1C LEVEL TO BETWEEN 68-74%.** • Determines SGFPT Master and Individual Speed Controllers are responding in Auto.	*This action is NOT part of the Critical steps, but is part of the immediate actions.*
	SRO (continuous)	Directs/ensures actions of 0POP04-FW-0001, Loss of Steam Generator Level Control.	
	SRO	Ensures immediate actions are taken: • Manual control of 'C' MFRV, SG level being returned to 68-74%. • Determines SGFPT Master and Individual Speed Controllers are responding in Auto.	*MFRV – Main Feed Regulating Valve*
	SRO/BOP	Determines MFRV's are in service and 'C' MFRV is in Manual and responding.	
	SRO/BOP	Determines the LPFRV's are not in service.	*LPFRV – Low Power Feed Regulating Valve*

OPERATOR ACTIONS

Op-Test No.: #1 **Backup Scenario** **Event No.:** 2

Event Description: SG ‘C’ Controlling Level Channel LT-539 Fails Low (Tech Spec)

Time	Position	Required Operator Actions	Notes
	SRO/BOP	Checks if Master any individual SGFP Speed Controllers are in Manual.	*All SGFP Controller will be in Auto.*
	SRO/BOP	• Ensure appropriate Feed to steam DP OR SGFP Master Speed Controller at 100% demand in Auto. • If DP is too low, BOP operator may take manual control of the SGFPT Master Speed Controller to raise DP.	• *Required DP is 137 psid for 75% power.* • *If DP is low, but close to required value, the Unit Supv. may elect to first monitor DP since the Feedwater System is still in a state of change.*
	BOP	Restores SG 1C NR level to 68-74%	
	SRO/BOP	Ensure all SG NR levels > 20%, but < 87.5%	
	BOP	Checks SG water level control instruments for failures: • Level – determines LT-0539 has failed low and performs the following: o Selects an alternate channel for SG ‘C’ level control (LI-0573) o Checks QDPS ALARM Annunciator is cleared (not illuminated) • Checks the following transmitters operable: o All Feed Flow xmtrs. o All Steam Flow xmtrs. o All Steam Pressure xmtrs.	*-QDPS alarm is on Annunciator Panel 6M03, Window A-8.*

OPERATOR ACTIONS

Op-Test No.: #1 **Backup Scenario** **Event No.:** 2

Event Description: SG 'C' Controlling Level Channel LT-539 Fails Low (Tech Spec)

Time	Position	Required Operator Actions	Notes
	BOP	Performs the following: • Verifies ALL SG NR levels between 68% and 74% • Checks MFRV's and LPRV's – Automatic control is operable • Checks MFRV's OR LPRV's – in Automatic control. • Determines SG 1C MFRV Controller is operable, but not in AUTO and places SG 1C Main Feed Regulating Valve in AUTO if SG 'A' NR level is 68-74%, then monitors for proper operation.	*Only the MFRV's will be in service.*
	BOP	Checks Feedpump Master Speed Controller in Auto. • If the controller is in Manual, but it's desired to place it in Auto, adjust the controller to provide the required Feed-to-Steam DP. • Place the Controller in Auto • Monitor for proper operation (i.e. maintains required DP).	
	SRO	Checks Tech Specs and determines the following apply: • Table 3.3-1, Item 14 (action 6) • Table 3.3-3, Item 5.b and 6.d (action 20) Both action 6 and action 20 indicate the channel can be bypassed, but must be tripped within 72 hr.	***<u>Event # 3</u>*** *will occur after TS have been consulted and on cue from Lead Examiner.*
	SRO	Notifies I&C to trip or bypass the failed channel.	

OPERATOR ACTIONS

Op-Test No.: # 1 **Backup Scenario** **Event No.:** 3

Event Description: Loss of Isophase Bus Cooling and Power Reduction

Time	Position	Required Operator Actions	Notes
	BOP	Acknowledges and announces the following alarm: ISO PHASE BUS TROUBLE	*Alarm is located on Annunciator Panel 10M2, Window B8.*
	BOP	Informs the US and refers to the Annunciator Response Procedure (ARP).	
	BOP	Verifies trouble condition by checking Plant computer points.	
	BOP	Dispatches a Plant Operator to the local control panel to determine the cause of the alarm.	
	BOP	Informs the Unit Supervisor the Plant Operator reports the operating cooling fan has stopped and the standby fan cannot be started.	
	SRO	Based on report from Plant Operator, enters 0POP04-TM-0005, Fast Load Reduction.	*Per the ARP, if no cooling fans are running, 0POP04-TM-0005 must be used to lower turbine load at 5%/min. until Generator current is at or below 18,500 amps.*
	SRO	Notify STP Co-owners using website	*It's not likely the SRO will perform this action because of limited crew resources that are needed to operate the plant.*
	SRO	Determines amount of boric acid necessary for power reduction and directs RO to commence boration.	• *There's a table in 0POP04-TM-0005 used to estimate the amount of boric acid to add.* • *The US may provide additional direction on how much acid to add with each addition.*

OPERATOR ACTIONS

Op-Test No.: # 1	**Backup Scenario**	**Event No.:** 3
Event Description: Loss of Isophase Bus Cooling and Power Reduction (cont'd.)		

Time	Position	Required Operator Actions	Notes
	ALL RO	Commences a fast load reduction: • Commences boration - Places RC MU CONT SYS ON Sw. to STOP - Places RC MU CONT Sw. to BORATE - Ensure BA flow integrator FY-0110B is set for req. # of gallons. - Ensures BA MU FLW CONTR FK-0110 is set for desired flowrate. - Turns RC MU CONT SYS ON Sw. to START - Verifies BA Transfer Pump 1A or 1B starts. - When req. # of gallons has been added, ensures makeup is stopped. • Ensures Control Rods are in AUTO • Energizes Pzr heaters for boron equalization	
	BOP	• Checks Main Turbine in the IMP IN Mode.	*- if not in IMP IN, the US will have the operator place turbine control in IMP IN by depressing the IMP PRESS FEEDBACK 'IN' PB.*

OPERATOR ACTIONS

Op-Test No.: # 1	**Backup Scenario**	**Event No.:** 3
Event Description: Loss of Isophase Bus Cooling and Power Reduction (cont'd.)		

Time	Position	Required Operator Actions	Notes
	BOP	Reduces Turbine load: - Uses SETPOINT CONTROL Up/Down PB's to establish desired setpoint in SETPOINT display. - Sets LOAD RATE thumbwheel to desired ramp rate. - Depresses the 'GO' PB to initiate the load change.	• *NOTE: the SETPOINT display is not a calibrated display so the operator will use an approximate setting and monitor actual MW.* • *Unit Supervisor should direct a load reduction rate of 5%/min.*
	SRO	Has crew maintain the following parameters within prescribed limits: - Generator VARS (BOP) - Rod Control responding to Tave/Tref deviation (RO) - Pressurizer Level (RO) - Pressurizer Pressure (RO) - SG NR levels (BOP)	
	SRO/BOP	Directs/determines if Steam Dumps are armed. If so, monitors for proper Steam Dump operation.	*The faster Turbine load is changed, the more likely the Steam Dumps will arm.*
	SRO/BOP	Directs/ensures Main Turbine Vacuum is within permissible range.	*0POP04-TM-0005 contains an Addendum for this.*
	SRO/BOP	At < 95% power, ensures Feedwater Heaters 11A/B Bypass, MOV-0118, is closed.	*Rx power was initially 75%.*
	SRO/BOP	At < 65% Turbine load, remove one SGFPT from service.	
	ALL	At < 18,500 amps on Main Generator, crew stabilizes the plant.	• *Should get below 18,500 amps at 53-55% Rx power.* • *The Lead Examiner can signal for **<u>Event #4</u>** to occur once Main Generator amps are < 18,500 and RCS pressure is stable or rising.*

OPERATOR ACTIONS (Cont')

Op-Test No.: # 1 **Backup Scenario** **Event No.:** 4

Event Description: ECW Pump 1A trips without auto start of Standby Train

Time	Position	Required Operator Actions	Notes
	RO	Acknowledges and responds to the following alarm: ECW PMP 1A TRIP	• *Alarm is on Annunciator Panel 2M03, Window C7.* • *A DG 11 TRBL alarm will also come in on Annunciator Panel 3M03, Window A4.*
	RO	Determines ECW Pump 'A' has tripped. Informs the US and refers to the Annunciator Response Procedure (ARP).	
	RO	Determines the Standby CCW/ECW Train has NOT started and reports this to Unit Supervisor.	• *Standby CCW/ECW Train is Train 'C'.* • *Train 'C' ECW Pump was already in service, but 'C' CCW Pump should have started, but did not.*
	SRO	Directs the RO to start the Standby CCW Pump 1C.	*The operator may start CCW Pump 1C without SRO direction due to procedure direction to ENSURE the train is started.*
	SRO/RO	Directs/places #11 ESF DG in Emergency Stop.	
	SRO/RO	Directs/places the following Handswitches in PTL: • ECW Pump '1A' • ECW Screenwash Booster Pump '1A' • ECW Traveling Screen '1A'	

OPERATOR ACTIONS (Cont')

Op-Test No.: # 1	**Backup Scenario**	**Event No.:** 4
Event Description: ECW Pump 1A trips without auto start of Standby Train (cont'd)		

Time	Position	Required Operator Actions	Notes
	BOP	Operator ensures ECW Train 'A' Blowdown Valve FV-6935 is closed.	• *The Blowdown Valve should have automatically closed with the ECW Pump tripped.* • ***<u>Event #5</u>*** *should be initiated here on signal from Lead Examiner.* • *The Tech Spec evaluation for this event must be done after the scenario is terminated due to the number of Tech Specs that have to be evaluated.*
	SRO/RO	Directs/places the remaining ECW/CCW train in Standby: • 'B' ECW started • 'A' CCW secured • Train Mode Sw. re-aligned such that 'B' Train is in Standby.	
	SRO/RO	Directs/places Essential Chiller 12A is secured and places Handswitch in PTL.	
	SRO/RO	Directs/places Essential Chilled Water Train 'A' Pump in PTL	
	SRO/RO	Directs/places additional trains of CRE and EAB HVAC and chiller systems in service as needed.	*CRE: Control Room Envelope* *EAB: Electrical Auxiliary Bldg.*
	SRO/RO	Ensures CCW Train 'A' is secured and places CCW Pump 1A Control Sw. to PTL.	

