Facility:	Harris Nuclear Plant	Task No.:	119015H301
Task Title:	Perform RCS Average Temperature Data Sheet and Determine Inverse Count Rate Ratio (1/M)	JPM No.:	2016 NRC Exam Admin JPM RO A1-1
K/A Reference:	G2.1.43 RO 4.1 SRO 4.3	**Alternate Path - No**	
Examinee:	_____	NRC Examiner:	_____
Facility Evaluator:	_____	Date:	_____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

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

Initial Conditions:	A Reactor trip occurred 7 days ago due to a trip of the 'A' MFW pump. The pump has been repaired. The unit is in Mode 2, with a plant startup in progress per GP-004, REACTOR STARTUP (MODE 3 TO MODE 2). The OATC has just completed the 3rd doubling. The Reactor Startup spreadsheet cannot be used due to a unsatisfactory Benchmark Test message. This has not as yet been resolved, the startup will continue.

Initiating Cue:	The CRS has assigned you to perform manual calculations and plotting of the 1/M data points per Sheet 2 of Attachment 2 and Attachment 3 to predict when the Reactor will become critical. ONLY plot the Source Range data. Another operator will verify your calculations when you have completed the attachments. Place your predicted rod height for Reactor Criticality in the space provided below and circle the YES / NO response for the question. When complete return your papers to the Examiner.

Task Standard: Determines the predicted criticality will occur ABOVE the 500 pcm ECC rod height of 160 steps on CBD.

Required Materials: Calculator, ruler, pencil

General References: GP-004, Rev 60

Handouts: JPM Cue Sheets Pages 8 and 9, GP-004 Attachment 2 sheet 1 marked up through step 3 and sheet 2, additionally Attachment 3 sheet 1, enlarged to 11 x 17 size for ease of reading.

Time Critical Task: No

Validation Time: 15 minutes

Critical Step Justification	
Step 3	Critical to correctly calculate inverse count ratio in order to predict the estimated critical rod position following the doubling of source range counts
Step 4	Critical to correctly plot the inverse count ratio and controlling rod position in order to predict the estimated critical rod position following the doubling of source range counts
Step 5	Critical to correctly calculate inverse count ratio in order to predict the estimated critical rod position following the doubling of source range counts
Step 6	Critical to correctly plot the inverse count ratio and controlling rod position in order to predict the estimated critical rod position following the doubling of source range counts
Step 7	Critical to correctly calculate inverse count ratio in order to predict the estimated critical rod position following the doubling of source range counts
Step 8	Critical to correctly plot the inverse count ratio and controlling rod position in order to predict the estimated critical rod position following the doubling of source range counts
Step 9	Critical to determine the estimated critical rod height of 174 steps (166 – 182 steps, tolerance based on curve division readability) **and** NOT within the required band. (ABOVE the + 500 pcm limit)

Start Time: _____.

Performance Step: 1 OBTAIN PROCEDURE (GP-004, marked up attachment 2 and 11 x 17 of Attachment 3 will be provided to allow candidates to write on)

Standard: Obtains GP-004 and refers to Attachment 2 and 3.

Comment:

Performance Step: 2 Complete Attachment 3 Startup Information

Standard: Transfers the following information from Attachment 2 to Attachment 3:

- Date
- Startup Number
- Rod Insertion Limit
- 500 pcm below ECC
- 500 pcm above ECC
- Control Operator

Evaluator Note:	**The above information has been provided to the candidate as part of the JPM Cue sheet for Attachment 2. The transfer of this information from Attachment 2 to Attachment 3 may be performed at any time before the completion of the JPM** **IT IS ONLY REQUIRED TO PLOT OUT THE SOURCE RANGE PLOT. IT IS NOT REQUIRED TO PLOT OUT THE INTERMEDIATE RANGE DETECTOR PLOT**

Comment:

✓ **Performance Step: 3** Calculation of 1/M data point at 1421

Standard: Divides initial source range count rate by source range count reading for 1421

- **250 cps / 490 cps = 0.51 (0.510)**

Comment:

✓ **Performance Step: 4** Plot 1/M data point to determine predicted Criticality position at 1421

Standard: Manually plots 1/M data point on Attachment 3 using data from Attachment 2 and interpolates data to determine predicted critical position is > 220 steps on Control Bank D.

Comment:

✓ **Performance Step: 5** Calculation of 1/M data point at 1429

Standard: Divides initial source range count rate by source range count reading for 1429

- **250 cps / 975 cps = 0.26 (0.256)**

Comment:

✓ **Performance Step: 6** Plot 1/M data point to determine predicted Criticality position at 1429

Standard: Manually plots 1/M data point on Attachment 3 using data from Attachment 2 and interpolates data to determine predicted critical position is still > 220 steps on CB D.

Comment:

✓ **Performance Step: 7** Calculation of 1/M data point at 1437

Standard: Divides initial source range count rate by source range count reading for 1437

- **250 cps / 2100 cps = 0.12 (0.119)**

Comment:

✓ **Performance Step: 8** Plot 1/M data point to determine predicted Criticality position at 1437

Standard: Manually plots 1/M data point on Attachment 3 using data from Attachment 2 and interpolates data to determine predicted critical position is **174 steps on Control Bank D**. (166 – 182 steps, tolerance based on curve division readability)

Comment:

✓ **Performance Step: 9** Documents Attachment 3 results of predicted rod height for criticality

Standard: Documents the predicted rod height is **174 steps on Control Bank D**

(166 – 182 steps, tolerance based on curve division readability)

Answers: Is the predicted Rod Height for Reactor Criticality between the required band? **NO**

Determines the predicted criticality position is ABOVE the 500 pcm ECC value of 160 steps on Control Bank D

Comment:

Evaluator Note:	**Candidate determines the predicted rod height is 174 steps** (166 – 182 steps, tolerance based on curve division readability) **and NOT within the required band. Circles - NO (ABOVE the 500 pcm ECC limit)** **Returns JPM paper work.** **END OF JPM**

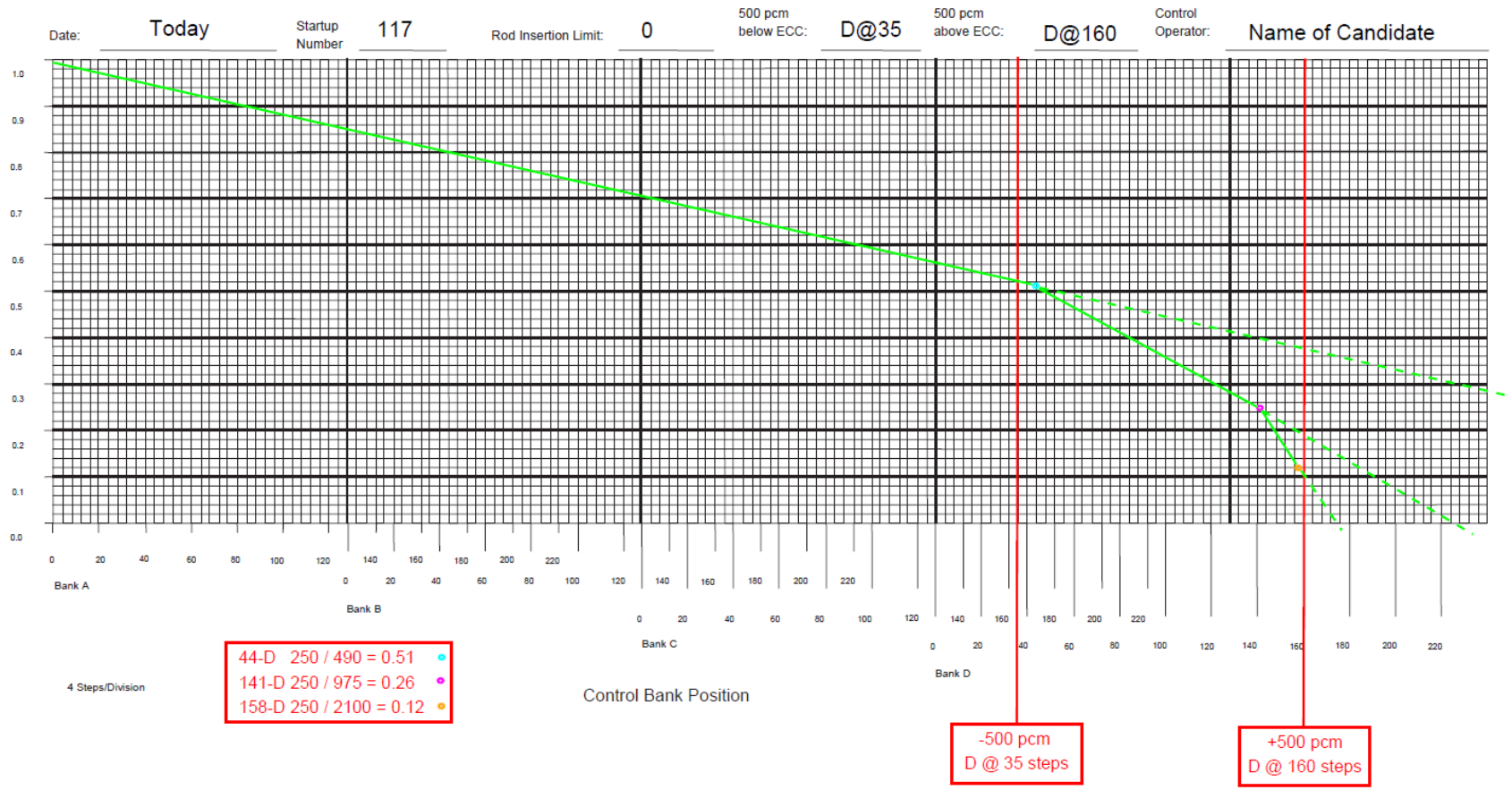
Comment:

Stop Time: _____

Attachment 2 - Inverse Count Rate Ratio (1/M) and RCS Average Temperature Data Sheet
Sheet 2 of 2

Date: TODAY Startup Number: 117
500 pcm below ECC: D@ 35 Steps on Bank: D
500 pcm above ECC: D @ 160 Steps on Bank: D
Rod Insertion Limit: 0 Steps on Bank: D

Data Point	Time	RCS Lowest T_{avg}	SR N-___ cps	1/M $\frac{C_o}{C_i}$	IR N-____ amps	1/M $\frac{C_o}{C_i}$	Control Bank Position (Steps-Bank)	Predicted Criticality (Steps-Banks)	Calculations Verified
1	1406	557°F	250	N/A	1.5E-11	N/A	0 - D	90 - D	N/A
2	1421	557°F	490	0.51	1.9E-11	N/A	44 - D	N/A - high	
3	1429	557°F	975	0.26	2.7E-11	N/A	141 - D	N/A - high	
4	1437	557°F	2100	0.12	3.4E-11	N/A	158 - D	174 steps	


Date: Today
Startup Number 117
Rod Insertion Limit: 0
500 pcm below ECC: D@35
500 pcm above ECC: D@160
Control Operator: Name of Candidate
Bank A
Bank B
Bank C
Bank D
4 Steps/Division
44-D 250 / 490 = 0.51
141-D 250 / 975 = 0.26
158-D 250 / 2100 = 0.12
Control Bank Position
-500 pcm
D @ 35 steps
+500 pcm
D @ 160 steps

Job Performance Measure No.: 2016 NRC Admin JPM RO A1-1

Perform RCS Average Temperature Data Sheet and Determine Inverse Count Rate Ratio (1/M)
IAW GP-004

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	A Reactor trip occurred 7 days ago due to a trip of the 'A' MFW pump. The pump has been repaired. The unit is in Mode 2, with a plant startup in progress per GP-004, REACTOR STARTUP (MODE 3 TO MODE 2). The OATC has just completed the 3rd doubling. The Reactor Startup spreadsheet cannot be used due to a unsatisfactory Benchmark Test message. This has not as yet been resolved, the startup will continue.

Initiating Cue:	The CRS has assigned you to perform manual calculations and plotting of the 1/M data points per Sheet 2 of Attachment 2 and Attachment 3 to predict when the Reactor will become critical. ONLY plot the Source Range data. Another operator will verify your calculations when you have completed the attachments. Place your predicted rod height for Reactor Criticality in the space provided below and circle the YES / NO response for the question below. When complete return your papers to the Examiner.

Name: _____

Date: _____

My predicted Rod Height for Reactor Criticality is _____ steps on Bank _____

Circle the response to the following question:

Is the predicted Rod Height for Reactor Criticality within the required band? YES / NO

Attachment 2 - Inverse Count Rate Ratio (1/M) and RCS Average Temperature Data Sheet
Sheet 1 of 2

INSTRUCTION

NOTE: Per CRTN 432495, SwQL_B_GP-004 Reactor Startup.xlsm is a reactivity management spreadsheet that has been approved for use during the approach to criticality. This spreadsheet does not require independent verification, as the spreadsheet calculations are automatically benchmarked when the spread sheet is opened. This spreadsheet can be found at the following location:

P:\Site\HNPApps\Operations_Qualified_Calcs

1. **OPEN** spreadsheet SwQL_B_GP-004 Reactor Startup.xlsm.
2. **IF** the Benchmark Test message indicates the benchmark test has been completed satisfactorily **AND** the indicated spreadsheet version is 1.1, **THEN CLICK** "OK" **AND CONTINUE** with Step 4.
3. **IF** the Benchmark Test message indicates the benchmark test has been completed unsatisfactorily **OR** the indicated version is not 1.1, **THEN:**
   a. **DOCUMENT** the error in an NCR.
   b. **DISCONTINUE** use of the spreadsheet.
   c. **PERFORM** manual calculations and plotting of the 1/M data points per Sheet 2 of Attachment 2 and Attachment 3.

NOTE: The following is to be recorded into the spreadsheet or Attachment 2, as applicable.

4. **RECORD** ECC data from Step 5.0.14. _____
5. **RECORD** highest NI channel numbers from Step 5.0.15. _____

NOTE: Baseline data is indicated with a '0' in the Data Point column. Failure to indicate a '0' will prevent the spreadsheet from performing calculations correctly. Successive 1/M data points are indicated by increasing the corresponding Data Point number.

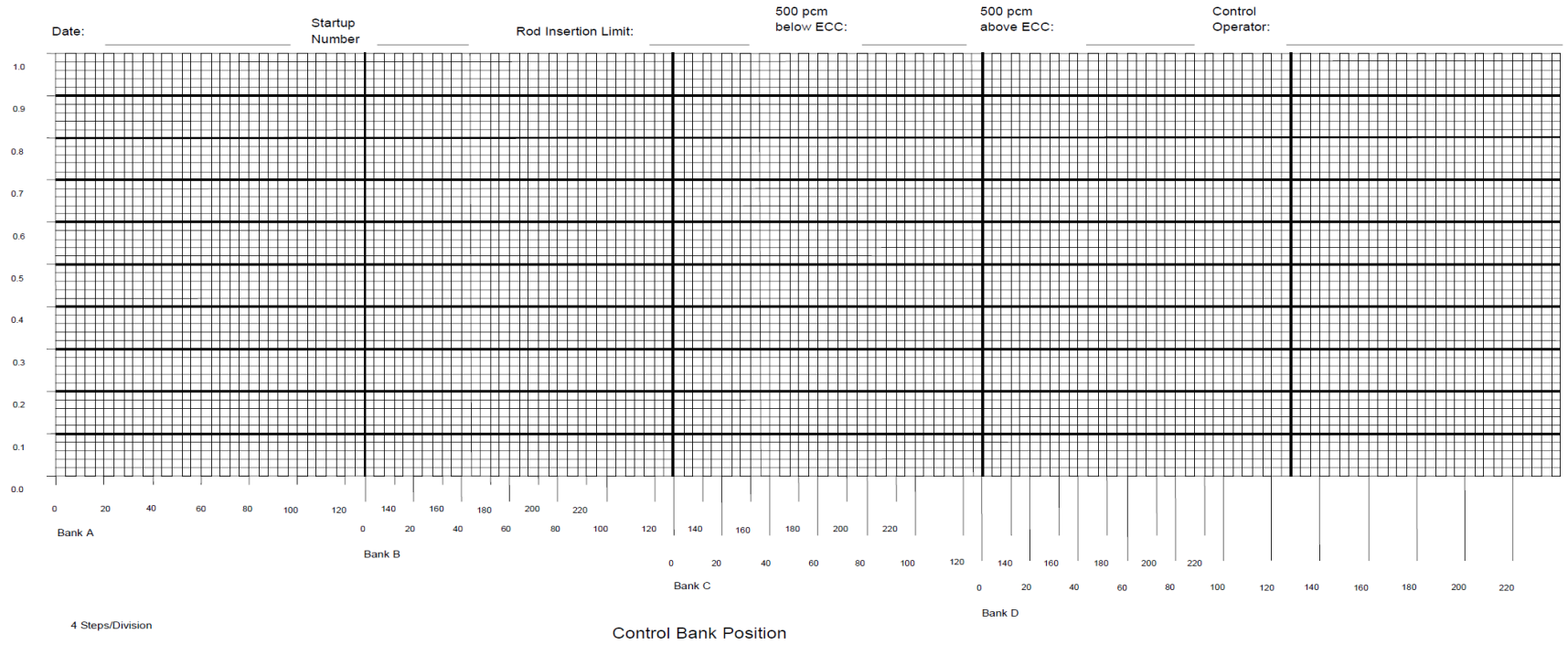
6. **RECORD** baseline 1/M data. _____
7. **RECORD** required data in accordance with Steps 5.0.23 through 5.0.25. _____
8. **WHEN** data collection is complete, **THEN PRINT** the spreadsheet by **SELECTING** the Print Attachments button. _____
9. **ATTACH** the printouts to the end of the completed GP-004. _____

Attachment 2 - Inverse Count Rate Ratio (1/M) and RCS Average Temperature Data Sheet
Sheet 2 of 2

Date: TODAY Startup Number: 117
500 pcm below ECC: D@ 35 Steps on Bank: D
500 pcm above ECC: D @ 160 Steps on Bank: D
Rod Insertion Limit: 0 Steps on Bank: D

Data Point	Time	RCS Lowest T_{avg}	SR N-___ cps	1/M C_o / C_i	IR N-___ amps	1/M C_o / C_i	Control Bank Position (Steps-Bank)	Predicted Criticality (Steps-Banks)	Calculations Verified
1	1406	557°F	250	N/A	1.5E-11	N/A	0 - D	90 - D	N/A
2	1421	557°F	490		1.9E-11	N/A	44 - D		
3	1429	557°F	975		2.7E-11	N/A	141 - D		
4	1437	557°F	2100		3.4E-11	N/A	158 - D		

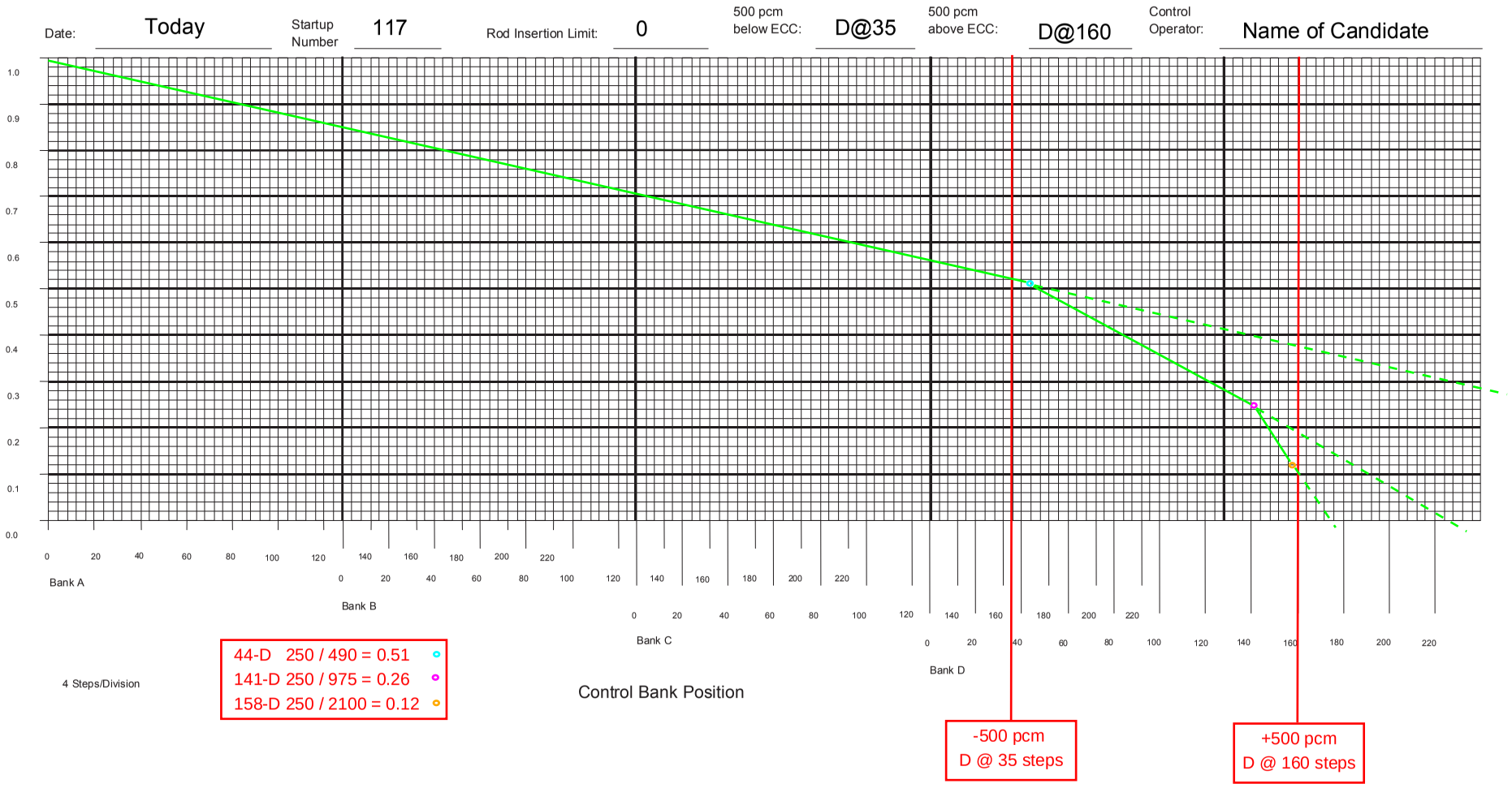
Attachment 3 - 1 / M Data Plot
Sheet 1 of 1



NOTE: Provide a 11 x 17 copy of this blank data plot.

Attachment 3 - 1 / M Data Plot

Sheet 1 of 1



Facility:	Harris Nuclear Plant	Task No.:	119015H301
Task Title:	Perform RCS Average Temperature Data Sheet and Determine Inverse Count Rate Ratio (1/M)	JPM No.:	2016 NRC Exam Admin JPM SRO A1-1
K/A Reference:	G2.1.43 RO 4.1 SRO 4.3	**Alternate Path - NO**	
Examinee:	_____	NRC Examiner:	_____
Facility Evaluator:	_____	Date:	_____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate, discuss or perform, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	A Reactor trip occurred 7 days ago due to a trip of the 'A' MFW pump. The pump has been repaired. The unit is in Mode 2, with a plant startup in progress per GP-004, REACTOR STARTUP (MODE 3 TO MODE 2). The OATC has just completed the 3rd doubling. The Reactor Startup spreadsheet cannot be used due to a unsatisfactory Benchmark Test message. This has not as yet been resolved, the startup will continue.
Initiating Cue:	The CRS has assigned you to perform manual calculations and plotting of the 1/M data points per Sheet 2 of Attachment 2 and Attachment 3 to predict when the Reactor will become critical. ONLY plot the Source Range data. Another operator will verify your calculations when you have completed the attachments. Place your predicted rod height for Reactor Criticality in the space provided. Circle the YES / NO response for the question and provide actions (IF ANY) based on your determination. When complete return your papers to the Examiner.

Task Standard: Determines the predicted criticality will occur ABOVE the 500 pcm ECC rod height of 160 steps on CBD.

Required Materials: Calculator

General References: GP-004, Rev 60

Handouts: JPM Cue Sheets Pages 8 and 9, GP-004 Attachment 2 sheet 1 marked up through step 3 and sheet 2, additionally Attachment 3 sheet 1, enlarged to 11 x 17 size for ease of reading.

Time Critical Task: No

Validation Time: 20 minutes

Critical Step Justification	
Step 3	Critical to correctly calculate inverse count ratio in order to predict the estimated critical rod position following the doubling of source range counts
Step 4	Critical to correctly plot the inverse count ratio and controlling rod position in order to predict the estimated critical rod position following the doubling of source range counts
Step 5	Critical to correctly calculate inverse count ratio in order to predict the estimated critical rod position following the doubling of source range counts
Step 6	Critical to correctly plot the inverse count ratio and controlling rod position in order to predict the estimated critical rod position following the doubling of source range counts
Step 7	Critical to correctly calculate inverse count ratio in order to predict the estimated critical rod position following the doubling of source range counts
Step 8	Critical to correctly plot the inverse count ratio and controlling rod position in order to predict the estimated critical rod position following the doubling of source range counts
Step 9	Critical to determine the estimated critical rod height of 174 steps (166 – 182 steps, tolerance based on curve division readability) and NOT within the required band. (ABOVE the + 500 pcm limit)
Step 10	Critical to determine the requirements of GP-004 for criticality not within the required band (ABOVE the + pcm limit) is to perform the actions of step 26.b – this is a reactivity concern

Start Time: _____

Performance Step: 1 OBTAIN PROCEDURE (GP-004, marked up attachment 2 and 11 x 17 of Attachment 3 will be provided to allow candidates to write on)

Standard: Obtains GP-004 and refers to Attachment 2 and 3.

Comment:

Performance Step: 2 Complete Attachment 3 Startup Information

Standard: Transfers the following information from Attachment 2 to Attachment 3:

- Date
- Startup Number
- Rod Insertion Limit
- 500 pcm below ECC
- 500 pcm above ECC
- Control Operator

Evaluator Note:	**The above information has been provided to the candidate as part of the JPM Cue sheet for Attachment 2. The transfer of this information from Attachment 2 to Attachment 3 may be performed at any time before the completion of the JPM** **IT IS ONLY REQUIRED TO PLOT OUT THE SOURCE RANGE PLOT. IT IS NOT REQUIRED TO PLOT OUT THE INTERMEDIATE RANGE DETECTOR PLOT**

Comment:

✓ **Performance Step: 3** Calculation of 1/M data point at 1421

Standard: Divides initial source range count rate by source range count reading for 1421

- **250 cps / 490 cps = 0.51 (0.510)**

Comment:

✓ **Performance Step: 4** Plot 1/M data point to determine predicted Criticality position at 1421

Standard: Manually plots 1/M data point on Attachment 3 using data from Attachment 2 and interpolates data to determine predicted critical position is > 220 steps on Control Bank D.

Comment:

✓ **Performance Step: 5** Calculation of 1/M data point at 1429

Standard: Divides initial source range count rate by source range count reading for 1429

- **250 cps / 975 cps = 0.26 (0.256)**

Comment:

✓ **Performance Step: 6** Plot 1/M data point to determine predicted Criticality position at 1429

Standard: Manually plots 1/M data point on Attachment 3 using data from Attachment 2 and interpolates data to determine predicted critical position is still > 220 steps on CB D.

Comment:

✓ **Performance Step: 7** Calculation of 1/M data point at 1437

Standard: Divides initial source range count rate by source range count reading for 0545

- **250 cps / 2100 cps = 0.12 (0.119)**

Comment:

✓ **Performance Step: 8** Plot 1/M data point to determine predicted Criticality position at 1437

Standard: Manually plots 1/M data point on Attachment 3 using data from Attachment 2 and interpolates data to determine predicted critical position is **174 steps on Control Bank D**. (166 – 182 steps, tolerance based on curve division readability)

Comment:

✓ **Performance Step: 9** Documents Attachment 3 results of predicted rod height for criticality

Standard: Documents the predicted rod height is **174 steps on Control Bank D**

(166 – 182 steps, tolerance based on curve division readability)

Answers: Is the predicted Rod Height for Reactor Criticality between the required band? **NO**

Determines the predicted criticality position is ABOVE the 500 pcm ECC value of 160 steps on Control Bank D

Comment:

✓ **Performance Step: 10**

Complete the following: Assuming the Reactor achieves criticality (or would achieve criticality) at your predicted rod height. What actions are required (IF ANY)?

B. ACTIONS are required in accordance with GP-004 – (if true then list the required step number(s) below:

Correct response is: **GP-004 step 26.b**

GP-004, Actions required when criticality is NOT achieved within 500 pcm of the ECC are as follows:

Notes prior to step 26:

NOTE: The maximum allowable administrative difference between the ECC and the actual critical condition is 500 pcm.

NOTE: The following Step is only required to be performed if criticality is NOT achieved within 500 pcm of the ECC.

Step 26.b

IF criticality is NOT achieved by the Maximum Estimated Critical Rod Height/Minimum Estimated Boron concentration (rod height or Boron concentration for 500 pcm above the ECC, as listed in Step 5.0.14)

THEN PERFORM the following:

(1) REINSERT all Control Banks.

(2) EVALUATE the conditions resulting in not achieving criticality.

(3) Before any subsequent startup, COMPLETE a new ECC and 1/M Data Plot using the same GP-004 and startup number.

Standard:

Provides the requirements that are stated in GP-004 step 26.b for criticality NOT achieved by the Maximum Estimated Critical Rod Height/Minimum Estimated Boron concentration.

Completes evaluation and returns paper work to Evaluator.

Evaluator Note:	**End of JPM.**

Completion Time: _____

My predicted Rod Height for Reactor Criticality is **174** (166 – 182 steps) steps on Bank **D** .

Complete the following: Assuming the Reactor achieves criticality at your predicted rod height. What actions (IF ANY) are required if the Reactor were to reach criticality at this height?

A. NO ACTIONS are required (if true then circle this response) – **NOT CIRCLED**

B. ACTIONS are required in accordance with GP-004 – (if true then list the required action(s):

YES there are actions (the candidates should provide the 3 actions found in GP-004 step 26.b

GP-004 Step 26.b

b. **IF** criticality is **NOT** achieved by the Maximum Estimated Critical Rod Height/Minimum Estimated Boron concentration (rod height or Boron concentration for 500 pcm above the ECC, as listed in Step 5.0.14)
THEN PERFORM the following:

(1) **REINSERT** all Control Banks.

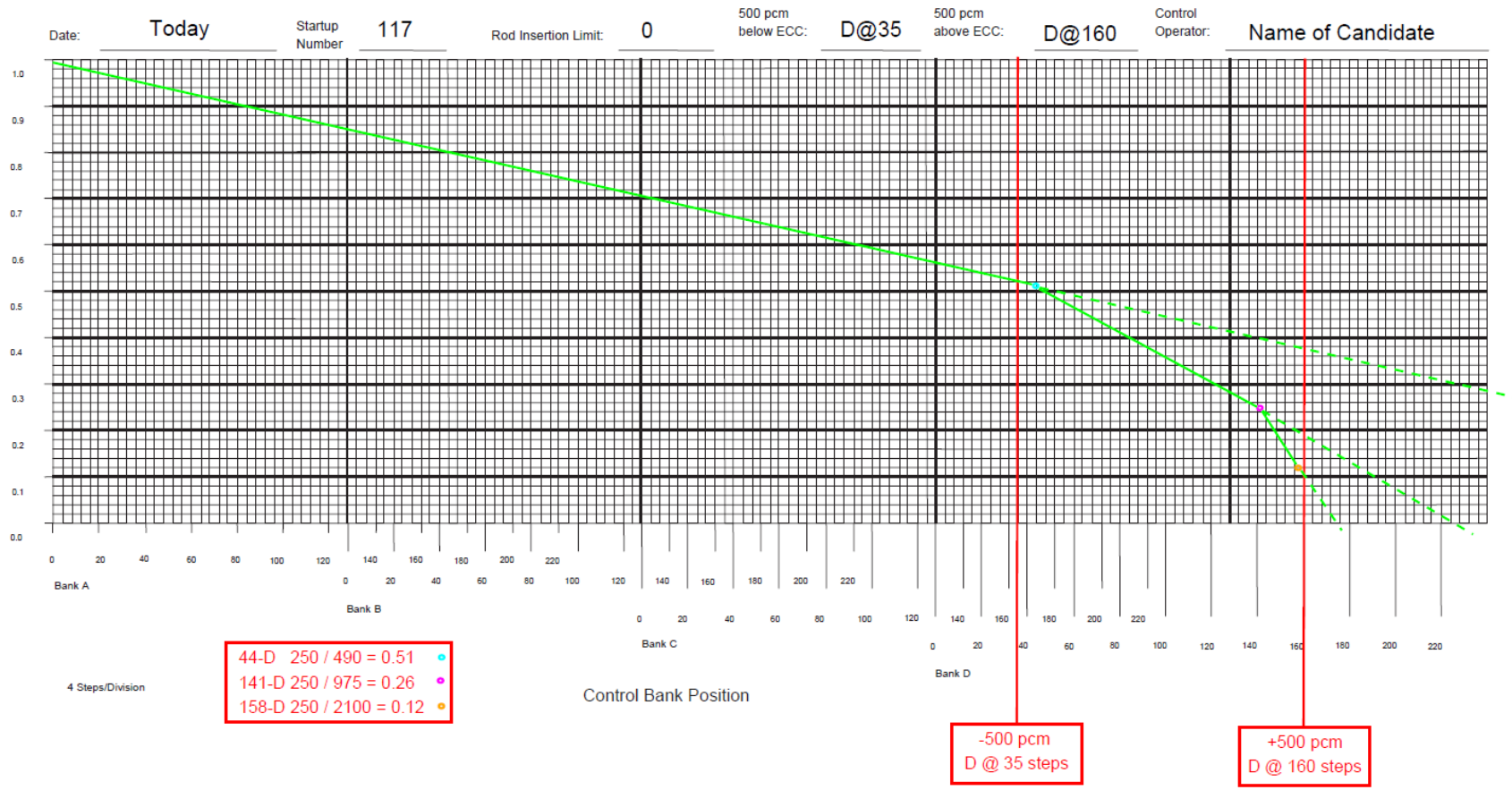
(2) **EVALUATE** the conditions resulting in not achieving criticality.

(3) Before any subsequent startup, **COMPLETE** a new ECC and 1/M Data Plot using the same GP-004 and startup number. (Reference 2.5.3)

Attachment 2 - Inverse Count Rate Ratio (1/M) and RCS Average Temperature Data Sheet
Sheet 2 of 2

Date: TODAY Startup Number: 117
500 pcm below ECC: D@ 35 Steps on Bank: D
500 pcm above ECC: D @ 160 Steps on Bank: D
Rod Insertion Limit: 0 Steps on Bank: D

Data Point	Time	RCS Lowest T_{avg}	SR N-___ cps	1/M C_o / C_i	IR N-___ amps	1/M C_o / C_i	Control Bank Position (Steps-Bank)	Predicted Criticality (Steps-Banks)	Calculations Verified
1	1406	557°F	250	N/A	1.5E-11	N/A	0 - D	90 - D	N/A
2	1421	557°F	490	0.51	1.9E-11	N/A	44 - D	N/A - high	
3	1429	557°F	975	0.26	2.7E-11	N/A	141 - D	N/A - high	
4	1437	557°F	2100	0.12	3.4E-11	N/A	158 - D	174 steps	


Date: Today
Startup Number 117
Rod Insertion Limit: 0
500 pcm below ECC: D@35
500 pcm above ECC: D@160
Control Operator: Name of Candidate
Bank A
Bank B
Bank C
Bank D
4 Steps/Division
44-D 250 / 490 = 0.51
141-D 250 / 975 = 0.26
158-D 250 / 2100 = 0.12
Control Bank Position
-500 pcm
D @ 35 steps
+500 pcm
D @ 160 steps

Job Performance Measure No.: 2016 NRC JPM Common RO SRO A1-1
Perform RCS Average Temperature Data Sheet and Determine Inverse Count Rate Ratio (1/M)
GP-004

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	A Reactor trip occurred 7 days ago due to a trip of the 'A' MFW pump. The pump has been repaired. The unit is in Mode 2, with a plant startup in progress per GP-004, REACTOR STARTUP (MODE 3 TO MODE 2). The OATC has just completed the 3rd doubling. The Reactor Startup spreadsheet cannot be used due to a unsatisfactory Benchmark Test message. This has not as yet been resolved, the startup will continue.
Initiating Cue:	The CRS has assigned you to perform manual calculations and plotting of the 1/M data points per Sheet 2 of Attachment 2 and Attachment 3 to predict when the Reactor will become critical. ONLY plot the Source Range data. Another operator will verify your calculations when you have completed the attachments. Record your predicted rod height for Reactor Criticality in the space provided below. Record the correct response for the question and provide actions (IF ANY) based on your determination. When complete return your papers to the Examiner.

Name: _____

Date: _____

My predicted Rod Height for Reactor Criticality is _____ steps on Bank _____

Complete the following: Assuming the Reactor achieves criticality (or would achieve criticality) at your predicted rod height. What action(s) are required (IF ANY)?

A. NO ACTIONS are required (if true then circle this response)

B. ACTIONS are required in accordance with GP-004 – (if true then list the required action(s):

_____
_____
_____
_____
_____
_____

Attachment 2 - Inverse Count Rate Ratio (1/M) and RCS Average Temperature Data Sheet
Sheet 1 of 2

INSTRUCTION

NOTE: Per CRTN 432495, SwQL_B_GP-004 Reactor Startup.xlsm is a reactivity management spreadsheet that has been approved for use during the approach to criticality. This spreadsheet does not require independent verification, as the spreadsheet calculations are automatically benchmarked when the spread sheet is opened. This spreadsheet can be found at the following location:

P:\Site\HNPApps\Operations_Qualified_Calcs

1. **OPEN** spreadsheet SwQL_B_GP-004 Reactor Startup.xlsm.
2. **IF** the Benchmark Test message indicates the benchmark test has been completed satisfactorily **AND** the indicated spreadsheet version is 1.1, **THEN CLICK** "OK" **AND CONTINUE** with Step 4.
3. **IF** the Benchmark Test message indicates the benchmark test has been completed unsatisfactorily **OR** the indicated version is not 1.1, **THEN:**
   a. **DOCUMENT** the error in an NCR.
   b. **DISCONTINUE** use of the spreadsheet.
   c. **PERFORM** manual calculations and plotting of the 1/M data points per Sheet 2 of Attachment 2 and Attachment 3.

NOTE: The following is to be recorded into the spreadsheet or Attachment 2, as applicable.

4. **RECORD** ECC data from Step 5.0.14. _____
5. **RECORD** highest NI channel numbers from Step 5.0.15. _____

NOTE: Baseline data is indicated with a '0' in the Data Point column. Failure to indicate a '0' will prevent the spreadsheet from performing calculations correctly. Successive 1/M data points are indicated by increasing the corresponding Data Point number.

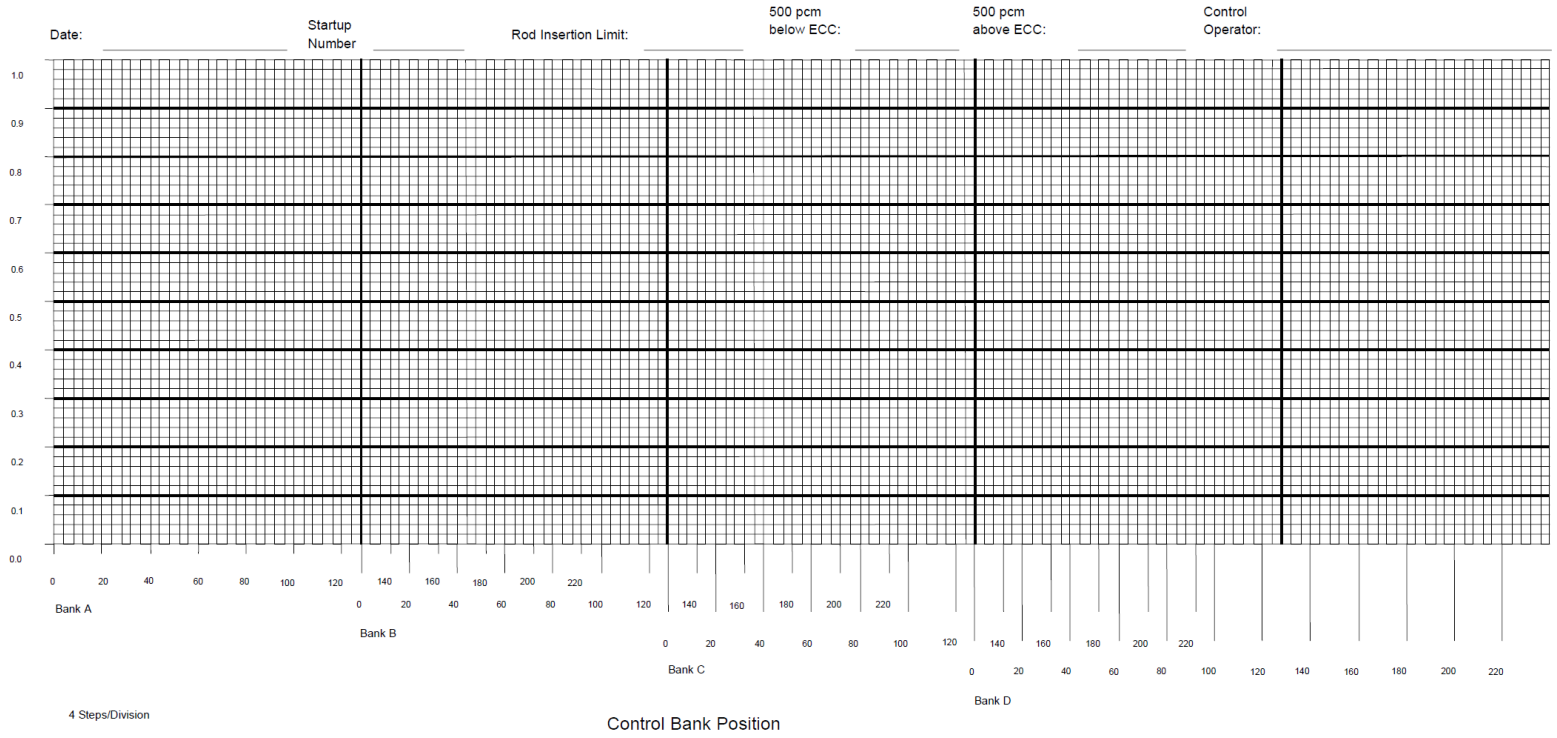
6. **RECORD** baseline 1/M data. _____
7. **RECORD** required data in accordance with Steps 5.0.23 through 5.0.25. _____
8. **WHEN** data collection is complete, **THEN PRINT** the spreadsheet by **SELECTING** the Print Attachments button. _____
9. **ATTACH** the printouts to the end of the completed GP-004. _____

Attachment 2 - Inverse Count Rate Ratio (1/M) and RCS Average Temperature Data Sheet
Sheet 2 of 2

Date: TODAY Startup Number: 117
500 pcm below ECC: D@ 35 Steps on Bank: D
500 pcm above ECC: D @ 160 Steps on Bank: D
Rod Insertion Limit: 0 Steps on Bank: D

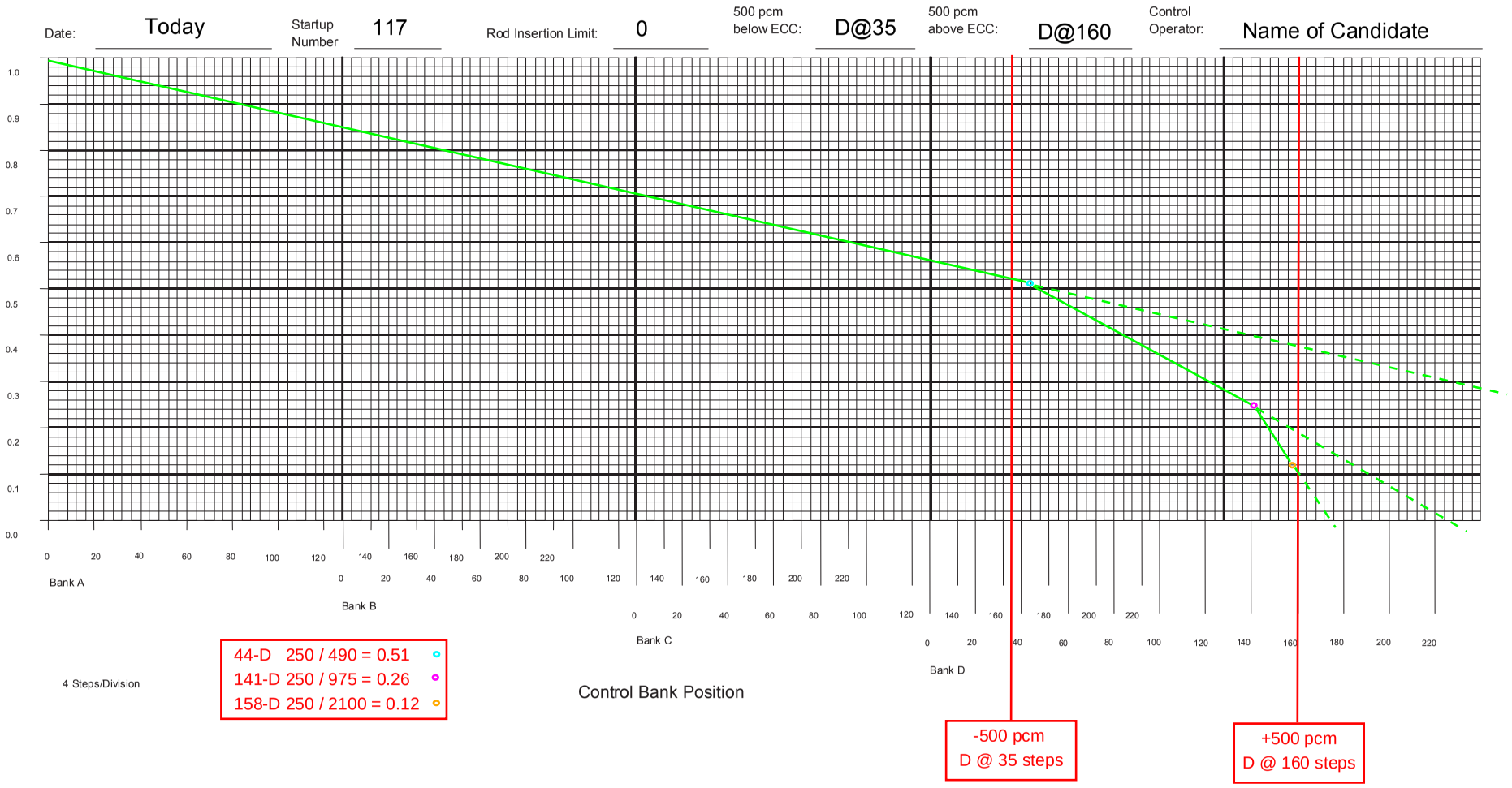
Data Point	Time	RCS Lowest T_{avg}	SR N-___ cps	1/M C_o / C_i	IR N-____ amps	1/M C_o / C_i	Control Bank Position (Steps-Bank)	Predicted Criticality (Steps-Banks)	Calculations Verified
1	1406	557°F	250	N/A	1.5E-11	N/A	0 - D	90 - D	N/A
2	1421	557°F	490		1.9E-11	N/A	44 - D		
3	1429	557°F	975		2.7E-11	N/A	141 - D		
4	1437	557°F	2100		3.4E-11	N/A	158 - D		

Attachment 3 - 1 / M Data Plot
Sheet 1 of 1



Attachment 3 - 1 / M Data Plot

Sheet 1 of 1



Facility:	Harris Nuclear Plant	Task No.:	002005H101
Task Title:	Determine the amount of RCS inventory that will be drained from RCS during the performance of GP-008, Draining the RCS	JPM No.:	2016 NRC Exam Admin JPM RO A1-2
K/A Reference:	G2.1.25 RO 3.9 SRO 4.2	ALTERNATE PATH:	NO

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE

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

Initial Conditions:	• A shift turnover is underway • The previous shift is implementing GP-008, Draining The Reactor Coolant System • An initial drain down of the RCS is in progress in preparation for the upcoming Refueling Outage • The drain is on hold for turnover and level is currently being maintained stable at the Reactor Vessel Flange • After turnover, the directions are to drain the RCS to -70” in preparation for Nozzle Dam installation • The Shift Manager has given permission to the crew to enter lower inventory conditions.

Initiating Cue:	You are an Extra Licensed Operator on shift. The CRS wants to know how many gallons of water will be drained from the RCS, to ensure adequate drain tank volume. You are required to calculate the amount of water that will be drained from the RCS from the current level to the directed level using GP-008, Draining the Reactor Coolant System, Attachment 5. Record your total to the nearest gallon.

Task Standard: Determine the calculated amount of RCS to be drained within specified limits.

Required Materials: Calculator, GP-008, Draining the RCS, Attachment 5 – Vessel Volume to Level Comparison

General References: GP-008, RCS, Attachment 5 , Rev. 44

Time Critical Task: No

Validation Time: 12 minutes

Critical Step Justification	
Step 2	Based on the curve you must determine the current RCS level to have an accurate starting point to calculate how many gallons of RCS will be drained.
Step 5	Based on the curve you must determine the volume, in gallons, that the RCS will be drained to reach -70” required to determine overall volume to be drained.
Step 6	An accurate total of RCS drainage is required to be provided to the Shift Manager (within tolerances). **32,900 gallons ± 1000 gallons** Draining the RCS too low could cause the RHR pumps to lose suction which would be a loss of shutdown cooling.

START TIME: _____

Step 1

Performance Step: 1 Obtain procedure

Standard: Obtains GP-008, Draining The Reactor Coolant System, Attachment 5, Vessel Volume to level comparison

Comment:

Step 2

✓ **Performance Step: 2** Determine current RCS volume

Standard: Using GP-008, Attachment 5
Determines current RCS volume with RCS level at Vessel Flange with SGs FULL to be 60,595 gallons

Comment:

Evaluator Note:	An alternate and valid method is to subtract the final volume from the initial volume as follows. 1. Record initial volume V_i=60,595 gal 2. Interpolate the final volume as follows (note: this may be done in one or multiple steps depending on the mathematical method used). $\boldsymbol{V_f} = 24{,}744\ gal + \left(\frac{-70\ in - (-82\ in)}{-65\ in - (-82\ in)}\right)(28{,}925\ gal - 24{,}744\ gal) = \boldsymbol{27{,}695\ gal}$ 3. Total volume drained (V_T)=V_f-V_i=32,900 gal

Step 3

Performance Step: 3 Determine RCS volume Top of Loops with SG's FULL

Standard: Using GP-008, Attachment 5
Determines RCS volume with RCS level at Top of Loops with SGs FULL to be 55,965 gallons

Comment:

Step 4

Performance Step: 4 Determine RCS volume at Top of Loops after SGs drain

Standard: Using GP-008, Attachment 5
Determines RCS volume with RCS level at Top of Loops with SGs DRAINED to be 28,925 gallons (-65")

Comment:

Step 5

✓ **Performance Step: 5** Determine RCS volume at -70” with SGs DRAINED

Standard: Using GP-008, Attachment 5
Determines RCS volume with RCS level at -70” with SGs DRAINED to be 28,925 gallons

Mid Loop -82” (24,744 gallons)
Top of Loops -65” (28,925 gallons)
17” (4,181 gallons) between Top of Loops and Mid Loop
245.941 gallons per inch
-65” to -70” = 5 inches x 245.941 = 1,229.705
1,230 gallons to be drained.
Volume at -70”=28,295 gal – 1,230 gal **= 27,695 gal**

Comment:

Step 6

✓ **Performance Step: 6** Determine total RCS volume drained from Vessel Flange with SGs FULL to -70”

Standard: Using GP-008, Attachment 5
Determines total volume drained to be:
32,900 gallons (+ 1000 gallons since curve could be used)

Current level Vessel Flange with SGs Full to Top of Loops with SGs FULL
60,595 - 55,965 = 4,630 gallons

SGs Drained level maintained at Top of Loops
55,965 – 28,925 = 27,040 gallons

Top of Loops with SGs Drained to -70”
1,230 gallons

Total drained volume = 4,630 + 27,040 + 1,230 = **32,900 gallons**

Comment:

Evaluator Note:	**After the total volume of RCS from Vessel Level at Flange with SGs FULL to -70” below the Flange is calculated: Evaluation on this JPM is complete.** **END OF JPM**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 NRC Exam Admin JPM RO A1-2

Determine the amount of RCS inventory that will be drained from RCS during the performance of GP-008, Draining the RCS.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	• A shift turnover is underway • The previous shift is implementing GP-008, Draining The Reactor Coolant System • An initial drain down of the RCS is in progress in preparation for the upcoming Refueling Outage • The drain is on hold for turnover and level is currently being maintained stable at the Reactor Vessel Flange • After turnover, the directions are to drain the RCS to -70" in preparation for Nozzle Dam installation • The Shift Manager has given permission to the crew to enter lower inventory conditions.

Initiating Cue:	You are an Extra Licensed Operator on shift. The CRS wants to know how many gallons of water will be drained from the RCS, to ensure adequate drain tank volume. You are required to calculate the amount of water that will be drained from the RCS from the current level to the directed level using GP-008, Draining the Reactor Coolant System, Attachment 5. Record your total to the nearest gallon.

Name _____

Date _____

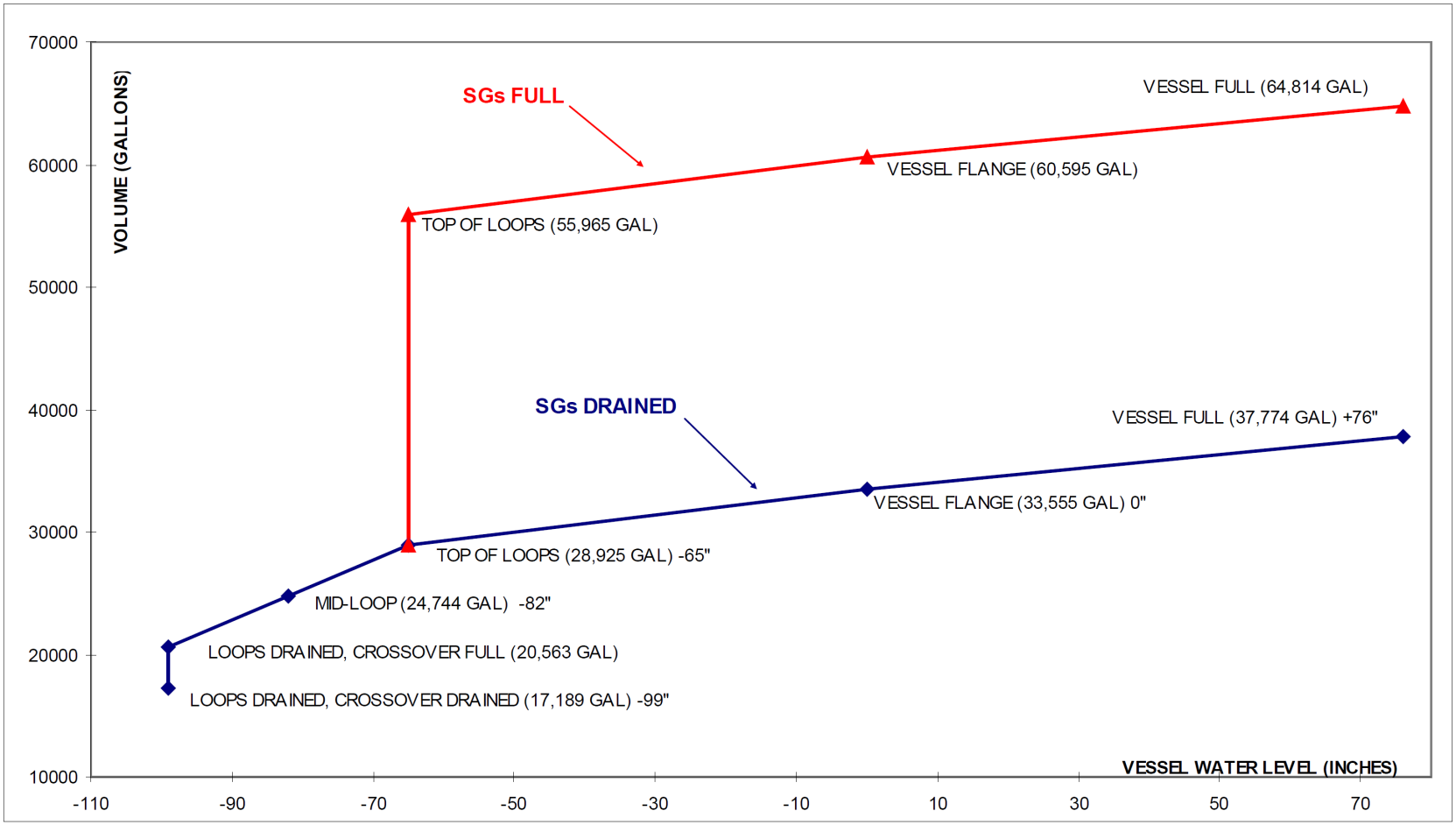
Name: _____

Date: _____

Show how the calculation was performed in the space provided below:

Total number of RCS gallons to be drained: _____

Attachment 5 - Vessel Volume to Level Comparison
Sheet 1 of 1



Facility:	Harris Nuclear Plant	Task No.:	301079H401
Task Title:	During a Loss of Shutdown Cooling, determine the times that the RCS will reach Core Boiling and Boil-Off	JPM No.:	2016 NRC Exam Admin JPM SRO A1-2
K/A Reference:	G2.1.20 RO 4.6 SRO 4.6		

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	The unit was operating at 100% power for the last 15 months. On 06/05/16 at 0000 the plant was shut down for a refueling outage. • The Reactor cavity has been filled. • 'A' RHR pump tripped when it was restarted after being realigned for Shutdown Cooling mode. Maintenance has determined that motor repairs are required and are not expected to be completed until 06/25/16. • The Refuel crew has reported the Manipulator Crane has interlock issues • No fuel has been moved The current date and time is 06/18/16 at 1200. • All of the fuel still remains in the vessel due to complications with the Manipulator crane. • An RCS leak has developed with cavity level lowering at a rate of 2 feet per hour. Current level is approximately 3 feet above the flange. • The crew is implementing AOP-020, Loss of RCS Inventory or RHR While Shutdown. • The 'B' RHR pump just tripped. • The last valid RCS temperature logged just before the 'B' RHR pump tripped was 135°F.

Initiating Cue:	In accordance with AOP-020, Section 3.4, step 13, you are directed to refer to curves H-X-8 through H-X-11 and determine: 1. The time to reach core boiling **and** 2. Core boil-off time Mark up your curves to indicate where you are determining these times. Write your estimates of "time to boil" and "time to boil-off" on the lines at the bottom of this page (below). Calculate your times in hours and minutes.

Task Standard: Candidate obtains curves and correctly identifies the times to reach core boiling and core boil-off time

Required Materials: Curve Book
Straight Edge

General References: AOP-020 (Rev. 38), Curve Book curves H-X-8, 9, 10 and 11 (All Rev. 3)

Time Critical Task: No

Validation Time: 15 minutes

Critical Step Justification	
Step 3	Step required in order to accurately determine “time to boil” using the appropriate curve.
Step 4	Step required in order to accurately determine “time to boil-off” using the appropriate curve.

START TIME: _____

Performance Step: 1 OBTAIN CURVES NEEDED FOR CALCULATION
(Curve Book will be provided to the candidate)

Standard: Refers to curves H-X-8 through H-X-11

Comment:

Performance Step: 2 Refers to provided data and determines that curve H-X-9 is required to calculate "time to boil" and curve H-X-11 is required to calculate "boil-off" time

Standard: Reviews curves and determines which ones are appropriate to determine the "time to boil" and "boil-off time"

Comment:

✓ **Performance Step: 3** Based on time since shutdown (06/05/16 – 6/18/16) 13 days 12 hours since shutdown and current RCS temperature of 135°F using curve H-X-9 determine "time to boil".
(Interpolate 125°-150° lines)

Standard: Reviews curve H-X-9
Determines that "time to boil" is **~18 minutes**
(± 2 minutes, 16 – 20 min is acceptable)

Comment:

✓ **Performance Step: 4** Based on time since shutdown (06/05/16 – 6/18/16) 13 days 12 hours since shutdown and current RCS temperature of 135°F using curve H-X-11 determine "time to boil-off"

Standard: Reviews curve H-X-11
Determines that "time to boil-off" is **4 hrs**
(± 15 minutes) or (4 hours 15 minutes to 3 hours 45 minutes)

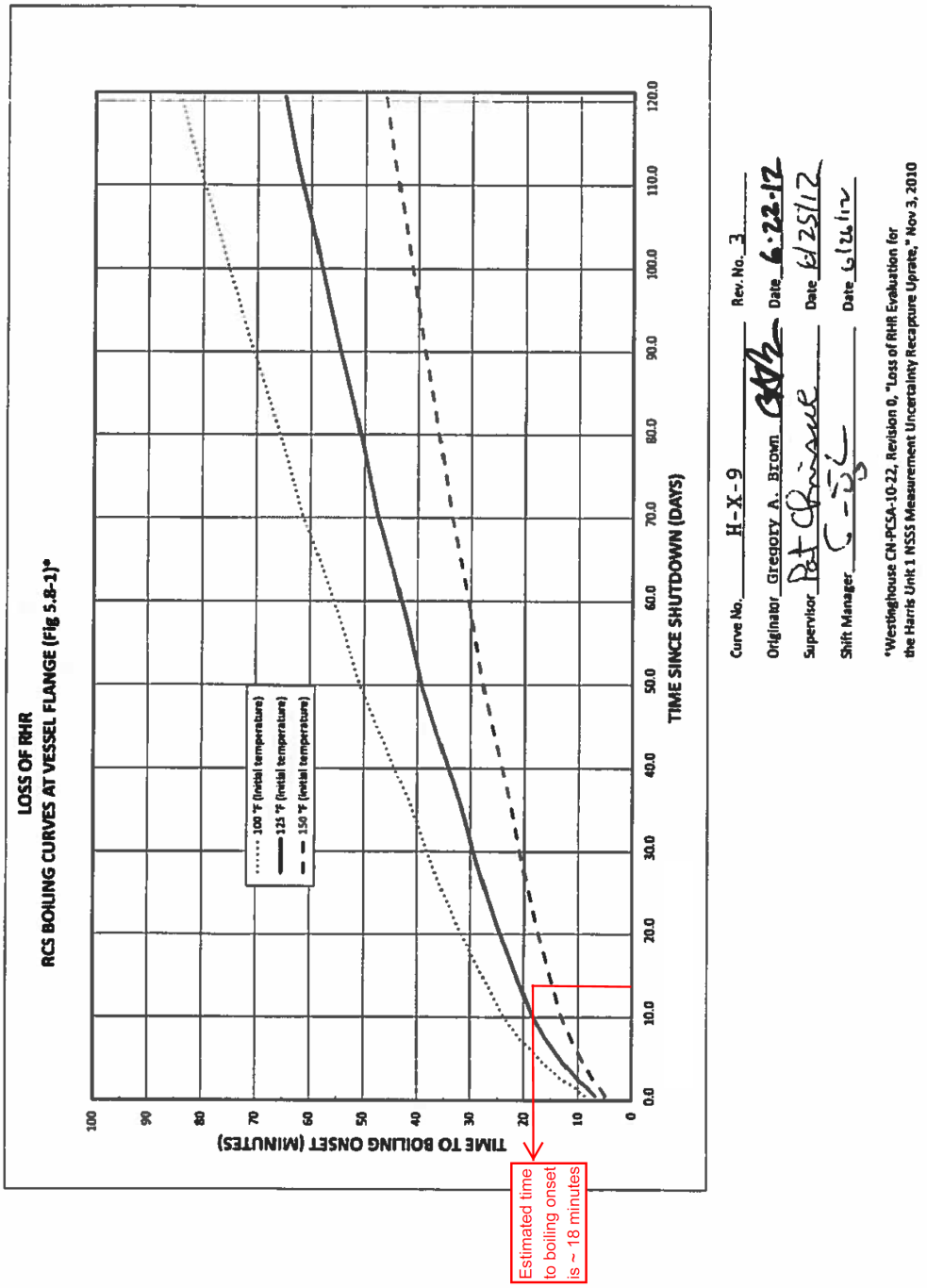
Note: The answer can be calculated in "just" minutes
Acceptable to have 240 minutes (255 minutes to 225 minutes).

Comment:

Terminating Cue: **After completing the "time to boil" and "time to boil-off" calculation, the evaluation on this JPM is complete.**
END OF JPM

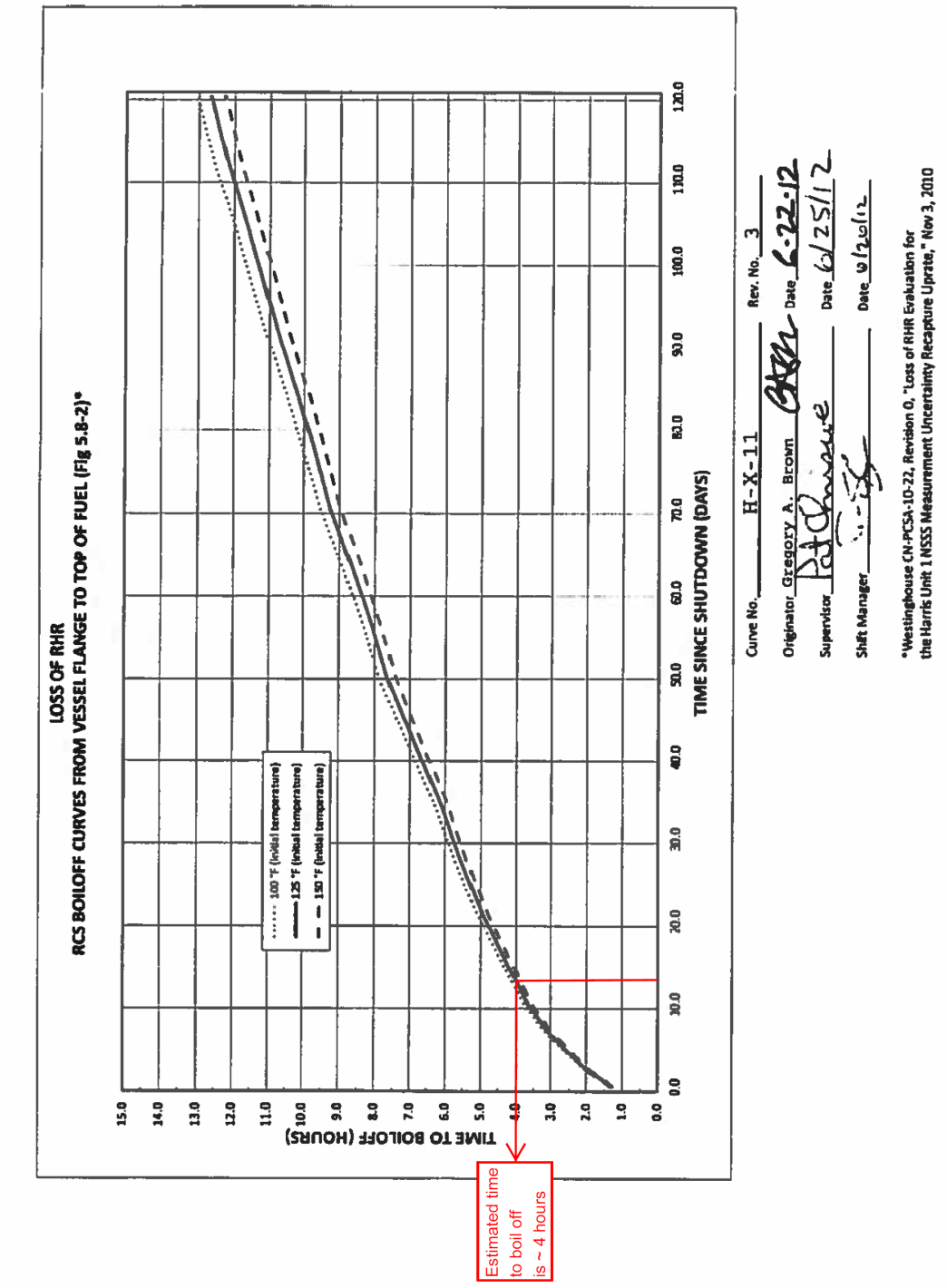
STOP TIME: _____

KEY



Initial conditions: Reactor cavity filled for refueling without fuel movement due to Manipulator Crane and Source Range problems. Core cooling is lost at 1200 and 13 days after shutdown. Core Exit Thermocouples are rising and are currently 135°F (a point between the dashed 150°F line and the solid 125°F line on the graph). Estimated time to boiling onset will be approximately 18 minutes from the time of the loss of cooling event.

KEY



Initial conditions: Reactor cavity filled for refueling without fuel movement due to Manipulator Crane and Source Range problems. Core cooling is lost at 1200 and 13 days after shutdown. Core Exit Thermocouples are rising and are currently 135°F. Estimated time to reach boil off will be approximately 4 hours from the time of the loss of cooling event. (A point on the curve between the dashed 150°F line and the solid 125°F line.)

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 NRC Exam Admin JPM SRO A1-2

During a Loss of Shutdown Cooling, determine the times that the RCS will reach Core Boiling and Boil-Off

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	The unit was operating at 100% power for the last 15 months. On 06/05/16 at 0000 the plant was shut down for a refueling outage. • The Reactor cavity has been filled. • 'A' RHR pump tripped when it was restarted after being realigned for Shutdown Cooling mode. Maintenance has determined that motor repairs are required and are not expected to be completed until 06/25/16. • The Refueling SRO has reported the Manipulator Crane has interlock issues • No fuel has been moved The current date and time is 06/18/16 at 1200. • All of the fuel still remains in the vessel due to complications with the Manipulator crane. • A RCS leak has developed with cavity level lowering at a rate of 2 feet per hour. Current level is approximately 3 feet above the flange. • The crew is implementing AOP-020, Loss of RCS Inventory or RHR While Shutdown. • The 'B' RHR pump just tripped. • The last valid RCS temperature logged just before the 'B' RHR pump tripped was 135°F.

Initiating Cue:	In accordance with AOP-020, Section 3.4, step 13, you are directed to refer to curves H-X-8 through H-X-11 and determine: 1. The time to reach core boiling and 2. Core boil-off time Mark up your curves to indicate where you are determining these times. Write your estimates of "time to boil" and "time to boil-off" on the lines at the bottom of this page (below). Calculate your times in hours and minutes.

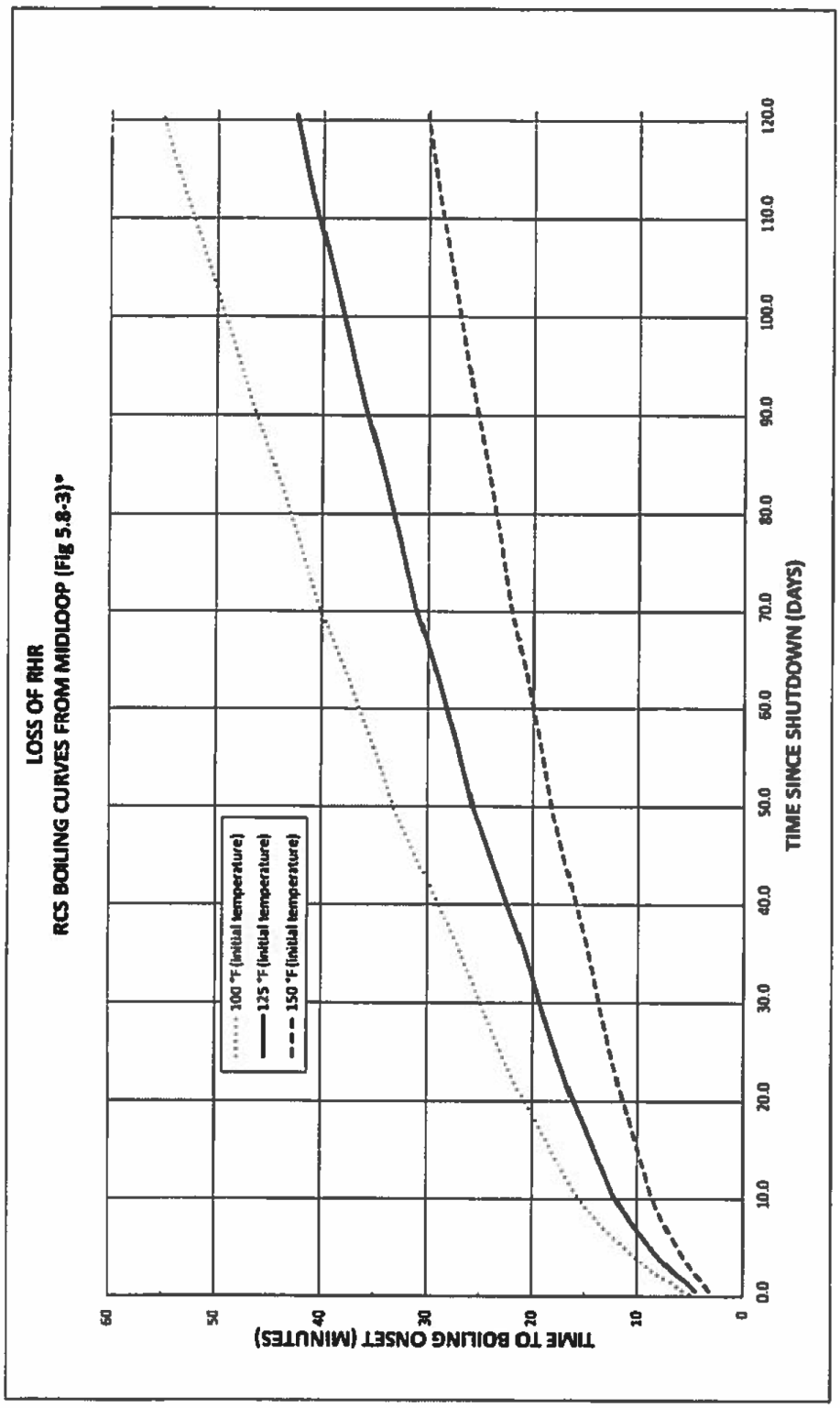
Name _____

Date _____

Record your calculations here and return your curves to the examiner:

TIME TO BOIL (hours / minutes) _____

TIME TO BOIL-OFF (hours / minutes) _____



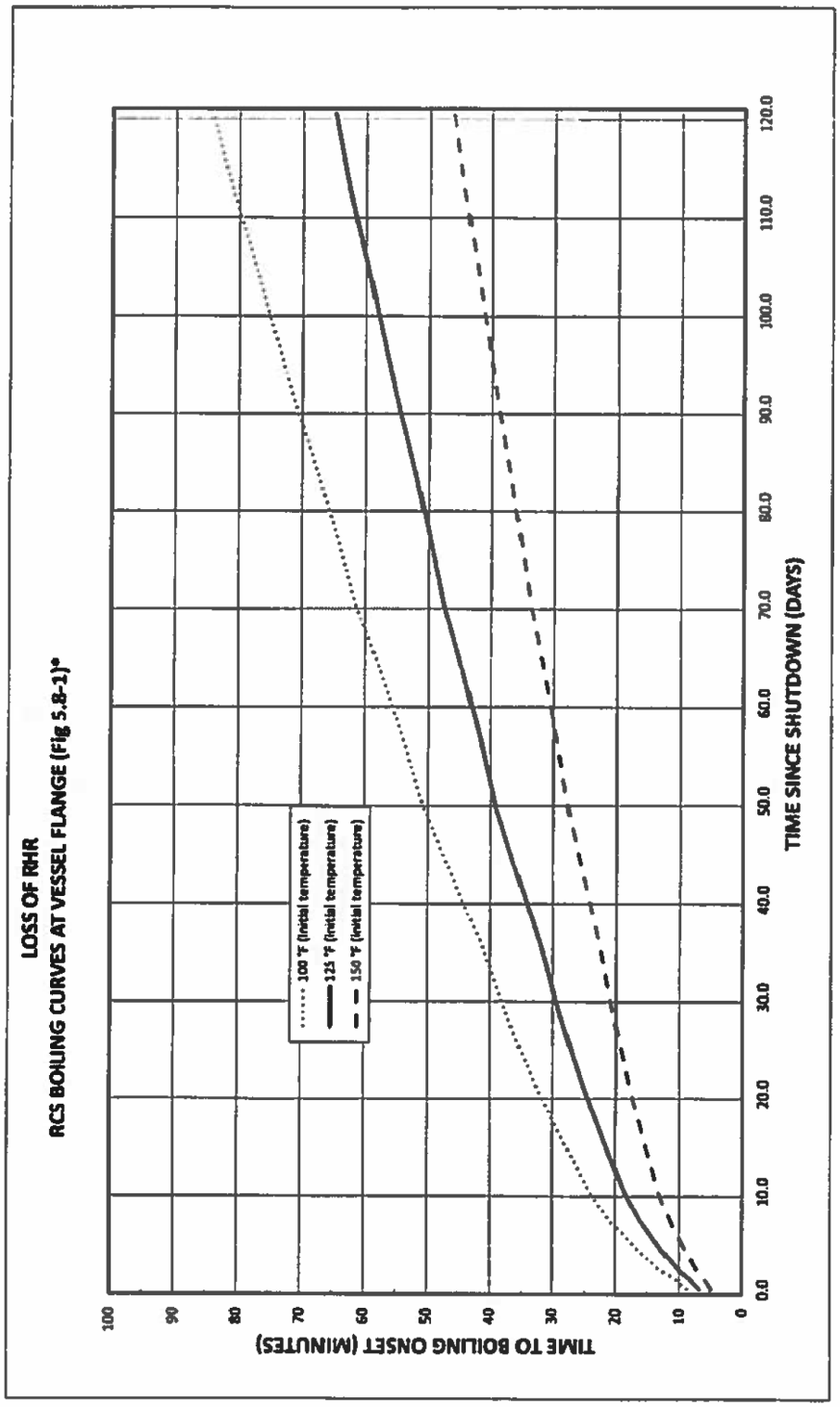
Curve No. H-X-B Rev. No. 3

Originator Gregory A. Brown Date 6-22-12

Supervisor [signature] Date 6/25/12

Shift Manager [signature] Date 6/26/12

*Westinghouse CN-PCSA-10-22, Revision 0, "Loss of RHR Evaluation for the Harris Unit 1 NSSS Measurement Uncertainty Recapture Uprate," Nov 3, 2010



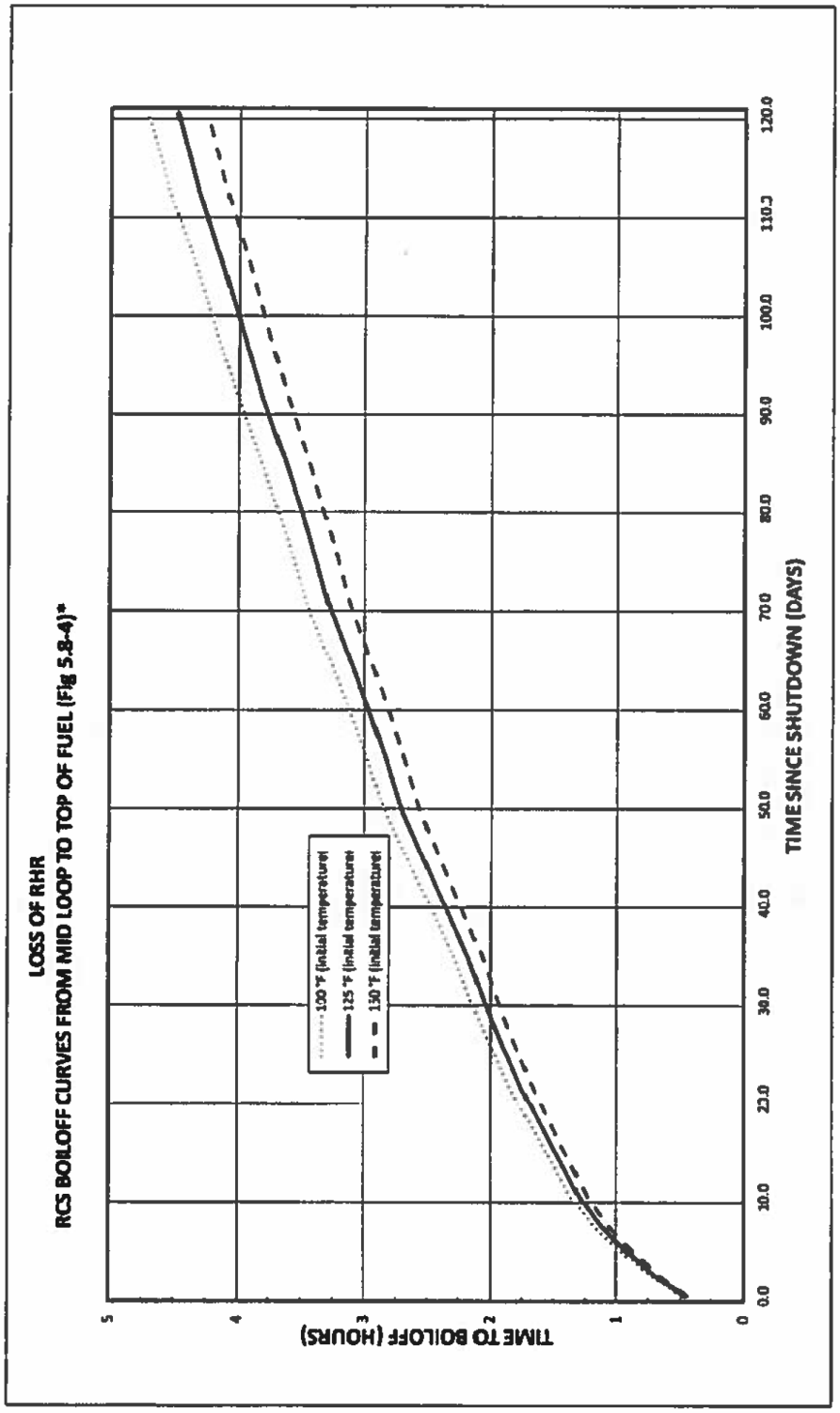
Curve No. H-X-9 Rev. No. 3

Originator Gregory A. Brown Date 6-22-12

Supervisor Pat Quinnane Date 6/25/12

Shift Manager [illegible] Date 6/26/12

*Westinghouse CN-PCSA-10-22, Revision 0, "Loss of RHR Evaluation for the Harris Unit 1 NSSS Measurement Uncertainty Recapture Uprate," Nov 3, 2010



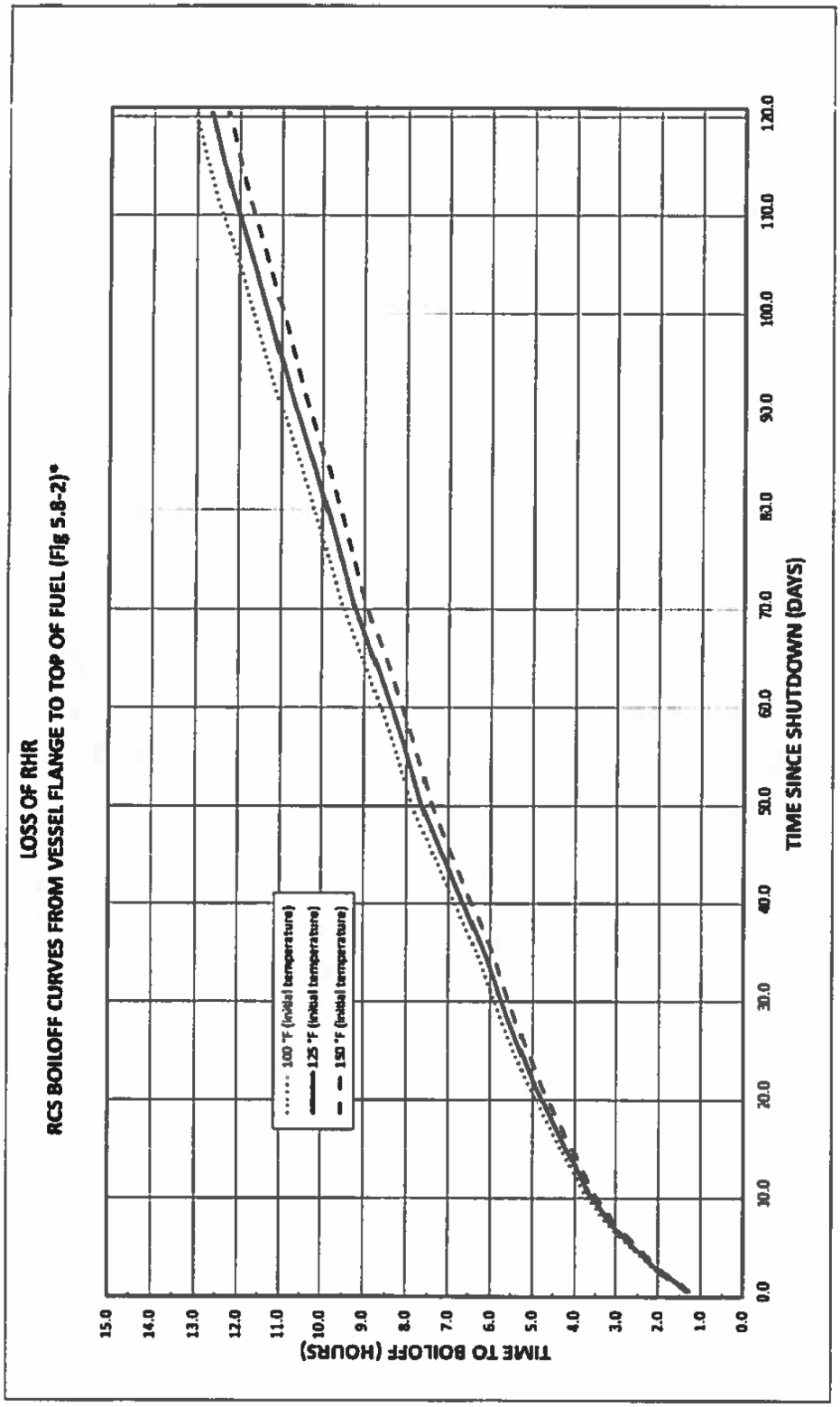
Curve No. H-X-10 Rev. No. 3

Originator Gregory A. Brown Date 6-22-12

Supervisor [signature] Date 6/25/12

Shift Manager [signature] Date 6/26/12

*Westinghouse CN-PCSA-10-22, Revision 0, "Loss of RHR Evaluation for the Harris Unit 1 NSSS Measurement Uncertainty Recapture Uprate," Nov 3, 2010



Curve No. H-X-11 Rev. No. 3

Originator Gregory A. Brown Date 6-22-12

Supervisor Pat Chinnue Date 6/25/12

Shift Manager [illegible] Date 6/20/12

*Westinghouse CN-PCSA-10-22, Revision 0, "Loss of RHR Evaluation for the Harris Unit 1 NSSS Measurement Uncertainty Recapture Uprate," Nov 3, 2010

Worksheet

Facility:	Harris Nuclear Plant	Task No.:	088017H601
Task Title:	Determine the Minimum and Maximum Allowed Indicated Flow for MCR Ventilation	JPM No.:	2016 NRC Exam Admin JPM RO / SRO A2
K/A Reference:	G2.2.44 RO 4.2 SRO 4.4		

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	Control Room HVAC is being aligned for Post-Accident Operation in accordance with OP-173, Control Room Area HVAC System, Section 8.2. The crew has completed steps up through step 8.2.2.8.

Initiating Cue:	The CRS has directed you to perform OP-173, section 8.2.2, steps 9.a through 9.d. Assume all verifications will be completed after you submit your completed paper work. Current RM-23 Outside Air Intake Radiation Monitor readings and ERFIS Met Tower data are provided on the following pages. Record your answers in the spaces provided below:

Task Standard: Determines the Minimum and Maximum Allowed Indicated Flow for MCR ventilation.

Required Materials: Marked up copy of OP-173, Control Room Ventilation, with section 8.2 completed up to step 8.2.2.8.

General References: OP-173, Rev. 37

Time Critical Task: No

Validation Time: 15 minutes

The following setup was required to achieve a request by Mike Donithan (2016 NRC Chief Examiner) to obtain photos or data screen prints to provide as reference material for the JPM. This data also includes a wind direction that's toward the correct (South) intake to increase the cognitive ability by having the candidate consider wind direction in their decision.

Simulator Setup

Reset Simulator to IC 19

Set Rad Monitors:

South Intake
RC-1CZ-3505A1-SA 4.16E-8 µc/ml
RC-1CZ-3505B1-SB 3.87E-7 µc/ml

North Intake
RC-1CZ-3505A2-SA 8.76E-6 µc/ml
RC-1CZ-3505B2-SB 6.93E-5 µc/ml

Set atmospheric conditions to:

- MMT1011 86°F
- MMT1002 29.54 in Hg

Additionally set all other ambient temperatures on ERFIS METTOWER screen to near 86°F
Set All wind directions on ERFIS METTOWER screen to near 180° (south)
NOTE: ERFIS screens will take some time to show the values

Take photos of RM-23 indications for the Rad Monitors to allow the candidate to determine which intake to use.
Take photos or print screen for ERFIS METTOWER data.