SEE NEXT PAGE FOR EVENT 4 TECH SPEC INFORMATION

OPERATOR ACTIONS (Cont')

Op-Test No.: # 1 **Backup Scenario** **Event No.:** 4

Event Description: ECW Pump 1A trips without auto start of Standby Train (cont'd)

Time	Position	Required Operator Actions	Notes
	SRO	Consults Tech Specs 3.5.2, 3.6.2.1, 3.6.2.3, 3.7.3, 3.7.4, 3.7.7, 3.7.14, 3.8.1.1, 3.8.1.2 and 3.8.1.3.	• *TS are referenced in the ARP.* • *Refer to discussion below on the referenced Tech Specs.*

Tech Specs Information:

- TS 3.5.2, 3.6.2.1, 3.6.2.3, 3.7.3, 3.7.4, 3.7.7, 3.7.14 all have **7 day** action statements that require returning the related component to operable status within 7 days or apply the CRMP (Configuration Risk Management Program) or be in at least Hot Standby within the next 6 hrs. and in Cold Shutdown within the following 30 hrs.
- TS 3.8.1.1, Actions 'b' and 'd' apply.
    - Action 'b' requires a surveillance be performed **within 1 hr.** and at least once every 8 hr. thereafter that demonstrates required independent circuits between the offsite transmission network and the onsite Class 1E distribution system are operable.
    - Action 'd' requires **(within 24 hrs.)** make the remaining ESF DG's operable (including support systems) and the Turbine Driven AFW Pump operable, otherwise apply the CRMP or be in at least Hot Standby within the next 6 hrs. and in Cold Shutdown within the following 30 hrs.
- TS 3.8.1.2 applies in Modes 5 and 6 therefore is NA for the current plant conditions.
- TS 3.8.1.3 applies in Mode 6 with Refueling Cavity level ≥ 23 feet therefore is NA for the current plant conditions.

SUMMARY: The most time-limiting TS are 3.8.1.1 Actions 'b' (within 1 hr.) and 'd' (within 24 hr.). All others that apply are 7 day actions.

OPERATOR ACTIONS

Op-Test No.: # 1 **Backup Scenario** **Events No.:** 5 and 6

Event Description: RCP 'B' Shaft Shear/Reactor Trip and 2 Stuck Control Rods

Time	Position	Required Operator Actions	Notes
	ALL	Respond to multiple alarms due to RCP Shaft shear and determines the Reactor has tripped.	*One of the crew members should announce a crew update, state the Reactor is tripped, and to perform immediate actions.*
	SRO	Directs/ensures crew enters 0POP05-EO-EO00, Reactor Trip or Safety Injection	
	RO	Completes immediate actions of 0POP05-EO-EO00 and determines: • Reactor is tripped • Turbine is tripped • AC ESF Busses are energized • SI not actuated or required	• *RO will announce status of immediate action steps as he/she performs them.* • *BOP Operator will monitor the plant and make an announcement of the Reactor trip.*
	RO	• Determines there are 2 Control Rods that did not insert fully. o K14 at 96 steps o C7 at 12 steps • Uses Reactor power trend and SUR to determine the Reactor is tripped.	*With 2 Control Rods not fully inserted, the RO must make a 'subjective determination' whether the Reactor is tripped.*
	SRO	Directs/ensures the immediate actions of EO00, Reactor Trip/SI have been completed by performing a procedure read through of them.	*Before beginning the verification of immediate actions, the US may direct the following actions be performed:* • *Throttle AFW flow to limit RCS cooldown.* • *Place RCP 1B control in PTL*
	SRO	Transitions to 0POP05-EO-ES01, Reactor Trip Response.	*This transition is based on Safety Injection not being actuated or required.*

OPERATOR ACTIONS

Op-Test No.: # 1	**Backup Scenario**	**Events No.:** 5 and 6
Event Description: RCP 'B' Shaft Shear/Reactor Trip and 2 Stuck Control Rods (cont'd.)		

Time	Position	Required Operator Actions	Notes
	SRO/RO	Directs/monitors RCS temperature trend.	*Should be stable or trending to 567 °F.*
	SRO/BOP	Directs/checks Main Feedwater Status: • FWIV's closed • FWIB's closed • FW Preheater Bypass Valves closed • FW Reg Valves closed. • Low Power Reg Valves closed. • Trips SGFPTs	*FW valve closures (isolations) will occur once RCS Tave is below 574 °F.*
	SRO/BOP	Directs/verifies FW flow is establish to at least 3 Steam Generators from Main FW OR AFW.	*Crew may attempt to restore normal FW, but if SG levels lower too fast, AFW will auto start.*
	SRO/RO **C*** *** denotes critical portion of actions**	Directs/checks if all Control Rods fully inserted. • Determines 2 Control Rods did not fully insert. • Commences Emergency Boration of 4540 gallons of boric acid. o Determines BA Tanks are available o Ensures Charging Line OCIV MOV-0025 is open. o Ensures at least one of the Charging Isolation Valves to the RCS is open (MOV-0003 OR MOV-0006) o Checks a CCP running. o **Starts a Boric Acid Pump*** o **Opens Alt Boration Isolation Valve MOV-0218.*** o **Maintains >50 gpm Charging flow on FI-0205***	• *If 2 or more rods fail to fully insert, the procedure requires 940 gallons of boric acid be added to RCS for every rod at 18 steps or less and 3600 gallons for every rod above 18 steps.* • *Rod K14 is at 96 steps and Rod C7 is at 12 steps so total acid required is 4540 gallons.* • *3 min. after Emergency Boration is started a Loss of offsite and onsite AC power will occur (Loss of All AC Power). This will be **Event #7.***

OPERATOR ACTIONS

Op-Test No.: # 1 **Backup Scenario** **Events No.:** 5 and 6

Event Description: RCP ‘B’ Shaft Shear/Reactor Trip and 2 Stuck Control Rods (cont’d.)

Time	Position	Required Operator Actions	Notes
	SRO/RO	Directs/checks status of Standby Diesel Generators – determines no DG’s are running.	
	SRO/RO	Directs/checks Pressurizer Level Control: • Pressurizer level >17%. • Charging is in service. • RCP Seal Injection Flow is normal. • Letdown is in service. • Pressurizer level trending to 25%.	
	SRO/RO	Directs/monitors Pressurizer Pressure Control: • Pressurizer Pressure >1857 psig. • Pressurizer Pressure stable at or trending to 2235 psig.	***Event #7*** *should be occurring around this point in the scenario.*
	SRO/BOP	Directs/monitors SG levels: • Narrow Range levels >14%. • AFW Pumps are running. • Uses AFW control valves to maintain SG NR levels between 22% - 50%. • Uses procedure Addendum to restore normal FW flow to SG’s.	*If NR levels in ALL SG’s are not >14%, then total AFW flow must be maintained >576 gpm.*
	SRO/RO	Directs/verifies all 13.8 kV and 4.16 kV AC Busses are energized from Offsite Power.	***Event #7*** *should have occurred by now. Refer to the Operator Actions for Event #7 beginning on the next page.*

OPERATOR ACTIONS

Op-Test No.: # 1 **Backup Scenario** **Event No.:** 7

Event Description: Loss of All AC Power

Time	Position	Required Operator Actions	Notes
	ALL	Respond to multiple alarms and determines a Loss of All AC power has occurred.	*No ESF DG's can provide power because:* • *The ECW Pump for ESF DG 11 previously tripped.* • *ESF DG 12 will be running, but the bus has an overcurrent lockout.* • *ESF DG 13 will be running, but the output breaker will not close.*
	SRO	Directs/ensures crew enters 0POP05-EO-EC00, Loss of All AC Power, and performs their immediate actions.	
	RO/BOP	Complete immediate actions of 0POP05-EO-EC00 and determines: • Reactor is tripped • Turbine is tripped	*These same steps were successfully performed when the Reactor trip first occurred.*
	SRO	Directs/ensures the immediate actions of EC00, have been completed by performing a procedure read through of them (the 2 steps above).	*Before beginning the verification of immediate actions, the US may direct the following actions be performed:* • *Placing ESF DG's 12 and 13 in Pull-To-Stop.* • *Placing all SG PORV's in Manual, then dispatches an operator to place all SG PORV Station Blackout Sw. in BYP.*

OPERATOR ACTIONS

Op-Test No.: # 1	**Backup Scenario**	**Event No.:** 7
Event Description: Loss of All AC Power		

Time	Position	Required Operator Actions	Notes
	SRO/RO	Directs/performs establishing RCP seal injection flow: • Determines power is available to the PDP. • Monitors VCT level > 3%. • Checks RCP seal 1 inlet or lower seal water bearing temperatures < 230 °F. • Opens PDP recirc valve fully and starts PDP. • Monitors RCP seal inlet and lower seal water bearing temperatures while throttling PDP recirc valve closed to obtain a cooldown rate of < 1 °F/min. • When seal inlet temperatures are < 135 °F, establishes a seal injection flow of 6-8 gpm.	*Power is from a non-class DG.*
	RO	Dispatches a Plant Operator to: • Open RWST to Chg. Pump suction MOV-0112C. • Close VCT outlet valves MOV-0112B and/or MOV-0113A.	*At least one of these two valves must be closed.*
	SRO/RO	Directs/checks if RCS is isolated: • Both Pressurizer PORV's are closed. • Letdown Orifice Header Isolation Valve is closed. • Dispatch a Plant Operator to close RCP Seal Return OCIV, MOV-0079.	*None of the Orifice Header Valves have power so there will be no position indication The operator will have to use other indications that Letdown is isolated (e.g. no Letdown flow indicated, ICS graphic).*