Critical Step Justification	
Step 2	Must determine which intake to use to prevent potential unnecessary contamination or inhalation of airborne radiation of the MCR personnel
Step 3	Must determine the correct correction factor or calculation will be wrong.
Step 4	Must determine Minimum Allowed Indicated flow to complete the task.
Step 5	Must determine Maximum Allowed Indicated flow to complete the task.

START TIME: _____

OP-173, Section 8.2.2 Note prior to Step 9

Performance Step: 1

NOTE: Opening the EMERGENCY FILTRATION OUTSIDE AIR INLET in a timely manner will minimize habitability concerns for the number of people in the MCR when it is isolated. (Reference 2.6.4)
NOTE: The decision of which Control Room Emergency Outside Air Intakes should be used to supply air to the system is based on the event in progress which has made recirculation necessary.

- In an emergency situation such as toxic gas, wind direction may be of primary consideration.
- In the event of high radiation, The RM-23 for the following radiation monitors should be used to determine which Outside Air intake has the lowest radiation reading:
  - SOUTH INTAKE NORTH INTAKE
    - RC-1CZ-3505A1-SA RC-1CZ-3505A2-SA
    - RC-1CZ-3505B1-SB RC-1CZ-3505B2-SB
- If the system is being placed into recirculation for maintenance reasons, either intake may be used.

NOTE: If, during the performance of this Section, MMT1011 decreases by 20°F or more, or MMT1002 increases by 0.5 in Hg or more, the correction factor in the following step would have to be re-determined. An increase in MMT1011, or a decrease in MMT1002 results in a more conservative calculation, so would not require re-determining the correction factor.
NOTE: EMERGENCY FILTRATION OUTSIDE AIR INLETS can be manually opened on loss of power.
NOTE: The intent of the following Step is to obtain a flow high enough to ensure MCR DP is greater than 0.125 inwg to ALL adjacent areas. However, it may not be necessary to obtain maximum flow conditions to obtain required DP. Care should be taken to avoid excessive DP across MCR boundary doors.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-173 Section 8.2.2 Step 9.a

✓ **Performance Step: 2** PERFORM the following to pressurize the control room to 0.125 INWG:

a. Using the NOTE above, DETERMINE which of the below Control Room Emergency Outside Air Intakes should be used to supply outside air to the system:

SOUTH / NORTH (circle one)

Standard: Reviews ERFIS screen printout and identifies South Intake RC-1CZ-3505A1-SA reading 4.32E-8 µc/ml as the lowest and circles **SOUTH**.

Comment:

OP-173 Section 8.2.2 Step 9.b

✓ **Performance Step: 3** DETERMINE the correction factor as follows:

$$\frac{(17.714)\ (\_\_\_\_\_\ \text{in Hg})}{\frac{\text{MMT1002}}{\_\_\_\_\_\ ^\circ\text{F} + 460}} = \_\_\_\_\_$$
$$\text{MMT1011}$$

Standard: Determines correction factor to be 0.96

$$\frac{(17.714)\ (\ 29.54\ \text{in Hg})}{\frac{\text{MMT1002}}{86^\circ\text{F} + 460}} = 0.95837281$$
$$\text{MMT1011}$$

(Rounded to 0.96)

Comment:

OP-173 Section 8.2.2 Step 9.c

✓ **Performance Step: 4** DETERMINE Minimum Allowed Indicated flow as follows:

$$\frac{315 \text{ cfm}}{\text{Correction Factor (from Step 8.2.2.9.b)}} = \text{\_\_\_\_\_ cfm}$$

Standard: Determines Minimum Allowed indicated flow as 300 cfm

$$\frac{315 \text{ cfm}}{0.96} = 328 \text{ cfm}$$

Correction Factor (from Step 8.2.2.9.b)

(Deviation ± 2 = 326 – 330)

Comment:

OP-173 Section 8.2.2 Step 9.d

✓ **Performance Step: 5** DETERMINE Maximum Allowed Indicated flow as follows:

$$\frac{400 \text{ cfm}}{\text{Correction Factor (from Step 8.2.2.9.b)}} = \text{\_\_\_\_\_ cfm}$$

Standard: Determines Maximum Allowed indicated flow as 380.9 cfm

$$\frac{400 \text{ cfm}}{0.96} = 417 \text{ cfm}$$

Correction Factor (from Step 8.2.2.9.b)

(Deviation ± 2 = 415 – 419)

Comment:

Performance Step 6 Provide results to CRS.

Evaluator Cue:	**When results are provided by applicant, END OF JPM**

Stop Time: _____

KEY

Step 9.a (SOUTH) / NORTH (circle one)

Step 9.b correction factor = 0.95837 (Could round to 0.96)

Step 9.c Minimum Allowed Indicated Flow = 328.6821128 (Deviation $\pm$ 2 = 326 – 330) cfm

Step 9.d Maximum Allowed Indicated Flow = 417.6666667 (Deviation $\pm$ 2 = 415 – 419) cfm

KEY

8.2.2 Procedural Steps (continued)

NOTE: Opening the EMERGENCY FILTRATION OUTSIDE AIR INLET in a timely manner will minimize habitability concerns for the number of people in the MCR when it is isolated. (Reference 2.6.4)

NOTE: The decision of which Control Room Emergency Outside Air Intakes should be used to supply air to the system is based on the event in progress which has made recirculation necessary.

- In an emergency situation such as toxic gas, wind direction may be of primary consideration.
- In the event of high radiation, The RM-23 for the following radiation monitors should be used to determine which Outside Air intake has the lowest radiation reading:

SOUTH INTAKE	NORTH INTAKE
RC-1CZ-3505A1-SA	RC-1CZ-3505A2-SA
RC-1CZ-3505B1-SB	RC-1CZ-3505B2-SB

- If the system is being placed into recirculation for maintenance reasons, either intake may be used.

NOTE: If, during the performance of this Section, MMT1011 (AMBIENT TEMPERATURE AVG) decreases by 20°F or more, or MMT1002 (BAROMETRIC PRESSURE AVG) increases by 0.5 in Hg or more, the correction factor in the following step would have to be re-determined. An increase in MMT1011, or a decrease in MMT1002 results in a more conservative calculation, so would not require re-determining the correction factor.

NOTE: If ERFIS is not available, data may be obtained using AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment.

NOTE EMERGENCY FILTRATION OUTSIDE AIR INLETS can be manually opened on loss of power. (Reference 2.3.6)

NOTE The intent of the following Step is to obtain a flow high enough to ensure MCR DP is greater than 0.125 INWG to ALL adjacent areas. However, it may not be necessary to obtain maximum flow conditions to obtain required DP. Care should be taken to avoid excessive DP across MCR boundary doors.

9. **PERFORM** the following to pressurize the control room to 0.125 INWG:

R a. Using the NOTE above, **DETERMINE** which of the below Control Room Emergency Outside Air Intakes should be used to supply outside air to the system: (Reference 2.3.1)

(SOUTH) / NORTH (circle one) Initial

KEY

8.2.2 Procedural Steps (continued)

b. **DETERMINE** the correction factor as follows:

Initial

$$\frac{(17.714)\left(\frac{29.54\ \text{in Hg}}{\text{MMT1002}}\right)}{\frac{86}{\text{MMT1011}}\ \text{F} + 460} = 0.95837281$$

Verified

c. **DETERMINE** Minimum Allowed Indicated flow as follows:

Initial

$$\frac{315\ \text{cfm}}{\frac{0.95837281}{\text{Correction Factor (from Step 8.2.2.9.b)}}} = 328.6821128\ \text{cfm}$$

Verified

d. **DETERMINE** Maximum Allowed Indicated flow as follows:

Initial

$$\frac{400\ \text{cfm}}{\frac{0.95837281}{\text{Correction Factor (from Step 8.2.2.9.b)}}} = 417.3741114\ \text{cfm}$$

Verified

e. **THROTTLE OPEN** one of the following EMER FILT OUTSIDE AIR INLET valve groups (determined in Step 8.2.2.9.a), to obtain flow between calculated values from Steps 8.2.2.9.c and 8.2.2.9.d, as indicated on FI-7817A SA (B SB). (Substep not performed is N/A):

(1) SOUTH, 1CZ-9 SA and 1CZ-10 SB. _____

(2) NORTH, 1CZ-11 SA and 1CZ-12 SB. _____

10. **ALIGN** the Plant Computer and Communications Rooms Ventilation for operation with a Control Room Isolation Signal per OP-163.01. _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 NRC Exam Common Admin JPM RO / SRO A2

Determine the Minimum and Maximum Allowed Indicated Flow for MCR Ventilation
OP-173.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	Control Room HVAC is being aligned for Post-Accident Operation in accordance with OP-173, Control Room Area HVAC System, Section 8.2. The crew has completed steps up through step 8.2.2.8.

Initiating Cue:	The CRS has directed you to perform OP-173, section 8.2.2, steps 9.a through 9.d. Assume all verifications will be completed after you submit your completed paper work. Current RM-23 Outside Air Intake Radiation Monitor readings and ERFIS Met Tower data are provided on the following pages. Record your answers in the spaces provided below:

Name: _____

Date: _____

Step 9.a SOUTH / NORTH (circle one)

Step 9.b correction factor = _____

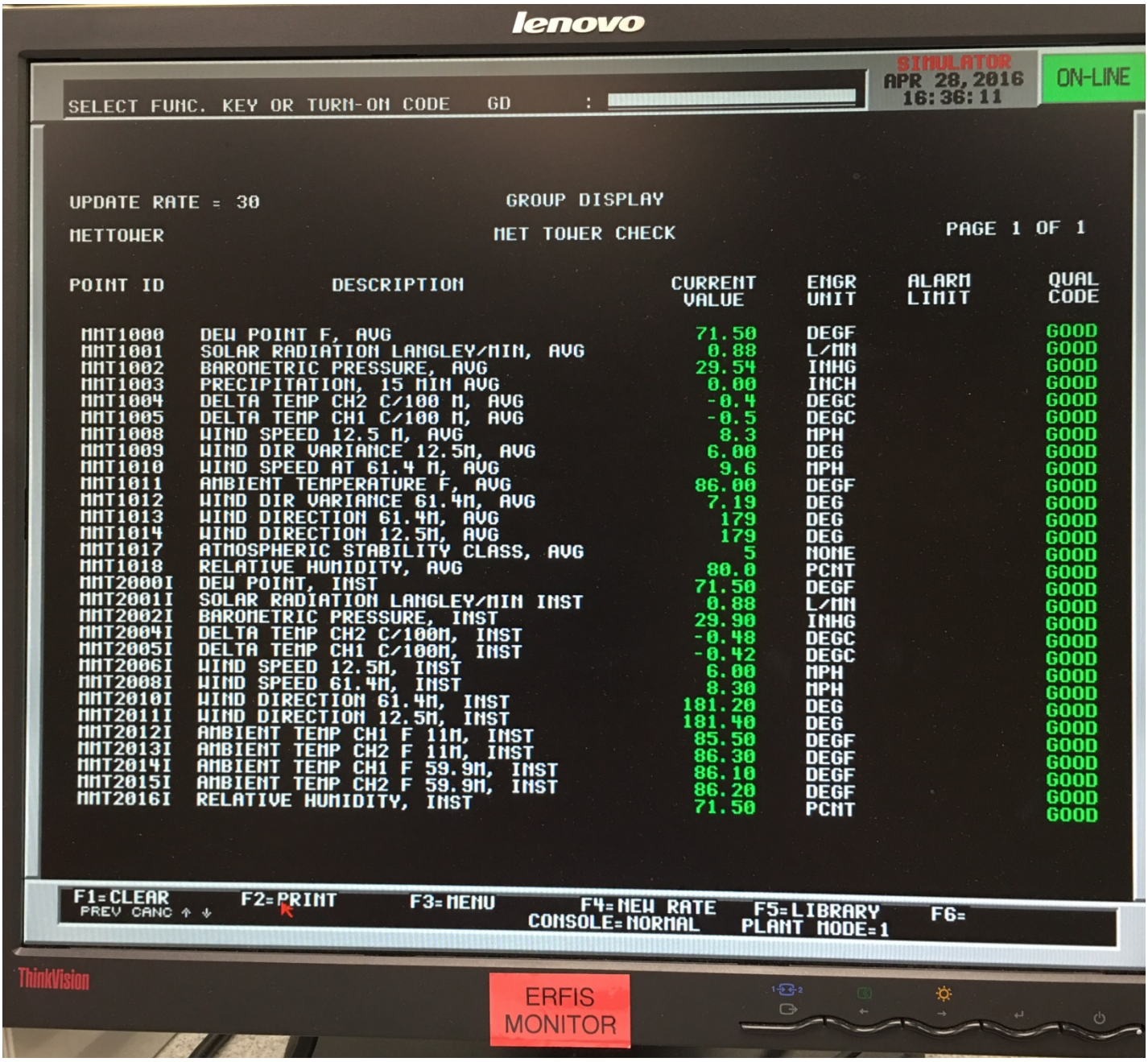
Step 9.c Minimum Allowed Indicated Flow = _____cfm

Step 9.d Maximum Allowed Indicated Flow = _____cfm

RM-23 current conditions

RM-23 current conditions

ERFIS METTOWER current display



8.2. Aligning the Control Room Area HVAC System for Post Accident Operation
R (Reference 2.3.6)

CAUTION
In the event of a steam line break or following a high radiation signal, the Control Room Area HVAC System must be pressurized within 2-hours. (Ref. AP-045, Operator Time Critical Action Program)

NOTE: Actuation of CREFS places the system in the emergency mode (i.e. isolation with recirculation mode) of operation. Actuation of the system closes the unfiltered outside air intake and the unfiltered exhaust dampers, and aligns the system for recirculation of the air within the CRE through the redundant trains of HEPA and charcoal filters. The emergency mode also allows for pressurization and filtered ventilation of the air supply to the CRE. (Reference 2.2.3)

8.2.1. Initial Conditions

1. Control Room Area HVAC isolation has occurred. JL
2. Section 8.1.2 has been completed. JL

8.2.2. Procedural Steps

CAUTION
A Control Room Isolation System may be manually reset after 5 seconds on the MCB to reposition valves and dampers. If this is done and the original signal is still greater than the alarm setpoint, the Control Room Area HVAC System will not automatically re-isolate until the original signal goes below its setpoint and another actuation signal is received.

1. **PLACE** the following Control Room Isolation Signal Reset Switches to RESET:
   - CONTROL ROOM ISOL TRAIN A RESET JL
   - CONTROL ROOM ISOL TRAIN B RESET JL
2. **VERIFY** the following alarms have cleared:
   - ALB-030/1-1, Control Room Isolation Train A JL
   - ALB-030/2-1, Control Room Isolation Train B JL

8.2. Aligning the Control Room Area HVAC System for Post Accident Operation
R (Reference 2.3.6)

CAUTION

In the event of a steam line break or following a high radiation signal, the Control Room Area HVAC System must be pressurized within 2-hours. (Ref. AP-045, Operator Time Critical Action Program)

NOTE: Actuation of CREFS places the system in the emergency mode (i.e. isolation with recirculation mode) of operation. Actuation of the system closes the unfiltered outside air intake and the unfiltered exhaust dampers, and aligns the system for recirculation of the air within the CRE through the redundant trains of HEPA and charcoal filters. The emergency mode also allows for pressurization and filtered ventilation of the air supply to the CRE. (Reference 2.2.3)

8.2.1. Initial Conditions

1. Control Room Area HVAC isolation has occurred. JL
2. Section 8.1.2 has been completed. JL

8.2.2. Procedural Steps

CAUTION

A Control Room Isolation System may be manually reset after 5 seconds on the MCB to reposition valves and dampers. If this is done and the original signal is still greater than the alarm setpoint, the Control Room Area HVAC System will not automatically re-isolate until the original signal goes below its setpoint and another actuation signal is received.

1. **PLACE** the following Control Room Isolation Signal Reset Switches to RESET:
   - CONTROL ROOM ISOL TRAIN A RESET JL
   - CONTROL ROOM ISOL TRAIN B RESET JL
2. **VERIFY** the following alarms have cleared:
   - ALB-030/1-1, Control Room Isolation Train A JL
   - ALB-030/2-1, Control Room Isolation Train B JL

8.2.2 Procedural Steps (continued)

c. **VERIFY** the following associated A (B) train valves/dampers go closed for the stopped fan:

R2 INLET CZ-23 (~~CZ-24~~) SLB-5 (~~6~~) JL

R2 DISCH CZ-21 (~~CZ-22~~) SLB-5 (~~6~~) JL

EMERGENCY FILTRATION DISCHARGE 1CZ-19 SA (~~1CZ-20 SB~~) JL

5. **SHUT** EMERGENCY FILTRATION RECIRC CZ-D66 SA (~~CZ-D61 SB~~) for the stopped R-2 Fan. JL

6. **IF** more than one EMERGENCY EXH FAN E-6 A-SA (~~B-SB~~) is running, **THEN PERFORM** the following at AEP-1:

CAUTION

Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

a. **STOP** one fan. JL

b. **VERIFY** EMERGENCY EXHAUST INLET 1AV-1 SA (~~1AV-4 SB~~) SHUT. JL

c. **VERIFY** EMERGENCY EXHAUST OUTLET 1AV-2 SA (~~1AV-5 SB~~) SHUT. JL

d. **LOG** fan operations in Attachments 4 and 5 of OP-172 as necessary. JL

NOTE: The following Step will regain the auto-closure capability on high radiation of all outside air intakes and should be performed prior to opening any intake, if necessary.

7. **IF** the Control Room Isolation was caused by a smoke detector, **THEN BYPASS** that detector in LFDCP-7 per OP-149 Section 8.13. N/A JL

8. **IF** a high radiation condition exists at the Control Room Air Intake, **THEN USE** AOP-005 concurrently with this procedure. JL

8.2.2 Procedural Steps (continued)

CAUTION

Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

3. **IF** more than one NORMAL SUPPLY FAN AH-15 ASA (BSB) is running, **THEN**:

   a. **STOP** one fan. JL

   b. **VERIFY** that the following associated A (B) train valves/dampers remain open for the running fan:

AH-15 IN CZ-D1 (CZ-D2)	SLB-5 (6)	JL
AH-15 DISCH CZ-25 (CZ-26)	SLB-5 (6)	JL
CONT RM NORMAL RECIRC DAMPER CZ-D69 SA (CZ-D70 SB)		JL

   c. **VERIFY** that the following associated A (B) train valves/dampers go closed for the stopped fan:

AH-15 IN CZ-D1 (CZ-D2)	SLB-5 (6)	JL
AH-15 DISCH CZ-25 (CZ-26)	SLB-5 (6)	JL
CONT RM NORMAL RECIRC DAMPER CZ-D69 SA (CZ-D70 SB)		JL

CAUTION

Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

4. **IF** more than one EMERGENCY FILTRATION FAN R-2 A-SA (B-SB) is running, **THEN**:

   a. **STOP** one fan. JL

   b. **VERIFY** the following associated A (B) train valves/dampers remain open for the running fan:

R2 INLET CZ-23 (CZ-24)	SLB-5 (6)	JL
R2 DISCH CZ-21 (CZ-22)	SLB-5 (6)	JL
EMERGENCY FILTRATION DISCHARGE 1CZ-19 SA (1CZ-20 SB)		JL

8.2.2 Procedural Steps (continued)

c. **VERIFY** the following associated ~~A~~ (B) train valves/dampers go closed for the stopped fan:

R2 INLET ~~CZ-23~~ (CZ-24) SLB-~~5~~ (6) JL

R2 DISCH ~~CZ-21~~ (CZ-22) SLB-~~5~~ (6) JL

EMERGENCY FILTRATION DISCHARGE ~~1CZ-19 SA~~ (1CZ-20 SB) JL

5. **SHUT** EMERGENCY FILTRATION RECIRC ~~CZ-D66 SA~~ (CZ-D61 SB) for the stopped R-2 Fan. JL

6. **IF** more than one EMERGENCY EXH FAN E-6 A-SA (~~B-SB~~) is running, **THEN PERFORM** the following at AEP-1:

CAUTION

Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

a. **STOP** one fan. JL

b. **VERIFY** EMERGENCY EXHAUST INLET ~~1AV-1 SA~~ (1AV-4 SB) SHUT. JL

c. **VERIFY** EMERGENCY EXHAUST OUTLET ~~1AV-2 SA~~ (1AV-5 SB) SHUT. JL

d. **LOG** fan operations in Attachments 4 and 5 of OP-172 as necessary. JL

NOTE: The following Step will regain the auto-closure capability on high radiation of all outside air intakes and should be performed prior to opening any intake, if necessary.

7. **IF** the Control Room Isolation was caused by a smoke detector, **THEN BYPASS** that detector in LFDCP-7 per OP-149 Section 8.13. N/A JL

8. **IF** a high radiation condition exists at the Control Room Air Intake, **THEN USE** AOP-005 concurrently with this procedure. JL

8.2.2 Procedural Steps (continued)

NOTE: Opening the EMERGENCY FILTRATION OUTSIDE AIR INLET in a timely manner will minimize habitability concerns for the number of people in the MCR when it is isolated. (Reference 2.6.4)

NOTE: The decision of which Control Room Emergency Outside Air Intakes should be used to supply air to the system is based on the event in progress which has made recirculation necessary.

- In an emergency situation such as toxic gas, wind direction may be of primary consideration.
- In the event of high radiation, The RM-23 for the following radiation monitors should be used to determine which Outside Air intake has the lowest radiation reading:

SOUTH INTAKE	NORTH INTAKE
RC-1CZ-3505A1-SA	RC-1CZ-3505A2-SA
RC-1CZ-3505B1-SB	RC-1CZ-3505B2-SB

- If the system is being placed into recirculation for maintenance reasons, either intake may be used.

NOTE: If, during the performance of this Section, MMT1011 (AMBIENT TEMPERATURE AVG) decreases by 20°F or more, or MMT1002 (BAROMETRIC PRESSURE AVG) increases by 0.5 in Hg or more, the correction factor in the following step would have to be re-determined. An increase in MMT1011, or a decrease in MMT1002 results in a more conservative calculation, so would not require re-determining the correction factor.

NOTE: If ERFIS is not available, data may be obtained using AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment.

NOTE EMERGENCY FILTRATION OUTSIDE AIR INLETS can be manually opened on loss of power. (Reference 2.3.6)

NOTE The intent of the following Step is to obtain a flow high enough to ensure MCR DP is greater than 0.125 INWG to ALL adjacent areas. However, it may not be necessary to obtain maximum flow conditions to obtain required DP. Care should be taken to avoid excessive DP across MCR boundary doors.

9. **PERFORM** the following to pressurize the control room to 0.125 INWG:

R a. Using the NOTE above, **DETERMINE** which of the below Control Room Emergency Outside Air Intakes should be used to supply outside air to the system: (Reference 2.3.1)

SOUTH / NORTH (circle one) _____

8.2.2 Procedural Steps (continued)

b. **DETERMINE** the correction factor as follows:

$$\frac{(17.714)\left(\frac{\text{MMT1002}}{\text{in Hg}}\right)}{\frac{\text{MMT1011}}{\text{F + 460}}} = \text{_____}$$

_____ Verified

c. **DETERMINE** Minimum Allowed Indicated flow as follows:

$$\frac{315 \text{ cfm}}{\text{Correction Factor (from Step 8.2.2.9.b)}} = \text{_____ cfm}$$

_____ Verified

d. **DETERMINE** Maximum Allowed Indicated flow as follows:

$$\frac{400 \text{ cfm}}{\text{Correction Factor (from Step 8.2.2.9.b)}} = \text{_____ cfm}$$

_____ Verified

e. **THROTTLE OPEN** one of the following EMER FILT OUTSIDE AIR INLET valve groups (determined in Step 8.2.2.9.a), to obtain flow between calculated values from Steps 8.2.2.9.c and 8.2.2.9.d, as indicated on FI-7817A SA (B SB). (Substep not performed is N/A):

(1) SOUTH, 1CZ-9 SA and 1CZ-10 SB. _____

(2) NORTH, 1CZ-11 SA and 1CZ-12 SB. _____

10. **ALIGN** the Plant Computer and Communications Rooms Ventilation for operation with a Control Room Isolation Signal per OP-163.01. _____

8.2. Aligning the Control Room Area HVAC System for Post Accident Operation

R (Reference 2.3.6)

CAUTION

In the event of a steam line break or following a high radiation signal, the Control Room Area HVAC System must be pressurized within 2-hours. (Ref. AP-045, Operator Time Critical Action Program)

NOTE: Actuation of CREFS places the system in the emergency mode (i.e. isolation with recirculation mode) of operation. Actuation of the system closes the unfiltered outside air intake and the unfiltered exhaust dampers, and aligns the system for recirculation of the air within the CRE through the redundant trains of HEPA and charcoal filters. The emergency mode also allows for pressurization and filtered ventilation of the air supply to the CRE. (Reference 2.2.3)

8.2.1. Initial Conditions

1. Control Room Area HVAC isolation has occurred. JL
2. Section 8.1.2 has been completed. JL

8.2.2. Procedural Steps

CAUTION

A Control Room Isolation System may be manually reset after 5 seconds on the MCB to reposition valves and dampers. If this is done and the original signal is still greater than the alarm setpoint, the Control Room Area HVAC System will not automatically re-isolate until the original signal goes below its setpoint and another actuation signal is received.

1. **PLACE** the following Control Room Isolation Signal Reset Switches to RESET:
   - CONTROL ROOM ISOL TRAIN A RESET JL
   - CONTROL ROOM ISOL TRAIN B RESET JL
2. **VERIFY** the following alarms have cleared:
   - ALB-030/1-1, Control Room Isolation Train A JL
   - ALB-030/2-1, Control Room Isolation Train B JL

CAUTION

Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

3. **IF** more than one NORMAL SUPPLY FAN AH-15 ASA (BSB) is running, **THEN**:

   a. **STOP** one fan. JL

   b. **VERIFY** that the following associated A (B) train valves/dampers remain open for the running fan:

      AH-15 IN CZ-D1 (CZ-D2) SLB-5 (6) JL

      AH-15 DISCH CZ-25 (CZ-26) SLB-5 (6) JL

      CONT RM NORMAL RECIRC DAMPER CZ-D69 SA (CZ-D70 SB) JL

   c. **VERIFY** that the following associated A (B) train valves/dampers go closed for the stopped fan:

      AH-15 IN CZ-D1 (CZ-D2) SLB-5 (6) JL

      AH-15 DISCH CZ-25 (CZ-26) SLB-5 (6) JL

      CONT RM NORMAL RECIRC DAMPER CZ-D69 SA (CZ-D70 SB) JL

CAUTION

Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

4. **IF** more than one EMERGENCY FILTRATION FAN R-2 A-SA (B-SB) is running, **THEN**:

   a. **STOP** one fan. JL

   b. **VERIFY** the following associated A (B) train valves/dampers remain open for the running fan:

      R2 INLET CZ-23 (CZ-24) SLB-5 (6) JL

      R2 DISCH CZ-21 (CZ-22) SLB-5 (6) JL

      EMERGENCY FILTRATION DISCHARGE 1CZ-19 SA (1CZ-20 SB) JL

8.2.2 Procedural Steps (continued)

c. **VERIFY** the following associated ~~A~~ (B) train valves/dampers go closed for the stopped fan:

R2 INLET ~~CZ-23~~ (CZ-24)	SLB-~~5~~ (6)	JL
R2 DISCH ~~CZ-21~~ (CZ-22)	SLB-~~5~~ (6)	JL
EMERGENCY FILTRATION DISCHARGE ~~1CZ-19 SA~~ (1CZ-20 SB)		JL

5. **SHUT** EMERGENCY FILTRATION RECIRC ~~CZ-D66 SA~~ (CZ-D61 SB) for the stopped R-2 Fan. JL

6. **IF** more than one EMERGENCY EXH FAN E-6 A-SA (~~B-SB~~) is running, **THEN PERFORM** the following at AEP-1:

CAUTION

Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

a. **STOP** one fan. JL

b. **VERIFY** EMERGENCY EXHAUST INLET ~~1AV-1 SA~~ (1AV-4 SB) SHUT. JL

c. **VERIFY** EMERGENCY EXHAUST OUTLET ~~1AV-2 SA~~ (1AV-5 SB) SHUT. JL

d. **LOG** fan operations in Attachments 4 and 5 of OP-172 as necessary. JL

NOTE: The following Step will regain the auto-closure capability on high radiation of all outside air intakes and should be performed prior to opening any intake, if necessary.

7. **IF** the Control Room Isolation was caused by a smoke detector, **THEN BYPASS** that detector in LFDCP-7 per OP-149 Section 8.13. N/A JL

8. **IF** a high radiation condition exists at the Control Room Air Intake, **THEN USE** AOP-005 concurrently with this procedure. JL

NOTE: Opening the EMERGENCY FILTRATION OUTSIDE AIR INLET in a timely manner will minimize habitability concerns for the number of people in the MCR when it is isolated. (Reference 2.6.4)

NOTE: The decision of which Control Room Emergency Outside Air Intakes should be used to supply air to the system is based on the event in progress which has made recirculation necessary.

- In an emergency situation such as toxic gas, wind direction may be of primary consideration.
- In the event of high radiation, The RM-23 for the following radiation monitors should be used to determine which Outside Air intake has the lowest radiation reading:

SOUTH INTAKE	NORTH INTAKE
RC-1CZ-3505A1-SA	RC-1CZ-3505A2-SA
RC-1CZ-3505B1-SB	RC-1CZ-3505B2-SB

- If the system is being placed into recirculation for maintenance reasons, either intake may be used.

NOTE: If, during the performance of this Section, MMT1011 (AMBIENT TEMPERATURE AVG) decreases by 20°F or more, or MMT1002 (BAROMETRIC PRESSURE AVG) increases by 0.5 in Hg or more, the correction factor in the following step would have to be re-determined. An increase in MMT1011, or a decrease in MMT1002 results in a more conservative calculation, so would not require re-determining the correction factor.

NOTE: If ERFIS is not available, data may be obtained using AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment.

NOTE EMERGENCY FILTRATION OUTSIDE AIR INLETS can be manually opened on loss of power. (Reference 2.3.6)

NOTE The intent of the following Step is to obtain a flow high enough to ensure MCR DP is greater than 0.125 INWG to ALL adjacent areas. However, it may not be necessary to obtain maximum flow conditions to obtain required DP. Care should be taken to avoid excessive DP across MCR boundary doors.

9. **PERFORM** the following to pressurize the control room to 0.125 INWG:

R a. Using the NOTE above, **DETERMINE** which of the below Control Room Emergency Outside Air Intakes should be used to supply outside air to the system: (Reference 2.3.1)

SOUTH / NORTH (circle one) _____

8.2.2 Procedural Steps (continued)

b. **DETERMINE** the correction factor as follows:

$$\frac{(17.714)\left(\frac{\text{MMT1002}}{\text{in Hg}}\right)}{\frac{\text{MMT1011}}{\text{F + 460}}} = \text{_____}$$

_____
Verified

c. **DETERMINE** Minimum Allowed Indicated flow as follows:

$$\frac{315 \text{ cfm}}{\text{Correction Factor (from Step 8.2.2.9.b)}} = \text{_____ cfm}$$

_____
Verified

d. **DETERMINE** Maximum Allowed Indicated flow as follows:

$$\frac{400 \text{ cfm}}{\text{Correction Factor (from Step 8.2.2.9.b)}} = \text{_____ cfm}$$

_____
Verified

e. **THROTTLE OPEN** one of the following EMER FILT OUTSIDE AIR INLET valve groups (determined in Step 8.2.2.9.a), to obtain flow between calculated values from Steps 8.2.2.9.c and 8.2.2.9.d, as indicated on FI-7817A SA (B SB). (Substep not performed is N/A):

(1) SOUTH, 1CZ-9 SA and 1CZ-10 SB. _____

(2) NORTH, 1CZ-11 SA and 1CZ-12 SB. _____

10. **ALIGN** the Plant Computer and Communications Rooms Ventilation for operation with a Control Room Isolation Signal per OP-163.01. _____

WORKSHEET

Facility:	Harris Nuclear Plant	Task No.:	119013H304
Task Title:	Using Valve Maps And Survey Maps Determine Stay Times For A Clearance	JPM No.:	2016 NRC Exam Admin JPM RO/SRO A-3

K/A Reference: G.2.3.4 RO 3.2 SRO 3.7

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: Actual Performance: X

Classroom X Simulator Plant

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	A plant shutdown IAW GP-006, Normal Plant Shutdown From Power Operation To Hot Standby (MODE 1 TO MODE 3) is in progress due to a fuel leak causing elevated RCS radiation readings. The Letdown demins are currently bypassed and unavailable. 1CS-167, VCT Outlet Check Valve gasket failed causing a body to bonnet leak that must be repaired for continued use of the VCT. Three operators are tasked to hang a clearance on 1CS-167. The clearance includes the following valves: • 1CS-165, VCT OUTLET LCV-115C • 1CS-166, VCT OUTLET LCV-115E • 1CS-321, Seal Water Return Isolation Valve to CSIP Suction • 1CS-793, ECCS Inner Vent Valve VCT Discharge Downstream 1CS-167 • 1CS-794, ECCS Outer Vent Valve VCT Discharge Downstream 1CS-167 Operator accumulated Whole Body dose for 2016 Operator 1 = 1640 mrem Operator 2 = 1600 mrem Operator 3 = 1580 mrem AND worked at the Surry Nuclear Plant this year from January through March where he has accumulated a whole body does of1540 mrem. In accordance with PD-RP-ALL-0001, the Radiation Protection Manager has authorized Operator 3 a dose extension to the limit that his signature authority is authorized to administer. The ALARA group has determined that additional shielding is not warranted for this work.

(Initiating Cue on next page)

Initiating Cue:	Using the supplied valve maps and survey map, determine the maximum allowable individual stay times for each Operator that would prevent exceeding the Duke Energy Annual Administrative dose limit while performing the clearance. Calculate individual stay times for the 3 operators. Do not consider dose received during transit. The calculated dose should be ONLY what they would receive while working at the valves for the clearance. Individual stay times for each Operator that would prevent exceeding the Duke Energy Annual Administrative dose limit plus the extension provided to Operator 3 while performing these activities. Complete the information below and return to the evaluator when complete.

Task Standard:	Calculation of stay times based on survey maps, 2 hours and 15 minutes for Operator 1, 2 hours and 30 minutes for Operator 2, 1 hour and 45 minutes for Operator 3.
Required Materials:	Survey map A78 RAB 261' Volume Control Tank Valve Gallery Map 23
General References:	PD-RP-ALL-0001, Radiation Worker Responsibilities, Rev 3 LIMIT = 2 rem but a Dose Extension individual limit up to 3.4 rem can be authorized by the Radiation Protection Manger - RPM (or designee).
Time Critical Task:	No
Validation Time:	15 minutes

Critical Task Justification	
Step 1	Must determine dose rates in order to calculate stay time
Step 2	Must determine available dose to determine stay time.
Step 3	IF incorrect calculation of stay time is made the individuals could exceed their dose limits.

START TIME: _____

Evaluator Note:	**The order of performance does not matter** **IF THE APPLICANT ASKS FOR IT: PD-RP-ALL-0001, Radiation Worker Responsibilities, Rev 3**

✓ **Performance Step: 1** Using Radiological Survey Record Map A78 and RAB 261' Volume Control Tank Valve Gallery Map 23, determines dose rates in the area where the clearance will be applied

Standard: Identifies that General Area Dose Rates are 160 mrem/hr

Comment:

✓ **Performance Step: 2** Determine the remaining dose for the year for each individual

Standard: Operator 1: **360 mrem**
2000 mrem - 1640 mrem = 360 mrem

Operator 2: **400 mrem**
2000 mrem - 1600 mrem = 400 mrem

Operator 3: **280 mrem**
3400 mrem - 1580 mrem (DEP) - 1540 mrem (Surry) = 280 mrem

Comment: **IAW PD-RP-ALL-001, Section 5.2.5 Dose Extension and Reduction, Rev. 3, page 18, the RPM is authorized to extend an individual's limit up to 3.4 rem (3400 mrem).**

✓ **Performance Step: 3** Determine stay time for each operator (based on 1st Operator reaching 2 Rem, the 2nd Operator reaching 2 Rem and the 3rd Operator reaching 3.4 Rem - for the year)

Standard:

Operator 1: **2 hours and 15 minutes**
360 mrem ÷ 160 mrem/hr = 2.25 hrs (2 hours and 15 minutes)

Operator 2: **2 hours and 30 minutes**
400 mrem ÷ 160 mrem/hr = 2.5 hrs (2 hours and 30 minutes)

Operator 3: **1 hour and 45 minutes**
280 mrem ÷ 160 mrem/hr = 1.75 hrs (1 hour and 45 minutes)

Comment:

Terminating Cue:	**After the stay time has been calculated, this JPM is complete.** **END OF JPM**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 NRC Exam Admin JPM SRO A-3 - Using Valve Maps And Survey Maps Determine Stay Times For A Clearance

PD-RP-ALL-0001 Rev. 3

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

JPM CUE SHEET

Initial Conditions:	A plant shutdown IAW GP-006, Normal Plant Shutdown From Power Operation To Hot Standby (MODE 1 TO MODE 3) is in progress due to a fuel leak causing elevated RCS radiation readings. The Letdown demins are currently bypassed and unavailable. 1CS-167, VCT Outlet Check Valve gasket failed causing a body to bonnet leak that must be repaired for continued use of the VCT. Three operators are tasked to hang a clearance on 1CS-167. The clearance includes the following valves: • 1CS-165, VCT OUTLET LCV-115C • 1CS-166, VCT OUTLET LCV-115E • 1CS-321, Seal Water Return Isolation Valve to CSIP Suction • 1CS-793, ECCS Inner Vent Valve VCT Discharge Downstream 1CS-167 • 1CS-794, ECCS Outer Vent Valve VCT Discharge Downstream 1CS-167 Operator accumulated Whole Body dose for 2016 Operator 1 = 1640 mrem Operator 2 = 1600 mrem Operator 3 = 1580 mrem AND worked at the Surry Nuclear Plant this year from January through March where he has accumulated a whole body does of1540 mrem. In accordance with PD-RP-ALL-0001, the Radiation Protection Manager has authorized Operator 3 a dose extension to the limit that his signature authority is authorized to administer. The ALARA group has determined that additional shielding is not warranted for this work.

Initiating Cue:	Using the supplied valve maps and survey map, determine the maximum allowable individual stay times for each Operator that would prevent exceeding the Duke Energy Annual Administrative dose limit while performing the clearance. Calculate individual stay times for the 3 operators. Do not consider dose received during transit. The calculated dose should be ONLY what they would receive while working at the valves for the clearance. Individual stay times for each Operator that would prevent exceeding the Duke Energy Annual Administrative dose limit plus the extension provided to Operator 3 while performing these activities. Complete the information below and return to the evaluator when complete.

Name: _____

Date: _____

Record the maximum allowable stay time calculations below to the nearest hour and minute.

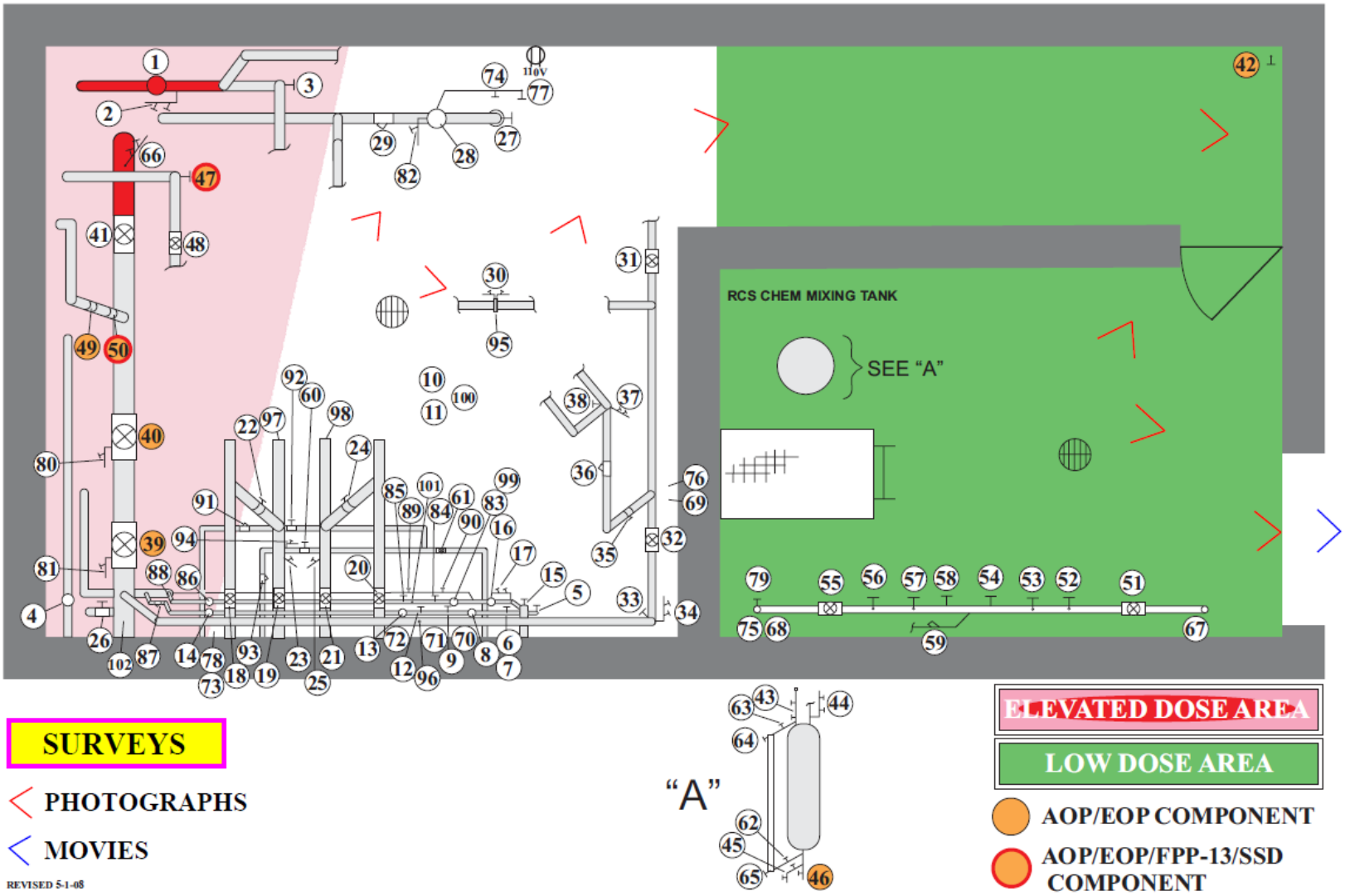
Operator 1: _____ Operator 2: _____ Operator 3: _____

RAB 261' VOLUME CONTROL TANK VALVE GALLERY

ITEM	DESCRIPTION	ELEV.(ft)	ITEM	DESCRIPTION	ELEV.(ft.)	ITEM	DESCRIPTION	ELEV.(ft.)	ITEM	DESCRIPTION	ELEV.(ft.)
1	1CS-123	4'	36	1CS-161	5'	72	1IA-0291-I09/I10	9'			
2	1CS-124/125	3'	37	1CS-162/163	4'	73	1IA-0291-I11/I12	5'			
3	1CS-126	5'	38	1CS-164	7'	74	1IA-0291-I13	2'			
4	1CS-127	8'	39	1CS-165	2'	75	1IA-1877	5'			
5	1CS-128	7'	40	1CS-166	2'	76	1IA-1878	2'			
6	1CS-129	8'	41	1CS-167	2'	77	1IA-1879	2'			
7	1CS-130	6'	42	1CS-265	3'	78	1IA-1880	4'			
8	1CS-131	5'	43	1CS-266/267	6'	79	1NI-39	6'			
9	1CS-132	6'	44	1CS-268/269	7'	80	1VL-1	2'			
10	1CS-132-HD1/HD2/	1'-3'	45	1CS-270/271	2'	81	1VL-2	2'			
	HI1/HV2		46	1CS-272	1'	82	1VL-3	2'			
11	1CS-132-HV1	7'	47	1CS-318	5'	83	1WG-1	2'			
12	1CS-133	6'	48	1CS-319	9'	84	1WG-2	2'			
13	1CS-134	1'	49	1CS-320	5'	85	1WG-3	2'			
14	1CS-135	5'	50	1CS-321	3'	86	1WG-4	2'			
15	1CS-136	6'	51	1CS-322	3'	87	1WG-5	2'			
16	1CS-137	2'	52	1CS-323	3'	88	1WG-6	1'			
17	1CS-138/139	1'	53	1CS-324/325	4'	89	1WG-7	1'			
18	1CS-140	9'	54	1CS-326	3'	90	1WG-8	1'			
19	1CS-141	4'	55	1CS-327	3'	91	3WG-138	1'			
20	1CS-142	9'	56	1CS-328	3'	92	3WG-139	1'			
21	1CS-143	4'	57	1CS-329/330	4'	93	3WG-238	2'			
22	1CS-144	5'	58	1CS-331	3'	94	3WG-430/431	1'			
23	1CS-145	3'	59	1CS-332	1'	95	FE-01CS-0114SW	12'			
24	1CS-146	5'	60	1CS-333	1'	96	I/P-01WG-6350	4'			
25	1CS-147	3'	61	1CS-334	1'	97	LT-01CS-0112SW	4'/9'			
26	1CS-148	2'	62	1CS-781	2'	98	LT-01CS-0115SW	4'/9'			
27	1CS-150	2'	63	1CS-782	5'	99	PC-21WG-1022W	2'			
28	1CS-151	3'	64	1CS-790	5'	100	PI-01CS-7540S	4'			
29	1CS-152	3'	65	1CS-791	2'	101	PI-01WG-1094W	3'			
30	1CS-153/154	12'	66	1CS-793/794	1'	102	TE-01CS-0116W	2'			
31	1CS-155	3'	67	1IA-291-I01	6'						
32	1CS-156	3'	68	1IA-291-I02	6'						
33	1CS-157	4'	69	1IA-0291-I04/I5	4'					REVISED 5-1-08	
34	1CS-158/159	2'	70	1IA-0291-I06	9'					AOP/EOP COMPONENT	
35	1CS-160	4'	71	1IA-0291-I07/I8	9'					AOP/EOP/FPP-13/SSD COMPNT	

MAP 23

RAB 261' VCT VALVE GALLERY

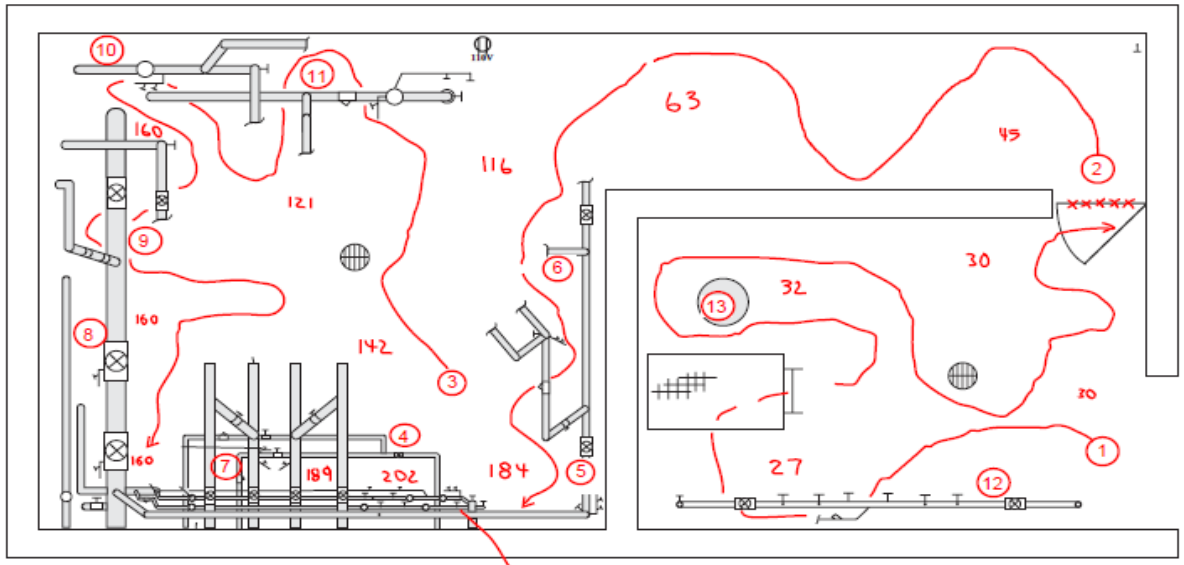


Map A78

RADIOLOGICAL SURVEY RECORD

Page 1 of 1

Unit 1	Bldg/Elev: RAB 261'	Area: VCT Valve Gallery	Date: 7-14-16	Time: 1201	RWP # 5859	Survey # 0507-002
Component: ICS-167		Work Description: Valve Repairs				
Surveyor: Michael Gully		Signature: Michael Gully		Reviewed by: Ronald Jones		7-14-16
Comments: N/A						



#	dpm/100cm²	Location
1-3	<1K/M	Floor
4-12	<1K	Valves/pipes
13	↓	Mixing Tank

% Power 0%

RA	Radiation Area	β	Beta Dose Rate
HRA	High Radiation Area	η	Neutron Dose Rate
LHRA	Locked HighRadiation Area	R	Rem/hour
VHRA	Very High Radiation Area	XXXX	Boundary
ARA	Airborne Radiation Area	○	Smear Location
CA	Contamination Area	△	Air Sample Location
RMA	Radioactive Materials Area	K	1000

Dose Rates in mrem/hr unless otherwise noted M Massilin

Air Activity

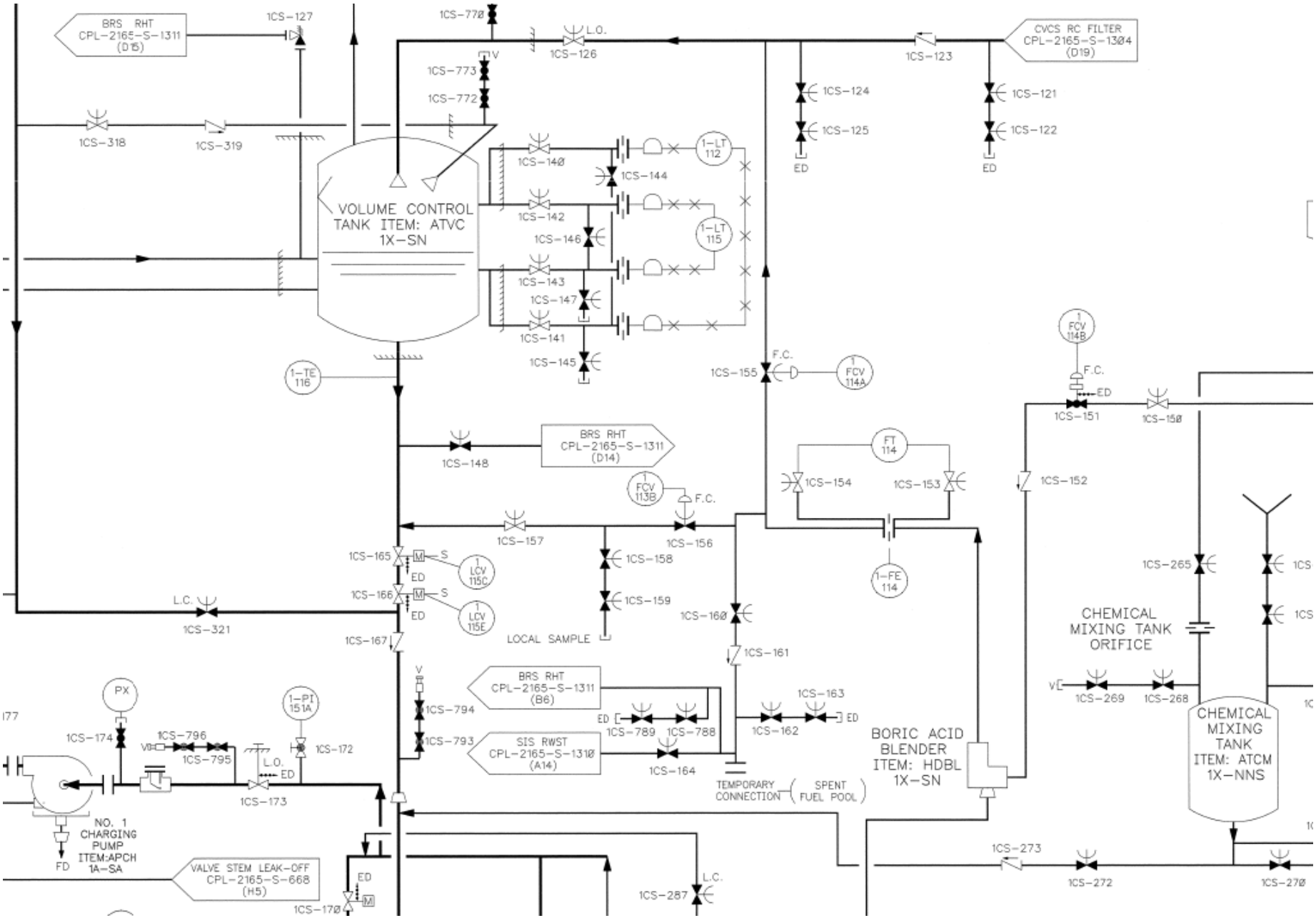
No. ___ DAC N/A % Activity ___ uCi/cc

No. ___ DAC ___ % Activity ___ uCi/cc

No. ___ DAC ___ % Activity ___ uCi/cc

Instrument	Serial No./UTC
RO-2	778026
L-177	1219688
N	
A	

QA Record


BRS RHT CPL-2165-S-1311 (D15)
1CS-127
1CS-770
L.O.
1CS-126
1CS-123
CVCS RC FILTER CPL-2165-S-1304 (D19)
1CS-773
1CS-772
1CS-124
1CS-125
1CS-121
1CS-122
ED
1CS-318
1CS-319
1CS-140
1CS-144
1-LT 112
VOLUME CONTROL TANK ITEM: ATVC 1X-SN
1CS-142
1CS-146
1-LT 115
1CS-143
1CS-147
1CS-141
1CS-145
1-TE 116
F.C.
1CS-155
1 FCV 114A
1 FCV 114B
1CS-151
1CS-150
BRS RHT CPL-2165-S-1311 (D14)
1CS-148
FT 114
1CS-154
1CS-153
1CS-152
1 FCV 113B
1CS-157
1CS-156
1CS-165
1CS-166
1 LCV 115C
1 LCV 115E
1CS-158
1CS-159
1-FE 114
1CS-265
1CS-160
1CS-161
L.C.
1CS-321
LOCAL SAMPLE
CHEMICAL MIXING TANK ORIFICE
1CS-269
1CS-268
1CS-167
BRS RHT CPL-2165-S-1311 (B6)
1CS-794
1CS-793
1CS-789
1CS-788
1CS-163
1CS-162
SIS RWST CPL-2165-S-1310 (A14)
1CS-164
PX
1-PI 151A
1CS-174
1CS-796
1CS-795
1CS-172
L.O.
1CS-173
TEMPORARY CONNECTION
SPENT FUEL POOL
BORIC ACID BLENDER ITEM: HDBL 1X-SN
CHEMICAL MIXING TANK ITEM: ATCM 1X-NNS
NO. 1 CHARGING PUMP ITEM:APCH 1A-SA
FD
VALVE STEM LEAK-OFF CPL-2165-S-668 (H5)
1CS-170
1CS-287
1CS-273
1CS-272
1CS-270

`Facility:	Harris Nuclear Plant	Task No.:	345001H602
Task Title:	Classify an Event	JPM No.:	2016 NRC Exam Admin JPM SRO A4
K/A Reference:	G2.4.41 RO 2.9 SRO 4.6	**Alternate Path - NO**	

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE: I will explain the initial conditions, which steps to simulate, discuss or perform, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	**This is a TIME CRITICAL JPM** Given the following plant conditions: At 1158 • The unit is operating at 100% power • A-SA EDG is under clearance The following occurs at 1159: • A Loss of Offsite power • Several Reactor First Out Annunciators are received but the Reactor remains at Power • The OATC attempts to trip the Reactor from the MCB but neither Reactor Trip switch functions • FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS, is entered and an Operator is dispatched to trip the Reactor locally • The Turbine is tripped from the MCB • Reactor power is ~ 12% At 1214: • The Turbine Building Operator has opened the Reactor trip breakers • RCS pressure rapidly decreased causing an automatic Safety Injection • The Outside Operator reports that the 'A' UAT is on fire The time is now 1233: • The 'A' UAT fire is extinguished
Initiating Cue:	Evaluate the EAL Matrix and determine the **HIGHEST** classification required for these plant conditions. **NOTE: DO NOT use SEC judgment.** Write out the **HIGHEST** EAL classification and the EAL identifier in the blanks provided then return your assessment page to the Evaluator.

Task Standard: Classify the highest EAL as an Site Area Emergency SS3.1.

Required Materials: None

General References: PEP-110 EAL Matrix
PEP-110 Rev. 25
EP-EAL (allowed reference) Rev. 16

Handouts:
- Attached Initial Conditions
- PEP-110 Rev. 25
- PEP-110 EAL Matrix
- EP-EAL Rev. 16

Time Critical Task: **YES – 15 minutes for classification.**

Validation Time: 15 minutes for classification

CRITICAL STEP JUSTIFICATION	
Step 2	Classification of the event is critical for determining State and County notifications, public information notices, site information notices, and event reportability to the Nuclear Regulatory Commission.

Evaluator Cue:	**Start Time for this portion of JPM begins when the individual has been briefed.**

START TIME: _____

Performance Step: 1 OBTAINS EP-EAL and EAL Matrix.

Standard : Obtains EP-EAL and EAL Matrix

Comments:

✓ **Performance Step: 2** Identify EAL Classification for events in progress.

Standard : There are 3 possible classifications for these conditions:

Two lower level classifications:

HU2.1 Unusual Event

Fire **not** extinguished within 15 min. of Control Room notification or verification of a Control Room fire alarm in **any** Table H-1 area

HA2.1 Alert – does not apply since the UAT is NOT a safety related component

SA1.1 Alert (A-EDG under clearance with LOOP)
AC power capability to 6.9 KV emergency buses 1A-SA and 1B-SB reduced to a single power source for ≥ 15 min.
AND

Any additional single power source failure will result in station blackout

The **HIGHEST** EAL classification is: **Site Area Emergency**

The EAL identifier is: **SS3.1**

An automatic trip failed to shut down the reactor
AND

Manual actions taken at the reactor control console (actuation of MCB Reactor Trip Switch #1, #2 or MCB Turbine Trip switch) do **not** shut down the reactor as indicated by reactor power ≥ 5%

Examiners Cue:	**Collect the candidates classification page.** **After the candidate returns this JPM classification.** **END of JPM.**

STOP TIME: _____

Emergency Action Levels

Attachment 1 – Emergency Action Level Technical Bases

Category: S – System Malfunction

Subcategory: 3 – Criticality & RPS Failure

Initiating Condition: Automatic trip fails to shut down the reactor and manual actions taken from the reactor control console are **not** successful in shutting down the reactor

EAL:

SS3.1 Site Area Emergency

An automatic trip failed to shut down the reactor

AND

Manual actions taken at the reactor control console (actuation of MCB Reactor Trip Switch #1, #2 or MCB Turbine Trip switch) do **not** shut down the reactor as indicated by reactor power ≥ 5%

Mode Applicability:

1 - Power Operation

Basis:

Generic

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual scram (trip) actions taken at the reactor control console are any set of actions by the reactor operator(s) at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual trip actions are not considered successful if action away from the reactor control console is required to trip the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Plant-Specific

A reactor trip is automatically initiated by the Reactor Protection System (RPS) when certain continuously monitored parameters exceed predetermined setpoints. The following are symptoms that require a reactor trip (ref. 1):

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 NRC Exam Admin JPM SRO A4

Classify an Event
PEP-110 and EP-EAL

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	**This is a TIME CRITICAL JPM** Given the following plant conditions: At 1158 • The unit is operating at 100% power • A-SA EDG is under clearance The following occurs at 1159: • A Loss of Offsite power • Several Reactor First Out Annunciators are received but the Reactor remains at Power • The OATC attempts to trip the Reactor from the MCB but neither Reactor Trip switch functions • FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS, is entered and an Operator is dispatched to trip the Reactor locally • The Turbine is tripped from the MCB • Reactor power is ~ 12% At 1214: • The Turbine Building Operator has opened the Reactor trip breakers • RCS pressure rapidly decreased causing an automatic Safety Injection • The Outside Operator reports that the 'A' UAT is on fire The time is now 1233: • The 'A' UAT fire is extinguished

Initiating Cue:	Evaluate the EAL Matrix and determine the **HIGHEST** classification required for these plant conditions. **NOTE: DO NOT use SEC judgment.** Write out the **HIGHEST** EAL classification and the EAL identifier in the blanks provided then return your assessment page to the Evaluator.

Name: _____

Date: _____

Highest EAL Classification for the plant conditions: _____

EAL Identifier: _____

Facility: Harris Nuclear Plant Task No.: 061003H104

Task Title: Shift AFW Pump Suction Locally JPM No.: 2016 HNP NRC Exam In-Plant JPM i

K/A Reference: 061 K4.01 4.1 RO 4.2 SRO ALTERNATE PATH - NO

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: X Actual Performance: _____

Classroom _____ Simulator _____ Plant X

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	A LOCA has occurred and EOP-ES-1.2, Post-LOCA Cooldown and Depressurization, is being performed. AFW Pumps A-SA and B-SB are being used to maintain SG levels. Makeup to the CST cannot be established and CST level is lowering. MCC's 1A35-SA and 1B35-SB are deenergized.

Initiating Cue:	• CST level has decreased to 9%. • The CRS has directed you to locally align ESW to A-SA MD AFW pump IAW OP-137 Section 8.1. • The "A" ESW header is in service. • Steps 8.1.2.1.a – f have been completed by the MCR. • You are to start at step 8.1.2.1.g and continue

Evaluator Note:	**At this time provide the candidate with a copy of OP-137 Section 8.1**

Evaluator Note: Expect that the entry and exit from the RCA and take a minute on location of the JPM will add time for completion of this JPM.

Task Standard: AFW Pump B-SB suction is aligned to ESW.

Required Materials: OP-137 Section 8.1

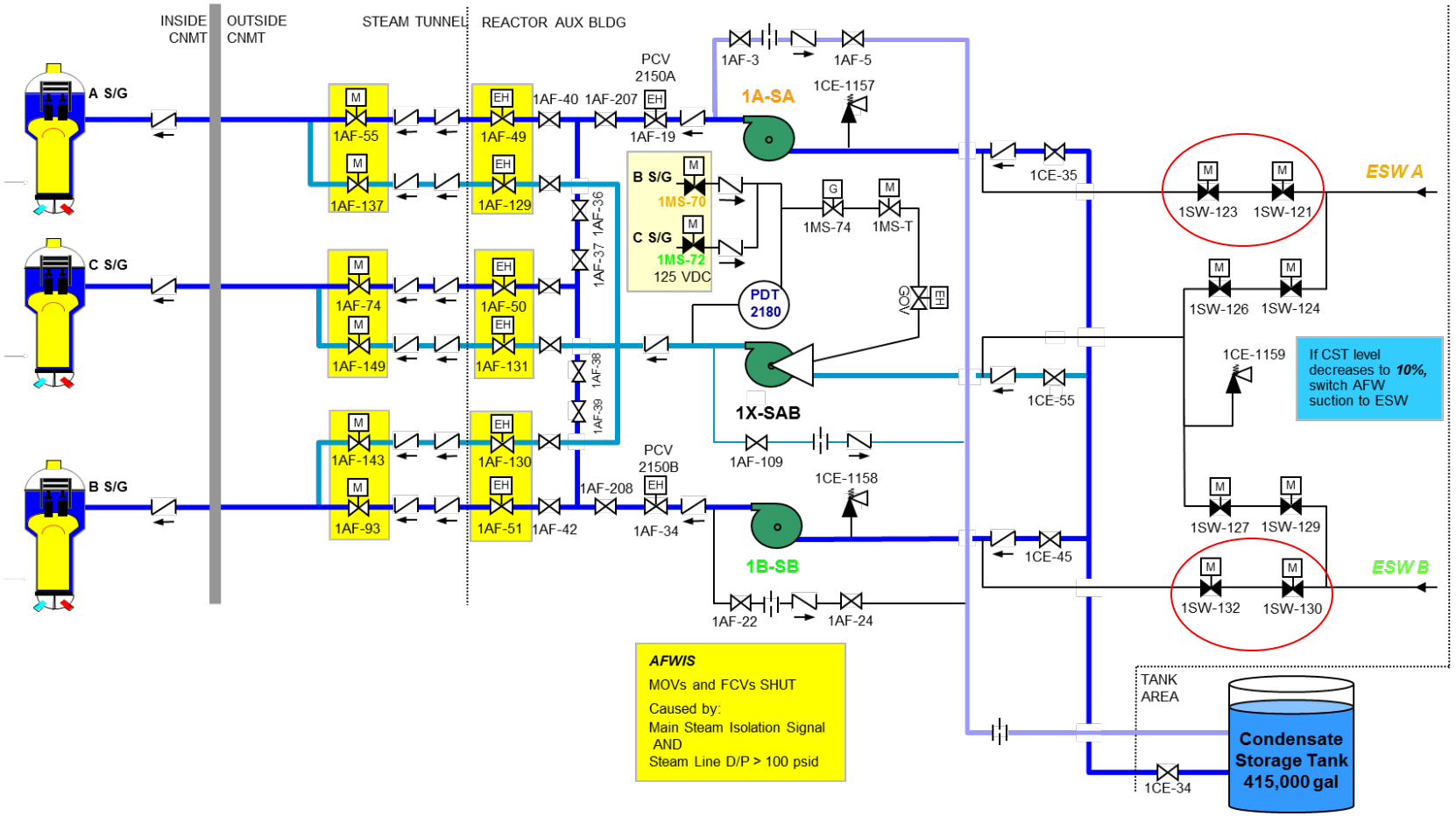
General References: OP-137 Section 8.1 Rev. 42

Time Critical Task: No

Validation Time: 15 minutes

Critical Task Justification	
Step 6	Required to be repositioned to establish a flow path from the ESW header in order to maintain the AFW system a functional heatsink
Step 7	Required to be repositioned to establish a flow path from the ESW header in order to maintain the AFW system a functional heatsink

Simplified AFW suction layout



BEFORE YOU START THIS JPM

INPLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAY BE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the candidate have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Maintain 6" from touching any equipment during the JPM.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

NOTE:	Add one minute for Take a Minute Core 4 checks.

START TIME: _____

OP-137 Section 8.1.1 Initial Conditions

Performance Step: 1

1. Condensate storage tank unavailable or level < 10%
2. Service Water System in operation per OP-139

Standard: Reviews initial conditions and initials completion
(Initial conditions were met with the initiating cues)

Comment:

'A' MDAFW Pump
OP-137 Section 8.1 Step 1.g

Performance Step: 2 SHUT 1SW-122, AFWP 1A SW Drain Isol.

Standard: Locates 1SW-122, and demonstrates shutting valve.

Evaluator Cue:	1SW-122 handwheel has rotated in the clockwise direction and the valve stem has come to a hard stop.

Comment:

Evaluator Note:	To engage the handwheels for the Service Water MOV's, the operator must turn the small handle (UNDER the body of 1SW-121 and on the side of 1SW-123). The valve handwheel will NOT be engaged and the valve will NOT open unless the small handle is turned to engage. Valve position indication is located on the top of the valve next to the wall. The operator should check this indication to ensure the valve has OPENED.

OP-137 Section 8.1 Step 1.h

Performance Step: 3 OPEN 1SW-121SA, SW HEADER A TO AUX FW MOTOR PMP A-SA.

Standard: Locates 1SW-121, engages handwheel, and opens valve.

Evaluator Cue:	**(NOTE: You can cue them by the position arrow IF they are checking the position with the arrow.)** **CUE: (If handwheel is properly engaged) 1SW-121 handwheel has rotated in the counter clockwise direction and has come to a hard stop.** **If the device to engage the handwheel is NOT turned then** **CUE: 1SW-121 handwheel has rotated in the counter clockwise direction and the handwheel spins freely.** **(provide the cue for when the handwheel is properly engaged when the candidate engages the handwheel first)**

Comment:

OP-137 Section 8.1 Step 1.i

Performance Step: 4 OPEN 1SW-123SA, SW HEADER A TO AUX FW MOTOR PMP A-SA.

Standard: Locates 1SW-123, engages handwheel, and attempts to open the valve.

Evaluator Cue:	**CUE: The handwheel will not turn, the valve is mechanically bound.** **(NOTE: You can cue them by the position arrow IF they are checking the position with the arrow.)** **The arrow is still pointing to "closed" - "shut".**

Standard: Contacts MCR and informs them 1SW-123 will not open.

Evaluator Cue: **MCR acknowledges 1SW-123 will not open. The MCR is directing you to return to 1SW-121 and shut 1SW-121. Contact the MCR after 1SW-121 is shut for additional directions.**

Standard: Returns to 1SW-121, turns the handwheel and shuts 1SW-121.

Evaluator Cue: **(NOTE: They may engage the handwheel by using the clutch. This is not necessary but there is no harm in doing so. You can also cue them by the position arrow IF they are checking the position with the arrow.)**

CUE: (After the handwheel is positioned) 1SW-121 handwheel has rotated in the clockwise direction and has come to a hard stop.

Standard: Contacts MCR and informs them 1SW-121 has been shut.

Evaluator Cue:	**Acknowledge report of 1SW-121 closure.** **State: Using Time Compression** **The MCR operators have now reopened the 'A' Train Containment Fan Cooler Service Water isolation valves and isolated the 'B' Train Containment Fan Cooler Service Water Isolation valves.** **Section 8.1.2 steps 2.a – f have been completed. You are being directed to continue with section 8.1.2.2 steps g, h and i to align Service Water to supply AFW pump 1B-SB from ESW header 'B'. Call the MCR when these steps are completed.**

Standard: Repeats back communications

Evaluator Cue:	**Complete third leg of communication:** **IF commination is repeated back correct then cue:** **"That's correct"** **OR re-read directions until communications are correct.**

Comment:

'B' MDAFW Pump alignment
OP-137 Section 8.1 Step 2.g

Performance Step: 5 SHUT 1SW-131, AFWP 1B SW Drain Isol.

Standard: Locates 1SW-131, and demonstrates shutting valve.

Evaluator Cue:	**1SW-131 handwheel has rotated in the clockwise direction and the valve stem has come to a hard stop.**

Comment:

Examiners Note:	To engage the handwheels for the Service Water MOV's the operator must turn the small handle (UNDER the body of 1SW-130 and on the side of 1SW-132). The valve handwheel will NOT be engaged and the valve will NOT open unless the small handle is turned to engage. Valve position indication is located on the top of the valve next to the wall. The operator should check this indication to ensure the valve has OPENED.

OP-137 Section 8.1 Step 2.h

Performance Step: 6 OPEN 1SW-130SB, SW HEADER B TO AUX FW MOTOR PMP B-SB.

✓ **Standard:** Locates 1SW-130, engages handwheel, and opens valve.

Evaluator Cue:	**(NOTE: You can cue them by the position arrow IF they are checking the position with the arrow.)** **CUE:(If handwheel is properly engaged) 1SW-130 handwheel has rotated in the counter clockwise direction and has come to a hard stop.** **If the device to engage the handwheel is NOT turned then** **CUE: 1SW-130 handwheel has rotated in the counter clockwise direction and the handwheel spins freely.** **(provide the cue for when the handwheel is properly engaged when the candidate engages the handwheel first)**

Comment:

OP-137 Section 8.1 Step 2.i

Performance Step: 7 OPEN 1SW-132SB, SW HEADER B TO AUX FW MOTOR PMP B-SB.

✓ **Standard:** Locates 1SW-132, engages handwheel, and opens valve.

Evaluator Cue:	**(NOTE: You can cue them by the position arrow IF they are checking the position with the arrow.)** **CUE:(If handwheel is properly engaged) 1SW-132 handwheel has rotated in the counter clockwise direction and has come to a hard stop.** **If the device to engage the handwheel is NOT turned then** **CUE: 1SW-132 handwheel has rotated in the counter clockwise direction and the handwheel spins freely.** **(provide the cue for when the handwheel is properly engaged when the candidate engages the handwheel first)**

Comment:

OP-137 Section 8.1 Step 2.j

Performance Step: 8 MONITOR AFW system parameters to ensure proper operation.

Standard: Notifies Control Room ESW is aligned to MDAFW Pump 1B-SB and to monitor for proper operation.

Evaluator Cue:	**Control Room acknowledges that ESW is aligned to AFW Pump 1B-SB.** **Evaluation on this JPM is complete.** **END OF JPM**

Comment:

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 HNP NRC Exam In-Plant JPM i

Shift AFW Pump Suction Locally IAW OP-137

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

BEFORE YOU START THIS JPM

INPLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAYBE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the examiner have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Maintain 6" from touching any equipment during the JPM.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

Initial Conditions:	A LOCA has occurred and EOP-ES-1.2, Post-LOCA Cooldown and Depressurization, is being performed. AFW Pumps A-SA and B-SB are being used to maintain SG levels. Makeup to the CST cannot be established and CST level is lowering. MCC's 1A35-SA and 1B35-SB are deenergized.

Initiating Cue:	• CST level has decreased to 9%. • The MCR has directed you to locally align ESW to A-SA MD AFW pump IAW OP-137 Section 8.1. • The "A" ESW header is in service. • Steps 8.1.2.1.a – f have been completed by the MCR. • You are to start at step 8.1.2.1.g and continue

8.0 INFREQUENT OPERATIONS

8.1. Using Emergency Service Water System as a Backup Source of Water to Auxiliary Feedwater System

8.1.1. Initial Conditions

1. Condensate storage tank unavailable or level less than 10%. (Reference 2.3.2) _____
2. Service Water System in operation per OP-139. _____

8.1.2. Procedural Steps

CAUTION

The Emergency Service Water System serves as a backup source of water to the Auxiliary Feedwater System if the Condensate Storage Tank volume is exhausted or unavailable. Since the Emergency Service Water System uses raw reservoir water, it is only used in extreme emergencies.

CAUTION

Isolating Service Water to the Containment Fan Coolers will make the Coolers inoperable, therefore only one Train of ESW should be aligned to the suction of the AFW pumps unless a determination has been made on the desirability of making both Trains of Containment Fan Coolers inoperable.

1. To supply AFW pump 1A-SA from ESW Header A, **PERFORM** the following:
   a. **DECLARE** A Train Containment Fan Coolers inoperable. _____
   b. **VERIFY** A Train Containment Fan Coolers are secured per OP-169. _____
   c. **SHUT** 1SW-92 SA, CNMT FAN COOLER AH-3 INLET. _____
   d. **SHUT** 1SW-97 SA, CNMT FAN COOLER AH-3 OUTLET. _____
   e. **SHUT** 1SW-91 SA, CNMT FAN COOLER AH-2 INLET. _____
   f. **SHUT** 1SW-109 SA, CNMT FAN COOLER AH-2 OUTLET. _____
   g. **SHUT** 1SW-122, AFWP 1A SW Drain Isol. _____
   h. **OPEN** 1SW-121SA, SW HEADER A TO AUX FW MOTOR PMP A-SA. _____
   i. **OPEN** 1SW-123SA, SW HEADER A TO AUX FW MOTOR PMP A-SA. _____
   j. **MONITOR** AFW system parameters to ensure proper operation. _____

8.1.2 Procedural Steps (continued)

2. To supply AFW pump 1B-SB from ESW Header B, **PERFORM** the following:

   a. **DECLARE** B TRAIN Containment Fan Coolers inoperable. _____

   b. **VERIFY** B Train Containment Fan Coolers are secured per OP-169. _____

   c. **SHUT** 1SW-227 SB, CNMT FAN COOLER AH-4 INLET. _____

   d. **SHUT** 1SW-110 SB, CNMT FAN COOLER AH-4 OUTLET. _____

   e. **SHUT** 1SW-225 SB, CNMT FAN COOLER AH-1 INLET. _____

   f. **SHUT** 1SW-98 SB, CNMT FAN COOLER AH-1 OUTLET. _____

   g. **SHUT** 1SW-131, AFWP 1B SW Drain Isol. _____

   h. **OPEN** 1SW-130SB, SW HEADER B TO AUX FW MOTOR PMP B-SB. _____

   i. **OPEN** 1SW-132SB, SW HEADER B TO AUX FW MOTOR PMP B-SB. _____

   j. **MONITOR** AFW system parameters to ensure proper operation. _____

CAUTION

Do **NOT** cross tie the ESW trains together via the TDAFW pump suction supply from ESW. Crosstie is prevented by performing only Step 8.1.2.3 **OR** 8.1.2.4.

3. To supply AFW pump 1X-SAB from ESW Header A, **PERFORM** the following:

   a. **DECLARE** A Train Containment Fan Coolers inoperable. _____

   b. **VERIFY** A Train Containment Fan Coolers are secured per OP-169. _____

   c. **VERIFY SHUT** 1SW-92 SA, CNMT FAN COOLER AH-3 INLET. _____

   d. **VERIFY SHUT** 1SW-97 SA, CNMT FAN COOLER AH-3 OUTLET. _____

   e. **VERIFY SHUT** 1SW-91 SA, CNMT FAN COOLER AH-2 INLET. _____

   f. **VERIFY SHUT** 1SW-109 SA, CNMT FAN COOLER AH-2 OUTLET. _____

   g. **SHUT** 1SW-125, AFWP 1X SW Header A Drain Isol. _____

8.1.2 Procedural Steps (continued)

h. **OPEN** 1SW-124SA, SW HEADER A TO AUX FW TURBINE PMP. _____

i. **OPEN** 1SW-126SA, SW HEADER A TO AUX FW TURBINE PMP. _____

j. **MONITOR** AFW system to ensure proper operation. _____

4. To supply AFW pump 1X-SAB, from ESW Header B, **PERFORM** the following:

a. **DECLARE** B Train Containment Fan Coolers inoperable. _____

b. **VERIFY** B Train Containment Fan Coolers are secured per OP-169. _____

c. **VERIFY SHUT** 1SW-227 SB, CNMT FAN COOLER AH-4 INLET. _____

d. **VERIFY SHUT** 1SW-110 SB, CNMT FAN COOLER AH-4 OUTLET. _____

e. **VERIFY SHUT** 1SW-225 SB, CNMT FAN COOLER AH-1 INLET. _____

f. **VERIFY SHUT** 1SW-98 SB, CNMT FAN COOLER AH-1 OUTLET. _____

g. **SHUT** 1SW-128, AFWP 1X SW Header B Drain Isol. _____

h. **OPEN** 1SW-127SB, SW HEADER B TO AUX FW TURBINE PMP. _____

i. **OPEN** 1SW-129SB, SW HEADER B TO AUX FW TURBINE PMP. _____

j. **MONITOR** AFW system to ensure proper operation. _____

Facility:	Harris Nuclear Plant	Task No.:	301089H401
Task Title:	Place a UPS Instrument Bus On Bypass Power and Shutdown the Associated Inverter	JPM No.:	2016 HNP NRC Exam In-Plant JPM j
K/A Reference:	062 A1.03 RO 2.5 SRO 2.8		ALTERNATE PATH - NO
Examinee:	_____	NRC Examiner:	_____
Facility Evaluator:	_____	Date:	_____

Method of testing:

Simulated Performance: X Actual Performance: _____

Classroom _____ Simulator _____ Plant X

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	The plant is in Mode 3. Maintenance has requested that UPS Inverter SIV be placed on bypass power source and that the Inverter be shutdown in order to inspect the high resistance contacts.

Initiating Cue:	The CRS has directed you to align UPS Instrument Channel IV to its Bypass power supply, and shutdown inverter SIV, in accordance with OP-156.02, AC Electrical Distribution, Section 8.33. Contact the MCR when you have the Inverter on the Bypass power source and the Inverter is shutdown.

DO NOT READ TO CANDIDATE Examiner:	Provide the candidate with a copy of OP-156.02 Section 8.33. Allow them a few minutes for a procedure / pre-job review. The start time will begin when the candidate is at the Inverter.

Task Standard: Instrument Bus SIV is powered from the Bypass power supply and the inverter is shutdown.

Required Materials: OP-156.02, AC Electrical Distribution, Section 8.33

General References: AOP-024, Loss of Uninterruptible Power Supply Rev. 56
OP-156.02, AC Electrical Distribution, Section 8.33 Rev. 141

Time Critical Task: No

Validation Time: 5 minutes

Critical Task Justification	
Step 3	Critical to depress the bypass to load pushbutton otherwise you would be unable to place the place the UPS Instrument Bus on bypass power and shutdown the associated inverter in accordance with plant procedures.
Step 4	Critical to place the manual bypass switch to the bypass to load positions otherwise you would be unable to place the place the UPS Instrument Bus on bypass power and shutdown the associated inverter in accordance with plant procedures.
Step 5	Critical to open the inverter output circuit breaker switch otherwise you would be unable to place the place the UPS Instrument Bus on bypass power and shutdown the associated inverter in accordance with plant procedures..
Step 6	Critical to open the battery input circuit breaker otherwise you would be unable to place the place the UPS Instrument Bus on bypass power and shutdown the associated inverter in accordance with plant procedures.
Step 7	Critical to open the rectifier AC input circuit breaker otherwise you would be unable to place the place the UPS Instrument Bus on bypass power and shutdown the associated inverter in accordance with plant procedures..
Step 8	Critical to open the bypass source AC input circuit breaker otherwise you would be unable to place the place the UPS Instrument Bus on bypass power and shutdown the associated inverter in accordance with plant procedures.

BEFORE YOU START THIS JPM

INPLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAY BE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the candidate have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Maintain 6" from touching any equipment during the JPM.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

NOTE:	Add one minute for Take a Minute Core 4 checks.

START TIME: _____

Performance Step: 1 **OP-156.02 Section 8.33, NOTE Prior to step 1**

NOTE: When aligned to the Manual Bypass:
• Tech Spec 3.8.3.1 ACTION c applies. (Modes 1, 2, 3, and 4)
• Tech Spec 3.8.3.2 ACTION applies. (Modes 5 an 6)

Initial Conditions:
1. It is desired to place an inverter on its bypass source.

OR

2. An inverter is on its bypass source and normal operation is desired.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Initials condition 1 and N/A's condition 2

Evaluator Note:	**IF the candidate calls the MCR CRS about the Tech Spec implication found in the NOTE prior to the Initial Conditions then acknowledge the information.** **Initial conditions: The initiating conditions were to place the inverter on its bypass source.**

Comment:

OP-156.02 Section 8.33, Step 1

Performance Step: 2 To place the inverter on the bypass source, PERFORM the following:
a. VERIFY the IN SYNC light is lit.

Standard: Identifies the IN SYNC light and verifies it is lit

Evaluator Cue:	**The IN SYNC light is lit**

Comment:

Evaluator Note:

Note: The procedure step below reads "Bypass to Load" and the label for the switch reads "Inverter bypass Source To Load". The critical step is to depress the pushbutton. A non –critical action is to STOP and review the mismatch with by contacting the CRS prior to proceeding. There will be a PRR written against this discrepancy at the conclusion of the exam. The step is considered a "soft match".

See page 8 for more details.

The candidate may stop and contact MCR for the label mismatch. IF so then cue that this has been identified and although the labeling is a soft match it has been verified as correct and you may continue.

OP-156.02 Section 8.33, Step 1 continued

✓ **Performance Step: 3** b. DEPRESS the Bypass to Load pushbutton.

Standard: Locates the Bypass to Load pushbutton and depresses the pushbutton (may simulate lifting plastic button cover).

Evaluator Cue:	**The Bypass to Load pushbutton has been depressed.** **The "Bypass Source Supplying Load" amber light turned on and the "Inverter Supplying Load" green light goes off.**

Comment:

OP-156.02 Section 8.33, Step 1 continued

✓ **Performance Step: 4**

c. TRANSFER Manual Bypass Switch to BYPASS TO LOAD position

Standard: Locates the transfer switch and places the manual Bypass switch to the BYPASS TO LOAD position (turns switch to right). May simulate lifting plexiglass cover for these steps.

Evaluator Cue:	**The manual Bypass switch is in the Bypass TO LOAD position.**

Comment:

OP-156.02 Section 8.33, Step 1 continued

✓ **Performance Step: 5**

d. IF shutdown of the inverter is desired, THEN PERFORM the following:
   1. OPEN Inverter Output circuit breaker.

Standard: Locates the Inverter Output circuit breaker switch and takes switch to OFF.

Evaluator Cue:	**The Inverter Output circuit breaker is OFF.**

Comment:

OP-156.02 Section 8.33, Step 1 continued

✓ **Performance Step: 6** 2. OPEN Battery Input circuit breaker.

Standard: Locates the Battery Input circuit breaker and takes switch to the OFF position.

Evaluator Cue:	**The Battery Input circuit breaker is OFF.**

Comment:

OP-156.02 Section 8.33, Step 1 continued

✓ **Performance Step: 7** 3. OPEN Rectifier AC Input circuit breaker.

Standard: Locates the Rectifier AC Input circuit breaker and takes switch to the OFF position.

Evaluator Cue:	**The Rectifier AC Input circuit breaker is OFF.**

Comment:

OP-156.02 Section 8.33, Step 1 continued

✓ **Performance Step: 8** 4. OPEN Bypass Source AC Input circuit breaker.

Standard: Locates the Bypass Source AC Input circuit breaker and takes switch to the OFF position.

Evaluator Cue:	**The Bypass Source AC Input circuit breaker is OFF.**

Comment:

OP-156.02 Section 8.33, Step 1 continued

Performance Step: 9 Communicate task completion to CRS.

Standard: Contacts MCR and informs the CRS that the SIV Inverter is on Bypass power and shutdown.

Evaluator Cue:	**The CRS acknowledges communication that Inverter SIV is on Bypass power and is shutdown.** **END OF JPM**

Comment:

Terminating Cue:	**After the Bypass Source AC input circuit breaker is open and communications are completed: "Evaluation of this JPM is complete."**

STOP TIME: _____

In accordance with AD-HU-ALL-0004, Section 5.2.22

22. For plant and equipment labels:

a. When reading equipment component identification labels, there are typically two pieces of information provided. The first is the Equipment ID Number (e.g., 1CS-12 is the equipment ID for a valve). The second is the Equipment Description (e.g., Unit 1 Upper Surge Tank Dome Inlet Isol).

b. Concerning **Equipment ID Numbers**, during procedure performance a 'hard match' (which is an exact character for character match) is required when reading **Equipment ID Numbers** in a procedure step or safety tag and comparing to the component identification label in the plant. If a ‘hard match’ does not exist, **STOP** and contact supervision.

c. Concerning **Equipment Description**, during procedure performance, a 'soft match' can be used when exact wording is not the same between a procedure or safety tag and the component label **Equipment Description**. Correct Component Verification must be ensured. Slight variations (e.g., abbreviation, sequencing of wording, spacing, and dashes) are permitted as long as no ambiguity exist in proper identification of the component and the Equipment ID (if provided – always provided for a safety tag but may not be provided in a procedure step) is a hard match. A few examples are:

(1) A Procedure step states: "Open the breaker for U-1 Seal Oil Vacuum Pump Motor." An acceptable 'soft match' on the component label would read "U-1 SO Vac Pmp Mtr Bkr".
(2) A Red Safety Tag has been printed for the following tag out: "Rack out 2A HDP Bkr." An acceptable 'soft match' on the component label would read "2A Heater Drain Pump Bkr" or "Heater Drain Pump 2A Bkr".

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 HNP NRC Exam In-Plant JPM j

Place a UPS Instrument Bus On Bypass Power and Shutdown the Associated Inverter
IAW OP-156.02

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

BEFORE YOU START THIS JPM

INPLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAYBE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the examiner have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Maintain 6" from touching any equipment during the JPM.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

Initial Conditions:	The plant is in Mode 3. Maintenance has requested that UPS Inverter SIV be placed on its bypass power source, and that the Inverter be shutdown in order to inspect the high resistance contacts.

Initiating Cue:	The CRS has directed you to align UPS Instrument Channel IV to its Bypass power supply, and shutdown inverter SIV, in accordance with OP-156.02, AC Electrical Distribution, Section 8.33. Contact the MCR when you have the Inverter on the Bypass power source and the Inverter is shutdown.

HARRIS NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 2

PROCEDURE TYPE: OPERATING PROCEDURE

NUMBER: **OP-156.02**

TITLE: **AC ELECTRICAL DISTRIBUTION**

3.0 PREREQUISITES

1. D.C. control power available per OP-156.01.

2. Fire Protection Detection and Suppression System aligned per OP-149 to transformers.

3. Electrical Area ventilation systems available for all areas that are to be energized.

4.0 PRECAUTIONS AND LIMITATIONS

1. The complete loss of any function required for either hot or cold shutdown will require the initiation of the HNP Emergency Plan, or the upgrading of response for a previously declared emergency. Accordingly, information concerning the loss of this system should be immediately relayed to the on-duty Control Operator and (when the Emergency Plan has already been activated), the Site Emergency Coordinator. Classification of the Emergency should be per the EAL Matrix. (Reference 2.7.1).

2. Electrical Distribution Bus transfers performed within this procedure may require de-energizing loads in use. A full study of plant impact should be conducted before the transfer.

3. Loads should be minimized before re-energizing switchgear and power centers.

4. Before closing any power supply breaker, the component being energized must be inspected to ensure that it is in a safe condition to be energized. It is suggested that an operator stand by the component while a second operator closes the appropriate breaker. The operators should be in communication during this operation.

5. All electrical breakers should be operated per this procedure.

6. Switchyard breakers and disconnects are operated only with concurrence from the Energy Control Center.

7. 6.9KV Buses A, D Synchronizer and Buses B, E Synchronizer must be placed in desired position for greater than 3 seconds before breaker may be closed.

8. If both Instrument Buses 1DP-1A-SI and 1DP-1A-SIII or 1DP-1B-SII and 1DP-1B-SIV associated with a Logic Train have been de-energized and one Instrument Bus is re-energized without placing the Logic Train Output in the Test Mode, an inadvertent Safeguard Actuation will occur upon re-energization due to the loss of the SI BLOCK Signals when de-energized. **[R – Reference 85H0015]**.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

9. During Backfeeding Operations, the GENERATOR BREAKER 52-7 & 52-9 EMERGENCY CLOSE switch must be left in the EMER CLOSE position. This will prevent the breakers from tripping open due to any generator trip signals that are present during this evolution.

10. While maintenance is being performed on a shutdown inverter, extreme caution must be taken. The capacitors may still be charged.

11. The 480V Cross Tie Breakers have a continuous amperage rating of 2500 amps. The 480V Bus and Main Feeder Breaker ratings are 4200 amps. The 480 volt Station Service Transformers for Aux Buses 1D1, 1E1, 1D2, 1E2, 1D3, and 1E3 are not rated to carry both 480V Aux Buses when Cross-Tied at full load on both Buses. Do not cross-tie buses if the total load will exceed full load rating.

12. Control of breakers from the MCB is possible only when in normal on the Main Transfer Panels.

13. When PICs are re-energized, a cabinet inspection should be performed to determine if any Short Circuit Trip LEDs are lit. Corrective actions should be initiated to reset any affected cards.

14. Mechanical agitation shall not be used to open any breaker that sticks in the closed position. If it cannot be positively determined by Operations that the breaker is fully open then Maintenance shall be contacted to determine the breaker position. If Maintenance concurs that the breaker is failed closed or cannot be determined to be open, then de-energize the associated bus before racking out the breaker.

    If the LK breaker is being opened as part of planned maintenance, document the failure to operate in CAP and notify HNP managers via e-mail. Do not request Maintenance support to manually open the affected breaker. De-energizing the bus will be done in planned and controlled manner.

    If the LK breaker was being opened emergently to support plant stabilization, i.e. attempting to isolate a known fault, then de-energize the associated bus. Based on loads impacted, this may require a manual RX trip first (1D2). CR 677892 documents long-standing concerns for Brown Boveri breakers

15. If the following breakers are de-energized, the inflow to the associated Sewage Tanks should be stopped to prevent overflow: (Reference 2.6.8)

    - 1-4B61-4BL, Sewage Lift Station Control Panel: Lift Station #1.
    - 1-4B61-3AR, Sewage Plant Main Dist Panel Feeder: Lift Station #2.
    - Warehouse PP B: Lift Station #3.
    - Chem Warehouse PP A: Lift Station #4.
    - 480 VAC K BLDG Feed at 236: Lift Station #5.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

16. Inadvertent parallel operations through the SUT and UAT should be limited to no longer than 24 hours. Parallel operations becomes a concern mainly on an electrical fault. With the SUT and UAT in parallel, the available fault current may exceed the interrupting capability of the 6.9 KV breakers. Circulating current can cause excessive heating of the components and conductors, or exceed the rating of those components. The Startup and Auxiliary Transformer limiting rating is 2,800 amps.

17. The electrical safety precautions of SAF-NGGC-2175 shall be adhered to when locally operating electrical equipment. Some equipment may have postings that define the electrical safety Hazard Category and PPE requirements based on Arc Flash Calculations. The posting may be more or less restrictive than those defined in SAF-NGGC-2175 Attachments. The equipment specific local postings take precedence over the Hazard Category and PPE determination of SAF-NGGC-2175 Attachments. Employees shall adhere to the Hazard Category and PPE determination of the local postings in lieu of SAF-NGGC-2175 Attachments.

18. When shutting the control power knife switch for the following pump breakers, auto closure could occur:

    - Motor Driven AFW Pumps
    - ESW Pumps
    - CCW Pumps

19. Before de-energizing any electrical bus, obtain permission from the Manager – Operations (not applicable for planned bus outages that have followed the normal scheduling process) . The only exceptions to this rule are cases where the bus must be immediately de-energized to prevent the following:

    - Personnel Injury
    - Equipment damage is occurring or is imminent
    - It is necessary to protect the public health and safety.

20. Before closing or resetting a tripped breaker, the cause must be determined. On a case-by-case basis, a tripped breaker may be cycled for troubleshooting at the discretion of the SM.

21. For seismic concerns: (Reference 2.7.6)

    - A 480 volt breaker left unattended in Test position or Disconnect(ed) position is required to have its breaker cubicle door closed and its door fasteners tightened.
    - A 6.9 KV breaker left unattended in Test position, Disconnect(ed) position is required to have its breaker compartment door closed and its door fasteners tightened.

22. Continuous operation of an Inverter with no load and a DC input voltage of 140 VDC for greater than 72 hours will cause overheating and possible unit damage/failure.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

23. When planning any power system outages reference AP-401 Log Book and EM-005 Temporary Power Book to ensure temporary loads are evaluated for losing power.

24. The Motor Driven AFW Flow Control Valves receive an auto open signal when breaker 105 or 125 is opened. This may cause over feeding the Steam Generators if the opposite train AFW pump is in service.

25. The cubicle locations given for 480V feeder and Crosstie breakers in this procedure are the locations of the actual breakers. The remote control switches are located on the same MCC but in a different cubicle. When opening or closing a breaker per this procedure, it is acceptable to use the close button/trip switch on the actual breaker or to use the appropriate remote control switch.

CAUTION

When radiation monitors are powered down, any actuations that occur on high radiation will occur on the loss of power, since these monitors are fail-safe.

26. Maintenance should power down all radiation monitors that will lose power and the RM-80 internal batteries should be disconnected before de-energizing a bus. This P&L is not applicable for short duration (less than 8 hours) bus outages.

27. Spare MCC and Power Panel breakers should be maintained in the de-energized position unless supplying temporary power.

28. During Bus 1-4A1 outage, MCC 1-4A11 will lose power. This will defeat the auto-closure feature for 1CC-252 on high flow resulting from RCP thermal barrer tube failure. A caution tag on control switch for 1CC-252 for manual isolation will be required.

NOTE: If Potable water discharge header pressure falls below 20 psig, the system must be flushed and disinfected prior to human consumption. In addition, a report to the North Carolina State Department of Environment and Natural Resources (NCDENR) Public Water Supply Section (PWSS) must be filed. Reference “Rules Governing Public Water Systems North Carolina Administrative Code Title 15a Department of Environment and Natural Resources Subchapter 18c Water Supplies Sections .0100 through .2200 Public Water Supply Section Updated July 2010”.

29. During General Services Bus outages which impact the Water Treatment Building 480V Buses 1-4A6 and/or 1-4B6, the Potable Water System will be without power. Prior to performing bus outages a systematic transfer of power to an alternate source (Harris Construction Feeder) can be performed using Temporary Power Procedure EM-322.

30. BR MONITOR TANK PMP B is required in Modes 1-3 for FUNCTIONALITY of the ASI and DSDG System by FPP-013. The busses that supply power to this pump are 1-4A Section 2, 1-4B1, and 1-4B1022.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

31. When de-energizing or re-energizing a PIC cabinet's primary or secondary power supply, some cards may appear to have blown fuse indications and may lose their function. Occasionally this is due to individual cards not being seated properly, and is not actually a blown fuse. I&C may be able to reseat the card to restore normal power and function to it.

32. Never remove more than one cooler from service at a time on the Main, Unit, or Startup Transformers.

33. When an IDP is aligned to the alternate source, IDP loads may not have terminal voltage above the loads minimum required terminal voltage under all design basis conditions. Once an IDP has been aligned to its alternate source, and prior to returning the connected loads to Operable status, an assessment needs to be performed by Engineering in order to determine if any reduced voltage condition existed during the alternate alignment which resulted in an under-voltage condition at any of the connected loads. Following the replacement of all four safety related inverters, the only time the plant should align an IDP to its alternate source would be during an outage if there was a need to work on the UPS feeder circuit breaker at the IDP. Typically during outages, safety bus voltages are higher than normal operating voltage and the risk of an under-voltage condition occurring is very low. During an alternate alignment configuration, safety bus voltage could be monitored at any level (6.9, 480, or 120) and a correlation drawn between the monitored bus voltage and the minimum required safety related power panel voltage necessary to ensure an under voltage condition did not exist. (Ref. EC 81091)

34. This procedure contains actions that can impact equipment important to the Harris Plant Emergency Plan. Refer to PLP-717, Equipment Important to Emergency Preparedness and ERO Response. [CR 526951 CORR, CR 580945 CAPR related]

35. De-energizing an instrument bus can cause a loss of AC power to ERFIS MUX Cabinets, resulting in a loss of ERFIS indication. It can also cause a loss of ERFIS indication from the opposite train of instrumentation, since ERFIS MUX Cabinets are connected in loops. If the loss of AC power occurs within two cabinets (as is the case with de -energizing a safety bus), the communication loop can be broken in multiple locations, and additional MUX Cabinets might be isolated from the computer system. This issue occurred on 5/1/12 (during H117R1) when Instrument Bus III was de-energized for maintenance. Both trains of spent fuel pool temperature indication on the ERFIS Computers were lost; local readings from the 'B' Train MUX Cabinets had to be obtained. Note that the high temperature alarms on the MCB Continued to function properly during this time. AR 534133.

36. Per Tech Spec 3.8.1.1 - If a component powered from a safety bus cannot be secured due to issues such as trip coil failures, control power malfunctions, or other breaker problems, then Tech Spec 3.8.1.1 must be evaluated to determine EDG operability. This is due to potential impacts to sequencing and load shedding requirements.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

37. Many Brown Boveri 480V breakers must have their charging springs manually charged. Attachment 16 will have asterisks by the breakers that need to be manually charged.

38. The flashing orange light (one pulse every 3 sec) on the LMAX breakers indicates "Normal Relay Operation" for Protection Function L.

39. Engineering performed EC 96516, Evaluate Impact of Cross Tie of WPB 480V Busses During Gen Serv 1-4A Outage, to evaluate the cross tie loading of WPB buses per OP-156.04 and OP-156.02 to ensure that cross tie loading is within the equipment ratings. This analysis reveals that there are no challenges to equipment or bus loading when cross tying from Bus 1-4B3 to 1-4A3, 1-4A1 to 14B1, or 1-4A103 to 1-4AB103 in either direction as long as Operations takes the recommended precautions to take the specified EHC's in this EC out of service during the cross tie. Cross tie of Bus 1-4B3 (1-4A3) to 1-4A3 (1-4B3) is acceptable without any restrictions. Cross tie of Bus 1-4A1 (1-4B1) to 1-4B1 (1-4A1) is acceptable if the following loads are removed from service: 1-4A1-3C, EHC-91 (1-4-XNNS); 1-4B1-3C, EHC-15 (1-4X-NNS); 1-4A1-3D, EHC-95 (1-4X-NNS). Cross tie of Bus 1-4A103 (1-4B103) to 1-4B103 (1-4A103) is acceptable if the following loads are removed from service: 1-4B103-2A EHC-41-1 (1-X-NNS); 1-4B103-2B, EHC-41-2 (1-4X-NNS); 1-4A103-6A, EHC-40-1 (1-4X-NNS); 1-4A103-6B, EHC-40-2 (1-4X-NNS). Steps have been added to the appropriate sections to address removing these EHC's from service. (Ref. 2.7.22)

40. EC 91711 installed Normal -Alternate Switches (1EE-E628 and 1EE-E629) in the servo-amp control power circuits for SG PORV-A (1MS-58) and SG PORV-B (1MS-60). These switches are for use during a FLEX-ELAP (Extended Loss of AC Power) event as a part of FUKUSHIMA response and are located in locked boxes (B5135-SA and B5136-SB) at RAB 286'. The normal and alternate sources of control power are PP-1A312-SA-3 and IDP-1A-SI-6 for SG PORV-A (1MS-58) and PP-1B312-SB-3 and IDP-1B-SII-11 for SG PORV-B (1MS-60). Use of these switches during other than FLEX-ELAP conditions has not been analyzed.

41. The following FLEX breakers are not installed during normal plant operation and are administratively inserted and racked in, and closed per FLEX procedures when extended loss of all AC conditions warrant:

    - 480V Bus 1A3 SA, cubicle 2B
    - 480V Bus 1B3 SB, cubicle 8B

42. The following installed FLEX breakers in the safety related 480V MCCs will be administratively controlled open during normal plant operation and closed by FLEX procedures if needed during specified beyond design basis events:

    - 480V MCC 1A21 SA, cubicle 6D
    - 480V MCC 1A31 SA, cubicle 13D
    - 480V MCC 1B21 SB, cubicle 8C
    - 480V MCC 1B31 SB, cubicle 12D

8.33. Bypass Source Operation for Safety 7.5 KVA Inverters

NOTE: When aligned to the Manual Bypass:

- Tech Spec 3.8.3.1 ACTION c applies. (Modes 1, 2, 3, and 4)
- Tech Spec 3.8.3.2 ACTION applies. (Modes 5 an 6)

8.33.1. Initial Conditions

1. It is desired to place an inverter on its bypass source. _____

OR

2. An inverter is on its bypass source and normal operation is desired. _____

8.33.2. Procedural Steps

1. To place the inverter on the bypass source, **PERFORM** the following:
   a. **VERIFY** the IN SYNC light is LIT. _____
   b. **DEPRESS** the Bypass to Load pushbutton. _____
   c. **TRANSFER** Manual Bypass Switch to BYPASS TO LOAD position. _____
   d. **IF** shutdown of the inverter is desired,
      THEN PERFORM the following:
      (1) **OPEN** Inverter Output circuit breaker. _____
      (2) **OPEN** Battery Input circuit breaker. _____
      (3) **OPEN** Rectifier AC Input circuit breaker. _____
      (4) **OPEN** Bypass Source AC Input circuit breaker. _____
2. To restore the inverter to normal operation, **PERFORM** the following:
   a. **IF** the inverter is shutdown,
      THEN PERFORM the following:
      (1) **DEPRESS** the Precharge Pushbutton. _____
      (2) **WHEN** the Precharge light is LIT,
      THEN CLOSE Battery Input circuit breaker. _____
      (3) **CLOSE Rectifier** AC Input circuit breaker. _____
      (4) **CLOSE** Bypass Source AC Input circuit breaker. _____
      (5) **CLOSE** Inverter Output circuit breaker. _____
   b. **VERIFY** the IN SYNC light is LIT. _____
   c. **TRANSFER** Manual Bypass Switch to NORMAL OPERATION position. _____
   d. **DEPRESS** the Inverter to Load pushbutton. _____
   e. **DEPRESS** the Alarm Reset pushbutton. _____

Facility: Harris Nuclear Plant Task No.: 001001H104

Task Title: Start Up A Rod Drive MG Set JPM No.: 2016 HNP NRC Exam In-Plant JPM k

K/A Reference: 001 A4.08 RO 3.7 SRO 3.4 ALTERNATE PATH - No

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: X Actual Performance: _____

Classroom _____ Simulator _____ Plant X

READ TO THE EXAMINEE	
I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• The Reactor is shut down with Tavg at 550°F and PRZ pressure of 2240 psig. • Both Rod Drive MG sets are secured.

Initiating Cue:	• The CRS is directing you to place the 1A Rod Drive MG set in service per OP-104 section 5.1 • The initial conditions are completed

Task Standard: 1A and 1B Rod Drive MG set operating and supplying power to the Rod Control System.

Required Materials: OP-104 Rev. 39 Section 5.1

General References: OP-104 Rev. 39

Time Critical Task: No

Validation Time: 15 minutes

Critical Step Justification	
Step 3	Must obtain the handle for the Rod Drive MG Set Synchronizing switch or the MG set motor circuit breaker cannot be closed.
Step 13	Must close the motor circuit breaker to start the MG Set motor.
Step 15	Must flash the field to obtain generator voltage then adjust the Generator line voltage to 240 VAC to verify that the generator is operational.
Step17	Must adjust generator voltage to 260 VAC to obtain the normal operational voltage in preparations to load the MG set.
Step 18	Must close the generator circuit breaker to allow the Reactor Trip breakers to have power to be closed.

BEFORE YOU START THIS JPM

INPLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAY BE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the candidate have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Maintain 6" from touching any equipment during the JPM.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

START TIME: _____

Evaluator NOTE:	**The Rod Drive MG Cabinets are oriented such that the '1B' MG is on the left side AND the '1A' MG is on the right side when facing the cabinets.**

Obtains OP-104 section 5.1.1 Initial Conditions

Performance Step: 1

NOTE: Both Rod Drive MG Set output breakers must be racked in before either output breaker will close.

1. Rod Control System lined up per Rod Control System Electrical Lineup Prestart Checklist, Attachment 1.
2. Shunt Trip Test per MST-I0072 or MST-I0001 (MST-I0073 or MST-I0320) has been performed on the Reactor Trip Breakers or is to be performed prior to making the Rod Control System capable of withdrawing rods.

Standard: Reviews NOTE and initial conditions for completion.

Evaluator Cue:	**Initial conditions have been satisfied.**

Comment:

OP-104 section 5.1.2 NOTE prior to step 1

Performance Step: 2 NOTE: The Rod Drive MG Set SYNCHRONIZING switch handle is normally kept in the Operations Key Locker

Standard: Operator reads and place-keeps at any procedure note/caution (initials, checks or circle/slash)

Comment:

OP-104 section 5.1.2 step 1

✓ **Performance Step: 3** OBTAIN the handle for the Rod Drive MG Set SYNCHRONIZING switch

Standard: Obtains handle or describes the method for obtaining the synchronizing switch handle.

- Get key from Shift Manager for key locker.
- Obtain handle from key locker.

Comment:

OP-104 section 5.1.2 NOTE prior to step 2

Performance Step: 4 B component equipment nomenclature is in parentheses

Standard: Operator reads and place-keeps at any procedure note/caution (initials, checks or circle/slash)

Comment:

Evaluator Note:	**The relay flag will NOT be required to be reset unless it is in fact dropped from a fault. This step just ensures that the flag is reset in case the relay has a problem while the MG set is operating.**

OP-104 section 5.1.2 step 2

Performance Step: 5 At the ROD PWR SUPPLY CNTL CABINETs for GENERATOR NO. 1A (1B) CUB. 2 (1) DEPRESS the RELAY FLAG RESET button

Standard: Locates and depresses the RELAY FLAG RESET button

Comment:

OP-104 section 5.1.2 NOTE prior to step 3

Performance Step: 6 Failure of the push rods to reset the flag would indicate that the corresponding relay may not have reset.

Standard: Operator reads and place-keeps at any procedure note/caution (initials, checks or circle/slash)

Comment:

OP-104 section 5.1.2 step 3

Performance Step: 7 On the front of GENERATOR NO. 1B CUB. 1, LIFT the mechanical push rod to reset the red flag on the GROUND PROTECTIVE RELAY

Standard: Locates and lifts the mechanical push rods to reset the RED FLAG on the GROUND PROTECTIVE RELAY

Evaluator Cue:	**GROUND PROTECTIVE RELAY red flag is reset.**

Comment:

OP-104 section 5.1.2 step 4

Performance Step: 8 On the front of the GENERATOR NO. 1A CUB. 2 LIFT BOTH mechanical push rods to reset the red flags on the DIRECTIONAL OVERCURRENT A and C relays.

Standard: Locates and lifts the mechanical push rod to reset A and C DIRECTIONAL OVERCURRENT RELAYS

Evaluator Cue:	**A and C DIRECTIONAL OVERCURRENT RELAYS reset.**

Comment:

OP-104 section 5.1.2 NOTE prior to step 5

Performance Step: 9 The potentiometer pointer is the thin white line at the upper left corner of the potentiometer.

Standard: Operator reads and place-keeps at any procedure note/caution (initials, checks or circle/slash)

Comment:

OP-104 section 5.1.2 step 5

Performance Step: 10 POSITION Generator No. 1A VOLTAGE ADJUST potentiometer to the mid position.

Standard: Locates and adjusts VOLTAGE ADJUST potentiometer to mid position

Evaluator Cue:	**VOLTAGE ADJUST potentiometer is in mid position**

Comment:

OP-104 section 5.1.2 NOTE prior to step 6

Performance Step: 11 Only one handle is used between the two synchronizing selector switches.

Standard: Operator reads and place-keeps at any procedure note/caution (initials, checks or circle/slash)

Comment:

OP-104 section 5.1.2 step 6

Performance Step: 12 VERIFY Generator No. 1A SYNCHRONIZING Selector Switch is in OFF.

Standard: Verifies Generator No. 1A SYNCHRONIZING selector switch is in the OFF position.

Evaluator Cue:	**SYNCHRONIZING selector switch is in the OFF position.**

Comment:

OP-104 section 5.1.2 step 7

✓ **Performance Step: 13** PLACE CS-495 MOTOR CIRCUIT BREAKER CONTROL SWITCH A in CLOSE

Standard: Locates and places the motor circuit breaker control switch No. 1A to the CLOSE position.

Evaluator Cue:	**Motor circuit breaker No. 1A control switch is in the CLOSE position.** **(IF checked): Red light is on, green light is off.**

Comment:

OP-104 section 5.1.2 step 8

Performance Step: 14 ALLOW 15 seconds for the Rod Drive MG to obtain full rated speed

Standard: Waits 15 seconds

Comment:

OP-104 section 5.1.2 step 9

✓ **Performance Step: 15** WHILE OBSERVING the GENERATOR LINE VOLTS meter, DEPRESS AND HOLD the GEN. FIELD FLASH pushbutton for GENERATOR NO. 1A CUB. 2. The Rod Drive MG voltage should rise to 230 to 260 VAC. After the voltage has stabilized, release the GEN. FIELD FLASH pushbutton

Standard: Locates and depresses the GEN. FIELD FLASH pushbutton until voltage has stopped increasing and then releases GEN. FIELD FLASH pushbutton

Evaluator Cue:	**Generator line voltage is steady at 240 VAC on the Generator Line Voltmeter.**

Comment:

OP-104 section 5.1.2 step 10

Performance Step: 16 CHECK the range of voltage control, 230 to 300 VAC, by POSITIONING to minimum then maximum Generator No. 1A VOLTAGE ADJUST potentiometer.

Standard: Locates and positions GENERATOR NO. 1A VOLTAGE ADJUST potentiometer from minimum to maximum to verify 230 to 300 VAC

Evaluator Cue:	**230 to 300 VAC range verified on voltage control.**

Comment:

OP-104 section 5.1.2 step 11

✓ **Performance Step: 17** ADJUST the Generator No. 1A VOLTAGE ADJUST potentiometer for 260 VAC.

Standard: Adjusts the generator VOLTAGE ADJUST potentiometer for 260 VAC.

Evaluator Cue:	**Generator VOLTAGE ADJUST potentiometer set for 260 VAC**

Comment:

OP-104 section 5.1.2 step 12

✓ **Performance Step: 18** PLACE 1IC-E171:017 GENERATOR CIRCUIT BREAKER CONTROL SWITCH A in CLOSE.

Standard: Locates and places GENERATOR CIRCUIT BREAKER NO. 1A control switch in the CLOSE position and obverses status light indication

Evaluator Cue:	**GENERATOR CIRCUIT BREAKER NO. 1A control switch is in the CLOSE position** **Red light is lit, green light is off.**

Comment:

OP-104 section 5.1.2 NOTES and Cautions prior to step 13

Performance Step: 19

NOTE:
- When the Reactor Trip Breaker closes, Rod Drive MG voltage will drop slightly as load is increased.

CAUTION:
- Before closing the Reactor Trip Breakers, the Turbine must be manually tripped to prevent the possibility of the Turbine latching automatically.
- Before closing the Reactor Trip Breakers, the Main Feed Regulating Valve Controllers must be verified to be in Manual and at 0% demand.

Standard: Operator reads and place-keeps at any procedure note/caution (initials, checks or circle/slash)

Comment:

OP-104 section 5.1.2 steps 13-15 (MCR)

Performance Step: 20

13. PERFORM the following:
    a. At the MCB, INITIATE a manual Turbine trip
    b. VERIFY the following Main FW Regulating Valve Controllers are in Manual and at 0% demand (minimum):
    - 1FW-133, MAIN FW A REGULATOR FK-478
    - 1FW-249, MAIN FW B REGULATOR FK-488
    - 1FW-191, MAIN FW C REGULATOR FK-498
14. VERIFY OST-1054, Permissives P-6 and P-10 Verification, is within periodicity prior to closing Reactor Trip Breakers.
15. At the MCB, CLOSE the Reactor Trip Breakers to load the Rod Drive MG.

Standard: Contacts and request the MCR to perform OP-104 section 5.1.2 steps 13-15.

Evaluator note:	**Candidate might state hearing Reactor Trip Breakers operating.**

Evaluator Cue:	**MCR to [*Candidate*], the Reactor Trip Breakers have been closed. OP-104 section 5.1.2 steps 13-15 are complete. Proceed with the next step to verify generator output voltage.**

Comment:

OP-104 section 5.1.2 step 16

Performance Step: 21 VERIFY the Generator No. 1A GENERATOR LINE VOLTS is 260 VAC.

Standard: Verifies Generator line voltage is 260 VAC on the Generator Line Voltmeter

Evaluator Cue:	**Generator Line Voltmeter reads 260 VAC.**

Comment:

Evaluator Cue:	**After the Motor Generator voltage is verified following Reactor trip breakers closed at the MCB which will load the motor-generator.** **Evaluation on this JPM is complete.** **END OF JPM**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 HNP NRC Exam JPM k
Start Up A Rod Drive MG Set
OP-104

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

BEFORE YOU START THIS JPM

INPLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAYBE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the examiner have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Maintain 6" from touching any equipment during the JPM.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

Initial Conditions:	• The Reactor is shut down with Tavg at 550°F and PRZ pressure of 2240 psig. • Both Rod Drive MG sets are secured.

Initiating Cue:	• The CRS is directing you to place the 1A Rod Drive MG set in service per OP-104 section 5.1 • The initial conditions are completed.

HARRIS NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 2

PROCEDURE TYPE: OPERATING PROCEDURE

NUMBER: **OP-104**

TITLE: **ROD CONTROL SYSTEM**

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1.0 PURPOSE

This procedure provides instructions for:

- startup and shutdown of the Rod Control Motor Generators
- manual and automatic operation of the Rod Control System
- operation of the DC Hold bus
- racking breakers associated with reactor trip and rod control in and out
- operation of the Pulse to Analogue Converter
- electrical lineup of Digital Rod Position Indication System (DRPI)

An FSAR requirement concerning position and manual rod speed of the shutdown banks is partially satisfied by this procedure.

2.0 REFERENCES

2.1. Plant Operating Manual Procedures

1. OPS-NGGC-1308
2. PLP-106
3. MST-I0001
4. MST-I0072
5. MST-I0073
6. MST-I0320

2.2. Technical Specifications

1. 3.1.3
2. 3.3.1
3. 3.3.2

2.3. Final Safety Analysis Report

1. 7.7.1

2.4. Corrective Action Program (CAP) Item

1. CR 96-02260-6
2. CR 98-00340 (LER 98-003)

2.5. Drawings

1. 6-B-401 0091

2.6. Technical Manuals

1. VM-PKO-V01 through V04 - Rod Control System
2. VM-PWV, Switchgear, Reactor Trip / Westinghouse
3. VM-PWW, Power Supplies, AC Reactor Trip / Westinghouse

2.7. Other

1. CP&L letter MS-884266 (DIN 881853879)
2. PCR-7039
3. ESR 97-00784
4. EC 51074
5. EC 67297

3.0 PREREQUISITES

1. AC Electrical System in operation.
2. DC Electrical System in operation.
3. Reactor Protection System in operation.
4. CRDM Cooling System in operation.
5. Source Range and Intermediate Range NIs operational.

4.0 PRECAUTIONS AND LIMITATIONS

1. Criticality must be anticipated any time control rods are being withdrawn.
2. Whenever the Reactor is critical and except for approved physics testing, control rods must be above the low-low insertion limit.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

3. One of the purposes of Rod Insertion Limits is to ensure adequate SDM assuming certain conditions at the existing power level. Following a significant load rejection or rapid power reduction, a BANK LOW or LOW-LOW INSERTION LIMIT Alarm is expected to occur since Xenon is not at equilibrium or stable. The presence of this alarm following a load rejection does not indicate a loss of SDM. If rods were above the insertion limits before the load rejection and no abnormal conditions affecting reactivity (example: stuck/untrippable rod, uncontrolled dilution) are experienced; then SDM is still assured. Per Tech Spec 3.1.3.6, when rods go below the insertion limits, we have two hours to restore them. This allows time for a controlled boration and emergency boration is not required, unless the two hour limit is threatened. The use of 1CS-278 is allowed for a large boration as long as the operator tracks the total volume added by using the time the valve is open and flow delivered.

4. Ensure Technical Specifications in Section 3/4.1.3 are met.

5. Any time Reactor Trip Breaker A(B) (not a Bypass breaker) is racked out, verify an EIR is initiated to require the following:

   a. The Shunt Trip Device of the Reactor Trip Breaker is tested per MST-I0072 or MST-I0001 (MST-I0073 or MST-I0320) in the TEST position and in the CONNECT position each and every time the breaker is racked in with the Rod Control System capable of withdrawing rods. (Tech. Spec. 3.3.1, Table 3.3-1, Item 20.)

6. When the Reactor is subcritical, positive reactivity must not be added by more than one method at a time; that is, boron dilution, rod motion or reactor coolant temperature change. (Exception: Due to the slow insertion rate contributed by xenon decay, positive reactivity addition by the operator may be performed during periods of xenon decay.)

7. Except during physics testing, control rod banks must always be withdrawn in the prescribed sequence with proper bank overlap.

8. Unless the RCS has been filled and vented, do not move control rods. If RCS pressure is less than 300 psig, station someone at Reactor Vessel Head before moving Control Rods. Loud metallic clacking indicates no water in the CRDM Housing.

9. Before transferring to automatic rod control, Tavg must be manually adjusted to within 1°F of T_{ref} to avoid a transient following the transfer.

10. When permissive and interlock C-5, Low Power Block of Automatic Rod Withdrawal, is actuated (Turbine First Stage pressure less than 15% of full power) the Rod Control Selector Switch must be turned to manual control.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

11. Before withdrawing any rod bank from the fully inserted position, the group step counters and rod position indicators for that bank must be at zero steps.

12. Do **NOT** exceed a startup rate of 1.0 decade per minute.

13. Before closing the Reactor Trip Breakers, manually trip the Turbine to prevent the possibility of the Turbine latching automatically.

14. Before closing the Reactor Trip Breakers, verify that the Main Feed Regulating Valve Controllers are in Manual and at 0 % demand. (Ref. AR 96171)

NOTE: DIRECTIONAL OVERCURRENT A and C relay units each have an Instantaneous Overcurrent relay at the top, a Directional relay at the center, and trip flags at the bottom.

15. Ensure that output voltages are matched as closely as possible when paralleling rod drive MG sets using the highest phase to phase voltage indications. Excessive circulating current will be indicated by observing the Directional relay located in the center section of each of the DIRECTIONAL OVERCURRENT A and C relay units. The generator with its voltage regulator setting too low will have its Directional relay movable contact resting on its left hand side stationary contact.

16. While the Rod Drive MG Sets are operating in parallel, do not adjust Rod Drive MG Set Voltage Potentiometers. This is to prevent the possibility of circulating currents, which will not be indicated on the MG Set Ammeter, tripping the output breakers.

17. The absence of the red and the green indication on the MCB after a reactor trip could mean a failure of the Shunt Trip Coil. If the Status light on TSLB-4 does not indicate the breaker is open, verify locally that the Trip Breaker has tripped and initiate a Work Request.

18. Reactor Trip breakers have not been seismically tested in the TEST or REMOVE positions. Do not leave a breaker in either position for an extended period of time.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

19. Do **NOT** test Rod Drive MG Set breakers in this OP. With one Rod Drive MG Set in service, if the breaker for the other Rod Drive MG Set is cycled in test, with the Sync switch on, the Rod Drive MG Set will start. Maintenance must be contacted for breaker testing.

20. If plant is in MODE 3, MODE 4 or MODE 5, verify TS 3.1.3.3 is met before closing Reactor Trip Breaker.

21. An Urgent Failure alarm coincident with the rod bank selector switch selected to an individual bank could potentially cause rods to drop if the rod bank selector switch is moved to another position. If the Urgent Failure is due to a stationary gripper problem, reduced current to the movable grippers may not be sufficient to hold the rods in place when the switch is selected to different bank. For this condition, placing rods in MANUAL is considered to be any position of the Rod Bank Selector switch except AUTO. This meets the intent of the immediate actions for AOP-001. The rod bank selector switch **SHOULD NOT** be moved until troubleshooting has determined that it is not a stationary gripper problem or repairs have been completed.

22. Sections 5.3, 5.4, 7.1, 7.2 and 8.9 are Continuous Use Sections. All other Sections are Reference use. (Ref. SOER 07-1, rec. 1)

23. Plant personnel shall adhere to applicable safety rules and regulations as identified in the Company Safety Manual, SAF-NGGC-2172 and SAF-NGGC-2175.

5.0 STARTUP

5.1. Single Rod Drive MG Startup

5.1.1. Initial Conditions

NOTE: Both Rod Drive MG Set output breakers must be racked in before either output breaker will close.

1. Rod Control System lined up per Rod Control System Electrical Lineup Prestart Checklist, Attachment 1. _____

2. Shunt Trip Test per MST-I0072 or MST-I0001 (MST-I0073 or MST-I0320) has been performed on the Reactor Trip Breakers or is to be performed prior to making the Rod Control System capable of withdrawing rods. _____

5.1.2. Procedural Steps

NOTE: The Rod Drive MG Set SYNCHRONIZING switch handle is normally kept in the Operations Key Locker.

1. **OBTAIN** the handle for the Rod Drive MG Set SYNCHRONIZING switch. _____

NOTE: B component equipment nomenclature is in parentheses.

2. At the ROD PWR SUPPLY CNTL CABINETs for GENERATOR NO. 1A (1B) CUB. 2 (1) **DEPRESS** the RELAY FLAG RESET button. _____

NOTE: Failure of the push rods to reset the flag would indicate that the corresponding relay may not have reset.

3. On the front of GENERATOR NO. 1B CUB. 1, **LIFT** the mechanical push rod to reset the red flag on the GROUND PROTECTIVE RELAY. _____

5.1.2 Procedural Steps (continued)

4. On the front of the GENERATOR NO. 1A (1B) CUB. 2 (1) **LIFT BOTH** mechanical push rods to reset the red flags on the DIRECTIONAL OVERCURRENT A and C relays. _____

NOTE: The potentiometer pointer is the thin white line at the upper left corner of the potentiometer.

5. **POSITION** Generator No. 1A (1B) VOLTAGE ADJUST potentiometer to the mid position. _____

NOTE: Only one handle is used between the two synchronizing selector switches.

6. **VERIFY** Generator No. 1A (1B) SYNCHRONIZING Selector Switch is in OFF. _____

7. **PLACE** CS-495 (CS-496) MOTOR CIRCUIT BREAKER CONTROL SWITCH A (B) in CLOSE. _____

8. **ALLOW** 15 seconds for the Rod Drive MG to obtain full rated speed. _____

9. **WHILE OBSERVING** the GENERATOR LINE VOLTS meter, **DEPRESS AND HOLD** the GEN. FIELD FLASH pushbutton for GENERATOR NO. 1A (1B) CUB. 2 (1). The Rod Drive MG voltage should rise to 230 to 260 VAC. After the voltage has stabilized, release the GEN. FIELD FLASH pushbutton. _____

10. **CHECK** the range of voltage control, 230 to 300 VAC, by **POSITIONING** to minimum then maximum Generator No. 1A (1B) VOLTAGE ADJUST potentiometer. _____

11. **ADJUST** the Generator No. 1A (1B) VOLTAGE ADJUST potentiometer for 260 VAC. _____

12. **PLACE** 1IC-E171:017 (1IC-E172:017) GENERATOR CIRCUIT BREAKER CONTROL SWITCH A (B) in CLOSE. _____

NOTE: When the Reactor Trip Breaker closes, Rod Drive MG voltage will drop slightly as load is increased.

CAUTION

Before closing the Reactor Trip Breakers, the Turbine must be manually tripped to prevent the possibility of the Turbine latching automatically.

CAUTION

Before closing the Reactor Trip Breakers, the Main Feed Regulating Valve Controllers must be verified to be in Manual and at 0% demand. (Ref. AR 96171)

13. **PERFORM** the following:

    a. At the MCB, **INITIATE** a manual Turbine trip. _____

    b. **VERIFY** the following Main FW Regulating Valve Controllers are in Manual and at 0% demand (minimum):

    - 1FW-133, MAIN FW A REGULATOR FK-478 _____
    - 1FW-249, MAIN FW B REGULATOR FK-488 _____
    - 1FW-191, MAIN FW C REGULATOR FK-498 _____

14. **VERIFY** OST-1054, Permissives P-6 and P-10 Verification, is within periodicity prior to closing Reactor Trip Breakers. _____

15. At the MCB, **CLOSE** the Reactor Trip Breakers to load the Rod Drive MG. _____

16. **VERIFY** the Generator No. 1A (1B) GENERATOR LINE VOLTS is 260 VAC. _____

Facility:	Harris Nuclear Plant	Task No.:	301009H401
Task Title:	Initiate Emergency Boration Following a Reactor Trip (AOP-002)	JPM No.:	2016 HNP NRC Exam Simulator JPM CR a
K/A Reference:	APE024 AA1.17 RO 3.9 SRO 3.9	**ALTERNATE PATH - YES**	

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

Initial Conditions:	• The plant was at 100% power when the 'A' MFW pump tripped • The crew performed a manual Reactor Trip in accordance with AOP-010, Feedwater Malfunctions • The crew completed the immediate actions of EOP E-0, Reactor Trip or Safety Injection and have transitioned to ES-0.1, Reactor Trip Response • RCS temperature has been stabilized in accordance with ES-0.1 step 4

Initiating Cue:	• Your position is the OATC • You have the responsibility for the Foldout items in ES-0.1 • Continue ES-0.1 starting with step 5

DO NOT READ TO THE EXAMINEE:	**Allow the candidate to use the procedures from the Simulator for this JPM. You will need to have pre-made copies of ES-0.1 and AOP-002 ready for replacements after the JPM is complete.**

Task Standard: Emergency Boration flow ≥30 GPM with Charging flow ≥30 GPM

Required Materials: BOP required to perform ES-0.1, Step 4

General References: ES-0.1, REACTOR TRIP RESPONSE Rev. 2
AOP-002, EMERGENCY BORATION Rev. 24

Handout: None – use simulator references

Time Critical Task: No

Validation Time: 8 minutes

Critical Step Justification	
Step 3	The operator must start one of the two BA pumps. A boric acid pump has to be running to deliver boric acid flow. The Boric Acid Tank provides the most preferred source of borated water for emergency boration. If a Boric Acid Pump cannot be started, the RNO directs the operator forward to the step for establishing the flow path from the RWST.
Step 5	After the emergency boration flow path cannot be established due to 1CS-278 failing to open the operator must establish an alternate boration valve lineup to establish a boration. Flow is established from the BA Tank via a BAT pump through FCV-A and FCV-113B to CSIP suction. This provides a method for the control room operator to use the preferred flow path if 1CS-278 cannot be used.
Step 6	A flow rate of > 30 gpm ensures that the boron concentration and required flow of the action statements of LCOs 3.1.1.1 and 3.1.1.2 are being met.

2016 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-164
- Password "noinstants"
- Go To Run
- Adjust volume / range for Source Range audio counts to an in plant expected level to reduce distraction from source range audio counts

- (**IF NEEDED**) The 86 relays should roll when the simulator is placed in run. If not then run the APP file "Roll 86 Gen" or they can be manually overridden with override LO's
  - XGAO018A GEN LOCKOUT G1A-TRIP COIL ON
  - XGBO017A GEN LOCKOUT G1B-TRIP RELAY ON

- **GO TO FREEZE** and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup information is how this exam IC was developed.

- Reset to IC-19
- Go to run
- Insert a malfunction to prevent two control rods from inserting on the trip
  - CRF16a 220.0 4 (shutdown bank A Rod N-7)
  - CRF16b 220.0 27 (control bank A Rod F-14)
- Insert IRF CVC161 ENGAGED to prevent 1CS-278 from opening
- Shut 1CS-8 (60 gpm letdown orifice)
- Reduce flow on FCV-121 to < 30 gpm (somewhere close to 20 gpm)
- Place a trip of the 'A' MFW Pump on Trigger 1 (IMF CFW16A)
- Go to run, insert Trigger 1 then manually trip the Reactor
- Verify immediate action conditions are met
- Secure the TDAFW pump and adjust AFW flows to obtain SG levels > 25%
- Stabilize RCS temperature within the required range of ES-0.1, Step 4
- Acknowledge and reset annunciator alarms
- Freeze and snap to exam IC

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: _____

ES-0.1, Step 5

Performance Step: 1 Check Feed System Status:

- RCS temperature – less than 564˚F
- Verify Feed Reg valves – SHUT
- Check feed flow to SG's – GREATER THAN 210 KPH

Standard:

Verifies RCS temperature indication less than 564˚F	**YES**
Verifies each Feed Reg Valve indicating SHUT	**YES**
Verifies feed flow to SG's greater than 210 KPH	**YES**

Comment:

ES-0.1, Step 6

Performance Step: 2 Check control rod status:

- Check DRPI – available
- Verify all control rods – fully inserted

Standard:

- Determines DRPI available by indicating lights on AEP-1
- Determines two rods stuck fully out
- Takes RNO path to AOP-002

Evaluator Note:	**Applicant may go to AEP-1 to determine which rods are stuck.**

Comment:

AOP-002, Step 1

√ **Performance Step: 3** VERIFY a Boric Acid (BA) Pump RUNNING.

Standard: Starts one BA Pump

Comment:

AOP-002, Step 2.a Alternate Path Begins

Performance Step: 4 ESTABLISH boration flowpath using 1CS-278 as follows:

- OPEN 1CS-278, Emergency Boric Acid Addition **NO**

Standard: Identifies 1CS-278 will not open.
Informs CRS 1CS-278 will NOT open.
Takes RNO path to Step 3

Evaluator Cue:	**Acknowledge 1CS-278 will not open.**

Comment:

AOP-002, Steps 3.a,b

√ **Performance Step: 5** ESTABLISH boration flowpath using FCV-113A/B as follows:

OPEN the following valves

- 1CS-283, Boric Acid To Boric Acid Blender FCV-113A
- 1CS-156, Make Up To CSIP Suction FCV-113B

VERIFY at least 30 gpm boric acid flow to CSIP suction on recorder panel or ERFIS point FCS0113A.

Standard: Locates MCB switches then turns switch to OPEN for

- 1CS-283
- 1CS-156

Verifies flow indicated on recorder panel or ERFIS

Comment: **Candidate may use recorder FR-113 vice ERFIS.**

AOP-002, Step 4

√ **Performance Step: 6** VERIFY and MAINTAIN at least 30 gpm charging flow to RCS (FI-122A.1) until required boration is completed.

Standard: Verifies flow indicated on FI-122A.1 as < 30 gpm.
With FCV-121 in manual candidate increases demand to increase flow to ≥ 30 gpm flow to CSIP suction on FI-121A.1

Comment:

Evaluator Cue:	**After the candidate has established and verified flow to CSIP suction on FI-121A.1** **Announce: I have the shift, END OF JPM** **Inform Simulator Operator to place the Simulator in Freeze.**

Comment:

STOP TIME: _____

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 HNP Audit Exam Simulator JPM CR a

Initiate Emergency Boration Following a Reactor Trip
(ES-0.1 and AOP-002)

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	• The plant was at 100% power when the 'A' MFW pump tripped • The crew performed a manual Reactor Trip in accordance with AOP-010, Feedwater Malfunctions • The crew completed the immediate actions of EOP E-0, Reactor Trip or Safety Injection and have transitioned to ES-0.1, Reactor Trip Response • RCS temperature has been stabilized in accordance with ES-0.1 step 4

Initiating Cue:	• Your position is the OATC • You have the responsibility for the Foldout items in ES-0.1 • Continue ES-0.1 starting with step 5

Facility: Harris Nuclear Plant | Task No.: 004016H101

Task Title: Place Excess Letdown In Service | JPM No.: 2016 HNP NRC Exam Simulator JPM CR b

K/A Reference: 004 A4.06 3.6 RO/ 3.1 SRO **ALTERNATE PATH - NO**

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• The unit is operating at 100% power MOL • Normal letdown needs to be secured for maintenance due to a problem with PCV-145 • PCV-145 is in manual

Initiating Cue:	• You are the OATC and have been directed by the CRS to establish Excess Letdown to the VCT per OP-107, Section 8.2. • Excess letdown has not been in service during this refueling cycle

Evaluator Note:	**The candidates should be briefed outside of the Simulator prior to performing this JPM. Provide them with a copy of the procedure and inform them that ALL initial conditions are satisfied.** **This will allow them to review the Precautions and Limitations associated with OP-107 and have time for a task preview of the steps to accomplish establishing Excess Letdown. Expect that the candidates will take about 10-15 minutes to complete this review.**

Task Standard: Excess letdown is established with proper flow and temperature

Required Materials: None

General References: OP-107, Rev. 113

General References: OP-107, Rev. 113, Prerequisites, P&L's, and Section 8.2, Excess Letdown Heat Exchanger Operation

Time Critical Task: No

Validation Time: 15 minutes

Critical Step Justification	
Step 12	Excess Letdown flow cannot be established if 1CS-466, EXCESS LETDOWN TO VCT/RCDT, is NOT positioned to the RCDT.
Step 13	Excess Letdown flow cannot be established if 1CS-461, EXCESS LETDOWN valve is NOT opened.
Step 14	Excess Letdown flow cannot be established if 1CS-460, EXCESS LETDOWN valve is NOT opened
Step 17	Exceeding procedural parameters limits for outlet temperatures or pressure could damage the Excess Letdown Heat Exchanger OR the RCDT for this flow path.
Step 19	Exceeding procedural parameters limits for outlet temperatures or pressure could damage the Excess Letdown Heat Exchanger and for this flow path the excess pressure would go to the RCDT.
Step 22	Exceeding procedural parameters limits for outlet temperatures or pressure could damage the Excess Letdown Heat Exchanger and for this flow path the high pressure will lift the Letdown relief which discharges to the PRT.

2016 NRC Exam JPM b - SIMULATOR SETUP

Simulator Operator

- Reset to IC-165
- Password “noinstants”
- Place RED Off Normal placard on PCV-145
- Go to RUN
- Silence and Acknowledge annunciators
- GO TO FREEZE and inform the lead examiner the Simulator is ready. **DO NOT GO TO RUN** until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup information is how IC-165 was developed.

- Initial Simulator IC was IC-19
- GO to RUN
- Place PCV-145 in manual
- Silence Acknowledge and Reset Annunciators
- FREEZE and Snap these conditions to your exam IC

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: _____

Performance Step: 1 **OBTAIN PROCEDURE**

Standard: Obtains OP-107 and reviews P & L's and Section 8.2 for Excess Letdown Heat Exchanger Operation. Reviews and verifies initial conditions are satisfied.

Evaluator Cue:	**Initial conditions have been established**

Comment:

OP-107, Section 8.2, Note prior to step 1

Performance Step: 2

NOTE: Normally Excess Letdown will go to the VCT. However, if plant conditions warrant, the RCDT may be selected. When the Excess Letdown line has been flushed, the VCT position can then be re-selected.

NOTE: If Excess Letdown is to remain in service for sufficient time for dilution or boration to be necessary then VCT level should be lowered to accommodate the expected level increase before placing Excess Letdown in service

NOTE: Placing Excess Letdown in service will result in increased dose rates in the Seal Water Heat Exchanger Room.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-107, Section 8.2, Caution prior to step 1

Performance Step: 3

Caution
Excess Letdown operation during times of BTRS operation may result in damage to the RCP seals (due to increased contaminants and higher pH water). This should not prevent any AOP or EOP actions. The Responsible Engineer for RCP or CVCS may provide additional guidance if needed.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-107, Section 8.2, Step 1

Performance Step: 4

INFORM Radwaste Control Room to monitor Seal Water Filter ΔP while Excess Letdown is in service.

Standard: Contacts RW Control Room operator to monitor Seal Water Filter ΔP while Excess Letdown is in service

Simulator Operator:	**Acknowledge request to monitor Seal Water Filter ΔP while Excess Letdown is in service**

Comment:

OP-107, Section 8.2, Step 2.a

Performance Step: 5

PLACE the excess letdown heat exchanger in operation as follows:

VERIFY 1CC-188, CCW TO EXCESS LETDOWN HEAT EXCHANGER, is open.

Standard: Locates MCB switch for 1CC-188, CCW TO EXCESS LETDOWN HEAT EXCHANGER, verifies it is open

Comment:

OP-107, Section 8.2, Step 2.b

Performance Step: 6 **VERIFY** 1CC-202 SB, CCW FM EXCESS LTDN & RCDT HEAT EXCHANGERS, is open.

Standard: Locates MCB switch for 1CC-202 SB, CCW FM EXCESS LTDN & RCDT HEAT EXCHANGERS, verifies it is open.

Comment:

OP-107, Section 8.2, Step 2.c

Performance Step: 7 **VERIFY** 1CC-176, CCW TO EXCESS LTDN & RCDT HEAT EXCHANGERS, is open.

Standard: Locates MCB switch for 1CC-176, CCW TO EXCESS LTDN & RCDT HEAT EXCHANGERS, verifies it is open.

Comment:

OP-107, Section 8.2, Note prior to step 3

Performance Step: 8 NOTE: Flushing the excess letdown line to the RCDT is required if the boron concentration in the excess letdown line from the RCS isolation valves to 1CS-466 is unknown or differs from RCS concentration. The volume of this line is 74 gallons. Two volumes (148 gallons) should be adequate to prevent unexpected reactivity changes in the RCS when flow is aligned to the VCT.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-107, Section 8.2, Caution prior to step 3

Performance Step: 9 Caution: 1CS-464, HC-137 EXCESS LTDN FLOW is rated for 1500 psid. Anytime that 1CS-464 is exposed to greater than 1500 psid, leakby should be expected.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-107, Section 8.2, Step 3.a

Performance Step: 10 **IF** excess letdown flow is to be aligned to the RCDT, **THEN PERFORM** the following:

NOTIFY Radwaste Control Room of expected RCDT level change.

Standard: Contacts RW Control Room and informs the operator to expect RCDT level change.

Simulator Operator:	**RW Operator acknowledges**

Comment:

OP-107, Section 8.2, Step 3.b

Performance Step: 11 **VERIFY** 1CS-464, HC-137 EXCESS LTDN FLOW is shut (potentiometer to zero).

Standard: Operator verifies HC-137 EXCESS LTDN FLOW is shut (potentiometer to zero).

Comment:

OP-107, Section 8.2, Step 3.c

✓ **Performance Step: 12** **PLACE** 1CS-466, EXCESS LETDOWN TO VCT/RCDT, to the RCDT position.

Standard: Operator locates MCB switch and places 1CS-466, EXCESS LETDOWN TO VCT/RCDT, to the RCDT position.

Comment:

OP-107, Section 8.2, Step 4

✓ **Performance Step: 13** **PLACE** 1CS-461, EXCESS LETDOWN to OPEN.

Standard: Operator locates MCB switch and places 1CS-461, EXCESS LETDOWN valve to OPEN.

Comment:

OP-107, Section 8.2, Step 5

✓ **Performance Step: 14** **PLACE** 1CS-460, EXCESS LETDOWN to OPEN.

Standard: Operator locates switch and places 1CS-460, EXCESS LETDOWN valve to OPEN.

Comment:

OP-107, Section 8.2, Note prior to Step 6

Performance Step: 15

NOTE: Seal Water Flow should be observed on FR-154A and FR-154B when adjusting 1CS-464, HC-137 EXCESS LTDN FLOW for the following reasons:

- RCP No 1 seal leakoff flow will be affected, and
- The possibility exists of lifting the 150 psi safety on the excess letdown/No. 1 seal return line.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-107, Section 8.2, Caution prior to Step 6

Performance Step: 16

Do **NOT** exceed 174°F outlet temperature as indicated on TI-139.

Do **NOT** exceed 150 psig as indicated on PI-138.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-107, Section 8.2, Step 6

✓ **Performance Step: 17** ADJUST 1CS-464, HC-137 EXCESS LTDN FLOW as necessary to establish excess letdown flow, and not exceed the following parameters:

- 174°F outlet temperature as indicated on TI-139
- 150 psig as indicated on PI-138

Standard: Operator adjusts 1CS-464, HC-137 EXCESS LTDN FLOW to establish excess letdown flow while not exceeding 174°F outlet temperature as indicated on TI-139 and 150 psig as indicated on PI-138 until ≥ 148 gallons have been flushed to the RCDT.

Examiner Cue: **(NOTE: This should be enough time for the applicant to determine that an adequate flush has been completed.)**	After adjustments to 1CS-464 have been made establishing Excess letdown to RCDT cue the applicant: **"Time compression is being used; approximately 5 minutes have elapsed since 1CS-464 has been opened."**

Comment:

OP-107, Section 8.2, Step 7.a

Performance Step: 18 IF excess letdown flow is to be aligned to the VCT, THEN PERFORM the following:
VERIFY 1CS-464, HC-137 EXCESS LTDN FLOW is shut (potentiometer to zero).

Standard: Locates and verifies 1CS-464, HC-137 EXCESS LTDN FLOW is SHUT

Comment:

OP-107, Section 8.2, Step 7.b

✓ **Performance Step: 19** PLACE 1CS-466, EXCESS LETDOWN TO VCT/RCDT, to the VCT position.

Standard: Locates MCB switch and places 1CS-466, EXCESS LETDOWN TO VCT/RCDT, to the VCT position.

Comment:

OP-107, Section 8.2, Note Prior to Step 7.c

Performance Step: 20 NOTE: Seal Water Flow should be observed on FR-154A and FR-154B when adjusting 1CS-464, HC-137 EXCESS LTDN FLOW for the following reasons:
• RCP No 1 seal leakoff flow will be affected, and
• The possibility exists of lifting the 150 psi safety on the excess letdown/No. 1 seal return line.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-107, Section 8.2, Caution Prior to Step 7.c

Performance Step: 21 CAUTION :Do NOT exceed 174°F outlet temperature as indicated on TI-139.

CAUTION : Do NOT exceed 150 psig as indicated on PI-138.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-107, Section 8.2, Step 7.c

✓	**Performance Step: 22**	ADJUST 1CS-464, HC-137 EXCESS LTDN FLOW as necessary to establish excess letdown flow and not exceed the following parameters: • 174°F outlet temperature as indicated on TI-139. • 150 psig as indicated on PI-138.
	Standard:	Locates MCB control for 1CS-464, HC-137 EXCESS LTDN FLOW to establish flow and adjusts excess letdown flow while not exceeding 174°F outlet temperature as indicated on TI-139 or 150 psig as indicated on PI-138.
	Comment:	

Examiner Cue:	**NOTE: It may be necessary to ask the candidate if Excess Letdown has been placed in service IF they do not report to the CRS after Excess Letdown has clearly been established.** **After Excess Letdown has been established and reported to the CRS then:** **Announce: I have the shift, END OF JPM** **Inform Simulator Operator to place the Simulator in Freeze.**

Terminating Cue:	**After the candidate has established Excess letdown within temperature and pressure limits and/or Excess letdown flow is > Charging flow JPM is complete.**

STOP TIME: _____

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 NRC Exam Simulator JPM b
Establish Excess Letdown to the VCT
OP-107, Section 8.2, Excess Letdown Heat Exchanger Operation

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	• The unit is operating at 100% power MOL • Normal letdown needs to be secured for maintenance due to a problem with PCV-145 • PCV-145 is in manual

Initiating Cue:	• You are the OATC and have been directed by the CRS to establish Excess Letdown to the VCT per OP-107, Section 8.2. • Excess letdown has not been in service during this refueling cycle

C
CONTINUOUS
USE

HARRIS NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 2

PROCEDURE TYPE: OPERATING PROCEDURE

NUMBER: **OP-107**

TITLE: **CHEMICAL AND VOLUME CONTROL SYSTEM**

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1.0 PURPOSE

This procedure provides initial conditions, precautions, and instructions for placing in service, removing from service, and operating the Chemical and Volume Control System including starting and stopping a CSIP, swapping CSIPs, filling RCP standpipes, charging and letdown operations, and VCT operations.

2.0 REFERENCES

2.1. Plant Operating Manual Procedures

1. PLP-106
2. PLP-702
3. PLP-631
4. OMM-013
5. OP-100
6. OP-102
7. OP-109
8. OP-120.02.39
9. OP-120.04
10. OP-120.07
11. OP-120.08
12. OP-130.01
13. OP-139
14. OP-145
15. OP-151.01
16. OP-152.01
17. OP-152.02
18. OP-156.02
19. OP-161
20. OP-161.01
21. OP-185
22. AOP-003
23. OST-1107
24. OST-1126
25. OST-1814
26. CRC-001
27. CRC-120
28. EPT-857T
29. OPS-NGGC-1303
30. MNT-NGGC-0007
31. CHE-NGGC-0045

2.2. Technical Specifications

1. 3.1.2
2. Table 5.7-1
3. 3.9.1
4. 3.4.6.2
5. 3.4.9.3

2.3. Final Safety Analysis Report

1. 6.3.1
2. 7.4.1
3. 8.3.1
4. 9.3.4
5. 15.4.6

2.4. Drawings

1. 5-S-1303, S01, S02
2. 5-S-1304
3. 5-S-1305
4. 5-S-1307
5. 5-S-1371

2.5. Technical Manuals

1. VM-ISP-V02, Pumps (CSIP)
2. VM-BKF, Valves (Kerotest Mfg. Corp.)

2.6. Corrective Action Program (CAP) Items

1. 84H0361
2. 84H0276
3. 84H0277
4. 85H0047
5. 86H0404
6. 86H0138
7. 86H0635
8. 88H0698
9. 90H0936
10. 91H1257
11. 92H0605
12. 94H0516
13. 94H0596
14. 96H0146
15. NCR 222825
16. CR 509107
17. CR 569593

2.7. Other

1. SHF/10-11720, Serial: SHNPP-84-1217 and SHNPP-85-142 (DIN 842960398 and 851410761)
2. SHF/10-4065 Letter #: MS-850786 (O)
3. SHF/10-13510F Serial: SHNPPA-83-2068
4. Technical Bulletin NSD-TB 77-14
5. ESR 95-00066
6. Information Notice IN 96-11
7. ESR 97-00312
8. ESR 97-00666
9. ESR 01-00085
10. ESR 01-00087
11. SOER 97-1
12. Calculation HNP-M/MECH-1095
13. 10CFR50.48 (c) NFPA 805
14. SC-N-032, Charging Line Flow F-122 (Process Instrumentation Control Scaling Calculations)
15. EC 67999, HNP NFPA 805 Transition
16. EC 71147 Child # 16, Prevent Multiple Spurious Operation Due To Fires In MCC Vertical Stacks- NFPA 805.
17. EC 70350 Child #4, Alternate Seal Injection And Back-Up Diesel Generator System.
18. EC 70350 Child #1, Alternate Seal Injection And Back-Up Diesel Generator System.
19. EC 81919, RCP Seal Water Injection Filter DP Impulse Line Relocation
20. LER 2012-003-00
21. EC 91213, CVCS Over Pressurization

2.7 **Other** (continued)

22. CR 616070

23. EC 95159, Locking Wire for Valves 1CS-495 and 1CS-496

24. EC 91700, B Acid Tank Connection for NTTF 4.2 (FLEX)

25. EC 91695, FLEX RCS Connections for NTTF 4.2 (FLEX)

3.0 PREREQUISITES

1. **VERIFY** the Service Water System is in operation and aligned per OP-139 as necessary to support CVCS operation. _____

2. **VERIFY** the CCW System is in operation and aligned per OP-145 as necessary to support CVCS operation. _____

3. **VERIFY** the Primary Makeup System is in operation and aligned per OP-102 as necessary to support CVCS operation. _____

4. **VERIFY** the Compressed Air System is in operation and aligned per OP-151.01 as necessary to support CVCS operation. _____

5. **VERIFY** the AC Electrical Distribution System is energized and aligned per OP-156.02 as necessary to support CVCS operation. _____

6. **VERIFY** the Waste Gas System is available and aligned per OP-120.07 as necessary to support CVCS operation. _____

7. **VERIFY** Hydrogen gas is available per OP-152.02 as necessary to support CVCS operation. _____

8. **VERIFY** Nitrogen gas is available per OP-152.01 as necessary to support CVCS operation. _____

9. **VERIFY** Freeze Protection and Temperature Maintenance are aligned per OP-161 and OP-161.01. _____

4.0 PRECAUTIONS AND LIMITATIONS

1. The minimum required boration flow paths operable per Tech Specs 3.1.2.1 and 3.1.2.2 must be maintained.

2. The minimum CSIP operability requirements per Tech Specs 3.1.2.3 and 3.1.2.4 must be maintained.

3. The minimum required borated water sources operable per Tech Specs 3.1.2.5 and 3.1.2.6 must be maintained.

4. The oxygen concentration in the VCT must be maintained below four percent to avoid explosive mixtures of hydrogen and oxygen.

5. The temperature of the reactor coolant letdown downstream of the letdown heat exchanger, should be maintained less than 125°F.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

6. The letdown flow must be maintained below its alarm setpoint of 130 gpm.

7. Do not exceed the design flow rate of 60 gpm for the cation bed demineralizer.

8. Before hydrazine addition during startup, the letdown demineralizers shall be valved out of service. When hydrazine level is within acceptable limits and with Chemistry's concurrence, the letdown demineralizers may be placed in service. (Refer to CRC-160)

9. At least 15 psig is required in the VCT to ensure sufficient cooling water to the RCP Number 2 seals.

10. One seal water injection filter is to be in service at all times.

11. T_{AVG} and control rod motion should be monitored following a VCT makeup. Corrective action should be taken to maintain shutdown margin and rod insertion limits.

12. Letdown shall not be in operation without charging.

13. The reactor makeup control system should always be set for automatic makeup except for the following times:

    - during reactor coolant dilution or boration
    - when making up to the RWST, RHT, or VCT
    - when limits of P&L 14 cannot be met

NOTE: FK-113 BORIC ACID FLOW is unstable in the range below 1 gpm except for zero when the valve is fully shut.

14. Automatic makeup can be used routinely for VCT makeup for Boric Acid flow rates between 1 and 30 gpm and RWMU total flow rates between 50 and 120 gpm as determined by OP-107.01 Attachment 7.

15. Automatic makeup can be used as a backup to manual makeup if the Boric Acid Controller is set to either 0.2 or zero (0) gpm and RWMU total flow rate of 120 gpm (Reference Section 5.1).

4.0 PRECAUTIONS AND LIMITATIONS (continued)

16. Do **NOT** operate VCT makeup in automatic if VCT pressure is higher than the normal range. (ESR 97-00312 design calculation limits VCT pressure to between 20 and 30 psig for automatic makeup.)

17. The VCT low level alarm indicates one of the following:

    - A controller malfunction
    - Misalignment of VCT make-up
    - Failure of the level instrument

    Failure to correct the malfunction may result in automatic addition of RWST water to the CSIP suction header.

NOTE: When PRZ backup heaters are energized in manual, PK-444A1, PRZ Master Pressure Controller (a PI controller) will integrate up to a greater than normal output, opening PRZ Spray Valves to return and maintain RCS pressure at setpoint. The result is as follows:

- PORV PCV-444B will open at a lower than expected pressure
- ALB-009-3-2, PRESSURIZER HIGH PRESS DEVIATION CONTROL, will activate at a lower than expected pressure
- Increased probability for exceeding Tech Spec DNB limit for RCS pressure

18. The pressurizer backup heaters should be operated as necessary to limit the difference between pressurizer and the RCS boron concentration to less than 10 ppm.

19. An RCS boron dilution should be anticipated when performing one of the following evolutions and the associated RCS temperature increase will be more noticeable early in core life:

    - Placing a CVCS filter in service
    - RCS chemical addition
    - RCS degassing
    - Lowering VCT Temperature

20. When the reactor is subcritical, the effects of boron dilution must be observed in terms of source range count rate. Prompt corrective action is required if the count rate increases by a factor of two.

21. Boration should be performed before the control rods reach the low-low insertion limit position.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

22. If dilution occurs while the reactor is shut down, criticality should be anticipated at any time.

R 23. An uncontrolled dilution while in cold shutdown or during refueling may require the initiation of the HNP Emergency Plan, or the upgrading of response for a previously declared emergency. Accordingly, information concerning an uncontrolled dilution should be immediately relayed to the Superintendent - Shift Operations and (when the Emergency Plan has already been activated), the Site Emergency Coordinator. Classification of the Emergency should be per the EAL Matrix. (Reference 2.7.1)

24. The following limitations apply to filter operations:

- Reactor Coolant Filter Max ΔP: 20 psid
- Seal Water Injection Filter Max ΔP: 20 psid
- Boric Acid Filter Max ΔP: 20 psid
- Seal Water Return Filter Max ΔP: 20 psid

25. The pressure downstream of the letdown orifices must be maintained above the saturation pressure to prevent flashing of the letdown coolant before it enters the letdown heat exchanger.

R 26. During periods when high coolant activity can be anticipated, utilize the demineralizers to allow for cleanup of the RCS coolant. (Reference 2.7.4)

27. Monitor the temperature differential between the auxiliary spray water and the pressurizer to ensure that if the limit of 320°F is exceeded, the event is logged per OMM-013 and the maximum limit of 625°F is not exceeded.

28. The boric acid batching tank boron concentration must be verified by sample analysis before transfer to the boric acid tank.

29. Before exceeding 250°F, RCS dissolved oxygen shall be reduced to less than 100 ppb.

30. RCP Seal Injection flow should be maintained at all times when the Reactor Coolant System pressure is above atmospheric or when the Reactor Coolant System is being filled.

31. Seal leak-off valves must be shut when the seal injection water is not supplied and the Reactor Coolant System pressure is less than 100 psig. This prevents backflow of potentially dirty water from the volume control tank.

R 32. Minimum allowable flow for a CSIP is 60 gpm for an unlimited time which is provided by normal miniflow during normal operation and alternate miniflow during safety injection. The vendor recommends minimizing time at minimum flow for optimal equipment reliability and longevity. (Reference 2.6.6)

4.0 PRECAUTIONS AND LIMITATIONS (continued)

R 33. Whenever the RCS is water solid and pressure is being maintained by RHR letdown, all three letdown orifice isolation valves shall be open. (Reference 2.6.4)

34. The following limitorque valves can drift open due to system pressure when the valve is placed in manual and shut:

1CS-182	1CS-196	1CS-210	1CS-240
1CS-278	1CS-341	1CS-382	1CS-423
1CS-470	1CS-472	1CS-745	1CS-746
1CS-752	1CS-753		

R 35. Verify that the Chemical and Volume Control System is properly filled and vented before system operation. (Reference 2.6.2)

36. Due to the relationship between VCT pressure and high RCS H_2 concentration, VCT pressure should be maintained between 20 and 30 psig when H_2 is the pressure source.

37. If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the pre-set value.

38. The following guidelines on CSIP starting duty should not be exceeded:

    a. Motor Cold - 3 consecutive starts

    b. Motor at Operating Temperature - 2 consecutive starts

        (1) Subsequent restart attempts are allowed after one of the following requirements:

            (a) Motor has been running for greater than 15 minutes

            (b) Motor has been standing idle for greater than 45 minutes

39. The following guidelines on Boric Acid Transfer Pump starting duty should not be exceeded:

    a. A maximum of 5 start/stop cycles per hour.

    b. If the maximum number of starts and stops have been achieved, it is recommended to wait 15 minutes before the next starting period. Rotating pumps prior to exceeding the 5 start/stop cycles per hour is recommended.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

c. If Boric Acid Transfer Pump starting duties are exceeded, an evaluation should be performed by Engineering.

R 40. If both Boric Acid Transfer Pumps must be run in parallel, verify 1CS-552, BA Recirc Orifice Bypass Isol Valve, is open. (Reference 2.6.8)

41. Diverting letdown flow from the VCT to RHT without modulating may cause the recycle evaporator feed demin to bypass on high ΔP.

42. RCS temperature changes may occur following CSIP pump start if significant boron concentration changes have occurred since pump was last operated.

R 43. An indication of a failed CVCS demineralizer is a sudden and rapid increase in the Reactor Coolant Filter differential pressure. If resin intrusion from a failed CVCS demineralizer is suspected, then bypass the demineralizers and have Chemistry sample the RCS for pH, conductivity, and sulfate. Do **NOT** backflush the Reactor Coolant Filter without first isolating letdown or removing the failed demineralizer from service since to backflush the filter with letdown in service, the filter bypass valve must be opened. Resin intrusion into the reactor coolant has caused sulfate stress corrosion cracking in CRDM penetrations. (Reference 2.7.6)

44. The following electrical interlocks exist between the Letdown Isolation Valves (1CS-1 and 1CS-2) and the Letdown Orifice Isolation Valves (1CS-7, 1CS-8 and 1CS-9):

- All Orifice Isolation Valves must be fully shut before opening the Letdown Isolation Valves.
- If any Orifice Isolation Valves are open and a Letdown Isolation Valve shuts, the Orifice Isolation Valves will shut.

45. Letdown will isolate on Low Pressurizer Level (17%) or a Phase A Isolation Signal.

46. If two CSIPs are in service at the same time, ensure the weaker pump recirc valve is open to provide sufficient flow for cooling **OR** immediately secure one pump. The vendor recommends minimizing time at minimum flow for optimal equipment reliability and longevity.

R 47. There are two Kirk Key interlocks associated with the C CSIP 6.9 KV breakers. One prevents racking in both C CSIP breakers. The other prevents racking in the C CSIP breaker on a bus where the other (A CSIP or B CSIP) breaker is already racked in. (Reference 2.3.3)

48. Management has determined that evolutions in this procedure have FMEA Classifications as noted in applicable sections of this procedure, as described in MNT-NGGC-0007.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

49. Holding the control switch in the shut position for the Letdown Orifice Isolation Valves 1CS-7, 1CS-8 and 1CS-9 will cause the valve to close more quickly than turning the control switch to shut and releasing due to the solenoid arrangement on the valves.

50. Voids may form in the Excess Letdown delay header when the system is removed from service at elevated pressure and temperature due to the hot fluid flashing when pressure is decreased. This may appear as an increase in VCT level.

R 51. RCP Seal Return is normally aligned to the top of the VCT to reduce the potential for hydrogen gas stripping downstream of the CSIP normal miniflow orifices returning to the CSIP suction. (Reference SOER 97-1 and 2.6.9)

52. The following apply during Section 8.11 and 8.12 when reducing/restoring VCT temperature:

    a. When actions are taken to reduce RCP seal injection temperature, RCP Seal leakoff flow is expected to initially increase. In the long term (1 to 3 hours) leakoff flow is expected to stabilize and gradually decrease below its initial values. Several days may be required to complete the reduction in letdown temperature and to stabilize RCP seal leakoff flows.

    b. VCT temperature changes should be performed in a controlled manner to limit the change in RCP seal leakoff rates.

    c. VCT temperature must be allowed to stabilize after any change of approximately 5°F to allow seal leakoff flows to stabilize.

    d. If RCP seal leakoff flow exceeds 5.5 GPM, the RCP Seal injection filters should be swapped as necessary to allow both filters to be backwashed to reduce leakoff flows. During letdown temperature changes, it is preferred the filter swaps and backwashes be performed after letdown temperature and seal leakoffs flow has stabilized.

    e. If RCP seal leakoff flow exceeds 6.0 GPM, any letdown temperature changes should be suspended and a determination made regarding restoration of letdown temperature to its normal range using Section 8.12.

    f. If elevated RCP seal leakoff flows occur and cannot be reduced, implement applicable guidance in AOP-018.

g. Prior to reducing letdown temperature by more than 2°F, 1CS-50 LETDOWN TO VCT/DEMIN must be placed in the VCT position to prevent removal of boron by the CVCS mixed bed demineralizer. Prior to restoring the CVCS mixed bed demineralizer to service, the bed must be rinsed in and equilibrium boron concentration achieved as verified by sampling.

53. The following evolutions may cause controlled leakage to increase, and possibly exceed the Tech Spec maximum:

- Starting an additional CSIP
- Swapping from the weak CSIP to the strong CSIP
- Decreasing Letdown flow
- Increasing VCT level
- Increasing VCT pressure

Controlled leakage must be monitored following any change in CVCS lineup to ensure the Tech Spec requirements remain met.

54. 1CS-464, HC-137 EXCESS LTDN FLOW is rated for 1500 psid. Anytime that 1CS-464 is exposed to greater than 1500 psid, leakby should be expected.

55. Valves are SHUT and power is removed from CSIP A Alternate Miniflow Relief to RWST, 1CS-746 and CSIP B Alternate Miniflow Relief to RWST, 1CS-752 while in Mode 5, 6 and defueled to prevent spurious operation due to fire (EC 67999). (Reference 2.7.15) These valves may be energized and opened briefly for performance of an approved procedure.

56. Upon loss of normal seal injection flow (defined as less than 4.0 gpm to two out of the three RCPs: FIS-7207, FIS-7208, and FIS-7209) the ASI Pump Auto Start Timer will initiate. If seal injection flow is not increased in 2 minutes and 30 seconds the squib valves will be actuated and the ASI Pump will start 15 seconds later.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

57. The RHR to CSIP suction isolation valves are interlocked to allow their manual opening only when BOTH of the following conditions exist:

    a. For the respective valve:

    - 1RH-25 - either 1RH-1 or 1RH-2, or both, must be shut.
    - 1RH-63 - either 1RH-39 or 1RH-40, or both, must be shut.

    b. For either 1RH-25 or 1RH-63:
    (at least one valve in each line must be shut)

    - either 1CS-745 or 1CS-746, or both, must be shut, **AND**
    - either 1CS-752 or 1CS-753, or both, must be shut.

    This interlock with the RCS suction valves is based on preventing cross-connection of the RHR and CVCS suction piping during normal cooldown or heat-up and preventing over pressurization of the CSIP suction piping. The interlock with the miniflow valves is to ensure that post-accident recirculation water from the containment sumps does not enter the RWST.

58. Once the Sequencer is initiated, equipment starting outside of its design load block will result in the Sequencer being inoperable. Tech Spec 3.8.1.1.h is applicable until the breaker for the affected load is opened.

59. When Mixed Bed (Letdown) Demineralizers are taken out of service or bypassed for any reason, RP shall be notified to assess any radiation level changes.

60. Caution should be taken to avoid extened operation of both the main lube oil pump and aux lube oil pump simultaneously, as this causes higher than normal lube oil pressures that may result in equipment malfunctions. If lube oil pressure can not be maintained by the main lube oil pump, the CSIP should be secured and the problem corrected. An example of this is starting the aux lube oil pump to avoid nuisance alarms. (QCE 581187)

61. Per Tech Spec 3.8.1.1 - If a component powered from a safety bus cannot be secured due to issues such as trip coil failures, control power malfunctions, or other breaker problems, then Tech Spec 3.8.1.1 must be evaluated to determine EDG operability. This is due to potential impacts to sequencing and load shedding requirements.

62. CSIP casing drain valves 1CS-175, 1CS-176, 1CS-189, 1CS 190, 1CS-203, and 1CS-204 have a history of leaking past their seats. Maintenance should apply proper torque when these Kerotest MFG 1" Y-type globe valves are shut. Vendor manual, VM-BKF, states that the nominal operating torque, by means of the handle, for ¾" and 1" valves is 35 ft-lb.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

63. CVCS design pressure is 2800 psig. Certain individual components in the normal miniflow alignment and the alternate miniflow alignment have been re-evaluated to 3100 psig. The Boron Injection Tank (BIT) cannot be uprated above 2800 psig, thus requiring isolation from the peak pressure spike during start of the first CSIP. (Ref. 2.7.21)

8.2. Excess Letdown Heat Exchanger Operation

8.2.1. Initial Conditions

1. CCW is being supplied to the excess letdown heat exchanger per OP-145. _____

2. RCP Seal Return is in service per Section 5.2. _____

8.2.2. Procedural Steps

NOTE: Normally Excess Letdown will go to the VCT. However, if plant conditions warrant, the RCDT may be selected. When the Excess Letdown line has been flushed, the VCT position can then be re-selected.

NOTE: If Excess Letdown is to remain in service for sufficient time for dilution or boration to be necessary then VCT level should be lowered to accommodate the expected level increase before placing Excess Letdown in service

NOTE: Placing Excess Letdown in service will result in increased dose rates in the Seal Water Heat Exchanger Room.

CAUTION

Excess Letdown operation during times of BTRS operation may result in damage to the RCP seals (due to increased contaminants and higher pH water). This should not prevent any AOP or EOP actions. The Responsible Engineer for RCP or CVCS may provide additional guidance if needed.

R 1. **INFORM** Radwaste Control Room to monitor Seal Water Filter ΔP while Excess Letdown is in service. (Reference 2.6.11) _____

2. **PLACE** the excess letdown heat exchanger in operation as follows:

   a. **VERIFY** 1CC-188, CCW TO EXCESS LETDOWN HEAT EXCHANGER, is open. _____

   b. **VERIFY** 1CC-202 SB, CCW FM EXCESS LTDN & RCDT HEAT EXCHANGERS, is open. _____

   c. **VERIFY** 1CC-176, CCW TO EXCESS LTDN & RCDT HEAT EXCHANGERS, is open. _____

NOTE: Flushing the excess letdown line to the RCDT is required if the boron concentration in the excess letdown line from the RCS isolation valves to 1CS-466 is unknown or differs from RCS concentration. The volume of this line is 74 gallons. Two volumes (148 gallons) should be adequate to prevent unexpected reactivity changes in the RCS when flow is aligned to the VCT.

CAUTION

1CS-464, HC-137 EXCESS LTDN FLOW is rated for 1500 psid. Anytime that 1CS-464 is exposed to greater than 1500 psid, leakby should be expected.

3. **IF** excess letdown flow is to be aligned to the RCDT,
   THEN PERFORM the following:

   a. **NOTIFY** Radwaste Control Room of expected RCDT level change. _____

   b. **VERIFY** 1CS-464, HC-137 EXCESS LTDN FLOW is shut (potentiometer to zero). _____

   c. **PLACE** 1CS-466, EXCESS LETDOWN TO VCT/RCDT, to the RCDT position. _____

4. **PLACE** 1CS-461, EXCESS LETDOWN to OPEN. _____

5. **PLACE** 1CS-460, EXCESS LETDOWN to OPEN. _____

NOTE: Seal Water Flow should be observed on FR-154A and FR-154B when adjusting 1CS-464, HC-137 EXCESS LTDN FLOW for the following reasons:

- RCP No 1 seal leakoff flow will be affected, and
- The possibility exists of lifting the 150 psi safety on the excess letdown/No. 1 seal return line.

CAUTION

Do **NOT** exceed 174°F outlet temperature as indicated on TI-139.

CAUTION

Do **NOT** exceed 150 psig as indicated on PI-138.

6. **ADJUST** 1CS-464, HC-137 EXCESS LTDN FLOW as necessary to establish excess letdown flow, and not exceed the following parameters:

   - 174°F outlet temperature as indicated on TI-139. _____
   - 150 psig as indicated on PI-138. _____

7. **IF** excess letdown flow is to be aligned to the VCT,
   THEN PERFORM the following:

   a. **VERIFY** 1CS-464, HC-137 EXCESS LTDN FLOW is shut (potentiometer to zero). _____

   b. **PLACE** 1CS-466, EXCESS LETDOWN TO VCT/RCDT, to the VCT position. _____

NOTE: Seal Water Flow should be observed on FR-154A and FR-154B when adjusting 1CS-464, HC-137 EXCESS LTDN FLOW for the following reasons:

- RCP No 1 seal leakoff flow will be affected, and
- The possibility exists of lifting the 150 psi safety on the excess letdown/No. 1 seal return line.

CAUTION

Do **NOT** exceed 174°F outlet temperature as indicated on TI-139.

CAUTION

Do **NOT** exceed 150 psig as indicated on PI-138.

c. **ADJUST** 1CS-464, HC-137 EXCESS LTDN FLOW as necessary to establish excess letdown flow and not exceed the following parameters:

- 174°F outlet temperature as indicated on TI-139. _____
- 150 psig as indicated on PI-138. _____

d. **IF** it is necessary to lower VCT level,
THEN ALIGN Excess Letdown to the RCDT per Step 8.2.2.3. _____

8. **DIRECT** Health Physics Technician to survey the Seal Return Heat Exchanger Room. _____

8.2.2 Procedural Steps (continued)

9. **WHEN** excess letdown is no longer required,
THEN REMOVE the Excess Letdown Heat Exchanger from operation as follows:

   a. **SHUT** 1CS-464, HC-137 EXCESS LTDN FLOW (potentiometer to zero). _____

   b. **SHUT** 1CS-461, EXCESS LETDOWN. _____

   c. **SHUT** 1CS-460, EXCESS LETDOWN. _____

   d. **VERIFY** 1CS-466, EXCESS LETDOWN TO VCT/RCDT, is in the VCT position. _____

   e. **DIRECT** Radwaste Control Room to swap and backflush the Seal Injection Filter per OP-120.02.39 Section 5.7 or 5.8. _____

NOTE: 1CS-464 is opened to allow the delay header to refill with back flow from the RCP seal return header after void is formed during delay header cooling.

NOTE: VCT level could increase by 1 to 3 percent during the delay header cooldown and then decrease by 1 to 3 percent once the delay header has cooled and is refilling.

NOTE: Voiding and refilling of the delay header may be trended using TCS0139, Excess Letdown HX Outlet Temp, and LCS0115, VCT Level.

NOTE: Past experience has shown that the delay header will cool within 6 hours.

   f. **WHEN** Excess Letdown flow has been isolated for at least 6 hours,
   THEN PERFORM the following to allow the delay header to refill.

      (1) **OPEN** 1CS-464, HC-137 EXCESS LTDN FLOW (potentiometer to 100%). _____

      (2) **WHEN** VCT level changes due to refilling of the delay header have ceased,
      AND TCS0139 is stable at close to containment ambient temperature,
      THEN SHUT 1CS-464, HC-137 EXCESS LTDN FLOW (potentiometer to zero). _____

8.2.2 Procedural Steps (continued)

10. **DIRECT** Health Physics Technician to survey the Seal Return Heat Exchanger Room. _____

11. **COMPLETE** Section 8.2.3. _____

8.2.3. Excess Letdown Heat Exchanger Operation Configuration Control Closeout

COMPONENT NUMBER	COMPONENT DESCRIPTION	POSITION	CHECK	VERIFY
1CS-461	EXCESS LETDOWN	SHUT	_____	_____
1CS-460	EXCESS LETDOWN	SHUT	_____	_____
1CS-466	EXCESS LETDOWN TO VCT/RCDT	VCT	_____	_____
1CS-464	HC-137 EXCESS LTDN FLOW	SHUT	_____	_____

All personnel performing this section for alignment or verification must supply their initials and name below.

Initials	Name (Print)	Initials	Name (Print)

Approved by _____ _____
CRS Date

After receiving the final review signature, this OP Section becomes a QA RECORD.

Facility: Harris Nuclear Plant Task No.: 301150H601

Task Title: Transfer To Hot Leg Recirculation JPM No.: 2016 HNP NRC Exam Simulator JPM CR c

K/A Reference: 011-EK3.13 RO 3.8 / SRO 4.2 **ALTERNATE PATH - YES**

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• The plant was operating at 100% power and subsequently has experienced a Large Break LOCA. • The ESF equipment is operating and presently aligned per EOP ES-1.3, Transfer to Cold Leg Recirculation.

Initiating Cue:	• Your position is the OATC • 6.5 hours have passed since the LOCA occurred. • The CRS directs you to implement EOP ES-1.4, Transfer Between Cold Leg and Hot Leg Recirculation and perform steps 1 – 5 to transfer to Hot Leg recirculation. • **The BOP will acknowledge annunciators not associated with your task.**

Evaluator Note:	**The candidates should be briefed outside of the Simulator prior to performing this JPM. Provide them with a copy of the procedure.** **This will allow them to review the procedure and perform a task preview of the steps to accomplish transfer between cold and hot leg recirculation. Expect that the candidates will take about 5-10 minutes to complete this review.**

Task Standard: Transfer to hot leg recirculation is accomplished IAW ES-1.4.

Required Materials: EOP ES-1.4, Rev. 0

General References: EOP ES-1.4, Rev. 0

Time Critical Task: No

Validation Time: 20 minutes

Critical Step Justification	
Step 6	Without shutting 1SI-340 and 1SI-341 RHR flow would continue to flow to the cold legs
Step 7	Without opening 1SI-359 RHR flow would not be lined up to deliver flow to the hot legs therefore hot leg recirculation would not occur.
Step 11	Secures CSIP flow to prevent dead head conditions (no mini-flow protection) during flow path realignment
Steps 14 and 15	Must reopen 1SI-52 and restart 'A' CSIP to re-establish cold leg High Head Safety Injection flow in accordance with RNO action
Step 18	Secures CSIP flow to prevent dead head conditions (no mini-flow protection) during flow path realignment
Step 19	Without shutting 1SI-3 AND 1SI-4 CSIP flow would continue to flow to the RCS cold legs
Step 20	Must open 1SI-86 to establish flow path for 'B' CSIP to hot legs
Step 21	Restarts CSIP to re-establish High Head Safety Injection flow to the hot legs
Step 23	Secures CSIP flow to deadheading CSIP during subsequent valve lineup
Step 24	Must shut 1SI-52 to prevent CSIP flow to cold legs
Step 25 and 26	Must open miniflow isolation valves to relieve pressure locking on 1SI-107
Step 27	Must restart the 'A' CSIP to establish flow to the hot legs
Step 28	Must open valve to establish a Hot leg Recirc flow path
Step 29	Must secure mini-flow lineup to complete 'A' CSIP flow path to the hot legs
Step 30	Must secure mini-flow lineup to complete 'A' CSIP flow path to the hot legs

2016 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-166
- Password "noinstants"
- (**IF NEEDED**) The 86 relays should roll when the simulator is placed in run. If not then run the APP file "Roll 86 Gen" or they can be manually overridden with override LO's
  - XGAO018A GEN LOCKOUT G1A-TRIP COIL ON
  - XGBO017A GEN LOCKOUT G1B-TRIP RELAY ON
- Put this file in the AMS folder: 2016NRCJPMcCAEP
- Go to RUN
- Silence and Acknowledge annunciators

- GO TO FREEZE and inform the lead examiner the Simulator is ready. **DO NOT GO TO RUN** until directed by the lead examiner. (The examiner has provided the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup information is how to develop the exam IC. Since the JPM recreates a pressure locked valve (1SI-107 will not open under pressure) a CAEP and several triggers need to be created.