OPERATOR ACTIONS

Op-Test No.: # 1	**Backup Scenario**	**Event No.:** 7
Event Description: Loss of All AC Power		

Time	Position	Required Operator Actions	Notes
	SRO/BOP	Directs/verifies total AFW flow > 576 gpm. If AFW Pump #14 hasn't started: • Opens steam supply valves • Ensure AFW valve alignment is proper or takes action to make it so. o Operator may have to open 'D' SG AFW OCIV.	• *The turbine driven AFW Pump (#14) will automatically start to provide flow to 'D' SG IF at least 1 SG NR level lowers to 20%.* • *If the US wants to feed any other SG, he/she will have to have a Plant Operator cross-tie AFW lines with 'D' SG.*
	SRO/RO	Attempts to restore power to any AC ESF Bus from an ESF DG: • Attempts to Emergency Start any ESF DG • Attempts to start any ESF DG using the Normal Operating Procedure. • Dispatches an operator to locally start any ESF DG.	*The ESF DG's can be started, but there won't be any cooling water so it does no good to start a DG at this time.*
	SRO/RO	Checks if any AC ESF Bus has automatically energized – none are because no ESF DG's are running.	
	SRO/RO	Determines no AC ESF Buses can be manually energized and performs the following: • Trips any running ESF DG • Energizes an AC ESF Bus from the Emergency Transformer using procedure Addendum 1.	*The SRO may give Addendum 1 to an operator to perform so the SRO can continue in the procedure.* • *Refer to the actions on next page if the SRO continues in the procedure.* • *Refer to the page after next of this scenario guide for the Addendum 1 actions.*

OPERATOR ACTIONS

Op-Test No.: # 1	**Backup Scenario**	**Event No.:** 7
Event Description: Loss of All AC Power		

Time	Position	Required Operator Actions	Notes
	SRO/crew	Determines no AC ESF Busses are currently energized and directs: • a Plant Operator perform Addendum 4, Vital DC Bus Monitoring • a Control Room Operator perform Addendum 2, Equipment in PTL	*Both Control Room operators will now be busy performing Addendums.*
	SRO/crew	Checks RCP Seal Injection has been established to all RCP's	
	SRO/crew	Try to establish offsite power per 0POP04-AE-0001, First Response to Loss of Any 13.8 kV or 4.16 kV Bus.	• *By this time, as ESF Bus should be energized from performing Addendum 1.* • *Terminate the scenario once the crew determines an AC ESF Bus is energized including its' related Load Centers and MCC's (Control Room lights come back on when this is done).*

OPERATOR ACTIONS

Op-Test No.: # 1	**Backup Scenario**	**Event No.:** 7
Event Description: Loss of All AC Power		

Time	Position	Required Operator Actions	Notes
	SRO/RO or BOP (whichever operator/s does/do the Addendum)	Performs Addendum 1: • Verifies power is available from the Emergency Transformer • Opens feeder breakers from normal ESF Bus power sources to ESF Busses that are de-energized (all busses in this case). • Opens motor-operated disconnects from normal ESF Bus sources to ESF Busses that are de-energized (all busses in this case). • Verifies feeder breakers from Emergency Bus 1L to ESF Busses that are de-energized are open (all busses in this case). • Closes motor-operated disconnect from Emergency Bus 1L to the ESF Bus to be energized (ESF Bus E1C is the first preferred bus to be re-energized). • Closes Emergency Transformer feeder breaker to Bus 1L. • Closes emergency feeder breaker from Bus 1L to ESF Bus to be energized (should be Bus E1C). • Closes supply breaker from ESF Transformer to ESF Bus to be energized (should be Bus E1C). • Determines an ESF Bus is not yet energized and manually energizes the selected ESF Bus.	• *The capacity of the Emergency Transformer will allow only 1 ESF Bus to be energized.* • *When this last step is complete, an AC ESF Bus should be energized.* • *Terminate the scenario once the crew determines an AC ESF Bus is energized.*

CRITICAL TASK SUMMARY

POSITION	EXPECTED RESPONSE	ACCEPTANCE CRITERIA	SAT/ UNSAT
SRO/BOP C	**Performs immediate actions of 0POP04-FW-0001:** • **PLACES SG 1C MAIN FEEDWATER REGULATING VALVE CONTROLLER IN MANUAL** • **ADJUSTS CONTROLLER OUTPUT TO MATCH FEED/STEAM FLOW AND RESTORE SG 1C LEVEL TO BETWEEN 68-74%.**	**Manually controls SG 'C' level such that a manual or automatic Reactor trip does not occur.**	
SRO/RO C	**Establishes Emergency Boration:** • **Starts a Boric Acid Pump.** • **Opens Alt Boration Isolation Valve MOV-0218.** • **Maintains >50 gpm Charging flow on FI-0205.**	**Establishes > 50 gpm of Charging flow with BA Pump running and MOV-0218 open.**	

THE CRITICAL TASK SUMMARY IS CONTINUED ON THE NEXT PAGE

CRITICAL TASK SUMMARY

POSITION	EXPECTED RESPONSE	ACCEPTANCE CRITERIA	SAT/ UNSAT
SRO/ RO or BOP (whichever operator does the Addendum) C	**Performs Addendum 1:** • **Verifies power is available from the Emergency Transformer** • **Opens feeder breakers from normal ESF Bus power sources to ESF Busses that are de-energized (all busses in this case).** • **Opens motor-operated disconnects from normal ESF Bus sources to ESF Busses that are de-energized (all busses in this case).** • **Verifies feeder breakers from Emergency Bus 1L to ESF Busses that are de-energized are open (all busses in this case).** • **Closes motor-operated disconnect from Emergency Bus 1L to the ESF Bus to be energized (ESF Bus E1C is the first preferred bus to be re-energized).** • **Closes Emergency Transformer feeder breaker to Bus 1L.** • **Closes emergency feeder breaker from Bus 1L to ESF Bus to be energized (should be Bus E1C).** • **Closes supply breaker from ESF Transformer to ESF Bus to be energized (should be Bus E1C).** • **Determines an ESF Bus is not yet energized and manually energizes the selected ESF Bus.**	**Energizes one 4160V ESF AC Bus from the Emergency Transformer.**	

TURNOVER INFORMATION

- Reactor Power is 75% and holding during a plant startup for completion of FWBP work to correct a common mode motor problem (bearing lubrication).
- Cycle Burnup is 150 MWD/MTU
- RCS Boron Concentration is 1435 ppm
- Hourly dilutions to maintain current power are approximately 10gallons. Total Batch Integrator set at 10 gallons, getting 11. Xenon is at equilibrium conditions.
- Boric Acid Tanks 'A' and 'B' are at 7348 ppm.
- No liquid waste discharges are in progress or planned.
- No personnel are in containment.
- FHB Truck Bay doors are closed
- No ESF DG FOST's are on recirc.
- Unit 2 is lined up for Essential Cooling Pond Blowdown.
- Circ Water Pump 11 is out of service for maintenance (exhibits high vibration)
- Containment Spray Pump 1A is out of service for maintenance (replacement of lower motor bearing)
- Upon assuming the watch, start FWBP #13 and secure FWBP #11 per 0POP02-FW-0001, to allow maintenance on FWBP #11, the last FWBP to be repaired.

SIMULATOR SETUP

1. Check and Clean the following procedures:

   - 0POP02-FW-0001, Main Feedwater (R69)
   - 0POP02-CC-0001, Component Cooling Water (Rev. not needed)
   - 0POP02-CH-0005, Essential Chiller Operation (Rev. not needed)
   - 0POP02-HE-0001, Electrical Auxiliary Building HVAC System (Rev. not needed)
   - 0POP04-CV-0003, Emergency Boration (R12)
   - 0POP04-TM-0005, Fast Load Reduction (R22)
   - 0POP04-FW-0001, Loss of Steam Generator Level Control (R24)
   - 0POP05-EO-EO00, Reactor Trip or Safety Injection (R21)
   - 0POP05-EO-ES01, Reactor Trip Response (R24)
   - 0POP05-EO-EC00, Loss of All AC (R21)
   - 0POP09-AN-02M3 (Window C7), Annunciator Response (R24)
   - 1POP09-AN-10M2 (Window B8), Annunciator Response (R21)

2. Annunciator Response Procedures:

   ALL Annunciator Response Procedures (ARP's) must be checked if this scenario is the first to be run on this day. Setup for subsequent runs of this scenario only requires those ARP's that were actually marked-in to be checked. Instructors running the scenario must keep track of which ARP's these are, otherwise all will have to be checked for subsequent scenarios as well.

3. Log into Instructor Workstation as <lotnrc> user, open Orchid (nstps server), then 'Unlock' Initial Conditions Group <lotnrc>.

4. Reset to IC # 214 and verify:
   - Step Counter positions (CP-005 annunciator window cleared)
   - Red light on end of CP-010 off
   - ICS Annunciators have stopped counting up
   - Ensure the proper FOP/BO sign is posted at CP-005. Should be: FOP 249 steps/BO 112 steps.

5. Go to RUN and perform the following:

   - Annunciators are acknowledged, reset, silenced.
   - RM-11 is functional; alarms are acknowledged (stop flashing). Ensure all grids are checked.
   - Control Switch FLAGS aligned appropriately to breaker position on CP-003 and CP-010.
   - Verify both FHB Filter Outlet Damper controllers are in AUTO and CLOSED (HV-9507 and 9507A).

CONTINUED ON NEXT PAGE

SIMULATOR SETUP (cont'd.)