- Initial Simulator IC was IC-19
- Tie a LB LOCA to Trigger 1
  - imf RCS01A 0 100
- You will need to create a CAEP file and use this file to allow the candidate to take the switch for 1SI-107 to OPEN without the valve opening when tried on the first attempt. The CAEP file will delete the malfunction that has the valve wheel engaged and set to 0 (shut). I named the CAEP 2016NRCJPMcCAEP. In the future you can name it whatever you desire. Simulator exam security did not allow me to leave this CAEP in the CAEP folder so I saved it to my portable hard drive and loaded it for validation and the examination.
- CAEP 2016NRCJPMcCAEP
  - dmf sis083
  - mrf sis082 (n 0 0) DISENGAGE
- Create 2 trigger files (these files are now saved on the Simulator so you will NOT have to recreate these trigger files – this is just what I did. Makes sure you have spaces before and after the equal signs and dashes for the name of the file.)
  - CSIP_A_switch_to_START
    - xa2i127 == 3
  - 1SI-107OPEN
    - @xa1i102|JIS|DI.value==4
- Now open the Event Trigger Summary (ET) to assign some files to triggers 1 + 2
  - Trigger 1 – click assign file – scroll through the files and assign this file
    - CSIP_A_switch_to_START
  - Click on link command and type this in the box
    - trg= 2 APP! "2016NRCJPMcCAEP"
  - Trigger 2 – click assign file – scroll through the files and assign this file
    - 1SI-107OPEN

Continued on next page:

IC development for JPM CR c (continued)

- Insert a malfunction to maintain 1SI-107 shut (engage manual hand wheel and set valve position to 0 – shut)
  - irf sis082 (n 0 0) ENGAGE
  - irf sis083 (n 0 0) 0 00:00:00 0
  -

GO to RUN

- Run trigger 1 (LB LOCA) this will cause a rapid Reactor Trip and SI
- Perform foldout actions of E-0 to trip all RCPs when RCS pressure is < 1400 psig and SI flow is > 200 gpm
- Perform additional actions of E-0 (including energizing 1A1 and 1B1 and adjusting AFW flows as necessary) then transition to E-1
- Energize power to CSIP cross connect valves
  - Run AMS file cvc\E-0 Att 3 CSIP suct & disc valve power
- Energize Accumulator discharge valves
  - Run AMS file cvc\path-1 Att. 6
- Continue with E-1 steps up to wait for 6.5 hours
- Allow RWST level to decrease until < 23.4%
- With RWST level < 23.4% perform EOP ES-1.3 Cold Leg Recirc Lineup
  - Cold Leg Recirc Lineup established IAW ES-1.3

- Silence Acknowledge and Reset Annunciators

- FREEZE and Snap these conditions to your exam IC

Evaluator Note:	***During the performance of this JPM a RED path condition may occur for RCS Integrity. This is expected since the RCS has depressurized from the LB LOCA event. Since RCS pressure is < 230 psig and RHR Hx header flow is > 1000 gpm the actions are to return to procedure and step in effect.*** ***IF the candidate stops progressing with the procedure in effect cue them that EOP-FR-P.1, Response To Imminent Pressurized thermal Shock has already been addressed. Continue with your actions.***

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: _____

OBTAIN PROCEDURE

Performance Step: 1 Procedure EOP ES-1.4 obtained

Standard: Locates a copy of EOP ES-1.4 and goes to Step 1

Comment:

EOP ES-1.4, Note prior to Step 1

Performance Step: 2

NOTE: IF an RHR pump and/or CSIP has been secured to mitigate blockage of the associated recirculation sump, **THEN** it should **NOT** be restarted during implementation of this procedure. All valve alignments; however, should be performed.

NOTE: Monitoring for degraded recirculation sump performance and evaluation of potential mitigating actions is to continue during implementation of and following transition from this procedure

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Evaluator Cue:	**The recirc sump levels are >142" and there are no signs of degraded performance. IF the candidate takes more than a minute to evaluate the recirculation sumps:** **Cue: Another Operator will monitor the Containment Recirc Sumps for indications of Sump Blockage or Degradation**

Comment:

EOP ES-1.4, Step 1

Performance Step: 3

Check Charging System Status:
a. Check charging line - ISOLATED

Standard: Locates charging line flow indicator or isolation valve indicators and determines that flow through charging line is isolated. Proceeds to step 2 of ES-1.4

Comment:

EOP ES-1.4, Step 2

Performance Step: 4 Check SI Systems - ALIGNED FOR COLD LEG RECIRCULATION

Standard: Determines that SI systems are aligned for Cold Leg Recirculation. (Also part of turnover)

Comment:

EOP ES-1.4, Note prior to Step 3

Performance Step: 5 Steps 3, 4 AND 5 will transfer the SI system from cold leg recirculation to hot leg recirculation.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

EOP ES-1.4, Step 3.a

✓ **Performance Step: 6** Align RHR Pumps For Hot Leg Recirculation**:**

a. Shut low head SI to cold leg valves:
   - 1SI-340
   - 1SI-341

Standard:

1. Locates 1SI-340 control switch, verifies that the control power is ON and 1SI-340 is SHUT
2. Locates 1SI-341 control switch, energizes control power
3. Takes switch for 1SI-341 out of pull to lock then takes the switch to SHUT

Examiners NOTE:	**IF required to cue candidate due to confusion as to why 1SI-340 is powered and shut tell them:** **1SI-340 has it's power on and is shut from the Cold Leg Recirc alignment that has already been completed.**

Comment:

EOP ES-1.4, Step 3.b

✓ **Performance Step: 7**

b. Open low head SI to hot leg valve:
- 1SI-359

Standard:

a. Locates 1SI-359 control switch
b. Energizes control power
c. Takes switch for 1SI-359 out of pull to lock then takes switch to OPEN

Comment:

EOP ES-1.4, Caution prior to Step 4

Performance Step: 8

CAUTION: Simultaneous flow through two injection headers by one CSIP may cause pump run out (as indicated by oscillating discharge pressure).

Standard:

Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

EOP ES-1.4, Step 4.a

Performance Step: 9

Align Train A CSIP For Hot Leg Recirculation:
a. Check Train A CSIP - RUNNING

Standard:

Identifies CSIP A is running

Comment:

EOP ES-1.4, Step 4.b

Performance Step: 10 b. Check alternate high head SI to cold leg valve – OPEN
- 1SI-52

Standard: Identifies control power is on and 1SI-52 is OPEN

Comment: **This is the way the valve was aligned for Cold Leg Recirc.**

EOP ES-1.4, Step 4.c

✓ **Performance Step: 11** c. Stop Train A CSIP.

Standard: Locates CSIP A control switch and takes the pump to STOP.
(May inform CRS that 'A' CSIP will be stopped)

Comment:

Evaluator Cue:	**IF CRS is informed that 'A' CSIP will be stopped acknowledge the communication.**

EOP ES-1.4, Step 4.d

Performance Step: 12 d. Shut alternate high head SI to cold leg valve:
- 1SI-52

Standard: Locates 1SI-52 control switch (control power is already ON) and takes the valve to SHUT

Comment:

*** Evaluator / Simulator Operator Information:**	**NOTE: 1SI-107 is failed closed (handwheel is engaged and valve position set to 0% open). Do NOT delete the valve position at 0% open or engage the handwheel. IF the failure is deleted the valve will immediately go back to OPEN.** **An AMS file with a conditional trigger has been developed to delete the failure of 1SI-107 (handwheel engaged and position at 0% open). The malfunction for 1SI-107 is modified when the A CSIP switch is taken to START which takes place AFTER the candidate attempts to open 1SI-107.**

EOP ES-1.4, Step 4.e

Performance Step: 13

e. Open alternate high head SI to hot leg valve:
- 1SI-107

Standard:

a. Locates 1SI-107 control switch
b. Energizes control power
c. Takes switch for 1SI-107 out of pull to lock then takes the switch to OPEN

Identifies that 1SI-107 **WILL NOT OPEN**. Informs the CRS that 1SI-107 will not open and implements the RNO for step 4.e

Comment:

Evaluator Cue:	**Acknowledge any communication that 1SI-107 will not open and communications with alternate path activities (1SI-52 and 'A' CSIP restart).**

Alternate Path starts here

RNO EOP ES-1.4, Step 4.e

✓ **Performance Step: 14**

e. Perform the following:
   1) Reopen alternate high head SI to cold leg valve: 1SI-52
   2) Consult the plant operations staff to evaluate use of Attachment 1 to open the alternate high head SI to hot leg valve while continuing with this procedure.

Standard: **Locates control switch for 1SI-52 and takes switch to OPEN.**
Contacts plant operations staff (or informs CRS to contact plant operations staff) to evaluate use of Attachment 1

Comment:

Evaluator OR Simulator Operator Cue:	**CRS acknowledge need to contact plant operations staff OR if plant staff is contacted then acknowledge request to evaluate use of Attachment 1.**

EOP ES-1.4, Step 4.f

Performance Step: 15

f. Restart the Train A CSIP.

✓ **Standard:** Locates CSIP A control switch and takes the pump to START.
(May inform the CRS that 'A' CSIP will be restarted)

Comment:

Evaluator Cue:	**IF CRS is informed that 'A' CSIP will be started acknowledge the communication.**

EOP ES-1.4, Step 5.a

Performance Step: 16 Align Train B CSIP For Hot Leg Recirculation:
a. Check Train B CSIP - RUNNING

Standard: Identifies CSIP B is running

Comment:

EOP ES-1.4, Step 5.b

Performance Step: 17
b. Check any BIT outlet valve – OPEN
- 1SI-3
- 1SI-4

Standard: Identifies 1SI-3 and 1SI-4 are OPEN

Comment:

Evaluator Note:	**With the current plant configuration when the 'B' CSIP is stopped the Alternate Seal Injection (ASI) timers will start due to RCP seal water flow decreasing to < 4 gpm. (Flow is provided by the 'B' CSIP only at this time).** **If flow is not restored by restarting the 'B' CSIP within 2 minutes and 30 seconds the ASI squib valves will actuate and the ASI pump will start 15 seconds later. This will not change the hot leg injection line up but…if the ASI pump starts the candidate may refer to AOP-018, the annunciator directions, or OP-185 to secure the ASI pump operation.** **IF the candidate stops performing the actions of ES-1.4 to address the ASI system then Cue:** **Another operator will address the ASI system response.**

EOP ES-1.4, Step 5.c

✓ **Performance Step: 18**

c. Stop Train B CSIP.

Standard: Locates CSIP B control switch and takes the pump to STOP. (May inform CRS that 'B' CSIP will be stopped)

Comment:

Evaluator Cue:	**IF CRS is informed that 'B' CSIP will be stopped acknowledge the communication.**

EOP ES-1.4, Step 5.d

✓ **Performance Step: 19**

d. Shut BIT outlet valves:
- 1SI-3
- 1SI-4

Standard: Locates 1SI-3 and 1SI-4 control switches and takes the valves to SHUT

Comment:

EOP ES-1.4, Step 5.e

✓ **Performance Step: 20**

e. Open high head SI to hot leg valve:
- 1SI-86

Standard:

a. Locates 1SI-86 control switch
b. Energizes control power
c. Takes 1SI-86 switch out of pull to lock then takes switch to OPEN

Comment:

EOP ES-1.4, Step 5.f

✓ **Performance Step: 21**

f. Restart the Train B CSIP.

Standard:

Locates CSIP B control switch and takes the pump to START.
(May inform CRS that 'B' CSIP will be started)

NOT CRITICAL: Reports to CRS that 'A' CSIP is still in Cold Leg Recirc due to 1SI-107 not opening and 'B' CSIP is now in Hot Leg Recirc line up.

Comment:

Evaluator Cue:	**Acknowledge any communications then cue below:** **CRS to candidate:** **Plant operations staff has completed an evaluation of using Attachment 1 and the directions are to perform Attachment 1. Start with step 1 to attempt to open 1SI-107.** **Report the position of 1SI-107 to CRS when complete.**

EOP ES-1.4, Attachment 1 Note and Caution prior to step 1

Performance Step: 22

NOTE: This attachment provides guidance to open high head injection valves that are pressure locked. The effects of pressure locking are relieved by operating the associated CSIP.

CAUTION: CSIPs should **NOT** be operated unless the associated normal miniflow isolation valves are open.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

EOP ES-1.4, Attachment 1, step 1

✓ **Performance Step: 23**

To Open Alternate Hot Leg Valve (1SI-107) Perform The Following:

a. Stop Train A CSIP.

Standard: Locates MCB control switch for 'A' CSIP and places switch to stop.

(May inform CRS that 'A' CSIP will be stopped)

Comment:

Evaluator Cue:	**IF CRS is informed that 'A' CSIP will be stopped acknowledge the communication.**

EOP ES-1.4, Attachment 1, step 1

✓ **Performance Step: 24**

b. Shut alternate high head SI to cold leg valve: 1SI-52

Standard: Locates 1SI-52 control switch and takes the valve to SHUT

Comment:

*** Evaluator:**	**Ensure that the Simulator Operator has ran the AMS file that will delete the malfunction of 1SI-107 when the switch is take to OPEN.**

EOP ES-1.4, Attachment 1, step 1

✓ **Performance Step: 25**

c. Open the common CSIP normal miniflow isolation valve: 1CS-214

Standard: Locates 1CS-214 control switch and takes switch to OPEN

Comment:

EOP ES-1.4, Attachment 1, step 1

✓ **Performance Step: 26**

d. Open the associated Train A CSIP normal miniflow isolation valve:

☐ **1CS-182 (CSIP 1A-SA)**

☐ 1CS-210 (CSIP 1C-SAB)

Standard: Locates 1CS-182 control switch and takes switch to OPEN

Comment:

EOP ES-1.4, Attachment 1, step 1

✓ **Performance Step: 27** e. Restart the Train A CSIP.

Standard: Locates the control switch for 'A' CSIP and STARTS the pump.
(May inform CRS that 'A' CSIP will be started)

Comment:

Evaluator Cue:	**IF CRS is informed that 'A' CSIP will be started acknowledge the communication.**

EOP ES-1.4, Attachment 1, step 1

✓ **Performance Step: 28** f. Open alternate high head SI to hot leg valve: 1SI-107

Standard: Locates 1SI-107 control switch and takes it to OPEN
(Valve opens)
Informs CRS that 1SI-107 has opened.

Comment:

Evaluator Cue:	**Acknowledge communication.**

EOP ES-1.4, Attachment 1, step 1

✓ **Performance Step: 29** g. Shut the common CSIP normal miniflow isolation valve: 1CS-214

Standard: Locates 1CS-214 and takes switch to SHUT

Comment:

EOP ES-1.4, Step 6

✓ **Performance Step: 30**

h. Shut the associated Train A CSIP normal miniflow isolation valve:

☐ **1CS-182 (CSIP 1A-SA)**

☐ 1CS-210 (CSIP 1C-SAB)

Standard: Locates 1CS-182 control switch and takes switch to SHUT

Reports to CRS that 1SI-107 has opened and the 'A' CSIP is in the Hot Leg Recirc lineup

Comment:

Evaluator Cue:	**CRS acknowledge report.** **After the candidate has reported completion of Attachment 1 step 1: Evaluation on this JPM is complete.** **I have the shift, END OF JPM** **Inform Simulator Operator to place the Simulator in Freeze.**

STOP TIME: _____

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 HNP NRC Exam Simulator JPM CR c

Transfer to Hot Leg Recirculation
IAW EOP ES-1.4.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	• The plant was operating at 100% power and subsequently has experienced a Large Break LOCA. • The ESF equipment is operating and presently aligned per EOP ES-1.3, Transfer to Cold Leg Recirculation.

Initiating Cue:	• Your position is the OATC • 6.5 hours have passed since the LOCA occurred. • The CRS directs you to implement EOP ES-1.4, Transfer Between Cold Leg and Hot Leg Recirculation and perform steps 1 – 5 to transfer to Hot Leg recirculation. • **The BOP will acknowledge annunciators not associated with your task.**

HARRIS NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 4

PROCEDURE TYPE: EMERGENCY OPERATING PROCEDURE (EOP)

NUMBER:

EOP-ES-1.4

TITLE: # TRANSFER TO HOT LEG RECIRCULATION

PURPOSE

This procedure provides the necessary instructions for transferring the safety injection system to hot leg and cold leg recirculation.

SYMPTOMS AND ENTRY CONDITIONS

This guideline is entered:

1) From E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 24, when the specified time interval has elapsed, or

2) When a decision is made, based upon the recommendation of the Plant Engineering Staff, that transfer to hot-leg recirculation is required. Transfer to hot-leg recirculation might be required, eventually, after transferring to cold-leg recirculation during the implementation of:

   a. ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION;
   b. ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT û SUBCOOLED RECOVERY DESIRED;
   c. ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT û SATURATED RECOVERY DESIRED.

MAJOR ACTION CATEGORIES

- Align Low-Head SI Flow Path for Hot Leg Recirculation
- Align High-Head SI Flow Path for Hot Leg Recirculation

INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

- **IF** an RHR pump and/or CSIP has been secured to mitigate blockage of the associated recirculation sump, **THEN** it should **NOT** be restarted during implementation of this procedure. All valve alignments; however, should be performed.
- Monitoring for degraded recirculation sump performance and evaluation of potential mitigating actions is to continue during implementation of and following transition from this procedure.

1. Check Charging System Status:

☐ a. Check charging line - ISOLATED	☐ a. RETURN TO procedure **AND** step in effect.
☐ 2. Check SI Systems - ALIGNED FOR COLD LEG RECIRCULATION	☐ 2. Observe **NOTE** prior to Step 8 **AND** GO TO Step 8.

INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

Steps 3, 4 AND 5 will transfer the SI system from cold leg recirculation to hot leg recirculation.

3. Align RHR Pumps For Hot Leg Recirculation:

   a. Shut low head SI to cold leg valves:

   ☐ 1SI-340
   ☐ 1SI-341

   b. Open low head SI to hot leg valve:

   ☐ 1SI-359

   ☐ c. Observe **CAUTION** prior to Step 4 **AND** Continue with Step 4.

   ☐ a. **WHEN** both valves shut, **THEN** do Step 3b.

   ☐ Observe **CAUTION** prior to Step 4 **AND** Continue with Step 4.

   b. Perform one of the following to establish low head SI flow (listed in order of preference):

   1) Open low head SI train B to cold leg valve:

   ☐ 1SI-341

   2) Open low head SI train A to cold leg valve:

   ☐ 1SI-340

   ☐ Consult plant operations staff for recommendations concerning subsequent transfers between hot leg and cold leg recirculation.

INSTRUCTIONS	RESPONSE NOT OBTAINED

CAUTION

Simultaneous flow through two injection headers by one CSIP may cause pump runout (as indicated by oscillating discharge pressure).

4. Align Train A CSIP For Hot Leg Recirculation:

☐ a. Check Train A CSIP - RUNNING	☐ a. GO TO Step 5.
b. Check alternate high head SI to cold leg valve - OPEN	☐ b. GO TO Step 5.
☐ 1SI-52	
☐ c. Stop Train A CSIP.	
d. Shut alternate high head SI to cold leg valve:	☐ d. Restart the Train A CSIP.
☐ 1SI-52	☐ GO TO Step 5.
e. Open alternate high head SI to hot leg valve:	e. Perform the following:
☐ 1SI-107	1) Reopen alternate high head SI to cold leg valve:
	☐ 1SI-52
	☐ 2) Consult the plant operations staff to evaluate use of Attachment 1 to open the alternate high head SI to hot leg valve while continuing with this procedure.
☐ f. Restart the Train A CSIP.	

INSTRUCTIONS	RESPONSE NOT OBTAINED
5. Align Train B CSIP For Hot Leg Recirculation:	
☐ a. Check Train B CSIP - RUNNING	☐ a. GO TO Step 6.
b. Check any BIT outlet valve - OPEN	☐ b. GO TO Step 6.
☐ • 1SI-3	
☐ • 1SI-4	
☐ c. Stop Train B CSIP.	
d. Shut BIT outlet valves:	☐ d. Restart the Train B CSIP.
☐ 1SI-3 ☐ 1SI-4	☐ GO TO Step 6.
e. Open high head SI to hot leg valve:	e. Perform the following:
☐ 1SI-86	1) Reopen BIT outlet valves: ☐ 1SI-3 ☐ 1SI-4
	☐ 2) Consult the plant operations staff to evaluate use of Attachment 1 to open the high head SI to hot leg valve while continuing with this procedure.
☐ f. Restart the Train B CSIP.	
☐ 6. Change From Hot Leg To Cold Leg Recirculation In 6.5 HOURS Using This Procedure.	
☐ 7. RETURN TO Procedure **AND** Step In Effect.	

INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

Steps 8, 9 AND 10 will transfer the SI system from hot leg recirculation to cold leg recirculation.

8. Align RHR Pumps For Cold Leg Recirculation:

a. Shut low head SI to hot leg valve:	☐ a. **WHEN** valve shut then do step 8b.
☐ 1SI-359	☐ Observe **CAUTION** prior to Step 9 **AND** Continue with Step 9.
b. Open low head SI train B to cold leg valve:	b. Open low head SI train A to cold leg valve:
☐ 1SI-341	☐ 1SI-340

INSTRUCTIONS	RESPONSE NOT OBTAINED

CAUTION

Simultaneous flow through two injection headers by one CSIP may cause pump runout (as indicated by oscillating discharge pressure).

9. Align Train A CSIP For Cold Leg Recirculation:

☐ a. Check Train A CSIP - RUNNING	☐ a. GO TO Step 10.
b. Check alternate high head SI to hot leg valve - OPEN	☐ b. GO TO Step 10.
☐ 1SI-107	
☐ c. Stop Train A CSIP.	
d. Shut alternate high head SI to hot leg valve:	☐ d. Restart the Train A CSIP.
☐ 1SI-107	☐ GO TO Step 10.
e. Open alternate high head SI to cold leg valve:	e. Perform the following:
☐ 1SI-52	1) Reopen alternate high head SI to hot leg valve:
	☐ 1SI-107
	☐ 2) Consult the plant operations staff to evaluate use of Attachment 1 to open the alternate high head SI to cold leg valve while continuing with this procedure.
☐ f. Restart the Train A CSIP.	

INSTRUCTIONS	RESPONSE NOT OBTAINED
10. Align Train B CSIP For Cold Leg Recirculation:	
☐ a. Check Train B CSIP - RUNNING	☐ a. GO TO Step 11.
b. Check high head SI to hot leg valve - OPEN ☐ 1SI-86	☐ b. GO TO Step 11.
☐ c. Stop Train B CSIP.	
d. Shut high head SI to hot leg valve: ☐ 1SI-86	☐ d. Restart the Train B CSIP. ☐ GO TO Step 11.
e. Open BIT outlet valves: ☐ 1SI-3 ☐ 1SI-4	e. **IF** at least one BIT outlet valve can **NOT** be opened, **THEN** perform the following: 1) Reopen high head SI to hot leg valve: ☐ 1SI-86 ☐ 2) Consult the plant operations staff to evaluate use of Attachment 1 to open BIT valves while continuing with this procedure.
☐ f. Restart the Train B CSIP.	

INSTRUCTIONS	RESPONSE NOT OBTAINED
☐ 11. Change From Cold Leg To Hot Leg Recirculation In 6.5 HOURS Using This Procedure.	
☐ 12. RETURN TO Procedure **AND** Step In Effect.	

- END -

Attachment 1
Sheet 1 of 4
OPENING HIGH HEAD INJECTION VALVES WITH PRESSURE LOCKING

INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

This attachment provides guidance to open high head injection valves that are pressure locked. The effects of pressure locking are relieved by operating the associated CSIP.

CAUTION

CSIPs should **NOT** be operated unless the associated normal miniflow isolation valves are open.

1. To Open Alternate Hot Leg Valve (1SI-107) Perform The Following:

☐ a. Stop Train A CSIP.

b. Shut alternate high head SI to cold leg valve:

☐ 1SI-52

c. Open the common CSIP normal miniflow isolation valve:

☐ 1CS-214

d. Open the associated Train A CSIP normal miniflow isolation valve:

☐ • 1CS-182 (CSIP 1A-SA)
☐ • 1CS-210 (CSIP 1C-SAB)

☐ e. Restart the Train A CSIP.

f. Open alternate high head SI to hot leg valve:

☐ 1SI-107

g. Shut the common CSIP normal miniflow isolation valve:

☐ 1CS-214

h. Shut the associated Train A CSIP normal miniflow isolation valve:

☐ • 1CS-182 (CSIP 1A-SA)
☐ • 1CS-210 (CSIP 1C-SAB)

☐ f. Reopen alternate high head SI to cold leg valve (1SI-52).

Attachment 1
Sheet 2 of 4
OPENING HIGH HEAD INJECTION VALVES WITH PRESSURE LOCKING

INSTRUCTIONS	RESPONSE NOT OBTAINED

2. To Open Hot Leg Valve (1SI-86) Perform The Following:

☐ a. Stop Train B CSIP.

b. Shut BIT outlet valves:

☐ • 1SI-3
☐ • 1SI-4

c. Open the common CSIP normal miniflow isolation valve:

☐ 1CS-214

d. Open the Train B CSIP normal miniflow isolation valve:

☐ • 1CS-196 (CSIP 1B-SB)
☐ • 1CS-210 (CSIP 1C-SAB)

☐ e. Restart the Train B CSIP.

f. Open high head SI to hot leg valve:

☐ 1SI-86

g. Shut the common CSIP normal miniflow isolation valve:

☐ 1CS-214

h. Shut the Train B CSIP normal miniflow isolation valve:

☐ • 1CS-196 (CSIP 1B-SB)
☐ • 1CS-210 (CSIP 1C-SAB)

f. Open the BIT outlet valves:

☐ 1SI-3
☐ 1SI-4

Attachment 1
Sheet 3 of 4
OPENING HIGH HEAD INJECTION VALVES WITH PRESSURE LOCKING

INSTRUCTIONS	RESPONSE NOT OBTAINED
3. To Open Alternate Cold Leg Valve (1SI-52) Perform The Following:	
☐ a. Stop Train A CSIP.	
b. Shut alternate high head SI to hot leg valve:	
☐ 1SI-107	
c. Open the common CSIP normal miniflow isolation valve:	
☐ 1CS-214	
d. Open the Train A CSIP normal miniflow isolation valve:	
☐ • 1CS-182 (CSIP 1A-SA) ☐ • 1CS-210 (CSIP 1C-SAB)	
☐ e. Restart the Train A CSIP.	
f. Open alternate high head SI to cold leg valve:	☐ f. Reopen alternate high head SI to hot leg valve (1SI-107).
☐ 1SI-52	
g. Shut the common CSIP normal miniflow isolation valve:	
☐ 1CS-214	
h. Shut the Train A CSIP normal miniflow isolation valve:	
☐ • 1CS-182 (CSIP 1A-SA) ☐ • 1CS-210 (CSIP 1C-SAB)	

Attachment 1
Sheet 4 of 4
OPENING HIGH HEAD INJECTION VALVES WITH PRESSURE LOCKING

INSTRUCTIONS	RESPONSE NOT OBTAINED

4. To Open BIT Outlet Valves Perform The Following:

☐ a. Stop Train B CSIP.

b. Shut high head SI to hot leg valve:

☐ 1SI-86

c. Open the common CSIP normal miniflow isolation valve:

☐ 1CS-214

d. Open the Train B CSIP normal miniflow isolation valve:

☐ • 1CS-196 (CSIP 1B-SB)
☐ • 1CS-210 (CSIP 1C-SAB)

☐ e. Restart the Train B CSIP.

f. Open BIT outlet valves.

☐ 1SI-3
☐ 1SI-4

☐ f. **IF** at least one BIT outlet valve can **NOT** be opened, **THEN** reopen high head SI to hot leg valve (1SI-86).

g. Shut the common CSIP normal miniflow isolation valve:

☐ 1CS-214

h. Shut the Train B CSIP normal miniflow isolation valve:

☐ • 1CS-196 (CSIP 1B-SB)
☐ • 1CS-210 (CSIP 1C-SAB)

- END -

Revision Summary

General	Rev. 0	This procedure supersedes EOP-EPP-011, adopts the ERG number designations, adds the Entry Consitions and replaces verbs "increase" and "decrease" with equivalent verbs. (PRR 00505953)

Facility: Harris Nuclear Plant Task No.: 301068H401

Task Title: Perform a Max Rate Cooldown for a SG Tube Rupture (E-3) JPM No.: 2016 HNP NRC Exam Simulator JPM CR d

K/A Reference: 041 A4.08 RO 3.0 SRO 3.1 **ALTERNATE PATH - YES**

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• The unit was operating at 100% power when a SG Tube Rupture developed in the 'A' SG. • The crew manually tripped the Reactor and actuated a manual Safety Injection. • The crew has transitioned from EOP-E-0, Reactor Trip Or Safety Injection to EOP-E-3, Steam Generator Tube Rupture. • The TD AFW Pump has tripped and cause is being investigated • The CRS has determined that there is at least one intact SG available for RCS cooldown.

Initiating Cue:	• Your position is the BOP. • **ERFIS is NOT Available.** • The CRS has directed you to continue progressing through EOP-E-3 starting at step 28.

Task Standard: Determine the required core exit temperature based on the lowest ruptured SG pressure then cooldown the RCS to this target temperature utilizing the Steam Dumps and SG PORVs.

Required Materials: EOP-E-3, Steam Generator Tube Rupture, Rev. 1

General References: EOP-E-3, Steam Generator Tube Rupture, Rev. 1

Time Critical Task: No

Validation Time: 15 minutes

Critical Step Justification	
Step 2	Critical to determine the required core exit temperature is 495°F by identifying that ERFIS is NOT available and the lowest ruptured SG pressure ('C' SG) is 900 to 1000 psig. Without the correct temperature the cooldown will be either stopped too soon which will require additionally cooldown later OR later than required and delay making progress through E-3.
Step 4	Critical to place Steam Dump Pressure Controller In MANUAL and lower output to 0% for a controlled transfer to Steam Pressure mode, and prepare to dump steam from intact SGs to condenser at Maximum Rate.
Step 5	Critical to place Steam Dumps to Steam Pressure mode to allow manual control of Steam dumps to establish a Max Rate RCS cooldown.
Step 7	Critical to momentarily place Both Steam Dump Interlock Bypass Switches To INTLK BYP if these switches are not taken to this position the Steam Dumps will not open.
Step 9	Critical to dump steam from intact SGs to condenser at Maximum Rate which will decrease RCS temperature which will enable the operator to depressurize the RCS to equal the ruptured SG pressure.
Step 10	Critical to identify that the MAX RATE cooldown has stopped and the Steam Dumps have closed. Then reestablishes Max cooldown using SG PORVs. If this is not recognized then the RCS will not be able to be depressurized to the ruptured SG pressure to stop the tube leakage.
Step 12	Critical to stop the RCS cooldown by securing the 'B' and 'C' SG PORVs after Core Exit TCs or Thot indications are below 505°F but prior to either reaching 480°F (Core Exit TCs) or 470°F (Thot) indications for cooldown (due to readability of scale) to prevent RCS overcooling which would delay the RCS depressurization to ruptured SG pressure.
Step 13	Setting the SG PORV controllers correctly prevents a delay in RCS depressurization to ruptured SG pressure.

2016 HNP NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-167
- Password "noinstants"
- (**IF NEEDED**) The 86 relays should roll when the simulator is placed in run. If not then run the APP file "Roll 86 Gen" or they can be manually overridden with override LO's
  - XGAO018A GEN LOCKOUT G1A-TRIP COIL ON
  - XGBO017A GEN LOCKOUT G1B-TRIP RELAY ON
- Go to run
- Turn OFF ERFIS in SFC and power down the MCR EFRIS screens
- Set RVLIS screens: top screen to Vessel Level, bottom screen to T/C's
- Silence and Acknowledge annunciators
- Place STAR placards on 'A' SG AFW isolation valves 1AF-55, 1AF-137 and on 'A' SG PORV controller

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

To recreate the IC setup for this JPM:

- Initial Simulator IC was IC-19
- Go to run
- Insert a 420 gpm SG Tube Leak on the 'A' SG
  - imf sgn05a (n 00:00:00 00:00:00) 420 00:00:00 0
- Manually trip the Rx and insert a Safety Injection
- Perform actions of E-0 then transition to E-3
- Perform actions of E-3 up to step 28 (determine required core exit temperatures based on lowest ruptured SG pressure)
- Isolate 'A' SG and shut 'A' SG MSIV
- Allow the Simulator to run to obtain the following conditions (approximately)
  - RCS temp 546°
  - PZR Pressure ~1800 psig
  - 'A' SG Pressure ~ 940 psig

(To get the above PZR pressure we opened the PZR Spray a few times to lower RCS pressure down otherwise you will have problems with RCS pressure causing an SI signal and a distraction that you would not want during the JPM. Also opened the 'A' SG PORV to bring down pressure to be at the low end of the 900 – 1000 range. Leave the TDAFW Pump in operation until 'B' and 'C' SG pressures are < 900 # then trip the TDAFW pump)

- Trip the TDAFW Pp to prevent a cooldown using the TDAFW Pp
  - Imf cfw01c (n 00:00:00 00:00:00) true

- Develop Conditional Trigger (1) to cause the Steam Dumps to fail closed
  - Assign a conditional trigger (SDC_OPEN) when Steam Dumps output pushbutton is increased the Steam Dumps with a 5 second delay. Dumps will close in ~ 30 seconds from when the output button is pushed.
  - Imf mss07 (1 00:00:00 00:00:00) 3 0.0

- Silence Acknowledge and Reset Annunciators
- Freeze and Snap these conditions to your exam IC

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

Performance Step: 1 **OBTAIN PROCEDURE**

Standard: Obtains current copy of E-3, Steam Generator Tube Rupture

(May review steps prior to step 28)

Prepares to proceed with E-3 step 28.

Evaluator Note:	**Each candidate may take a few minutes here to review the steps that have been previously completed in EOP-E-3.** **The JPM start time should begin when they have completed the review procedure review.**

Comment:

START TIME: _____

EOP-E-3, Step 28

√ **Performance Step: 2** Determine required core exit temperature based on lowest ruptured SG pressure:

Standard: Obtains SG 'A' pressure from MCB pressure instruments and determines that the pressure is between 900 and 1000 psig
Determines ERFIS is NOT available and the required core exit temperature is 495°F

Comment: **Critical to determine required temperature is 495°F.**

EOP-E-3, Step 29

Performance Step: 3 Condenser Available For Steam Dump:

Condenser Available Requirements
Any Intact SG MSIV - OPEN
Condenser Available (C-9)- LIT (BPLB 3-3)
Steam Dump Contol - AVAILALBE

Standard: Determines that the 'B' and 'C' MSIVs are OPEN
Condenser is Available
Steam Dump Control is Available

Comment:

EOP-E-3, Step 30

√ **Performance Step: 4** Place Steam Dump Pressure Controller In MANUAL AND Lower Output To 0%.

Standard: Locates Steam Dump Pressure Controller, places controller to manual and lowers output to 0%

Comment:

EOP-E-3, Step 31

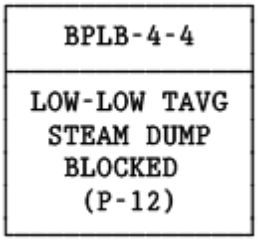
√ **Performance Step: 5** Place Steam Dump Mode Select Switch In STEAM PRESS.

Standard: Locates Steam Dump Mode Selector switch and turns switch to the right from Tavg to STEAM PRESS

Comment:

EOP-E-3, Step 32

Performance Step: 6 Check RCS Temperature ≤ 553°F (P-12)



Standard: Identifies that RCS temperature is < 553°F
Locates BPLP-4-4 and determines that Low-Low Tavg Steam Dump Blocked (P-12) is ON

Comment:

EOP-E-3, Step 33

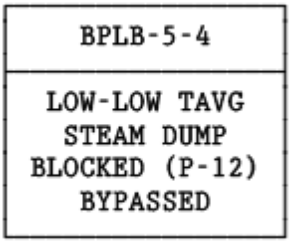
√ **Performance Step: 7** Momentarily Place Both Steam Dump Interlock Bypass Switches To INTLK BYP.

Standard: Locates the Steam Dump Interlock Bypass switches and turns BOTH switches to INTLK BYP

Comment:

EOP-E-3, Step 34

Performance Step: 8 Check LOW-LOW STEAM DUMP (P-12) BYPASSED Status Light – ILLUMINATED



Standard: Locates BPLB-5-4 and checks that the LOW-LOW STEAM DUMP (P-12) BYPASSED Status Light is ILLUMINATED

Comment:

EOP-E-3, Step 35

√ **Performance Step: 9** Dump Steam From Intact SGs To Condenser At Maximum Rate.

Standard: Raises Steam Dump controller to OPEN the Steam Dumps to start a Max Rate Cooldown.

Monitors RCS temperature during cooldown until Core Exit TCs (or 'B' or 'C' Loop WR Thot) are at the required target temperature.

Comment: **When PK-464 (Steam Dump controller) raise pushbutton is depressed the steam dumps will fail shut in ~ 30 seconds.**

EOP-E-3, Step 35 continued – ALTERNATE PATH Begins

√	**Performance Step: 10**	Identifies that the Cooldown has stopped and the Steam Dumps have closed. Determines SG PORV must be used to continue Max Rate Cooldown.
	Standard:	Informs the CRS that the Steam Dumps have closed (steam dump control is Unavailable) and restores the RCS Max Rate Cooldown by opening the SG PORVs in accordance with step 29 RNO actions. **RNO Step 29 now applies**: Dump steam from intact SGs at maximum rate using any of the following: (Listed in order of preference): a) SG PORVs – Locates controls for ONLY the 'B' and 'C' SG PORVs and places controls to manual then 100% to fully open BOTH PORVs Verifies that the cooldown rate is again established and RCS temperature is lowering towards the core exit temperature of 495°F at the maximum rate.

Evaluator Cue:	**CRS acknowledges that the SDC system has failed and the candidate will continue the Max Rate Cooldown using the 'B' and 'C' S/G PORVs.** **If required, ask the candidate "What actions do you recommend?"** **The candidate should recommend "Continue the Max Rate Cooldown using the 'B' and 'C' S/G PORVs in accordance with the RNO for Step 29".** **NOTE: The RNO for step 34 performs the same actions as the RNO for step 29. It is acceptable to recommend the performance of this RNO step in lieu of the RNO for step 29.**

Comment:

EOP-E-3, Step 36

Performance Step: 11 Core Exit TCs – LESS THAN REQUIRED TEMPERATURE

Standard: Identifies that RVLIS or Thot temperatures indicate LESS THAN 495°F

Informs the CRS that the core exit temperatures are less than the required temperature.

Evaluator Cue:	**CRS acknowledges that the core exit temperatures are less than the required temperature.**

Comment:

EOP-E-3, Step 37

√ **Performance Step: 12** Stop RCS Cooldown

Standard: Secures the cooldown by closing the 'B' and 'C' SG PORVs.

Comment: **Critical to stop the RCS cooldown by securing the 'B' and 'C' SG PORVs after Core Exit TCs or Thot indications are below 505°F and :**

- **IF using Core Exit TCs then prior to Core Exit TCs reaching 480°F**
- **IF using Thot indications then prior to Thot reaching 470°F (since these indications are not digital are reading in 10°F increments)**

Evaluator Note:	**In the next step the candidate can either set the PORV controller to AUTO with the setpoint range of 42% to 48.5% OR** **Stabilize Core Exit Temperatures between 480°F – 495°F with the PORV controller in MANUAL. IF the manual PORV control option is chosen then the JPM can be ended when the Evaluator is satisfied with post-cooldown temperature control.**

EOP-E-3, Step 38

√ **Performance Step: 13** Maintain Core Exit TCs Less Than Required Temperature.

Standard: Sets the 'B' and 'C' SG PORV controllers to 48.5% to maintain Core Exit TCs < 495°F.

NOTE: A setting of 48.5% corresponds to 495°F (Tcold)
Acceptable PORV Controller setting range: 48.5% – 42%
(where 42% corresponds to 480°F Tcold)

OR

Adjusts PORV controllers for 'B' and 'C' SG PORV Manually to control CET within a range of 470°F – 495°F.

Evaluator Cue:	**CRS acknowledges that the core exit temperatures are being maintained as required. I have the shift.** **End of JPM** **Direct Simulator Operator to place the Simulator in Freeze.**

Comment:

STOP TIME: _____

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 HNP NRC Exam Simulator JPM CR e
Perform a Max Rate Cooldown for a SG Tube Rupture
EOP-E-3, Steam Generator Tube Rupture

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	• The unit was operating at 100% power when a SG Tube Rupture developed in the 'A' SG. • The crew manually tripped the Reactor and actuated a manual Safety Injection. • The crew has transitioned from EOP-E-0, Reactor Trip Or Safety Injection to EOP-E-3, Steam Generator Tube Rupture. • The TD AFW Pump has tripped and cause is being investigated • The CRS has determined that there is at least one intact SG available for RCS cooldown.

Initiating Cue:	• You are the BOP. • **ERFIS is NOT Available.** • The CRS has directed you to continue progressing through EOP-E-3 starting at step 28.

Facility: Harris Nuclear Plant Task No.: 005016H101

Task Title: Align the RHR System for ECCS Mode JPM No.: 2016 HNP NRC Exam Simulator JPM CR e

K/A Reference: 005 A4.01 RO 3.6 SRO 3.4 ALTERNATE PATH - NO

Examinee: _____ NRC Examiner: _____

Facility Evaluator _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• The crew is performing a plant startup in accordance with GP-002, Normal Plant Heatup From Cold Solid To Hot Subcritical Mode 5 to Mode 3. • 'A' RHR train is operating in cooldown alignment • 'B' RHR Train is in ECCS alignment • The last satisfactory run of OST-1216 has the throttle position of 1CC-146 at 50 degrees open

Initiating Cue:	• Your position is the BOP • The CRS has directed you to align the 'A' RHR System for ECCS Mode prior to RCS temperature exceeding 350°F (ERFIS) • An Extra RO will be monitoring the Secondary Systems • The previous shift has started placing the 'A' Train RHR System in ECCS Mode per OP-111 Section 7.2 and have turned over the lineup at step 19. Since 'B' RHR pump is in ECCS mode steps 26-34 can be marked NA for the 'B' Pump

***Evaluator Note*:**	**The students should be briefed outside of the Simulator prior to performing this JPM. Provide them with a copy of OP-111 with P&L's, ALL initial conditions satisfied and Section 7.2 steps 1-18 completed.** **This will allow them to review the Precautions and Limitations associated with OP-111 and have time for a task preview of the steps. Expect that the candidates will take about 10 - 15 minutes to complete this review.**

Task Standard: 'A' RHR pump is aligned for ECCS Mode of operation

Required Materials: OP-111, Section 7.2.2 Rev. 59

General References: OP-111, Section 7.2.2 Rev. 59

Time Critical Task: No

Validation Time: 15 minutes

Critical Step Justification	
Step 2	Stopping the 'A' RHR is required to prevent deadheading the pump during the ECCS valve alignment
Step 3 or 5	1RH-26 and 1CS-28 are in series. Shutting either valve will isolate RHR from Letdown.
Step 11	Opening 1SI-322 SA aligns the 'A' RHR suction to the RWST and is part of the ECCS valve alignment requirements
Step 13	In order to operate 1SI-340 SA the control power must be turned on. Without control power the valve would have to be manually operated.
Step 14	Opening 1SI-340 SA aligns the 'A' RHR train discharge path to the RCS Cold legs and is required to be opened to allow flow while in the ECCS valve alignment.
Step 18	Opening 1SI-326 SA aligns the 'A' RHR train discharge path to the RCS Hot leg injection flowpath and is required to be opened to allow flow while in the Hot Leg recirculation ECCS valve alignment.
Step 21	Opening 1RH-30 aligns the 'A' RHR discharge path to the RCS Cold legs and is required to be opened to allow flow while in the ECCS valve alignment.

2016 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-168
- Password “noinstants”
- Set ERFIS screens as follows:
  - Move dedicated SPTOP to CRT-1
  - CRT-2 QP RHRA
  - CRT-3 QP OUTSURGE
  - CRT-4 QP LTOP
  - CRT-5 QP SGLEVEL
  - CRT-6 ALARM
- Go to run
- Silence and Acknowledge annunciators

NOTE: A EXTRA RO should be stationed near the FW controls to act as if they are monitoring the Secondary side of the plant. THERE SHOULDN’T have to be any adjustments made during the performance of the JPM. The ‘A’ RHR train should be placed in ECCS mode prior to the RCS exceeding 350°F.

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

To recreate the IC setup for this JPM:

- Initial Simulator IC was IC-2
- The ‘B’ RHR pump is currently in ECCS Mode and the ‘A’ RHR is ready to be placed in ECCS Mode
- Using OP-111 Section 7.2.2 complete steps 1-18 for the ‘A’ RHR Train with conditions satisfied to stop the ‘A’ RHR pump in step 19
- Ensure that the IC is at a temperature as cool as possible prior to starting the alignment of the ‘A’ Train RHR to ECCS mode to prevent exceeding 350° during the time it takes to align the system. You must also be well below 249°F (limit in GP-002 P&L 38) prior to shutting the RCS loop suction valves to the RHR system.
- Silence Acknowledge and Reset Annunciators
- Freeze and Snap these conditions to your exam IC

Simulator Operator:	*When directed by the Lead Examiner go to Run.*

START TIME: _____

OP-111 Section 7.2.2 Caution prior to Step 19

Performance Step: 1 Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-111 Section 7.2.2, Step 19

✓ **Performance Step: 2** STOP RHR PUMP A-SA.

Standard: Locates MCB control switch for the 'A' RHR pump and takes switch to STOP the 'A' RHR pump

Comment:

OP-111 Section 7.2.2, Step 20

✓ **Performance Step: 3** SHUT AND LOCK 1RH-26, RHR Header A To CVCS Letdown Isol Vlv.

Standard: Contacts Aux Operator to shut and lock 1RH-26, RHR Header A To CVCS Letdown Isol Vlv

Simulator Communicator:	Acknowledge request to shut and lock shut and lock 1RH-26, RHR Header A To CVCS Letdown Isol Vlv

Simulator Operator:	Shut 1RH-26 and report to communicator that 1RH-26 is shut

Simulator Communicator:	Report that 1RH-26, RHR Header A To CVCS Letdown Isol Vlv is shut and locked

Comment: *** Performance of either Step 3 or Step 5 is critical (NOT BOTH) since these valves are in series.**

OP-111 Section 7.2.2, Step 21

Performance Step: 4 ADJUST PK-145.1 setpoint as required by present plant conditions.

Standard: Locates PK-145.1, reviews current RCS pressure and adjusts setpoint to maintain present pressure

Comment: (Note: no adjustment to PK-145.1 setpoint should be needed)

OP-111 Section 7.2.2, Step 22

✓ **Performance Step: 5** SHUT 1CS-28, RHR LETDOWN HC-142.1

Standard: Locates switch and shuts 1CS-28, RHR Letdown HC-142.1

Comment: *** Performance of either Step 3 or Step 5 is critical (NOT BOTH) since these valves are in series.**

OP-111 Section 7.2.2, Step 23

Performance Step: 6	THROTTLE AND LOCK 1CC-146, RHR HX A Outlet Throttle Valve, to the position as determined by the last satisfactory run of OST-1216 or OST-1316 AND DOCUMENT per OPS-NGGC-1308.
Standard:	Contacts Aux Operator and directs 1CC-146, RHR HX A Outlet Throttle Valve to be positioned to 50° open and then locked and starts documentation of 1CC-146 position.

Simulator Communicator:	**Acknowledge request to throttle open 1CC-146 to 50° and then lock the valve in that position**. (no simulator valve position changes need to be made) **Wait 10 – 20 seconds and report back that 1CC-146 has been throttled to 50° and locked**.

Evaluator Cue:	**Another Operator will complete the documentation of 1CC-146 position per OPS-NGGC-1308.**

Comment:

OP-111 Section 7.2.2, Step 24

Performance Step: 7	**IF** two Trains of CCW are in service, **THEN REFER** to OP-145, "Securing the Second CCW Pump While Supplying Both RHR Heat Exchangers", **PRIOR** to performing the next step.
Standard:	Identifies ONLY one Train of CCW is in service and N/A's step for securing the second Train.

Comment:

OP-111 Section 7.2.2, Step 25

Performance Step: 8 SHUT 1CC-147, CCW FROM RHR HEAT EXCHANGER A-SA.

Standard: Locates switch and shuts 1CC-147, CCW from RHR Heat Exchanger A-SA.

Comment:

OP-111 Section 7.2.2, Note and Caution prior to Step 26

Performance Step: 9 NOTE: Steps 7.2.2.26 through 7.2.2.34 place both RHR Trains in ECCS lineup at the same time. Both RHR Trains of components are to be aligned together unless only one RHR Train is in service. Steps for the RHR Train that is already in ECCS Mode may be marked N/A.

CAUTION: Both RHR Loops must be pressurized greater than 50 psig to prevent a water hammer if stagnant portions of the RHR System are still hot when 1SI-322 SA and 1SI-323 SB are opened.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

OP-111 Section 7.2.2, Step 26

Performance Step: 10 VERIFY the following:
A RHR Loop is pressurized greater than 50 psig on PI-600A.
B RHR Loop is pressurized greater than 50 psig on PI-600B.

Standard: Locates PI-600A and PI-600B and identifies PI-600A is > 50 psig and PI-600B is < 50 psig (B RHR is in ECCS alignment)

Steps 26-34 can be marked NA for the 'B' RHR pump.

Evaluator Cue: **(If needed) 'B' RHR pump is in ECCS mode steps 26-34 can be marked NA for the 'B' Pump**

Comment: **'B' RHR loop is in ECCS alignment pressure (< 50 psig on PI-600B)**

OP-111 Section 7.2.2, Step 27

✓ **Performance Step: 11** OPEN 1SI-322 SA, RWST TO RHR PUMP A-SA.

Standard: Locates switch and OPENS 1SI-322 SA, RWST TO RHR PUMP A-SA

Comment:

OP-111 Section 7.2.2, Step 28

Performance Step: 12 OPEN 1SI-323 SB, RWST TO RHR PUMP B-SB.

Standard: **N/A's step 28 per NOTE prior to step 26 ('B' Train is already in ECCS Mode)**

Comment:

OP-111 Section 7.2.2, Step 29.a

✓ **Performance Step: 13** PERFORM the following for 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG:

a. **VERIFY** 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG CONT PWR & VLV POS is in ON.

Standard: Locates control power and valve position switch for 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG CONT PWR & VLV POS and places switch to ON

Comment:

OP-111 Section 7.2.2, Step 29.b

✓ **Performance Step: 14** PERFORM the following for 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG:

b. **OPEN** 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG.

Standard: Locates switch and OPENS 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG

Comment:

OP-111 Section 7.2.2, Step 29.c

Performance Step: 15 PERFORM the following for 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG:

c. PLACE 1SI-340 control switch to PULL TO LOCK

Standard: Locates switch for 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG and places switch to PULL TO LOCK

Comment:

OP-111 Section 7.2.2, Step 29.d

Performance Step: 16 PERFORM the following for 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG:

d. PLACE 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG CONT PWR & VLV POS, to OFF.

Standard: Locates control power and valve position switch for 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG CONT PWR & VLV POS and places switch to OFF

Comment:

OP-111 Section 7.2.2, Step 30.a, b, c, d

Performance Step: 17 PERFORM the following for 1SI-341 SB, LOW HEAD SI TRAIN B TO COLD LEG:

a. **VERIFY** 1SI-341 SB, LOW HEAD SI TRAIN B TO COLD LEG CONT PWR & VLV POS is in ON.
b. **OPEN** 1SI-341 SB, LOW HEAD SI TRAIN B TO COLD LEG.
c. PLACE 1SI-341 control switch to PULL TO LOCK
d. PLACE 1SI-341 SB, LOW HEAD SI TRAIN B TO COLD LEG CONT PWR & VLV POS, to OFF.

Standard: **N/A's step 30 per NOTE prior to step 26 ('B' Train is already in ECCS Mode)**

Comment:

OP-111 Section 7.2.2, Step 31

✓ **Performance Step: 18** OPEN 1SI-326 SA, LOW HEAD SI TRAIN A TO HOT LEG CROSSOVER.

Standard: Locates switch and opens 1SI-326 SA, LOW HEAD SI TRAIN A TO HOT LEG CROSSOVER

Comment:

OP-111 Section 7.2.2, Step 32

Performance Step: 19 OPEN 1SI-327 SB, LOW HEAD SI TRAIN B TO HOT LEG CROSSOVER.

Standard: **N/A's step 32 per NOTE prior to step 26 ('B' Train is already in ECCS Mode)**

Comment:

OP-111 Section 7.2.2, Step 33

Performance Step: 20 **OPEN AND LOCK** the following breakers:
1B21-SB-5B Supply Breaker To 1RH-1.
1B21-SB-11A Supply Breaker To 1RH-39.
1A21-SA-7B Supply Breaker To 1RH-2.
1A21-SA-8A Supply Breaker To 1RH-40.

Standard: Contacts Aux Operator and directs Operator to Open and then Lock the following breakers:

1B21-SB-5B Supply Breaker To 1RH-1.
1A21-SA-7B Supply Breaker To 1RH-2.

N/A for 'B' Train which is already in ECCS Mode
1B21-SB-11A Supply Breaker To 1RH-39.
1A21-SA-8A Supply Breaker To 1RH-40.

Simulator Communicator:	Acknowledge request to open and then lock breakers: 1B21-SB-5B Supply Breaker To 1RH-1. 1A21-SA-7B Supply Breaker To 1RH-2. After the Simulator Operator completes opening the breakers report back that the breakers are open and locked.

Simulator Operator:	To open 1B21-SB-5B Supply Breaker To 1RH-1: **Insert remote function RHR008 BKR_OFF** To open 1A21-SA-7B Supply Breaker To 1RH-2: **Insert remote function RHR009 BKR_OFF** Inform the Simulator Communicator after completion.

Comment:

OP-111 Section 7.2.2, Step 34

✓	**Performance Step: 21**	Open the following: a. 1RH-30, RHR HEAT XCHG A OUT FLOW CONT HC-603A1. b. 1RH-66, RHR HEAT XCHG B OUT FLOW CONT HC-603B1.
	Standard:	Locates switch and opens: a. 1RH-30, RHR HEAT XCHG A OUT FLOW CONT HC-603A1. b. N/A 'B' Train already in ECCS alignment
	Comment:	**After candidate completes opening 1RH-30 the RHR system alignment for 'A' Train is in ECCS Mode.**

Evaluator Cue:	**Evaluation on this JPM is complete.** **END OF JPM** **Direct Simulator Operator to place the Simulator in Freeze.**

STOP TIME: _____

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 HNP NRC Exam JPM CR e
Align the RHR System for ECCS Mode
OP-111

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	• The crew is performing a plant startup in accordance with GP-002, Normal Plant Heatup From Cold Solid To Hot Subcritical Mode 5 to Mode 3. • 'A' RHR train is operating in cooldown alignment • 'B' RHR Train is in ECCS alignment • The last satisfactory run of OST-1216 has the throttle position of 1CC-146 at 50 degrees open

Initiating Cue:	• Your position is the BOP • The CRS has directed you to align the 'A' RHR System for ECCS Mode prior to RCS temperature exceeding 350°F (ERFIS) • An Extra RO will be monitoring the Secondary Systems • The previous shift has started placing the 'A' Train RHR System in ECCS Mode per OP-111 Section 7.2 and have turned over the lineup at step 19. Since 'B' RHR pump is in ECCS mode steps 26-34 can be marked NA for the 'B' Pump

HARRIS NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 2

PROCEDURE TYPE: OPERATING PROCEDURE

NUMBER: **OP-111**

TITLE: **RESIDUAL HEAT REMOVAL SYSTEM**

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1.0 PURPOSE

R This procedure provides the initial conditions, precautions and limitations and instructions for operation of the Residual Heat Removal System including: (Reference FSAR 5.4.7)

- Instructions for placing one or both RHR loops in service.
- Returning the RHR System to the normal safety injection lineup.
- Filling and Venting the RHR System.
- Temporarily stopping and restarting RHR loop flow.

2.0 REFERENCES

2.1. Plant Operating Manual Procedures

1. OMM-001
2. OP-100
3. OP-101
4. OP-107
5. OP-107.01
6. OP-109
7. OP-110
8. OP-145
9. OP-151.01
10. OP-156.01
11. OP-156.02
12. GP-007
13. OST-1107
14. OST-1216
15. OST-1814
16. CRC-100
17. CRC-160
18. OMP-003
19. PLP-106
20. OST-1316
21. OPS-NGGC-1308

2.2. Technical Specifications

1. 3.1.1.2
2. 3.3.3.5.b
3. 3.4.1.3
4. 3.4.1.4.1
5. 3.4.1.4.2
6. 3.4.2.1
7. 3.4.6.2
8. 3.4.9.1
9. 3.4.9.2
10. 3.5.2
11. 3.5.3
12. 3.9.1.a
13. 3.9.8.1
14. 3.9.8.2

2.3. Final Safety Analysis Report

1. 5.2.2
2. 5.4.7
3. 6.2.4
4. 8.3.1

2.4. Drawings

1. 5-S-0668
2. 5-S-1308
3. 5-S-1310
4. 5-S-1324

2.5. Technical Manuals

1. VM-BJH-VO4, Pumps, Residual Heat Removal
2. VM-IJV, Motors

2.6. Corrective Action Program (CAP) Items

1. 85H0624
2. 85H0635
3. 86H0138
4. 86H0404
5. 89H0406
6. 89H0851
7. 94H0516
8. 96H0087
9. CR 98-03304
10. AR 1867
11. NCR 345425
12. NCR 432567
13. NCR 438223
14. NCR 58670
15. NCR 441829
16. CR 569593

2.7. Other

1. SHF/10-11720, Serial: SHNPP-84-1217 and SHNPP-85-142 (DIN 842960398 and 851410761)
2. OEF 85-182 (SOER 85-04)
3. OEF 86-181 (SER 23-86)
4. NRC Generic Letter 88-17 and SHNPP Response Letter NLS-88-293
5. NRC Generic Letter 88-17 and SHNPP Response Letter NLS-89-028
6. WCAP 11916
7. NRC Information Notice 95-35
8. ESR 96-00054
9. ESR 96-00126
10. ESR 97-00338
11. ESR 97-00769
12. ESBU-TB-96-03, Westinghouse Technical Bulletin (DIN 982861135)
13. SEN 213, Indian Point Steam Generator Tube Failure
14. ESR 01-00025
15. ESR 00-00301
16. Calculation NSSS-35 “Leakage Rates Of ECCS Components Outside Containment”
17. Westinghouse Technical Bulletin NSD-TB-76-9 (CAP 85H0635)
18. NRC Generic Letter 08-01 and SHNPP Response Letter HNP-08-098
19. EC 67999, HNP NFPA 805 Transition
20. LER 2012-003-00

3.0 PREREQUISITES

1. The AC Electrical Distribution System is energized and aligned for normal operation per OP-156.02.

2. The DC Electrical Distribution System is energized and aligned for normal operation per OP-156.01.

3. The Reactor Coolant System is aligned per OP-100 as necessary to support RHR System Operation.

4. The Component Cooling Water System is in operation and aligned per OP-145.

5. The Boron Recycle System is aligned per OP-109 as necessary to support RHR System Operation.

6. The Compressed Air System is pressurized and aligned per OP-151.01.

7. The Sampling System is aligned per OP-101.

4.0 PRECAUTIONS AND LIMITATIONS

1. The following conditions must be met before placing the RHR System in operation and during RHR System operation:

   - RCS temperature less than 350°F.
   - RCS pressure less than 360 psig as indicated by PI-402 and PI-403.

2. Before placing the RHR System in operation, the boron concentration in the RHR System should be greater than or equal to the required SDM or the required refueling concentrations per CRC-160. The boron concentration requirements will be dependent on the intended use of the RHR System. Using the RHR system for cooldown purposes requires that the boron concentration be greater than or equal to the required shutdown margin (SDM). Using the RHR system to support refueling operations requires that the boron concentration be greater than or equal to the refueling concentration. (Reference PLP-106)

3. To avoid thermal shock of the RHR Pumps during normal operations, flow through the RHR System must be initiated slowly and RHR Pump discharge temperature monitored closely per Attachment 6, Acceptable RHR Pump Temperature Transients. (Reference ESBU-TB-96-03)

4. 1RH-26 and 1RH-64, RHR Header A (B) To CVCS Letdown Isol Vlvs, should not both be open at the same time, except when shifting letdown from one train of RHR to the other. 1RH-26 and 1RH-64 should be opened only if the idle loop suctions from the RCS are open or running RHR Loop discharge is less than 425 psig. This is to prevent lifting the idle loop suction relief.

4.0 PRECAUTIONS AND LIMITATIONS (Continued)

R 5. Whenever the plant is water solid and RCS pressure is being maintained by low pressure letdown from RHR, the normal letdown flow path should be maintained lined up with all three orifice isolation valves open and 1CS-28, RHR LETDOWN HC-142.1 open. (Reference 85H0635, 2.7.17)

6. RHR should not be placed in service (aligned to RCS as a suction/discharge path or aligned to RCS through letdown) until proper reducing conditions are met. Placing RHR in service prior to achieving proper reducing conditions could result in higher personnel dose rates within the RAB. Also, reducing conditions provide the proper corrosion controls within the RHR system.

7. The following guidelines on RHR Pump starting duty should not be exceeded:

   a. Motor Cold - 2 attempted starts.

   b. Motor At Operating Temperature - 1 attempted restart.

      (1) Subsequent restart attempts are allowed after one of the following requirements:

         (a) Motor has been running for greater than 15 minutes;

         OR

         (b) Motor has been standing idle for greater than 45 minutes.

8. Monitor RCS boron concentration to ensure adequate shutdown margin is maintained.

9. During cooldown, limit the cooldown rate not to exceed the cooldown limits specified in Tech Spec 3.4.9.

10. Mechanical seal leakage on the RHR pump is limited to 10 drops per minute. Leakage in excess of this limit requires an Engineering review for possible seal replacement. (Reference 2.7.16)

11. Anytime RHR flow is reduced to less than 2000 gpm, log RHR Pump vibration hourly. The acceptable maximum vibration limit is 0.3 inches peak to peak.

R 12. When the RCS water level is being lowered to drain the SG tubes, RHR flow should be throttled to less than 2500 gpm to minimize the possibility of losing RHR Pump suction. (Reference OEF 86-181, SER 23-86)

13. Do not run an RHR Pump without CCW flow to the Seal Water Heat Exchanger if the suction water temperature is greater than 225°F. (Reference ESR 97-00769)

14. When running RHR Pumps on recirculation, ensure flow is greater than or equal to 500 gpm.

4.0 PRECAUTIONS AND LIMITATIONS (Continued)

R 15. If any function required for either hot or cold shutdown is completely lost, initiate the SHNPP Emergency Plan, or the upgrading of response for a previously declared emergency. Accordingly, relay information concerning the loss of this system to the Superintendent - Shift Operations and when the Emergency Plan is activated, the Site Emergency Coordinator. Classification of the Emergency is per the EAL Matrix. (Reference SHF/10-11720)

16. Any alteration of normal RHR System lineup may require entry into a limiting condition for operation, ensure compliance with Tech Specs before system changes.

17. Maximum full load running amps for an RHR pump is 338 amps. (Reference ESR 97-00338)

R 18. All RCPs and/or RHR Pumps may be de-energized for up to 1 hour provided: (Reference Tech Spec 3.4.1.3, 3.4.1.4.1, and 3.4.1.4.2)

a. No operations are permitted that would cause dilution of the RCS boron concentration;

AND

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

R 19. During the performance of core alterations and core loading verification in the vicinity of the Reactor Vessel Hot Legs, RHR loops may be removed from operation for up to 1 hour per 2 hour period. (Reference Tech Spec 3.9.8.1 and 3.9.8.2)

R 20. When on RHR cooling and the RCS is partially drained (RCS water level greater than 36 inches below the vessel flange), ensure the running RHR Pump is stopped before starting the standby RHR Pump to prevent possibility of losing suction to RHR Pumps due to low RCS level. (Reference OEF 86-181, SER 23-86)

R 21. Do not operate RHR Pumps with RCS water level less than the centerline of the Reactor Vessel outlet (greater than 82 inches below Reactor Vessel Head Flange). (Reference OEF 85-182, SOER 85-04)

R 22. Normally, whenever the RCS is water solid, the RHR Pump Suction Valves 1RH-1, 1RH-2, 1RH-39 and 1RH-40 should remain open to insure that there is a flow path from the RCS to the RHR Suction Reliefs (Reference 85H0635). There are times when emergent items or testing may require that one train of RHR Loop Suction valves be shut. This is permissible due the over pressure protection provided by LTOPs and the remaining RHR loop suction relief.

4.0 PRECAUTIONS AND LIMITATIONS (Continued)

23. Prior to opening the RHR loop suction valves, all but one CSIP should be removed from service to preclude RHR system over pressurization should an inadvertent SI occur with only one RHR loop suction relief available. The over pressurization concern is also applicable when isolating the RHR loop suction relief. (Reference ESR 01-00025)

R 24. Whenever the reactor coolant is above 160°F, at least one RCP should be in operation. (Reference 85H0635)

R 25. Ensure system is filled and vented before system operation. (Reference 86H0404)

26. During the RHR system fill and venting operations, consideration should be given to the relative height differences between the cavity and the RWST levels. The potential for shifting water from one source to the other should be evaluated prior to the start of the evolution. (AR 142011)

R 27. When the RCS pressure is being maintained by 1CS-38, LTDN PRESSURE PK-145.1, changes to the flow rate through the RHR loop by throttling of valves or operating pumps will result in changes in RCS pressure. (Reference 85H0635)

28. During normal operation, CCW Temperature should be maintained less than 105°F. During cooldown on RHR, CCW Heat Exchanger outlet may be permitted to increase to 125°F.

29. During Outages, refer to OMP-003 for further restrictions as to when RHR loops must be operable. (Reference NRC Information Notice 95-35)

30. When placing RHR into service, PRT level should be monitored for indication of RCS\RHR leakage through the RHR suction reliefs.

31. The following requirements are specified to meet the RHR Technical Specifications:

    a. 3.5.2 - Each RHR pump is aligned for cold leg injection upon receipt of an SIAS, and all automatic functions for switch over to cold leg recirculation are operable. CCW and ESW flowpaths for the RHR heat exchanger and the pump seal cooler must be operable, with CCW alignable to the RHR heat exchanger from the MCB. The surveillance testing and ISI testing is required, except that the interlocks for the RHR hot leg suction valves may be inoperable provided the valves are closed and the power supply breaker is open.

    b. 3.5.3 - The requirements for 3.5.2, specified above, must be met with the following exceptions allowed. The RHR loop may be aligned to the RCS for shutdown cooling provided it can be manually realigned for cold leg injection from the MCB (the automatic functions for switch over to cold leg recirculation are still required). The operable ECCS train (including high pressure injection components) must be of the same safety train (SA or SB).

c. 3.4.1.3 / 3.4.1.4.1 / 3.4.1.4.2 / 3.7.3 / 3.7.4 / 3.9.8.1 / 3.9.8.2 - For operability, an RHR loop must be capable of being manually aligned to the RCS and started from the MCB, including functional CCW and ESW pumps and flowpaths. ISI testing of the RHR pump is required to be performed but the pump is operable provided it can provide sufficient flow to remove decay heat, or as specified in the minimum flow surveillance requirements. To meet the requirement that an RHR loop be operating, the loop must be aligned in the shutdown cooling mode controlling RCS temperature. While ESW is required to be functional, NSW may be in operation rather than ESW.

32. The use of OSI-PI is acceptable as a tool to trend or calculate computer points used in this procedure.

33. During HEATUP and COOLDOWN modes of operation, time in recirculation mode should be minimized to prevent thermal binding of 1RH-31 (1RH-69) RHR pump 1A-SA (1B-SB) mini flow valves. (AR 143794)

34. Post fill and vent UT checks for voids, beyond what is specified in this procedure, may be required by a Clearance Order and/or by a PMT Task . Tracking and completion of these checks are tracked by the Clearance Order process and/or by the site scheduling tool (Progress Reporter).
[R NRC Generic Letter 08-01 and SHNPP Response Letter HNP-08-098]

35. The following valves are normally SHUT and power is removed while in MODE 5, MODE 6 and defueled to prevent spurious operation due to fire (EC 67999), Reference 2.7.19. These valves may be energized and opened briefly for performance of an approved procedure. The breakers **must** be ON and the valves energized while in Modes 1-4 for RHR to be operable in ECCS Mode.

1RH-25 1RH-63 ISI-359

36. Prior to the removal of any RHR loop from service in preparation for aligning it in the ECCS Mode, total RHR gas concentration should be less than 50 cc/kg to minimize gas formation in the associated piping. (2.6.13, 2.6.14)

37. The RHR to CSIP suction isolation valves are interlocked to allow their manual opening only when BOTH of the following conditions exist:

a. For the respective valve:

- 1RH-25 - either 1RH-1 or 1RH-2, or both, must be shut.
- 1RH-63 - either 1RH-39 or 1RH-40, or both, must be shut.

b. For either 1RH-25 or 1RH-63:
(at least one valve in each line must be shut)

- either 1CS-745 or 1CS-746, or both, must be shut, **AND**
- either 1CS-752 or 1CS-753, or both, must be shut.

This interlock with the RCS suction valves is based on preventing cross-connection of the RHR and CVCS suction piping during normal cooldown or heat-up and preventing over pressurization of the CSIP suction piping. The interlock with the miniflow valves is to ensure that post-accident recirculation water from the containment sumps does not enter the RWST.

4.0 PRECAUTIONS AND LIMITATIONS (Continued)

38. In order to meet Technical Specifications for placing an RHR Train in ECCS Mode, the RHR Loop suction piping must be cold enough to prevent flashing / vapor binding in the pump suction chamber should the pump start. Actual temperature requirements and limitations are summarized in the table below:
[CAPR – AR 345425]

Cooldown	ERFIS Available (Use highest RCS Hot Leg Temperature)	ERFIS **NOT** Available (Use average RCS Hot Leg Temperature)	Additional limitations
1st RHR Pump in Shutdown Cooling Mode	Anytime in MODE 4	Anytime in MODE 4	Train will not be available or operable for ECCS Mode until RCS HOT leg temperatures are less than 229°F (225°F ERFIS not available)
2nd RHR Pump in Shutdown Cooling Mode	Less than 229°F	Less than 225°F	None
Heatup			
1st RHR Pump in ECCS Mode	Anytime in MODE 5	Anytime in MODE 5	None (Operable for ECCS Mode)
1st RHR Pump in ECCS Mode	Less than 229°F	Less than 225°F	No requirements As good practice, operate the RHR train in the forced cooling mode until the RHR pump discharge temperature is less than or equal to140°F using ERFIS (less than or equal to135°F using MCB). Continue to force cool the RHR system for at least an additional 30 minutes. Any depressurization will be by sampling system. (Operable for ECCS Mode with or without forced cooling)
2nd RHR Pump in ECCS Mode	Less than 249°F	Less than 245°F	Operate the RHR train in the forced cooling mode until the RHR pump discharge temperature is less than or equal to140°F using ERFIS (less than or equal to135°F using MCB). Continue to force cool the RHR system for at least an additional 30 minutes. Any depressurization will be by sampling system. (Operable for ECCS Mode after forced cooling)
2nd RHR Pump in ECCS Mode (not recommended for normal plant heatup because the time required to reach the pipe temperatures to support transition to MODE 3 is not known, and could take up to 3 days)	Greater than or equal to 249°F	Greater than or equal to 245°F	Operate the RHR train in the forced cooling mode until the RHR pump discharge temperature is less than or equal to140°F using ERFIS (less than or equal to135°F using MCB). Continue to force cool the RHR system until contact pyrometer (with an accuracy of 2°F) readings on the piping inside containment between the containment exterior wall and the bioshield wall are less than 258°F, and the temperature of the piping in the elevation 216' pipe tunnel is less than 173°F. Any depressurization will be by sampling system. (Operable for ECCS Mode after forced cooling)

39. Once the Sequencer is initiated, equipment starting outside of its design load block will result in the Sequencer being inoperable. Tech Spec 3.8.1.1.h is applicable until the breaker for the affected load is opened.

4.0 PRECAUTIONS AND LIMITATIONS (Continued)

40. Per Tech Spec 3.8.1.1 - If a component powered from a safety bus cannot be secured due to issues such as trip coil failures, control power malfunctions, or other breaker problems, then Tech Spec 3.8.1.1 must be evaluated to determine EDG operability. This is due to potential impacts to sequencing and load shedding requirements.

7.2.2. Procedural Steps

NOTE: The following procedure steps describe operation of the running RHR train, assuming RHR Train A is running. If RHR Train B is running, operation of Train B RHR components is required, use component nomenclature that is in parentheses.

NOTE: This section does **NOT** align a cooling flowpath through the RHR suction piping, therefore, the temperature of the RHR suction piping will remain elevated for an extended period of time. Any required testing involving the RHR suction line which is temperature limiting should be performed prior to increasing RCS temperature.

CAUTION

Even though 1RH-30(1RH-66) is shut, there is still some leakby flow that will lead to continued RHR cooldown. Attachment 6 cooldown rates must be monitored and maintained within limits. (Ref. AR 93682)

1. **VERIFY** output for 1RH-30 (1RH-66), RHR HEAT XCHG A(B) OUT FLOW CONT HC-603 A1(B1) at 0%. _____

2. **VERIFY** 1RH-30 (1RH-66), RHR HEAT XCHG A(B) OUT FLOW CONT is closed by observing either of the following: (Substep not performed is N/A)

   - MLB 3A-SA (3B-SB) for RHR HX OUT SHUT HCV-603 A(B) light lit. _____

   - Local position of 1RH-30 (1RH-66), RHR HEAT XCHG A(B) OUT FLOW. _____

3. **SHUT** 1SI-340 SA (1SI-341 SB), LOW HEAD SI TRAIN A (B) TO COLD LEG and verify no flow as indicated on FI-605A1 (B1). _____

4. **VERIFY OPEN** 1RH-31 (1RH-69), RHR PUMP A-SA (B-SB) MINI FLOW. _____

7.2.2 Procedural Steps (continued)

NOTE: The next two steps will ensure that the loop being removed is kept pressurized while it is being cooled down.

5. **VERIFY** 1CS-28, RHR LETDOWN HC-142.1, is greater than 40% open. _____

6. **VERIFY OPEN** 1RH-26 (1RH-64), RHR Header A (B) To CVCS Letdown Isol Vlv. _____

7. **ADJUST** PK-145.1, LTDN PRESSURE controller, setpoint to 42% (250 psig) or greater. _____

NOTE: When RHR loop suctions are shut in the following step, letdown flow from RHR will stop and reverse, reducing CVCS letdown flow.

8. **VERIFY SHUT** all of the following Loop Suction valves:

   a. 1RH-1 and 1RH-2, RCS LOOP A TO RHR PUMP A-SA. _____

   b. 1RH-39 and 1RH-40, RCS LOOP C TO RHR PUMP B-SB. _____

9. **ADJUST** charging flow as necessary to maintain PRZ level requirements. _____

NOTE: The following step maintains the lowest pressure in the RHR loop above P_{SAT} while still providing letdown for PRZ level control.

10. **ADJUST** PK-145.1 as necessary to maintain RHR suction pressure at 132 psig or greater. _____

11. **PLACE** controller for 1RH-20 (1RH-58), RHR HEAT XCHG A (B) BYP FLOW CONT FK-605A1 (B1), in **MANUAL**. _____

12. **ADJUST OUTPUT** of FK-605A1 (B1) to 50-55%. _____

13. **PRIOR** to initiating further cooldown in the next step, **VERIFY** additional cooldown will not result in Attachment 6 limits are being exceeded. _____

14. **POSITION OUTPUT** of 1RH-30 (1RH-66), RHR HEAT XCHG A (B) OUT FLOW CONT HC-603A1 (B1) to 10%. _____

7.2.2 Procedural Steps (continued)

15. To start cooldown of the RHR loop, **PERFORM** the following:

    a. **MONITOR** RHR pump cooldown rate using:

    - TRH0604A (TRH0604B), RHR Pump A (B) Disch Temp _____
    - TR-604 (TR-606) red pen, RHRP-A (B) Disch Temp _____

    b. **MAINTAIN** RHR pump cooldown rate per Attachment 6 limits. _____

CAUTION

RHR pump flow must be maintained greater than 500 gpm by FIS-602A (B) indication while throttling shut on 1RH-20 (1RH-58).

    c. **STATION** an operator at FIS-602A (B), Resid Ht Rem Pmp 1A (1B) Flow, to monitor RHR Pump A SA (B SB) flow. _____

    d. **SLOWLY SHUT** 1RH-20 (1RH-58), RHR HEAT XCHG A (B) BYP FLOW CONT FK-605A1 (B1), to start cooldown of the RHR loop. _____

NOTE: It may take a couple of hours for the metal to cool to less than 140°F ERFIS (135°F MCB) after the RHR loop discharge temperatures indicate that the system is cool. If the RHR loop is cooled to less than 140°F ERFIS (135°F MCB) in an hour or less then it may be necessary to cool the piping longer before stopping the RHR Pump.

16. **VERIFY** RHR Pump A-SA(B-SB) Discharge Temp is less than 140°F, as indicated by TRH0604A(TRH0604B) **OR** less than 135°F, as indicated by TR-604(TR-606) red pen. **[CAPR – AR 345425]** _____

17. **IF** Plant Conditions required maintaining RHR in the Shutdown Cooling Mode above Highest RCS Hot Leg temperature of 249°F (using ERFIS) or Average RCS Hot Leg temperature of 245°F (using MCB)
    THEN GO TO Section 8.13. **[CAPR – AR 345425]** _____

NOTE: The following Step is N/A if the plant is in MODE 5. It is optional if Highest RCS Hot Leg Temperature is less than 229°F using ERFIS (Average Hot Leg Temperature less than 225°F if using MCB indication)

18. **WHEN** RHR Pump A-SA(B-SB) Discharge Temp is less than 140°F ERFIS (135°F MCB),
    THEN CONTINUE force cooling the suction line for at least 30 minutes prior to continuing. **[CAPR – AR 345425]** _____

CAUTION

Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

19. **STOP** RHR PUMP A-SA (B-SB). _____

20. **SHUT AND LOCK** 1RH-26 (1RH-64), RHR Header A (B) To CVCS Letdown Isol Vlv. _____

21. **ADJUST** PK-145.1 setpoint as required by present plant conditions. _____

22. **SHUT** 1CS-28, RHR LETDOWN HC-142.1. _____

R 23. **THROTTLE AND LOCK** 1CC-146 (1CC-166), RHR HX A (B) Outlet Throttle Valve, to the position as determined by the last satisfactory run of OST-1216 or OST-1316
AND DOCUMENT per OPS-NGGC-1308. (Reference 89H0406) _____

24. **IF** two Trains of CCW are in service,
THEN REFER to OP-145, “Securing the Second CCW Pump While Supplying Both RHR Heat Exchangers”, **PRIOR** to performing the next step. _____

25. **SHUT** 1CC-147 (1CC-167), CCW FROM RHR HEAT EXCHANGER A-SA (B-SB). _____

NOTE: Steps 7.2.2.26 through 7.2.2.34 place both RHR Trains in ECCS lineup at the same time. Both RHR Trains of components are to be aligned together unless only one RHR Train is in service. Steps for the RHR Train that is already in ECCS Mode may be marked N/A.

R **CAUTION**

Both RHR Loops must be pressurized greater than 50 psig to prevent a water hammer if stagnant portions of the RHR System are still hot when 1SI-322 SA and 1SI-323 SB are opened. (Reference 89H0851)

26. **VERIFY** the following:

a. A RHR Loop is pressurized greater than 50 psig on PI-600A. _____

b. B RHR Loop is pressurized greater than 50 psig on PI-600B. _____

7.2.2 Procedural Steps (continued)

27. **OPEN** 1SI-322 SA, RWST TO RHR PUMP A-SA. _____

28. **OPEN** 1SI-323 SB, RWST TO RHR PUMP B-SB. _____

29. **PERFORM** the following for 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG:

    a. **VERIFY** 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG CONT PWR & VLV POS is in ON. _____

    b. **OPEN** 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG. _____

    c. **PLACE** 1SI-340 control switch to PULL TO LOCK. _____

    d. **PLACE** 1SI-340 SA, LOW HEAD SI TRAIN A TO COLD LEG CONT PWR & VLV POS, to OFF. _____

30. **PERFORM** the following for 1SI-341 SB, LOW HEAD SI TRAIN B TO COLD LEG:

    a. **VERIFY** 1SI-341 SB, LOW HEAD SI TRAIN B TO COLD LEG CONT PWR & VLV POS is in ON. _____

    b. **OPEN** 1SI-341 SB, LOW HEAD SI TRAIN B TO COLD LEG. _____

    c. **PLACE** 1SI-341 control switch to PULL TO LOCK. _____

    d. **PLACE** 1SI-341 SB, LOW HEAD SI TRAIN B TO COLD LEG CONT PWR & VLV POS, to OFF. _____

31. **OPEN** 1SI-326 SA, LOW HEAD SI TRAIN A TO HOT LEG CROSSOVER. _____

32. **OPEN** 1SI-327 SB, LOW HEAD SI TRAIN B TO HOT LEG CROSSOVER. _____

R 33. **OPEN AND LOCK** the following breakers:
(Reference FSAR 6.2.4)

    a. 1B21-SB-5B Supply Breaker To 1RH-1. _____

    b. 1B21-SB-11A Supply Breaker To 1RH-39. _____

    c. 1A21-SA-7B Supply Breaker To 1RH-2. _____

    d. 1A21-SA-8A Supply Breaker To 1RH-40. _____

7.2.2 Procedural Steps (continued)

34. **OPEN** the following:

    a. 1RH-30, RHR HEAT XCHG A OUT FLOW CONT HC-603A1. _____

    b. 1RH-66, RHR HEAT XCHG B OUT FLOW CONT HC-603B1. _____

R 35. **THROTTLE AND LOCK** 1CC-166 (1CC-146), RHR HX B (A) Outlet Throttle Valve, to the position as determined by the last satisfactory run of OST-1216 or OST-1316
AND DOCUMENT per OPS-NGGC-1308. (Reference 89H0406). _____

NOTE: Step 7.2.2.36 is only necessary if the RHR loop is not at RWST pressure. Normal RWST level results in an RHR pump discharge pressure of 40 to 50 psig on PI-600A (B).

NOTE: Previous outages used a method for faster depressurization. It has been determined that rapid depressurization may result in voiding in the portion the RHR suction line that is not cooled while on recirc, so that method has been deleted and will not be used. **[CAPR – AR 345425]**

36. **IF** necessary,
THEN PERFORM the following to depressurize the A (B) RHR loop to RWST pressure using sampling: **[CAPR – AR 345425]**

    a. **VERIFY** sampling aligned to the A (B) RHR loop per OP-101. _____

    b. **DIRECT** Chemistry personnel to purge the RHR sample line until A (B) RHR loop is at RWST pressure. _____

37. **WHEN** the RHR loop is depressurized to RWST pressure on PI-600A (B), **THEN RETURN** sampling alignment to the RCS per OP-101. _____

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: Harris Nuclear Plant Task No.: 301135H601

Task Title: Manually Align Containment Spray JPM No.: 2016 HNP NRC Exam Simulator JPM CR f

K/A Reference: 026 A4.01 (4.5/4.3) **ALTERNATE PATH - YES**

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• A plant event is in progress • RCS pressure is lowering and Containment pressure is rising • An automatic Reactor Trip and SI have occurred • EOP E-0, Reactor Trip or Safety Injection Loss Of Reactor or Secondary Coolant is being implemented • Immediate actions of E-0 have just been completed

Initiating Cue:	• Your position is the OATC • The CRS directs you to continue with EOP E-0 starting at step 5 to stabilize the plant • You are responsible for all E-0 foldout items. • **The BOP will silence annunciators**

Task Standard: Containment Spray has been manually initiated and aligned for Containment Spray operation and ALL 3 RCPs are stopped.

Required Materials: None

General References: EOP E-0, Loss Of Reactor or Secondary Coolant Rev. 4

Handout: Use simulator copy of EOP E-0.

Time Critical Task: No

Validation Time: 10 minutes

CRITICAL STEP JUSTIFICATION	
Step 1	The RCP trip criteria should be monitored continuously while in E-0. Securing ALL 3 RCP's when E-0 foldout RCP Trip Criteria is met is a required operator action to reduce the amount of RCS mass pumped out of the break.
Step 12	Starting one train of Containment Spray system will reduce Containment pressure. The combination of a CT pump running and the Containment Ventilation system prevents the Containment from exceeding the design pressure limit during a LBLOCA.

2016 HNP Audit Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-169
- Password “noinstants”

- (**IF NEEDED**) The 86 relays should roll when the simulator is placed in run. If not then run the APP file “Roll 86 Gen” or they can be manually overridden with override LO’s
  - XGAO018A GEN LOCKOUT G1A-TRIP COIL ON
  - XGBO017A GEN LOCKOUT G1B-TRIP RELAY ON

- **Go to RUN**

- **Silence and Acknowledge annunciators**

- **GO TO FREEZE** and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup was used to create this JPM exam snap

Initial Simulator IC to IC-19, 100% power

Go To Run

Defeat automatic and manual Containment Spray actuation

- imf ZRPK505A FAIL_ASIS
- imf ZRPK505B FAIL_ASIS

- Initiate a LBLOCA
  - imf rcs01b 10%

- Stay in RUN until Containment Pressure exceeds 10 psig and is rising

Go to FREEZE and save IC conditions

Simulator Operator:	**This JPM will cause multiple annunciators to alarm based on the SI event that is occurring. There should be a person to silence annunciators to reduce the noise level initially with this JPM.** **When directed by the Lead Examiner go to Run.**

START TIME: _____

Evaluator Note:	**Foldout criteria will be met for RCP Trip Criteria and the candidate may identify that it is met quickly.** **It is critical to secure the RCPs prior to the direction of securing the RCPs at step 16 RNO (Performance step 13) since the candidate is tasked with ALL E-0 foldout items.**

E-0, Step 5.a

✓ **Performance Step: 1**

a. Review Foldout page

RCP TRIP CRITERIA

IF both of the following occur, THEN stop all RCPs:

- **SI flow- GREATER THAN 200 GPM**
- **RCS pressure – LESS THAN 1400 PSIG**

Standard:

Checks SI flow and RCS pressure on MCB indicators, ERFIS, or Recorder Panel.

Identifies that both SI flow is > 200 gpm and RCS pressure is < 1400 psig and foldout RCP Trip Criteria is met.

- Locates A, B, and C RCP control switches and STOPS all RCP's.

(May provide crew update that all RCP's have been secured and Containment is Adverse, pressure > 3 psig)

Continues to monitor remaining E-0 fold out items

Comment:

E-0, Step 5.b

Performance Step: 2 b. Evaluate EAL Matrix

Standard: Notifies the Shift Manager and STA to evaluate the EAL matrix.

Evaluator Cue:	**CRS acknowledges "The SRO team will evaluate the EAL matrix".**

Comment:

E-0, Step 6

Performance Step: 3 Verify CSIPs – ALL RUNNING

Standard:
- Locates and checks running indication for the 'A' and 'B' CSIP's (indicating lights, amps, flow, status lights, etc.) and verifies that BOTH pumps are running

Comment:

E-0, Step 7

Performance Step: 4 Verify RHR Pumps – ALL RUNNING

Standard:
- Locates and checks running indication for the 'A' and 'B' RHR Pumps (indicating lights, amps, flow, status lights, ect) and verifies that BOTH pumps are running

Comment:

E-0, Step 8

Performance Step: 5 Safety Injection flow – GREATER THAN 200 GPM

Standard:
- Locates and checks Safety Injection flow rates and identifies that Safety Injection flow is > 200 gpm

Comment:

E-0, Step 9

Performance Step: 6 RCS Pressure – LESS THAN 230 PSIG - **NO**

Standard:
- Locates indications of RCS pressure and determines that pressure is > 230 psig
- GO TO STEP 12

Comment:

E-0, Step 12

Performance Step: 7 Main Steam Line Isolation – ACTUATED

MAIN STEAM LINE ISOLATION ACTUATION CRITERIA
CNMT pressure – GREATER THAN OR EQUAL TO 3.0 PSIG
Any SG pressure - LESS THAN OR EQUAL TO 601 PSIG

Standard:
- Identifies that a Main Steam Line Isolation should have actuated based on Containment pressure > 3 psig

Comment:

E-0, Step 13

Performance Step: 8 Verify All MSIVs AND Bypass Valves - SHUT

Standard:

- Locates indications for 'A', 'B', and 'C' MSIV and MSIV Bypass valves and verifies that ALL are shut

Comment:

E-0, Step 14

Performance Step: 9 Any SG pressure – 100 PSIG LOWER THAN PRESSURE IN TWO OTHER SGs

Standard:

- Locates indications for 'A', 'B', and 'C' SG pressures and identifies that pressures are approximately equal and NO SG is 100 psig lower than the other two SGs
- RNO step 14. GO TO Step 16

Comment:

E-0, Step 16

Performance Step: 10 (* Continuous Action Step)
Check CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG

Standard:

- Locates indications for Containment pressure and determines that Containment pressure has NOT remained < 10 psig
- RNO step 16. Perform the following:
  a) Verify CNMT spray – ACTUATED
  b) Stop all RCPs

Comment:

E-0, Step 16 RNO

Performance Step: 11 a) Verify CNMT spray - Actuated

Standard:

- Locates and checks indication for CONTAINMENT SPRAY PUMPS A-SA and B-SB and/or checks ALB-001/4-1 CONTAINMENT SPRAY ACTUATION annunciator.
- Determines that neither CNMT spray pump is running
- Attempts to manually actuate Containment Spray by using the Containment Spray Actuation Switches turning both left or both right switches **at the same time**.
- Checks indication to see if CNMT Spray Pumps have started. **(NO neither pump has started)**

Comment:

✓ **Performance Step: 12** **Alternate Path begins here**

Manually start Containment Spray System
(Evaluator: The order is not specified in the procedure)

Standard:

Manually start Containment Spray using the following steps:

- Takes control switch for CONTAINMENT SPRAY PUMP A-SA TO START
- Takes control switch for 1CT-50, Containment Spray Pump 1A-SA Discharge, to OPEN
- Takes control switch for 1CT-12, Containment Spray Chemical Addition, to OPEN

- Takes control switch for CONTAINMENT SPRAY PUMP B-SB to START
- Takes control switch for 1CT-88, Containment Spray Pump 1B-SB Discharge, to OPEN
- Takes control switch for 1CT-11, Containment Spray Chemical Addition, to OPEN

Verifies that both Containment Spray pumps are operating correctly and have flow indication.