- Tag out the following components:
  - Circ Water Pump 11
  - Containment Spray Pump 1A
- If Annunciator 5M03-D-5, ROD SUPV MONITOR ROD POSTION TRBL, comes in, take ICS point YCO400 off scan.

6. Execute Lesson Plan for <NRC_Scenario_BU> in <lotnrc/2011> directory. These actions will set up any initial conditions for the scenario. Run the scenario in accordance with the next section, Scenario Instructions'.

7. Set TOTAL M/U BATCH integrator to 10 gallons. **(CHECK BEFORE EACH SCENARIO)**

8. Verify BA Controller Pot setting is 3.9 **(CHECK BEFORE EACH SCENARIO)**

9. Place the simulator in FREEZE

SCENARIO INSTRUCTIONS

1. Provide Shift Turnover sheets to the crew and review the information. Ensure the candidates don't have any questions.

2. Review the Simulator Differences list with the crew.

3. Have the crew perform their board walkdown and inform the floor instructor when ready to take the watch.

4. Note START TIME when the crew takes the watch and place the simulator in RUN. Verify simulator clock is set correctly.

START TIME: ________ (time crew takes the watch)

ALWAYS 'TRIGGER' EVENTS IN THE SIMULATOR SCENARIO LESSON PLANS. THIS WAY, ANY TIME DELAYS ASSOCIATED WITH EVENTS WILL TAKE PLACE AS INTENDED.

REFER TO 'EXPECTED BOOTH COMMUNCATIONS' AND 'EXPECTED BOOTH ACTIONS' SECTIONS FOR INSTRUCTOR ACTIONS DURING THE SCENARIO.

5. Trigger the step titled 'Start Chart' and ensure specified Critical Parameters for the scenario begin recording as the scenario runs.

NOTE: ***Events (Lesson Plan Steps) are triggered upon the Lead Examiners cues or at the times listed below (time from last event).***

6. Time **+ 18 MIN**. -Trigger **STEP** 2 (SG LT-0539 fails LOW)

7. Time **+ 14 MIN**. - Trigger **STEP** 3 (Loss of Iso Phase Bus Cooling)

8. Time **+ 15 MIN**. - Trigger **STEP** 4 (Trip ECW Pump 'A')

9. Time **+ 4 MIN**. - Trigger **STEP 5** (RCP shaft shear)

10. Place simulator in FREEZE when cued by the Lead Examiner to terminate scenario.

11. DO NOT RESET simulator until <u>all</u> Examiners have completed Follow-Up Questioning.

SCENARIO INSTRUCTIONS (cont'd.)

12. Ensure the following prior to printing out the Critical Parameters:

    - Each parameter is labeled with its descriptive name (e.g. 'RCS Subcooling').
    - The time range is set to 3000 seconds. Select 'View', Select 'Page', note 'Time Range', change to 3000 sec if necessary.
    - Each parameter has an appropriate range to facilitate a display of variation during the scenario. If the range has to be adjusted, go to 'View', Select 'Variables', then change the range of the desired parameter.

13. After Critical Parameters have been retrieved and verified as satisfactory, perform the following:

    - Clear Critical Parameters trend data for this simulator session.
    - Label the printout with the date, time, Crew #, and Scenario #.

EXPECTED BOOTH COMMUNICATIONS

EVENT #1, Swap FWBP's (0POP02-FW-0001 Sections 13 and 14)

Call up procedure 0POP02-FW-0001 on a booth computer so you can better follow what the Control Room is requesting of you.

Starting FWBP #13 (Section 13)

As TGB/CP Watch…

- Procedure step 13.1: When contacted by the Control Room to verify the Lube Oil and Seal Water Systems for FWBP #13 are in service, immediately inform them that both systems are in service.

- Procedure NOTE before Step 13.4: If contacted by the Control Room to verify FWBP #13 Lube Oil Reservoir Temperature is > 60 °F as indicated on TI-7467A, TI-7468A and TI-7469A, acknowledge the request then, after a short time, report that all indicators show temperatures > 60 °F (if asked for temperatures, give values in range of 80-90 °F).

- Procedure Step 13.5: When contacted by the Control Room to monitor FWBP #13 seal water outlet temperatures, acknowledge the request. After a short time, report they are all within range (90-170 °F).

  NOTE: Seal water outlet temperatures should be maintained relatively constant due to the action of the temperature control valves.
  Refer to 0POP02-FW-0001, Step 13.5 for details on monitoring seal water outlet temperatures. The expected temperature range is 90-170 °F.

- When contacted by the Control Room to check the Blue Permissive light is ON an 13.8 kV Swgr. 1J, cubicle 9, acknowledge the request then, after a short time, report that the light is ON.

  - If contacted by the Control Room to check FWBP #13 ready for start, inform them that it is ready for a start.
  - Once FWBP #13 has been started, contact the Control Room to inform them the start was satisfactory.

TGB/CP WATCH ACTIONS/COMMUNICATIONS ARE CONTINUED ON NEXT PAGE

<u>Starting FWBP #13 (Section 13) (cont'd.)</u>

As TGB/CP Watch…

- After FWBP #13 is started, the Control Room will contact you to verify the following items (procedure steps 13.9 through 13.14):
  - Step 13.9: Aux Oil Pump automatically stops and shaft-driven pump is putting out ≥ 15 psig). **Report the Aux Oil Pump is stopped and the shaft-driven pump discharge pressure is >15 psig.**
  - Step 13.10: Recirc Valve is positioned properly for plant conditions.
    If the pump discharge valve is open, the recirc valve FV-7178 will be allowed to modulate based on pump discharge flow. **Report the Recirc Valve is closed and stable.**
  - Steps 13.11: Cooler outlet temp. is 95°- 115°F. Steps 13.12 and 13.13 are contingency steps if Cooler outlet temperature is NOT within range. **Report temperature is within range.**
  - Step 13.13: If Oil Sump Heaters do not maintain Cooler Outlet Temperature > 70 °F and > 5 °F above ambient, reduce cooling water to Lube Oil Cooler as necessary. **Report Lube Oil Cooler Outlet temperatures are > 70 °F and > 5 °F above ambient.**
  - Step 13.14: Seal Water TCV is maintaining seal water outlet temp relatively constant. **Report that seal water outlet temperatures are being maintained at 150 °F** (allowable range is 130 °F to 170 °F).

EVENT #1 COMMUNICATIONS ARE CONTINUED ON NEXT PAGE.

EXPECTED BOOTH COMMUNICATIONS (cont'd.)

EVENT #1, Swap FWBP's (0POP02-FW-0001 Sections 13 and 14)

Stopping FWBP #11 (Section 14)

As TGB/CP Watch…

- When contacted by the Control Room to ensure FWBP #11 Aux Oil Pump is available for securing FWBP #11 (step 14.1) there will be a series of steps that must be performed in the field. Refer to procedure steps 14.1.1 – 14.1.5. The Control Room operator will likely direct you to perform the series of steps to test FWBP #11's Aux Oil Pump and report back. If so, acknowledge the direction then, after a short time, **report FWBP #11 Aux Oil Pump has performed satisfactory.**

  Additional Information:
  - The steps will take 2 operators so, if necessary, inform the Control Room you'll obtain the assistance of a second Plant Operator.
  - Step 14.1.1: starts the FWBP #11 Aux Oil Pump by placing the Handswitch in START and holding it there.
  - Step 14.1.2: checks FWBP #11 lube oil discharge pressure is >15 psig.
  - Step 14.1.3: The Handswitch for FWBP #11 has been released and the switch has been placed in AUTO.
  - Step 14.1.4 will be NA because oil pressure was > 15 psig.
  - Step 14.1.5 you'll **report FWBP #11 Aux Oil Pump has performed satisfactory**.

- When contacted by the Control Room to ensure FWBP #11 Aux Oil Pump has started after FWBP #11 was stopped (step 14.4), there will be a few steps that must be performed in the field and the status reported to the Control Room. Refer to procedure steps 14.4.1 – 14.4.3.
  - Step 14.4.1: you'll report the START light is illuminated for FWBP #11.
  - Step 14.4.2: you'll report lube oil pressure at filter outlet is >15 psig (or give a # that's > 15 psig).
  - Step 14.4.3 will be NA because the FWBP #11 Aux Oil Pump started as it should.

- When contacted by the Control Room to cycle FWBP #11 seal water (lube water) strainer per procedure step 14.6 or Section 18, acknowledge the order. After a short time, report back that you've completed cycling the FWBP strainer per procedure section 18.

EVENT #2, SG 'C' Controlling Level Channel (LT-0539) fails LOW

As I&C Maintenance or the Duty Maintenance Supervisor, if notified to place the channel in trip or bypass, acknowledge the request. No further action is necessary.

EXPECTED BOOTH COMMUNICATIONS (cont'd.)

EVENT #3, Loss of Isophase Bus Cooling and Power Reduction

As TGB Watch, when dispatched by the Control Room to investigate an ISO PHASE BUS TROUBLE alarm received in the Control Room, after a short time, report there is a CONTROL POWER UNDERVOLTAGE LIGHT (RED) on the Cooling Fan (Fan 1A) that was running, and the fan is now stopped.

- The Control Room should now direct you to start the other fan (Fan 1B). When the Control Room directs you to start the Standby Cooling Fan, inform them it will not start.

As TGB Watch, if asked by the Control Room if the white 'CONTROL POWER' light is lit, inform them that it is lit.

As TGB Watch, if asked by the Control Room if there are any other abnormal alarm or light indications at the local panel, report there are none.

As Duty Maintenance Supervisor, if contacted by the Control Room to investigate the Iso Phase Bus Cooling Fans issues, acknowledge the request. No further action is needed.

EVENT #4, ECW Pump 1A trips without auto start of the standby pump

- As the MAB Watch, if asked to check CCW Pump 1C has a good start, report that it has had a good start (no problems noted).