Provides report to CRS that both 'A' and 'B' CT systems have been manually actuated.

Evaluator Cue:	**Acknowledge report that both Containment Spray pumps have been manually started.**

Comment: **Critical to start either A or B CT Pump and open 1CT-50 and 1CT-12 or 1CT-88 and 1CT-11.**

E-0, Step 16 RNO (continued)

Performance Step: 13 b) Stop all RCPs

Standard: Locates control switches for RCP-A, RCP-B, and RCP-C and takes them to STOP or verifies that the RCPs have been secured earlier when E-0 foldout RCP Trip Criteria was met.

Informs the CRS that all RCPs have been secured.

Comment: **This step also procedurally stops the RCPs but the action to secure the RCPs should have been addressed with E-0 foldout.**

Evaluator Cue:	**CRS acknowledges that the RCPs have been secured. Another Operator will continue with E-0.** **Announce "I have the shift" END OF JPM** **Direct the Simulator Operator to go to Freeze.**

Comment:

STOP TIME: _____

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 NRC Exam Simulator JPM f

Manually Align Containment Spray
In accordance with E-0

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	• A plant event is in progress • RCS pressure is lowering and Containment pressure is rising • An automatic Reactor Trip and SI have occurred • EOP E-0, Reactor Trip or Safety Injection Loss Of Reactor or Secondary Coolant is being implemented • Immediate actions of E-0 have just been completed

Initiating Cue:	• Your position is the OATC • The CRS directs you to continue with EOP E-0 starting at step 5 to stabilize the plant • You are responsible for all E-0 foldout items. • **The BOP will silence annunciators**

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: Harris Nuclear Plant Task No.: 301098H401

Task Title: Restoration of Offsite Power to Emergency Buses (EOP ECA-0.0, Attachment 1) JPM No.: 2016 HNP NRC Exam Simulator JPM CR g

K/A Reference: 055 EA1.07 RO 4.3 SRO 4.5 **ALTERNATE PATH - YES**

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• The unit was operating at 100% power • 'A' EDG is under clearance due to a failure that caused the Generator field to not flash during OST-1013 Subsequently: • A failure of a transmission line on the Duke grid resulted in the cascading trip of several units which resulted in low grid frequency • The HNP unit has experienced a loss of offsite power • 'B' EDG failed to start. The problem is being investigated • The crew entered ECA-0.0, Loss Of All AC Power • The load dispatcher has contacted HNP and informed the MCR that the grid is now stable

Initiating Cue:	• Your position is the BOP • The CRS has directed you to restore offsite power to a (one) AC emergency bus using ECA-0.0 Attachment 1. • The Load Dispatcher has given permission to restore offsite power to 6.9 KV buses and to reset any tripped Start Up XFMR lockout relays.

Examiner:	**Provide the candidate a copy of ECA-0.0 Attachment 1.**

Task Standard: Bus 1B-SB energized from the SUT

Required Materials: None

General References: EOP-ECA-0.0, Attachment 1, Rev. 3

Time Critical Task: NO

Validation Time: 15 Minutes

CRITICAL STEP JUSTIFICATION	
Step 15	Critical to place synchronizer control switch to proper position to allow closing breaker in next step.
Step 16	Critical to close Start Up XFMR B To Aux Bus E Breaker 121, without the breaker being closed power cannot be restored to Emergency Bus B-SB.
Step 18	Critical to close breaker 124 for Aux Bus E To Emergency Bus B-SB, without the breaker being closed power cannot be restored to Emergency Bus B-SB.
Step 20	Critical to place synchronizer control switch to proper position to allow closing breaker in next step.
Step 21	Critical to close tie breaker 125 for Emergency Bus B-SB To Aux Bus E, without the breaker being closed power cannot be restored to Emergency Bus B-SB.
Step 23	Critical to close Emergency Bus B-SB To XFMR B1-SB Breaker B1 A-SB and Emergency Bus B-SB To XFMR B3-SB Breaker B3 A-SB to supply power to safeguards emergency equipment.
Step 24	Critical to close 6.9 KV Emergency Bus B-SB To XFMR B2-SB Breaker B2 A-SB to supply power to safeguards emergency equipment.

2016 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-170
- Password "noinstants"
- Hang clearance tags on 1A-EDG
- Protect Equipment IAW OMM-001
  - Protected Train Equipment Tags on:
    - B-SB EDG Start Switch
    - B-SB Fuel Oil Transfer Pump Switch
    - Breaker 52-1, Breaker 52-2 and Breaker 52-3

Equipment Unavailable	Equipment to be Protected	Notes
'A-SA' EDG	'B-SB' EDG 'B-SB' EDG Output breaker 126 'B-SB' DFO Transfer Pump Room 'B' Train PICs SWYD Components (Modes 1-4) 'A' SUT	SWYD Components are: Breakers 52-1, 52-2, 52-3, and Line Panels 5,6, and 7. 'B' Train PICs: 2, 4, 10, 14, and 18

- (**IF NEEDED**) The 86 relays should roll when the simulator is placed in run. If not then run the APP file "Roll 86 Gen" or they can be manually overridden with override LO's
  - XGAO018A GEN LOCKOUT G1A-TRIP COIL ON
  - XGBO017A GEN LOCKOUT G1B-TRIP RELAY ON
- Go to RUN
- Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup information is how this exam IC was developed

- Reset to IC-19
- Place 1A-EDG under clearance
  - IRF DSG005 (n 0 0) LOCAL
  - IRF DSG006 (n 0 0) MAINTAIN
- Fail Emergency Bus A-SA to Aux Bus D Tie Breaker 105 SA **ASIS** (this will not allow the breaker to be manually closed from the MCB switch)
  - IOR XD1I066 (n 0 0) ASIS
- Fail Emergency Bus B-SB to Aux Bus E Tie Breaker 125 SB **ASIS** (this will not allow the breaker to be manually closed from the MCB switch)
  - IOR XD1I075 (n 0 0) ASIS
- Fail 1B-SB EDG to start
  - IMF DSG01 (n 0 0) B
- Loss of Offsite Power (trigger 1)
  - IMF EPS01 (1 0 0) W/O_DELAY

JPM IC development – continued

- Since Attachment 1 allows the operator to choose energizing either bus 'A' or 'B', malfunctions were developed to fail breakers 105 and 125 ASIS. The JPM is written to have ONLY one of the buses energize due to an problem with the opposite train breaker (alternate path development). When the candidate first attempts to close either breaker 105 or breaker 125 the breaker they initially choose will NOT close. They will then have to restore power to the other bus. The conditional triggers will clear the other breakers failure when the first breaker switch is taken to the CLOSE position.
- Create 2 trigger files (note these files will NOT need to be recreated I have saved them to the Simulator trigger file this is just how I did it)

    - Breaker104toclose
        - @xbbi073|JIS|DI.value==3
    - Breaker124toclose
        - @xbbi077|JIS|DI.value==3

- Open ET (Event Trigger Summary)

- On trigger 2 – click assign file then type in the following
    - Breaker104toclose
- Click – link command – then type in the following
    - dor xd1i075 (n 0 0) ASIS

- On trigger 3 – click assign file then type in the following
    - Breaker124toclose
- Click – link command – then type in the following
    - dor xd1i066 (n 0 0) ASIS

- Place the Simulator in Run – insert Trigger 1
    - Isolate Letdown
    - Adjust TDAFW flow to maintain AFW flow > 210 KPPH and NR levels between 25% to 50% (this may require adjusting TDAFW pump speed as necessary to raise flow)
    - Place the EDG 1B-SB emergency stop switch to EMERG STOP

- Delete the Loss of Offsite Power malfunction
    - DMF EPS01

- FREEZE and SNAP these conditions to your exam IC

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: _____

Evaluator Note:	EOP ECA-0.0 Step 9 Directs energizing AC Emergency Buses from Offsite Power using Attachment 1 The attachment allows flexibility of energizing Emergency Bus 'A' with steps 2-8 or 'B' with steps 9-15. There isn't a fault indicated on either bus so a candidate should NOT be suspecting that either bus has a fault. But…you never know. Since the JPM is going to be ran as an ALTERNATE PATH the candidate has the choice of attempting to re-energize either bus first. Either choice will yield a failure of energizing the first bus but will have a success path for energizing the second bus. Since there could be a decision made by the candidate on which bus to restore first the JPM has a Part A (steps 2-8) and Part B steps 9-15). IF the candidate starts with trying to energize the 'A' bus (more than likely) use Part A of the JPM. IF the candidate starts with trying to energize the 'B' bus (least likely – maybe suspects a fault due to failure of EDG 'B' to start) use Part B.

Common step for Part A and Part B

EOP-ECA-0.0 Attachment 1 - RESTORATION OF OFFSITE POWER TO EMERGENCY BUSES

Caution prior to step 1

Performance Step: 1 **CAUTION**

Tripping of a Start Up XFMR lockout relay indicates a major fault on the XFMR. Re-energizing the XFMR may cause additional damage and should **NOT** be done without dispatcher's permission.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

Common step for Part A and Part B

EOP ECA-0.0, Attachment 1, Step 1.a, b

Performance Step: 2 Obtain Load Dispatcher's permission prior to performing the following:

a. Restoring offsite power to 6.9 KV buses
b. Resetting any tripped Start Up XFMR lockout relays

Standard: Information provided by CRS stated that the Load Dispatcher has provided permissions to restore offsite power to the 6.9 KV buses and reset any tripped Startup XFMR lockout releays

Comment:

EOP ECA-0.0, Attachment 1, Caution / Note prior to Step 2

Performance Step: 3

CAUTION

An AC Bus should **NOT** be re-energized if it is suspected the bus may be faulted.

NOTE

Steps 2 through 8 restore power to Bus A-SA and Steps 9 through 15 restore power to Bus B-SB.

Standard: Operator reads and placekeeps at any procedure note or caution (initials, checks or circle/slash)

Comment:

Part A, Energizing the 'A' Emergency Bus first starts on the next page

Part B, Energizing the 'B' Emergency Bus first starts on page 14

PART A – Attempting restoration of power to the 'A' Emergency Bus first

PART B – Attempting restoration of power to the 'B' Emergency Bus first (go to page 14)

EOP ECA-0.0, Attachment 1, Step 2.a

Performance Step: 4 On Start Up XFMR Protective Relay Panel 1A, verify off-site power to Start Up XFMR A:
a. Verify the Start Up XFMR 1A Lockout SU 1A Relay is reset.

Standard: Locates Startup XFMR 1A Lockout SU 1A Relay and verifies that the relay is reset. **(Relay is reset)**

Comment:

EOP ECA-0.0, Attachment 1, Step 2.b

Performance Step: 5 b. Verify closed any of the following switch yard tie breakers to energize Start Up XFMR A:
- Breaker 52-2
- Breaker 52-3

Standard: Locates tie breaker switches for Startup XFMR A
- Breaker 52-2 **(Verifies already closed)**
- Breaker 52-3 **(Not required to be closed but may be closed w/o consequences)**

Comment:

EOP ECA-0.0, Attachment 1, Step 3.a

Performance Step: 6 Restore offsite power to 6.9 KV Aux Bus D:
a. Place Start Up XFMR To Aux Buses A & D Synchronizer control switch to BREAKER 101 position.

Standard: Locates Synchronizer control switch for Start Up XFMR To Aux Buses A & D and places switch to Breaker 101 position

Comment:

EOP ECA-0.0, Attachment 1, Step 3.b

Performance Step: 7 b. Close Start Up XFMR A To Aux Bus D Breaker 101.

Standard: Locates switch for Start Up XFMR A To Aux Bus D Breaker 101 and places switch to CLOSE. **(RED LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 3.c

Performance Step: 8 c. Place Start Up XFMR To Aux Buses A & D Synchronizer control switch to OFF.

Standard: Locates Synchronizer control switch for Start Up XFMR To Aux Buses A & D and places switch to OFF

Comment:

EOP ECA-0.0, Attachment 1, Step 4

Performance Step: 9 Verify Aux Bus D To Emergency Bus A-SA Breaker 104 - CLOSED

Standard: Locates Aux Bus D to Emergency Bus A-SA Breaker 104 switch and takes switch to CLOSE **(RED LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 5

Performance Step: 10 Verify Diesel Generator A-SA Breaker 106 A SA - OPEN

Standard: Locates Diesel Generator A-SA Breaker 106 A SA switch and verifies breaker is Open **(GREEN LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 6.a

Performance Step: 11 Energize 6.9 KV Bus A-SA:

a. Place Emergency Bus A-SA To Aux Bus D Synchronizer control switch to SYNC.

Standard: Locates Synchronizer control switch for Emergency Bus A-SA To Aux Bus D and places control to SYNC

Comment:

EOP ECA-0.0, Attachment 1, Step 6.b

Performance Step: 12

b. Close Emergency Bus A-SA To Aux Bus D Tie Breaker 105.

Standard: Locates switch for Emergency Bus A-SA To Aux Bus D Tie Breaker 105 and takes switch to CLOSE.
(GREEN LIGHT STAYS LIT) – Reports to CRS that Emergency Bus A-SA To Aux Bus D Tie Breaker 105 will not close
(may dispatch AO to investigate)

Evaluator Cue:	**Acknowledge report that Emergency Bus A-SA To Aux Bus D Tie Breaker 105 will not close.**

Simulator Communicator:	**IF AO is dispatched: Acknowledge and repeat back communications to investigate breaker**

Evaluator NOTE:	**IF needed to get the candidate back on task: Ask for an estimation on when power will be restored to an Emergency Bus.**

Comment:

EOP ECA-0.0, Attachment 1, Step 9.a – Alternate Path Begins

Restoration of power from the Start Up XFMR 1B to the B-SB Emergency Bus

Performance Step: 13 On Start Up XFMR Protective Relay Panel 1B, verify off-site power to Start Up XFMR B:
a. Verify the Start Up XFMR 1B Lockout SU 1B Relay is reset.

Standard: Locates Startup XFMR 1B Lockout SU 1B Relay and verifies that the relay is reset. **(Relay is reset)**

Comment:

EOP ECA-0.0, Attachment 1, Step 9.b

Performance Step: 14 b. Verify closed any of the following switch yard tie breakers to energize Start Up XFMR B:
- Breaker 52-13
- Breaker 52-14

Standard: Locates tie breaker switches for Startup XFMR B
- Breaker 52-13 **(Not required to be closed but may be closed w/o consequences)**
- Breaker 52-14 **(Verifies already closed)**

Comment:

EOP ECA-0.0, Attachment 1, Step 10.a

✓ **Performance Step: 15** Restore offsite power to 6.9 KV Aux Bus E:
a. Place Start Up XFMR To Aux Buses B & E Synchronizer control switch to BREAKER 121 position.

Standard: Locates Synchronizer control switch for Start Up XFMR To Aux Buses B & E and places switch to Breaker 121 position

Comment:

EOP ECA-0.0, Attachment 1, Step 10.b

✓ **Performance Step: 16** b. Close Start Up XFMR B To Aux Bus E Breaker 121.

Standard: Locates switch for Start Up XFMR B To Aux Bus E Breaker 121 and places switch to CLOSE. **(RED LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 10.c

Performance Step: 17 c. Place Start Up XFMR To Aux Buses B & E Synchronizer control switch to OFF.

Standard: Locates Synchronizer control switch for Start Up XFMR To Aux Buses B & E and places switch to OFF

Comment:

EOP ECA-0.0, Attachment 1, Step 11

✓ **Performance Step: 18** Verify Aux Bus E To Emergency Bus B-SB Breaker 124 - CLOSED

Standard: Locates Aux Bus D to Emergency Bus B-SB Breaker 124 switch and takes switch to CLOSE **(RED LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 12

Performance Step: 19 Verify Diesel Generator B-SB Breaker 126 B SB - OPEN

Standard: Locates Diesel Generator B-SB Breaker 126 B SB switch and verifies breaker is Open **(GREEN LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 13.a

✓ **Performance Step: 20** Energize 6.9 KV Bus B-SB:

a. Place Emergency Bus B-SB To Aux Bus E Synchronizer control switch to SYNC.

Standard: Locates Synchronizer control switch for Emergency Bus B-SB To Aux Bus E and places control to SYNC

Comment:

EOP ECA-0.0, Attachment 1, Step 13.b

✓ **Performance Step: 21**

b. Close Emergency Bus B-SB To Aux Bus E Tie Breaker 125.

Standard: Locates switch for Emergency Bus B-SB To Aux Bus E Tie Breaker 125 and takes switch to CLOSE.
(RED LIGHT LIT)

Comment:

EOP ECA-0.0, Attachment 1, Step 13.c

Performance Step: 22

c. Place Emergency Bus B-SB To Aux Bus E Synchronizer control switch to OFF.

Standard: Locates Synchronizer control switch for Emergency Bus B-SB To Aux Bus E and places control to OFF

Comment:

EOP ECA-0.0, Attachment 1, Step 14

✓ **Performance Step: 23**

Close the following 6.9 KV breakers:
- Emergency Bus B-SB To XFMR B1-SB Breaker B1 A-SB
- Emergency Bus B-SB To XFMR B3-SB Breaker B3 A-SB

Standard:

- Locates control switch for Emergency Bus B-SB To XFMR B1-SB Breaker B1 A-SB and places control to CLOSE **(RED LIGHT LIT)**
- Locates control switch for Emergency Bus B-SB To XFMR B3-SB Breaker B3 A-SB and places control to CLOSE **(RED LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 15

✓ **Performance Step: 24**

Verify 6.9 KV Emergency Bus B-SB To XFMR B2-SB Breaker B2 A-SB - CLOSED

Standard:

- Locates control switch for 6.9 KV Emergency Bus B-SB To XFMR B2-SB Breaker B2 A-SB and places control to CLOSE **(RED LIGHT LIT)**

Informs CRS that power is restored to Emergency Bus B-SB

Evaluator Cue:	**Acknowledge any reports:** **After the 6.9 KV Emergency Bus B-SB power is restored: Evaluation on this JPM is complete.** **I have the shift, END OF JPM** **Inform Simulator Operator to place the Simulator in Freeze.**

Comment:

STOP TIME: _____

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

PART B – Attempting restoration of power to the 'B' Emergency Bus first

Restoration of power from the Start Up XFMR 1B to the B-SB Emergency Bus

Performance Step: 4.b On Start Up XFMR Protective Relay Panel 1B, verify off-site power to Start Up XFMR B:
a. Verify the Start Up XFMR 1B Lockout SU 1B Relay is reset.

Standard: Locates Startup XFMR 1B Lockout SU 1B Relay and verifies that the relay is reset. **(Relay is reset)**

Comment:

EOP ECA-0.0, Attachment 1, Step 9.b

Performance Step: 5.b b. Verify closed any of the following switch yard tie breakers to energize Start Up XFMR B:
- Breaker 52-13
- Breaker 52-14

Standard: Locates tie breaker switches for Startup XFMR B
- Breaker 52-13 **(Not required to be closed but may be closed w/o consequences)**
- Breaker 52-14 **(Verifies already closed)**

Comment:

EOP ECA-0.0, Attachment 1, Step 10.a

Performance Step: 6.b Restore offsite power to 6.9 KV Aux Bus E:
d. Place Start Up XFMR To Aux Buses B & E Synchronizer control switch to BREAKER 121 position.

Standard: Locates Synchronizer control switch for Start Up XFMR To Aux Buses B & E and places switch to Breaker 121 position

Comment:

EOP ECA-0.0, Attachment 1, Step 10.b

Performance Step: 7.b e. Close Start Up XFMR B To Aux Bus E Breaker 121.

Standard: Locates switch for Start Up XFMR B To Aux Bus E Breaker 121 and places switch to CLOSE. **(RED LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 10.c

Performance Step: 8.b f. Place Start Up XFMR To Aux Buses B & E Synchronizer control switch to OFF.

Standard: Locates Synchronizer control switch for Start Up XFMR To Aux Buses B & E and places switch to OFF

Comment:

EOP ECA-0.0, Attachment 1, Step 11

Performance Step: 9.b Verify Aux Bus E To Emergency Bus B-SB Breaker 124 - CLOSED

Standard: Locates Aux Bus D to Emergency Bus B-SB Breaker 124 switch and takes switch to CLOSE **(RED LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 12

Performance Step: 10.b Verify Diesel Generator B-SB Breaker 126 B SB - OPEN

Standard: Locates Diesel Generator B-SB Breaker 126 B SB switch and verifies breaker is Open **(GREEN LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 13.a

Performance Step: 11.b Energize 6.9 KV Bus B-SB:

d. Place Emergency Bus B-SB To Aux Bus E Synchronizer control switch to SYNC.

Standard: Locates Synchronizer control switch for Emergency Bus B-SB To Aux Bus E and places control to SYNC

Comment:

EOP ECA-0.0, Attachment 1, Step 13.b

Performance Step: 12.b

e. Close Emergency Bus B-SB To Aux Bus E Tie Breaker 125.

Standard: Locates switch for Emergency Bus B-SB To Aux Bus E Tie Breaker 125 and takes switch to CLOSE.

(GREEN LIGHT STAYS LIT) – Reports to CRS that Emergency Bus B-SB To Aux Bus E Tie Breaker 125 will not close

(may dispatch AO to investigate)

Evaluator Cue:	**Acknowledge report that Emergency Bus B-SB To Aux Bus E Tie Breaker 125 will not close.**

Simulator Communicator:	**IF AO is dispatched: Acknowledge and repeat back communications to investigate breaker**

Evaluator NOTE:	**IF needed to get the candidate back on task: Ask for an estimation on when power will be restored to an Emergency Bus.**

Comment:

EOP ECA-0.0, Attachment 1, Step 2.a – Alternate Path Begins

Restoration of power from the Start Up XFMR 1A to the A-SA Emergency Bus

EOP ECA-0.0, Attachment 1, Step 2.a

Performance Step: 13.b On Start Up XFMR Protective Relay Panel 1A, verify off-site power to Start Up XFMR A:
a. Verify the Start Up XFMR 1A Lockout SU 1A Relay is reset.

Standard: Locates Startup XFMR 1A Lockout SU 1A Relay and verifies that the relay is reset. **(Relay is reset)**

Comment:

EOP ECA-0.0, Attachment 1, Step 2.b

Performance Step: 14.b b. Verify closed any of the following switch yard tie breakers to energize Start Up XFMR A:
- Breaker 52-2
- Breaker 52-3

Standard: Locates tie breaker switches for Startup XFMR A
- Breaker 52-2 **(Verifies already closed)**
- Breaker 52-3 **(Not required to be closed but may be closed w/o consequences)**

Comment:

EOP ECA-0.0, Attachment 1, Step 3.a

✓ **Performance Step: 15.b** Restore offsite power to 6.9 KV Aux Bus D:

d. Place Start Up XFMR To Aux Buses A & D Synchronizer control switch to BREAKER 101 position.

Standard: Locates Synchronizer control switch for Start Up XFMR To Aux Buses A & D and places switch to Breaker 101 position

Comment:

EOP ECA-0.0, Attachment 1, Step 3.b

✓ **Performance Step: 16.b** e. Close Start Up XFMR A To Aux Bus D Breaker 101.

Standard: Locates switch for Start Up XFMR A To Aux Bus D Breaker 101 and places switch to CLOSE. **(RED LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 3.c

Performance Step: 17.b f. Place Start Up XFMR To Aux Buses A & D Synchronizer control switch to OFF.

Standard: Locates Synchronizer control switch for Start Up XFMR To Aux Buses A & D and places switch to OFF

Comment:

EOP ECA-0.0, Attachment 1, Step 4

✓ **Performance Step: 18.b** Verify Aux Bus D To Emergency Bus A-SA Breaker 104 - CLOSED

Standard: Locates Aux Bus D to Emergency Bus A-SA Breaker 104 switch and takes switch to CLOSE **(RED LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 5

Performance Step: 19.b Verify Diesel Generator A-SA Breaker 106 A SA - OPEN

Standard: Locates Diesel Generator A-SA Breaker 106 A SA switch and verifies breaker is Open **(GREEN LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 6.a

✓ **Performance Step: 20.b** Energize 6.9 KV Bus A-SA:

b. Place Emergency Bus A-SA To Aux Bus D Synchronizer control switch to SYNC.

Standard: Locates Synchronizer control switch for Emergency Bus A-SA To Aux Bus D and places control to SYNC

Comment:

EOP ECA-0.0, Attachment 1, Step 6.b

✓ **Performance Step: 21.b**

c. Close Emergency Bus A-SA To Aux Bus D Tie Breaker 105.

Standard: Locates switch for Emergency Bus A-SA To Aux Bus D Tie Breaker 105 and takes switch to CLOSE.
(RED LIGHT LIT)

Comment:

EOP ECA-0.0, Attachment 1, Step 6.c

Performance Step: 22.b

a. Place Emergency Bus A-SA To Aux Bus D Synchronizer control switch to OFF.

Standard: Locates Synchronizer control switch for Emergency Bus A-SA To Aux Bus D and places control to OFF

Comment:

EOP ECA-0.0, Attachment 1, Step 7

✓ **Performance Step: 23.b**

Close the following 6.9 KV breakers:
- Emergency Bus A-SA To XFMR A1-SA Breaker A1 A-SA
- Emergency Bus A-SA To XFMR A3-SA Breaker A3 A-SA

Standard:
- Locates control switch for Emergency Bus A-SA To XFMR A1-SA Breaker A1 A-SA and places control to CLOSE **(RED LIGHT LIT)**
- Locates control switch for Emergency Bus A-SA To XFMR A3-SA Breaker A3 A-SA and places control to CLOSE **(RED LIGHT LIT)**

Comment:

EOP ECA-0.0, Attachment 1, Step 8

✓ **Performance Step: 24.b** Verify 6.9 KV Emergency Bus A-SA To XFMR A2-SA Breaker A2 A-SA - CLOSED

Standard:

- Locates control switch for 6.9 KV Emergency Bus A-SA To XFMR A2-SA Breaker A2 A-SA and places control to CLOSE **(RED LIGHT LIT)**

Informs CRS that power is restored to Emergency Bus A-SA

Evaluator Cue:	**Acknowledge any reports:** **After the 6.9 KV Emergency Bus A-SA power is restored: Evaluation on this JPM is complete.** **I have the shift, END OF JPM** **Inform Simulator Operator to place the Simulator in Freeze.**

Comment:

STOP TIME: _____

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 HNP NRC Exam Simulator JPM g

Restoration of Offsite Power to Emergency Buses
EOP ECA-0.0, Loss Of All AC Power, Attachment 1

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	• The unit was operating at 100% power • 'A' EDG is under clearance due to a failure that caused the Generator field to not flash during OST-1013 Subsequently: • A failure of a transmission line on the Duke grid resulted in the cascading trip of several units which resulted in low grid frequency • The HNP unit has experienced a loss of offsite power • 'B' EDG failed to start. The problem is being investigated • The crew entered ECA-0.0, Loss Of All AC Power • The load dispatcher has contacted HNP and informed the MCR that the grid is now stable

Initiating Cue:	• Your position is the BOP • The CRS has directed you to restore offsite power to a (one) AC emergency bus using ECA-0.0 Attachment 1. • The Load Dispatcher has given permission to restore offsite power to 6.9 KV buses and to reset any tripped Start Up XFMR lockout relays.

Attachment 1
Sheet 1 of 4
RESTORATION OF OFFSITE POWER TO EMERGENCY BUSES

CAUTION

Tripping of a Start Up XFMR lockout relay indicates a major fault on the XFMR. Re-energizing the XFMR may cause additional damage and should **NOT** be done without dispatcher's permission.

1. Obtain Load Dispatcher's permission prior to performing the following:

☐ a. Restoring offsite power to 6.9 KV buses

☐ b. Resetting any tripped Start Up XFMR lockout relays

CAUTION

An AC Bus should **NOT** be re-energized if it is suspected the bus may be faulted.

NOTE

Steps 2 through 8 restore power to Bus A-SA and Steps 9 through 15 restore power to Bus B-SB.

2. At Start Up XFMR Protective Relay Panel 1A, verify off-site power to Start Up XFMR A:

☐ a. Verify the Start Up XFMR 1A Lockout SU 1A Relay is reset.

b. Verify closed any of the following switch yard tie breakers to energize Start Up XFMR A:

☐ • Breaker 52-2
☐ • Breaker 52-3

Attachment 1
Sheet 2 of 4
RESTORATION OF OFFSITE POWER TO EMERGENCY BUSES

3. Restore offsite power to 6.9 KV Aux Bus D:

☐ a. Place Start Up XFMR To Aux Buses A & D Synchronizer control switch to BREAKER 101 position.

☐ b. Close Start Up XFMR A To Aux Bus D Breaker 101.

☐ c. Place Start Up XFMR To Aux Buses A & D Synchronizer control switch to OFF.

☐ 4. Verify Aux Bus D To Emergency Bus A-SA Breaker 104 - CLOSED

☐ 5. Verify Diesel Generator A-SA Breaker 106 A SA - OPEN

6. Energize 6.9 KV Bus A-SA:

☐ a. Place Emergency Bus A-SA To Aux Bus D Synchronizer control switch to SYNC.

☐ b. Close Emergency Bus A-SA To Aux Bus D Tie Breaker 105.

☐ c. Place Emergency Bus A-SA To Aux Bus D Synchronizer control switch to OFF.

7. Close the following 6.9 KV breakers:

☐ • Emergency Bus A-SA To XFMR A1 Breaker A1 A-SA
☐ • Emergency Bus A-SA To XFMR A3-SA Breaker A3 A-SA

☐ 8. Verify 6.9 KV Emergency Bus A-SA To XFMR A2-SA Breaker A2 A-SA - CLOSED

Attachment 1
Sheet 3 of 4
RESTORATION OF OFFSITE POWER TO EMERGENCY BUSES

9. On Start Up XFMR Protective Relay Panel 1B, verify off-site power to Start Up Aux XFMR B by performing the following:

☐ a. Verify the Start Up XFMR 1B Lockout SU 1B Relay is reset.

b. Verify any of the following switch yard tie breakers are closed to energize Start Up XFMR B:

☐ • Breaker 52-13
☐ • Breaker 52-14

10. Restore offsite power to 6.9 KV Aux Bus E:

☐ a. Place Start Up XFMR To Aux Buses B & E Synchronizer control switch to BREAKER 121 position.

☐ b. Close Start Up XFMR B To Aux Bus E Breaker 121.

☐ c. Place Start Up XFMR To Aux Buses B & E Synchronizer control switch to OFF.

☐ 11. Verify Aux Bus E To Emergency Bus B-SB Breaker 124 - CLOSED

☐ 12. Verify Diesel Generator B-SB Breaker 126 B SB - OPEN

13. Energize 6.9 KV Bus B-SB:

☐ a. Place Emergency Bus B-SB To Aux Bus E Synchronizer control switch to SYNC.

☐ b. Close Emergency Bus B-SB To Aux Bus E Tie Breaker 125.

☐ c. Place Emergency Bus B-SB To Aux Bus E Synchronizer control switch to OFF.

14. Close the following 6.9 KV breakers:

☐ • Emergency Bus B-SB To XFMR B1-SB Breaker B1 A-SB
☐ • Emergency Bus B-SB To XFMR B3-SB Breaker B3 A-SB

Attachment 1
Sheet 4 of 4
RESTORATION OF OFFSITE POWER TO EMERGENCY BUSES

☐ 15. Verify 6.9 KV Emergency Bus B-SB To XFMR B2-SB Breaker B2 A-SB - CLOSED

- END -

Facility:	Harris Nuclear Plant	Task No.:	088018H101
Task Title:	Restoring the Control Room Area HVAC System to Normal After a Control Room Isolation Signal	JPM No.:	2016 HNP NRC Exam Simulator JPM CR h
K/A Reference:	APE067 AA1.05 RO 3.0 SRO 3.1	**ALTERNATE PATH - YES**	
Examinee:	_____	NRC Examiner:	_____
Facility Evaluator:	_____	Date:	_____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• The plant is operating at 100% power when a fire occurred at the Dedicated Shutdown Diesel Generator during testing. • The smoke from the fire caused a Control Room Ventilation Isolation signal to occur. (Smoke detected at the normal intake Zone 1-150) • The Fire Brigade has put the fire out and the smoke has been cleared.

Initiating Cue:	• Your position is the BOP. • The CRS has directed you to restore the Control Room Area HVAC System to normal in accordance with OP-173, Control Room Area HVAC System, Section 8.4. • The initial conditions are satisfied and the HVAC system is in operation per section 8.1 of OP-173.

Task Standard: Place the Control Room Area HVAC system in normal operation

Required Materials: Replacement copy of OP-173, Control Room Area HVAC System, Rev. 37 for each JPM performed

General References: OP-173, Control Room Area HVAC System, Rev. 37, ALB-030-6-4, Rev. 35

Time Critical Task: No

Validation Time: 15 minutes

CRITICAL STEP JUSTIFICATION	
Step 4	Must reset both trains of Control Room ventilation or the system cannot be taken out of the Emergency filtration lineup.
Step 7	Must open the normal intake valves to return system lineup to normal flow path for operation.
Step 10	Must start a normal exhaust fan to obtain flow and obtain correct damper alignment.
Step 12	Must stop both emergency filtration fans to return to normal filtration lineup and to shift dampers back to normal lineup.
Step 13	Must shut emergency exhaust Recirc dampers to complete normal alignment of Control Room ventilation system.
Step 18	Must start the standby fan to re-establish Main Control Room ventilation.

2016 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-171
- Password "noinstants"
- Go to RUN
- Ensure RM-11 is NORMAL
- Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

To recreate the IC setup for this JPM:

- Initial Simulator IC was IC-19 – go to RUN
- Enter a Control Room Isolation Signal (CRIS) (the JPM has the signal in due to smoke but there isn't a relay that can be individually used so use the one for Radiation)
  - irf rms011 (n 00:00:00 00:00:00) 0.0005 00:00:00
  - irf rms013 (n 00:00:00 00:00:00) 0.0005 00:00:00
- After the fans and dampers have completed switching positions reset the rad monitors to 1e-7 or they will not clear (value is < the alarm setpoint on RM-11)
  - mrf rms011 (n 00:00:00 00:00:00) 1e-007 00:00:00
  - mrf rms013 (n 00:00:00 00:00:00) 1e-007 00:00:00
  - Reset RM-11 back to normal
- Start the Motor Driven Fire Pump
  - irf msc029 (n 0 0) START
- Place 2 alarms to on to simulate a fire
- Fire Detection System Trouble
  - ian xn30a07 (n 0 0) ALARM_ON
- Reflash Fire Pump System Trouble
  - ian xn30b07 (n 0 0) ALARM_ON
- Create a conditional Trigger to trip AH-15 A SA when the control switch for Emergency Filtration Recirc Damper CA-D61 SB is taken to SHUT

  To create the conditional trigger:
  - Go to malfunctions
  - Find Control Room Normal Support Fan AH-15-1A assign Trigger 1 with switch to STOP and GREEN light OFF
    - ior xdi085 (1 00:00:00 00:00:00) STOP
    - ior xd2o085 (1 00:00:00 00:00:00) OFF
  - Wait for ALB 30-3-3 CNT Room Air Low ΔP to alarm
  - Find Annuciator ALB-030-6-4 assign Trigger 1 to alarm on
    - ior xn30d06 (1 00:00:00 00:00:00) ALARM_ON
  - Go to triggers
    - Click on Trigger 1
    - Click on 'Assign File'
    - Choose CZD61Shut
    - (source file should now have CZD61Shut)

- Silence, Acknowledge and Reset the annunciators
- Freeze and Snap and save these conditions to your exam IC

Simulator Operator:	*When directed by the Lead Examiner go to Run.*

START TIME: _____

Performance Step: 1 Previews procedure

Standard: Obtains a copy of OP-173 and refers to Section 8.4

IF asked by candidate Evaluator Cue:	**Initial Conditions have been satisfied:** **Control Room Isolation Signal is clear and the Control Room Area HVAC System is in operation per Section 8.1, 8.2 or 8.3**

Comment:

OP-173, Section 8.4 Note prior to Step 1

Performance Step: 2 NOTE: The following Step will cause ALB-030/1-1, Control Room Isolation Train A, and ALB-030/2-1, Control Room Isolation Train B, to clear

Standard: Operator reads and placekeeps any note or caution (initials, checks or circle/slash)

Comment:

OP-173, Section 8.4 Caution prior to Step 1

Performance Step: 3 CAUTION: Failure of equipment to secure in this section will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

Standard: Operator reads and placekeeps any note or caution (initials, checks or circle/slash)

Comment:

OP-173, Section 8.4 Step 1

✓ **Performance Step: 4** PLACE the CONTROL ROOM ISOL TRAIN A and B RESET switches to RESET.

- CONTROL ROOM ISOL TRAIN A RESET
- CONTROL ROOM ISOL TRAIN B RESET

Standard: Locates and momentarily operates the Control Room Isol Train A reset switch to reset and the Train B reset switch to reset

Operator resets alarm using reset button on MCB

(May report to CRS that the Control Room Isolation signal for Train A and B are clear)

Evaluator Cue:	**Acknowledge any report.**

Comment: Note: this will cause ALB-030/1-1 and ALB-030/2-1 alarms to clear.

OP-173, Section 8.4, Step 2

Performance Step: 5

Shut any of the following EMER FILT SOUTH (NORTH) OUTSIDE AIR INLET valves that are open, (any that are not open may be marked N/A):

- EMER FILT SOUTH OUTSIDE AIR INLET 1CZ-9 SA
- EMER FILT SOUTH OUTSIDE AIR INLET 1CZ-10 SB
- EMER FILT NORTH OUTSIDE AIR INLET 1CZ-11 SA
- EMER FILT NORTH OUTSIDE AIR INLET 1CZ-12 SB

Standard:

Locates valves and verifies ALL outside air inlets are closed. (Position indication lights are all green.)

Comment:

OP-173, Section 8.4, Note prior to Step 3

Performance Step: 6

NOTE: Performing steps 8.4.2.3 through 8.4.2.6 quickly will minimize excessive pressurization of the Main Control Room

Standard:

Operator reads and placekeeps any note or caution (initials, checks or circle/slash).

Comment:

OP-173, Section 8.4, Step 3

✓ **Performance Step: 7**

OPEN the following Control Normal Outside Air Intake Valves:

- NORMAL INTAKE 1CZ-1 SA
- NORMAL INTAKE 1CZ-2 SB

Standard:

Locates and Opens NORMAL INTAKES
1CZ-1 SA and 1CZ-2 SB (Green Light goes off and Red Light comes on)

Comment:

OP-173, Section 8.4, Step 4

Performance Step: 8 If more than one NORMAL SUPPLY FAN AH-15 ASA (BSB) is running, stop one fan.

Standard: Identifies ONLY one NORMAL SUPPLY FAN is running (AH-15 ASA) and there is no need to stop a fan

Comment:

OP-173, Section 8.4, Step 5

Performance Step: 9

Verify associated valves/dampers align for the stopped train as follows:	
AH-15 IN CZ-D1 (CZ-D2)	Shut (indication) on SLB-5 (6)
AH-15 IN CZ-25 (CZ-26)	Shut (indication) on SLB-5 (6)
CONT ROM NORMAL RECIRC DAMPER CZ-D69 SA (CZ-D70 SB)	Shut

Standard: Locates and verifies the associated valves/dampers aligned for the stopped train.

AH-15B IN CZ-D2	**Shut** (indication) on SLB-6
AH-15B IN CZ-26	**Shut** (indication) on SLB-6
CONT ROM NORMAL RECIRC DAMPER CZ-D70 SB	**Shut**

Comment:

OP-173, Section 8.4, Step 6

✓ **Performance Step: 10** Start NORMAL EXHAUST FAN E-9 A (B)

Standard: Takes Normal Exhaust Fan E-9 A fan switch to start, confirms RED light is lit

Comment:

OP-173, Section 8.4, Step 7

Performance Step: 11 Verify the following valves/dampers are aligned as indicated:

E-9A(B) IN CZ-D6 (CZ-D7)	Open (located on SLB-7)
E-9A(B) OUT CZ-D12 (CZ-13)	Modulates (located on SLB-7)
NORMAL EXHAUST 1CZ-3 SA and 1CZ-4 SB	Open

Standard: Verifies:

E-9A IN CZ-D6	**Open** (located on SLB-7)
E-9A OUT CZ-D12	**Modulates** (located on SLB-7)
NORMAL EXHAUST 1CZ-3 SA and 1CZ-4 SB	**Open**

Comment:

OP-173, Section 8.4, Steps 8, 9 and 10

✓ **Performance Step: 12** If running, THEN STOP BOTH EMERGENCY FILTRATION FAN R-2 A-SA and R-2 B-SB and verify:

R2 INLET CZ-23 (CZ-24)	Shut [located on SLB-5 (6)]
R2 DISCH CZ-21 (CZ-22)	Shut [located on SLB-5 (6)]
EMERGENCY FILTRATION DISCHARGE 1CZ-19 SA and 1CZ-20 SB	Shut

Standard: Locates and stops **both** EMERGENCY FILTRATION FANS R-2 A-SA and R-2 B-SB (**critical to stop fans**) and verifies:

R2 INLET CZ-23 (CZ-24)	**Shut** [located on SLB-5 (6)]
R2 DISCH CZ-21 (CZ-22)	**Shut** [located on SLB-5 (6)]
And verifies that EMERGENCY FILTRATION DISCHARGE 1CZ-19 SA and 1CZ-20 SB	**Shut**

Comment:

NOTE: Alternate Path Starts Here

Lead Examiner and Simulator Operator:	**When the candidate shuts CZ-D61 SB a conditional trigger will trip the running Control Room Emergency Supply Fan breaker (AH-15 ASA breaker 1A36-SA-5A)**

OP-173, Section 8.4, Step 11

✓ **Performance Step: 13** Shut the EMERGENCY FILTRATION RECIRC dampers
EMERGENCY FILTRATION RECIRC DAMPER CZ-D66 SA
and
EMERGENCY FILTRATION RECIRC DAMPER CZ-D61 SB

Standard: Locates the control switches and **SHUTS** the EMERGENCY FILTRATION RECIRC dampers
CZ-D66 SA (Green Light On)
and
CZ-D61 SB (supply breaker 1A36-SA-5A trips)
Green light On

Comment:

Supply breaker 1A36-SA-5A for AH-15 ASA trips open

Performance Step: 14 **Annunciator ALB-030-6-4, CONT ROOM HVAC NORMAL SUPPLY FANS AH-15 LOW FLOW-O/L**

Standard: Acknowledges alarm and identifies that AH-15A SA has lost green indication on MCB and reports information to CRS.
Pulls APP and reviews response for alarm

Evaluator Cue:	**The CRS acknowledges the report. If the candidate identifies the AH-15A SA has tripped and determines the APP will be addressed after the task to restore ventilation is complete as the CRS direct the candidate to address the APP before continuing with the task.**

Comment:

Response to ALB-030-6-4, CONT ROOM HVAC NORMAL SUPPLY FANS AH-15 LOW FLOW-O/L

Performance Step: 15 **PERFORM** Corrective Actions:

a. CHECK AH-15 fans status indication on MCB.

b. IF fan is tripped, **THEN PERFORM** the following:

(1) START the standby fan using OP-173, Control Room Area HVAC System.

(2) IF white fan trouble light is LIT, **THEN DISPATCH** an operator to check overload relays on 1A36-SA-5A or 1B36-SB-3A.

(3) DISPATCH an operator to check for tripped breaker on 1A36-SA-5A or 1B36-SB-3A.

c. CHECK damper alignment on MCB for CZ-D1SA-1, CZ-D2SB-1, CZ-25 and CZ-26.

d. IF alb-030-6-3 is ALARMING, THEN REFER TO ALB-030-6-3

Standard:

- Identifies that AH-15 ASA has tripped and the white fan trouble light is NOT lit
- Start the standby fan:
  - Obtains a copy of OP-173 section 5.1, Control Room Area HVAC and starts the standby fan (standby fan will actually be started in Performance Step: 19)

Comment:

OP-173, Section 5.1, Startup of Normal Supply and Exhaust Fans

Performance Step: 16 **PERFORM** Corrective Actions:

(1) START the standby fan using OP-173, Control Room Area HVAC System.

Section 5.1.1 Initial Conditions

1. **Attachment 1 is complete**
2. **Attachment 2 is complete**

Standard: Reviews plant status control off-normal report for Control Room Area HVAC System components.

Lead Evaluator Cue:	**Using time compression the Initial Conditions are met.**

Standard: Initials section 5.1.1 step 1 and 2 for initial conditions complete

Comment:

OP-173, Section 5.1.2, Notes prior to step 1

Performance Step: 17 **NOTE: The following Steps align Train A Control Room Area HVAC components to service. Train B nomenclature is in parenthesis.**

NOTE: If Swapping Control Room Ventilation Fans, it is preferable to secure the running fan first, then start the desired fans with this section.

Standard:

- Operator reads and placekeeps any note or caution (initials, checks or circle/slash)

Comment:

OP-173, Section 5.1.2, step 1

✓ **Performance Step: 18** START the NORMAL SUPPLY FAN AH-15 BSB

Standard: Locates MCB switch for AH-15 BSB and takes switch to start, confirms RED light is lit

Comment:

OP-173, Section 5.1.2, step 2

Performance Step: 19 **VERIFY** that the following components are aligned properly:
AH-15 IN CZ-D2 ……..Open SLB-6
AH-15 DISCH CZ-26 ……..Open SLB-6
NORMAL INTAKE 1CZ-1 SA and 1CZ-2 SB…….. .Open
CONT RM NORMAL RECIRC DAMPER CZ-D70 SB… Open
NORMAL EXHAUST FAN E-9B…….. Running
E-9B IN CZ-D7 ……Open SLB-7
E-9B OUT CZ-D13 …….Modulates SLB-7
NORMAL EXHAUST 1CZ-3 SA and 1CZ-4 SB ……..Open

Standard: **VERIFIES** that the following components are aligned properly:
AH-15 IN CZ-D2 ……..**Open SLB-6**
AH-15 DISCH CZ-26 ……..**Open SLB-6**
NORMAL INTAKE 1CZ-1 SA and 1CZ-2 SB…….. .**Open**
CONT RM NORMAL RECIRC DAMPER CZ-D70 SB… **Open**
NORMAL EXHAUST FAN E-9B…….. **Running**
E-9B IN CZ-D7 ……**Open SLB-7**
E-9B OUT CZ-D13 …….**Modulates SLB-7**
NORMAL EXHAUST 1CZ-3 SA and 1CZ-4 SB ……..**Open**

Evaluator Cue:	**After verification of step 2 components** **CUE: Another Operator will continue with any remaining ventilation restoration. I have the shift. END OF JPM** **Direct Simulator Operator to place the Simulator in Freeze.**

STOP TIME: _____

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 HNP NRC Exam Simulator JPM h

Restoring the Control Room Area HVAC System to Normal After a Control Room Isolation Signal
OP-173, Control Room Area HVAC System

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	• The plant is operating at 100% power when a fire occurred at the Dedicated Shutdown Diesel Generator during testing. • The smoke from the fire caused a Control Room Ventilation Isolation signal to occur. (Smoke detected at the normal intake Zone 1-150) • The Fire Brigade has put the fire out and the smoke has been cleared.

Initiating Cue:	• Your position is the BOP. • The CRS has directed you to restore the Control Room Area HVAC System to normal in accordance with OP-173 “Control Room Area HVAC System”, Section 8.4. • The initial conditions are satisfied and the HVAC system is in operation per section 8.1 of OP-173.

HARRIS NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 6

PROCEDURE TYPE: ANNUNCIATOR PANEL PROCEDURE

NUMBER: **APP-ALB-030**

TITLE: **MAIN CONTROL BOARD**

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(1) 6-B-501 8227

DEVICES: CR6/2972 **SETPOINT**: N/A

CONTROL ROOM ISOLATION TRAIN A

REFLASH : NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Bypass Permissive Light Box (BPLB), SI ACTUATED window (4-1)
   - RM-11 or RM-23, any Control Room Outside Air Intake Rad Monitor in alarm
   - Smoke Detection in Zone 1-150 (MCR)

2. **VERIFY** Automatic Functions:
   - Verified using OMM-004
3. **PERFORM** Corrective Actions:
   a. **IF** a Safety Injection has occurred,
      THEN GO TO EOP-E-0.
   b. **GO TO** OP-173 Section 8.1

CAUSES:

1. Safety Injection
2. Control Room Outside Air Intake Radiation Monitor in high alarm, or loss of power
3. Control Room Area Smoke Detection
4. Alarm circuit or instrument malfunction

REFERENCES:

1. Tech Specs 3.7.6
2. 6-B-401 2972
3. EOP-E-0
4. OP-173

DEVICES: TAS-01CZ-7824ASV **SETPOINT**: 200°F (Pre-Hi)
280°F (Hi)

CONT ROOM EMER FILTER SYS A CHAR FILTER TROUBLE

REFLASH ; NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Emergency Filter Train A Inlet Temperature TI-7821A
   - Control Room Supply Fan R-2 (1A-SA) Outlet Temperature TI-7819A
   - Alarm circuit or instrument malfunction

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **CHECK** Control Room temperature indication to determine source of excessive temperature:
      (1) **IF** ALL temperatures indicate normal,
      THEN DISPATCH an operator to check charcoal filter for evidence of fire.
      (2) **IF** the charcoal filter inlet temperature is abnormally high,
      THEN DISPATCH an operator to check EHC-72 (1A-SA) for proper heater operation.
   b. **IF** a fire in the charcoal filter is suspected,
   THEN REFER TO FPP-002, Fire Emergency.
   c. **PLACE** Emergency Filter Train B in service
   AND REMOVE Emergency Filter Train A from service, if necessary, using OP-173, Control Room Area HVAC System. (Reference 5)

CAUSES:

1. Fire in charcoal filter
2. EHC-72 (1A-SA) continuously energized
3. Alarm circuit or instrument malfunction

REFERENCES:

1. Tech Specs 3.7.6
2. 6-B-401 2987
3. FPP-002
4. OP-173
5. PLP-114

DEVICES: TS-01CZ-7824ASA **SETPOINT**: 57.5°F

CONT ROOM EMER FILTER SYS A LOW TEMP AFTER HEPA FILTER

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Emergency Filter Train A Charcoal Filter Inlet Temperature TI-7824A
2. **VERIFY** Automatic Functions: None
3. **PERFORM** Corrective Actions:
   a. Check HEPA Filter Outlet Temperature on TI-7824A (MCB).
   b. **IF** HEPA filter outlet temperature is LOW,
   THEN DISPATCH an operator to check EHC-72 (1A-SA) for proper operation.

CAUSES:

1. Malfunction of EHC-72 (1A-SA)
2. Temperature switch or alarm circuit malfunction

REFERENCES:

1. Tech Specs 3.7.6
2. 6-B-401 2971

DEVICES: PDS-01CZ-7823ASV
PDS-01CZ-7827ASV

SETPOINT: 1.5 in water
6.3 in water

CONT ROOM EMER FILTER SYS A HIGH ΔP

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   a. Emergency Filter Train A HEPA Filter ΔP PDI-7823A
   b. Emergency Filter Train A Overall ΔP PDI-7827A

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:

NOTE

Tech Spec 3/4.7.6.d.1 requires the pressure drop across the combined HEPA filter and charcoal adsorber bank be less than 5.1 INWG at a flow rate of 3600-4400 cfm. This value can NOT be directly measured using MCB indication. If an actual high ΔP condition exists, prompt action should be taken to verify unit operability.

   a. **CHECK** Control Room ΔP indication to determine validity of alarm and location of high ΔP.
      (1) **IF** an actual high ΔP conditions exists,
      THEN PERFORM OST-1231, Control Room Emergency Filtration System Operability 18 Month Interval, to verify operability of the unit.
   b. **PLACE** Emergency Filter Train B in service
      AND REMOVE Emergency Filter Train A from service, if necessary using OP-173, Control Room Area HVAC System.

CAUSES:

1. High ΔP across HEPA filter
2. High overall ΔP across Emergency Filter Train A
3. Clogged Filter in Train A
4. Alarm circuit or differential pressure detector malfunction

REFERENCES:

1. Tech Spec 3.7.6
2. 6-B-401 2987
3. OP-173
4. OST-1231

DEVICES: MIS-01CZ-7824ASV **SETPOINT**: 70% relative humidity

CONT ROOM EMER FILTER SYS A HUMIDITY HIGH

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - NO Control Room indication available. Local indication verified in Step 3.

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **DISPATCH** an operator to check MIS-7824A to determine validity of alarm.
   b. **IF** the alarm is valid,
      THEN DIRECT an operator to check operation of demister filter AND electric heater.
   c. **PLACE** Emergency Filter Train B in service
      AND REMOVE Emergency Filter Train A from service, if necessary using OP-173, Control Room Area HVAC System.

CAUSES:

1. Failure of demister filter
2. Failure of electric heater
3. Alarm circuit or detector malfunction

REFERENCES:

1. Tech Spec 3.7.6
2. 6-B-401 2987
3. OP-173

DEVICES: CR6/2973 **SETPOINT**: N/A

CONTROL ROOM ISOLATION TRAIN B

REFLASH : NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Bypass Permissive Light Box (BPLB), SI ACTUATED window (4-1)
   - RM-11 or RM-23, any Control Room Outside Air Intake Rad Monitor in alarm
   - Smoke Detection in Zone 1-150 (MCR)

2. **VERIFY** Automatic Functions:
   - Verified using OMM-004.
3. **PERFORM** Corrective Actions:
   a. **IF** a Safety Injection has occurred,
      THEN GO TO EOP-E-0.
   b. **GO TO** OP-173 Section 8.1.

CAUSES:

1. Safety Injection
2. Control Room Outside Air Intake Radiation Monitor in high alarm, or loss of power
3. Control Room Area Smoke Detection
4. Alarm circuit or instrument malfunction

REFERENCES:

1. Tech Specs 3.7.6
2. 6-B-401 2973
3. EOP-E-0
4. OP-173

DEVICES: TAS-01CZ-7824BSV **SETPOINT**: 200°F (Pre-hi)
280°F (Hi)

CONT ROOM EMER FILTER SYS B CHAR FILTER TROUBLE

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - **a.** Emergency Filter Train B Inlet Temperature TI-7821B
   - **b.** Control Room Supply Fan R-2 (1B-SB) Outlet Temperature TI-7819B
   - **c.** Alarm circuit or instrument malfunction

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   - **a.** **CHECK** Control Room temperature indication to determine source of excessive temperature:
     - **(1)** **IF** ALL temperatures indicate normal,
       THEN DIRECT an operator to check charcoal filter for evidence of fire.
     - **(2)** **IF** the charcoal filter inlet temperature is abnormally high,
       THEN DIRECT an operator to check EHC-72 (1B-SB) for proper heater operation.
   - **b.** **IF** a fire in the charcoal filter is suspected,
     THEN REFER TO FPP-002, Fire Emergency.
   - **c.** **PLACE** Emergency Filter Train A in service
     AND REMOVE Emergency Filter Train B from service, if necessary, using OP-173, Control Room Area HVAC System. (Reference 4)

CAUSES:

1. Fire in charcoal filter
2. EHC-72 (1B-SB) continuously energized
3. Alarm circuit or instrument malfunction

REFERENCES:

1. Tech Specs 3.7.6
2. 6-B-401 2988
3. FPP-002
4. OP-173
5. PLP-114

DEVICES: TS-01CZ-7824BSB **SETPOINT**: 57.5°F

CONT ROOM EMER FILTER SYS B LOW TEMP AFTER HEPA FILTER

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Emergency Filter Train B Charcoal Filter Inlet Temperature TI-7824B
2. **VERIFY** Automatic Functions: None
3. **PERFORM** Corrective Actions:
   a. **IF** HEPA filter outlet temperature is LOW,
   THEN DISPATCH an operator to check EHC-72 (1B-SB) for proper operation.

CAUSES:

1. Malfunction of EHC-72 (1B-SB).
2. Temperature switch or alarm circuit malfunction.

REFERENCES:

1. Tech Specs 3.7.6
2. 6-B-401 2971

DEVICES: PDS-01CZ-7823BSV
PDS-01CZ-7827BSV

SETPOINT: 1.5 in water
6.3 in water

CONT ROOM EMER FILTER SYS B HIGH ΔP

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   a. Emergency Filter Train B HEPA Filter ΔP PDI-7823B
   b. Emergency Filter Train B Overall ΔP PDI-7827B

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:

NOTE

Tech Spec 3/4.7.6.d.1 requires the pressure drop across the combined HEPA filter and charcoal adsorber bank be less than 5.1 INWG at a flow rate of 3600-4400 cfm. This value can NOT be directly measured using MCB indication. If an actual high ΔP condition exists, prompt action should be taken to verify unit operability.

   a. **CHECK** Control Room ΔP indication to determine validity of alarm AND location of high ΔP.
      (1) **IF** an actual high ΔP conditions exists,
      THEN PERFORM OST-1231, Control Room Emergency Filtration System Operability 18 Month Interval, to verify operability of the unit.
   b. **PLACE** Emergency Filter Train A in service
      AND REMOVE Emergency Filter Train B from service, if necessary using OP-173, Control Room Area HVAC System.

CAUSES:

1. High ΔP across HEPA filter
2. High overall ΔP across Emergency Filter Train B
3. Clogged Filter in Train B
4. Alarm circuit or differential pressure detector malfunction

REFERENCES:

1. Tech Spec 3.7.6
2. 6-B-401 2988
3. OP-173
4. OST-1231

DEVICES: MIS-01CZ-7824BSV **SETPOINT**: 70% relative humidity

CONT ROOM EMER FILTER SYS B HUMIDITY HIGH

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - NO Control Room indication available. Local indication verified in Step 3.

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **DISPATCH** an operator to check MIS-7824B to determine validity of alarm.
   b. **IF** the alarm is valid,
      THEN DISPATCH an operator to check operation of demister filter and electric heater.
   c. **PLACE** Emergency Filter Train A in service
      AND REMOVE Emergency Filter Train B from service, if necessary using OP-173, Control Room Area HVAC System.

CAUSES:

1. Failure of demister filter
2. Failure of electric heater
3. Alarm circuit or detector malfunction

REFERENCES:

1. Tech Spec 3.7.6
2. 6-B-401 2988
3. OP-173

DEVICES: 1SFD-E080 1SFD-E081 1SFD-E082 1SFD-E083 1SFD-E084 1SFD-E085 1SFD-E086 1SFD-E087 1SFD-E088 1SFD-E089 1SFD-E090

SETPOINT: None

IFD SYSTEM TROUBLE

REFLASH: YES

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - FireWorks workstation PC located in the Main Control Room.
   - Fire Alarm Control Panel (FACP) located in the Reactor Auxiliary Building EL. 305' ARP Room.

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **CONSULT** the FireWorks Screen and determine the equipment/component initiating the Trouble signal.
   b. **IF** the alarm is caused by a detector**,**
      THEN DISPATCH an operator to the detector location to investigate the source of the initiating signal (LCD will display fault conditions).
   c. **IF** the alarm is caused by the FACP**,**
      THEN DISPATCH an operator to the FACP to investigate the source of the fault.
   d. **ESTABLISH** appropriate compensatory measures per FPP-013 if required.
   e. **INITIATE** corrective actions to troubleshoot and repair the cause of the alarm.

CAUSES:

1. Fault condition from the IFD detectors or Fire Alarm Control Panel (FACP).
2. Alarm circuit or instrument malfunction.

REFERENCES:

1. 6-B-401 9600
2. 6-B-401 9608
3. 6-B-401 9609
4. 6-B-401 9620
5. 6-B-401 9634
6. 6-B-401 9636
7. 6-B-401 9637
8. 6-B-401 9639
9. 6-B-401 9640
10. 6-B-401 9643
11. 6-B-401 9644
12. 6-B-401 9684
13. FPP-002
14. FPP-013

DEVICES: PDS-01CZ-7838A
PDS-01CZ-7838B

SETPOINT: 0.1 in water
0.1 in water

CONTROL ROOM AIR LOW ΔP

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Control Room to outside air ΔP indications PDI-7838A1 and PDI-7838B1
   - Damper position indication on MCB
   - AH-15 running indication on MCB

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **CHECK** supply damper positions on MCB AND direct an operator to reposition any misaligned dampers.
   b. **VERIFY** proper operation of AH-15 supply fans.
   c. **START** standby fan, if necessary, using OP-173, Control Room Area HVAC System.
   d. **DISPATCH** an operator to verify proper operation of Modulating Exhaust dampers CZ-D12-1 and CZ-D13-1.
   e. **CHECK** ALL doors to and from Main Control Room SHUT.

CAUSES:

1. Automatic dampers NOT operating properly
2. Supply damper misalignment
3. Supply fan failure
4. Door to/from Main Control Room open
5. Instrument or alarm circuit malfunction

REFERENCES:

1. Tech Spec 3.7.6
2. 6-B-401 2992
3. OP-173

DEVICES: FS-01CZ-7819AS
FS-01CZ-7819BS

SETPOINT: 14 fps
14 fps

CONTROL ROOM EMER FLTR UNIT FANS R2 LOW FLOW - O/L

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Control Room Emergency Filtration System Flow FI-7819A and FI-7819B.
   - Fan running indication for R-2 (1A-SA) and R-2 (1B-SB)
   - Position indication for dampers CZ-23, CZ-24, CZ-21, CZ-22, CZ-B19SA and CZ-B20SB.

2. **VERIFY** Automatic Functions:
   a. Fans trip on overload.

3. **PERFORM** Corrective Actions:
   a. **VERIFY** proper operation of R-2 fans on MCB.
   b. **IF** a fan has tripped,
   THEN PERFORM the following:
   (1) **START** the standby fan, using OP-173, Control Room Area HVAC System.
   (2) **IF** white fan trouble light is LIT,
   THEN DISPATCH an operator to check for tripped overload relays on 1A36-SA-3D or 1B36-SB-3D.
   (3) **DISPATCH** an operator to check for breaker trip on 1A36-SA-3D or 1B36-SB-3D.
   c. **VERIFY** proper alignment of valves in filtration train using indication on MCB of CZ-23, CZ-24, CZ-21, CZ-22, CZ-B19SA and CZ-B20SB.

CAUSES:

1. Overload trip (thermal or magnetic)
2. Low flow through fan with fan running
3. Damper misalignment
4. Loss of control power to fan
5. Flow switch of alarm circuit malfunction

REFERENCES:

1. Tech Spec 3.7.6
2. 6-B-401 2980, 2983
3. PCR-3494
4. OP-173

DEVICES: FS-01CZ-7817AS
FS-01CZ-7817BS

SETPOINT: 31 fps (350 cfm)
31 fps (350 cfm)

CONTROL ROOM EMER AIR SUP OAI HIGH FLOW

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Control Room Emergency Filter System Flow FI-7817A OR FI-7817B
   - R-2 (1A-SA) and R-2 (1B-SB) running indication
   - Damper position indication for 1CZ-9, 1CZ-10, 1CZ-11, CZ-21, CZ-22, CZ-23 and CZ-24

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **VERIFY** proper fan status.
   b. **IF** BOTH R-2A **AND** R-2B are running,
      THEN STOP one fan using OP-173, Control Room Area HVAC System.
   c. **VERIFY** proper damper alignment on MCB.
   d. **IF** dampers are out of position,
      THEN REPOSITION as required.

CAUSES:

1. BOTH Emergency Air Supply Fans RUNNING
2. Damper misalignment
3. Flow switch or alarm circuit malfunction
4. Control Room Ventilation in RECIRC

REFERENCES:

1. Tech Spec 3.7.6
2. 6-B-401 2971
3. OP-173

DEVICES: 1SFD-E080 1SFD-E081 1SFD-E082 1SFD-E083 1SFD-E084 1SFD-E085 1SFD-E086 1SFD-E087 1SFD-E088 1SFD-E089

SETPOINT: Actuated

IFD SYSTEM ALERT

REFLASH: YES

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - FireWorks workstation PC located in the Main Control Room.
   - Fire Alarm Control Panel (FACP) located in the Reactor Auxiliary Building EL. 305' ARP Room.

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **IF** confirmation is received that a fire exists or a second alarm (fire alarm in adjacent zone or a fire pump start) is received in the Control Room or an Incipient Fire Detection System Alarm is received before an AO or on-shift I&C tech has responded to an Incipient Fire Detection Alert,
   THEN PERFORM the following:
   (1) SOUND the plant fire alarm.
   (2) DISPATCH the Fire Brigade.
   (3) GO TO FPP-002, Step 8.1.6
   b. **CONSULT** the FireWorks Screen and determine the Incipient Detector Zone initiating the Alert signal.

NOTE
With IFD System Alert locked in the operator or an Incipient Detection Fire Watch is required to remain in the area until the alarm is cleared by repairing or clearing the condition. (see FPP-013)

   c. **DISPATCH** an operator to the Incipient Detector Zone causing the alarm to investigate the source of the initiating signal.
   d. **DISPATCH** the on-shift I&C technician to the Incipient Detector Zone causing the alarm with the portable incipient detector to investigate the source of the initiating signal.
   e. **MONITOR** the initiating detector response on the CirrusPro screen during the field investigation.

CAUSES:

1. Incipient fire detected in the monitored cabinet.
2. Alarm circuit or instrument malfunction.

REFERENCES:

1. 6-B-401 9600
2. 6-B-401 9608
3. 6-B-401 9609
4. 6-B-401 9620
5. 6-B-401 9634
6. 6-B-401 9636
7. 6-B-401 9637
8. 6-B-401 9639
9. 6-B-401 9640
10. 6-B-401 9643
11. 6-B-401 9644
12. 6-B-401 9684
13. FPP-002
14. FPP-013

DEVICES: TS-01CZ-7819A2
TS-01CZ-7819B2

SETPOINT: 280°F
280°F

CONTROL ROOM EMER FLTR UNIT FANS R2 DISCH TEMP HI-HI

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - R-2 (1A-SA) Outlet temperature TI-7819A
   - R-2 (1B-SB) Outlet temperature TI-7819B
   - ALB-030-4-5, Control Room Emer Fltr Unit Fans R2 Disch Temp Hi

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **CHECK** TS-01CZ-7819A2 and TS-01CZ-7819B2 to verify alarm.
   b. **DISPATCH** an operator to check R-2 fans for indication of fire in housing or rubbing noises.
   c. **IF** problem is in fan unit,
      THEN PERFORM the following, using OP-173, Control Room Area HVAC System:
      (1) **START** the standby fan.
      (2) **STOP** the running fan.
   d. **IF** in Recirculation mode,
      THEN DISPATCH an operator to check operation of EHC-24 or EHC-26.

CAUSES:

1. Fire in R-2 (1A-SA) or R-2 (1B-SB) fan housing
2. EHC-24 or EHC-26 continuously energized while in Recirculation mode
3. Fan R-2 (1A-SA) or R-2 (1B-SB) rubbing housing causing overheating
4. Temperature switch or alarm circuit malfunction

REFERENCES:

1. Tech Specs 3.7.6
2. 6-B-401 2992
3. PLP-114
4. OP-173

DEVICES: TS-01CZ-7819A1
TS-01CZ-7819B1

SETPOINT: 200°F
200°F

CONTROL ROOM EMER FLTR UNIT FANS R2 DISCH TEMP HI

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - R-2 (1A-SA) Outlet Temperature TI-7819A
   - R-2 (1B-SB) Outlet Temperature TI-7819B

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **CHECK** TI-7819A AND TI-7819B on MCB to verify alarm.
   b. **DISPATCH** an operator to check R-2 fans for indication of fire in housing OR rubbing noises.
   c. **IF** problem is in fan unit,
   THEN PERFORM the following, using OP-173, Control Room Area HVAC System:
   (1) **START** the standby fan.
   (2) **STOP** the running fan.
   d. **IF** in Recirculation mode,
   THEN DISPATCH an operator to check operation of EHC-24 or EHC-26.

CAUSES:

1. Fire in R-2 (1A-SA) or R-2 (1B-SB) fan housing
2. EHC-24 or EHC-26 continuously energized while in Recirculation mode
3. Fan R-2 (1A-SA) or R-2 (1B-SB) rubbing housing causing overheating
4. Temperature switch or alarm circuit malfunction

REFERENCES:

1. Tech Specs 3.7.6
2. 6-B-401 2992
3. PLP-114
4. OP-173

DEVICES: 1SFD-E080 1SFD-E081 1SFD-E082 1SFD-E083 1SFD-E084 1SFD-E085 1SFD-E086 1SFD-E087 1SFD-E088 1SFD-E089

SETPOINT: Actuated

IFD SYSTEM ALARM

REFLASH: YES

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - FireWorks workstation PC located in the Main Control Room.
   - Fire Alarm Control Panel (FACP) located in the Reactor Auxiliary Building EL. 305' ARP Room.

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **IF** confirmation is received that a fire exists or a second alarm (fire alarm in adjacent zone or a fire pump start) is received in the Control Room or an Incipient Fire Detection System Alarm is received before an AO or on-shift I&C tech has responded to an Incipient Fire Detection Alert,
   THEN PERFORM the following:
   (1) SOUND the plant fire alarm.
   (2) DISPATCH the Fire Brigade.
   (3) GO TO FPP-002, Step 8.1.6
   b. **CONSULT** the FireWorks Screen and determine the Incipient Detector Zone initiating the Alarm signal.

NOTE
With IFD System Alarm locked in the operator or an Incipient Detection Fire Watch is required to remain in the area until the alarm is cleared by repairing or clearing the condition. (see FPP-013)

   c. **IF** an operator/I&C technician are on location at the Incipient Detector Zone due to an earlier ALERT, continue the investigation,
   IF NOT DISPATCH the Fire Brigade per FPP-002 and a I&C technician with the portable incipient detector to the zone.
   d. **MAINTAIN** communication with local personnel until the source of the alarm is identified.
   e. **MONITOR** the initiating detector response on the CirrusPro screen during the field investigation.
   f. **REFER TO** FPP-002, FIRE EMERGENCY.

CAUSES:

1. Incipient fire detected in the monitored cabinet.
2. Alarm circuit or instrument malfunction.

REFERENCES:

1. 6-B-401 9600
2. 6-B-401 9608
3. 6-B-401 9609
4. 6-B-401 9620
5. 6-B-401 9634
6. 6-B-401 9636
7. 6-B-401 9637
8. 6-B-401 9639
9. 6-B-401 9640
10. 6-B-401 9643
11. 6-B-401 9644
12. 6-B-401 9684
13. FPP-002
14. FPP-012-02-RAB286
15. FPP-012-02-RAB305-324
16. FPP-013

DEVICES: FS-01CZ-7841 **SETPOINT**: 10 fps

CONT ROOM HVAC PURGE EXHAUST FANS ES-1 LOW FLOW - O/L

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - ES-1 (1A-NNS) and (1B-NNS) Fan running indications on MCB.

2. **VERIFY** Automatic Functions:
   a. Fans trip on overload.

3. **PERFORM** Corrective Actions:
   a. **VERIFY** proper operation of fans ES-1 (1A-NNS) and ES-1 (1B-NNS) on MCB.
   b. **IF** a fan has TRIPPED,
   THEN DISPATCH an operator to perform the following:
   (1) **IF** ES-1A is the standby fan,
   THEN energize the standby fan:
   a) **CLOSE** breaker 1D21-6C, ES-1 (1A-NNS) Control Room Purge Sys Exhaust Fan
   b) **PLACE** SS-2969, Smoke Purge Fan ES-1(1A-NNS) O/L – Loss of Power Annunciator Activation, switch to ENABLE.
   c) **NOTIFY** the Control Room that the standby fan is available for start.
   (2) **IF** ES-1B is the standby fan,
   THEN energize the standby fan:
   a) **CLOSE** breaker 1E21-6A, ES-1 (1B-NNS) Control Room Purge Sys Exhaust Fan.
   b) **PLACE** SS-2970, Smoke Purge Fan ES-1(1B-NNS) O/L – Loss of Power Annunciator Activation, switch to ENABLE.
   c) **NOTIFY** the Control Room that the standby fan is available for start.
   (3) **IF** the white fan trouble light is LIT,
   THEN DIRECT the operator to check for tripped overload relays on 1D21-6C or 1E21-6A.
   (4) **DIRECT** the operator to check for tripped breaker on 1D21-6C or 1E21-6A.
   c. **WHEN** the standby fan is energized,
   THEN START the standby fan.
   d. **VERIFY** proper alignment of valves 1CZ-13 and 1CZ-14 on MCB.

CAUSES:

1. Damper misalignment
2. Loss of control power to fan
3. Fan overload trip
4. Flow switch or circuit malfunction
5. Selector switch SS-2969 or SS-2970 enabled while breaker is open

REFERENCES:

1. 6-B-401 2973, 2969, 2970

DEVICES: MFDIC-CCU/CP703VP **SETPOINT**: None

FIRE DET SYS
MFDIC - CCU
CPU POWER FAIL

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - ALB-30-7-1, Fire Detection System Trouble in ALARM
   - ALB-30-8-1, Fire Detection System Fire in ALARM
   - ERFIS Display fire alarm status screen via turn on code FIRE
   - MFDIC-CCU CPU (CP703VP) located in the Secondary Alarm Station
   - MFDIC Display Console PC located in the Secondary Alarm Station
   - MFDIC Hard-Wired Annunciator Panel in the Secondary Alarm Station

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **POST** a continuous fire watch at the MFDIC Hard-Wired Annunciator Panel in the Secondary Alarm Station.
   b. **INFORM** Information Technology/Computer Maintenance Support of the alarm condition.

CAUSES:

1. Loss of 24VDC power to the Main Fire Detection Information Center (MFDIC) - Central Control Unit (CCU) CPU
2. Alarm circuit malfunction

REFERENCES:

1. PCR-00942
2. 6-B-401 9518
3. ESR 96-00511

DEVICES: PDS-01CZ-7832AS
PDS-01CZ07832BS

SETPOINT: 1.3 INWC
1.3 INWC

CONT ROOM HVAC NORMAL SUPPLY AH-15 FILTER HIGH ΔP

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - No Control Room indication available. Local indication verified in Step 3.

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **DISPATCH** an operator to verify proper ΔP across AH-15 filter.
   b. **IF** ΔP is HIGH,
      THEN PERFORM the following, using OP-173, Control Room Area HVAC System:
      (1) **START** the standby fan.
      (2) **STOP** the running fan.

CAUSES:

1. Clogged filter
2. Detector or alarm circuit malfunction

REFERENCES:

1. 6-B-401 2971
2. OP-173

DEVICES: FS-01CZ-7836S **SETPOINT**: 19 fps

CONT ROOM HVAC NORMAL SUPPLY FANS AH-15 LOW FLOW - O/L

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Fan status indication at MCB for AH-15 (1A-SA and 1B-SB)
   - Damper position indication on MCB for CZ-D2SB, CZ-25, and CZ-26
   - ALB-030-6-3, Cont Room Normal Supply AH-15 Filter High ΔP

2. **VERIFY** Automatic Functions:
   a. Fans trip on overload

3. **PERFORM** Corrective Actions:
   a. **CHECK** AH-15 fans status indication on MCB.
   b. **IF** fan is tripped,
   THEN PERFORM the following:
   (1) **START** the standby fan using OP-173, Control Room Area HVAC System.
   (2) **IF** white fan trouble light is LIT,
   THEN DISPATCH an operator to check overload relays on 1A36-SA-5A or 1B36-SB-3A.
   (3) **DISPATCH** an operator to check for tripped breaker on 1A36-SA-5A or 1B36-SB-3A.
   c. **CHECK** damper alignment on MCB for CZ-D1SA-1, CZ-D2SB-1, CZ-25 and CZ-26.
   d. **IF** ALB-030-6-3 is ALARMING,
   THEN REFER TO ALB-030-6-3.

CAUSES:

1. Fan overload trip (thermal or magnetic)
2. Loss of control power to fan motor
3. Damper misalignment
4. High filter ΔP
5. Alarm circuit or instrument malfunction

REFERENCES:

1. Tech Spec 3.7.6
2. 6-B-401 2972, 2946
3. OP-173

DEVICES: TIS-01CZ-7833A
TIS-01CZ-7833B

SETPOINT: 75°F
75°F

CONT ROOM HVAC NORMAL SUPPLY FANS AH-15 IN AIR HI TEMP

REFLASH: NO

OPERATOR ACTIONS:

NOTE

This ALB may annunciate on train swap or start of fan AH-15 (1A-SA or 1B-SB) due to actual elevated temperatures caused by the slow response of the temperature control loop which is placed in service. This condition should correct itself within approximately 60 minutes and no Operator response is required. During his time, there may be a burning coil smell and uncomfortable temperatures in the MCR until the controller resets. (CR 478411)

1. **CONFIRM** alarm using:
   - Control Room Supply Fans discharge temperature TI-7835A1 and TI-7835B1

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **IF** MCR temperature exceeds 75 F for greater than 1 hour,
   THEN INITIATE a work order to have the applicable temperature control loop calibration checked. (CR 478411)
   b. **CHECK** fans AH-15 (1A-SA and 1B-SB) discharge temperature TI-7835A1/B1.
   c. **DISPATCH** an operator to verify Essential Service Chill Water flow through cooling coils.
   d. **DISPATCH** an operator to verify heater EHC-112 is NOT energized.

CAUSES:

1. Purge and Makeup Intake heater EHC-112 continuously energized
2. Low or loss of Essential Service Chill Water flow through cooling coil
3. Temperature switch or alarm circuit malfunction

REFERENCES:

1. PLP-114
2. 6-B-401 2971
3. AOP-004

DEVICES: MFDIC-CCU/CP703VP **SETPOINT**: None

FIRE DETECTION SYSTEM TROUBLE

REFLASH: YES

OPERATOR ACTIONS:

NOTE

EC 98159 R0 isolated 1SFD-E016 (LFDCP-10) Zone 1-72 by lifting sensor leads 35, 36, 37 and 38. MFDIC point 0677 has been removed from polling per OP-149 so that no trouble alarm for Zone 1-72 will be generated in the MCR.

1. **CONFIRM** alarm using:
   - MFDIC MCR Display console PC located in the Main Control Room
   - MFDIC-CCU (CP703VP) located in the Secondary Alarm Station
   - MFDIC Display console PC located in the Secondary Alarm Station
   - MFDIC Hard-Wired Annunciator Panel in the Secondary Alarm Station

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **CHECK** the MFDIC MCR Display Console PC for alarm information,
      OR DISPATCH Personnel to the Secondary Alarm Station to perform the following:
      - **CHECK** for amber trouble lights on the MFDIC Hard-Wired Annunciator Panel
      - **CHECK** for trouble alarm information on the MFDIC-CCU CPU (CP703VP)
      - **CHECK** for trouble alarm information on the MFDIC Local Display Console PC

   b. **NOTIFY** CRS of ANY trouble alarm condition(s).

CAUSES:

1. Trouble condition alarm from Fire Detection System MFDIC:
   a. Loss of electrical integrity in any fire protection detection, actuation or alarm circuit
   b. Failure of water to flow within 5 seconds after any deluge valve release is actuated
   c. Operation of any isolation of sectionalizing valve in the Fire Protection System, upstream from deluge, pre-action, multi-cycle alarm valves and strainers away from their normal active position
   d. Loss of power to fire pumps
   e. Loss of air pressure in supervised suppression system (Pre-Action and Multi-Cycle Sprinkler Systems)
   f. Operation of water flow detection devices
2. Alarm circuit malfunction

REFERENCES:

1. 6-B-401 9518
2. PCR-0942
3. ESR 96-00511
4. EC 98159, Temporary Modification to LFDCP-10 (1SFD-E016)

DEVICES: LS-*1FO-2480
PS-*1FP-8627
TS-*1FP-8628
SS-*1FP-8628
PS-*1FP-8622A
PS-*1FP-8622B
Various other relays in pump controllers

SETPOINT: Lo fuel oil level 225 gal
Lo lube oil press 6 psig
Hi coolant temp 212°F
Overspeed 2200 rpm
DD PMP START 83 psig
MD PMP START 100 psig

FIRE PUMP SYSTEM TROUBLE

REFLASH: YES

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - No Control Room indication available. Local indication verified in Step 3.
2. **VERIFY** Automatic Functions: None
3. **PERFORM** Corrective Actions:
   a. IF confirmation is received that a fire exists or a second alarm (fire alarm in adjacent zone or a fire pump start) is received in the Control Room or an Incipient Fire Detection System Alarm is received before an AO or on-shift I&C tech has responded to an Incipient Fire Detection Alert,
   THEN PERFORM the following:
   (1) SOUND the plant fire alarm.
   (2) DISPATCH the Fire Brigade.
   (3) GO TO FPP-002, Step 8.1.6

NOTE
The Diesel Driven Fire Pump should not be left running unattended for an extended period of time unless necessary for actual fire fighting activities. Timely response to this annunciator is required to ensure Diesel Fire Pump, if running, is operating properly. (Reference FPP-002)

b. DISPATCH an operator to MFDIC to determine if alarm is due to pump running or trouble.
c. IF pump trouble, **THEN NOTIFY** CRS of annunciator(s) in ALARM
d. IF a pump is running, **AND** ALB-030-8-1 is NOT in ALARM,
THEN CONTACT the Radwaste Control Room to determine if ALB-105-10-6, Warehouse 6/9 Sprinkler System Flow, is in ALARM
e. IF a pump is running, **THEN CHECK** the status of building floor drain sumps, alarms, pumps running on RWCB and MCB MLB-4A-SA and MLB-4B-SB for indications of a potential fire header break
f. IF Motor Driven Fire Pump is running,
THEN DISPATCH an operator to verify proper system operation and reason pump started.
g. IF Motor Driven Fire Pump is NOT running,
THEN DISPATCH an operator to check the following:
- Breaker position AND control power fuse on 480V General Service Bus 1-4A101-5A
- Disconnect switch AND breaker on the Motor Driven Fire Pump controller

h. IF Diesel Driven Fire Pump is running,
THEN DISPATCH an operator to verify proper operation of system and determine reason for pump starting.
i. IF Diesel Driven Fire Pump is NOT running,
THEN DISPATCH an operator to check local indication for cause of alarm.
j. SECURE ANY running pump not required to be in service.

(Continued on Next Page)

CAUSES:

1. Trouble with Diesel Driven Emergency Fire Pump 1-4A-NNS:
   - **a.** Battery failure
   - **b.** High water temperature
   - **c.** Low lube oil pressure
   - **d.** Engine failed to start
   - **e.** Overspeed
   - **f.** Low fuel level
   - **g.** Diesel Driven Emergency Fire Pump running
   - **h.** Loss of AC Power to Diesel Driven Fire Pump battery charger
   - **i.** Auto Start Off
2. Trouble with Motor Driven Fire Pump 1-4B-NNS:
   - **a.** Motor Driven Fire Pump is running
   - **b.** Loss of control power
   - **c.** Loss of power to motor
3. Instrument or alarm circuit malfunction

REFERENCES:

1. FPP-002
2. 6-B-401 2581, 2583

DEVICES: FIS-01CZ-7839 **SETPOINT**: 500 cfm

CONT ROOM HVAC NORMAL EXHAUST FANS E-9 LOW FLOW - O/L

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Fan running indication on MCB
   - Damper position indication on MCB

2. **VERIFY** Automatic Functions:
   a. Fan trip on overload

3. **PERFORM** Corrective Actions:
   a. **CHECK** E-9 fan status on MCB.
   b. **IF** fan indicated tripped,
   THEN PERFORM the following:
   (1) **START** the standby fan using OP-173, Control Room Area HVAC System.
   (2) **IF** white trouble light is LIT,
   THEN DISPATCH an operator to check/reset overload relays on 1D21-6B or 1E21-7D.
   (3) **DISPATCH** an operator to check for tripped breaker on 1D21-6B or 1E21-7D.
   c. **IF** fan status is proper,
   THEN CHECK damper position indication on MCB for 1CZ-3, 1CZ-4, CZ-D6-1, CZ-D7-1, CZ-D12-1 and CZ-D13-1.
   d. **IF** dampers are out of position,
   THEN REPOSITION the dampers using control switches on MCB.

CAUSES:

1. Low flow with fan running
2. Overload trip (thermal or magnetic)
3. Loss of control power to fan motor
4. Damper misalignment
5. Alarm circuit or instrument malfunction

REFERENCES:

1. 6-B-401 2972, 2955
2. OP-173

DEVICES: TIS-01CZ-7832 **SETPOINT**: 55 °F

CONT ROOM HVAC NORMAL SUPPLY OAI LOW TEMP

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - Control Room Supply Fans Discharge Temperature TI-7835A1 and TI-7835B1
2. **VERIFY** Automatic Functions: None
3. **PERFORM** Corrective Actions:
   a. **CHECK** AH-15 discharge temperature indication TI-7835A1 and TI-7835B1 to verify proper operation of EHC-24 or EHC-26.
   b. **CHECK** outside air temperature.

CAUSES:

1. Low outside air temperature
2. Malfunction of EHC-24 or EHC-26
3. Temperature switch or circuit malfunction

REFERENCES:

1. 6-B-401 2971

DEVICES: MFDIC-CCU/CP703VP **SETPOINT**: None

FIRE DETECTION SYSTEM FIRE

REFLASH: NO

OPERATOR ACTIONS:

NOTE

- Any fire detector locked in alarm will prevent other detectors in the affected zone from causing a fire alarm. Therefore all fire detection for the affected zone should be considered inoperable per FPP-013.
- If another fire point from a different zone alarms, the MFDIC panel will cause this window to reflash.

1. **CONFIRM** alarm using:
   - ERFIS Display fire alarm status screen via turn on code FIRE
2. **VERIFY** Automatic Functions:

NOTE

If fire condition alarm is from area supplied with automatic fire suppression system, automatic fire suppression may be activated.

CAUTION

If fire testing is in progress, the ERFIS FIRE Screen must be displayed and monitored in the Main Control Room to ensure a fire in the plant does not go undetected.

3. **PERFORM** Corrective Actions:
   a. **IF** confirmation is received that a fire exists or a second alarm (fire alarm in adjacent zone or a fire pump start) is received in the Control Room or an Incipient Fire Detection System Alarm is received before an AO or on-shift I&C tech has responded to an Incipient Fire Detection Alert,
      THEN PERFORM the following:
      (1) SOUND the plant fire alarm.
      (2) DISPATCH the Fire Brigade.
      (3) GO TO FPP-002, Step 8.1.6
   b. **CHECK** fire points in alarm on ERFIS Display fire alarm status screen via turn on code FIRE **AND DETERMINE** location of alarming detector.
   c. **IF** ERFIS is NOT available,
      THEN DISPATCH personnel to check any of the following to determine location of the alarming detector:
      - MFDIC MCR Display Console PC
      - MFDIC-CCU CPU(CP703VP) - Secondary Alarm Station
      - MFDIC Display Console PC - Secondary Alarm Station
      - MFDIC Hard-Wired Annunciator Panel - Secondary Alarm Station
   d. **DISPATCH** an Operator to validate the alarm.
   e. **IF** fire is present at location indicated,
      THEN GO TO FPP-002, Fire Emergency.
   f. **IF** NO fire is present,
      THEN RESET local detector panel
      AND SILENCE alarm on MFDIC.

CAUSES:

1. Fire Condition Alarm from MFDIC
2. Detector or alarm circuit malfunction

REFERENCES:

1. 6-B-401 9518
2. FPP-002
3. PCR-0942
4. ESR 96-00511

DEVICES: N/A

SETPOINT: N/A

SECONDARY SAMPLE ROOM TROUBLE

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - No Control Room indication available. Local indication verified in Step 3.
2. **VERIFY** Automatic Functions: None
3. **PERFORM** Corrective Actions:
   a. **NOTIFY** Chemistry of alarm condition.

CAUSES:

1. ANY alarm on the Secondary Sampling System Annunciator Panel
2. Detector or alarm circuit malfunction

REFERENCES:

1. 6-B-501 8227
2. AOP-033

DEVICES: EMERGENCY pushbutton depressed

SETPOINT: None

WASTE PROCESSING SYSTEM TROUBLE

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - No Control Room indication available. Local indication verified in Step 3.

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **CONTACT** Radwaste Control Room to determine cause of alarm.
   b. **DISPATCH** personnel to assist Radwaste as necessary.