EVENT #7, Loss of All AC Power

As MAB Watch, when contacted by the Control Room to close the following valves, acknowledge the order and **refer to "Expected Booth Actions"** for details on operating the valves:

- RWST to CCP Suction, MOV-0112C
- VCT Outlet, MOV-0112B
- VCT Outlet, MOV-0113A

As MAB Watch, when directed by the Control Room to close RCP Seal Return OCIV, MOV-0079, acknowledge the order and **refer to "Expected Booth Actions"** for details on operating the valve.

EVENT #7, Loss of All AC Power, is continued on the next page

EXPECTED BOOTH COMMUNICATIONS (cont'd.)

EVENT #7, Loss of All AC Power

As EAB Watch:

- If contacted by the Control Room to place the Station Blackout Pwr. Switches for all SG PORV's in BYP, acknowledge the request then refer to 'Expected Booth Actions' for the lesson plan step that will do this action.

  NOTE TO INSTRUCTOR: Upon loss of power to E1A, the SG PORV's will fail closed (recent plant mod). To restore control of the SG PORV's to the Control Room, a lesson plan step must be triggered which will perform the same action as operating the 'Station Blackout Power Switches' to BYP in the plant.

- If contacted by the Control Room to come to the Control Room (to perform Addendum 4 of 0POP05-EO-EC00), after a short time, go to the Control Room to receive instructions. No further action is required.

As TGB Watch, if contacted by the Control Room to cross-tie SG's, acknowledge the request then use AFW 'Remotes' to operate necessary valves to perform the requested operation. Once requested valve manipulations are done, report back to the Control Room.

EXPECTED BOOTH ACTIONS

1. DA High Level Dump Valves: If asked to open the DA High Level Dump Valves, trigger lesson plan **Step 10** or perform the following:

   - Select 'Remotes'
   - Select 'Condensate System'
   - Scroll down to locate remotes CD-27 and CD-28
   - Insert a value of 0.3 for each valve
   - Report to the Control Room that the DA High Level Dump Bypass Valves are open X turns (X = the # of turns requested).

2. Restoring SG PORV's (Placing the Station Blackout Pwr. Switches for all SG PORV's in BYP).

   If contacted by the Control Room to place the Station Blackout Pwr. Switches for all SG PORV's in BYP, wait a short time then trigger lesson plan **Step 11**. After this action, call the Control Room and report the switches for all SG PORV's are in BYP.

3. When directed by the Control Room to operate the following valves, trigger the indicated lesson plan step:
   - Open RWST to CCP Suction, MOV-0112C - Trigger **Step 7**
   - Close VCT Outlet, MOV-0112B and VCT Outlet, MOV-0113A – trigger **Step 8**

4. When directed by the Control Room to close RCP Seal Return OCIV, MOV-0079, trigger lesson plant **Step 9**.

FACILITY: SOUTH TEXAS PROJECT DATE OF EXAM: 09/2011 OPERATING TEST NO.: 1

APPLICANT	EVENT TYPE	Scenarios 1			2			3			4			TOTAL	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
Crew A		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
	RX														1	1	0
RO ☐	NOR	1												1	1	1	1
SRO-I ☐	I/C	2,3,4 5,6												5	4	4	2
SRO-U ☒	MAJ	6												1	2	2	1
	TS	3,5												2	0	2	2
	RX		1											1	1	1	0
RO ☐	NOR				1									1	1	1	1
SRO-I ☒	I/C		3,5,7		2,3 4,6									7	4	4	2
SRO-U ☐	MAJ		6		5									2	2	2	1
	TS				1,3									2	0	2	2
	RX			1										1	1	1	0
RO ☒	NOR					1								1	1	1	1
SRO-I ☐	I/C			2,4,7		3,4								5	4	4	2
SRO-U ☐	MAJ			6		5								2	2	2	1
	TS														0	2	2
	RX														1	1	0
RO ☐	NOR														1	1	1
SRO-I ☐	I/C														4	4	2
SRO-U ☐	MAJ														2	2	1
	TS														0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the “at-the-controls (ATC)” and “balance-of-plant (BOP)” positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant’s competence count toward the minimum requirements specified for the applicant’s license level in the right-hand columns.

FACILITY: SOUTH TEXAS PROJECT DATE OF EXAM: 09/2011 OPERATING TEST NO.: 1

APPLICANT	EVENT TYPE	Scenarios 1			2			3			4			TOTAL	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
Crew B		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
	RX														1	1	0
RO ☐	NOR	1												1	1	1	1
SRO-I ☐	I/C	2,3,4 5,6												4	4	4	2
SRO-U ☒	MAJ	6												1	2	2	1
	TS	3,5												2	0	2	2
	RX		1											1	1	1	0
RO ☐	NOR							1						1	1	1	1
SRO-I ☒	I/C		3,5,7					2,3,4 5,7						8	4	4	2
SRO-U ☐	MAJ		6					6						2	2	2	1
	TS							2,3						2	0	2	2
	RX			1										1	1	1	0
RO ☒	NOR														1	1	1
SRO-I ☐	I/C			2,4,7					2,3 4,5					6	4	4	2
SRO-U ☐	MAJ			6					6					2	2	2	1
	TS														0	2	2
	RX														1	1	0
RO ☐	NOR														1	1	1
SRO-I ☐	I/C														4	4	2
SRO-U ☐	MAJ														2	2	1
	TS														0	2	2

Instructions:

3. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

4. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

FACILITY: SOUTH TEXAS PROJECT DATE OF EXAM: 09/2011 OPERATING TEST NO.: 1

APPLICANT	EVENT TYPE	Scenarios 1			2			3			4			TOTAL	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
Crew C		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
	RX														1	1	0
RO ☐	NOR	1						1						2	1	1	1
SRO-I ☐	I/C	2,3,4 5,6						2,3,4 5,7						10	4	4	2
SRO-U ☒	MAJ	6						6						2	2	2	1
	TS	3,5						2,3						4	0	2	2
	RX			1										1	1	1	0
RO ☒	NOR														1	1	1
SRO-I ☐	I/C			2,4,7					2,3 4,5					7	4	4	2
SRO-U ☐	MAJ			6					6					2	2	2	1
	TS														0	2	2
	RX		1											1	1	1	0
RO ☒	NOR									1				1	1	1	1
SRO-I ☐	I/C		3,5,7							3,5,7				6	4	4	2
SRO-U ☐	MAJ		6							6				2	2	2	1
	TS														0	2	2
	RX														1	1	0
RO ☐	NOR														1	1	1
SRO-I ☐	I/C														4	4	2
SRO-U ☐	MAJ														2	2	1
	TS														0	2	2

Instructions:

5. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the “at-the-controls (ATC)” and “balance-of-plant (BOP)” positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

6. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant’s competence count toward the minimum requirements specified for the applicant’s license level in the right-hand columns.

FACILITY: SOUTH TEXAS PROJECT DATE OF EXAM: 09/2011 OPERATING TEST NO.: 1

APPLICANT	EVENT TYPE	Scenarios 1 CREW POSITION SRO			Scenarios 2 CREW POSITION SRO			Scenarios 3 CREW POSITION SRO			Scenarios 4 CREW POSITION SRO			TOTAL	MINIMUM(*) R	I	U
Crew D		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO ☐ SRO-I ☒ SRO-U ☐	RX														1	1	0
	NOR	1												1	1	1	1
	I/C	2,3, 4 5,6							2,3 4,5					9	4	4	2
	MAJ	6							6					2	2	2	1
	TS	3,5												2	0	2	2
RO ☒ SRO-I ☐ SRO-U ☐	RX		1											1	1	1	0
	NOR									1				1	1	1	1
	I/C		3,5, 7							3,5,7				6	4	4	2
	MAJ		6							6				2	2	2	1
	TS														0	2	2
Crew G																	
RO ☒ SRO-I ☐ SRO-U ☐	RX												1	1	1	1	0
	NOR					1								1	1	1	1
	I/C					3,4							3,4,7	5	4	4	2
	MAJ					5							5	2	2	2	1
	TS														0	2	2
RO ☒ SRO-I ☐ SRO-U ☐	RX														1	1	0
	NOR														1	1	1
	I/C						2,4,6					2,4 6,7		7	4	4	2
	MAJ						5					5		2	2	2	1
	TS														0	2	2

Instructions:

7. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

8. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

FACILITY: SOUTH TEXAS PROJECT DATE OF EXAM: 09/2011 OPERATING TEST NO.: 1

APPLICANT	EVENT TYPE	Scenarios 1			2			3			4			TOTAL	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
Crew E		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO ☐ SRO-I ☒ SRO-U ☐	RX														1	1	0
	NOR	1				1					1			3	1	1	1
	I/C	2,3,4 5,6				3,4					2,3, 4 6,7			12	4	4	2
	MAJ	6				5					5			3	2	2	1
	TS	3,5									2,3			4	0	2	2
RO ☐ SRO-I ☒ SRO-U ☐	RX		1											1	1	1	0
	NOR				1								1	2	1	1	1
	I/C		3,5,7		2,3 4,6								3,4, 7	10	4	4	2
	MAJ		6		5								5	3	2	2	1
	TS				1,3									2	0	2	2
RO ☒ SRO-I ☐ SRO-U ☐	RX			1										1	1	1	0
	NOR														1	1	1
	I/C			2,4,7			2,4,6					2,4 6,7		10	4	4	2
	MAJ			6			5					5		3	2	2	1
	TS														0	2	2
RO ☐ SRO-I ☐ SRO-U ☐	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														2	2	1
	TS														0	2	2

Instructions:

9. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

10. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

ES-301Transient and Event Checklist Form ES-301-5

FACILITY: SOUTH TEXAS PROJECT DATE OF EXAM: 09/2011 OPERATING TEST NO.: 1

APPLICANT	EVENT TYPE	Scenarios 1 CREW POSITION SRO	1 ATC	1 BOP	2 CREW POSITION SRO	2 ATC	2 BOP	3 CREW POSITION SRO	3 ATC	3 BOP	4 CREW POSITION SRO	4 ATC	4 BOP	TOTAL	MINIMUM(*) R	I	U
Crew F																	
	RX														1	1	0
RO ☐	NOR				1						1			2	1	1	1
SRO-I ☒	I/C				2,3 4,6				2,3 4,5		2,3,4 6,7			13	4	4	2
SRO-U ☐	MAJ				5				6		5			3	2	2	1
	TS				1,3						2,3			4	0	2	2
	RX														1	1	0
RO ☒	NOR					1				1			1	3	1	1	1
SRO-I ☐	I/C					3,4				3,5, 7			3,4,7	8	4	4	2
SRO-U ☐	MAJ					5				6			5	3	2	2	1
	TS														0	2	2
	RX														1	1	0
RO ☒	NOR														1	1	1
SRO-I ☐	I/C						2,4,6					2,4 6,7		7	4	4	2
SRO-U ☐	MAJ						5					5		2	2	2	1
	TS														0	2	2
	RX														1	1	0
RO ☐	NOR														1	1	1
SRO-I ☐	I/C														4	4	2
SRO-U ☐	MAJ														2	2	1
	TS														0	2	2

Instructions:

11. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

12. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

ES-301 | **Competencies Checklist** | **Form ES-301-6**

Facility: South Texas Project **Date of Examination:** 9/11 **Operating Test No.:** 1

Competencies	APPLICANTS - CREW A															
	RO ☐ SRO-I ☐ SRO-U ☒				RO ☐ SRO-I ☒ SRO-U ☐				RO ☒ SRO-I ☐ SRO-U ☐				RO ☐ SRO-I ☐ SRO-U ☐			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	2,3 5,6	2,4 5			3,5 6,7	2,3 4,5			2,4 6	1,3 5						
Comply With and Use Procedures (1)	ALL	2,4 5			3,5 6	2,4 5			2,4 6	1,3 4,5						
Operate Control Boards (2)	N/A	2,4 5			1,3 5,6	N/A			1,2 4,6	1,3 4,5						
Communicate and Interact	ALL	ALL			ALL	ALL			ALL	ALL						
Demonstrate Supervisory Ability (3)	2,3 4,5 6	N/A			N/A	2,3 4,5			N/A	N/A						
Comply With and Use Tech. Specs. (3)	3,5	N/A			N/A	1,3			N/A	N/A						

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Check the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

ES-301 | **Competencies Checklist** | **Form ES-301-6**

Facility: South Texas Project **Date of Examination:** 9/11 **Operating Test No.:** 1

Competencies	**APPLICANTS - CREW B**															
	RO ☐ **SRO-I** ☐ **SRO-U** ☒				**RO** ☐ **SRO-I** ☒ **SRO-U** ☐				**RO** ☒ **SRO-I** ☐ **SRO-U** ☐				**RO** ☐ **SRO-I** ☐ **SRO-U** ☐			
	SCENARIO				**SCENARIO**				**SCENARIO**				**SCENARIO**			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Interpret/Diagnose Events and Conditions	2,3 5,6		3,5 6,7		3,5 6,7		2,3 5,6 7		2,4 6		2,4 6					
Comply With and Use Procedures (1)	ALL		1,3 5,6		3,5 6		3,4 5,6		2,4 6		2,4 6					
Operate Control Boards (2)	N/A		1,3 5,6		1,3 5,6		N/A		1,2 4,6		2,4 6					
Communicate and Interact	ALL		ALL		ALL		ALL		ALL		ALL					
Demonstrate Supervisory Ability (3)	2,3 4,5 6		N/A		N/A		2,3 4,5 6		N/A		N/A					
Comply With and Use Tech. Specs. (3)	3,5		N/A		N/A		2,3		N/A		N/A					

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Check the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Facility: South Texas Project **Date of Examination:** 9/11 **Operating Test No.:** 1

Competencies	APPLICANTS - CREW C															
	RO ☐ SRO-I ☐ SRO-U ☒				RO ☒ SRO-I ☐ SRO-U ☐				RO ☒ SRO-I ☐ SRO-U ☐				RO ☐ SRO-I ☐ SRO-U ☐			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	2,3 5,6		2,3 5,6 7		3,5 6,7		3,5 6,7		2,4 6		2,4 6					
Comply With and Use Procedures (1)	ALL		3,4 5,6		3,5 6		1,3 5,6		2,4 6		2,4 6					
Operate Control Boards (2)	N/A		N/A		1,3 5,6		1,3 5,6		1,2 4,6		2,4 6					
Communicate and Interact	ALL		ALL		ALL		ALL		ALL		ALL					
Demonstrate Supervisory Ability (3)	2,3 4,5 6		2,3 4,5 6		N/A		N/A		N/A		N/A					
Comply With and Use Tech. Specs. (3)	3,5		2,3		N/A		N/A		N/A		N/A					

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Check the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

ES-301	Competencies Checklist	Form ES-301-6

Facility: South Texas Project **Date of Examination:** 9/11 **Operating Test No.:** 1

Competencies	APPLICANTS															
	CREW D								CREW G							
	RO ☐ SRO-I ☒ SRO-U ☐				RO ☒ SRO-I ☐ SRO-U ☐				RO ☒ SRO-I ☐ SRO-U ☐				RO ☒ SRO-I ☐ SRO-U ☐			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	2,3 5,6		2,4 6		3,5 6,7		3,5 6,7			1,3 5		3,5 7		2,4 5		2,4 6
Comply With and Use Procedures (1)	ALL		2,4 6		3,5 6		1,3 5,6			1,3 4,5		1,3 5,7		2,4 5		2,4 6,7
Operate Control Boards (2)	N/A		2,4 6		1,3 5,6		1,3 5,6			1,3 4,5		3,5 7		2,4 5		2,4 6,7
Communicate and Interact	ALL		ALL		ALL		ALL			ALL		ALL		ALL		ALL
Demonstrate Supervisory Ability (3)	2,3 4,5 6		N/A		N/A		N/A			N/A		N/A		N/A		N/A
Comply With and Use Tech. Specs. (3)	3,5		N/A		N/A		N/A			N/A		N/A		N/A		N/A

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Check the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

ES-301 **Competencies Checklist** **Form ES-301-6**

Facility: South Texas Project **Date of Examination:** 9/11 **Operating Test No.:** 1

Competencies	**APPLICANTS - CREW E**															
	RO ☐ **SRO-I** ☒ **SRO-U** ☐				**RO** ☐ **SRO-I** ☒ **SRO-U** ☐				**RO** ☒ **SRO-I** ☐ **SRO-U** ☐				**RO** ☐ **SRO-I** ☐ **SRO-U** ☐			
	SCENARIO				**SCENARIO**				**SCENARIO**				**SCENARIO**			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Interpret/Diagnose Events and Conditions	2,3 5,6	1,3 5		2,3 4,6 7	3,5 6,7	2,3 4,5		3,5 7	2,4 6	2,4 5		2,4 6				
Comply With and Use Procedures (1)	ALL	1,3 4,5		2,3 4,6 7	3,5 6	2,4 5		1,3 5,7	2,4 6	2,4 5		2,4 6,7				
Operate Control Boards (2)	N/A	1,3 4,5		N/A	1,3 5,6	N/A		3,5 7	1,2 4,6	2,4 5		2,4 6,7				
Communicate and Interact	ALL	ALL		ALL	ALL	ALL		ALL	ALL	ALL		ALL				
Demonstrate Supervisory Ability (3)	2,3 4,5 6	N/A		2,3 4,6 7	N/A	2,3 4,5		N/A	N/A	N/A		N/A				
Comply With and Use Tech. Specs. (3)	3,5	N/A		2,3	N/A	1,3		N/A	N/A	N/A		N/A				

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Check the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Facility: South Texas Project **Date of Examination:** 9/11 **Operating Test No.:** 1

Competencies	APPLICANTS - CREW F															
	RO ☐ SRO-I ☒ SRO-U ☐				RO ☒ SRO-I ☐ SRO-U ☐				RO ☒ SRO-I ☐ SRO-U ☐				RO ☐ SRO-I ☐ SRO-U ☐			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions		2,3 4,5	2,4 6	2,3 4,6 7		1,3 5	3,5 6,7	3,5 7		2,4 5		2,4 6				
Comply With and Use Procedures (1)		2,4 5	2,4 6	2,3 4,6 7		1,3 4,5	1,3 5,6	1,3 5,7		2,4 5		2,4 6,7				
Operate Control Boards (2)		N/A	2,4 6	N/A		1,3 4,5	1,3 5,6	3,5 7		2,4 5		2,4 6,7				
Communicate and Interact		ALL	ALL	ALL		ALL	ALL	ALL		ALL		ALL				
Demonstrate Supervisory Ability (3)		2,3 4,5	N/A	2,3 4,6 7		N/A	N/A	N/A		N/A		N/A				
Comply With and Use Tech. Specs. (3)		1,3	N/A	2,3		N/A	N/A	N/A		N/A		N/A				

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Check the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Facility: South Texas Project **Scenario No.: 1** **Op-Test No.: LOT18 NRC**

Examiners: **Operators:**

Initial Conditions: 90% Power and Stable.

Turnover: At step 7.52 of 0POP03-ZG-0005. Commence raising power to 98% at 10%/hr.