CAUSES:

1. Radwaste personnel depressing the EMERGENCY pushbutton on the waste process control board
2. Alarm circuit failure

REFERENCES:

1. 6-B-401 4352

DEVICES: N/A **SETPOINT**: N/A

RAB
SAMPLE ROOM A
TROUBLE

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - No Control Room indication available. Local indication verified in Step 3.
2. **VERIFY** Automatic Functions: None
3. **PERFORM** Corrective Actions:
   a. **NOTIFY** Chemistry of alarm condition.

CAUSES:

1. Reactor Make-up Water Storage Tank Conductivity alarm on the Primary Sampling Electrical Panel 1A.
2. Detector or alarm circuit malfunction

REFERENCES:

1. Tech Specs 3.4.7
2. 6-B-401 2441

DEVICES: N/A **SETPOINT**: N/A

CHLORINE SYSTEM TROUBLE

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - No Control Room indication available. Local indication verified in Step 3.
2. **VERIFY** Automatic Functions: None
3. **PERFORM** Corrective Actions:

CAUTION
Caution should be exercised due to the possibility of airborne chlorine.

   a. **DISPATCH** an operator to check chlorination system control panel to determine cause of alarm.
   b. **NOTIFY** Chemistry of alarm on chlorination system.

CAUSES:

1. Alarm on Chlorination System Control Panel
2. Instrument or alarm circuit malfunction

REFERENCES:

1. 6-B-401 2414

DEVICES: N/A

SETPOINT: N/A

PH ADJUSTMENT SYSTEM TROUBLE

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - No Control Room indication available. Local indication verified in Step 3.

2. **VERIFY** Automatic Functions:
   a. pH controller failure shuts down acid and caustic pump.

3. **PERFORM** Corrective Actions:
   a. **DISPATCH** an operator to check pH Control Panel for cause of alarm.
   b. **NOTIFY** Chemistry of alarm on pH Control Panel.

CAUSES:

1. ANY abnormal condition alarming on the pH Control Panel
2. Instrument or alarm circuit failure

REFERENCES:

1. 6-B-401 2041

DEVICES: N/A

SETPOINT: N/A

CHEMICAL FEED SYSTEM TROUBLE

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - No Control Room indication available. Local indication verified in Step 3.

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **DISPATCH** an operator to check Chemical Feed Control Panel to determine which annunciator is in alarm condition.
   b. **NOTIFY** Chemistry of alarm condition.

CAUSES:

1. Alarm on Hydrazine and Ammonia Control Panel
2. Alarm circuit malfunction

REFERENCES:

1. 6-B-401 2419

DEVICES: LIS-21OX-8029V
PS-21OX-8029V

PS-21OX-8030

SETPOINT: 25 in water
200 psig (Hi) &
30 psig (Low)
30 psig

BULK O_2 STORAGE SYSTEM TROUBLE

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   - ERFIS O_2 Tank Level Point (LOX8029) (25 in water is approximately 17% level)
   - No other Control Room indication available. Local indication verified in Step 3.

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:
   a. **NOTIFY** Radwaste Control Room of the alarm condition and to check the following:
      - Tank level and pressure
      - Proper operation of regulating valves

CAUSES:

1. O_2 supply for WPS catalytic recombiner low pressure
2. Low liquid O_2 tank level
3. Low liquid O_2 tank pressure

NOTE
Due to the calibration allowance for PCV-4 (160 - 240 psig), pressure may be as high as 240 psig. The alarm setpoint tolerance allows it to alarm between 150 and 240 psig.

4. High liquid O_2 tank pressure
5. Alarm circuit or instrument malfunction

REFERENCES:

1. 6-B-401 1015

DEVICES: See step 1 below **SETPOINT**: See step 1 below

COMPUTER ALARMS MISC

REFLASH: See NOTE below

OPERATOR ACTIONS:

NOTE

ERFIS alarms will not re-flash on the annunciator Panel when elevating from a Warning to Alarm on the same point. The only indication that the alarm has changed state will be a color change from yellow to red on the alarm screen. New alarm points that come in subsequently will initiate a single re-flash of the Annunciator window and will follow the same process.

1. **CONFIRM** alarm using:
   - Read points off of ERFIS computer to determine which point is alarming.

			Alarm	Warning
ASP8234	DO2 Gas Concentration		5 ppb	N/A
FPP8010	Hi N2 Flow to Elect Penet		HIGH	
LSC8741B	CTMU Trav Scrn B Diff Lvl		HI-HI	
LSC8741C	CTMU Trav Scrn C Diff Lvl		HI-HI	
ERFSYS01	ERFIS FAILOVER		TROUBLE	
ERFSYS02	ERFIS BACKUP OOS		TROUBLE	
TBD8453	SG BD HX Bldn Outlet Temp		155°F	150°F
TCT7165A	Cnmt Spray Pmp A Mtr Windg Temp		284°F	274°F
TCT7165B	Cnmt Spray Pmp B Mtr Windg Temp		284°F	274°F
TCX9440A	Chiller WC-2A Mtr Winding Temp		210°F	175°F
TCX9440B	Chiller WC-2B Mtr Winding Temp		210°F	175°F
TCX9441A	Chlr WC-2A Cmpr Inbd Brg Temp		175°F	170°F
TCX9441B	Chlr WC-2B Cmpr Inbd Brg Temp		175°F	170°F
TCX9442A	Chlr WC-2A Cmpr Outbd Brg Temp		175°F	170°F
TCX9442B	Chlr WC-2B Cmpr Outbd Brg Temp		175°F	170°F
TMP1971A	Clg Twr MU Pmp 1X Mtr Windg Temp		266°F	240°F
TMP1971B	Clg Twr MU Pmp 1X Thrst Brg Temp		175°F	175°F
TMP1971C	Clg Twr MU Pmp 1X Upper Brg Temp		175°F	160°F
TMP1972A	Clg Twr MU Pmp 1&2X Mtr Windg Temp		266°F	240°F
TMP1972B	Clg Twr MU Pmp 1&2X Thrst Brg Temp		175°F	175°F
TMP1972C	Clg Twr MU Pmp 1&2X Upper Brg Temp		175°F	160°F
TSF5100E	New Fuel Pool Temp	HI	144°F	104°F
		LO	70°F	86°F
TSF5100F	New Fuel Pool Temp	HI	144°F	104°F
		LO	70°F	86°F
TSF5110A	Spent Fuel Pool Temp	HI	105°F	102°F
		LO	70°F	86°F
TSF5110D	Spent Fuel Pool Temp	HI	105°F	102°F
		LO	70°F	86°F
TSP8234	Second Smpl TCU Temp		95°F	N/A
VCX2604	Chlr WC-2 CHP P4 A-SA Vib		HIGH	
VCX2634	Chlr WC-2 CHP P4 B-SB Vib		HIGH	
VMP1972A	CTMU Pmp 1X Vib		HIGH	
VMP1972B	CTMU Pmp 1&2X Vib		HIGH	
VMP1972B	CTMU Pmp 1&2X Vib		HIGH	
VSF5131A	SFP Pmp A Vib		HIGH	
VSF5131B	SFP Pmp B Vib		HIGH	
VSF5191A	SFP Pur Pmp A Vib		HIGH	

(Continued on Next Page)

OPERATOR ACTIONS (Continued):

VSF5191B	SFP Pur Pmp B Vib	HIGH
ZAV3011A	PIC Room A Temp	HIGH
ZCT0644B	Cnmt Vent Isolation Signal	ACTUATED
ZCT1027C	CSP A Switch Over Failure	FAIL
ZCT1028C	CSP B Switch Over Failure	FAIL
ZFP2588D	Cnmt Sprinkler Isol Vlv 1FP-347	NOT OPEN
ZDICSP	Dist I&C Sys Plat (DICSP) TRBL	ALARM
ZRM3546A	WPB 5 Skid Low Flow	ALARM
ZRM3546B	WPB 5 Loss of Isokinetic Control	ALARM
ZRM3546C	WPB 5 Flow Rate Monitor TRBL	ALARM
ZRM3546D	WPB 5 Isokinetic Pump Monitor	OFF
ZRM3547A	WPB 5A Skid Low Flow	ALARM
ZRM3547B	WPB 5A Loss of Isokinetic Control	ALARM
ZRM3547C	WPB 5A Flow Rate Monitor TRBL	ALARM
ZRM3547D	WPB 5A Isokinetic Pump Monitor	OFF
ZRM3509A	PVS Skid Low Flow	ALARM
ZRM3509B	PVS Loss of Isokinetic Control	ALARM
ZRM3509C	PVS Flow Rate Monitor TRBL	ALARM
ZRM3509D	PVS Isokinetic Pump Monitor	OFF
ZSC1900A	CTMU Trav Scrn Bay C Bkr	START
ZSC1901A	CTMU Trav Scrn Bay B Bkr	START
ZSC2309A	Fire Serv Trav Scrn Status	SCRN FAIL

2. **VERIFY** Automatic Functions:
   None.
3. **PERFORM** Corrective Actions:
   a. **CHECK** indication on MCB associated with alarming computer point.
   b. **IF** necessary,
      THEN DISPATCH an operator to check local indication associated with alarm.
   c. **IF** Point FPP8010, Hi N2 Flow to Elect Penet , is causing the alarm,
      THEN GO TO AOP-023**.**

NOTE
All calculated ERFIS points, including Continuous Calorimetric and AFD Monitor, may be affected.

   d. **IF** Point ERFSYS01 or ERFSYS02 is causing the alarm,
      THEN NOTIFY on-duty IT of the alarm.

CAUTION
ERFIS computer point TSP8234 indicating greater than 95°F may indicate cooling failure to the Secondary Sampling Panel and equipment damage or personnel safety hazard may exist.

   e. **IF** Point ASP8234 or TSP8234 is causing the alarm,
      THEN NOTIFY Chemistry to investigate the alarm as soon as possible.
   f. **IF** Point ZRM3546A, ZRM3546B, ZRM3546C, or ZRM3546D is causing the alarm,
      THEN:
      (1) **NOTIFY** HP to investigate the alarm as soon as possible.
      (2) **IMPLEMENT** OWP-RM-15 for WPB Stack 5 if necessary.
   g. **IF** Point ZRM3547A, ZRM3547B, ZRM3547C, or ZRM3547D is causing the alarm,
      THEN:
      (1) **NOTIFY** HP to investigate the alarm as soon as possible.
      (2) **IMPLEMENT** OWP-RM-15 for WPB Stack 5A if necessary.
   h. **IF** Point ZRM3509A, ZRM3509B, ZRM3509C, or ZRM3509D is causing the alarm,
      THEN:
      (1) **NOTIFY** HP to investigate the alarm as soon as possible.
      (2) **IMPLEMENT** OWP-RM-15 for PVS if necessary.
   i. **IF** Point ZDICSP is causing the alarm,
      THEN NOTIFY IT to investigate the alarm.

(Continued on Next Page)

CAUSES:

1. Input to the alarm is from CTMU and Screen wash, ESCW, CTMT spray, Fuel Pool Cooling and Purification, Penetration Pressurization Systems, Secondary Sampling Panel, DICSP, and ERFIS Continuous Calorimetric.
2. Alarm circuit malfunction

REFERENCES:

1. 6-B-401 1070, 2339
2. ESR 95-00283
3. EC 74907, High Pressure Turbine Steam Path Replacement
4. EC 74914, Implement License Change for the MUR Uprate

General – Revision 35

This revision (PRR 704982) revises this procedure per EC 98159 and incorporates the following:

PRR 704982 - APP-ALB-030-7-2, Fire Pump System Trouble, Operator Actions, Step 3.b.(2), needs an additional step added after it to "Check the status of any building floor drain sumps, alarms, pumps running on RWCB, and check MCB, MLB-4A-SA, MLB-4B-SB indicators for potential fire header break. Basis for change: Apparent Cause Evaluation (ACE), CR-696331. This step will provide added assurance that an incident of internal flooding due to a fire header leak /break is identified in a timely manner based on available indications.

Description of Changes

Page	Window	Change Description
26	7-1	Added Note before Operator Actions: EC 98159 R0 isolated 1SFD-E016 (LFDCP-10) Zone 1-72 by lifting sensor leads 35, 36, 37 and 38. MFDIC point 0677 has been removed from polling per OP-149 so that no trouble alarm for Zone 1-72 will be generated in the MCR.
27	7-2	Original Operator Actions 3.b.(1) and (2): Increased step level. Steps are now 3.c and 3.d. (reviewer comment)
27	7-2	Operator Action 3.e: New action - **IF** a pump is running, **THEN CHECK** the status of building floor drain sumps, alarms, pumps running on RWCB and MCB MLB-4A-SA and MLB-4B-SB for indications of a potential fire header break. (PRR 704982)

HARRIS NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 2

PROCEDURE TYPE: OPERATING PROCEDURE

NUMBER: **OP-173**

TITLE: **CONTROL ROOM AREA HVAC SYSTEM**

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1.0 PURPOSE

This procedure provides instructions for the operation of the Control Room Area HVAC System, Purge System and Emergency Filtration System.

2.0 REFERENCES

2.1. Plant Operating Manual Procedures

1. AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment
2. PLP-114, Relocated Technical Specifications and Design Basis Requirements
3. MNT-NGGC-0009, Application Of Protective Coatings
4. OMM-004, Post-Trip/Safeguards Actuation Review
5. OP-148, Essential Services Chilled Water System
6. OP-151.01, Compressed Air
7. OP-156.01, DC Electrical Distribution
8. OP-156.02, AC Electrical Distribution
9. OP-163, ERFIS
10. OP-163.01, ERFIS Support Systems
11. OP-172, Reactor Auxiliary Building HVAC System
12. AOP-004, Remote Shutdown
13. AOP-005, Radiation Monitoring System
14. OST-1231, Control Room Emergency Filtration System Operability 18 Month Interval Modes All
15. APP-ALB-030, Main Control Board
16. EST-400, Engineered Safety Feature Air Filtration Testing
17. CMP-003, Protective Coatings
18. AP-045, Operator Time Critical Action Program

2.0 REFERENCES (continued)

2.2. Technical Specifications

1. 3.3.3.1
2. 3.7.6
3. Tech Spec Bases 3/4.7.6

2.3. SHNPP FSAR

1. 6.4.3
2. 6.4.6
3. 7.3.1
4. 7.3.1.5.7
5. 7.5
6. 9.4.1
7. 15.1.5.3.5
8. 15.3.3.3.2

2.4. Drawings

1. 5-S-1017
2. 6-B-401 2947, 2949, 2972, 2973, 2975, 2976, 2978
3. CAR-2168-G-517 S04

2.5. Technical Manuals

1. VM-PSL-V01, Air Handling Units, Safety-Related

2.6. Other

1. CAP Item 92H0134
2. ACFR 94-02472-7
3. ESR 96-00056
4. ESR 97-00534
5. ESR 98-00043
6. AR 108027
7. Calc. Book 9-CRH
8. EC 56215
9. CR 569593
10. LER 2012-003-00
11. CR 742421

3.0 PREREQUISITES

1. AC Electrical power available per OP-156.02.

2. 125 VDC power available per OP-156.01.

3. Essential Services Chilled Water available per OP-148.

4. Instrument Air available per OP-151.01.

4.0 PRECAUTIONS AND LIMITATIONS

1. Air handling units, AH-15 A&B, maximum filter differential pressure is 0.75 INWG.

2. MNT-NGGC-0009 governs control of charcoal filter contaminants such as painting within the power block areas.

3. A Control Room Isolation Signal (CRIS) will also automatically shutdown RAB Normal Ventilation, including any running Pre-entry Purge Exhaust Fan (E-5), start the Train specific RAB Emergency Exhaust (E-6A or E-6B), and inhibit restart of RAB Normal Ventilation (including the E-5 fans) until the CRIS is reset.

4. A Control Room Isolation Signal may be manually reset after 5 seconds. This will allow repositioning of valves and dampers. If this is done and the original signal is still greater than the alarm setpoint, the Control Room Area HVAC System will **NOT** automatically re-isolate until the original signal goes below its setpoint and another actuation signal is received.

5. Do not allow greater than 400 CFM of outside air into the Control Room Area HVAC System when modulating the post accident OAI valves for control room pressurization.

6. Do not initiate smoke purge operation without permission from the CRS and the Site Incident Commander.

7. If the odor of chlorine is detected in the Control Room, SCBAs should be donned and the Control Room Area HVAC System should be placed in the recirculation mode.

8. Refer to AP-002 for guidance on control of Control Room doors.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

9. Calculation 9-CRH has determined the maximum time period that the Main Control Room can be isolated based on limits for maximum Carbon Dioxide (CO_2) concentration and minimum Oxygen (O_2) concentration. One example of the limits established by the calculation is: 10 people in the MCR with an isolation limit of 71 hours. (Reference 2.6.4)

    a. Carbon Dioxide (CO_2) concentration:

        - Carbon Dioxide (CO_2) concentration = 0.16% requires evaluation of exposure for each person within the boundary and consideration of ventilating the MCR.

        - Maximum Carbon Dioxide (CO_2) concentration = 0.33% requires ventilating the MCR.

    b. Minimum Oxygen (O_2) concentration = 20.0% requires ventilating the MCR.

10. Smoke purge operation may cause a loss of liquid in the loop seals. This could prevent CRAV HVAC from meeting its design positive pressure. Check and refill loop seals as required following smoke purge operation.

11. If an AH-15 door must be opened (such as for filter replacement, recording vibrations or inspections), additional pressurization of the Main Control Room may be experienced. The control room intake radiation monitors will remain operable while the AH-15 door is open.

12. Tech Spec 3.7.6 APPLICABILITY includes the following:

        - MODES 1, 2, 3 and 4

        - MODES 5 and 6

        - During movement of irradiated fuel assemblies

        - Movements of loads over fuel pools

13. Once the Sequencer is initiated, equipment starting outside of its design load block will result in the Sequencer being inoperable. Tech Spec 3.8.1.1.h is applicable until the breaker for the affected load is opened

14. Per Tech Spec 3.8.1.1 - If a component powered from a safety bus cannot be secured due to issues such as trip coil failures, control power malfunctions, or other breaker problems, then Tech Spec 3.8.1.1 must be evaluated to determine EDG operability. This is due to potential impacts to sequencing and load shedding requirements.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

15. In the event of a steam line break or following a high radiation signal, the Control Room Area HVAC System must be pressurized within 2-hours using one of the following: (Ref. AP-045, Operator Time Critical Action Program)

    - Section 8.2, Aligning the Control Room Area HVAC System for Post Accident Operation

      OR

    - Section 8.3, Placing the Control Room Area HVAC System into Recirc Manually

5.0 STARTUP

5.1. Startup of Normal Supply and Exhaust Fans

5.1.1. Initial Conditions

1. Attachment 1 is complete. _____

2. Attachment 2 is complete. _____

5.1.2. Procedural Steps

NOTE: The following Steps align Train A Control Room Area HVAC components to service. Train B nomenclature is in parenthesis.

NOTE: If Swapping Control Room Ventilation Fans, it is preferable to secure the running fan first, then start the desired fans with this section.

NOTE: ALB-30/6-4, CONT ROOM HVAC NORMAL SUPPLY FANS AH-15 LOW FLOW-O/L, is expected when starting AH-15 and the alarm should clear in a short time.

1. **START** the NORMAL SUPPLY FAN AH-15 ASA (BSB). _____

2. **VERIFY** the following components are aligned properly:

AH-15 IN CZ-D1 (CZ-D2)	Open SLB-5 (6)	_____
AH-15 DISCH CZ-25 (CZ-26)	Open SLB-5 (6)	_____
NORMAL INTAKE 1CZ-1 SA and 1CZ-2 SB	Open	_____
CONT RM NORMAL RECIRC DAMPER CZ-D69 SA (CZ-D70 SB)	Open	_____
NORMAL EXHAUST FAN E-9 A(B)	Running	_____
E-9A(B) IN CZ-D6 (CZ-D7)	Open SLB-7	_____
E-9A(B) OUT CZ-D12 (CZ-D13)	Modulates SLB-7	_____
NORMAL EXHAUST 1CZ-3 SA and 1CZ-4 SB	Open	_____

3. **IF** any of the components listed in Step 5.1.2.2 fail to operate properly, **THEN SECURE** the selected train per Section 7.1. _____

4. **IF** the running fan was secured in Step 5.1.2.3, **THEN PERFORM** Steps 5.1.2.1 and 5.1.2.2 of this Section to start the other train. _____

6.0 NORMAL OPERATIONS

Parameter:	Control Room Emergency Filtration Train A(B) DP	2 to 6.3 INWG
Inst. No.:	PDI-7827A SA (B SB)	
Location:	MCB	
Parameter:	Control Room Emergency Filtration HEPA Prefilter Outlet Temperature	60° to 190°F
Inst. No.:	TI-7824A SA (B SB)	
Location:	MCB	
Parameter:	Control Room Emergency Filtration HEPA Prefilter DP	1.0 to 1.5 INWG
Inst. No.:	PDI-7823A SA (B SB)	
Location:	MCB	
Parameter:	Control Room Post Accident Outside Air Intake Flow	0 to 400 CFM
Inst. No.:	FI-7817A SA (B-SB)	
Location:	MCB	
Parameter:	AH-15A(B) Exh Out Temp.	55° to 75°F
Inst. No.:	TI-7835A1 SA (B1 SB)	
Location:	MCB	
Parameter:	Control Room Temperature	72° to 75°F
Inst. No.:	TI-7837A1 SA (B1 SB)	
Location:	MCB	
Parameter:	Control Room to Outside Air (ARP Room) DP	0.2 to 1.0 INWG
Inst. No.:	PDI-7838A1 SA (B1 SB)	
Location:	MCB	
Parameter:	Control Room Emergency Filtration EHC-72 (A-SA) (B-SB) Inlet Temperature	60° to 80°F
Inst. No.:	TI-7821A SA (B SB)	
Location:	MCB	
Parameter:	Control Room Emergency Filtration Fan R-2 (A-SA) (B-SB) Disch Flow	4000 CFM
Inst. No.:	FI-7819A SA (B SB)	
Location:	MCB	

8.0 INFREQUENT OPERATIONS

8.1. Automatic Startup of Emergency Filtration System

NOTE: The following conditions will cause a Control Room Area HVAC System isolation:

- Power Failure to Radiation Monitor.
- High Radiation level at Normal OAI or at either Post Accident OAI.
- Smoke Detection Signal from Zone 1-150 on the main return ventilation duct.
- SI signal.

NOTE: A Control Room Isolation signal will cause ALB-030/1-1, Control Room Isolation Train A, and ALB-030/2-1, Control Room Isolation Train B, to alarm.

CAUTION

In the event of a steam line break or following a high radiation signal, the Control Room Area HVAC System must be pressurized within 2-hours. (Ref. AP-045, Operator Time Critical Action Program)

8.1.1. Initial Conditions

1. Control Room Area HVAC System isolation has occurred. _____

8.1.2. Procedural Steps

1. **VERIFY** the Control Room Area HVAC System has properly aligned per ERFIS Safeguards Program, OSI-PI, **OR** OMM-004 Attachment 5. _____

2. **IF** the Electrical Equipment Protection Room is in Smoke Purge Operation,
   THEN VERIFY the administrative controls allowed by Tech Spec 3.7.6 and described in OP-172 are applied. _____

3. **WHEN** permissible,
   THEN PERFORM applicable portions of Attachments 3 and 4 (Charcoal Adsorber Log) as necessary. _____

8.1.2 Procedural Steps (continued)

4. **NOTIFY** Radiation Protection that:

   a. RAB Normal Ventilation is secured. _____

   b. The Control Room is in recirculation. _____

   c. Monitoring for Oxygen (O_2) and Carbon Dioxide (CO_2) in the MCR will be required and logged in the shift log: (Ref. 4.0.9) _____

      (1) Within 24 hours of the control room going into recirculation. _____

      (2) Once per shift thereafter. _____

NOTE: There are limits to the number of people in the Main Control Room and amount of time that the MCR can be isolated without outside air intake. These limits have been established by calculation 9-CRH. One example of the limits is: 10 people in the MCR and a limit of 71 hours. (Reference 2.6.4)

5. **WHEN** permissible,
   THEN LINEUP Control Room ventilation per Section 8.2. _____

8.4. Restoring the Control Room Area HVAC System to Normal after a Control Room Isolation Signal or Manual Recirc

8.4.1. Initial Conditions

1. Control Room Isolation Signal clear _____

2. Control Room Area HVAC System in operation per Section 8.1, 8.2 or 8.3. _____

8.4.2. Procedural Steps

NOTE: The following Step will cause ALB-030/1-1, Control Room Isolation Train A, and ALB-030/2-1, Control Room Isolation Train B, to clear.

CAUTION

Failure of equipment to secure in this section will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

1. **PLACE** the following Control Room Isolation Reset Signal Reset Switches to RESET:

   - CONTROL ROOM ISOL TRAIN A RESET _____
   - CONTROL ROOM ISOL TRAIN B RESET _____

2. **SHUT** any of the following EMER FILT SOUTH (NORTH) OUTSIDE AIR INLET valves that are open (any that are not open may be marked N/A):

   - EMER FILT SOUTH OUTSIDE AIR INLET 1CZ-9 SA _____
   - EMER FILT SOUTH OUTSIDE AIR INLET 1CZ-10 SB _____
   - EMER FILT NORTH OUTSIDE AIR INLET 1CZ-11 SA _____
   - EMER FILT NORTH OUTSIDE AIR INLET 1CZ-12 SB _____

NOTE: Performing steps 8.4.2.3 through 8.4.2.6 quickly will minimize excessive pressurization of the Main Control Room.

3. **OPEN** the following Control Normal Outside Air Intake Valves:

   - NORMAL INTAKE 1CZ-1 SA _____
   - NORMAL INTAKE 1CZ-2 SB. _____

4. **IF** more than one NORMAL SUPPLY FAN AH-15 ASA (BSB) is running, **THEN STOP** one fan. _____

5. **VERIFY** associated valves/dampers align for the stopped train as follows:

AH-15 IN CZ-D1 (CZ-D2)	Shut SLB-5 (6)	_____
AH-15 DISCH CZ-25 (CZ-26)	Shut SLB-5 (6)	_____
CONT RM NORMAL RECIRC DAMPER CZ-D69 SA (CZ-D70 SB)	Shut	_____

6. **START** NORMAL EXHAUST FAN E-9 A (B). _____

7. **VERIFY** the following valves/dampers are aligned as indicated:

E-9A(B) IN CZ-D6 (CZ-D7)	Open SLB-7	_____
E-9A(B) OUT CZ-D12 (CZ-D13)	Modulates SLB-7	_____
NORMAL EXHAUST 1CZ-3 SA and 1CZ-4 SB	Open	_____

8. **IF** running,
   THEN STOP EMERGENCY FILTRATION FAN R-2 A-SA. _____

9. **IF** running,
   THEN STOP EMERGENCY FILTRATION FAN R-2 B-SB. _____

10. **VERIFY** the following valves/dampers are aligned as indicated:

R2 INLET CZ-23 (CZ-24)	Shut SLB-5 (6)	_____
R2 DISCH CZ-21 (CZ-22)	Shut SLB-5 (6)	_____
EMERGENCY FILTRATION DISCHARGE 1CZ-19 SA and 1CZ-20 SB	Shut	_____

8.4.2 Procedural Steps (continued)

11. **SHUT** the following Control Room Emergency Filtration Recirc Dampers:

    - EMERGENCY FILTRATION RECIRC DAMPER CZ-D66 SA _____
    - EMERGENCY FILTRATION RECIRC DAMPER CZ-D61 SB. _____

12. **PERFORM** applicable portions of Attachments 3 and 4 (Charcoal Adsorber Log) as necessary. _____

13. **SECURE** RAB Emergency Exhaust System per OP-172, Section 8.6. _____

14. **PERFORM** a startup of the RAB Normal Ventilation System per OP-172, Section 5.1. _____

15. **RESTORE** Switchgear Rooms A and B Ventilation per OP-172. _____

16. **RESTORE** Electrical Equipment Protection Rooms Ventilation to normal per OP-172. _____

17. **RESTORE** the Plant Computer and Communications Rooms Ventilation to normal per OP-163.01 Section 8.4. (restoration steps) _____

18. **IF** a breaker for a R-13 fan was opened in Section 8.3 in preparation for testing,
    THEN CLOSE the following affected breaker (**MARK** breaker NOT closed N/A):

    - 1D14-1B, R-13 (1&2A-NNS) Computer Room Return Fan _____
    - 1D14-1F, R-13 (1&2B-NNS) Computer Room Return Fan _____

19. **NOTIFY** Radiation Protection that:

    a. The Control Room is no longer in recirculation. _____

    b. Periodic monitoring for Oxygen (O_2) and Carbon Dioxide (CO_2) will no longer be required. _____

HARRIS 2016 NRC SCENARIO 1

Facility: Harris Nuclear Plant Scenario No.: 1 Op Test No.: 05000400/2016301

Examiners: _____ Operators: SRO:

_____ OATC:

_____ BOP:

Initial Conditions: IC-19: 100%, MOL

- The unit is operating at 100% power
- The following equipment is under clearance
  - 'B' MD AFW Pump
  - 'B' NSW pump
  - Boric Acid Transfer Pump B-SB

Turnover:
- Engineering reports that there are high motor vibrations on the 'A' Heater Drain Pump.
- Directions from the Operations Manager are to conservatively reduce power IAW GP-006 at 4 DEH units/min to 95% then remove 'A' Heater Drain Pump from service IAW OP-136 Section 7.1.
- Plant risk condition is YELLOW due to down power.

Critical Tasks:
- Initiate a MANUAL Turbine trip prior to automatic Low Steam Line SI signal
- Establish condensate flow to the SG's before RCS bleed and feed is required

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – RO/SRO N – BOP/SRO	Lower power to stop 'A' HD Pump (to 95% power)
2	CRF008	I – RO/SRO	T-ref Controller fails low (AOP-001)
3	LT:486	I – BOP/SRO TS – SRO	SG 'B' Controlling Level Channel fails LO
4	LT-115	I – RO/SRO	VCT Level Channel 115 fails LOW (AOP-003)
5	SIS03C	C – RO/SRO TS – SRO	'C' Accumulator nitrogen leak
6	TUR24A	C – BOP/SRO	EHC pump shaft shear with standby auto start failure
7	CFW16A CFW16B	M – ALL	MFW Pump "A" trip (AOP-010 to E-0) MFW Pump "B" trip (2 minute delay) – **Loss Of Heat Sink**
8	TUR02	C – BOP/SRO	AUTO Turbine Trip fails (manual successful)
9	CFW01B	C – BOP/SRO	MD AFW Pump "A" breaker trips when started
10	CFW01C	C – BOP/SRO	TD AFW Pump trips when running (FR-H.1)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 1

Engineering has reported that the 'A' Heater Drain Pump has high vibrations and is recommending that the pump be secured as soon as possible. Directions from the Operations Manager are to conservatively reduce power to 95% IAW GP-006 at 4 DEH units/min then remove 'A' Heater Drain Pump from service IAW OP-136 section 7.1. All required notifications have been made to individuals concerning the reason for the down power. Plant risk condition is YELLOW due to the upcoming downpower.

The following equipment is under clearance:

- 'B' MDAFW Pump is under clearance for pump packing repairs. The pump has been inoperable for 12 hours and will be restored to operable status within the next 24 hours. Tech Spec 3.7.1.2 LCO Action **a** and Tech Spec 3.3.3.5.b Action **c** applies. 72 hour LCO or HSB within the next 6 hours, HSD following 6 hours.

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least three independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:

a. Two motor-driven auxiliary feedwater pumps, each capable of being powered from separate emergency buses, and

b. One steam turbine-driven auxiliary feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one auxiliary feedwater pump inoperable, restore the required auxiliary feedwater pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 1 (continued)

Equipment is under clearance continued:

'B' MDAFW Pump - (continued) - Tech Spec 3.3.3.5.b Action **c**

INSTRUMENTATION

REMOTE SHUTDOWN SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.3.5.b All transfer switches, Auxiliary Control Panel Controls and Auxiliary Transfer Panel Controls for the OPERABILITY of those components required by the SHNPP Safe Shutdown Analysis to (1) remove decay heat via auxiliary feedwater flow and steam generator power-operated relief valve flow from steam generators A and B, (2) control RCS inventory through the normal charging flow path, (3) control RCS pressure, (4) control reactivity, and (5) remove decay heat via the RHR system shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

c. With one or more inoperable Remote Shutdown System transfer switches, power, or control circuits required by 3.3.3.5.b, restore the inoperable switch(s)/circuit(s) to OPERABLE status within 7 days, or be in HOT STANDBY within the next 12 hours.

- 'B' NSW Pump under clearance for shaft inspection. The pump has been under clearance for 8 hours. Inspection and return to service are expected to be completed within 24 hours.
- Boric Acid Transfer Pump B-SB is under clearance due to breaker blown control power fuses. Has been under clearance for 12 hours. The problem with the breaker has been repaired and the clearance will be removed later this shift. Tech Spec 3.3.3.5.b which is a 7 day LCO and 3.1.2.2 applies (3.1.2.2 is for tracking only). OWP-CS-05 has been completed.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 1 (continued)

Boric Acid Transfer Pump B-SB (Tech Spec)

REMOTE SHUTDOWN SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.3.5.a The Remote Shutdown System monitoring instrumentation channels shown in Table 3.3-9 shall be OPERABLE.

3.3.3.5.b All transfer switches, Auxiliary Control Panel Controls and Auxiliary Transfer Panel Controls for the OPERABILITY of those components required by the SHNPP Safe Shutdown Analysis to (1) remove decay heat via auxiliary feedwater flow and steam generator power-operated relief valve flow from steam generators A and B, (2) control RCS inventory through the normal charging flow path, (3) control RCS pressure, (4) control reactivity, and (5) remove decay heat via the RHR system shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With the number of OPERABLE remote shutdown monitoring channels less than the Minimum Channels OPERABLE as required by Table 3.3-9, restore the inoperable channel(s) to OPERABLE status within 7 days, or be in HOT SHUTDOWN within the next 12 hours.

b. With the number of OPERABLE remote shutdown monitoring channels less than the Total Number of Channels required by Table 3.3-9, restore the inoperable channels to OPERABLE status within 60 days or submit a Special Report in accordance with Specification 6.9.2 within 14 additional days.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 1 (continued)

Event 1

The first evolution for the crew is to commence a power reduction at 4 DEH Units / min from 100% to 95% in preparations of securing the 'A' Heater Drain Pump. It is expected that the SRO will conduct a reactivity brief.

Verifiable actions: The RO will borate as necessary to lower power and monitor automatic operation of rod control. The BOP will operate the DEH Main Turbine controls as necessary to reduce turbine load. The BOP will secure the 'A' Heater Drain pump.

Event 2

Failure of the Tref Processor (fails low). The crew should enter AOP-001 and carry out the immediate actions.

Verifiable actions: The OATC will perform the immediate actions of AOP-001 by verifying that <2 rods are dropped (no rods have dropped), place Rod Control in MANUAL and then verify no rod motion. With concurrence from the SRO the OATC will restore Tave to pre-failure conditions by withdrawing the rods in manual.

Event 3

SG "B" controlling level transmitter LT-486 fails low. Flow and level will rise as observed on "B" SG FI-486, FI-487 and NR level instruments LI-483, LI-484 and LI-485.

Verifiable actions: The BOP should report and respond to annunciator ALB-014-5-3A Steam Gen B NR Low Level. The BOP should take manual control of the "B" SG flow control valve and lower the output of the M/A station to restore level to 57% Narrow Range.

The SRO should provide trip limits and level bands IAW OMM-001 Attachment 13. The SRO directs the implementation of OWP-RP-06.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 1 (continued)

Event 3

Tech Spec Evaluation: The SRO should evaluate Tech Specs 3.3.1, Reactor Trip Instrumentation, Table 3.3-1 Items 13 Steam Generator Water Level –Low – Low and item 14 SG Water Level – Low Coincident With Steam/Feedwater Flow Mismatch, Action 6 for both and Tech Spec 3.3.2, ESF Instrumentation, Table 3.3-3 Item 5b, Action 19 and Tech Spec 3.3.3.6 Accident Monitoring.

TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
12. Reactor Coolant Flow--Low					
a. Single Loop (Above P-8)	3/loop	2/loop in any operating loop	2/loop in each operating loop	1	6
b. Two Loops (Above P-7 and below P-8)	3/loop	2/loop in two operating loops	2/loop in each operating loop	1	6
13. Steam Generator Water Level--Low-Low	3/stm. gen.	2/stm. gen. in any operating stm. gen.	2/stm. gen. each operating stm. gen.	1, 2	6(1)

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
b. Steam Generator Water Level--High-High (P-14)	4/stm. gen.	2/stm. gen. in any stm. gen.	3/stm. gen. in each stm. gen.	1, 2	19

***NOTE:** IF the crew does not respond to the low water level in the SG a High level (> 78%) will develop which will cause an automatic Turbine trip and a Reactor trip since power is > 10% (REACTOR TRIP TURBINE TRIP P7) .

An automatic Reactor Trip for this event would create an unanticipated critical task. (See **Note** after critical task justification statements for details on unanticipated critical tasks.)

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 1 (continued)

Event 4

Failure of VCT level transmitter LT-115 (low). This failure will cause an automatic make up to the VCT to initiate. The crew should identify the failed level transmitter then enter AOP-003, Malfunction of Reactor Makeup Control. There are no immediate actions associated with AOP-003.

Verifiable actions: The OATC will respond to the Reactor Makeup Control system malfunction and place the Reactor Makeup Water Control Switch to STOP. This action will secure the unneeded VCT makeup caused by the level transmitter failure. The SRO will contact Maintenance to investigate and repair the failure.

Event 5

"C" Accumulator nitrogen leak causes pressure to decrease until annunciator ALB 01-9-1 alarms.

Verifiable actions: The crew should respond to the low pressure condition and restore the Accumulator pressure to normal. The OATC will verify open 1SI-287, ACCUMULATORS & PRZ PORV N2 SUPPLY then OPEN the ACCUM N2 SUPPLY/VENT for the "C" Accumulator: 1SI-297 for ACCUMULATOR C N2 Supply & Vent.

Tech Spec Evaluation: The SRO should declare the "C" Accumulator inoperable per Tech Spec 3.5.1, due to being connected to Non-Safety piping (a one hour action statement in Modes 1 through 3 above 1000 psig). Additionally, The SRO should evaluate Tech Spec 3.5.1 for Accumulator pressure if pressure gets below Tech Spec operability limit.

3.5.1 Each Reactor Coolant System (RCS) accumulator shall be OPERABLE with:

a. The isolation valve open with power supply circuit breaker open,
b. A contained borated water volume of between 66 and 96% indicated level,
c. A boron concentration of between 2400 and 2600 ppm, and
d. A nitrogen cover-pressure of between 585 and 665 psig

ACTION:a. With one accumulator inoperable, except as a result of a closed isolation valve or boron concentration not within limits, restore the inoperable accumulator to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to less than 1000 psig within the following 6 hours.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 1 (continued)

Event 6

DEH pump shaft shears and auto start failure of the standby DEH pump. When DEH pressure decreases to < 1600 psig annunciator ALB-020-4-2B EH Fluid Low Press will alarm.

Verifiable actions: The BOP should manually start the standby DEH pump prior to system pressure reducing to <1500 psig. If the standby pump is not started prior to DEH pressure decreasing to < 1500 psig they should identify that the standby pump auto start feature has also malfunctioned. Once the standby pump is started DEH system pressure will return to normal. With DEH pressure decreasing the crew should dispatch an Aux Operator to investigate the DEH system for indications of leakage or pump failure.

> ***NOTE**: IF the crew does not respond to this event by starting the standby DEH pump they would enter AOP-038, Rapid Down power when DEH fluid pressure drops to <1500 psig. Entering AOP-038 is ONLY appropriate IF the standby pump is not available. IF the crew fails to start the standby DEH pump system pressure will continue to slowly decrease. When system pressure decreases to 1150 psig an automatic Turbine Trip on Auto Stop Oil Pressure will occur. (ALB-018 window 3-4). Without any actions the crew would create an unanticipated critical task by allowing the Turbine trip to occur which would then cause an automatic Reactor Trip (Reactor Trip Turbine Trip P-7).
>
> (See **Note** after critical task justification statements for details on unanticipated critical tasks.)

Event 7 – MAJOR (Leading to Loss of Heat Sink)

Main Feedwater Pump "A" trips with Reactor Power > 90%. The crew should respond to ALB-016-1-4, FW Pump A/B O/C Trip –Gnd or Bkr Fail to Close and AOP-010, Feedwater Malfunctions and perform the immediate actions.

Verifiable actions: The OATC should manually trip the Reactor IAW AOP-010 actions for loss of a Feed Water pump with initial Reactor power above 90%.

Two minutes after the "A" MFW pump trips the "B" MFW pump will trip. The crew should recognize that the second pump has tripped by MCB annunciators, pump indications and Steam Generator level changes.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 1 (continued)

Event 8

Main Turbine fails to automatically trip. In accordance with EOP-E-0, Reactor Trip or Safety Injection immediate action 2 the BOP should identify the automatic trip failure of the Main Turbine due to none of the Turbine Throttle valves indicating closed.

Verifiable actions: The BOP should manually trip the Turbine in the preferred order: Turning the MCB Turbine trip switch to trip (**this action if performed will be successful**). If this action is NOT performed RNO actions would be: depress the Turbine Manual pushbutton on DEH then simultaneously depress the Fast Action and GV Lower push buttons or shut the MSIV's. IF the follow up actions are performed without first manually tripping the Turbine using the trip switch it does not constitute a failure since the Turbine will be tripped but the trip would be unnecessarily delayed.

Event 9

MD AFW Pump "A" trips immediately upon starting.

Verifiable actions: The BOP will identify a MD AFW pump trip by annunciator ALB-017-5-4, Aux Feedwater Pump A Trip or Close Ckt Trouble alarm. At this time IF the TD AFW pump has not auto started on SG low levels the BOP should determine that starting the TD AFW pump is required and open both MS-70 and MS-72 steam supply valves to the TD AFW pump to maintain AFW flow to the Steam Generators.

Event 10: TDAFW Pump trips, (timing controlled by Lead Evaluator) while implementing EOP-ES-0.1, Reactor Trip Response. Annunciator ALB-017-7-4, Aux Feedwater Pump Turbine Trip. Once EOP-ES-0.1 is entered the first step to "Implement Function Restoration Procedures as required". A RED path will exist for EOP-FR-H.1, Response To Loss of Secondary Heat Sink due to a loss of all Feedwater flow to the SG's (< 210 KPPH) and Narrow Range levels in ALL SGs < 25%. Once identified the crew should make transition to EOP-FR-H.1.

Verifiable actions: The OATC will secure ALL RCPs while the BOP continues efforts to restore AFW flow. The OATC will depressurize the RCS and block auto SI signals. The BOP will depressurize one SG to < 500 psig then establish Condensate flow to the SGs.

The scenario ends when Condensate flow is established and verified to one SG.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 1 (continued)

CRITICAL TASK JUSTIFICATION:

1. Initiate a MANUAL Turbine trip (Prior to the receipt of the Low Steam Line Pressure SI signal)

   Without tripping the main Turbine adverse consequences or significant degradation in the mitigative capability of the plant will occur. Taking actions will prevent the actuation of the ECCS. If the ECCS is allowed to actuate it will fill the RCS and challenge the RCS pressure boundary by challenging the Pressurizer PORV's and code Safety valves. Also, WOG ERG-Based Critical task E-0, Manually trip the main Turbine before a severe (Orange Path) challenge develops to either the Subcriticality or the Integrity CSF or before transition to EOP-ECA-2.1, Uncontrolled Depressurization of ALL Steam Generators) whichever happens first.

2. Establish Condensate flow to the SG's before RCS bleed and feed required

   Failure to establish feedwater flow to any SG results in the crew's having to rely upon the lower-priority action of establishing RCS bleed and feed to minimize core uncovery. This constitutes incorrect performance that fails to prevent "degradation of any barrier to fission product release." The analyses presented in the ERG Background Document for FR-H.1 demonstrate that a complete loss of heat sink occurs when the SG inventories deplete (dry out). Unless some form of SG inventory is restored, the SG dryout deteriorates primary-to-secondary heat transfer, allowing core decay heat to increase the RCS temperature and pressure. The increasing RCS pressure automatically forces the pressurizer PORVs to open, which creates a small-break LOCA and simultaneously degrades the RCS fission-product barrier. As long as the RCS pressure remains high, the flow out the PORVs exceeds the ECCS flow into the RCS, which depletes RCS inventory. Eventually the core starts to uncover, degrading the core cooling CSF.
   Once the core is uncovered, fuel temperatures increase rapidly until severe fuel damage occurs, unless some form of core cooling is restored. Fuel over-heating constitutes severe degradation of a fission-product barrier (fuel matrix/clad). Establishing feedwater flow into the SGs offers the most effective recovery action to restore the heat sink. The introduction of feedwater flow immediately restores SG inventory and re-establishes primary-to-secondary heat transfer, decreasing RCS pressure and cooling the core. The RCS pressure decrease then precludes the opening of the PORVs and degradation of the RCS barrier.

Note: An unanticipated critical task may be created in a scenario should an applicant's action or lack of action cause an unexpected RPS or ESFAS actuation. A critical task may be assigned and graded as unsatisfactory even if corrected by another team member prior to the unanticipated RPS/ESFAS actuation. Should the applicant self-correct the action or inaction prior to the unanticipated plant response, a critical task failure should not be assigned to the applicant.

SIMULATOR SETUP

For the 2016 NRC Exam Simulator Scenario # 1

Reset to IC-161 password “noinstants”

Go to RUN

Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner.

Set ERFIS screens

(The examiner has provided the candidates with initial conditions and the initiating cues prior to placing the simulator in RUN.)

SPECIAL INSTRUCTIONS

Post conditions for status board from IC-19
Reactor Power 100% steady state
Control Bank D at 218 steps
RCS boron 1009 ppm

Update the status board: "B" MDAFW Pump is OOS for motor overhaul
Pump has been OOS for 12 total hours and is expected back within the next 24 hours
Tech Spec 3.7.1.2, 72 hour LCO or HSB within the next 6 hours, HSD following 6 hours

Hang restricted access signs on MCR entry swing gates

Hang CIT on “B” MDAFW Pump MCB switch then place protected train placards per OMM-001 Attachment 16 on "A" MDAFW Pump, MS-70 and 72, "B" ESW Pump, "B" RHR Pump and "B" CCW Pump

"B" NSW pump Out Of Service for breaker repairs
Repairs to be completed within 24 hours
Place CIT on switch for "B" NSW and place protected train placard on "A" NSW pump switch

Hang CIT on Boric Acid Transfer Pump B-SB
Place protected train placard on "A" BA Transfer Pump switch

Op Test No.: NRC	Scenario # 1	Event # 1	Page 12 of 68
Event Description:	**Reduce power to secure "A" Heater Drain Pump**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		***When the crew has completed their board walkdown and are ready to assume the shift then direct the Simulator Operator to place the Simulator in RUN.*** ***After the Simulator is in RUN announce to the crew that they have the shift.***
Simulator Operator:		***When directed by the Lead Evaluator go to Run.***
	SRO	GP-006, Step 6.2.4.
Procedure Note:		**When PRZ backup heaters are energized in manual, PK-444A1, PRZ Master Pressure Controller (a PI controller) will integrate up to a greater than normal output, opening PRZ Spray Valves to return and maintain RCS pressure at setpoint. The result is as follows:** • **PORV PCV-444B will open at a lower than expected pressure.** • **ALB-009-3-2, PRESSURIZER HIGH PRESS DEVIATION CONTROL, will activate at a lower than expected pressure.** • **Increased probability for exceeding Tech Spec DNB limit for RCS pressure.**
	OATC	OP-100 section 8.15
	OATC	• PLACE PK-444A, PRZ PRESS CONTROL, in Manual • ADJUST output of PK-444A to between 40 and 45%. • PLACE PK-444A, PRZ PRESS CONTROL, in Auto • IMMEDIATELY PLACE desired Backup Heater Control switches to ON.

Op Test No.: NRC	Scenario # 1	Event # 1	Page 13 of 68
Event Description:	**Reduce power to secure "A" Heater Drain Pump**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**Indicated PRNI power may increase >100% if the Turbine ramp is not started after energizing all Pressurizer Heaters. The crew may elect to begin boration prior to lowering turbine load.**
	OATC	OP-107.01, Section 5.2
	OATC	• DETERMINE the reactor coolant boron concentration from chemistry OR the Main Control Room status board. • DETERMINE the magnitude of boron concentration increase required. • DETERMINE the volume of boric acid to be added using the reactivity plan associated with the IC.
Procedure Note:		**FIS-113, BORIC ACID BATCH COUNTER, has a tenths position.**
Procedure Caution:		**If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the preset value.**
	OATC	SET FIS-113, BORIC ACID BATCH COUNTER, to obtain the desired quantity.
	SRO	Directs boration

Op Test No.: NRC	Scenario # 1	Event # 1	Page 14 of 68
Event Description:	**Reduce power to secure "A" Heater Drain Pump**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		• **Boric Acid flow controller must be set between 0.2 and 6 (1 and 30 gpm.).** • **Performing small borations at high flow rates may result in an overboration based on equipment response times. Boration flow should be set such that the time required to reach the desired setpoint will happen after release of the control switch.**
	OATC	• VERIFY the RMW CONTROL switch has been placed in the STOP position. • VERIFY the RMW CONTROL switch green light is lit. • SET controller 1CS-283, FK-113 BORIC ACID FLOW, for the desired flow rate. • PLACE control switch RMW MODE SELECTOR to the BOR position.
Procedure Note:		• **Boration may be manually stopped at any time by turning control switch RMW CONTROL to STOP.** • **During makeup operations following an alternate dilution, approximately 10 gallons of dilution should be expected due to dilution water remaining in the primary makeup lines.**

Op Test No.: NRC	Scenario # 1	Event # 1	Page 15 of 68
Event Description:	**Reduce power to secure "A" Heater Drain Pump**		

Time	Position	Applicant's Actions or Behavior
	OATC	• START the makeup system as follows: o TURN control switch RMW CONTROL to START momentarily. o VERIFY the RED indicator light is LIT. o IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP. • VERIFY boration automatically terminates when the desired quantity of boron has been added. • Monitor Tavg and rod control for proper operation. • Establish VCT pressure between 20-30 psig. • Turn control switch RMW MODE SELECTOR to AUTO. • START the makeup system as follows: o TURN control switch RMW CONTROL to START momentarily. o VERIFY the RED indicator light is LIT.
Evaluator Note:		**The following steps will initiate turbine load reduction IAW GP-006.**
	SRO	INFORMS Load Dispatcher that a load reduction to 95% will begin.
Procedure Note:		Routine load changes must be coordinated with the Load Dispatcher to meet system load demands.

Op Test No.: NRC	Scenario # 1	Event # 1	Page 16 of 68
Event Description:	**Reduce power to secure "A" Heater Drain Pump**		

Time	Position	Applicant's Actions or Behavior
Procedure Caution:		A failure of the VIDAR in the DEH computer has resulted in a plant trip in the past. This failure would affect operation in Operator Auto, and can be detected as follows: • If OSI-PI is available, then VIDAR is functioning properly if the 'DEH_MEGAWATTS' point is updating. • If OSI-PI is not available, then accessing the 'ANALOG INPUTS' screen on the Graphics Display Computer (located in the Termination Cabinet Room near the ATWS Panel) will show several points, most of which should be updating if the VIDAR Unit is functioning properly. • If the DEH graphics computer is out of service, then VIDAR can be checked as updating on the operator panel as follows: o Depress 'Turbine Program' display button. o Check 'Turbine Program' display button is illuminated. o Check 'Reference' and 'Demand' displays indicate '0000'. o Depress '1577'. o Depress 'Enter'. o If the 'Demand' display indicates '0000', then VIDAR is updating. o If the 'Demand' display indicates '0001', then VIDAR is not updating
Evaluator Note:		**There is no procedural guidance directing when the boration to lower power is required. The crew may elect to perform the boration prior to placing the Turbine in GO.**
	SRO	DIRECTS BOP to start power reduction at 4 DEH Units/Min. May direct initiation of a boration before the power reduction begins.
	BOP	Requests PEER check prior to manipulations of DEH Control

Op Test No.: NRC	Scenario # 1	Event # 1	Page 17 of 68
Event Description:	**Reduce power to secure "A" Heater Drain Pump**		

Time	Position	Applicant's Actions or Behavior
	BOP	• DEPRESS the LOAD RATE MW/MIN push-button. • ENTER the desired rate, **NOT** to exceed 5 MW/MIN, in the DEMAND display. (4 DEH Units/minute) • DEPRESS the ENTER push-button. • DEPRESS the REF push-button. • ENTER the desired load (per CRS) in the DEMAND display. • DEPRESS the ENTER push-button. The HOLD push-button should illuminate.
Procedure Note:		**The unloading of the unit can be stopped at any time by depressing the HOLD push-button. The HOLD lamp will illuminate and the GO lamp will extinguish. The load reduction can be resumed by depressing the GO push-button. The HOLD lamp will extinguish and the GO lamp will illuminate.**
	BOP	• DEPRESS the GO push-button to start the load reduction. • VERIFY the number in the REFERENCE display decreases. • VERIFY Generator load is decreasing. • Communicate to the SRO that the Turbine is in GO.
	BOP	• WHEN Turbine load is less than 95%, THEN ensure the 3A and 3B Feedwater Vents have been opened per OP-136, Section 7.2. *This will be directed to a field operator.*
Simulator Communicator:		**Acknowledge directions from BOP to perform OP-136 section 7.2.** **(No actions are required by the Simulator Operator)** **Wait 2-3 minutes and report completion of task to BOP**

Op Test No.: NRC	Scenario # 1	Event # 1	Page 18 of 68
Event Description:	**Reduce power to secure "A" Heater Drain Pump**		

Time	Position	Applicant's Actions or Behavior
	Crew	Ramp is completed: Power level is approximately 95% Prepares to secure the 'A' Heater Drain Pump
OP-136		OP-136, Feedwater Heaters, Vents, and Drains
Section 7.0 Shutdown		7.1 Shutdown of Heater Drain Pumps
		7.1.1 Initial Conditions
Procedure Note:		Normally the Heater Drain Pumps are stopped when Reactor power is 40 to 45% per GP-006.
	BOP	1. IF only one Heater Drain Pump is to be stopped, THEN the following conditions should be met: a. Reactor power is less than 99% to accommodate for the loss of secondary efficiency. (YES) b. The MW feedback loop is removed from service (YES) 2. IF both Heater Drain pumps are to be stopped, THEN Maintenance has verified that PS-01MS-110 is reset to prevent a turbine runback (N/A)
OP-136		Section 7.1.2 Procedure Steps
Procedure Note:		• The intent of this section is to establish 4A (B) Feedwater Heater level control on the Condenser Dump valve before stopping the Heater Drain Pump. This minimizes the level transient when the pump is secured. • As the Condenser Dump valves starts to control level, the HDP discharge level control valve will start to shut and discharge flow will decrease. • The Main Control Room operator must monitor HDP flow and provide trending information to the operator at the pneumatic alternate level controller.

Op Test No.: NRC	Scenario # 1	Event # 1	Page 19 of 68
Event Description:	**Reduce power to secure "A" Heater Drain Pump**		

Time	Position	Applicant's Actions or Behavior
Procedure Caution:		Stopping Heater Drain Pumps at power levels greater than 50% can result in oscillations in heater levels. Heater 4A (4B) Condenser Dump Controller may need adjustment to stabilize levels.
Evaluator Note:		**ERFIS group display or quick plot "HDPA" has been previously created and is a plot available to the Operators**
	BOP	1. CREATE a plot on ERFIS to monitor Heater Drain Pump discharge flow, discharge pressure and heater level. (FHD-1255A, PHD1255A and LHD1250A)
	BOP	2. ESTABLISH communications between the Main Control Room and the operator at 4A pneumatic alternate level controller
Simulator Communicator:		**Acknowledge directions to establish communications with the BOP.**
Simulator Operator:		**Monitor the FW Heater 4A using simulator drawing FWH02** ***(LC-01HD-1251A(B) is HD-23 on the drawing*** **NOTE: the as-found LC-01HD-1251A(B) (*HD-23*) pneumatic controller setting is also on this display and will be asked for in step 4. Provide the settings value to the Communicator.**
	BOP	**3. IF** desired, **THEN PLACE** the 4A (B) Feedwater Heater Sight Glass in service by slowly opening the applicable isolation valves listed below: • 1HD-293-LI1-2 (1HD-299-LI1-2), LG-01HD-1250A (B) Instrument Valve. • 1HD-293-HI1-2 (1HD-299-HI1-2), LG-01HD-1250A (B) Instrument Valve. **N/A – Not desired**

Op Test No.: NRC	Scenario # 1	Event # 1	Page 20 of 68
Event Description:	**Reduce power to secure "A" Heater Drain Pump**		

Time	Position	Applicant's Actions or Behavior
	BOP	4. PERFORM the following at LC-01HD-1251A (B) : a. RECORD as-found LC-01HD-1251A (B) pneumatic controller setting in the control room log.
Simulator Communicator:		**Report the as-found LC-01HD-1251A(B) (*HD-23 setpoint*) pneumatic controller setting to the BOP.**
Procedure Note:		Actions in Step 7.1.2.4.b cause response being monitored in Step 7.1.2.4.c. Step 7.1.2.4.b will cause HDP discharge flow to lower.
	BOP	b. While monitoring Heater Drain Pump discharge flow, DIRECT the local operator to slowly lower the set point on 4A (B) pneumatic alternate level controller.
Simulator Operator:		**Run Trigger 20 - *(HD-23 is put to manual and the setpoint is adjusted down to 2")* to open the 4A FWH alternate level control valve to lower HDP A discharge flow**
	BOP	c. WHEN Heater Drain Pump discharge flow is less than or equal to 500 kpph, THEN STOP Heater Drain Pump A (B).
Simulator Operator:		**DO NOT run** Trigger 21**:** conditionally activates when 'A' HDP control switch is taken to STOP.
	BOP	d. DIRECT the operator at LC-01HD-1251A (B) to slowly adjust 4A (B) Feedwater Heater level to approximately 2 inches.
	BOP	e. RECORD as-left LC-01HD-1251A (B) pneumatic controller setting in the control room log.
Simulator Communicator:		**(As left setting of LC-01HD-1251A (B) can be found on drawing FWH02)** **Report the as-left LC-01HD-1251A(B) pneumatic controller setting to the BOP. *(HD-23 should read 2")***
	BOP	5. IF necessary, THEN REPEAT Steps 7.1.2.1 through 7.1.2.4 for the remaining pump. **(N/A)**

Op Test No.: NRC	Scenario # 1	Event # 1	Page 21 of 68
Event Description:	**Reduce power to secure "A" Heater Drain Pump**		

Time	Position	Applicant's Actions or Behavior
	BOP	6. VERIFY the 4A and 4B Feedwater Heater Sight Glasses are isolated by shutting isolation valves listed below: • 1HD-293-HI1-2, LG-01HD-1250A Instrument Valve • 1HD-293-LI1-2, LG-01HD-1250A Instrument Valve • 1HD-299-HI1-2, LG-01HD-1250B Instrument Valve • 1HD-299-LI1-2, LG-01HD-1250B Instrument Valve **N/A sight glasses were NOT cut in.**
	BOP	Reports to CRS that the 'A' Heater Drain Pump is secured
Lead Evaluator:		**The Lead Evaluator can cue Event 2 (T-ref processer failure low) after the crew has secured the "A" Heater Drain Pump and the unit is again stable.**

Op Test No.: NRC	Scenario # 1	Event # 2	Page 22 of 68
Event Description:	**T-Ref Processor Failure - LOW**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		On cue from Lead Evaluator insert Trigger 2 T-ref processor failure low
Indications Available		• **Uncontrolled rod motion** • **Tave – Tref MCB digital indication reads Tref at 557°F**
	OATC	RESPONDS to uncontrolled rod motion.
	SRO	ENTERS and directs actions of AOP-001. Makes PA announcement for AOP entry
	OATC	PERFORMS immediate actions.
Immediate Action	OATC	CHECK that LESS THAN TWO control rods are dropped. (YES)
Immediate Action	OATC	POSITION Rod Bank Selector Switch to MAN.
Immediate Action	OATC	CHECK Control Bank motion STOPPED. (YES)
	SRO	Conduct a FOCUS BRIEF on entry into AOP-001.
	SRO	READS immediate actions and proceeds to Section 3.2. Directs BOP to place Turbine to HOLD if in GO.
	BOP	Places Turbine to HOLD if in GO.

Op Test No.: NRC	Scenario # 1	Event # 2	Page 23 of 68
Event Description:	**T-Ref Processor Failure - LOW**		

Time	Position	Applicant's Actions or Behavior
	OATC	CHECK that instrument channel failure has NOT OCCURRED by observing the following: • RCS Tavg (YES) • RCS Tref (NO)
	OATC	PERFORM the following: • IF a power supply is lost, THEN GO TO AOP-024, Loss of Uninterruptible Power Supply. (NO) • IF an individual instrument failed, THEN MAINTAIN manual rod control until corrective action is complete. • IF a Power Range NI Channel failed, THEN BYPASS the failed channel using OWP-RP. (N/A)
	OATC	MANUALLY OPERATE affected control bank to restore the following: • EQUILIBRIUM power and temperature conditions • RODS above the insertion limits of Tech Spec 3.1.3.6 and PLP-106, Technical Specification Equipment List Program and Core Operating Limits Report.
	OATC	Determines Tref based on 1st Stage pressure using Curve G-4. He/she may instead use Tref just before the failure to determine the current value of Tref.
Evaluator Note:		The following will be done when Tave is restored.
	OATC	VERIFY proper operation of the following: • CVCS demineralizers (YES) • BTRS (N/A) • REACTOR Makeup Control System (YES)
	SRO	CHECK that this section was entered due to control banks MOVING OUT. (NO)

Op Test No.: NRC	Scenario # 1	Event # 2	Page 24 of 68
Event Description:	**T-Ref Processor Failure - LOW**		

Time	Position	Applicant's Actions or Behavior
	OATC	CHECK that NEITHER of the following OCCURRED: • Unexplained RCS boration (YES) • Unplanned RCS dilution (YES)
	SRO	CHECK that an automatic Rod Control malfunction OCCURRED. (NO)
	SRO/ OATC	MAINTAIN manual rod control until appropriate corrective action is complete. Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist. Contacts support personnel for repairs.
	SRO	Exits AOP-001
	SRO/ OATC	May establish OMM-001 Att 13 limits for Tavg with Rod Control in manual when exiting AOP-001. May discuss Equipment Problem Checklist with WCC and ask for support for the failure.
Evaluator's Note:		**When Tavg is restored and AOP-001 exited, cue initiation of Event 3 SG "B" Controlling Level Channel Failure (Low)**

Op Test No.: NRC	Scenario # 1	Event # 3	Page 25 of 68
Event Description:	**SG "B" Controlling Level Channel Failure (Low)**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from Lead Evaluator actuate Trigger 3 SG "B" Controlling Level Channel Failure (Low)**
Indications Available		**ALB-14-2-1B SG B NR LVL/SP HI/LO DEV ALB-14-5-4B STEAM GEN B LOW-LOW LVL**
	BOP	RESPONDS to alarms and ENTERS ALB-014-2-1B and 5-4B.
Evaluator Note:		**The APP-ALB-014-2-1B and 14-5-4B actions are similar. IAW AD-OP-ALL-1000, the operator may take MANUAL control of a malfunctioning controller before being directed by a procedure or the SRO. Some or all of the following failure indications may be reported to the SRO.**
	BOP	• CONFIRM alarm using LI-484 SA, LI-485 SB, or LI-486 SA, Steam Generator B level indicators. o Reports LI-486 reading or failed low. o FI-486 and FI-487 are rising o Actual NR level is rising • VERIFY Automatic Functions: NONE • PERFORM Corrective Actions: o CHECK Steam Flow (FI-484, FI-485) AND Feed Flow (FI 486, 487) for deviation. (YES) o IF FCV-488, SG B auto level controller, is NOT sufficiently correcting level, THEN: (YES) ▪ SWITCH to MANUAL **- Lowers M/A output** ▪ RESTORE level to normal (57% NR).

Op Test No.: NRC	Scenario # 1	Event # 3	Page 26 of 68
Event Description:	**SG "B" Controlling Level Channel Failure (Low)**		

Time	Position	Applicant's Actions or Behavior
	SRO	Should provide guidance to maintain B SG level to be maintained between 52 to 62%, Trip limit of 30% Low and 73% High (IAW OMM-001, Attachment 13) Refer to OWP-RP-06 to remove channel from service. (See Attachment 1 at end of scenario) Contacts I&C to have channel removed from service. Dispatch AO to investigate
Evaluator's Note:		**Failed channel does NOT have to be removed from service to continue the scenario.**
	SRO	Enters Instrumentation TS 3.3.1 Functional Unit 13, 14 Action 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied: a. The inoperable channel is placed in the tripped condition within 6 hours, and b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1 3.3.2 Functional Unit 5.b, 6.c Action 19 With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the following conditions are satisfied : a. The inoperable channel is placed in the tripped condition within 6 hours, and b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.

Op Test No.: NRC	Scenario # 1	Event # 3	Page 27 of 68
Event Description:	**SG "B" Controlling Level Channel Failure (Low)**		

Time	Position	Applicant's Actions or Behavior
	SRO	May request an extra operator for dedicated feedwater operation Direct operator and I&C to perform OWP-RP-06 Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist. Contacts support personnel for repairs.
Communicator:		**Acknowledge request and reports from SRO.** **IF an extra operator is requested say that one will be sent when available. NO one is available right now.** **IF asked to report to MCR to perform OWP-RP-06 state that you will report as soon as possible.**
Simulator Operator:		**DO NOT RUN APP for failure. Not required to continue with scenario.**
Evaluator Note:		**After SG level is under control, TS's have been identified and RMU control in AUTO then cue Event 4 (VCT level Channel 115 fails low)** **Note: Any Tech Spec evaluation completion can be continued after the scenario is ended.** **With RMU control in AUTO an automatic VCT makeup will be generated from VCT level channel 115 (<20% causes auto makeup).**

Op Test No.: NRC	Scenario # 1	Event # 4	Page 28 of 68
Event Description:	**VCT Level Channel 115 Fails Low**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 4 VCT Level Channel 115 failure low**
Indications Available		• **Auto Makeup initiates** • **ALB-007-4-3, VCT HIGH-LOW LEVEL** • **ALB-007-5-5, COMPUTER ALARM CHEM & VOL SYSTEMS**
	OATC	RESPONDS to alarm ALB-007-4-3.
	SRO	Crew may immediately secure auto makeup based on AD-OP-ALL-1000 guidance since the makeup is due solely to the instrument failure.
	OATC	ENTERS and performs APP-ALB-007-4-3.
Evaluator Note:		**The SRO is likely to go directly to AOP-003, MALFUNCTION OF REACTOR MAKEUP CONTROL, while the OATC references the APP as time allows.**
	OATC	CONFIRM alarm using LI-115-1, Vol Control Tank Level (MCB-1A2).
	OATC	DETERMINES LT-115 failed LOW. May also use LI-112 (ERFIS indication) to report what actual VCT level is doing.

Op Test No.: NRC	Scenario # 1	Event # 4	Page 29 of 68
Event Description:	**VCT Level Channel 115 Fails Low**		

Time	Position	Applicant's Actions or Behavior

	OATC	VERIFY Automatic Functions:
		• AT 5% VCT level, the following occurs: (N/A)
		  ○ 1CS-291, Suction from RWST (LCV-115B) opens.
		  ○ 1CS-292, Suction from RWST (LCV-115D) opens
		  ○ 1CS-165, VCT Outlet/Dilution (LCV-115C) shuts
		  ○ 1CS-166, VCT Outlet/Dilution (LCV-115E) shuts
		• **AT 20% VCT level, auto makeup from the Reactor Makeup System starts. (YES)**
		• AT 40% VCT level, auto makeup from the Reactor Makeup System stops. (N/A)
		• AT 80% VCT level, 1CS-120, VCT Level Control Vlv, fully diverts letdown flow to the RHT. (N/A)

Procedure Caution:		**Low VCT level is a precursor to gas binding the CSIPs.**
Procedure Note:		**If either LT-112 or LT-115 fails high, the automatic CSIP suction swapover from the VCT to the RWST will not function if required.**
	SRO	IF EITHER of the following occurs: • VCT level is less than 20% AND automatic makeup is NOT in progress • VCT level is greater than 40% AND automatic makeup is still in progress THEN GO TO AOP-003, Malfunction of Reactor Makeup Control.
AOP-003	SRO	ENTERS and directs actions of AOP-003. No immediate actions Makes PA announcement for AOP entry Conduct a FOCUS BRIEF on entry into AOP-003.
	CREW	CHECK instrument air available. (YES)
	OATC	CHECK BOTH LT-112 and LT-115 functioning properly. (NO)

Op Test No.: NRC	Scenario # 1	Event # 4	Page 30 of 68
Event Description:	**VCT Level Channel 115 Fails Low**		

Time	Position	Applicant's Actions or Behavior
	SRO	GO TO Section 3.1, LT-112 or LT-115 Malfunction.
	SRO	REFER TO Attachment 1, VCT Level Control Channels Operation, as necessary to assess the effects of an LT-112 or LT-115 malfunction.
Procedure Note:		**An instrument malfunction may manifest itself as a slow drift rather than a "full high" or "full low" failure. Until the instrument has failed fully high or fully low, all steps should be reviewed for applicability periodically, even if not continuously applicable.**
	OATC	CHECK that LT-115 is FAILING. (YES)
	OATC	MONITOR VCT level using either of the following: • ERFIS point LCS0112 • LI-112 (local)
	OATC	CHECK LT-115 FAILING LOW. (YES)
	OATC	PLACE RMW CONTROL Switch in STOP. (May already have been performed.)
Procedure Note:		**Normally, VCT level is maintained between 20 and 40% by auto makeup.**
	OATC	CONTROL VCT level as follows: • MAINTAIN level BELOW 70% • MAINTAIN level ABOVE 20% OR DESIRED MINIMUM
	OATC	MAINTAIN VCT level GREATER THAN 5%.

Op Test No.: NRC	Scenario # 1	Event # 4	Page 31 of 68
Event Description:	**VCT Level Channel 115 Fails Low**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**Since the following procedure caution does not apply it may not be read .**
Procedure Note:		**Lifting leads in the following step will simulate a low-low level signal from the failed instrument. This is to allow a valid low-low level signal from the good instrument to initiate emergency makeup.**
	OATC	CHECK the malfunctioning instrument FAILING LOW. (YES)
	SRO	DIRECT Maintenance to investigate and repair the instrument malfunction.
	SRO	CHECK that the instrument malfunction has been repaired.
	SRO	WAIT until repairs are complete before proceeding. Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist. Contacts support personnel for repairs.
Communicator:		**Respond to crew requests.** **NOTE: Do not run the APP file to lift leads for this event prior to continuing with Event 5. If questioned later report back that you are working on it.**
paren		**The Lead Evaluator can cue Event 5 - "C" Accumulator nitrogen leak while the crew is waiting for the instrument repairs. This event will take ~5 minutes from insertion until a low pressure alarm actuates. Consider cueing the Simulator Operator early for this event.**

Op Test No.: NRC	Scenario # 1	Event # 5	Page 32 of 68
Event Description:	**"C" Accumulator Nitrogen Leak**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from Lead Evaluator actuate Trigger 5** **"C" Accumulator nitrogen leak**
Indications Available		**Alarm ALB-01-9-1, ACCUMULATOR TANK C HIGH-LOW PRESSURE**
	OATC	Responds to alarm ALB-1-9-1, ACCUMULATOR TANK C HIGH-LOW PRESSURE.
	OATC	Enters APP-ALB-01-9-1
	OATC	CONFIRM alarm using SI Accumulator pressure indicators PI-929 and PI-931 • No automatic actions associated with this alarm
	OATC	PERFORM Corrective Actions: • IF SI Accumulator pressure has risen AND NO rise in level has occurred, THEN . . . (N/A)
Procedure Note:		**N2 through 1SI-287 is the primary source of motive power to the PRZ PORVs, with Instrument Air as backup. If 1SI-287 is shut in a mode where LTOPS is required operable, and Instrument Air is not available to PORV accumulators, LTOPS must be declared inoperable.**
	OATC	IF SI Accumulator pressure has risen AND is accompanied by a rise in level, THEN. . . (NO)

Op Test No.: NRC	Scenario # 1	Event # 5	Page 33 of 68
Event Description:	**"C" Accumulator Nitrogen Leak**		

Time	Position	Applicant's Actions or Behavior
	OATC	IF SI Accumulator pressure has dropped, THEN: (YES) • IF pressure drop is accompanied by a drop in level, THEN: (NO) • STOP any accumulator draining in progress (NONE) • MONITOR leakage into CNMT Sump. (NONE) • DISPATCH an operator to CNMT to locate and isolate leakage as soon as possible. • REFER TO OP-110, Safety Injection AND Raise Accumulator pressure.
	SRO	Directs OATC to pressurize "C" Accumulator IAW OP-110, Safety Injection to maintain pressure within Tech Spec range Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist. Contacts support personnel for repairs.
Evaluator Note:		**The following TS must be entered if Accumulator pressure lowers to less than 585 PSIG and/or when it is connected to the N2 System.**
	SRO	Refer to Technical Specification 3.5.1.d Action a - With one accumulator inoperable, except as a result of a closed isolation valve or boron concentration not within limits, restore the inoperable accumulator to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to less than 1000 psig within the following 6 hours.

Op Test No.: NRC	Scenario # 1	Event # 5	Page 34 of 68
Event Description:	**"C" Accumulator Nitrogen Leak**		

Time	Position	Applicant's Actions or Behavior
	OATC	Enters OP-110, Section 8.2 – Pressurizing the SI Accumulators.
	OATC	Verifies Initial Conditions • The Nitrogen System is available per OP-152.01 • Accumulator level is greater than 66% • If the Accumulators are depressurized, the Accumulator metal temperature must be greater than 70°F before pressurization. (Contact pyrometer can be used or containment ambient temperature) [N/A]
Procedure Note:		**To minimize any potential sluicing between Accumulators through leaking valves, Accumulator pressures should be approximately equal (within 4 psid between lowest and highest ERFIS indications) at the completion of this Section.**
	OATC	Perform the following Steps on only one Accumulator at a time. At the MCB, verify open 1SI-287, ACCUMULATORS & PRZ PORV N2 SUPPLY. Declare the associated Accumulator inoperable per Tech Spec 3.5.1, due to being connected to Non-Safety piping (a one hour action statement in Modes 1 through 3 above 1000 psig).
Procedure Note:		**To prevent exceeding the capacity of the N2 System and maintain train separation for the Accumulators, only one Accumulator should be pressurized at a time.**
	OATC	At the MCB, open the ACCUM N2 SUPPLY/VENT for the Accumulator to be pressurized: 1SI-297 for ACCUMULATOR C N2 Supply & Vent.
Procedure Note:		**The Accumulator should not be pressurized to the upper Technical Specification limit (665 psig) to allow for thermal expansion of the Accumulator gas during plant heatup.**

Op Test No.: NRC	Scenario # 1	Event # 5	Page 35 of 68
Event Description:	**"C" Accumulator Nitrogen Leak**		

Time	Position	Applicant's Actions or Behavior
	OATC	Pressurize the Accumulator to the desired pressure indicated by the associated pressure indicators: PI-929, 931, ACCUMULATOR TK C PRESS.
	OATC	At the MCB, shut the ACCUMULATOR N2 SUPPLY & VENT valve for the Accumulator that was pressurized: 1SI-297 for ACCUMULATOR C N2 Supply & Vent.
	OATC	Complete Attachment 6. (see next 2 pages)
	OATC	IF the Accumulator parameters are within the Tech Spec requirements, THEN DECLARE the Accumulator that was pressurized operable. **(May not declare operable based on leak rate).** Informs SRO that the "C" Accumulator pressure is within Tech Spec requirements and the "C" Accumulator can be considered operable.
	SRO	Acknowledges OATC information
Evaluator Note:		**The Lead Evaluator can cue Event 6 - EHC Pump A shaft shear while the crew is performing Attachment 6 since it will take several minutes for DEH system pressure to lower to the alarm setpoint.**

Op Test No.: NRC	Scenario # 1	Event # 5	Page 36 of 68
Event Description:	**"C" Accumulator Nitrogen Leak**		

Time	Position	Applicant's Actions or Behavior

Attachment 6 - Accumulator Pressurization/Venting Restoration Checklist
Sheet 1 of 2

Person(s) Performing Checklist

Initials	Name (Print)	Initials	Name (Print)

Remarks - Indicate any component not in the prescribed position.

Checklist Started Time _____ Date _____

Checklist Completed Time _____ Date _____

Approved by _____ Date _____
CRS

After receiving the final review signature, this OP Attachment becomes a QA RECORD

Op Test No.: NRC	Scenario # 1	Event # 5	Page 37 of 68
Event Description:	**"C" Accumulator Nitrogen Leak**		

Time	Position	Applicant's Actions or Behavior

Attachment 6 - Accumulator Pressurization/Venting Restoration Checklist
Sheet 2 of 2

COMPONENT NUMBER	COMPONENT DESCRIPTION	POSITION	CHECK	VERIFY
	Main Control Board			
1SI-295	ACCUMULATOR A N_2 SUPPLY & VENT	SHUT	_____	_____
1SI-296	ACCUMULATOR B N_2 SUPPLY & VENT	SHUT	_____	_____
1SI-297	ACCUMULATOR C N_2 SUPPLY & VENT	SHUT	_____	_____
1SI-287	ACCUMULATORS & PRZ PORV N_2 SUPPLY	OPEN	_____	_____
1SI-298	ACC VENT PRESS CNTL (HC-936)	POT DEMAND AT "0"	_____	_____

Op Test No.: NRC	Scenario # 1	Event # 6	Page 38 of 68
Event Description:	**EHC Pump A Shaft Shear / Standby Pump auto start failure**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from Lead Evaluator actuate Trigger-6** **EHC Pump A shaft shear with standby auto start failure** **NOTE: This event will take a few minutes prior to the low pressure alarm since there are accumulators in the system holding the pressure up.**
Indications Available		**ALB-20-4-2B, EH FLUID LOW PRESS**
	BOP	Responds to ALB-20-4-2B or indication of degrading EHC pressure on PI-4221.
	BOP	Enters APP-ALB-20-4-2B.
	BOP	Confirms alarm using PI-4221.
	BOP	VERIFY Automatic Functions: • Standby DEH Pump starts at 1500 psig, as sensed by PS-01TA-4223V.
Evaluator Note:		The BOP may immediately start the standby pump or wait until after reading the APP. *** IF the standby pump is not started EHC pressure will continue to lower resulting in a Turbine / Reactor trip when system pressure reduces to < 1150 psig. The resultant Reactor trip will introduce a "new" critical task to the scenario. (see NOTE on Critical Task Justifications)**
Communicator:		**When dispatched to investigate, wait ~1 minute then report there is a shaft shear on the 'A' EHC Pump**

Op Test No.: NRC	Scenario # 1	Event # 6	Page 39 of 68
Event Description:	**EHC Pump A Shaft Shear / Standby Pump auto start failure**		

Time	Position	Applicant's Actions or Behavior
	BOP	PERFORM Corrective Actions: a. IF the Reactor is tripped, THEN GO TO EOP-E-0. (NO) b. START the standby DEH Pump. (**YES**) c. IF EH Fluid pressure drops to 1500 psig, … (NO) d. DISPATCH an operator to perform the following: 1) MONITOR DEH Pump and PCV operation. 2) VERIFY OPEN the following, a) 1EH-1, A EH Pump Suction Vlv b) 1EH-8, B EH Pump Suction Vlv c) 1EH-31, Main Hdr Press Switch Isol Vlv 3) INVESTIGATE system for leaks. 4) IF a leak is found, THEN ISOLATE the leak AND IMMEDIATELY NOTIFY Control Room.
	SRO	BOP may suggest or the SRO may direct the BOP to place EHC Pump A control switch to PULL-TO-LOCK.
	BOP	(**IF directed**) locates EHC Pump A control switch and turns switch to the left then pulls switch up to place in Pull To Lock.
	SRO / OATC	Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist. Contacts support personnel for repairs.
Evaluator Note:		**(Review the information on the following page prior to actuation of Event 7)**

Op Test No.: NRC	Scenario # 1	Event # 6	Page 40 of 68
Event Description:	**EHC Pump A Shaft Shear / Standby Pump auto start failure**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**After Trigger 7 is actuated** ("A" MFW Pump Trip) the following will occur: • After a 2 minute time delay the "B" MFW pump will also trip • The Main Turbine will NOT receive an AUTO TRIP signal from Reactor Protection and must be tripped manually by the BOP during the EOP E-0 immediate action response. • "A" MD AFW pump will trip immediately upon starting (either from an auto or manual start signal). When the crew is working through EOP-ES-0.1, Reactor Trip Response, the Lead Evaluator will direct the Simulator Operator to actuate Trigger 10 which will trip the TD AFW pump. The combination of Narrow Range SG levels in ALL SGs < 25% and Total Feed Flow to SG < 210 KPPH will cause the CSFST for Heat Sink to change to RED. The crew will immediately transition to FR-H.1 on the RED path condition.
Evaluator Note:		**When desired or after SRO contacts support personnel then inform the Simulator Operator to insert Event 7.**

Op Test No.: NRC	Scenario # 1	Event # 7	Page 41 of 68
Event Description:	**Main Feedwater Pump "A" Trip**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from Lead Evaluator actuate Trigger 7** **Trip of "A" MFW Pump**
Indications Available		**ALB-016-1-4, FW Pump A/B O/C Trip –Gnd or Bkr Fail to Close** **Multiple FW flow alarms**
	BOP	RESPOND to multiple alarms/indications.
	BOP	REPORTS MFW Pump "A" tripped.
AOP-010		Feedwater Malfunctions
	Crew	Identifies entry conditions met for AOP-010, Feedwater Malfunctions.
Immediate Action	BOP	CHECK ANY Main Feedwater Pump TRIPPED. (YES)
Immediate Action	OATC	CHECK initial Reactor power less than 90%. (NO) TRIP the Reactor and GO TO EOP E-0
Immediate Action	OATC	INITIATES a MANUAL Reactor Trip.
Communicator:		**IF contacted by MCR to investigate the causes of the "A" and later the "B" MFW pump trip report that both breakers have tripped on overcurrent. There are no signs of damage at the pumps.** **WHEN / IF WCC is contacted report that Electrical Maintenance is investigating the problems with the breakers any repairs will be made as quickly as possible.**

Op Test No.: NRC	Scenario # 1	Event # 9	Page 42 of 68
Event Description:	**"A" MD AFW Pump Trip**		

Time	Position	Applicant's Actions or Behavior
EOP-E-0		Reactor Trip or Safety Injection
	SRO	ENTERS EOP-E-0
	OATC	Verify Reactor Trip: Reactor Trip Confirmation • Reactor Trip AND Bypass BKRs – OPEN (YES) • Rod Bottom lights LIT (YES) • Neutron flux dropping (YES)
Critical Task #1	BOP	Check Turbine Trip – ALL THROTTLE VALVES SHUT • All turbine throttle valves – SHUT (NO) RNO – Manually trip turbine from MCB • Locates Turbine Manual Trip switch and TRIPS Turbine Check for any of the following: • All turbine throttle valves – SHUT (YES) (TSLB-2 OR DEH PANEL B) OR All turbine governor valves – SHUT (DEH PANEL B) **Critical to manually trip Turbine from MCB prior to the receipt of the Low Steam Line Pressure SI signal**
	BOP	Perform the following: a. AC emergency buses – AT LEAST ONE ENERGIZED (YES – Both 1A-SA and 1B-SB from Off-Site)
	OATC	SI – ACTUATED (BOTH TRAINS) (NO)

Op Test No.: NRC	Scenario # 1	Event # 9	Page 43 of 68
Event Description:	**"A" MD AFW Pump Trip**		

Time	Position	Applicant's Actions or Behavior
	OATC	SI actuation – REQUIRED (NO) **SI ACTUATION CRITERIA** PRZ Pressure - LESS THAN OR EQUAL TO 1850 PSIG CNMT Pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG Pressure - LESS THAN OR EQUAL TO 601 PSIG Abnormal Operating Procedure - DIRECTS MANUAL ACTUATION One SI Train - FAILED (BPLP 4-1 FLASHING)
Evaluator Note:		**The "B" Main Feedwater Pump will trip 2 minutes after the "A" Main Feedwater Pump trip occurred. The crew should identify the trip by the following annunciator:** **ALB-016-1-4, FW Pump A/B O/C Trip-Gnd or Dkr Fail to Close** **ALB-016-2-2, Loss of BOTH Main FW Pumps** **AND the "A" MD A** **FW pump will trip when it starts** **ALB-017-5-4, Aux Feedwater Pump A Trip or Close Ckt Trouble**
Communicator:		**IF contacted to investigate the cause of the "A" AFW pump trip report the breaker is tripped on overcurrent. No signs of damage at the pumps.** **WHEN / IF WCC is contacted report that Electrical Maintenance is investigating the breaker and that repairs will be made as quickly as possible.** **IF asked about the "B" MD AFW pump status report that it is still waiting on parts to complete emergent repairs.**
EOP-ES-0.1		Reactor Trip Response
	SRO	Conduct a FOCUS BRIEF on entry into EOP-ES-0.1. GO TO EOP-ES-0.1, Reactor Trip Response Assigns EOP-ES-0.1 Foldout Criteria

Op Test No.: NRC	Scenario # 1	Event # 9	Page 44 of 68
Event Description:	**"A" MD AFW Pump Trip**		

Time	Position	Applicant's Actions or Behavior
	SRO	IMPLEMENT Function Restoration Procedures as required.
	SRO	Informs SM to EVALUATE EAL Matrix
	BOP	CHECK RCS Temperature: a. Check RCPs – ANY RUNNING (YES) b. CHECK SG Blowdown isolation valves – SHUT. (YES)

SG	(MLB-1A-SA)	(MLB-1B-SB)
A	1BD-11	1BD-1
B	1BD-30	1BD-20
C	1BD-49	1BD-39

Op Test No.: NRC	Scenario # 1	Event # 9	Page 45 of 68
Event Description:	**"A" MD AFW Pump Trip**		

Time	Position	Applicant's Actions or Behavior
	BOP	STABILIZE AND maintain temperature between 555°F AND 559°F using Table 1. (**RCS Temp trend is > 557°F and rising - middle column**)

TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP

- Guidance is applicable until another procedure directs otherwise.
- IF no RCPs running, THEN use wide range cold leg temperature.

	RCS TEMPERATURE TREND		
	LESS THAN 557°F AND DROPPING	GREATER THAN 557°F AND RISING	STABLE AT OR TRENDING TO 557°F
OPERATOR ACTION	• Stop dumping steam • Control feed flow • Maintain total feed flow greater than 210 KPPH until level greater than 25% at least one intact SG • IF cooldown continues, THEN, shut MSIVs AND BYPASS valves	• IF condenser available THEN transfer steam dump to STEAM PRESSURE mode using OP-126, Section 5.3 AND dump steam to condenser - OR - • Dump steam using intact SG PORVs • Control feed flow to maintain SG levels	• Control feed flow and steam dump to establish and maintain RCS temperature between 555°F AND 559°F

	Crew	CHECK Feed System Status:
	OATC	• RCS Temperature – LESS THAN 564°F. (YES)
	BOP	• VERIFY feed reg valves – SHUT. (YES)
	BOP	• CHECK feed flow to SGs – GREATER THAN 210 KPPH. (YES – may report: "**Only the Turbine Driven AFW Pump is running**")

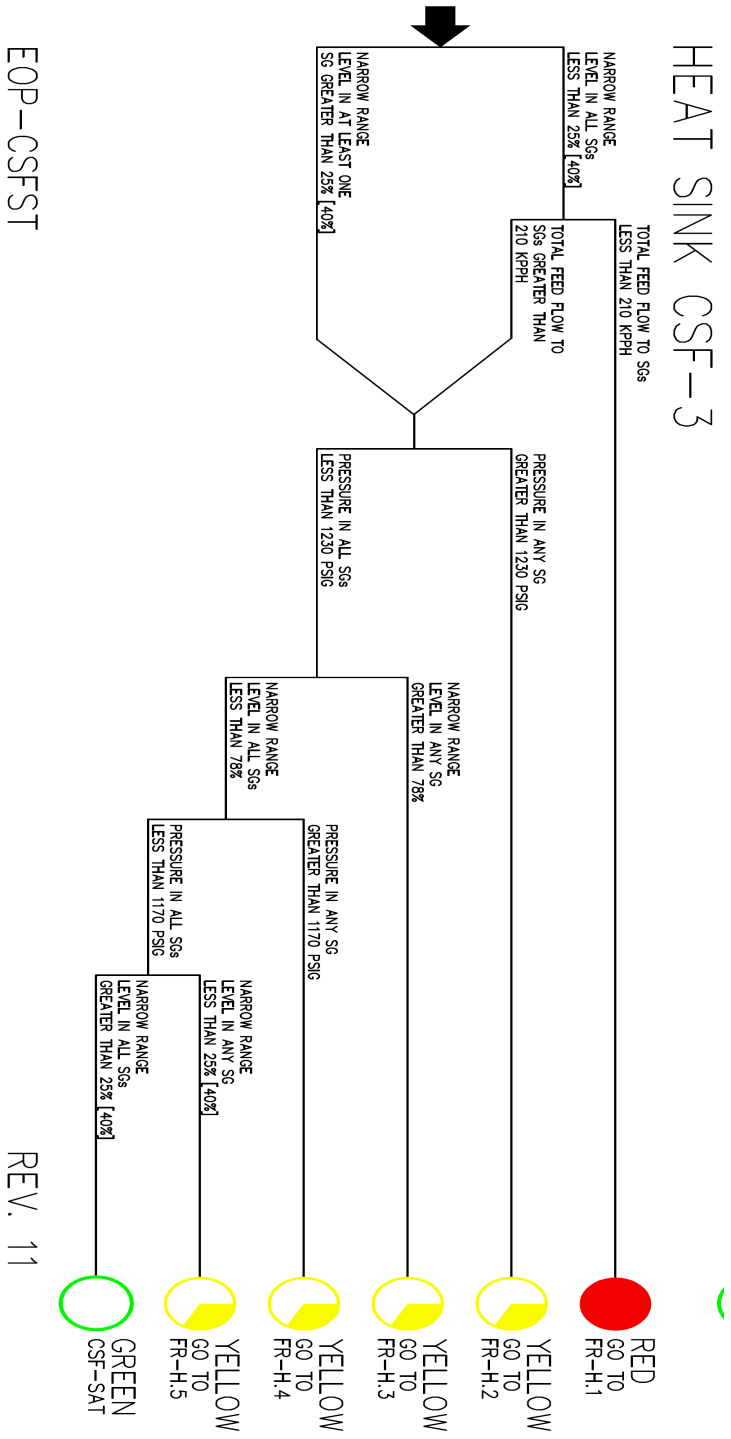
Op Test No.: NRC	Scenario # 1	Event # 9	Page 46 of 68
Event Description:	**"A" MD AFW Pump Trip**		

Time	Position	Applicant's Actions or Behavior
	OATC	CHECK Control Rod Status: • CHECK DRPI – AVAILABLE. (YES) • VERIFY all control rods – FULL INSERTED. (YES)
	OATC	CHECK PRZ level – GREATER THAN 17%. (YES)
Lead Evaluator:		**Cue Simulator Operator to insert Trigger 10** **Trip of the Turbine Driven AFW pump**
Simulator Operator:		**On cue from Lead Evaluator actuate Trigger 10** **Trip of the TD AFW pump**
	CREW	Contacts AO's to investigate failures
Communicator		**During the remainder of the scenario any communications for a request to restore MFW or AFW –** **Maintenance is looking at the situation and will make repairs as soon as they can.** **When ANY pump is available the WCC will contact the MCR.**

	Crew	• Identifies TD AFW Pump has tripped Identifies RED PATH on CSFST for Heat Sink when: • NR Level in ALL SG's < 25% • Total Feed Flow to SGs < 210 KPPH

Op Test No.: NRC	Scenario # 1	Event # 9	Page 47 of 68
Event Description:	**"A" MD AFW Pump Trip**		

Time	Position	Applicant's Actions or Behavior



Op Test No.: NRC	Scenario # 1	Event # 10	Page 48 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
EOP-FR-H.1		**RESPONSE TO LOSS OF SECONDARY HEAT SINK**
	SRO	TRANSITIONS to EOP-FR-H.1 after verification of RED Path. Conduct a FOCUS BRIEF on entry into EOP-FR-H.1.
	SRO	Reads Caution prior to step 1
Evaluator Note:		**The following procedure caution does not apply and therefore may be summarized.**
		CAUTION • This procedure should NOT be performed if total feed flow capability of 210 KPPH is available AND total feed flow has been reduced due to operator action as directed by the EOPs. (The following EOPs direct feed flow to be reduced below 210 KPPH: ECA-2.1, "UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS" FR-S.1, "RESPONSE TO NUCLEAR POWER GENERATION/ATWS" FR-P.1, "RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK" FR-P.2, "RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK" FR-Z.1, "RESPONSE TO HIGH CONTAINMENT PRESSURE") • Feed flow should NOT be established to any faulted SG while a non-faulted SG is available.
	SRO	PERFORM the following: Initiate monitoring of Critical Safety Function Status Trees. Evaluate EAL Matrix – contacts SM to EVALUATE EAL Matrix (Refer to PEP-110)

Op Test No.: NRC	Scenario # 1	Event # 10	Page 49 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
	OATC	CHECK Secondary Heat Sink Requirements: • RCS pressure – > ANY NON-FAULTED SG PRESS (**YES**) • RCS temperature – GREATER THAN 350°F [330°F]. (**YES**) • STOP any running RHR pumps. (**YES**)
	SRO	Check If Bleed And Feed Is Required: SG WR levels - ANY TWO LESS THAN 15% [30%] (NO) GO TO Step 4
	SRO	NOTE: Foldout applies **FOLDOUT** • **RCS BLEED AND FEED INITIATION CRITERIA** **IF** any two SG wide range levels drop to less than 15% [30%], **THEN** perform the following: • Stop all RCPs. • Observe **CAUTION** prior to Step 16 **AND** GO TO Step 16. • **COLD LEG RECIRCULATION SWITCHOVER CRITERIA** **IF** RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1. • **AFW SUPPLY SWITCHOVER CRITERIA** **IF** CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1. • **RHR RESTART CRITERIA** **IF** RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS.
	SRO	Assigns EOP-FR-H.1 Foldout Criteria

Op Test No.: NRC	Scenario # 1	Event # 10	Page 50 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
	BOP	CHECK SG Blowdown and SG Sample Valves shut (YES) **SG Blowdown And Sample Isolation Valves** Process Line / Outside CNMT (MLB-1A-SA) / Inside CNMT (MLB-1B-SB) SG A Sample: 1SP-217 / 1SP-214/216 SG B Sample: 1SP-222 / 1SP-219/221 SG C Sample: 1SP-227 / 1SP-224/226 SG A Blowdown: 1BD-11 / 1BD-1 SG B Blowdown: 1BD-30 / 1BD-20 SG C Blowdown: 1BD-49 / 1BD-39
	BOP/SRO	ESTABLISH AFW Flow to at least ONE SG: • OBSERVE MCB indications to determine cause of AFW failure: ○ CST level (NO) ○ MDAFW pump power supplies (**YES**) ○ TDAFW pump steam supply valves (**YES**) ○ TDAFW pump speed controller (NO) ○ TDAFW pump control power (NO) ○ AFW valve alignment (NO) • TRY to restore AFW flow at the MCB. (Refer to EOP-FR-H.1 Attachment 1 for guidance of rate of feed flow.) (Refer to OP-137, Auxiliary Feedwater System, for guidance regarding AFW pump operations, precautions and limitations and valve operation.)

Op Test No.: NRC	Scenario # 1	Event # 10	Page 51 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
	BOP	Check IF AFW Flow Established: • TOTAL feed flow to SGs – GREATER THAN 210 KPPH. (NO) GO TO Step 6.c
	BOP/SRO	PERFORM the following: • CONTINUE attempts to restore AFW flow at the MCB and locally.
	SRO	OBSERVE NOTE prior to Step 7 AND continue with Step 7.
Procedure Note:		**After stopping all RCPs and placing steam dump in the steam pressure mode, RCS pressure and temperature will increase as natural circulation is established. A large loop ΔT prior to PRZ PORV opening confirms natural circulation. This must be considered while evaluating bleed and feed criteria.**
	OATC	STOP Heat Input from RCP Operations: • **Stops ALL RCPs**
	BOP	CHECK all of the following to determine if steam can be dumped to condenser: • CHECK any intact SG MSIV – OPEN. (**YES**) • CHECK Condenser Available (C-9) light (BPLB 3-3) – LIT. (**YES**) • STEAM dump control system – AVAILABLE. (**YES**)

Op Test No.: NRC	Scenario # 1	Event # 10	Page 52 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
Evaluator's Note:		**The following three substeps may have already been performed per Table 4.**
	BOP	• PLACE Steam Dump pressure controller in Manual AND decrease output to 0%. • PLACE Steam Dump mode select switch in STEAM PRESS. • ADJUST Steam Dump controller setpoint to 84% (1092 PSIG) AND place in AUTO.
	OATC	Check SI actuated (NO) GO TO Step 10
Evaluator Note:		**The crew should NOT attempt to start either MFW Pump until the reasons for the original trips are known and corrected.** **The crew may answer "POWER to at least ONE main FW pump – AVAILABLE" as YES but they will still end up being directed to continue**
	BOP	ESTABLISH Main FW Flow to at least ONE SG: • CHECK condensate system – IN SERVICE. (YES) • SUPPORT condition for FW startup – AVAILABLE. (YES) • POWER to at least ONE main FW pump – AVAILABLE. (YES - There is power but both MFW Pump breakers are tripped)
	SRO	WHEN support conditions met, THEN do Steps 10c and 10d.
	SRO	OBSERVE CAUTION prior to Step 12 and GO TO Step 12.

Op Test No.: NRC	Scenario # 1	Event # 10	Page 53 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
Procedure Caution:		**Following block of automatic SI actuation, manual SI actuation may be required if conditions degrade. (Examples of degraded conditions are the inability to maintain or restore PRZ level, RVLIS indication or RCS subcooling.)**
Procedure Note:		• **After the low steam pressure SI signal is blocked, main steam line isolation will occur if the high steam pressure rate setpoint is exceeded.** • **The Main FW pump discharge valve control switches must be held in the OPEN position to open the valves with the main FW pumps stopped**.
	BOP	DEPRESSURIZE RCS and block Low Steam Pressure SI: Open the following valves while continuing with this procedure: • Low pressure FW heater bypass valves: o 1CE-330 o 1CE-359 • High pressure FW heater bypass valve: o 1FW-110 • Main FW pump discharge valves: o 1FW-29 o 1FW-60
	OATC	• CHECK SI – IN SERVICE. (NO) o RNO – go to step 12f
	OATC	DEPRESSURIZE RCS to between 1900 PSIG AND 1950 PSIG • CHECK letdown - IN SERVICE (YES) • DEPRESSURIZE using auxiliary spray (refer to OP-107) BLOCK SI Signals: • Low PRZ pressure • Low steam pressure MAINTAIN pressure less than 1950 PSIG

Op Test No.: NRC	Scenario # 1	Event # 10	Page 54 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
OP-107		Chemical and Volume Control System Section 8.13 Auxiliary Spray Operations
	OATC	Auxiliary Spray IAW OP-107 Section 8.13: VERIFY SHUT Normal Pressurizer Spray valves: • 1RC-107, PRZ SPRAY LOOP A PCV 444 C • 1RC-103, PRZ SPRAY LOOP B PCV 444 D OPEN 1CS-487, PRESSURIZER AUX SPRAY Monitor ERFIS point TRC0450, PZR SURGE LINE TEMP, AND MINIMIZE swings greater than 100°F VERIFY SHUT 1CS-480, ALTERNATE CHARGING PLACE FK-122, CHARGING FLOW 1CS-231, in Manual Maintain Pressurize pressure as steady as possible, using any of the following, as needed: • ADJUST FK-122 as needed to control Pressurizer Pressure • Energize and control PRZ heaters • OPEN or SHUT 1CS-492, NORMAL CHARGING.
Evaluator's Note:		**RCS pressure will need to be monitored or it will continue to decrease with AUX spray until noticed. This may also result in letdown isolation. If VCT level drops <5%, CSIP suction will swap the RWST.**
Procedure Notes:		• **Depressurizing only one SG minimizes the likelihood of reaching the "bleed and feed" criteria (due to lowering SG level) AND the likelihood of the appearance of degraded plant conditions that might require manual SI actuation.** • **The preferred SG to depressurize is the intact SG with the highest indicated wide range level.** • **A second SG may be depressurized if condensate flow cannot be established to the first SG depressurized.**

Op Test No.: NRC	Scenario # 1	Event # 10	Page 55 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior

	BOP	DEPRESSURIZE One SG To Less Than 500 PSIG AND ESTABLISH Condensate Flow:
		• IDENTIFY the SG to be depressurized.
		• SHUT the following valves for the SGs that are NOT to be depressurized.
		  • MSIVs (A & B, 1MS-80 & 1MS-82)
		  • MSIV bypass valves
		  • SG main Steam drain isolation before MSIV (A & B, 1MS-231 & 1MS-266)
		• DUMP steam at maximum rate to depressurize identified to SG to 500 PSIG using any of the following (listed in order of preference):
		  • Condenser steam dump
		ESTABLISH condensate flow using Attachment 3.

Evaluator's Note:		**Alignment actions will commence while the SG is being depressurized.**

Op Test No.: NRC	Scenario # 1	Event # 10	Page 56 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
EOP-FR-H.1		**Attachment 3**
Procedure Note:		• **This attachment provides instructions for establishing condensate flow to one SG to restore secondary heat sink. It may also be used as a reference for establishing condensate flow to SGs while implementing other EOPs.** • **After the low steam pressure SI blocked, main steam line isolation will occur if the high steam pressure rate setpoint is exceeded.** • **If an action or its contingency in this attachment can NOT be accomplished, the operator should return to the step in effect, while continuing efforts to establish condensate flow.**
	BOP	CHECK Primary and Secondary Conditions To Allow Establishing Condensate Flow: • CHECK low steam SG pressure SI – BLOCKED (YES) • CHECK SG pressure for SG to which condensate flow is to be established - LESS THAN 500 (NO) • GO To Step 2.
Procedure Note:		**The preferred SG to depressurize is the intact SG with the highest indicated wide range level.**
Evaluator's Note:		**Main Steam isolation may actuate during this action. This actuation will shut the MSIV's and the Steam Dumps will no longer function. If so, the depressurization should be continued using the respective SG PORV.**

Op Test No.: NRC	Scenario # 1	Event # 10	Page 57 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior

	BOP	Depressurize One SG To Less Than 500 PSIG:
		• Identify the SG to be depressurized.
		• Shut the following valves for the SGs that are NOT to be depressurized.
		  ○ MSIVs
		  ○ MSIV bypass valves
		  ○ SG main steam drain isolations before MSIV:
		  ▪ SG A: 1MS-231
		  ▪ SG B: 1MS-266
		  ▪ SG C: 1MS-301
		• Dump steam at maximum rate to depressurize identified SG to 500 PSIG using any of the following (listed in order of preference):
		  ○ Condenser steam dump
		  ○ SG PORVs
		  ○ Locally operate SG PORVs using OP-126, "MAIN STEAM, EXTRACTION STEAM, AND STEAM DUMP SYSTEMS", Section 8.2.
		  ○ TDAFW pump
		CHECK Condensate System Status:
		• At least one condensate – RUNNING (**YES**)
		• At least one condensate booster pump – RUNNING (**YES**)

Evaluator Note:		**The MAX rate depressurization may cause the MSIV's to auto close on Steam Pressure Rate. IF this occurs the crew should continue the depressurization using the SG PORV's.**
Procedure Note:		**The Main FW pump discharge valve control switches must be held in the OPEN position to open the valves with the Main FW pumps stopped.**

Op Test No.: NRC	Scenario # 1	Event # 10	Page 58 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
	BOP	Verify the following valves - OPEN: • Low pressure FW heater bypass valves: (1CE-330/1CE-359) • High pressure FW heater bypass valves: (1FW-110) • Main FW pump discharge valves: (1FW-29/1FW-60)
	OATC	RESET SI. (Not active)
	CREW	Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. (Refer to E-0 Attachment 6.) (NA)
	BOP	RESET FW Isolation. (NOT ACTIVE) PLACE Feed Reg Bypass Controllers In Manual AND Set Output To Zero. RESET AND open main FW isolation valve(s): (All open already) • 1FW-159 (A SG) • 1FW-277 (B SG) • 1FW-217 (C SG) SHUT Main FW Pump Recirc Valves: (1FW-8/1FW-39) (Already SHUT)
Procedure Caution:		**Condensate Booster Pumps will trip on high discharge pressure of 625 psig (180 second time delay). This will result in delayed heat sink recovery.**
	BOP	PLACE Condensate Booster Pump Controllers In Manual AND Control Discharge Pressure At 600 PSIG.

Op Test No.: NRC	Scenario # 1	Event # 10	Page 59 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		**Local checks for flow noise may be used to confirm the presence of flow.**
	Crew	Dispatch Aux Operator to FRV Bypass valves to listen for flow noise then report once flow noise is heard.
Communicator **Simulator Operator:**		**When directed to go to desired FRV Bypass valve, wait ~1 minute, then report that you are standing by as requested.** **To monitor for flow on simulator observe flow indicators in the CFW drawing or open the monitored parameter file - Plant Status Monitor CFW and check the status of flow using:** • **Line 21: wcfw479(1) FRV Bypass Valve A flow** • **Line 22: wcfw479(2) FRV Bypass Valve B flow** • **Line 23: wcfw479(3) FRV Bypass Valve C flow**
	BOP	ESTABLISH Feed Flow to SG(s): (Refer to Attachment 1 while performing actions that restore feed flow.)
Critical Task #2	BOP	ESTABLISH feed flow using the feed reg bypass valves from the MCB. **Feed flow to at least one SG –ESTABLISHED** **Critical to establish Feedwater flow into at least one SG before RCS feed and bleed is required**
Communicator:		**Report back to MCR when flow is observed through the FRV Bypass valve that is being monitored.**
	BOP	Acknowledges FRV Bypass flow noise and updates crew

Op Test No.: NRC	Scenario # 1	Event # 10	Page 60 of 68
Event Description:	**TD AFW Pump Trip LOSS OF HEAT SINK**		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator:		**Terminate the scenario after feed flow has been established and Wide Range level increase or Feed Water Flow can be identified in at least one SG. Instruct the Simulator Operator to place the Simulator in FREEZE and announce "I have the shift, remain in the Simulator and don't discuss the scenario. There may be follow up questions asked prior to your release."**
Simulator Operator:		***When directed by the Lead Evaluator go to FREEZE.***

Op Test No.: NRC	Scenario # 1	Event # N/A	Page 61 of 68
Event Description:	**Scenario Guide Attachment 1 OWP-RP-06 Reactor Protection "B" SG Level**		

Time	Position	Applicant's Actions or Behavior

OWP-RP-06
Sheet 1 of 5

EIR Number: _____
W/O Number: _____
Clearance Number: _____

1. OWP - RP-06

2. System: Reactor Protection

3. Component: B SG LEVEL

4. Scope: LCO action required due to inoperable SG B narrow range level protection channel I (LI-01FW-0484), II (LI-01FW-0485), III (LI-01FW-0486), or IV (LI-01FW-0483).

5. Applicable Requirements: 3.3.1 (Modes 1 and 2), 3.3.2 (Modes 1, 2, and 3) and 3.3.3.6 (Modes 1, 2, and 3)

6. Precautions: 1) To prevent a Reactor Trip insure only one channel is taken out of service at a time, by verifying corresponding Trip Status Lights for the other channels are de-energized. 2) Both associated SF/FF mismatch channels including steam flow pressure compensation must remain OPERABLE (FB/488B & FB/488A not tripped) for maintenance on channel I or II. 3) For Maintenance on channel III, SG level must be controlled manually.

7. Component lineup completed per attached sheet(s). _____ / _____ Signature Date

8. Testing required on redundant equipment while the component is inoperable. None

9. Testing/Action required to restore operability. (N/A if tracked on EIR)

. MST-I0026 for Chan I or _____ / _____
. MST-I0027 for Chan II or _____ / _____
. MST-I0028 for Chan III or _____ / _____
. MST-I0035 for Chan IV _____ / _____
. Channel Check _____ / _____
Signature Date

10. Component lineups restored per attached sheet(s). _____ / _____ Signature Date

11. Remarks: _____

12. Reviewed By: _____ _____
Superintendent - Shift Operations Date

After receiving the final review signature, this OWP becomes a QA RECORD and should be submitted to Document Services.

Op Test No.: NRC	Scenario # 1	Event # N/A	Page 62 of 68
Event Description:	**Scenario Guide Attachment 1 OWP-RP-06 Reactor Protection "B" SG Level**		

Time	Position	Applicant's Actions or Behavior

Bistable/Status Light Lineup

Component ID or Number	Position for Inoperability Initial/Verified		Restored Position Initial/Verified	
B SG LEVEL PROTECTION CHANNEL I (LI-484)				
In PIC 1 on Card C1-861				
NOTE: . The Master Test Switch may be positioned to TEST for troubleshooting. It is not required to be in TEST to meet Tech Specs. Operating this switch before operating the bistable switches aids in troubleshooting by maintaining system conditions the same as they were when the trouble occurred.				
. Concurrent verification is preferred while tripping bistables.				
SW6 (LS/484D) Master Test Switch for LS/484	TEST	_____/_____	NORMAL	_____/_____
In PIC 1 on Card C1-829:				
BS1 (LB/484A Low Low Level RX Trip)	TEST	_____/_____	NORMAL	_____/_____
BS2 (LB/484B Low Level for SF/FF Mismatch RX Trip)	TEST	_____/_____	NORMAL	_____/_____
BS3 (LB/484C for P-14)	TEST	_____/_____	NORMAL	_____/_____
On TSLB-2 (Check the following):				
SG B LO LO LVL LB 484A (Window 5-1)	ENERGIZED	_____/_____	DE-ENERGIZED	_____/_____
SG B LO LVL LB 484B (Window 2-1)	ENERGIZED	_____/_____	DE-ENERGIZED	_____/_____
SG B HI HI LVL LB 484C (Window 8-1)	ENERGIZED	_____/_____	DE-ENERGIZED	_____/_____

Op Test No.: NRC	Scenario # 1	Event # N/A	Page 63 of 68
Event Description:	**Scenario Guide Attachment 1 OWP-RP-06 Reactor Protection "B" SG Level**		

Time	Position	Applicant's Actions or Behavior

Bistable/Status Light Lineup

Component ID or Number	Position for Inoperability Initial/Verified		Restored Position Initial/Verified	
B SG LEVEL PROTECTION CHANNEL II (LI-485)				
In PIC 2 on Card C2-861				
NOTE: . The Master Test Switch may be positioned to TEST for troubleshooting. It is not required to be in TEST to meet Tech Specs. Operating this switch before operating the bistable switches aids in troubleshooting by maintaining system conditions the same as they were when the trouble occurred.				
. Concurrent verification is preferred while tripping bistables.				
SW6 (LS/485D) Master Test Switch for LS/485	TEST	_____/_____	NORMAL	_____/_____
In PIC 2 on Card C2-829:				
BS1 (LB/485A Low Low Level RX Trip)	TEST	_____/_____	NORMAL	_____/_____
BS2 (LB/485B Low Level for SF/FF Mismatch RX Trip)	TEST	_____/_____	NORMAL	_____/_____
BS3 (LB/485C for P-14)	TEST	_____/_____	NORMAL	_____/_____
On TSLB-2 (Check the following):				
SG B LO LO LVL LB 485A (Window 5-2)	ENERGIZED	_____/_____	DE-ENERGIZED	_____/_____
SG B LO LVL LB 485B (Window 2-2)	ENERGIZED	_____/_____	DE-ENERGIZED	_____/_____
SG B HI HI LVL LB 485C (Window 8-2)	ENERGIZED	_____/_____	DE-ENERGIZED	_____/_____
On Main Control Board:				
CAUTION Prior to placing the SG LVL ATWS panel bypass switch to normal, verify the A and B train trouble lights and the A and B train trip lights are not lit on the AMSAC panel.				
SG LVL ATWS PANEL BYPASS Switch	BYPASS	_____/_____	NORMAL	_____/_____

Op Test No.: NRC	Scenario # 1	Event # N/A	Page 64 of 68
Event Description:	**Scenario Guide Attachment 1 OWP-RP-06 Reactor Protection "B" SG Level**		

Time	Position	Applicant's Actions or Behavior

Bistable/Status Light Lineup

Component ID or Number	Position for Inoperability Initial/Verified		Restored Position Initial/Verified	
B SG LEVEL PROTECTION CHANNEL III (LI-486)				
In PIC 3 on Card C3-861				
NOTE: . The Master Test Switch may be positioned to TEST for troubleshooting. It is not required to be in TEST to meet Tech Specs. Operating this switch before operating the bistable switches aids in troubleshooting by maintaining system conditions the same as they were when the trouble occurred.				
. Concurrent verification is preferred while tripping bistables.				
SW6 (LS/486B) Master Test Switch for LS/486	TEST	_____/_____	NORMAL	_____/_____
In PIC 3 on Card C3-829:				
BS1 (LB/486A Low Low Level RX Trip)	TEST	_____/_____	NORMAL	_____/_____
BS2 (LB/486C for P-14)	TEST	_____/_____	NORMAL	_____/_____
On TSLB-2 (Check the following):				
SG B LO LO LVL LB 486A (Window 5-3)	ENERGIZED	_____/_____	DE-ENERGIZED	_____/_____
SG B HI HI LVL LB 486C (Window 8-3)	ENERGIZED	_____/_____	DE-ENERGIZED	_____/_____
On Main Control Board:				
FK-488 (Main FW Reg. Valve B Controller)	MANUAL	_____/_____	AUTO/MANUAL	_____/_____
FK-489.1 (Main FW Bypass Valve B Controller)	MANUAL	_____/_____	AUTO/MANUAL	_____/_____

Op Test No.: NRC	Scenario # 1	Event # N/A	Page 65 of 68
Event Description:	**Scenario Guide Attachment 1** **OWP-RP-06 Reactor Protection "B" SG Level**		

Time	Position	Applicant's Actions or Behavior

OWP-RP-06
Sheet 5 of 5

Bistable/Status Light Lineup

Component ID or Number	Position for Inoperability Initial/Verified	Restored Position Initial/Verified
B SG LEVEL PROTECTION CHANNEL IV (LI-483)		
In PIC 4 on Card C4-863		
NOTE: . The Master Test Switch may be positioned to TEST for troubleshooting. It is not required to be in TEST to meet Tech Specs. Operating this switch before operating the bistable switches aids in troubleshooting by maintaining system conditions the same as they were when the trouble occurred.		
. Concurrent verification is preferred while tripping bistables.		
SW2 (LS/483B) Master Test Switch for LS/483	TEST _____/_____	NORMAL _____/_____
In PIC 4 on Card C4-846:		
BS1 (LB/483A for P-14)	TEST _____/_____	NORMAL _____/_____
On TSLB-2 (Check the following):		
SG B HI HI LVL LB 483A (Window 8-4)	ENERGIZED _____/_____	DE-ENERGIZED _____/_____

Op Test No.: NRC	Scenario # 1	Event # N/A	Page 66 of 68
Event Description:	**Scenario Guide Attachment 2 FR-H.1 Attachment 1**		

Time	Position	Applicant's Actions or Behavior

RESPONSE TO LOSS OF SECONDARY HEAT SINK

Attachment 1
Sheet 1 of 2
GUIDANCE ON RESTORATION OF FEED FLOW

1. Before RCS Bleed And Feed Using AFW:

   Feed at least one intact SG, whose wide range level is greater than 15% [30%], with total feed flow to SGs greater than 210 KPPH.

2. Before RCS Bleed And Feed Using MFW:

   Feed at least one intact SG, whose wide range level is greater than 15% [30%], without restriction on rate.

3. Before RCS Bleed And Feed Using Condensate:

   IF wide range RCS Tcold is stable at **OR** trending to the saturation temperature corresponding to the depressurized SG pressure, **THEN** feed the depressurized SG without restriction on rate.

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Op Test No.: NRC	Scenario # 1	Event # N/A	Page 67 of 68
Event Description:	**Scenario Guide Attachment 2 FR-H.1 Attachment 1**		

Time	Position	Applicant's Actions or Behavior

RESPONSE TO LOSS OF SECONDARY HEAT SINK

Attachment 1
Sheet 2 of 2
GUIDANCE ON RESTORATION OF FEED FLOW

4. After RCS Bleed And Feed Using Any Feed Flow Method:
   a. **IF** core exit TCs are stable **OR** dropping, **THEN** recover SG level as follows:
      1) **IF** AFW flow will be used to recover heat sink, **THEN** perform the following:
         (a) Shut **ALL** AUX FW ISOLATION MOVs to all SGs.
         (b) Start the available AFW pump.
         (c) Shut **ALL** AUX FW REGULATOR FCVs to all SGs.
         (d) Designate **ONE** intact SG in which to recover heat sink.
         (e) For the running AFW pump, open the AUX FW ISOLATION MOV for the designated SG.
         (f) Throttle open the AUX FW REGULATOR FCV to establish 50 KPPH AFW flow to the designated SG.
         (g) **WHEN** wide range level rises to greater than 15% [30%], **THEN** feed flow may be raised to maximum rate.
      2) **IF** main FW **OR** condensate flow will be used to recover heat sink, **THEN** perform the following:
         (a) Designate **ONE** intact SG in which to recover heat sink.
         (b) Feed designated SG at lowest controllable rate (flow noise just becomes audible at associated feed reg bypass valve).
         (c) **WHEN** wide range level rises to greater than 15% [30%], **THEN** feed flow may be raised to maximum rate.
   b. **IF** core exit TCs are rising, **THEN** feed one intact SG at maximum rate until SG narrow range level is greater than 25% [40%]. Do **NOT** reduce feed flow if core exit TCs become stable **OR** dropping.
   c. **WHEN** RCS hot leg temperatures are dropping, **THEN** check the SG being fed (active SG) for symptoms indicating a faulted **OR** ruptured condition.
   d. **IF** the active SG is faulted **OR** ruptured, **THEN** perform the following:
      1) Establish feed flow to another intact SG.
      2) **IF** an intact SG does **NOT** exist, **THEN** a decision should be made to use the best available SG, which may be the currently active SG.
      3) **WHEN** the heat load has been transferred to a backup SG, **THEN** isolate the faulted **OR** ruptured SG to prevent further radiation releases.
   e. Unless required by Step 4d, feed flow should **NOT** be established to another dry SG except as directed by the plant operations staff.

- END -

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Op Test No.: NRC	Scenario # 1	Event # N/A	Page 68 of 68
Event Description:	**Scenario Guide Revision Summary**		

Rev. 0

Initial Development

Rev. 1

NRC D-1 Outline comments incorporated

Rev. 2

Operation validation comments incorporated

Rev. 3

NRC 60 day submittal comments incorporated

Rev. 4

NRC Prep Week comments incorporated

Rev. Final

Approved for administration by NRC Region II

Appendix D	Scenario Outline	Form ES-D-1

HARRIS 2016 NRC EXAM SCENARIO 2

Facility:	Harris Nuclear Plant	Scenario No.:	2	Op Test No.:	05000400/2016301
Examiners:		Operators:	SRO:		
			OATC:		
			BOP:		

Initial Conditions: IC-32, 28% power, MOL

- The unit is operating at 28% power
- The following equipment is under clearance
  - 'B' MD AFW Pump
  - 'B' NSW pump
  - Boric Acid Transfer Pump B-SB

Turnover:

- Plant is at 28% power, MOL with start up in progress. GP-005 step 127.
- Turbine is in HOLD with a rate of 2 DEH units per minute set
- Raise Turbine ramp rate to 4 DEH units per minute then continue raise load to 100%.
- Plant risk condition is YELLOW due to startup.

Critical Tasks:

- Control AFW flow to minimize RCS cooldown
- Close MSIVs for SG 'A' and 'C'

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP/SRO R – RO/SRO	Power escalation to 100% (GP-005)
2	NIS07E	I – RO/SRO TS – SRO	Power Range N-44 fails HI (AOP-001)
3	Hva01b	C – BOP/SRO TS – SRO	Containment Fan Cooler Fan (AH-2 A-SA) Trips
4	CVC29A	C – RO/SRO TS – SRO	CSIP 'A' Shaft Shear (AOP-018)
5	eps12	C – BOP/SRO	Total Loss of Cooling Banks on the UAT 1A (AOP-039)
6	MSS11	M – All	Main Steam Line Break outside of Containment (E-0 to E-2)
7	ZDSQ2:52A	I – RO/SRO	'A' RHR Pump fails to start from sequencer
8	MSS05A MSS05B MSS05C	C – BOP/SRO	MSIVs fail to close and can't be closed from control room (ECA-2.1) Valves close when Instrument Air is isolated locally (return to E-2)
9	ZRPK616A ZRPK616B	I – BOP/SRO	SG 'B' AFW isolation valve fails to close on Feedwater Isolation signal

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 2

Scenario Summary:

The unit is currently operating at ~28% power, MOL. Normal startup is in progress IAW with GP-005, Power Operation (Mode 2 to Mode 1) section 5.0 step 127 following a Reactor trip 72 hours ago. The Reactor went critical 7 hours ago. Ramp load rate is set at 2 DEH units per minute. DEH control panel load is set at 960, and the Turbine is in hold. The load dispatcher requests that when the Turbine ramp is resumed that the ramp rate be increased to 4 DEH units per minute.

The following equipment is under clearance: 'B' MDAFW Pump, 'B' NSW Pump and 'B' Boric Acid Pump

- 'B' MDAFW Pump is under clearance for pump packing repairs. The pump has been inoperable for 12 hours and will be restored to operable status within the next 24 hours. Tech Spec 3.7.1.2 LCO Action **a** and Tech Spec 3.3.3.5.b Action **c** applies. 72 hour LCO or HSB within the next 6 hours, HSD following 6 hours.

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least three independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:

a. Two motor-driven auxiliary feedwater pumps, each capable of being powered from separate emergency buses, and

b. One steam turbine-driven auxiliary feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one auxiliary feedwater pump inoperable, restore the required auxiliary feedwater pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 2 (continued)

Equipment is under clearance continued:

'B' MDAFW Pump - (continued) - Tech Spec 3.3.3.5.b Action **c**

INSTRUMENTATION

REMOTE SHUTDOWN SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.3.5.b All transfer switches, Auxiliary Control Panel Controls and Auxiliary Transfer Panel Controls for the OPERABILITY of those components required by the SHNPP Safe Shutdown Analysis to (1) remove decay heat via auxiliary feedwater flow and steam generator power-operated relief valve flow from steam generators A and B, (2) control RCS inventory through the normal charging flow path, (3) control RCS pressure, (4) control reactivity, and (5) remove decay heat via the RHR system shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

c. With one or more inoperable Remote Shutdown System transfer switches, power, or control circuits required by 3.3.3.5.b, restore the inoperable switch(s)/circuit(s) to OPERABLE status within 7 days, or be in HOT STANDBY within the next 12 hours.

'B' NSW Pump under clearance for shaft inspection. The pump has been under clearance for 8 hours. Inspection and return to service are expected to be completed within 24 hours.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 2 (continued)

Equipment is under clearance continued:

Boric Acid Transfer Pump B-SB is under clearance due to breaker blown control power fuses. Has been under clearance for 12 hours. The problem with the breaker has been repaired and the clearance will be removed later this shift. Tech Spec 3.3.3.5.b which is a 7 day LCO and 3.1.2.2 applies (3.1.2.2 is for tracking only). OWP-CS-05 has been completed.

REMOTE SHUTDOWN SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.3.5.a The Remote Shutdown System monitoring instrumentation channels shown in Table 3.3-9 shall be OPERABLE.

3.3.3.5.b All transfer switches, Auxiliary Control Panel Controls and Auxiliary Transfer Panel Controls for the OPERABILITY of those components required by the SHNPP Safe Shutdown Analysis to (1) remove decay heat via auxiliary feedwater flow and steam generator power-operated relief valve flow from steam generators A and B, (2) control RCS inventory through the normal charging flow path, (3) control RCS pressure, (4) control reactivity, and (5) remove decay heat via the RHR system shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With the number of OPERABLE remote shutdown monitoring channels less than the Minimum Channels OPERABLE as required by Table 3.3-9, restore the inoperable channel(s) to OPERABLE status within 7 days, or be in HOT SHUTDOWN within the next 12 hours.

b. With the number of OPERABLE remote shutdown monitoring channels less than the Total Number of Channels required by Table 3.3-9, restore the inoperable channels to OPERABLE status within 60 days or submit a Special Report in accordance with Specification 6.9.2 within 14 additional days.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 2 (continued)

Event 1

The crew performs a power escalation IAW GP-005. The previous crew were increasing Turbine load at 2 DEH units per minute. The load dispatcher has requested that when the power increase continues that the ramp rate is increased to 4 DEH units per minute.

Verifiable actions: For this reactivity manipulation, it is expected that the SRO will conduct a reactivity brief. The RO will dilute the RCS as necessary per the reactivity plan and monitor auto operation of rod control to raise Reactor power. The BOP will operate the DEH Main Turbine controls to first increase the Turbine ramp rate from 2 DEH units to 4 DEH units per minute then ensure the controls are set correctly prior to ramping the Turbine up to full power.

Event 2

Power Range Channel N-44 fails high. After the crew has placed the 'B' train of Containment Fan Coolers in service PR channel N-44 will fail high. This will cause rods to start stepping in at max speed. The crew should identify that a Power Range channel failure is the cause for the automatic rod motion and enter AOP-001, Malfunction of Rod Control and Indication System.

Verifiable actions: The OATC will perform the immediate actions of AOP-001 by verifying that <2 rods are dropped (no rods have dropped), place Rod Control in MANUAL and then verify no rod motion. With concurrence from the SRO the OATC will restore Tave to pre-failure conditions by withdrawing the rods in manual.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 2 (continued)

Event 2 (continued)

Tech Spec Evaluation: Tech. Spec 3.3.1 for any impact due to the failure a Power Range instrument.

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-1.

ACTION: As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each Reactor Trip System instrumentation channels and interlock and the automatic trip logic shall be demonstrated OPERABLE by the performance of the Reactor Trip System Instrumentation Surveillance Requirements specified in Table 4.3-1.

TABLE 3.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. Manual Reactor Trip	2	1	2	1, 2	1
	2	1	2	3*, 4*, 5*	9
2. Power Range, Neutron Flux					
a. High Setpoint	4	2	3	1, 2	2
b. Low Setpoint	4	2	3	1###, 2	2

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 2 (continued)

Event 2 (continued)

Tech Spec Evaluation: Tech. Spec 3.3.1 (continued)

ACTION STATEMENTS

ACTION 1 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in HOT STANDBY within the next 6 hours.

ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours.

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1, and

c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours per Specification 4.2.4.2.

Event 3

Containment Fan Cooler Fan AH-2 A-SA trips, resulting in annunciator ALB 027-7-2, CONTAINMENT FAN COOLERS AH-2 LOW FLOW – O/L actuating.

Verifiable actions: The BOP will establish the 'B' train of Containment Fan Coolers IAW OP-169, Containment Cooling and Ventilation.

Tech Spec Evaluation: Tech Spec 3.6.2.3 Action a, Containment Systems – Containment Cooling System.

CONTAINMENT SYSTEMS

CONTAINMENT COOLING SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.2.3 Four containment fan coolers (AH-1, AH-2, AH-3, and AH-4) shall be OPERABLE with one of two fans in each cooler capable of operation at low speed. Train SA consists of AH-2 and AH-3. Train SB consists of AH-1 and AH-4.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

a. With one train of the above required containment fan coolers inoperable and both Containment Spray Systems OPERABLE, restore the inoperable train of fan coolers to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Event 4

CSIP 'A' shaft shear will be inserted after the Containment Fan Cooler corrective actions have been completed. The failure will result in multiple alarms on ALB-006 and ALB-007 associated with the loss of charging flow. The crew will stop the 'A' CSIP then enter AOP-018, RCP Abnormal Conditions in order to address the loss of seal injection.

Verifiable actions: The RO will STOP the 'A' CSIP and isolate letdown by shutting letdown orifices 1CS-7 and 1CS-8. AOP-018 immediate actions for NO running CSIP is to isolate Letdown. The ASI (Alternate Seal Injection) pump will start during this event (2 minute and 45 seconds after the seal injection low flow occurs). The RO will have to manually align valves to prepare to start the 'B' CSIP then start the 'B' CSIP. The RO will then open HC-186.1, RCP Seal WTR INJ flow valve and direct an AO to STOP the ASI pump.

Prior to restoring letdown IAW OP-107, Chemical and Volume Control System the Major event will be inserted.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 2 (continued)

Event 4

Tech Spec Evaluation: Tech Spec 3.1.2.4 At least two charging/safety injection pumps shall be OPERABLE.

REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.4 At least two charging/safety injection pumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

With only one charging/safety injection pump OPERABLE, restore at least two charging/safety injection pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN as specified in the CORE OPERATING LIMITS REPORT (COLR), plant procedure PLP-106 at 200°F within the next 6 hours; restore at least two charging/safety injection pumps to OPERABLE status within the next 7 days or be in HOT SHUTDOWN within the next 6 hours.

Event 5

Total Loss of Cooling Banks on the UAT 1A. This failure will require the crew to implement AOP-039, Startup and Unit Auxiliary Transformer Trouble entry (no immediate actions). The BOP should review annunciator ALB-022-3-1, Unit Aux Xfer-A Trouble response and dispatch an operator to locally investigate the cause of the alarm. The report from the AO will be that all transformer cooling is lost. The crew should recognize this meets the entry conditions of AOP-039, Startup And Unit Auxiliary Transformer Trouble. The crew should monitor EFRIS to determine the UAT 1A temperature is approaching the limit that will require the transformer to be unloaded within 30 minutes.

Verifiable actions: The CRS should direct the BOP to transfer the house loads from the UAT 1A to the SUT 1A using OP-156.02, AC Electrical Distribution. The BOP will transfer loads and the SRO will prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 2 (continued)

Event 6 – MAJOR - Main Steam Line Break outside of Containment

Main Steam Line Break outside of Containment

Verifiable Actions: The crew will trip the Reactor, initiate SI and enter EOP E-0, Reactor Trip or Safety Injection.

Major Event: The crew will transition from E-0 to E-2 to EOP-ECA-2.1, Uncontrolled Depressurization of All Steam Generators. ECA-2.1 will also direct shutting air to RAB 261. ECA-2.1 will direct that feed flow is lowered to 12.5 KPPH to each SG. This will cause a RED PATH for FR-H.1 and require the crew to transition into the Loss Of Heat Sink procedure. Since the low flow (< 210 KPPH) was initiated by the operators and a flow rate of > 210 KPPH is available the crew will transition back into ECA-2.1. After returning into ECA-2.1 a cue will be provided to the Simulator Operator to shut the 'A' and 'C' MSIVs. This action will simulate that the air isolation was successful and 2 of the 3 MSIV's shut. Based on ECA-2.1 foldout back to E-2 "IF any SG pressure rises at any time, THEN GO TO E-2, Step 1".

With 2 MSIV's shut the crew will observe a pressure rise in the 2 SG's and return to E-2.

Event 7

The 'B' RHR pump will trip immediately after it starts and cannot be restarted. The 'A' RHR pump will fail to start automatically from the 'A' Sequencer.

Verifiable Actions: The RO will start the 'A' RHR pump while the crew is implementing E-0 (step 7 – Verify RHR Pumps – ALL RUNNING).

Event 8

Automatic Main Steam Isolation does not occur.

Verifiable Actions: The BOP will attempt to perform a manual Main Steam Isolation by actuating the Main Steam Line Isolation switch. The MSIV's will NOT close from this actuation. The BOP will then attempt to close the MSIVs using the individual switches on the MCB. Again, the MSIVs will fail to close. After the crew continues in E-0 they will transition to EOP E-2, Faulted Steam Generator Isolation, they dispatch an AO to locally shut the instrument air supply to RAB 261 (this will isolate air to the MSIV's in an effort to shut them when auto and manual isolation does not work from the MCB). This will not initially be successful.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 2 (continued)

Event 9

The AFW Auto Isolation for the 'B' SG will not occur.

Verifiable Actions: The BOP will manually isolate AFW flow to the 'B' Steam Generator from the MDAFW Pump and the TDAFW Pump by shutting the associated isolation valves.

The scenario will be terminated at the lead Evaluator's discretion following transition from EOP-ECA-2.1 back to EOP-E-2.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 2 (continued)

CRITICAL TASK JUSTIFICATION:

1. Manually isolate MSIV's on SG 'A' and 'C' prior to a severe (ORANGE path) challenge develops to the Integrity Critical Safety Function

NOTE: This critical task will be accomplished by first attempting to manually actuate a Main Steam Line Actuation when the automatic actuation failed then attempting to manually shut the MSIV via MCB switches. The MSIV's will not shut via the switches. Directions will be provided to an Auxiliary Operator to isolate the Instrument Air to the MSIV's. IF the Aux Operator is dispatched the 'A' and 'C' MSIV will shut and the task will be successful.
Failure to close the MSIVs causes challenges to CSFs. Such an omission constitutes a failure by the crew to "demonstrate (the ability to) recognize a failure of an automatic actuation of an ESF system or component." They should take one or more actions that would prevent a challenge to plant safety. Uncontrolled depressurization of all SGs causes an excessive rate of RCS cooldown, well beyond the conditions typically analyzed in the FSAR. The excessive cooldown rate creates large thermal stresses in the reactor pressure vessel and causes rapid insertion of a large amount of positive reactivity.

2. Control AFW flow to minimize RCS cooldown – prior to a severe (ORANGE path) challenge developing to the Integrity Critical Safety Function

The crew must reduce and control the AFW flow rate to a maximum of 12.5 KPPH when directed by EOP ECA-2.1 when all SGs are faulted.

Failure to control the AFW flow rate to the SGs leads to an unnecessary and avoidable severe challenge to the integrity CSF. Also, failure to perform the critical task increases the challenges to the subcriticality CSF beyond those irreparably introduced by the plant conditions.
If AFW flow rate is not controlled, the cooldown transient for Reactor vessel inlet temperature will result in an ORANGE path challenge to the integrity CSF, especially after RCPs are tripped. Although the performance standard for this task is tied to the integrity CSF, the challenge to other CSFs is exacerbated by failure to perform the critical task. The other affected CSF would be subcriticality (since the steam break is located outside Containment the Containment CSF would not be challenged).
Failure to control the AFW flow rate, means that the blowdown from all SGs continues at a higher rate than it would if the crew performs the critical task. This continuation of the blowdown at a higher-than-necessary rate significantly worsens the power excursion. It constitutes a challenge to the subcriticality CSF beyond that irreparably introduced by the plant conditions.

Note: An unanticipated critical task may be created in a scenario should an applicant's action or lack of action cause an unexpected RPS or ESFAS actuation. A critical task may be assigned and graded as unsatisfactory even if corrected by another team member prior to the unanticipated RPS/ESFAS actuation. Should the applicant self-correct the action or inaction prior to the unanticipated plant response, a critical task failure should not be assigned to the applicant.

SIMULATOR SETUP

For the 2016 NRC Exam Simulator Scenario # 2

Reset to IC-162 password “noinstants”

Go to RUN

Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner.

Set ERFIS screens to normal at power

(The examiner has provided the candidates with initial conditions and the initiating cues prior to placing the simulator in RUN.)

SPECIAL INSTRUCTIONS

Post conditions for status board from IC-32 and from Scenario 2
Reactor Power 28% steady state
Control Bank D at 133 steps
RCS boron 1527 ppm

Provide a Reactivity Plan to candidates for raising power to 100%
Provide a copy of GP-005, Power Operation (Mode 2 to Mode 1) signed off up to and including step 127 section 5.0.

Update the status board: "B" MDAFW Pump is OOS for pump packing repair
Pump has been OOS for 12 total hours and is expected back within the next 24 hours
Tech Spec 3.7.1.2, 72 hour LCO or HSB within the next 6 hours, HSD following 6 hours

Hang restricted access signs on MCR entry swing gates

Hang CIT on “B” MDAFW Pump MCB switch then place protected train placards per OMM-001 Attachment 16 on "A" MDAFW Pump, MS-70 and 72, "B" ESW Pump, "B" RHR Pump and "B" CCW Pump

"B" NSW pump Out Of Service for breaker repairs
Repairs to be completed within 24 hours
Place CIT on switch for "B" NSW and place protected train placard on "A" NSW pump switch

Hang CIT on Boric Acid Transfer Pump B-SB
Protect the 1A-SA Boric Acid Transfer pump

Op Test No.: NRC	Scenario # 2	Event # 1	Page 14 of 79
Event Description:	**Raise Power**		

Time	Position	Applicant's Actions or Behavior
LEAD EVALUATOR:		**The crew has been directed to raise power to 100% using GP-005, Power Operation. Step 127 directs a load increase to 90% Reactor power. The DEH load rate is set to 2 DEH Units / Min and demand is set to 960 DEH Units.** **When the crew has completed their board walk down and are ready to take the shift inform the Simulator Operator to place the Simulator in Run. When the Simulator is in run announce:** **CREW UPDATE – (SRO's Name) Your crew has the shift. END OF UPDATE**
Simulator Operator:		**When directed by the Lead Evaluator go to Run.**
	SRO	Provides direction per GP-005, starting at Step 127
	BOP	CONTINUE raise Turbine Load at 4 DEH Units / Min (set at 2): Change Turbine Ramp Rate by depressing the Turbine DEH control panel Load Rate MW/MIN button and observes: REFERECE displays MW 0002 Depresses "4" – DEMAND displays MW 0004 Depresses ENTER – REFERENCE displays MW 0004 Depresses REF pushbutton and display returns to initial readings of current MW and Demand MW Depresses the GO pushbutton and continues the load increase to 90% Reactor power Monitors turbine and feedwater system response . Notifies SRO that the Turbine ramp has started
	SRO	Acknowledges Turbine ramp has begun

Op Test No.: NRC	Scenario # 2	Event # 1	Page 15 of 79
Event Description:	**Raise Power**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**The crew may elect to start a dilution before the power change is initiated.**
OP-107.01		Section 5.4 RCS Temperature Adjustment (ALT DIL)
Procedure Note:		FIS-114 may be set for one gallon less than desired. A pressure transient caused by 1CS-151 shutting results in FIS-114 normally indicating one gallon more than actual flow but two gallons more would be unexpected.
Procedure Caution:		If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the preset value.

	OATC	• SETS FIS-114, TOTAL MAKEUP WTR BATCH COUNTER, to obtain the desired quantity.
		• VERIFY the RMW CONTROL switch has been placed in the STOP position.
		• VERIFY the RMW CONTROL switch green light is lit.
		• IF the current potentiometer setpoint of controller 1CS-151, FK-114 RWMU FLOW, needs to be changed to obtain makeup flow, THEN PERFORM the following:
		  ○ RECORD the current potentiometer setpoint of controller 1CS-151, FK-114 RWMU FLOW, in Section 5.4.3.
		  ○ SET controller 1CS-151, FK-114 RWMU FLOW, for the desired flow rate.
		• PLACE the control switch RMW MODE SELECTOR to the ALT DIL position.

Op Test No.: NRC	Scenario # 2	Event # 1	Page 16 of 79
Event Description:	**Raise Power**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		Alternate Dilution may be manually stopped at any time by turning the control switch RMW CONTROL to STOP.
OATC:		• START the makeup system as follows: o TURN control switch RMW CONTROL to START momentarily. o VERIFY the red indicator light is lit. o IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP. • VERIFY dilution automatically terminates when the desired quantity has been added. • IF controller 1CS-151, FK-114 RWMU FLOW, potentiometer was changed in Step 5.4.2.5, THEN PERFORM the following: o REPOSITION controller FK-114 to the position recorded in Section 5.4.3. o INDEPENDENTLY VERIFY FK-114 potentiometer position of Step 5.4.2.9.a is correct. • MONITOR Tavg and rod control for proper operation. • ESTABLISH VCT pressure between 20 – 30 psig. • TURN control switch RMW MODE SELECTOR to AUTO. • START the makeup system as follows: o TURN control switch RMW CONTROL to START momentarily. o VERIFY the red indicator light is lit. o IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP.
	CREW	Continues Load Increase IAW GP-005 Step 128

Op Test No.: NRC	Scenario # 2	Event # 1	Page 17 of 79
Event Description:	**Raise Power**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		NOTE: Per EC 74907 and EC 74914, AMSAC is set to arm at 35% (268.5 psig Turbine First Stage Pressure) based upon Siemens prediction of High Pressure Turbine First Stage Pressure versus Load curve. Early monitoring of the "AMSAC Armed" light will aid in collection of plant data at its Setpoint. NOTE: The respective Main Feed Pump recirculating valve 1FW-8 or 1FW-39 should shut when Main Feed Pump suction flow reaches 4300 KPPH (ERFIS point FCE2210A or FCE2210B).
	BOP	At 33% Main Turbine load, PERFORM the following: • At AMSAC Control Panel, DEPRESS the SYSTEM RESET button. ○ Dispatches Auxiliary Operator to AMSAC Control Panel to depress the System Reset button.
Simulator Communicator:		**Acknowledge directions to go to the AMSAC Control Panel and DEPRESS the SYSTEM RESET button.**
Simulator Communicator:		There isn't anything that needs to be done on the Simulator for the AMSAC system reset. Wait one minute and report back: **"The AMSAC Control Panel SYSTEM RESET button has been depressed."**
	BOP	• CHECK SG LEVEL ATWS PANEL TROUBLE annunciator clear on ALB-17/1-1. **(YES)** • PLACE the SG LVL ATWS PANEL BYPASS switch to NORMAL. ○ Locates the SG LVL ATWS PANEL BYPASS switch and places switch to NORMAL • VERIFY SG LEVEL ATWS PANEL BYPASS annunciator clear on ALB-17/2-1 **(YES – clears)**

Op Test No.: NRC	Scenario # 2	Event # 1	Page 18 of 79
Event Description:	**Raise Power**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**When power has been increased ~ 5%, with acknowledgement from the other Evaluators, continue with the scenario.** **Cue Simulator Operator to insert Trigger 2:** **Event 2, Power Range NIS Channel 44 failure HIGH (AOP-001, Malfunction of Rod Control and Indication System)**

Op Test No.: NRC	Scenario # 2	Event # 2	Page 19 of 79
Event Description:	**Power Range NIS Channel 44 Fails High**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 2:** **Power Range NIS Channel 44 failure HIGH**
Indications Available		• Uncontrolled rod motion/bistable trips.
	OATC	RESPONDS to alarms/uncontrolled rod motion.
	SRO	ENTERS and directs actions of AOP-001, MALFUNCTION OF ROD CONTROL AND INDICATION SYSTEM. Makes PA announcement for AOP entry Holds a crew focus brief
AOP-001		Malfunction of Rod Control and Indication System.
	OATC	PERFORMS AOP-001 Immediate Actions.
Evaluator Note:		**Rods cannot be withdrawn until AOP-001 actions have been implemented to clear the overpower rod stop.** **OWP-RP-26 provides the same actions as AOP-001 to clear the overpower rod stop.**
Immediate Action	OATC	CHECK that LESS THAN TWO control rods are dropped. (YES)
Immediate Action	OATC	POSITION Rod Bank Selector Switch to MAN.
Immediate Action	OATC	CHECK Control Bank motion STOPPED. (YES)
	SRO	PROCEEDS to Section 3.2.

Op Test No.: NRC	Scenario # 2	Event # 2	Page 20 of 79
Event Description:	**Power Range NIS Channel 44 Fails High**		

Time	Position	Applicant's Actions or Behavior
	OATC	CHECK ALL of the following Rod Control System inputs - NORMAL: • RCS Tavg (YES) • RCS Tref (YES) • POWER Range NI channels (NO, NI-44 Failed) • TURBINE first stage pressure (YES)
	SRO	RNO Actions: PERFORM the following: • IF a power supply is lost, THEN GO TO AOP-024, Loss of Uninterruptible Power Supply. (NO) • IF an individual instrument failed, THEN MAINTAIN manual rod control until corrective action is complete. (YES) • IF a Power Range NI Channel failed, THEN PLACE the affected NI Rod Stop Bypass switch to BYPASS at the Detector Current Comparator Drawer. (YES)
	BOP	Proceeds to the Detector Current Comparator Drawer and places NI-44 Rod Stop Bypass switch to BYPASS • Reports completion of task to the SRO.
	OATC	Manually OPERATE affected control bank to restore the following: • Equilibrium power and temperature conditions • Rods above the insertion limits of Tech Spec 3.1.3.6 and PLP-106, Technical Specification Equipment List Program and Core Operating Limits Report. • Withdraws Control Bank 'D' to restore T_{ave} with T_{ref}.
	OATC	VERIFY proper operation of the following: (YES) • CVCS demineralizers • BTRS • Reactor Makeup Control System
	SRO	CHECK that this section was entered due to control banks MOVING OUT. (NO) GO TO Step 6.

Op Test No.: NRC	Scenario # 2	Event # 2	Page 21 of 79
Event Description:	**Power Range NIS Channel 44 Fails High**		

Time	Position	Applicant's Actions or Behavior
	SRO	CHECK that NEITHER of the following OCCURRED: (NO) • Unexplained RCS Boration • Unplanned RCS dilution
Procedure Note:		If control rod motion is not due to instrument malfunction, CVCS or RWMU malfunction, or unexplained boration or dilution, the only remaining explanation not yet explored is a malfunction of the automatic circuitry in the Rod Control System.
	SRO	CHECK that spurious rod motion is due to malfunction of the Automatic Control Rod System. (NO) GO TO Step 9.
	SRO	EXIT this procedure.
	SRO	• Refer to OWP-RP-26 to remove channel from service. • Direct operator and I&C to perform OWP-RP-26 • Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist for the failure of NI-44 • Contacts WCC for assistance / generation of Work Request
Evaluator Note:		**Any Tech Spec evaluation may be completed with a follow-up question after the scenario.** **NOTE: P-10 functional unit 19.b is an input to 19.c. Actions for functional unit 19.b are addressed by performing the actions for 19.c.**

Op Test No.: NRC	Scenario # 2	Event # 2	Page 22 of 79
Event Description:	**Power Range NIS Channel 44 Fails High**		

Time	Position	Applicant's Actions or Behavior
	SRO	Enters Instrumentation TS 3.3.1 Functional Unit 2.a, 3, and 4 ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels. STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied: a. The inoperable channel is placed in the tripped condition within 6 hours. b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1. and c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or,. the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours per Specification 4.2.4.2.3.3.1 Reference the below T.S. but it will not apply for this conditions because 3 instruments is the Minimum Number required 3.3.1 Functional Unit 19 b, c, and d. ACTION 7 - With less than the Minimum Number of Channels OPERABLE, within 1 hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3. The crew may enter T.S. 3.2.5.b if control rod insertion causes RCS Pressure to go below the limit for DNB. (2202 psig ERFIS average and 2205 psig MCB Average (ref. OST-1021 – The value listed in Tech Specs is 2185 psig after subtracting for instrument uncertainty) 3.2.5.b DNB Parameters Action - With any of the above parameters not within its specified limit. restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 6 hours.
Simulator Communicator:		**Acknowledge request and reports from SRO.** **IF asked to report to MCR to perform OWP-RP-26 state that you will report as soon as possible.**

Op Test No.: NRC	Scenario # 2	Event # 2	Page 23 of 79
Event Description:	**Power Range NIS Channel 44 Fails High**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**It is not required to implement the OWP prior to continuing with the scenario.**
Lead Evaluator:		**Note: Any Tech Spec evaluation may be completed with a follow-up question after the scenario.** **Note: I&C field activities are not required to be completed before continuing with the next event. The actions for OWP-RP-26 are listed in Attachment 1 in the back of this scenario guide.** **Note: It is not required for T_{ave} to exactly match T_{ref} or Rod Control to be placed in Automatic before continuing with the next event.** **After Control Bank 'D' has been withdrawn to restore T_{ave} with T_{ref}, cue Simulator Operator to insert Trigger 3.** **Event 3, Containment Fan Cooler Trips (AH-2 A-SA)**

Op Test No.: NRC	Scenario # 2	Event # 3	Page 24 of 79
Event Description:	**Containment Fan Cooler Fan (AH-2 A-SA) Trips**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 3:** **Containment Fan Cooler Trips (AH-2 A-SA)**
Indications Available:		ALB-027-7-2 CONTAIMENT FAN COOLERS AH-2 LOW FLOW-O/L ALB-001-6-5 ESF SYS TRN A BYPASSED OR INOPERABLE
APP ALB-027		The actions from the APP-ALB-027-7-2 are below but crew will also have actions from APP-ALB-001 to address as well
	BOP	• RESPONDS to alarm on ALB-027-7-2 and ALB-001-6-5 • Refers to annunciator response
	BOP	CONFIRM alarm using: • AH-2 fans running indication • AH-2 fan trouble indication • Damper position indication VERIFY Automatic Functions: • Fans trip on overload. (YES)

Op Test No.: NRC	Scenario # 2	Event # 3	Page 25 of 79
Event Description:	**Containment Fan Cooler Fan (AH-2 A-SA) Trips**		

Time	Position	Applicant's Actions or Behavior
	BOP	PERFORM Corrective Actions: • CHECK the fan status indication. • IF the running fan has tripped, THEN START standby containment fan per OP-169, Containment Cooling and Ventilation. • CHECK proper damper alignment per OP-169, Containment Cooling and Ventilation. • DISPATCH an operator to check the status of the following breakers: o 1A22-SA-2A, AH-2 (1A-SA) CNMT Fan Cooler
Simulator Communicator:		**When dispatched as an AO to investigate fan breakers, approximately 2 to 3 minutes later report "there is an overcurrent trip condition on breaker 1A22-SA-2A, AH-2 (1A-SA) CNMT Fan Cooler".**
	SRO	• Direct BOP to start the B train of containment fan coolers using OP-169, Containment Cooling and Ventilation • May direct selecting AH-2 (1B-SA) as the lead fan. • T/S 3.6.2.3 action (a) is applicable based on the initial trip of AH-2 (1A-SA). (7-day LCO) • If AH-2 (1B-SA) is selected as the lead fan, then the T/S LCO is no longer in effect. • If AH-2 (1B-SA) is <u>not</u> selected as the lead fan, then T/S 3.6.2.3 action (a) will remain in effect. (7-day LCO)
Evaluator Note:		**The OATC may need to borate while holding power.**

Op Test No.: NRC	Scenario # 2	Event # 3	Page 26 of 79
Event Description:	**Containment Fan Cooler Fan (AH-2 A-SA) Trips**		

Time	Position	Applicant's Actions or Behavior
	BOP	• Verifies Initial Conditions met in OP-169 section 5.1. • Uses CNMT Purge as necessary to control CNMT pressure. • Place the control switches for both fans in each Containment Fan Cooler unit AH-2 A-SA (AH-1 B-SB) and AH-3 A-SA (AH-4 B-SB) to LO-SPD.
Procedure Note:		After any fan cooler is started in low speed, the fan should be allowed to come up to speed for approximately 15 seconds before shifting to fast speed. This reduces the starting current required for high speed operation. The following switch sequence must be performed without delay, one fan at a time, to prevent fan coast down before being started in fast speed. This sequence is functionally related (obtain a single result in close sequence or time), allowing signoff to be delayed until running in HI-SPD.
	BOP	(Note:switching fans from low speed to high speed is a two-switch operation) For each of the fans started in Step 5.1.2.2, START the fans in HI-SPD, as follows: AH-2 A-SA (AH-1 A-SB) • PLACE AH-2 A-SA (AH-1 A-SB) control switch to STOP. • PLACE AH-2 A-SA (AH-1 A-SB) control switch to HI-SPD. AH-2 B-SA (AH-1 B-SB) • PLACE AH-2 B-SA (AH-1 B-SB) control switch to STOP. • PLACE AH-2 B-SA (AH-1 B-SB) control switch to HI-SPD. AH-3 A-SA (AH-4 A-SB) • PLACE AH-3 A-SA (AH-4 A-SB) control switch to STOP. • PLACE AH-3 A-SA (AH-4 A-SB) control switch to HI-SPD. AH-3 B-SA (AH-4 B-SB) • PLACE AH-3 B-SA (AH-4 B-SB) control switch to STOP. • PLACE AH-3 B-SA (AH-4 B-SB) control switch to HI-SPD.

Op Test No.: NRC	Scenario # 2	Event # 3	Page 27 of 79
Event Description:	**Containment Fan Cooler Fan (AH-2 A-SA) Trips**		

Time	Position	Applicant's Actions or Behavior
	BOP	Proceed to OP-169 section 7.1 to secure A train fans. PLACE the control switch for each of the following fans to be removed from service to STOP: • AH-2 A-SA (AH-1 A-SB) • AH-2 B-SA (AH-1 B-SB) • AH-3 A-SA (AH-4 A-SB) • AH-3 B-SA (AH-4 B-SB)
	SRO	Evaluate Tech Spec 3.6.2.3.a • T/S 3.6.2.3 action (a) is applicable based on the initial trip of AH-2 (1A-SA). (7-day LCO) • If AH-2 (1B-SA) is not selected as the lead fan, then T/S 3.6.2.3 action (a) will remain in effect. (7-day LCO) • Implements OWP-CV-02, Containment Ventilation, for AH-2 Fan. Instructs OATC or BOP to perform actions (energize ESF Bypass Panel A window 4-1 by depressing the associated window) • Initiates Equipment Problem Checklist and contacts WCC for assistance
	OATC BOP	Implements OWP-CV-02 by depressing window 4-1 on ESF Bypass Panel A
Evaluator Note:		**After 'B' Train Containment Fan Coolers have been placed in service, cue the Simulator Operator to insert Trigger 4, CSIP 'A' Shaft Shear** **Event 4, CSIP 'A' Shaft Shear**

Op Test No.: NRC	Scenario # 2	Event # 4	Page 28 of 79
Event Description:	**"A" CSIP Shaft Shear**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from Lead Evaluator actuate Trigger 4:** **"CSIP 'A' shaft shear"**
Indications Available:		ALB-06-1-1 CHARGING PUMP DISCHARGE HEADER HIGH-LOW FLOW ALB-08-2-1 RCP SEAL WATER INJECTION LOW FLOW
	OATC	• RESPONDS to alarms on ALB-06-1-1 and ALB-08-2-1. • REPORTS CSIP 'A' shaft shear (From MCB indications of no flow and pump still running with abnormal amps) • Takes MCB switch for 'A' CSIP to STOP and reports to CRS that 'A' CSIP is secured
	SRO	ENTERS and directs actions of AOP-018, REACTOR COOLANT PUMP ABNORMAL CONDITIONS. Makes PA announcement for AOP entry Holds a crew focus brief
AOP-018		RCP Abnormal Conditions
Immediate Action	OATC	PERFORMS immediate actions. • CHECK ANY CSIP RUNNING. (YES but shaft sheared. NO if CSIP 'A' was preemptively secured when shaft shear was identified) • ISOLATE letdown by verifying the following valves SHUT: o 1CS-7, 45 GPM Letdown Orifice A o 1CS-8, 60 GPM Letdown Orifice B o 1CS-9, 60 GPM Letdown Orifice C

Op Test No.: NRC	Scenario # 2	Event # 4	Page 29 of 79
Event Description:	**"A" CSIP Shaft Shear**		

Time	Position	Applicant's Actions or Behavior
	SRO	ENTERS AOP-018, RCP Abnormal Conditions. Makes plant PA announcement for AOP entry No immediate actions (if the OATC did not secure CSIP 'A') Conducts a Focus brief
	SRO	REFER to PEP-110, Emergency Classification and Protective Action Recommendations, AND ENTER the EAL Matrix.
Simulator Communicator:		**The crew should dispatch AOs to investigate.** **IF dispatched, wait 1-2 minutes then report that "the shaft is broken on the 'A' CSIP." Report as TB operator (if dispatched) that "there are no apparent problems at the breaker for 'A' CSIP."**
Procedure Note:		Minimum allowable flow for a CSIP is 60 gpm which is provided by normal miniflow during normal operation and alternate miniflow during safety injection. Maintaining CSIP flow greater than or equal to 60 gpm also satisfies this requirement.
	SRO	EVALUATE plant conditions AND GO TO the appropriate section:

MALFUNCTION	SECTION	PAGE
Loss of CCW and/or Seal Injection to RCPs	3.1	5

	OATC	CHECK ALB-5-1-2A, RCP Thermal Bar HDR High Flow, alarm CLEAR. (YES)
	SRO	CHECK ALL RCPs operating within the limits of Attachment 1. (YES)

Op Test No.: NRC	Scenario # 2	Event # 4	Page 30 of 79
Event Description:	**"A" CSIP Shaft Shear**		

Time	Position	Applicant's Actions or Behavior
	OATC	• CHECK ALL RCPs RUNNING. (YES) • CHECK the following NORMAL for ALL RCPs: o CCW flow (YES) o Seal Injection flow (NO)
	SRO	RESTORE using the applicable attachment:
		MALFUNCTION: Loss of Seal Injection flow from CSIPs ONLY ATTACHMENT: Attachment 4 (Page 28)
	OATC	• CHECK at least one CSIP RUNNING. (NO) • DISPATCH an operator to monitor operation of the ASI System. • ADJUST charging flow as follows: o PLACE controller FK-122.1, CHARGING FLOW, in MANUAL AND SHUT. o VERIFY OPEN 1CS-235 SB, CHARGING LINE ISOLATION. o VERIFY OPEN 1CS-238 SA, CHARGING LINE ISOLATION. o CHECK RCS pressure GREATER THAN 1400 PSIG (YES) o SET FK-122.1 DEMAND position to 30%. • SHUT HC-186.1, RCP Seal WTR INJ Flow. • VERIFY a suction path for the standby CSIP by performing the following: o VERIFY CSIP suction flowpath from VCT as follows: ▪ VERIFY greater than 5% level is established in VCT. (YES) ▪ VERIFY the following valves are OPEN: • LCV-115C, VCT Outlet (1CS-165) (YES) • LCV-115E, VCT Outlet (1CS-166) (YES) ▪ GO TO Step 19. • MAINTAIN CCW HX outlet temperature less than 105°F.

Op Test No.: NRC	Scenario # 2	Event # 4	Page 31 of 79
Event Description:	**"A" CSIP Shaft Shear**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		The ASI System will add negative reactivity to the RCS. If the standby CSIP can NOT be started, a plant load reduction must be initiated to accommodate the boration.
	OATC	• START the standby CSIP. (CSIP 'B') • CHECK charging header pressure greater than 2200 psig on PI-121. (YES) • OPEN HC-186.1, RCP Seal WTR INJ Flow. • DIRECT the operator monitoring the ASI System to STOP the ASI Pump by placing CS-210.1, ASI PUMP MOTOR CONTROL SWITCH, in STOP. (At the ASI System Control Panel)
Simulator Communicator:		**Acknowledge request to place ASI Pump Motor Control Switch, CS-210.1, in STOP. Wait 1 minute, then perform manipulation, and report that "the ASI Pump Motor Control Switch has been placed in STOP and the ASI Pump is Secured."**
Procedure Caution:		DO NOT restore Seal Injection to an RCP that has lost all seal cooling for 4 minutes.

	OATC	• ADJUST HC-186.1, RCP Seal WTR INJ Flow, to establish seal injection flow as necessary to maintain the following:
		  ○ LESS than 31 gpm total flow to all RCPs
		  ○ BETWEEN 8 and 13 gpm to all RCPs
		• DIRECT the operator monitoring the ASI System to PLACE CS-210.1, ASI PUMP MOTOR CONTROL SWITCH, in AUTO. (At the ASI System Control Panel)

Simulator Communicator:		**Acknowledge request to place ASI Pump Motor Control Switch, CS-210.1, in AUTO. Perform manipulation, and report "the ASI Pump Motor Control Switch has been placed in AUTO."**

Op Test No.: NRC	Scenario # 2	Event # 4	Page 32 of 79
Event Description:	**"A" CSIP Shaft Shear**		

Time	Position	Applicant's Actions or Behavior
	BOP	START CSIP room ventilation per OP-172, Reactor Auxiliary Building HVAC System. (AH-9B) • Starts AH-9B
	OATC	RESTORE Charging and Letdown flow per OP-107, Chemical and Volume Control System.
Evaluator Note:		**The steps for evaluating restoration of letdown begin on the next page.**
	SRO	• MONITOR Tavg to Tref. (ASI injection has added negative reactivity) • INITIATE action to determine and correct the cause of the loss of the CSIP. o Completes an Equipment Problem Checklist and contacts WCC for assistance. o Directs AO to remove control power from 'A' CSIP
Simulator Operator:		**IF directed - Remove control power from the 'A' CSIP. Use remote function CVC047 to open knife switch for control power to the A CSIP.**
Simulator Communicator:		**Report back after control power has been removed.**
	OATC	CHECK seal injection flow from CSIPs has been established between 8 and 13 gpm to all RCPs.
Evaluator Note:		**This step will not be completed before next event is initiated.**
	SRO	WHEN seal injection flow from CSIPs has been established between 8 and 13 gpm, THEN PERFORM OST-1126, Reactor Coolant Pump Seals Controlled Leakage Evaluation Monthly Interval Modes 1-4.

Op Test No.: NRC	Scenario # 2	Event # 4	Page 33 of 79
Event Description:	**"A" CSIP Shaft Shear**		

Time	Position	Applicant's Actions or Behavior
	SRO	ENTERS TS: • 3.1.2.4, CSIP's, 72 hours to restore at least 2 CSIPs, or be in Hot Standby within the next 6 hours • 3.5.2, ECCS Subsystems, 72 hours to restore the inoperable subsystem to operable status, or be in Hot Standby within the next 6 hours
OP-107		Chemical and Volume Control System
	OATC	OP-107, Section 5.4 – Initiating Normal Letdown • Verifies Initial Conditions: o Charging flow established o PRZ Level > 17% o 1CS-7, 1CS-8, 1CS-9 (Letdown Orifice Isolation valves) SHUT
Procedure Caution:		If Charging flow was stopped or greatly reduced prior to letdown being secured, there is a possibility that the Letdown line contains voids due to insufficient cooling. This is a precursor to water hammer, and should be evaluated prior to initiating letdown flow.
	OATC	VERIFY 1CC-337, TK-144 LTDN TEMPERATURE, controller is: • in AUTO **AND** • set for 110 to 120 ˚F (4.0 to 4.7 on potentiometer) normal operation
Procedure Note:		PK-145.1 LTDN PRESSURE, 1CS-38, may have to be adjusted to control at lower pressures.

Op Test No.: NRC	Scenario # 2	Event # 4	Page 34 of 79
Event Description:	**"A" CSIP Shaft Shear**		

Time	Position	Applicant's Actions or Behavior

	OATC	• VERIFY 1CS-38 Controller, PK-145.1 LTDN PRESSURE, in MAN with output set at 50%.
		• VERIFY open the following Letdown Isolation Valves:
		  • 1CS-2, LETDOWN ISOLATION LCV-459
		  • 1CS-1, LETDOWN ISOLATION LCV-460
		• VERIFY open 1CS-11, LETDOWN ISOLATION.

Procedure Note:		The following table gives the minimum charging flow required to keep the regenerative heat exchanger temperature below the high temperature alarm when letdown is established:

Letdown Flow (to be established)	Minimum Charging Flow necessary when letdown is established
45 gpm	20 gpm
60 gpm	26 gpm
105 gpm	46 gpm
120 gpm	53 gpm

Procedure Note:		If PRZ level is above the programmed level setpoint, charging flow should be adjusted to a point above the minimum required to prevent regen heat exchanger high temperature alarm but low enough to reduce PRZ level.

Op Test No.: NRC	Scenario # 2	Event # 4	Page 35 of 79
Event Description:	**"A" CSIP Shaft Shear**		

Time	Position	Applicant's Actions or Behavior
	OATC	• ADJUST controller 1CS-231, FK-122.1 CHARGING FLOW, as required to: o Maintain normal pressurizer level program o Keep regenerative heat exchanger temperature below the high temperature alarm when the desired letdown orifice is placed in service. • OPEN an Orifice Isolation Valve (1CS-7, 1CS-8, 1CS-9) for the orifice to be placed in service. • ADJUST 1CS-38 position by adjusting PK-145.1 output as necessary to control LP LTDN Pressure (PI-145.1) at 340 to 360 psig, to prevent lifting the LP Letdown Relief. • WHEN Letdown pressure has stabilized at 340 to 360 psig on PI-145.1, LP LTDN PRESS, THEN PERFORM the following: o ADJUST PK-145.1 LTDN PRESSURE setpoint to 58% o PLACE the controller in AUTO.
	OATC	• VERIFY PK-145.1 LTDN PRESSURE Controller maintains Letdown pressure stable at 340 to 360 psig. • OPEN additional orifice isolation valves (1CS-7, 1CS-8, 1CS-9) as required. • ADJUST charging flow as necessary to: o Prevent high temperature alarm (per table above) o Maintain pressurizer programmed level. • PLACE PRZ level controller, LK-459F, in AUTO, as follows: o PLACE PRZ level controller, LK-459F, in MAN to cancel any integrated signal. o RECORD FI-122A.1, CHARGING FLOW. _____GPM

Op Test No.: NRC	Scenario # 2	Event # 4	Page 36 of 79
Event Description:	**"A" CSIP Shaft Shear**		

Time	Position	Applicant's Actions or Behavior
	OATC	DETERMINE PRZ level controller, LK-459F setpoint by one of the two methods. (N/A Step not performed) DETERMINE LK-459F based on the table below: LTDN Flow / Charging Flow / LK-459F Setpoint (approx.. value) 45 gpm / 27 gpm / *3% 60 gpm / 42 gpm / *8% 105 gpm / 87 gpm / *34% 120 gpm / 102 gpm / *46% * Approximate values based on NOT/NOP Calculate PRZ level controller, LK-459F setpoint. LK-459F setpoint = (Desired Charging Flow / 150 gpm)^2 x 100%
	OATC	• ADJUST PRZ level controller, LK-459F, to the calculated setpoint. • PLACE PRZ level controller, LK-459F, in AUTO. • WHEN the following occurs: o Program pressurizer level is matching the current pressurizer level **AND** o Letdown and seal return are balanced with seal injection flow and charging flow. THEN place controller 1CS-231, FK-122.1 CHARGING FLOW, in AUTO. (NOTE: The Scenario can continue without waiting for Charging to be placed in AUTO.) • COMPLETE Section 5.4.3.
Evaluator Note:		**The SRO may address OWP-CS, CHEMICAL AND VOLUME CONTROL SYSTEM. This OWP verifies status light box verification when CSIP 'A' is tagged out for maintenance and is not needed to be implemented in this scenario.**

Op Test No.: NRC	Scenario # 2	Event # 4	Page 37 of 79
Event Description:	**"A" CSIP Shaft Shear**		

Time	Position	Applicant's Actions or Behavior
	SRO	Contacts WCC for EIR and support. Requests that either control power is removed or breaker is racked out on 'A' CSIP.
Evaluator Note:		**IF the crew did not have the control power removed or the breaker racked out on 'A' CSIP, when the SI signal occurs later in the scenario the 'A' CSIP will restart.** **After Letdown is restored cue Simulator Operator to insert Trigger 5, Total Loss of Cooling Banks on the UAT 1A Transformer** **Event 5, Total Loss of Cooling Banks on the UAT 1A Transformer**

Op Test No.: NRC	Scenario # 2	Event # 5	Page 38 of 79
Event Description:	**Total Loss of Cooling Banks on the UAT 1A Transformer**		

Time	Position	Applicant's Actions or Behavior

Simulator Operator:		**On cue from Lead Evaluator insert Trigger 5** **Total Loss of Cooling Banks on the UAT 1A Transformer**
Indications Available		ALB-022-3-1, UNIT AUX XFMR-A TROUBLE
APP-ALB-022		UNIT AUX XFMR-A TROUBLE
Procedure Note:		• This alarm is common for any local alarm at UAT 1A. • If this annunciator is locked in, consideration should be given for compensatory actions.
Procedure Caution:		Ground fault indication on both a 480V bus and the 6.9KV bus feeding it indicate transformer degradation. This could lead to catastrophic failure. Actions up to and including a reactor trip may be required in preparation for loss of bus resulting from transformer de-energization. If the transformer is confirmed to be grounded action should be taken to immediately isolate the grounded transformer.

Op Test No.: NRC	Scenario # 2	Event # 5	Page 39 of 79
Event Description:	**Total Loss of Cooling Banks on the UAT 1A Transformer**		

Time	Position	Applicant's Actions or Behavior	
	BOP	CONFIRM alarm using: (see Alarm / Device / Setpoint in APP ALB-022-3-1) VERIFY Automatic Functions: • If UAT 1A Lockout Fault Pressure Trip occurs: ○ Generator Lockout occurs ○ Auto transfer to SUT 1A occurs ○ UAT 1A Cooling Pumps and Fans will stop (To enable automatic control, both 86/G1A and 86/G1B Generator Lockout relays must be reset at the MCR Generator Relay Panels).	(NO)
	BOP	PERFORM Corrective Actions: • IF the loss of UAT 1A results in a loss of Emergency Bus 1A-SA, THEN GO TO AOP-025, Loss of One Emergency AC Bus (6.9KV) or Loss of One Emergency DC Bus (125V).	(NO)
Procedure Caution:		A ground makes the electrical system unreliable; therefore, a high priority should be placed on locating and isolating the ground.	
	BOP	• DISPATCH an operator to 286 RAB Swgr Room to check the following relays for grounds: ○ Aux Bus 1A-3, UAT 1A to Aux Bus 1A, 59/UTAX relay contact status ○ Aux Bus 1D-1, UAT 1A to Aux Bus 1D, 59/UTAY relay contact status	(NO) (NO)
	CREW	Dispatches an AO to check the following relays for grounds	

Op Test No.: NRC	Scenario # 2	Event # 5	Page 40 of 79
Event Description:	**Total Loss of Cooling Banks on the UAT 1A Transformer**		

Time	Position	Applicant's Actions or Behavior
Simulator Communicator:		**Acknowledge request and wait ~1 minute then report back using the telephone "NO grounds present on Aux Bus 1A or 1D"**
	BOP	DISPATCH an operator to UAT-1A Local Panel Alarm to check for alarms.
Simulator Communicator:		**Acknowledge request and wait ~1-2 minutes then report back using the radio "The High Winding Temperature Annunciator is in and No cooling fans are running."**
	BOP	• IF UAT 1A local alarms exist, THEN GO TO AOP-039, Startup and Unit Auxiliary Transformer Trouble. (YES)
	SRO	ENTERS and directs actions of AOP-039, STARTUP AND UNIT AUXILIARY TRANSFORMER TROUBLE Makes PA announcement for AOP entry Holds a crew focus brief
AOP-039		STARTUP AND UNIT AUXILIARY TRANSFORMER TROUBLE
Procedure Note:		This procedure contains no immediate actions.
	BOP	DISPATCH an operator to the alarming transformer with the applicable Attachment: • Attachment 2, Unit Auxiliary Transformer 1A or 1B Trouble Local Actions
	BOP	DISPATCH an operator to perform Attachment 2 for the 1A UAT

Op Test No.: NRC	Scenario # 2	Event # 5	Page 41 of 79
Event Description:	**Total Loss of Cooling Banks on the UAT 1A Transformer**		

Time	Position	Applicant's Actions or Behavior
Simulator Communicator:		**Acknowledge request and wait 1-2 minutes then report back using the radio "The Cooling Control toggle switch is in MANUAL per AOP-039 Attachment 2 and ALL cooling fans are NOT running."**
	CREW	• Monitor applicable transformer parameters: o Should monitor listed electrical indicators and temperatures for UAT A. • NOTIFY the following personnel of any problems with Startup or Unit Auxiliary Transformers: • Responsible Engineer • Load Dispatcher (System Operator) • Plant/Transmission Activities Coordinator (PTAC)
Simulator Communicator:		**Acknowledge communications and notifications**
	SRO	GO TO the applicable Section`:
		Section / **Page**
		3.2, Unit Auxiliary Transformer Trouble / 16
	SRO	Unit Auxiliary Transformer Trouble, Section 3.2
	BOP	CHECK alarming UAT supplying associated 6900V Aux Buses. (YES)
Procedure Note:		The following actions are taken in response to reports received from the operator performing Attachment 2, Unit Auxiliary Transformer 1A or 1B Trouble Local Actions.
	SRO	GO TO the applicable Step:
		Section / **Step** / **Page**
		UAT - Total Loss of Cooling Banks / 3 / 17

Op Test No.: NRC	Scenario # 2	Event # 5	Page 42 of 79
Event Description:	**Total Loss of Cooling Banks on the UAT 1A Transformer**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		• Each UAT has three transformer cooling banks. Each bank consists of one oil pump and three associated cooling fans. A cooling bank is considered to be in service if the pump and at least one fan are operating. • This step may be terminated if the transformer has at least one cooling bank restored to service.
Procedure Caution:		UATs are not designed to be self-cooled. If NO transformer cooling banks are operating, the transformer should be removed from service within 30 minutes (1-hour absolute maximum) of cooling loss if loaded (6-hours if unloaded) unless cooling is restored. Bubble formation in the oil reduces heat transfer and may result in transformer winding failure.
	SRO	PERFORM the following for TOTAL loss of transformer cooling banks:
	BOP	• VERIFY the Cooling Control Switch has been placed in MANUAL. (YES)
	SRO	• REDUCE UAT load using ONE of the following methods: o TRANSFER affected buses to the SUT, if available. (Refer to OP-156.02 as necessary.) o TRANSFER to equipment with another power supply. Directs the BOP to transfer Aux Bus 1A and Aux Bus 1D to the SUT per OP-156.02.
Evaluator Note:		**The actions for OP-156.02, Section 7.1 are listed in Attachment 2 in the back of this scenario guide.**

Op Test No.: NRC	Scenario # 2	Event # 5	Page 43 of 79
Event Description:	**Total Loss of Cooling Banks on the UAT 1A Transformer**		

Time	Position	Applicant's Actions or Behavior	
	SRO	• CHECK that ANY cooling banks have been restored.	(NO)
		PERFORM the following: • COMMENCE power reduction using AOP-038, Rapid Downpower. • GO TO Step 7 to remove transformers from service within the applicable time limits: o 1-hour from loss of cooling (loaded)	
Evaluator Note:		**Note: It is not required for the crew to implement AOP-038 before continuing with the next event.** **After Aux Bus 1A is transferred to the SUT and the SRO communications with the Work Control Center are completed cue Simulator Operator to insert Trigger 6, Main Steam Line Break outside Containment** **Event 6, Main Steam Line Break outside Containment**	

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from Lead Evaluator insert Trigger 6 "MS Line Break Outside of CNMT"**
Indications Available		• ALB-09-3-3, PRZ CONT LOW PRESS AND HEATERS ON • ALB-09-5-1 PRESSURIZER HIGH-LOW PRESS • Rising Reactor power • RCS pressure lowering • Charging flow rising • SG pressures lowering
	OATC	Recommends Reactor Trip, Manually Trips Reactor and recommends Manual MSLI (with no objection from SRO)
EOP-E-0		EOP-E-0, Reactor Trip or Safety Injection
Immediate Action	OATC	Manually trips the Reactor PERFORM immediate actions of EOP-E-0
Immediate Action	OATC	VERIFY Reactor Trip: **REACTOR TRIP CONFIRMATION** **Reactor Trip AND Bypass BKRs – OPEN** **Rod Bottom Lights (Zero Steps – LIT** **Neutron Flux – DROPPING** • Trip breakers RTA and BYA OPEN (YES) • Trip breakers RTB and BYB OPEN (YES) • ROD Bottom lights LIT – Zero steps LIT (YES) • NEUTRON flux dropping (YES)

Time	Position	Applicant's Actions or Behavior
Immediate Action	BOP	Check Turbine Trip – ALL THROTTLE VALVES SHUT TURB STOP VLV 1 — TSLB-2-11-1 TURB STOP VLV 2 — TSLB-2-11-2 TURB STOP VLV 3 — TSLB-2-11-3 TURB STOP VLV 4 — TSLB-2-11-4 • ALL turbine throttle valves – SHUT (YES)
Immediate Action	BOP	Perform The Following: a. AC emergency buses – AT LEAST ONE ENERGIZED b. AC emergency buses – BOTH ENERGIZED (YES) 1A-SA and 1B-SB Buses are energized by off-site power
Immediate Action	OATC	SI – ACTUATED (BOTH TRAINS) BPLP 4-1,"SI ACTUATED" - LIT (CONTINUOUSLY) (YES or NO) SRO may direct initiation of MSLI (following recognition of steam break) while monitoring for SI Actuation Criteria SI – Required (YES)

Time	Position	Applicant's Actions or Behavior
	SRO	Perform the Following: a. Review Foldout page b. Evaluate EAL Matrix • Informs Shift Manager to evaluate EAL Matrix Foldout Applies:

REACTOR TRIP OR SAFETY INJECTION

FOLDOUT

- **RCP TRIP CRITERIA**

  IF both of the following occur, **THEN** stop all RCPs:

  - SI flow - GREATER THAN 200 GPM
  - RCS pressure - LESS THAN 1400 PSIG

- **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA**

  - **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT
  - **IF** RCS pressure rises to greater than 2200 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN

- **RHR RESTART CRITERIA**

  IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS.