Event No.	Malf. No.	Event Type*	Event Description
1 (0 min)	N/A	RO (R) BOP (R) SRO (N)	Raise power from 90% to 98%
2 (10 min)	11-01-02 (1) 11-01-06 (1)	BOP (C) SRO (C)	OLACW Pump #12 Trips and OLACW Pump #13 fails to auto start.
3 (20 min)	02-20-01 (1)	RO (I) SRO (I, TS)	PRZ Level Channel LT-465 fails high.
4 (30 min)	08-12-05 (1) 07-04-02 (1)	BOP (C) SRO (C)	SGFPT #12 trips and SU SGFP #14 fails to auto start.
5 (50 min)	02-13-01 (0.6)	RO (C) SRO (C, TS)	PRZ PORV leakage (isolable) after SG levels stabilize.
6 (60 min)	05-03-02 (0.35)	ALL (M)	SGTR on B Steam Generator (~350 gpm) after PORV isolated/Tech Specs addressed. **(CT)**
7 (N/A)	10-02-02 (1) 10-09-02 (1)	RO (C) BOP (C) SRO (C)	Loss of 13.8KV Standby Bus 1G and Train B Sequencer failure. (loss of standby bus occurs on RX Trip - integral) **(CT)**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	1
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	0
7. Critical tasks (2–3)	2

STP LOT-18

NRC Scenario #1 Description

Initial Conditions: The plant is at 90% power. The crew is at step 7.52 of POP03-ZG-0005, Plant Startup to 100%, with instructions to raise power to 98% at 10%/hr.

Event 1: The crew is to raise power to 98% using POP03-ZG-0005. This is a normal evolution with no malfunctions.

Event 2: OLACW Pump #12 Trips. OLACW Pump #13 fails to auto start. The crew will respond using POP04-OC-0001, Loss of Open Loop Auxiliary Cooling Water, which will ensure OLACW Pump #13 is manually started.

Event 3: Controlling PZR level Channel LT-0465 fails high. The crew will respond using POP04-RP-0002, Loss Of Automatic Pressurizer Level Control, to select an alternate channel and stabilize the plant. The SRO will address Tech Spec implications.

Event 4: SGFPT #12 trips with the SU SGFP #14 failing to auto start. The crew will respond and stabilize the plant using POP04-FW-0002, Steam Generator Feed Pump Trip.

Event 5: After the crew has stabilized steam generator levels, PZR PORV seat leakage will occur. The crew will respond using POP04-RC-0003, Excessive RCS Leakage, to isolate the leaking PORV and stabilize the plant. The SRO will address Tech Spec implications.

Event 6: After the crew has addressed PZR PORV Seat Leakage Tech Spec, a 350 gpm SGTR will develop on SG 1B. The crew may initially respond using POP04-RC-0004, Steam Generator Tube Leakage, however, since the tube rupture is greater than 200 gpm, the crew may go right to POP05-EO-EO00, Reactor Trip or SI, and then to POP05-EO-EO30, Steam Generator Tube Rupture.

Event 7: When the Reactor is tripped, 13.8KV Standby BUS 1G will LOCKOUT with a failure of the Train B Sequencer. Standby DG #12 will automatically start but the crew will have to manually start ESF equipment on Train B. This will be performed using Addendum #5 of POP05-EO-EO00.

Termination: The scenario will terminate after the crew performs a RCS depressurization in POP05-EO-EO30.

Critical Tasks:

- Manually starts ECW Pump 1B prior to completing Addendum #5 of POP05-EO-EO00 and prior to ESF DG #12 tripping.
- Isolates the ruptured SG prior to commencing cooldown in 0POP05-EO-EO30, SGTR.

Source: New

Facility: South Texas Project **Scenario No.: 2** **Op-Test No.: LOT18 NRC**

Examiners: **Operators:**

Initial Conditions: 48% power and stable. Condensate Pump #13 OOS for Maintenance.

Turnover: Tornado Watch is in effect. 0POP04-ZO-0002, Addendum 1 has been completed to step 10. Management has made the decision to hold reactor power at 48% until a current line of thunderstorms moves through the area. Start Train A and secure Train C Control Room HVAC for surveillance testing later in the shift.

Event No.	Malf. No.	Event Type*	Event Description
1 (0 min)	POSBARP 08433TCC (0)	RO (C) SRO (C, TS)	Swap running CRE HVAC trains. Train A Supply fan trips on overcurrent after starting.
2 (15 min)	05-14-01 (0.6)	BOP (I) SRO (I)	Feedwater Header Pressure PT-557 fails to an intermediate position (ramps in over 5 minutes).
3 (25 min)	04-01-01 (1)	RO (C) SRO (C, TS)	CCW Pump 1A Trips and CCW Pump 1C fails to Auto Start.
4 (45 min)	AST1 & AST3 (1)	RO (C) BOP (C) SRO (C)	Main Turbine trip below P-9
5 (N/A)	02-01-02 (.0007) (.4)	ALL (M)	308 gpm SBLOCA on Loop B. **(CT)**. Leak rate rises after sequencers are reset in POP05-EO-EO10. **(CT)**
6 (N/A)	01-12-16,17,18, 19,22,23, (1)	BOP (C) SRO (C)	Automatic Feedwater Isolation fails following the SI actuation (Integral)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	1
3. Abnormal events (2–4)	3
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	2
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	2

STP LOT-18

NRC Scenario #2 Description

Initial Conditions: 48% power and stable. Condensate Pump #13 OOS for Maintenance. Tornado Watch is in effect. 0POP04-ZO-0002, Addendum 1 has been completed to step 10. Management has made the decision to hold reactor power at 48% until a current line of thunderstorms moves through the area. Start Train A and secure Train C Control Room HVAC for surveillance testing later in the shift.

Event 1: Train A CRE HVAC Supply Fan will trip on overcurrent after starting. The crew will respond to the POP09 for the associated trouble alarm. The POP09 will have the crew secure Train A CRE HVAC. The SRO will address Tech Spec implications.

Event 2: Feedwater header pressure PT-0557 fails to an intermediate position causing all Turbine Driven Steam Generator Feedwater Pumps to slow down. The crew will respond and stabilize the plant using POP04-FW-0002, Steam Generator Feed Pump Trip.

Event 3: CCW Pump 1A trips and CCW Pump 1C fails to auto start. The POP09 for CCW Pump 1A trip will have the crew ensure that CCW Pump 1C has started. Depending on the CCW pressure perturbation, the crew may have to also respond to a loss of CCW to the RCP Thermal Barriers. The SRO will address Tech Spec implications.

Event 4: After the crew has addressed CCW Pump Tech Spec, a Main Turbine trip will occur. The crew will respond and stabilize the plant using POP04-TM-0003, Main Turbine Trip Below P-9.

Event 5: When the crew places Steam Dumps in the Steam Pressure Mode per POP04-TM-0003, Main Turbine Trip Below P-9, a 300 gpm SBLOCA will develop on LOOP B. The crew may initially respond using POP04-RC-0003, Excessive RCS Leakage, however, since the leak is greater than 200 gpm, the crew may go right to POP05-EO-EO00, Reactor Trip or SI, and then to POP05-EO-EO10, Loss of Reactor or Secondary Coolant. The leak will rise to a LBLOCA after the crew resets the sequencers in POP05-EO-EO10, requiring the crew to enter and perform the actions of POP05-EO-FRZ1, Response to High Containment Pressure.

Event 6: Feedwater Isolation will fail to automatically actuate after receiving the SI signal. The operator will have to manually align feedwater using Addendum #5 of POP05-EO-EO00.

Termination: The scenario will be terminated after the crew manually starts 2 CS Pumps per POP05-EO-FRZ1, Response to High Containment Pressure.

Critical Tasks:

- Depressurize intact SGs to less than 1000 psig within 45 minutes of the initiation of the SBLOCA.
- Manually start CS Pumps to address RCB pressure prior to exiting POP05-EO-FRZ1.

Source: New

Facility: South Texas Project **Scenario No.: 3** **Op-Test No.: LOT18 NRC**

Examiners:

Operators:

Initial Conditions: 100% Power and Stable. Three (3) Condensate pumps are in service to support maintenance on LPHD Pump #13. LPHD Pump #13 and RCFC 12A are OOS.

Turnover: LPHD Pump #13 has been repaired and is ready to be placed back in service. When LPHD Pump #13 is in service, secure Condensate Pump #13.

Event No.	Malf. No.	Event Type*	Event Description
1 (0 min)	(N/A)	BOP (N) SRO (N)	Return a Low Pressure Heater Drip Pump to service.
2 (15 min)	09-02-01 (true)	RO (C) SRO (C, TS)	RCFC Fan 11A low DP.
3 (25 min)	06-16-02 (0)	RO (I) BOP (I) SRO (I, TS)	PT-505 (Turbine Impulse Pressure) fails low. **(CT)**
4 (35 min)	03-10-01 (0.1)	RO (C) SRO (C)	Charging line leak in Containment.
5 (50 min)	10-06-01 (1)	RO (C) BOP (C) SRO (C)	Loss of load (Generator output breaker opens) 2 minutes after the charging line isolation valve is closed (integral).
6 (N/A)	05-04-01 (1)	ALL (M)	Steam Generator 1A Safety Valve fails open 10 seconds after the reactor trips. (Integral) **(CT)**
7 (N/A)	01-12-04A (1)	BOP (I) SRO (I)	Phase ‘A’, Train ‘A’ fails to actuate. (auto and manual)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	1
3. Abnormal events (2–4)	3
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	0
7. Critical tasks (2–3)	2

STP LOT-18

NRC Scenario #3 Description

Initial Conditions: 100% Power and Stable. LPHD Pump #13 and RCFC 12C are OOS. LPHD Pump #13 has been repaired and is ready to be placed back in service.

Event 1: The crew will start LPHD Pump #13 and place in service. The crew will then proceed to secure Condensate Pump #13 as it is no longer needed. This is a normal evolution with no malfunctions.

Event 2: After the LPHD Pump evolution is complete, RCFC Fan 11A will have a sheared shaft. A Low Fan DP Alarm will have the crew secure RCFC Fan 11A and evaluate starting another available RCFC. Containment Pressure will rise and may bring in an RCB Pressure High Alarm if another RCFC is not started. The SRO will address Tech Spec implications.

Event 3: After addressing RCFC Fan Tech Specs, PT-0505, a Turbine Impulse Pressure Channel, will fail low. The crew will respond using 0POP04-TM-0004, Failure of Turbine Impulse Pressure Transmitter (PT-505/506). The SRO will address Tech Spec implications.

Event 4: After addressing Tech Specs for PT-0505 failure, a CVCS charging line leak will develop in Containment. The crew will respond using 0POP04-RC-0003, Excessive RCS Leakage, and will be able to identify and isolate the leak.

Event 5: 2 minutes after the charging line is isolated, the main generator output breaker will open causing a total loss of load. An automatic reactor trip will likely occur since steam dumps are in steam pressure mode due to the PT-505 failure. The crew will respond using POP05-EO-EO00, Reactor Trip or Safety Injection

Event 6: 10 seconds after the reactor trip, a safety valve on SG 1A will fail open (due to pressure spike caused by loss of load), resulting in a faulted steam generator. The crew will respond using POP05-EO-EO20, Faulted Steam Generator Isolation.

Event 7: On the SI, Phase A on Train A will fail to actuate and can not be manually actuated. The crew will respond using Addendums 1 and 5 of 0POP05-EO-EO00, Reactor Trip or SI, which will require manually isolating any penetrations that are normally isolated by the Phase A signal.

Termination: The scenario will be terminated when POP05-EO-EO20 is exited.

Critical tasks:

- Place control rods in manual prior to receiving an automatic reactor trip following the failure of PT-505.
- Isolate feed and steam lines to steam generator 1A prior to exiting POP05-EO-EO20.

Source: New

Facility: South Texas Project **Scenario No.: 4** **Op-Test No.: LOT18 NRC**

Examiners: **Operators:**

Initial Conditions: 100% Power and Stable. Train B work week with ECW, D/G, CCW, SI, and AFW inoperable. SG 1B LT-0528 (CH 3) is in the Tripped condition.

Turnover: All Tech Spec actions are complete with the ESF Power Availability surveillance (PSP03-EA-0002) being due in 6 hours. Continuing Train 'B' Work Week. I/C is continuing to troubleshoot SG 1B LT-0528. The level transmitter has been inoperable for the last 4 days and is currently in the Tripped condition per Tech. Specs. After assuming the watch, secure SGFPT #12.

Event No.	Malf. No.	Event Type*	Event Description
1 (0 min)	NA	BOP (N) SRO (N)	Shut down SGFPT #12
2 (11 min)	02-19-03 (0)	RO (I) SRO (I, TS)	PRZ Pressure Channel PT-0457 fails low
3 (25 min)	05-22-01 (1)	BOP (I) SRO (I, TS)	SG 1A Steam Pressure PT-0514 fails high.
4 (40 min)	10-11-01 (1)	ALL (C)	Lockout of 4.16KV Bus E1A
5 (N/A)	05-20-08 (0)	ALL (M)	Inadvertent FWI when SG 1B CH 4 HI-Hi Bistable comes in. (7 minutes after DG 11 is placed in PTS - integral)
6 (N/A)	06-02-01 (1)	RO (C) SRO (C)	Main Turbine fails to auto trip and does not trip with the Manual PB. (integral) **(CT)**
7 (N/A)	08-03-03 (1) 08-02-01 (1)	ALL (C)	AFW Pump C trips 3 minutes after start and AFW Pump D overspeeds upon starting creating a Loss of Heat Sink condition. (integral) **(CT)**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	3
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	2

STP LOT-18

NRC Scenario #4 Description

Initial Conditions: The plant is at 100% power. A Train 'B' work week is in progress with Train 'B' ECW, D/G, CCW, SI and AFW inoperable for maintenance. All Tech Spec actions are complete with the ESF Power Availability surveillance (PSP03-EA-0002) being due in 6 hours. SG 1B LT-0528 (CH 3) has been inoperable for the past 4 days and is in the tripped condition as required by Tech Specs.

Event 1: The Crew will secure SGFPT #12 using POP02-FW-0002, S.G.F.P. Turbine. This is a normal evolution with no malfunctions.

Event 2: Controlling PZR Pressure Channel PT-0457 fails low. Operators will take action in accordance with POP04-RP-0001, Loss of Automatic Pressurizer Pressure Control, to stabilize the plant and select an alternate channel. The SRO will address Tech Spec implications.

Event 3: SG 1A Steam Pressure for the controlling steam flow channel, PT-0514, fails high. Operators will stabilize the plant and select an alternate channel in accordance with POP04-FW-0001, Loss of Steam Generator Level Control. The SRO will address Tech Spec implications.

Event 4: Lockout of 4.16KV bus E1A. The crew will stabilize the plant and take action in accordance with POP04-AE-0001, First Response To Loss Of Any Or All 13.8KV Or 4.16KV Bus. The next event will automatically occur 7 minutes after ESF DG #11 is placed in Pull-To-Stop.

Event 5/6: Inadvertent Feedwater Isolation occurs when a 2nd Hi-Hi level bistable trips on SG 1B. A reactor trip occurs, however the main turbine fails to automatically trip. The crew will perform the actions of POP05-EO-EO00, Reactor Trip or Safety Injection, trip the main turbine and stabilize the plant.

Event 7: Upon start, AFW Pump #14 trips on overspeed. AFW Pump #13 trips on overcurrent 3 minutes after start. This creates a loss of Heat Sink condition. When directed by the EOP to implement Functional Restoration Procedures, the crew will transition to POP05-EO-FRH1, Response to Loss Of Secondary Heat Sink, to address the loss of heat sink condition.

Termination: The scenario will terminate after feed and bleed is established in POP05-EO-FRH1 (completion of step 13).

Critical Tasks:

- Manually trips the main turbine prior to transition out of POP05-EO-EO00.
- Establishes feed and bleed of the RCS prior to transition out of POP05-EO-FRH1.

Source: New

Facility: South Texas Project Scenario No.: BU Op-Test No.: LOT18 NRC

Examiners: **Operators:**

Initial Conditions: 75% power and holding for completion of FWBP work to correct a common mode motor problem. Circulating Water Pump #11 and Containment Spray Pump 'A' are out of service for maintenance.

Turnover: Start FWBP #13 and secure FWBP #11 to allow maintenance on the last FWBP motor.

Event No.	Malf. No.	Event Type*	Event Description
1 (0 min)	N/A	SRO (N) BOP (N)	Swap Feedwater Booster Pumps
2 (18 min)	05-12-03 (0)	SRO (I, TS) BOP (I)	SG C controlling level channel (LT-0539) fails low **(CT)**
3 (32 min)	Thermal OL (true)	SRO (C) RO (R) BOP (C)	Loss of Iso-phase cooling results in down power
4 (47 min)	14-08-01 (true)	SRO (C, TS) RO (C)	Essential Cooling Water Pump 'A' trips without auto start of the standby train.
5 (51 min)	02-07-02 (true)	All (M)	RCP 'B' sheared shaft after plant stabilized following down power
6 (N/A)	52-LI-37 (18) 52-LI-57 (96)	SRO (C) RO (C)	2 control rods stuck partially out of the core following reactor trip (Integral) **(CT)**
7 (N/A)	10-08-01 10-11-02 (true)	SRO (M) RO (M)	Loss of offsite power and all ESF diesel generators (Loss of All AC) after boration started in ES01 (Integral) **(CT)**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	3
4. Major transients (1–2)	2
5. EOPs entered/requiring substantive actions (1–2)	2
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	3

STP LOT-18

NRC Scenario BU Description

Initial Conditions: 75% power and holding for completion of FWBP work to correct a common mode motor problem. Circulating Water Pump #11 and Containment Spray Pump 'A' are out of service for maintenance. The crew is directed to start FWBP #13 and secure FWBP #11 to allow maintenance on the last FWBP motor.

Event 1: The crew will start FWBP #13 and secure FWBP #11 in accordance with POP02-FW-0001, Main Feedwater. This is a normal evolution with no malfunctions.

Event 2: The controlling level channel on SG 'C' will fail low. The crew will perform the actions of POP04-FW-0001, Loss of Steam Generator Level Control, to stabilize the plant and place an alternate channel in service. The SRO will address Tech Spec implications.

Event 3: After Tech Specs have been addressed for the SG level channel failure, the Iso-phase cooling trouble alarm will be received. Use of the annunciator response and investigation by the local operator will reveal failure of both fans requiring a fast load reduction in accordance with POP04-TM-0005, Fast Load Reduction.

Event 4: ECW Pump 'A' trips and the standby train does not automatically start. The crew will use the annunciator response and normal operating procedures to place the standby train in service and properly remove the tripped train from service. The SRO will address Tech Spec implications.

Event 5: After the crew has stabilized the plant following the fast load reduction, a sheared shaft on RCP 'B' will occur causing an automatic reactor trip. The crew will respond using POP05-EO-EO00, Reactor Trip or Safety Injection and transition to POP05-EO-ES01, Reactor Trip Response.

Event 6: Following the reactor trip, the operators will notice 2 rods stuck partially out of the core. The determination will be made that the reactor is tripped in E0, however, ES01 will required initiation of emergency boration to account for the loss of negative reactivity.

Event 7: 3 minutes after the emergency borate valve is opened, a loss of offsite power will occur that results in a Loss of All AC Power and requiring entry into POP05-EO-EC00, Loss of All AC Power. EC00 has instructions for energizing one 4KV ESF bus from the Emergency Transformer which will be successful.

Termination: The scenario will be terminated after the crew energizes a 4KV bus from the emergency transformer in EC00.

Critical tasks:

- Manually control SG 'C' level such that a manual or auto reactor trip does not occur.
- Following the reactor trip, initiate emergency boration prior to exiting ES01.
- Energize a 4KV ESF bus from the Emergency Transformer prior to exiting EC00.

Source: New