- **RUPTURED SG AFW ISOLATION CRITERIA**

  IF all of the following occur to any SG, **THEN** stop feed flow by shutting the isolation valves (preferred) **OR** flow control valves to that SG:

  - Any SG level rises in uncontrolled manner **OR** has abnormal secondary radiation
  - Narrow range level - GREATER THAN 25% [40%]

- **AFW SUPPLY SWITCHOVER CRITERIA**

  IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

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Time	Position	Applicant's Actions or Behavior
	OATC	RCPs should be tripped based on RCP trip criteria being met.
Evaluator Note:		**The 'B' RHR pump trips when started. The 'A' RHR pump does not AUTO start from the sequencer and must be manually started.**
Event #7	OATC	• VERIFY ALL CSIPs AND RHR pumps – RUNNING. (NO). • Identifies that there are no RHR pumps running
		• Verifies completion of 'A' Sequencer through load block 9 • STARTS 'A' RHR pump
	BOP	Dispatch operator to investigate the cause of the trip of 'B' RHR pump.
Simulator Communicator:		**If directed to check status of 'B' RHR pump breaker, then after ~ 2 minutes, report that 'B' RHR pump breaker has an overcurrent trip.**
	OATC	SI flow > 200 gpm: . (YES)
	OATC	RCS pressure – LESS THAN 230 PSIG. (NO) GO TO Step 12.

Time	Position	Applicant's Actions or Behavior
Event #8	BOP	• MAIN Steam isolation – ACTUATED. (YES) MAIN STEAM LINE ISOLATION ACTUATION CRITERIA CNMT pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG pressure - LESS THAN OR EQUAL TO 601 PSIG (MSIV's are still open: RNO) Perform the following: • Attempts to manually actuate Main Steam Line Isolation (to close ALL MSIV's but the MSIV's will not shut) • MSLI may have been actuated pre-emptively after tripping the reactor if crew identified the steam leak. **Critical to attempt manual actuation to shut the MSIVs.**
Critical Task #1		
	BOP	Any SG pressure – 100 psig lower than pressure in two other SGs (NO, depressurizing at approximately the same rate) RNO: GO TO Step 16
	OATC	CHECK CNMT Pressure – HAS REMAINED < 10 PSIG. (YES)
	BOP	Verify AFW flow – AT LEAST 210 KPPH ESTABLISHED (YES)
	BOP	Energize AC buses 1A1 AND 1B1 Locates and closes: • Emergency Bus A-SA to XFMR A1 Breaker A1 A-SA • Emergency Bus B-SA to XFMR B1 Breaker B1 A-SA

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to: Verify Alignment of Components From Actuation of ESFAS Signals Using Attachment 3, "Safeguards Actuation Verification", While Continuing With This Procedure.
	BOP	Obtains Attachment 3 and performs verifications
Evaluator Note:		**The actions for EOP-E-0 Attachment 3 are listed in Attachment 3 in the back of this scenario guide on page 71.** **The RO will perform all board actions until the BOP completes Attachment 3. The BOP is permitted to properly align plant equipment IAW EOP-E-0 Attachment 3 without SRO approval.** **The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 3 is not predictable.**
	BOP	**First action of Attachment 3:** Directs TB AO -Place Air Compressor 1A and 1B in the local control mode.
Simulator Communicator:		**Acknowledge request to place AC 1A and 1B in the local control mode:**
Simulator Operator:		**When contacted to place A/B air compressors in Local Control mode, run CAEP :\air\ACs_to_local.txt.**
Simulator Communicator:		**When CAEP is complete, report that the air compressors are running in local control mode.**

Time	Position	Applicant's Actions or Behavior
	SRO	ASSIGNS OATC to perform the following: Stabilize AND Maintain Temperature Between 555°F AND 559°F Using Table 1.
	OATC	TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP • Guidance is applicable until another procedure directs otherwise. • IF no RCPs running, THEN use wide range cold leg temperature.

	RCS TEMPERATURE TREND		
	LESS THAN 557°F AND DROPPING	GREATER THAN 557°F AND RISING	STABLE AT OR TRENDING TO 557°F
OPERATOR ACTION	• Stop dumping steam • Control feed flow • Maintain total feed flow greater than 210 KPPH until level greater than 25% [40%] in at least one on intact SG • IF cooldown continues, THEN, shut MSIVs AND BYPASS valves	• IF condenser available THEN transfer steam dump to STEAM PRESSURE mode using OP-126, Section 5.3 AND dump steam to condenser - OR - • Dump steam using intact SG PORVs • Control feed flow to maintain SG levels	• Control feed flow and steam dump to establish and maintain RCS temperature between 555°F AND 559°F

Evaluator Note:		**The only action available to control RCS temperature is to limit AFW flow but a flow reduction to < 210 kpph should not be initiated until SG levels have recovered to at least 25% in one SG.**

Time	Position	Applicant's Actions or Behavior
	OATC	Check PRZ PORVs AND Spray Valves: • CHECK PRZ PORVs – SHUT (YES) • PRZ spray valves – SHUT. (YES) • CHECK PRZ PORV Block Valves – AT LEAST ONE OPEN. (YES)
	SRO	• ANY SG pressure – DROPPING IN AN UNCONTROLLED MANNER (YES) • ANY SG – COMPLETELY DEPRESSURIZED. (NO)
	SRO	GO TO EOP-E-2, "FAULTED STEAM GENERATOR ISOLATION" Step 1.
EOP-E-2		"FAULTED STEAM GENERATOR ISOLATION"
	SRO	Enters E-2
Procedure Caution:		At least one SG must be maintained available for RCS cooldown. Any faulted SG OR secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.
	SRO	Initiate Monitoring of Critical Safety Function Status Trees
	BOP	Verify ALL MSIVs – SHUT (NO)

Time	Position	Applicant's Actions or Behavior
	SRO	SRO directs the following actions to be taken outside the MCR: Contacts Aux Operator to: Perform the following: • Locally shut instrument air supply to RAB 261: 1IA-814 (north of AH-19 1A-SA) • Locally remove cap AND open drain valve: 1IA-1876 (located in corridor outside VCT valve gallery)
Simulator Communicator:		**Acknowledge request:** **At RAB 261: Shut instrument air supply to 1IA-814 and Remove cap AND open drain valve on 1IA-1876**
Simulator Operator:		**DO NOT PERFORM ANY ACTIONS AT THIS TIME.** **If contacted, say you're still working on it but are having a lot of trouble getting the cap off 1IA-1876.**
	BOP	• Verify all MSIV bypass valves – SHUT (NO) ○ Direct Aux Operator to Locally shut or isolate. • Check Any SG Pressure – STABLE OR RISING (NOT FAULTED) (NO)

Time	Position	Applicant's Actions or Behavior
EOP-ECA-2.1		Uncontrolled Depressurization Of All Steam Generators
	SRO	GO TO ECA−2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, Step 1.
	SRO	Foldout applies.
Evaluator Note:		**The ECA-2.1 Foldout criteria that may apply is: Minimum Feed Flow: IF level in any SG is less than 25% [40%], THEN maintain a minimum of 12.5 KPPH feed flow to that SG.**
	BOP	CHECK MSIVs AND Bypass Valves: • VERIFY all MSIVs – SHUT (NO) • Perform the following: (Previously directed) • Locally shut instrument air supply to RAB 261: 1IA-814 (north of AH-19 1A-SA) • Locally remove cap AND open drain valve: 1IA-1876 (located in corridor outside • VERIFY all MSIV Bypass Valves – SHUT (YES)
Procedure Caution:		IF the TDAFW pump is the only available source of feed flow, THEN maintain steam supply to the TDAFW pump from one SG.
Procedure Note:		IF local actions are required, attempts to isolate all boundaries of one SG should be completed prior to starting those for another SG.

Time	Position	Applicant's Actions or Behavior

	BOP	CHECK Secondary Pressure Boundary for ALL SGs:
		• VERIFY SG PORVs – SHUT (YES)
		• VERIFY Main FW isolation valves – SHUT (YES)
		• SHUT steam supply valves to TDAFW pump:
		  ○ SG B: 1MS-70 (SHUT)
		  ○ SG C: 1MS-72 (SHUT)
		• VERIFY main steam drain isolations before MSIVs – SHUT: (YES)
		  ○ SG A: 1MS-231
		  ○ SG B: 1MS-266
		  ○ SG C: 1MS-301
		• VERIFY SG Blowdown isolation valves – SHUT (YES)
		• VERIFY MS Analyzer isolation valves – SHUT (YES)

Procedure Note:		AS SG pressure and steam flow decrease, RCS hot leg temperatures will eventually stabilize and may increase. Adjusting feed flow and steam dump will control RCS hot leg temperatures.
	OATC	CONTROL RCS Temperature: • CHECK RCS cooldown rate – LESS THAN 100°F/HR (NO)
Critical Task #2	BOP	Lower feed flow to 12.5 KPPH to each SG. **Critical to lower AFW flow prior to a severe (ORANGE path) challenge developing to the Integrity Critical Safety Function**
	CREW	Identifies RED Path on Heat Sink and transitions to EOP-FR-H.1

Time	Position	Applicant's Actions or Behavior
EOP-FR-H.1		Response To Loss Of Secondary Heat Sink
	SRO	Enters EOP-FR-H.1, Response To Loss Of Secondary Heat Sink
Procedure Caution:		This procedure should NOT be performed if total feed flow capability of 210 KPPH is available AND total feed flow has been reduced due to operator action as directed by the EOPs. The following EOPs direct feed flow to be reduced below 210 KPPH: ECA-2.1, "UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS" FR-S.1, "RESPONSE TO NUCLEAR POWER GENERATION/ATWS" FR-P.1, "RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK" FR-P.2, "RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK" FR-Z.1, "RESPONSE TO HIGH CONTAINMENT PRESSURE" Feed flow should NOT be established to any faulted SG while a non-faulted SG is available.
	SRO	Reads Caution prior to step 1 and determines that FR-H.1 should not be performed **ECA-2.1, "UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS"** EXITS FR-H.1 and returns to EOP-ECA-2.1
	SRO	Returns to EOP-ECA-2.1 and continues in procedure at step 3.c.
	OATC	Check RCS hot leg temperatures - STABLE OR DROPPING (YES / NO)

Time	Position	Applicant's Actions or Behavior
	OATC	Maintain RCP Seal Injection Flow Between 8 GPM And 13 GPM. (Adjusts as needed)
Procedure Note:		The RCP Trip Criteria is in effect until SI is terminated.
	OATC	Check RCP Trip Criteria: a. Check RCPs - AT LEAST ONE RUNNING (NO - RCPS are OFF) GO TO Step 6
	OATC	Check PRZ PORV AND Block Valves: a. Verify power to PORV block valves – AVAILABLE (YES) b. PRZ PORVs – SHUT (YES) c. GO TO Step 6f. d. Check block valves - AT LEAST ONE OPEN (YES) e. IF a PRZ PORV opens on high pressure, THEN verify it shuts after pressure decreases to less than opening setpoint.
Procedure Note:		A SG may be suspected to be ruptured if it fails to dry out following isolation of feed flow. Local checks for radiation can be used to confirm primary-to-secondary leakage. Sampling of the RCS and SGs is directed in Step 29
	BOP/SRO	Check Secondary Radiation: Check for all of the following: • Condenser vacuum pump effluent rad – NORMAL (YES) • SG blowdown radiation – NORMAL (YES) • Main steamline radiation – NORMAL (YES) • SG activity sample - NORMAL (IF AVAILABLE) (N/A)

Time	Position	Applicant's Actions or Behavior
	OATC	Check is RHR Pumps Should Be Stopped • Check any RHR pumps – RUNNING ('B' pump – NO, pump tripped on start, 'A' pump - YES)
	OATC	• RCS Pressure - GREATER THAN 230 PSIG (YES) • RCS pressure - STABLE OR INCREASING (YES) • Check RHR pump suction - ALIGNED TO RWST (YES) • Reset SI. • Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. (Refer to E-0, Attachment 6) • Stop RHR pumps. (YES)
	OATC	Check CNMT Spray Status: • Check any CNMT spray pump – RUNNING (NO) • Go to step 10.
	OATC	Isolate SI Accumulators: • RCS hot leg temperatures – AT LEAST TWO LESS THAN 430°F (NO– It is possible that this will be a YES depending on the amount of time to get here. If so, breakers for accumulator discharge valves will be directed closed and the valves shut.) • Go to step 11.
		Monitor SI Termination Criteria: • Check for both of the following: o RCS subcooling - GREATER THAN 10°F (YES) o RCS pressure – STABLE **OR** RISING (YES) • PRZ level – GREATER THAN 10% (YES)

Time	Position	Applicant's Actions or Behavior
	OATC	Caution: Foldout items "SI REINITIATION CRITERIA" and "E – 2 TRANSITION CRITERIA" do not apply while performing SI termination in Steps 12 through 23. • Check SI – RESET (NO) • Reset SI – (OATC resets SI) • Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. (No response) • Reset Phase A and Phase B Isolations Signals (OATC resets phase A. Phase B is not actuated and does not requires resetting) • Open Instrument Air and Nitrogen Valves to CNMT: (OATC locates and opens 1IA-819 and 1SI-287) • Stop All But One CSIP. (No action required since A CSIP has shaft shear) • RCS Pressure – STABLE **OR** RISING (YES)
LEAD Evaluator Note:		**'B' SG MSIV will not close in this scenario. After the MSIVs for 'A' and 'C' SGs are closed, pressures will rise and meet EOP-E-2 transition criteria. Transition criteria will not apply while the SI Termination sequence is in progress.** **Wait UNTIL AFTER SI is checked RESET and then DIRECT the Simulator Operator to run Trigger 8 to close SG 'A' and 'C' MSIVs.** **NOTE: 'C' SG MSIV will shut 10 seconds AFTER 'A' MSIV shuts.**
Simulator Operator:		**NOTE: 'C' SG MSIV will shut 10 seconds AFTER 'A' MSIV shuts.** **When directed by the Lead Evaluator run Trigger 8 to shut SG 'A' and SG ' C' MSIVs.**
Simulator Communicator:		**Inform the MCR that Instrument Air has been isolated and vented to RAB 261' (EOP-E-2 Step 2 RNO is complete)**

Time	Position	Applicant's Actions or Behavior
	OATC	Isolate High Head SI Flow: • Check CSIP suction – ALIGNED TO RWST (YES) • Open normal miniflow isolation valves: (Locates and opens CSIP Mini-Flow isolation valves) • Shut BIT outlet valves: (Closes 1SI-3/1SI-4) • Verify cold leg **AND** hot leg injection valves – SHUT (YES) • Go to step 20
	OATC	**CAUTION** High head SI flow should be isolated before continuing. Establish Charging Lineup: • Shut charging flow control valve: (Places FK-122.1 in shut position) • Open charging line isolation valves: (Opens **1CS-235 and 1CS-238**) **CAUTION** Charging flow should **NOT** exceed 150 GPM to prevent damage to the regenerative heat exchanger. Control Charging Flow To Maintain PRZ Level: • Control charging using charging flow control valve: (no action required) • Maintain charging flow less than 150 GPM. (no action required) • PRZ Level – CAN BE MAINTAINED STABLE **OR** RISING (YES) Check If RHR Pumps Should Be Stopped: • Check RHR pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST (RHR pump will be secured if still running)

Time	Position	Applicant's Actions or Behavior
	OATC	**CAUTION** Simultaneous flow through the charging and SI lines may cause CSIP runout (as indicated by oscillating discharge pressure). Charging flow should **NOT** exceed 150 GPM to prevent damage to the regenerative heat exchanger. Check SI Reinitiation Criteria: • RCS subcooling – GREATER THAN 10°F (YES) • PRZ level – GREATER THAN 10% (YES) • PRZ level – CAN BE MAINTAINED GREATER THAN 10% (YES)
	CRS	**NOTE** Foldout items "SI REINITIATION CRITERIA" and "E-2 TRANSITION CRITERIA" are applicable.
	CREW	**IDENTIFIES 'A' and 'C' MSIV's have shut and SG pressure rising in both SGs**

Time	Position	Applicant's Actions or Behavior
	SRO	GO TO EOP-E-2, "Faulted Steam Generator Isolation" in accordance with ECA-2.1 FOLDOUT criteria when SG Pressure begins to rise and E-2 Foldout criteria applies.
Procedure Caution:		At least one SG must be maintained available for RCS cooldown. Any faulted SG OR secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.
	SRO	Initiate Monitoring Of Critical Safety Function Status Trees. (IMPLEMENT Function Restoration Procedures as required)
	BOP	Verify ALL MSIVs - SHUT: (NO – 'B' MSIV is still OPEN) RNO Actions have already been performed CHECK Any SG Pressure – STABLE OR RISING (NOT FAULTED) (YES) IDENTIFY Any Faulted SG: • ANY SG pressure – DECREASING IN AN UNCONTROLLED MANNER. (YES-"B") • ANY SG – COMPLETELY DEPRESSURIZED. (**YES - "B")**
Procedure Caution:		IF the TDAFW pump is the only available source of feed flow, THEN maintain steam supply to the TDAFW pump from one SG.
	BOP	ISOLATE Faulted SG(s) (Identified In Step 5): • VERIFY faulted SG(s) PORV – SHUT. (YES) • VERIFY Main FW isolation valves – SHUT. (YES)

Time	Position	Applicant's Actions or Behavior
Event 9	BOP	• VERIFY MDAFW AND TDAFW pump isolation valves to faulted SG(s) – SHUT. (NO, unless closed earlier) Closes 1AF-93, MDAFW Pump "B" and 1AF-143 TDAFW pump isolation valves to SG "B" to isolate AFW flow.
Lead Evaluator Discretion:		**After ensuring the actions for Event 9 are completed the scenario may be terminated at any point since the crew has re-entered EOP-E-2**
	BOP	Shut faulted SG(s) to steam supply valve to TDAFW pump – SHUT. • SG B: 1MS-70 (Previously Shut) • VERIFY MS drain isolation(s) before MSIVs 1MS-266 – SHUT (YES) • VERIFY SG BD isolation valves 1BD-30 and 1BD-20 – SHUT (YES) • VERIFY MS analyzer isolation valves – SHUT (YES) • CHECK CST Level – GREATER THAN 10%. (YES)
Procedure Note:		A SG may be suspected to be ruptured if it fails to dry out following isolation of feed flow. Local checks for radiation can be used to confirm primary-to-secondary leakage.

Time	Position	Applicant's Actions or Behavior
	SRO	Any SG – ABNORMAL RADIATION - (NO) OR UNCONTROLLED LEVEL RISE- (NO) **Secondary Radiation Monitors And Indications** RM-01MS-3591 SB, Main Steam Line A RM-01MS-3592 SB, Main Steam Line B RM-01MS-3593 SB, Main Steam Line C REM-01TV-3534, Condenser Vacuum Pump Effluent (RM-11: Grid 2 or Group 16) REM-1BD-3527, Steam Generator Blowdown (RM-11: Grid 2 or Group 16) RM-1TV-3536-1, Turbine Building Vent Stack Effluent (RM-11: Grid 2 or Group 16) SG Activity Sample GO TO Step 10
	OATC	CHECK if SI has been terminated: a. Check for all of the following: • Check BIT outlet valves – SHUT OR ISOLATED (YES) 1SI-3 1SI-4 • Check cold leg **AND** hot leg injection valves – SHUT (YES)
Lead Evaluator:		**Terminate the scenario.** **Instruct the Simulator Operator to place the Simulator in FREEZE and announce "I have the shift, remain in the Simulator and don't discuss the scenario. There may be follow up questions asked prior to your release."**
Simulator Operator		**Place the Simulator in FREEZE when directed by the Lead Examiner.**

OWP-RP-26
Sheet 1 of 4

EIR Number: _____
W/O Number: _____
Clearance Number: _____

1. OWP - RP-26

2. System: Nuclear Instrumentation

3. Component: POWER RANGE N-44

4. Scope: LCO action required due to inoperable Channel 4 Power Range Nuclear Instrumentation

5. Applicable Requirements: 3.3.1 (Modes 1 and 2), 4.2.1.1 and 4.2.4.2 (Mode 1 above 50% RATED THERMAL POWER)

6. Precautions: 1) Ensure only one channel out of service at a time. 2) This procedure does alter the channel's input to the P-8 or P-10 permissive logic when P312 is disconnected; however, P-8 and P-10 logic outputs are not affected due to the 2-out-of-4 coincidence RPS logic.

7. Component lineups completed per attached sheet(s). _____ / _____ Signature Date

8. Testing required on redundant equipment while the component is inoperable. Perform EST-915 once per 12 hrs if Rx power is greater 75% with one PR Channel inoperable(Notify Engineering as soon as initial OMM-001 notifications are complete to ensure flux map can be done within 12 hours). Perform OST-1039 once per 12 hrs if Rx power is greater than 50%.

9. Testing/Action required to restore operability. (N/A if tracked on EIR)

.	OST-1021, 1022 or 1033	_____ / _____
.	OST-1004 or OST-1000	_____ / _____
.	OST-1039 (above 50% RTP)	_____ / _____
.	MST-I0047	_____ / _____
		Signature Date

10. Component lineups restored per attached sheet(s) _____ / _____ Signature Date

11. Remarks: _____

12. Reviewed By: _____ _____ Superintendent - Shift Operations Date

After receiving the final review signature, this OWP becomes a QA RECORD and should be submitted to Document Services.

Bistable/Status Light Lineup

Component ID or Number	Position for Inoperability	Initial/Verified	Restored Position	Initial/Verified
NOTE: This OWP must be performed in order to prevent possible spurious rod motion or level control swings.				
On MAIN CONTROL BOARD:				
ROD BANK SELECTOR Switch	MANUAL	_____/_____	MANUAL	_____/_____
FW Reg Byp Valve Controllers:				
FK-479.1	MANUAL	_____/_____	MANUAL	_____/_____
FK-489.1	MANUAL	_____/_____	MANUAL	_____/_____
FK-499.1	MANUAL	_____/_____	MANUAL	_____/_____
On DETECTOR CURRENT COMPARATOR Drawer:				
UPPER SECTION Switch	PR N44	_____/_____	NORMAL	_____/_____
LOWER SECTION Switch	PR N44	_____/_____	NORMAL	_____/_____
On MISCELLANEOUS CONTROL AND INDICATION PANEL:				
ROD STOP BYPASS Switch	BYPASS PR N44	_____/_____	OPERATE	_____/_____
POWER MISMATCH BYPASS Switch	BYPASS PR N44	_____/_____	OPERATE	_____/_____
On COMPARATOR AND RATE Drawer:				
COMPARATOR CHANNEL DEFEAT Switch	N44	_____/_____	NORMAL	_____/_____
On Power Range Drawer N44A				
NOTE: The purpose of the sign installed below is to alert personnel of tripped bistables that may not be obvious at the NI drawer. The wording in quotations is the recommended wording, but similar words may also be used.				
Sign stating "Bistables Tripped - OWP-RP in Affect"	Installed	_____/_____	Removed	_____/_____

Bistable/Status Light Lineup

Component ID or Number	Position for Inoperability Initial/Verified	Restored Position Initial/Verified

In POWER RANGE N44:

NOTE: Concurrent verification is preferred in the following Step.

At the rear of N44
Drawer A, disconnect
P312 from J312 DISCONNECTED _____/_____ CONNECTED _____/_____

(On completion of the above lineup, check the following.)

On TSLB-4:

* Circle required state as determined by present plant conditions.

PR P-8 NC44N *ENERGIZED OR
(Window 3-4) ENERGIZED _____/_____ DE-ENERGIZED _____/_____

PR P-7/P-10 NC44M *ENERGIZED OR
(Window 4-4) ENERGIZED _____/_____ DE-ENERGIZED _____/_____

* Circle required state as determined by present plant conditions.

PR LO PWR HI FLUX NC 44P *ENERGIZED OR
(Window 5-4) ENERGIZED _____/_____ DE-ENERGIZED _____/_____

PR HI PWR HI FLUX NC 44R
(Window 6-4) ENERGIZED _____/_____ DE-ENERGIZED _____/_____

**May require manual reset of rate trips locally at drawer.

PR HI FLUX RATE NC 44U/K **
(Window 7-4) ENERGIZED _____/_____ DE-ENERGIZED _____/_____

On BYPASS PERMISSIVE LIGHTS Panel:

PR OVERPWR ROD WTHDRWL
BLK BYPASS CHAN IV
(Window 3-8) ENERGIZED _____/_____ DE-ENERGIZED _____/_____

Bistable/Status Light Lineup

Component ID or Number	Position for Inoperability Initial/Verified	Restored Position Initial/Verified
ON ERFIS Computer:		
(After status lights have been checked, perform the following using the DR function.)		
ANM0123M - PWR RNG CHANNEL N44 Q3 1-MIN AVG	DELETED FROM PROCESSING _____/_____	RESTORED TO PROCESSING _____/_____
On MAIN CONTROL BOARD:		
+ Circle appropriate position as determined by plant conditions.		
ROD BANK SELECTOR Switch	MAN/AUTO+ _____/_____	MAN/AUTO+ _____/_____
FW Reg Byp Valve Controllers:		
+ Circle appropriate position as determined by plant conditions.		
FK-479.1	MAN/AUTO+ _____/_____	MAN/AUTO+ _____/_____
FK-489.1	MAN/AUTO+ _____/_____	MAN/AUTO+ _____/_____
FK-499.1	MAN/AUTO+ _____/_____	MAN/AUTO+ _____/_____

7.0 SHUTDOWN

7.1. Transferring 6.9KV Auxiliary Buses 1A and 1D from UAT 1A to SUT 1A

7.1.1. Initial Conditions

1. All prerequisites in Section 3.0 are met. _____

2. Aux Buses 1A and 1D are powered from UAT 1A per Section 5.11, 8.1, or 8.32 of this procedure. _____

3. Network grid breakers are closed and providing power to SUT 1A (Switchyard Breakers 52-2 or 52-3). _____

4. **IF** Switchyard Grid Breakers 52-2 or 52-3 are **NOT** closed, **THEN CLOSE** the breakers per Section 8.29 if desired. _____

7.1.2. Procedural Steps

NOTE: Steps 7.1.2.1 through 7.1.2.10 are performed at the MCB.

1. **VERIFY** the availability of SUT 1A as indicated by the following voltmeters reading between 6.55 and 7.25KV:

   - EI-503, X WINDG VOLTS (**EACH** phase) _____
   - EI-504, Y WINDG VOLTS (**EACH** phase) _____

2. **PLACE** the START UP AUX XFMR A TO AUX BUSES A & D SYNCHRONIZER switch in the BKR-107 position. _____

3. **VERIFY** synchroscope is at the 12 O'CLOCK position. _____

7.1.2 Procedural Steps (continued)

NOTE: When breaker 107 is placed in the CLOSE position and subsequently released, breaker 108 will open.

CAUTION

If Breaker 108 fails to open, observe Precaution and Limitation 4.0.16. Manual opening of Breaker 108 requires use of the THINK switch.

4. **PLACE** BREAKER 107, START UP XFMR A TO AUX BUS A, to the CLOSE position. _____

5. **VERIFY** the following:

   - Auxiliary Bus A voltage remains between 6.55 and 7.25KV as indicated on EI-560. (**EACH** phase) _____
   - BREAKER 108, UNIT AUX XFMR A TO AUX BUS A, is open. _____

6. **PLACE** the START UP XFMR A TO AUX BUSES A & D SYNCHRONIZER switch to the BKR 101-position. _____

7. **VERIFY** synchroscope is at the 12 O'CLOCK position. _____

NOTE: When breaker 101 is placed in the CLOSE position and subsequently released, breaker 102 will open.

CAUTION

If Breaker 102 fails to open, observe Precaution and Limitation 4.0.16. Manual opening of Breaker 102 requires use of the THINK switch.

8. **PLACE** BREAKER 101, START UP XFMR A TO AUX BUS D, to the CLOSE position. _____

7.1.2 Procedural Steps (continued)

9. **VERIFY** the following:

   - Auxiliary Bus D voltage remains between 6.55 and 7.25KV as indicated on EI-561. (**EACH** phase) _____
   - BREAKER 102, UNIT AUX XFMR A TO AUX BUS D, is open. _____

10. **PLACE** the START UP AUX XFMR A TO AUX BUSES A & D SYNCHRONIZER switch to the OFF position. _____

11. **PERFORM** Attachment 1, Transformer Electrical Lineup Checklist. _____

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 1 of 8
Safeguards Actuation Verification

NOTE

- General guidance for verification of safeguards equipment is contained in Attachment 4 of this procedure.
- ERFIS displays of safeguards equipment status are not reliable while any associated safety-related electrical buses are de-energized.

☐ 1. Verify Two CSIPs - RUNNING

☐ 2. Verify Two RHR Pumps - RUNNING

☐ 3. Verify Two CCW Pumps - RUNNING

☐ 4. Verify All ESW **AND** ESW Booster Pumps - RUNNING

☐ 5. Verify SI Valves - PROPERLY ALIGNED

(Refer to Attachment 1.)

☐ 6. Verify CNMT Phase A Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 4.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 2 of 8
Safeguards Actuation Verification

☐ 7. Verify SG Blowdown **AND** SG Sample Isolation Valves In Table 1 - SHUT

Table 1: SG Blowdown And Sample Isolation Valves

Process Line	Outside CNMT (MLB-1A-SA)	Inside CNMT (MLB-1B-SB)
SG A Sample	1SP-217	1SP-214/216
SG B Sample	1SP-222	1SP-219/221
SG C Sample	1SP-227	1SP-224/226
SG A Blowdown	1BD-11	1BD-1
SG B Blowdown	1BD-30	1BD-20
SG C Blowdown	1BD-49	1BD-39

8. **IF** Main Steam Line Isolation Actuated **OR** Is Required By Any Of The Following, **THEN** Verify MSIVs **AND** MSIV Bypass Valves - SHUT

☐ • Steam line pressure - LESS THAN 601 PSIG

☐ • CNMT pressure - GREATER THAN 3.0 PSIG

9. **IF** CNMT Spray Actuation Signal Actuated **OR** Is Required, **THEN** Verify The Following:

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 9.)

☐ • CNMT spray pumps - RUNNING

☐ • CNMT spray valves - PROPERLY ALIGNED

☐ • Phase B isolation valves - SHUT

☐ • All RCPs - STOPPED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 3 of 8
Safeguards Actuation Verification

☐ 10. Verify Both Main FW Pumps - TRIPPED

☐ 11. Verify FW Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 6.)

☐ 12. Verify both MDAFW pumps - RUNNING

13. **IF** any of the following conditions exist, **THEN** verify the TDAFW pump - RUNNING

☐ • Undervoltage on either 6.9 KV emergency bus

☐ • Level in two SGs - LESS THAN 25%

☐ • Manual actuation to control SG level

14. Verify AFW Valves - PROPERLY ALIGNED

☐ • **IF** no AFW Isolation Signal, **THEN** verify isolation and flow control valves - OPEN

NOTE

An AFW Isolation signal signal requires a Main Steam Line Isolation coincident with one SG pressure 100 PSIG below the other two SGs.

☐ • **IF** AFW Isolation Signal present, **THEN** verify MDAFW and TDAFW isolation and flow control valves to affected SG - SHUT

☐ 15. Verify Both EDGs - RUNNING

☐ 16. Verify CNMT Fan Coolers - ONE FAN PER UNIT RUNNING IN SLOW SPEED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 4 of 8
Safeguards Actuation Verification

☐ 17. Verify CNMT Ventilation Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 7.)

☐ 18. Verify Control Room Area Ventilation - MAIN CONTROL ROOM ALIGNED FOR EMERGENCY OPERATION

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 5, Sheets 1 and 2, Sections for MAIN CONTROL BOARD, SLB-5 and SLB-6.)

19. Verify Essential Service Chilled Water System Operation:

☐ • Verify both WC-2 chillers - RUNNING

☐ • Verify both P-4 pumps - RUNNING

☐ (Refer to AOP-026, "LOSS OF ESSENTIAL SERVICE CHILLED WATER SYSTEM" for loss of any WC-2 chiller.)

20. Verify CSIP Fan Coolers - RUNNING

☐ AH-9 A SA
☐ AH-9 B SB
☐ AH-10 A SA
☐ AH-10 B SB

NOTE

Security systems are powered by bus 1A1 (normal supply) or bus 1B1 (alternate supply). Backup power will be available for approximately 30 MINUTES after the supplying bus is de-energized. (Refer to OP-115, "CENTRAL ALARM STATION ELECTRICAL SYSTEMS", Section 8.9 and 8.10.)

☐ 21. Verify AC buses 1A1 **AND** 1B1 - ENERGIZED

☐ 22. Place Air Compressor 1A **AND** 1B In The LOCAL CONTROL Mode.

(Refer to Attachment 7.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 5 of 8
Safeguards Actuation Verification

CAUTION

The maximum calculated dose rate in the vicinity of MCC 1A35-SA and MCC 1B35-SB is between 10 MREM/HR and 150 MREM/HR.

☐ 23. Dispatch An Operator To Unlock **AND** Turn ON The Breakers For The CSIP Suction **AND** Discharge Cross-Connect Valves:

(Refer to Attachment 2.)

MCC 1A35-SA		MCC 1B35-SB	
VALVE	CUBICLE	VALVE	CUBICLE
1CS-170	4A	1CS-171	4D
1CS-169	4B	1CS-168	7D
1CS-218	14D	1CS-220	9D
1CS-219	14E	1CS-217	12C

24. Check If C CSIP Should Be Placed In Service:

☐ • **IF** two charging pumps can **NOT** be verified to be running, **AND** C CSIP is available, **THEN** place C CSIP in service in place of the non-running CSIP using OP-107, "CHEMICAL **AND** VOLUME CONTROL SYSTEM, Section 8.5 or 8.7.

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 6 of 8
Safeguards Actuation Verification

25. Start The Spent Fuel Pump Room Ventilation System:

a. At AEP-1, verify the following ESCWS isolation valves - OPEN

1) SLB-11 (Train A)

☐ • AH-17 SUP CH 100 (Window 9-1)

☐ • AH-17 RTN CH 105 (Window 10-1)

2) SLB-9 (Train B)

☐ • AH-17 SUP CH 171 (Window 9-1)

☐ • AH-17 RTN CH 182 (Window 10-1)

b. At AEP-1, start one SFP PUMP ROOM FAN COOLER:

☐ • AH-17 1-4A SA

☐ • AH-17 1-4B SB

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 7 of 8
Safeguards Actuation Verification

NOTE

- Fuel pool levels **AND** temperatures should be monitored approximately every 1 to 2 HOURS.
- Following the initial check of fuel pool levels and temperature, monitoring responsibilities may be assumed by the plant operations staff (including the TSC or STA).
- Only fuel pools containing fuel are required to be monitored.

26. Check Status Of Fuel Pools:

☐ a. Operate spent fuel cooling pumps to maintain fuel pool temperatures between 85°F and 105°F.

b. Monitor fuel pool levels **AND** temperatures:

☐ • Refer to AOP-041, "SPENT FUEL POOL EVENT" Attachments 7, 8, 9, 10 and 11 for SFP parameter monitoring methods.

☐ • Refer to Curves H-X-24, H-X-25 and H-X-26 for SFP time to 200°F.

☐ • Levels - GREATER THAN LO ALARM (284 FT, 0 IN)

☐ • Temperatures - LESS THAN HI TEMP ALARM (105°F)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 8 of 8
Safeguards Actuation Verification

NOTE

IF control room ventilation was previously aligned to an emergency outside air intake for post-accident operations, **THEN** follow-up actions will be required to restore the alignment.

27. Consult Plant Operations Staff Regarding Alignment Of The Control Room Ventilation System:

☐ • Site Emergency Co-ordinator - Control Room

☐ • Site Emergency Co-ordinator - Technical Support Center

(Refer to PEP-230, "CONTROL ROOM OPERATIONS".)

- END -

Op Test No.: NRC	Scenario # 2	Event # N/A	Page 79 of 79
Event Description:	**Scenario Guide Revision Summary**		

Rev. 0

Initial Development

Rev. 1

NRC D-1 Outline comments incorporated

Rev. 2

Operation validation comments incorporated

Rev. 3

NRC 60 day submittal comments incorporated

Rev. 4

NRC Prep Week comments incorporated

Rev. Final

Approved for administration by NRC Region II

Appendix D	Scenario Outline	Form ES-D-1

HARRIS 2016 NRC EXAM SCENARIO 3 - SPARE

Facility: Harris Nuclear Plant Scenario No.: 3 Op Test No.: 05000400/2016301

Examiners: _____ Operators: SRO: _____

_____ OATC: _____

_____ BOP: _____

Initial Conditions: IC-8, MOL, ~3% power

- The unit is on hold until secondary chemistry is within limits with Reactor Power ~ 3%
- GP-005, Power Operation, step 97.b
- The following equipment is under clearance
  - 'B' NSW pump
  - 1SI-3, Boron Injection Tank Outlet valve
  - Boric Acid Transfer Pump B-SB

Turnover:

- Power ascension is on hold for 1SI-3 and 'B' BAT Pump repair completions.
- Start the 'B' Condensate Booster Pump and secure the 'A' Condensate Booster Pump IAW OP-134

Critical Tasks:

- Establish Flow from At Least One High-Head SI Pump prior to exiting EOP-E-0
- Manually trip all RCPs within 10 minutes of reaching RCP Trip Criteria of > 200 gpm SI Flow with < 1400 psig RCS Pressure

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP/SRO	Start the 'B' Condensate Booster Pump and secure the 'A' CB Pump (OP-134)
2	jfb7579 z2715tic iann xn29e04	C – BOP/SRO	AH-39 Containment Fan Coil Unit fan trip with back up auto start failure ('C' RCP cooling fan)
3	tt:144 jtb143b	I – RO/SRO	Letdown Temperature Controller fails LD/Diversion Valve fails to bypass demineralizers
4	ccw08a	C – RO/SRO TS – SRO	Component Cooling Water system leak (AOP-014) with manual makeup required to maintain level
5	pt:308b	I – BOP/SRO TS – SRO	'B' SG PORV opens with the controller in automatic
6	rcs09a	C – RO/SRO	RCP "A" rising vibration (AOP-018). Vibrations require a manual Reactor trip (E-0) , then secure 'A' RCP and PRZ spray valve.
7	rcs18a	M – ALL	SBLOCA inside Containment (E-0 to E-1)
8	sis017 sis018	C – RO/SRO	Failure of BIT outlet valve 1SI-4 to open requiring alternate high head injection flow path use Establish SI flow prior to securing RCPs when EOP-E-0 foldout requires them to be secured
9	zrpk504a zrpk504b	C – BOP/SRO	Failure of automatic Main Steam Line Isolation to occur when Containment pressure exceeds 3 psig

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 3

Low power scenario – Turnover to crew is the unit startup on hold. The plant is in Mode 2 with Reactor power less than 5%. Power ascension is on hold until secondary chemistry parameters are within limits and 1SI-3 and the 'B' Boric Acid pump are restored to service. At the conclusion of last shift the 'B' Condensate Booster pump oil system leak repairs and PMT were completed and the clearance was removed. The pump is ready to be returned to service. When the crew takes the shift the expectation is to start the 'B' Condensate Booster pump in accordance with OP-134, Condensate System, Section 5.6. After the pump is running they will hold power until secondary chemistry and the clearances are lifted on 1SI-3 and 'B' BA pump. They should prepare to continue with GP-005, Power Operation, to obtain rated power conditions.

The following equipment is under clearance:

- 'B' Normal Service Water Pump is under clearance for shaft inspection. The pump has been under clearance for 8 hours. Inspection and return to service is expected to be completed within 24 hours. (No Tech Specs are associated with this component)

- 1SI-3, Boron Injection Tank Outlet valve has been under clearance the last 12 hours for breaker repairs. The repairs are close to completion and the valve is expected to be returned to service within the next hour. The valve is currently shut with power removed. OWP-SI-01 has been completed. Tech Specs 3.5.2 and 3.6.3 apply.

EMERGENCY CORE COOLING SYSTEMS

3/4.5.2 ECCS SUBSYSTEMS - T_{avg} GREATER THAN OR EQUAL TO 350°F

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent Emergency Core Cooling System (ECCS) subsystems shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE Charging/safety injection pump,

b. One OPERABLE RHR heat exchanger,

c. One OPERABLE RHR pump, and

d. An OPERABLE flow path capable of taking suction from the refueling water storage tank on a Safety Injection signal and, upon being manually aligned, transferring suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 3 (continued)

- 1SI-3, Boron Injection Tank Outlet valve, Tech Specs…continued

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 Each containment isolation valve specified in the Technical Specification Equipment List Program, plant procedure PLP-106, shall be OPERABLE with isolation times less than or equal to required isolation times.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With one or more of the containment isolation valve(s) inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and:

a. Restore the inoperable valve(s) to OPERABLE status within 4 hours, or

b. Isolate each affected penetration within 4 hours by use of at least one deactivated automatic valve secured in the isolation position, or

- Boric Acid Transfer Pump B-SB is under clearance for the last 12 hours due to breaker blown control power fuses. The problem has been repaired and the clearance will be removed within the next hour. Tech Spec 3.3.3.5.b which is a 7 day LCO and 3.1.2.2 apply (3.1.2.2 is for tracking only). OWP-CS-05 has been completed.

REMOTE SHUTDOWN SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.3.5.a The Remote Shutdown System monitoring instrumentation channels shown in Table 3.3-9 shall be OPERABLE.

3.3.3.5.b All transfer switches, Auxiliary Control Panel Controls and Auxiliary Transfer Panel Controls for the OPERABILITY of those components required by the SHNPP Safe Shutdown Analysis to (1) remove decay heat via auxiliary feedwater flow and steam generator power-operated relief valve flow from steam generators A and B, (2) control RCS inventory through the normal charging flow path, (3) control RCS pressure, (4) control reactivity, and (5) remove decay heat via the RHR system shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With the number of OPERABLE remote shutdown monitoring channels less than the Minimum Channels OPERABLE as required by Table 3.3-9, restore the inoperable channel(s) to OPERABLE status within 7 days, or be in HOT SHUTDOWN within the next 12 hours.

b. With the number of OPERABLE remote shutdown monitoring channels less than the Total Number of Channels required by Table 3.3-9, restore the inoperable channels to OPERABLE status within 60 days or submit a Special Report in accordance with Specification 6.9.2 within 14 additional days.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 3 (continued)

Upon turnover and assuming the shift the BOP will start the 'B' Condensate Booster pump in accordance with OP-134, Condensate System, Section 5.6 "Second Condensate Booster Pump Start up" then secure the 'A' Condensate Booster pump in accordance with OP-134, Section 7.1

Event 1

Swap Condensate Booster Pumps place the 'B' Condensate Booster Pump in service.

Verifiable Action: The BOP will zero out the 'B' Condensate Booster Pump M/A station, open the discharge and recirc valve for the pump then start the 'B' Condensate Booster Pump. After the pump is running the BOP will increase 'B' pump speed and place the controller in Automatic. The BOP will then secure the 'A' Condensate Booster Pump.

After the 'B' Condensate Booster pump is in operation the crew will still be on startup hold but should have evaluated and discussed raising power IAW GP-005 to prepare to place the Main Feedwater Regulating valves in service.

Event 2

Trip of AH-39 Containment Fan Coil Unit fan with back up auto start failure.

Verifiable Action: The failure will cause annunciator ALB-029 4-5 "Containment Fan Coolers AH-39 Low Flow-O/L to alarm. The crew should identify that the standby fan did not auto start and start the standby fan. The SRO will complete OMM-001 Attachment 5 and request assistance from the WCC center.

Event 3

Letdown Temperature Controller fails - LD/Diversion Valve fails to bypass demineralizers. This failure will cause temperature controller TK-144 output to decrease to zero. Without cooling to the letdown heat exchanger, temperatures observed on TI-143 will increase. At 135°F annunciator ALB-007-3-2, Demin Flow Diversion High Temp will alarm.

Verifiable Action: The OATC will respond in accordance with the alarm procedure for ALB 007-3-2. The OATC should identify that the divert valve to the VCT has failed to respond and report the failure to the SRO. The OATC should manually bypass the CVCS Demineralizers with 1CS-50 (TCV-143), then take manual control of TK-144 to restore letdown temperature to normal

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 3 (continued)

Event 3 (continued)

The SRO should provide a temperature band between 110°F to 120°F to the OATC in accordance with AD-OP-ALL-1000, Conduct of Operations, for operation of components in manual. (Temperature band guidance can be found in OP-107, Chemical Volume And Control). The CVCS Demineralizers should remain bypassed pending an evaluation for continued resin use. The SRO will complete OMM-001 Attachment 5 and request assistance from the WCC center.

Event 4

Component Cooling Water system leak - requiring AOP-014, Loss of Component Cooling Water entry and manual makeup to maintain level. A CCW leak in the running pump suction header will develop. The leak will be within CCW Surge Tank makeup capability.

Verifiable Action: The crew should identify the leak by observation of MCB indications for CCW Surge Tank level or MCB annunciators based on CCW Surge Tank low level. The OATC will respond to the CCW Surge Tank level change and/or alarm and enter AOP-014, LOSS OF COMPONENT COOLING WATER. The OATC will maintain CCW Surge Tank level in the normal operating range by opening the Demin water make up valve 1DW-15, on the MCB. After dispatching an AO and locally isolating the leak the OATC will then start the standby 'B' CCW pump and secure the running 'A' CCW pump in accordance with OP-145, Component Cooling Water, then isolate the leak.

The SRO will complete OMM-001 Attachment 5 and request assistance from the WCC center.

Tech Spec Evaluation: The SRO should evaluate TS 3.7.3. TS 3.5.2 and TS 3.0.3 (both trains of ECCS INOPERABLE).

PLANT SYSTEMS

3/4.7.3 COMPONENT COOLING WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.3 At least two component cooling water (CCW) pumps*, heat exchangers and essential flow paths shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With only one component cooling water flow path OPERABLE, restore at least two flow paths to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

*The breaker for CCW pump 1C-SAB shall not be racked into either power source (SA or SB) unless the breaker from the applicable CCW pump (1A-SA or 1B-SB) is racked out.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 3 (continued)

Event 4 (continued)

EMERGENCY CORE COOLING SYSTEMS

3/4.5.2 ECCS SUBSYSTEMS - T_{avg} GREATER THAN OR EQUAL TO 350°F

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent Emergency Core Cooling System (ECCS) subsystems shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE Charging/safety injection pump,

b. One OPERABLE RHR heat exchanger,

c. One OPERABLE RHR pump, and

d. An OPERABLE flow path capable of taking suction from the refueling water storage tank on a Safety Injection signal and, upon being manually aligned, transferring suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

3/4.0 APPLICABILITY

LIMITING CONDITION FOR OPERATION

3.0.3 When a Limiting Condition for Operation is not met, except as provided in the associated ACTION requirements, within 1 hour action shall be initiated to place the unit in a MODE in which the specification does not apply by placing it, as applicable, in:

a. At least HOT STANDBY within the next 6 hours,
b. At least HOT SHUTDOWN within the following 6 hours, and
c. At least COLD SHUTDOWN within the subsequent 24 hours.

Where corrective measures are completed that permit operation under the ACTION requirements, the action may be taken in accordance with the specified time limits as measured from the time of failure to meet the Limiting Condition for Operation. Exceptions to these requirements are stated in the individual specifications.

This specification is not applicable in MODE 5 or 6.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 3 (continued)

Event 5

Failure of the 'B' SG PORV fails partially OPEN in AUTO and MANUAL – The 'B' SG PORV pressure instrument will fail high causing the PORV to open. Annunciator ALB-014-8-5 Computer Alarm Steam Generators will alarm and status of the PORV position can be observed on the MCB red/green PORV indication status lights. When the operator attempts to shut the valve the it will remain open requiring local action to isolate the penetration.

Verifiable Action: The BOP should respond to indications and depress the manual pushbutton for PK-308B1 and lower the output to zero.

Tech Spec Evaluation: The SRO should evaluate TS 3.6.3, Containment Isolation Valves and PLP-106, Technical Specification Equipment List Program and Core Operating Limits Report. IF the Tech Specs are not referred to during the scenario, then (if required) ask a follow up question at the end of the scenario dealing with the LCO.

TS 3.6.3 – Action c. Isolate the affected penetration within 4 hours. The redundant manual isolation valve per PLP-106, Attachment 5 is 1MS-61.

CONTAINMENT SYSTEMS

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 Each containment isolation valve specified in the Technical Specification Equipment List Program, plant procedure PLP-106, shall be OPERABLE with isolation times less than or equal to required isolation times.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With one or more of the containment isolation valve(s) inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and:

a. Restore the inoperable valve(s) to OPERABLE status within 4 hours, or

b. Isolate each affected penetration within 4 hours by use of at least one deactivated automatic valve secured in the isolation position, or

c. Isolate each affected penetration within 4 hours by use of at least one closed manual valve or blind flange, or

d. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 3 (continued)

Event 6

RCP "A" high vibration. During this event the 'A' RCP vibrations will begin to increase and over 3 minutes peak at 28 mils shaft. Note: the shaft vibration instrumentation reads up to 30 mils. The crew will respond to the 'A' RCP malfunction by either identifying rising vibrations or when ALB-010-1-5, RCP-A Trouble alarms. The crew should see the 'A' RCP vibration probe readings are increasing. The crew should enter AOP-018, Reactor Coolant Pump Abnormal Conditions and perform the immediate actions of checking any CSIP running (YES). Vibrations will continue to increase and exceed AOP-018 Attachment 1 RCP trip criteria of 20 mils shaft.

Verifiable Action: The OATC will perform a manual Reactor trip and secure the "A" RCP and associated PRZ spray valve after E-0 immediate actions are completed.

The crew will then transition from EOP E-0 to ES-0.1, Reactor Trip Response. The Lead Examiner can allow the crew to stabilize the plant then have the Simulator Operator insert the next event (Small Break LOCA).

Event 7 – Major – Small Break LOCA

SBLOCA inside Containment (Loop 'A')

The crew should recognize a rapid decrease in Pressurizer level and RCS pressure. If the crew responds quickly to the event they may manually actuate a Safety Injection based on ES-0.1 foldout criteria of not being able to maintain Pressurizer level > 5% or RCS subcooling < 10°F. If they do not respond quickly an Automatic Safety Injection will occur. The crew will then transition from ES-0.1 back to E-0, Reactor Trip or Safety Injection. They will again carry out immediate actions of E-0.

Event 8

Failure of BIT outlet valve 1SI-4 to open requiring alternate high head injection flow path use. 1SI-4 will fail to automatically open with the Safety Injection signal and cannot be manually opened from the MCB switch. Additionally, 1SI-3 was under clearance and cannot be opened from the MCB due to control power being removed from the breaker. In order to obtain Safety Injection flow the crew will have to use the alternate high head injection flow path as directed by E-0 RNO actions.

Verifiable Action: The OATC will OPEN alternate high head Safety Injection to cold legs valve 1SI-52 SA and then identify Safety Injection flow exceeding 200 gpm.

SCENARIO SUMMARY: 2016 NRC EXAM SCENARIO 3 (continued)

Event 8 (continued)

Establish SI flow prior to securing RCPs when EOP-E-0 foldout requires them to be secured. Shortly after entering E-0, the crew should recognize that the RCS pressure is low enough to meet Foldout Criteria for securing all RCPs but there is no flow indicated on FI-943 (normal SI flow indication). The crew will have to establish SI flow by opening the alternate high head Safety Injection to cold legs valve 1SI-52 SA.

Verifiable Action: After the OATC opens 1SI-52A adequate flow (> 200 gpm) will be indicated on FI-940 (alternate SI flow indication). Once flow is verified the low press and SI flow criteria will be met and the OATC will then STOP the 'B' and 'C' RCP's.

Event 9

Failure of automatic Main Steam Line Isolation to occur when Containment pressure exceeds 3 psig. As the Small Break LOCA continues to flow RCS to the Containment the pressure in the Containment will continue to rise. An automatic Main Steam Isolation signal is generated when Containment pressure is ≥ 3.0 psig. The crew will have shut the MSIV's due to the cooldown encountered from securing the 'A' RCP but the MSIV before seat drain valves (1MS-231, 1MS-266, 1MS-301) will remain OPEN. The MCB switch for manual actuation of MSLI will NOT function.

Verifiable Action: The BOP will have to manually shut the individual MCB switches for each MSIV before seat drain valve. These valves can be verified that they are not in the correct position by reviewing the Safeguards panel on ERFIS (after a MSLI actuation).

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ATTACHMENT 8
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Reference Use - Main Steam Isolation Verification

Components		REQ POS	POS CK
MAIN CONTROL BOARD			
ACTUATED BY EITHER TRAIN A OR B	1MS-80 MSIV A	SHUT	
	1MS-82 MSIV B	SHUT	
	1MS-84 MSIV C	SHUT	
	1MS-81 MSIV A BYPASS ISOL/FLOW CONT	SHUT	
	1MS-83 MSIV B BYPASS ISOL/FLOW CONT	SHUT	
	1MS-85 MSIV C BYPASS ISOL/FLOW CONT	SHUT	
	1MS-231 MAIN STEAM A DRAIN ISOL BEFORE MSIV	SHUT	
	1MS-266 MAIN STEAM B DRAIN ISOL BEFORE MSIV	SHUT	
	1MS-301 MAIN STEAM C DRAIN ISOL BEFORE MSIV	SHUT	

After making transitions from E-0 to E-1 to ES-1.2 the crew will determine that the RCS cool down rate exceeded 100°F/HR and will have to wait prior to reducing RCS temperature further. The scenario ends when the crew has determined that the 100°F/HR cool down rate has been exceed.

CRITICAL TASK JUSTIFICATION:

1. Establish Flow from At Least One High-Head SI Pump before a transition out of EOP-E-0 is made.

Failure of the crew to manually align Safety Injection flow through the alternate high head injection flow path results in a degradation of the capacity of the ECCS systems. The only available makeup water source during this event is the high pressure safety injection from the CSIPs. Until the alternate high head safety injection flow is aligned the safety margin of the plant is significantly reduced and may result in irreparable damage to the reactor core.

The acceptable results obtained in the FSAR analysis of a small-break LOCA are predicated on the assumption of minimum ECCS pumps injection. The analysis assumes that a minimum pumped ECCS flow rate, which varies with RCS pressure, is injected into the core. The flow rate values assumed for minimum pumped injection are based on operation of one each of the following ECCS pumps: Charging/SI pump, high-head SI pump and low-head SI pump. Operation of this minimum required complement of ECCS injection pumps is consistent with the FSAR assumption that only minimum safeguards is actuated. The action of establishing flow from the high head SI pump (CSIP at HNP) must be accomplished prior to a transition from EOP-E-O being made.

2. Manually trip all RCPs within 10 minutes of reaching RCP Trip Criteria of > 200 gpm SI Flow with < 1400 psig RCS Pressure

Securing RCPs during a SB LOCA event will prevent depleting the RCS to a critical inventory by pumping more mass through the break than would occur if the RCP operation were ceased. (Critical inventory is defined as the amount of inventory remaining in the RCS when the break completely uncovers and the break flow changes from a mixture of liquid and steam to all steam.) The LOCA event in this scenario is a SB LOCA that requires the RCPs to be secured when E-0 foldout conditions are met. IF the crew continues to allow the RCPs to operate due to lack of establishment of SI flow of > 200 gpm then RCS inventory will continue to deplete. Manually tripping the RCPs before depletion below the critical inventory conservatively ensures that Peak Clad Temperature remains below 2200°F. This action should be accomplished within 10 minutes of RCP Trip Criteria of > 200 gpm SI Flow with < 1400 psig RCS Pressure.

Note: An unanticipated critical task may be created in a scenario should an applicant's action or lack of action cause an unexpected RPS or ESFAS actuation. A critical task may be assigned and graded as unsatisfactory even if corrected by another team member prior to the unanticipated RPS/ESFAS actuation. Should the applicant self-correct the action or inaction prior to the unanticipated plant response, a critical task failure should not be assigned to the applicant.

SIMULATOR SETUP

For the 2016 NRC Exam Simulator Scenario # 3

Reset to IC-163 password “noinstants”

Go to RUN

Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner.

(The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

SPECIAL INSTRUCTIONS

Scenario will have ONLY the “A” Condensate Booster Pump running. Turnover information for starting the “B” Condensate Booster pump will be that the Condensate Booster Pump “B” Lock-Out Relays are reset. The crew will need to start the “B” pump then secure the “A” Condensate Booster Pump. OP-134 Section 5.6.1 Initial condition #3 requires Rx Power to be >5% and should be N/A’d for this start since it will be for swapping pumps.

Post conditions for status board from IC-8 with Reactivity Data for RCS boron of 1567
Mode 2 <5% Reactor power Startup on HOLD due to 1SI-3 and ‘B’ BA Pump.
Note: Unit cannot enter Mode 1 until 1SI-3 and BA pump are restored.

Provide a marked up copy of GP-005 Rev 93 through Step 97 the step for >5% power is not initialed
Control Bank D at 109 steps
RCS boron 1567 ppm
RCS press 2220 – 2250 psig all PZR heaters ON
SG level maintained with "A" MFW pump and FW Reg Bypass Vlvs in Auto
RCS temp 558°F, stable on Steam Dumps
RCS temp band from step 51 is 555°F - 561°F
Main Turbine at 1800 rpm
Hang CIT on 1SI-3, Boron Injection Tank Outlet valve
Place completed copy of OWP-SI-01 in OWP book
Hang CIT on Boric Acid Transfer Pump B-SB
Place a protected train plackard on Boric Acid Transfer Pump A-SA switch
Hang CIT on ‘B’ NSW Pump
Post Reactivity Signs (GP-006 Prerequisite #9)
Hang STAR placard on Rod Control In/Out Switch
Hang STAR placard on Steam Dump controller M/A station
Set CRT screen 3 to "QP POAH"

Update the status board:
1SI-3 Tech Spec 3.4.2 – 72 hour LCO, OOS for 12 hours
BA Transfer pump ‘B’ Tech Spec 3.3.3.5.b – 7 day LCO, OOS for 12 hours.

Op Test No.: NRC Scenario # 3 Event # 1 Page 13 of 72		
Event Description: **Start "B" Condensate Booster Pump**		
Time	Position	Applicant's Actions or Behavior
Lead Evaluator:		**When the crew has completed their board walk down and are ready to take the shift inform the Simulator Operator to place the Simulator in Run. When the Simulator is in run announce:** **CREW UPDATE – (SRO's Name) Your crew has the shift. END OF UPDATE**
Simulator Communicator:		**When directed by the Lead Evaluator, ensure that the annunciator horns are on and place the Simulator in RUN.**
Lead Evaluator:		**After the crew has taken the shift the BOP will place "B" Condensate Booster Pump in service and then secure the "A" Condensate Booster Pump.**
Evaluator Note:		**Before inserting the first failure wait for the BOP to secure "A" Condensate Booster Pump and completion of communications with the Aux Operator.**
	SRO	Directs BOP to start the "B" Condensate Booster pump in accordance with OP-134 section 5.6
	BOP	Performs OP-134 Reviews Sections 5.6, Second Condensate Booster Pump Start Up • Contacts Turbine Building AO to observe swap
Simulator Communicator:		**I printed out a copy of OP-134 Section 5.6 and have the procedure section in hand.**
	BOP	Informs Aux Operator that they are about to start "B" Condensate Booster Pump and / then • Makes PA announcement prior to starting pump

Op Test No.: NRC	Scenario # 3	Event # 1	Page 14 of 72
Event Description:	**Start "B" Condensate Booster Pump**		

Time	Position	Applicant's Actions or Behavior
OP-134		Condensate System, Section 5.6, Second Condensate Booster Pump Start Up
	BOP	Step 1: PERFORM prestart checks on Condensate Booster Pump B per Attachment 6. Contacts Aux Operator to perform prestart checks per Attachment 6
Simulator Communicator:		**I walked down the 'B' Condensate Booster Pump and completed the prestart checks. The pump is ready to be started.**
	BOP	Step 2: VERIFY CONDENSATE BOOSTER PUMP B RECIRC, 1CE-261 in MODU and shut. • Checks 1CE-261 in MODU and shut. (YES)
Procedure Caution:		There are no Condensate Booster Pump trips to protect the pump from running without seal water.
	BOP	Step 3: PLACE PK-2308 CNDST BSTR PUMP B SPEED CONTROLLER to MAN and zero the demand signal. • Checks PK-2308 in MAN with zero demand signal
	BOP	Step 4: VERIFY OPEN 1CE-268, CONDENSATE BOOSTER PUMP B DISCHARGE. • OPENS 1CE-268
Procedure Note:		• Computer points listed in Section 6.0 of this procedure may be monitored for information. • When the Condensate Booster Pump control switch is placed to the START position, the Aux Lube Oil Pump will start and supply the VSF Coupling with oil until oil pressure is greater than or equal to 10 psig as indicated on PI-01LO-2304B, at which time the Condensate Booster Pump starts.

Op Test No.: NRC Scenario # 3 Event # 1 Page 15 of 72		
Event Description: **Start "B" Condensate Booster Pump**		
Time	Position	Applicant's Actions or Behavior
Procedure Caution:		The amount of time the associated recirc valve, 1CE-261 is open, should be minimized due to lack of lubrication without Condensate Booster Pump running.
	BOP	PLACE the control switch CONDENSATE BOOSTER PUMP B RECIRC, 1CE-261 in the OPEN position immediately prior to starting Condensate Booster Pump B. • Places control switch for 'B' Condensate Booster Pump recirc valve 1CE-261 to OPEN
Procedure Note:		Starting the second Condensate Booster Pump may cause the previously running pump controller to reject to Manual. This is due to the speed sensor on the pump being started initially providing a speed input signal that is based on electrical noise. If the running CBP controller rejects to manual, it is permissible to return the controller to Auto once the CBP being started reaches the no-load speed. If the controller again rejects to manual, then further investigation would be required.
	BOP	Step 6: START B Condensate Booster Pump. • Places 'B' Condensate Booster Pump start switch to START • Verifies indications that the pump has started and running as expected
Simulator Communicator:		**Report that the 'B' Condensate Booster pump has a good start**
		Step 7: Locally VERIFY Condensate Booster Pump B Aux Lube Oil Pump has stopped. • Contacts Aux Operator to verify Aux Lube Oil Pump has stopped
Simulator Communicator:		**'B' Condensate Booster Pump Aux Lube Oil Pump has STOPPED**

Op Test No.: NRC	Scenario # 3	Event # 1	Page 16 of 72
Event Description:	**Start "B" Condensate Booster Pump**		

Time	Position	Applicant's Actions or Behavior
	BOP	Step 8: CHECK differential pressure across the Pall Replaceable Duplex Filter, as indicated between PI-01LO-2304B1 and PI-01LO-2304B2 is less than 15 PSI (less than 9 PSI when oil temperature has warmed up to normal). • Contacts Aux Operator to check differential pressure across the filter
Simulator Communicator:		**The differential pressure across the Duplex Filter, as indicated between PI-01LO-2304B1 and PI-01LO-2304B2 is 11 PSI. I will continue to monitor for normal response.**
	BOP	Step 9: N/A Step 10: SLOWLY INCREASE the demand signal on PK-2308 CNDST BSTR PUMP B SPEED CONTROLLER to match the demand signal on the previously running Condensate Booster Pump Speed Controller. • Slowly increases demand signal on PK-2308 and matches the demand signal on the 'A' Condensate Booster Pump Speed Controller.
	BOP	Step 11: WHEN the demand signals are matched, THEN PLACE PK-2308 CNDST BSTR PUMP B SPEED CONTROLLER to AUTO. • Verifies demand signals are matched and places PK-2308 in AUTO
	BOP	Step 12: PLACE the control switch for CONDENSATE BOOSTER PUMP B RECIRC, 1CE-261 in the MODU position. • Places control switch for 'B' Condesate Booster Pump recirc valve 1CE-261 to MODU position.

Op Test No.: NRC	Scenario # 3	Event # 1	Page 17 of 72
Event Description:	**Start "B" Condensate Booster Pump**		

Time	Position	Applicant's Actions or Behavior
	BOP	Step 13: After 5 to 10 minutes of running, VERIFY the VSF coupling oil level is in the normal operating range. • Contacts Aux Operator to verify the VSF coupling oil level is in the normal operating range after 5 to 10 minutes from when the pump was started.
Simulator Communicator:		**Acknowledge request to verify the VSF coupling oil level is normal in 5 to 10 more minutes.** **I will call you back if there is something abnormal.**
OP-134		Condensate System, Section 7.1, First Condensate Booster Pump Shutdown
	BOP	Shutdown the 'A' Condensate Booster Pump IAW Section 7.1
Procedure Note:		The letters and/or numbers in the parenthesis are for Condensate Booster Pump B.
Initial Conditions:		1. At least one Feed Pump has been secured per OP-134.01. 2. Both Condensate Booster Pumps are running. 3. CPD Operator and Chemistry have been notified of potential flow and pressure change in the condensate system.
	BOP	Verifies initial conditions are met
	BOP	**PLACE** PK-2307 (PK-2308) CNDST BSTR PUMP A (B) SPEED CONTROLLER to MAN and slowly zero the demand signal to maintain the FW PUMP SUCTION PRESS at 430 psig. • Slowly lowers PK-2307 to zero and maintains FW Pump Suction press ~ 430 psig with the 'B' Condensate Booster Pump

Op Test No.: NRC	Scenario # 3	Event # 1	Page 18 of 72
Event Description:	**Start "B" Condensate Booster Pump**		

Time	Position	Applicant's Actions or Behavior
	BOP	**STOP** Condensate Booster Pump A (B). • Takes the 'B' Condensate Booster Pump switch to STOP
	BOP	**ENSURE** Condensate Booster Pump Aux. Lube Oil Pump starts and runs for 14 to 16 minutes after Condensate Booster Pump is stopped. • Contacts AO to ensure Aux Lube Oil Pump started and continues to run for 14 – 16 minutes
Simulator Communicator:		**Acknowledge request to verify the Aux Lube Oil Pump started and runs for 14 – 16 minutes.** **I will call you back if there is something abnormal.**
	BOP	**SHUT** CONDENSATE BOOSTER PUMP A (B) DISCHARGE 1CE-227 (1CE-268). • Shuts A CBP discharge valve 1CE-227
	BOP	**VERIFY** CONDENSATE BOOSTER PUMP A (B) RECIRC, 1CE-220 (1CE-261) shuts. • Verifies 1CE-220 shuts • Informs SRO that 'B' Condensate Booster Pump is running and 'A' Condensate Booster Pump has been secured
	SRO	Acknowledges BOP and contacts WCC
End of OP-134 'B' Condensate Booster Pump Swap		
Evaluator Cue:		**When the BOP has completed swap of the 'B' Condensate Booster pump continue with the scenario.** **Cue Simulator Operator to insert Trigger 2:** **Event 2 – AH-39 fan trip with backup fan auto start failure**

Op Test No.: NRC	Scenario # 3	Event # 2	Page 19 of 72
Event Description:	**AH-39 Containment Fan Coil Unit Fan trip**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 2:** **AH-39 Containment Fan Coil Unit Fan trip** **(Note: there is approximately 20 second delay from the initiation of the trigger to actuation of fan trip and alarm)**
Indications Available		• ALB-029-4-5 CONTAINMENT FAN COOLERS AH-39 LOW FLOW - O/L • Increasing 'C' RCP stator winding temperatures
	BOP	RESPONDS to alarms and ENTERS APP-ALB-029-4-5
	BOP	• CONFIRM alarm using: o AH-39 fans running indication (NO) o Damper position indication (YES) • VERIFY Automatic Functions: o Running fan trips (YES) o Backup fan starts (NO) (BOP starts the standby fan when directed by SRO, may utilize OP-169 section 5.2 or the APP for guidance) • PERFORM Corrective Actions: o CHECK standby fan STARTS AND lead fan STOPS. o DISPATCH an operator to check status of the following breakers: ▪ 1D1-1A, AH-39 (1A-NNS) CNMT Fan Cooler ▪ 1E1-7C, AH-39 (1B-NNS) CNMT Fan Cooler
	SRO	Directs BOP to start standby Air Handler (this may take place prior to getting the report of the breaker condition) NOTE: The BOP may start the standby fan and then state to the SRO that he/she is starting the fan. In this case the SRO will just concur with this action.

Op Test No.: NRC	Scenario # 3	Event # 2	Page 20 of 72
Event Description:	**AH-39 Containment Fan Coil Unit Fan trip**		

Time	Position	Applicant's Actions or Behavior
Simulator Communicator:		**After approximately 1 minute from being dispatched to check the breaker for 1D1-1A, AH-39 (1A-NNS) CNMT Fan cooler breaker, report that:** ***"The indications on the Static Trip Unit show that an Overload Condition occurred for AH-39 A fan. There are no abnormalities on the AH-39A breaker."***
	BOP	○ IF any breaker has tripped on OVERLOAD or SHORT CIRCUIT as indicated on the Static Trip Unit, THEN PERFORM the following: **(Directs AO to perform based on report from communicator)** ▪ DEPRESS the breaker Alarm Reset. ▪ RACK OUT the breaker using OP-156.02, AC Electrical Distribution. ▪ VERIFY cause of the over current trip is determined prior to returning the breaker to service.
Simulator Communicator:		**Acknowledge request to perform directed actions at 1D1-1A**
Simulator Operator:		**Rack out breaker 1D1-1A for AH-39 and clear alarm** • **Activate Trg 15** **Trigger 15 will clear the alarm then 30 seconds later it will override the switch to STOP and turn off the RED and GREEN MCB switch lights.** **Have communicator report back 30 seconds after running the trigger.**
	SRO	Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist for the failure of AH-39. Contacts WCC and EM's for assistance with repairs.

Op Test No.: NRC	Scenario # 3	Event # 2	Page 21 of 72
Event Description:	**AH-39 Containment Fan Coil Unit Fan trip**		
Time	Position	Applicant's Actions or Behavior	

Evaluator Cue:	**When the BOP has completed start of the AH-39 (1B-NNS) CNMT Fan cooler, and the CRS has been informed the AH-39 (1B-NNS) CNMT Fan cooler is running, continue with the scenario.** **Cue Simulator Operator to insert Trigger 3:** **Event 3 – Letdown Temperature Controller fails to bypass demineralizers**

Op Test No.: NRC	Scenario # 3	Event # 3	Page 22 of 72
Event Description:	**LD Temp Controller fails with failure to bypass Demineralizers**		

Time	Position	Applicant's Actions or Behavior
Evaluator Cue:		**Event 3 – Input to Letdown Temperature Controller fails and failure to bypass demineralizers** **When breaker racking and assistance communications are completed, cue Simulator Operator to insert Trigger 3.**
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 3:** **Input to Letdown Temperature Controller fails** **LD/Diversion Valve fails to bypass demineralizers**
Indications Available:		• ALB-007-3-2, DEMIN FLOW DIVERSION HIGH TEMP • ALB-007-5-5, COMPUTER ALARM CHEM & VOL SYSTEMS • TK-144 output - decreases to 0 • TI-144.1 HX Out Temp – decreases to 0 • TI-143 temperature increasing
Evaluator Note:		**If the crew catches this failure early and temperature does not increase above 135°F then they may NOT identify that 1CS-50 is failed since there will be no reason for the valve to change position.** **Changes in Letdown temperature can have an effect on the demineralizers resins. During high input temperature a boron release can occur (effects similar to a boration) and during low input temperatures a boron absorption can occur (effects similar to a dilution).**
	RO	Responds to alarm and enters APP-ALB-007-3-2.

	RO	• CONFIRM alarm using:
		  o TI-143, LP Letdown Temperature.
		  o Reports TI-143 reading or trending high.
		• VERIFY Automatic Functions:
		  o Manually positions 1CS-50, Letdown to VCT/Demin, to divert flow to the VCT.

Op Test No.: NRC	Scenario # 3	Event # 3	Page 23 of 72
Event Description:	**LD Temp Controller fails with failure to bypass Demineralizers**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**CRS may direct manual control before APP is implemented.**
	RO	• PERFORM Corrective actions: o VERIFY that 1CS-50 diverts flow to the VCT, bypassing the BTRS and Purification Demineralizers. o PERFORM the following as needed to lower letdown temperature: ▪ VERIFY proper charging flow is established. (YES) ▪ LOWER letdown flow. (N/A – CCW Problem) o IF CCW flow to the Letdown Heat Exchanger appears low, THEN: ▪ TAKE manual control of TK-144. ▪ OPEN 1CC-337, to raise CCW flow.
	SRO	• Provide a temperature band IAW OMM-001 for operation of components in manual. OP-107 page 31 with TK-144 controller in auto directions is to maintain temperature from 110 – 120°F. **(NOTE this is not the only procedure that provides temperature guidance)** • Notify Health Physics that the demineralizers will remain bypassed • Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist • Contacts Work Control and/or System Engineer for assistance.
Simulator Communicator:		**If contacted as WCC, System Engineer, Health Physics or Chemistry: *"Maintain flow bypassing the demineralizers until a resin damage assessment is completed".***
Evaluator Cue:		**After crew has restored CCW flow to the Letdown Heat Exchanger, cue Simulator Operator to insert Trigger 4.** **NOTE: there is a 2 minute delay prior to the CCW alarm actuating.** **Event 4 – Component Cooling Water (CCW) system leak**

Op Test No.: NRC	Scenario # 3	Event # 4	Page 24 of 72
Event Description:		**CCW System Leak**	

Time	Position	Applicant's Actions or Behavior
Simulator Communicator:		**On cue from the Lead Evaluator actuate Trigger 4:** **Component Cooling Water system leak** **(Note: After the trigger is inserted it will take ~ 6 minutes for the CCW alarms to occur)**
Indications Available		• ALB-005-8-5, COMPUTER ALARM CCW SYSTEM • ALB-005-6-1, CCW SURGE TANK HIGH-LOW LEVEL • ALB-026-2-1, GROSS FAILED FUEL DET TROUBLE
Evaluator Note:		**The crew may enter AOP-014, LOSS OF COMPONENT COOLING WATER, when the first alarm is confirmed.**
	RO	RESPONDS to alarm ALB-005-8-5, COMPUTER ALARM CCW SYSTEM, and ALB-005-6-1, CCW SURGE TANK HIGH-LOW LEVEL.
	BOP	REPORTS CCW Surge Tank level alarm on alarm screen.
APP ALB-005		Actions from the APP are below but crew will most likely perform a direct entry into AOP-014. GO to page 25 if AOP-014 is entered
Procedure Note:		The CCW Surge Tank baffle plate separates Side A and Side B up to the 38% level.
	RO	CONFIRM alarm using: • LI-670A.1, CCW Surge Tank Level (Side A) • LI-676A.1, CCW Surge Tank Level (Side B)
	RO	MAINTAIN CCW Surge Tank level per SRO direction using 1DW-15, CCW Make Up.

Op Test No.: NRC	Scenario # 3	Event # 4	Page 25 of 72
Event Description:	**CCW System Leak**		

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY Automatic Functions: • CCW flow to the GFFD and Primary Sample Panel will isolate on a low CCW Surge Tank level (40%). **(Level should remain > 40%)** • CCW Holdup Tank Transfer Pump and the CCW Drain Tank Transfer Pump will trip on a high CCW Surge Tank level (75%). (N/A)
	RO	PERFORM Corrective Actions: • IF surge tank level is high AND rising. (N/A) • IF radiation activity level is increasing, THEN GO TO AOP-016, Excessive Primary Plant Leakage. (NO) • IF the alarm is due to plant heatup, THEN DRAIN the surge tank to normal level. (NO) • IF surge tank level is low, THEN GO TO AOP-014, Loss of Component Cooling Water. (YES)
	SRO	ENTERS and directs actions of AOP-014, LOSS OF COMPONENT COOLING WATER. Makes PA announcement for AOP entry Holds a crew focus brief
AOP-014		Loss Of Component Cooling Water
Procedure Note:		• This procedure contains no immediate actions. • Loss of CCW may require implementation of the SHNPP Emergency Plan.
	SRO	REFER TO PEP-110, Emergency Classification And Protective Action Recommendations, AND ENTER the EAL Matrix .
	SRO	EVALUATE plant conditions AND GO TO the appropriate section:

Op Test No.: NRC	Scenario # 3	Event # 4	Page 26 of 72
Event Description:	**CCW System Leak**		

Time	Position	Applicant's Actions or Behavior
		<table><tr><th>Malfunction</th><th>Section</th><th>Page</th></tr><tr><td>Leakage into CCW System</td><td>3.1</td><td>5</td></tr><tr><td>Leakage from CCW System</td><td>3.2</td><td>15</td></tr><tr><td>Loss of a CCW Pump</td><td>3.3</td><td>34</td></tr></table> • Determines section 3.2 is appropriate
	BOP/RO	CONTACTS AO to check RAB for CCW leaks. (This action is not procedurally directed but should happen during the course of implementing this AOP.)
Simulator Communicator:		**Acknowledge request.** **Wait 1 minute then report a leak in the suction header strainer flange between 1CC-27 and CCW Pump "A".**
Evaluator Note:		**The crew should begin to trace out where the leakage is and what to do to isolate the leakage using the MCR Simplified Flow Diagrams (SFDs). They should identify that the leak is isolated by shutting 1CC-27. They will see that isolating the leak will require them to start the standby pump and then secure the 'A' CCW pump. The crew may also shut 1CC-36 to isolate the discharge of the pump.**
	Crew	Identifies leak location on SFDs and determines method to isolate the leakage • Start 'B' CCW pump and secure 'A' CCW pump • Shut 1CC-27 • Shut 1CC-36
Simulator Communicator:		**Acknowledge crew directions to shut 1CC-27 and/or 1CC-36.**
Simulator Communicator:		**Sim Drawing CCW-CCW01, Close 1CC-27 (suction) and/or 1CC-36 (discharge) and delete MF CCW08A** **Then have Communicator report the valves closed approximately 1 minute after completion.**

Op Test No.: NRC	Scenario # 3	Event # 4	Page 27 of 72
Event Description:	**CCW System Leak**		

Time	Position	Applicant's Actions or Behavior
Simulator Communicator:		**If a leak report is requested from MCR to RW Operator: Rad Waste reports a rise in RAB floor drain in-leakage.**
Evaluator's Note:		**After leak is isolated by shutting 1CC-27 (pump suction) the crew may also shut 1CC-36 (pump discharge). IF the control power to the 'A' CCW pump is not removed from the pump any auto start of the 'A' CCW pump will cause the pump to run possibly without a suction or discharge path.**
Evaluator's Note:		**The path through the procedure may be different for each crew since it depends on when the leak location is known and how certain questions are answered. However, each crew should initiate makeup, swap running pumps, isolate the leak, and address the Tech Spec.**
Procedure Note:		The GFFD and RCS sample panel will isolate on low CCW Surge Tank level of less than or equal to 40%.
	RO	MAINTAIN CCW Surge Tank level between 45% and 75% using 1DW-15, CCW Make Up.
Procedure Note:		An affected CCW Pump is one to which any of the following apply: • Less than 4% level indicated on the CCW Surge Tank • Exhibits abnormal flow • IF non-essential header isolation valves are open, less than 4% level indicated on either CCW Surge Tank affects both CCW Pumps.
	RO	CHECK BOTH of the following conditions exist: • ALL CCW Surge Tank level indicators are greater than 4% (YES) • CCW Pump flow indication is NORMAL (YES)
	SRO	CHECK EITHER RHR Train in Shutdown Cooling Mode. (NO)

Op Test No.: NRC Scenario # 3 Event # 4 Page 28 of 72		
Event Description: **CCW System Leak**		
Time	Position	Applicant's Actions or Behavior
	RO/SRO	CHECK RCS temperature greater than 200°F. (YES)
	RO	CHECK CCW Surge tank level is > 40% (YES)
	RO/SRO	CHECK that CCW loads from the Non-Essential header require isolation by ANY of the following: (NO)
	RO/SRO	CHECK CCW lost to ANY operating RHR Train: (NO)
Evaluator Note:		**The steps highlighted below may not be performed IF the crew starts the 2nd CCW pump and has isolated the leak before reaching these steps.**
Procedure Caution:		Operation of RCPs for greater than 10 minutes without CCW cooling to the motor oil coolers may result in RCP bearing damage.
	SRO	CHECK CCW expected to be lost for greater than 10 minutes. (NO)
Procedure Caution:		Reactor Makeup Water Tank contains potentially tritiated water. Making up to the CCW System from the Reactor Makeup Water Tank could result in CCW System contamination. Operation of the system while it is contaminated requires an evaluation per 10CFR50.59.
	RO	CHECK CCW Surge Tank level STABLE OR RISING. (YES)

Op Test No.: NRC	Scenario # 3	Event # 4	Page 29 of 72
Event Description:	**CCW System Leak**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		• If the leak location is known, non-applicable steps (Steps 15 through 21) are not required to be performed. • If the leak location is not known, the CRS may direct performance of Steps 15 through 21 in any order. Steps 22 and 23 directing diagnostic and walkdown may be useful in determining leak location and may be performed prior to or in parallel with Steps 15 through 21. • Elevated leakage may be indicated by higher indicated levels, higher level controller setpoints, annunciators, evolutions in progress, notification by personnel, Chemistry sample results or other means. • RCDT in-leakage is indicated by elevated level controller output.
Simulator Communicator:		**If a leak report is requested from MCR to RW Operator:** **Rad Waste reports a rise in RAB floor drain in-leakage.**
	SRO	From the note above since the leak location is known from the Aux Operator report steps 15 – 21 are NOT required to be performed. Attachment 3 may be referenced but is not required to be implemented.
Simulator Communicator:		**If walkdown has NOT commenced acknowledge request.** **Wait 1 minute then report a leak in the suction header strainer flange between 1CC-27 and CCW Pump "A".**
	SRO	PERFORM a walkdown of CCW piping looking for leaks. • Walkdown was performed and leak location identified and isolated
Procedure Note:		Leakage in excess of 15.8 gph per train (unanticipated makeup greater than twice per shift) could exceed surge tank makeup capacity under design basis conditions.

Op Test No.: NRC	Scenario # 3	Event # 4	Page 30 of 72
Event Description:	**CCW System Leak**		

Time	Position	Applicant's Actions or Behavior
	SRO	WHEN the leak is LOCATED, THEN PERFORM the following: • CHECK that CCW System leakage can be isolated. (YES) • INITIATE corrective actions to restore system to service. • DIRECT Chemistry to sample CCW for proper corrosion inhibitor concentration. – Contacts Chemistry
Simulator Communicator:		**Acknowledge request for CCW sample**
	SRO	RESTORE CCW flow to the following, as needed: • Sample Heat Exchangers • GFFD • Excess Letdown • RCDT Heat Exchangers
	SRO	The SRO will complete OMM-001 Attachment 5 and request assistance from the WCC center to repair system leakage. The SRO should evaluate TS 3.7.3, 3.5.2 and 3.0.3. TS 3.7.3 Action: With only 1 CCW pump flow path OPERABLE, restore at least two flow paths to OPERABLE status within 72 hours or be in at least HSB within the next 6 hours and in CSD within the following 30 hours. TS 3.5.2: Both trains of ECCS INOPERABLE with NO applicable action statement apply TS 3.0.3. TS 3.0.3 Action: When a Limiting Condition for Operation is not met, except as provided in the associated ACTION requirements, within 1 hour action shall be initiated to place the unit in a MODE in which the specification does not apply by placing it, as applicable, in: HSB within the next 6 hours, HSD within the following 6 hours, and CSD within the subsequent 24 hours.
	SRO	DOCUMENT component manipulations per AD-OP-ALL-0204, Plant Status Control.

Op Test No.: NRC	Scenario # 3	Event # 4	Page 31 of 72
Event Description:	**CCW System Leak**		

Time	Position	Applicant's Actions or Behavior
	SRO	DIRECTS RO to start the 'B' CCW pump and stop the 'A' CCW Pump per OP-145.
Simulator Operator:		**If requested to remove control power from "A" CCW Pump either use the CCW drawing or find Remote Function: CCW075 CP_OFF**
OP-145		Component Cooling Water Section 5.2
	RO	VERIFIES Initial Conditions and contacts Aux Operator to perform pre-start checks on the 'B' CCW pump
Simulator Communicator:		**When contacted by RO – 'B' CCW pump prestart checks are completed and the pump is ready to be started.**
Procedure Note:		NOTE: Starting the second pump could cause ΔP fluctuations across REM-01CC-3501ASA (BSB) which may shut solenoid valves 1CC-23 and 1CC-40. NOTE: Starting the second pump may cause flow oscillations which could shut 1CC-252. Re-opening of 1CC-252 should not be attempted until the second pump is secured. NOTE: APP-ALB-005 Windows 1-3, 2-1, and 3-2 are expected alarms when starting the second CCW Pump.
Procedure Caution:		With one CCW pump running and the standby pump capable of an automatic start, ensure a minimum flow rate of 7850 gpm exists as indicated on FI-652.1 (FI-653.1). If both CCW pumps are running OR the CCW trains are separated, a minimum of 3850 gpm per pump is required. This lower flowrate should only be allowed for short durations to accomplish pump swapping or system realignment.

Op Test No.: NRC	Scenario # 3	Event # 4	Page 32 of 72
Event Description:	**CCW System Leak**		

Time	Position	Applicant's Actions or Behavior
	RO	Makes PA announcement that 'B' CCW pump is about to be started. Stand clear of the pump and breaker. Step 1: At the MCB, START CCW Pump Train B-SB. • Locates MCB start switch for ''B' CCW pump and starts pump • Verifies that indications are normal for the started pump.
Simulator Communicator:		**Inform RO that 'B' CCW pump has a good start.**
	RO	Step 2: VERIFY flow is greater than or equal to 3850 gpm on FI-653.1 and FI-652.1.
	RO	Step 3: VERIFY OPEN, 1CC-23 and 1CC-40, REM 3501 A CCW Inlet Solenoid Valve and REM 3501 B CCW Inlet Solenoid Valve respectively. • Contacts Aux Operator to verify
Simulator Communicator:		**Acknowledge request and report back in 1 minute** **1CC-23 and 1CC-40, REM 3501 A CCW Inlet Solenoid Valve and REM 3501 B CCW Inlet Solenoid Valves are OPEN**
	RO	PERFORM one of the following: • SECURE a second CCW Pump using Section 7.1.
OP-145		Component Cooling Water Section 7.1
	RO	VERIFIES Initial Conditions.
Procedure Note:		**The following Steps are written assuming shutdown of Train B-SB CCW pump. If shutting down Train A-SA CCW pump, use components in parenthesis.**

Op Test No.: NRC	Scenario # 3	Event # 4	Page 33 of 72
Event Description:	**CCW System Leak**		

Time	Position	Applicant's Actions or Behavior
	RO	Step 1: VERIFY OPEN, the following valves: • 1CC-99, CCW HEAT EXCHANGER A TO NONESSENTIAL SUP (YES) • 1CC-113, CCW HEAT EXCHANGER B TO NONESSENTIAL SUP (YES) • 1CC-127, CCW NONESSENTIAL RETURN TO HEADER B (YES) • 1CC-128, CCW NONESSENTIAL RETURN TO HEADER A (YES)
	RO	Step 2: VERIFY SHUT, 1CC-147 and 1CC-167, CCW FROM RHR HEAT EXCHANGER B-SB AND A-SA (YES)
Procedure Note:		**If pressure falls below 52 psig, the CCW pump will restart.**
Procedure Caution:		**Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.**
	RO	Step 3: At the MCB, PLACE the control switch for CCW Pump Train A-SA to STOP AND HOLD until system pressure stabilizes above 52 psig. • Stops 'A' CCW pump (may have been completed previously)
	RO	Step 4: VERIFY the following for Train A: • FLOW stops using FI-653.1 (FI-652.1) • PRESSURE remains greater than 75 psig suing PI-650 (PI-649).
	RO	Step 5: CHECK Train B flow rate between 10,000 and 11,000 gpm on MCB indicator FI-663.1. (YES)
Evaluator Cue:		**After the crew has completed AOP-014 actions to this point, cue the Simulator Operator to insert Trigger 5, "B" SG PORV opens** **Event 5 – "B" SG PORV fails partially OPEN in AUTO and MANUAL**

Op Test No.: NRC	Scenario # 3	Event # 5	Page 34 of 72
Event Description:	**"B" SG PORV fails partially OPEN in AUTO and MANUAL**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from Lead Evaluator insert Trigger 5** **SG B PORV, 1MS-60 fails Open in Auto and Manual**
Evaluator Note:		**This event is a Steam Generator partially failed open. This will require the field operators to locally isolate the valve by its block valve, 1MS-61. The SRO should evaluate Tech Specs 3.3.3.5, Remote Shutdown System, and 3.6.3, Containment Isolation Valves.**
Available Indications:		• ALB-014-8-5, Computer Alarm Steam Generators • ERFIS Point ID ZMS1255A 1MS-60 SG B PORV Not Shut
APP ALB-014		Actions from the APP are below but crew will most likely perform actions IAW AD-OP-ALL-1000, Section 5.5.13. GO to page 35 for AD-OP-ALL-1000 guidance.
Procedure Note:		ERFIS alarms will not re-flash on the Annunciator Panel when elevating from a Warning to Alarm on the same point. The only indication that the alarm has changed state will be a color change from yellow to red on the alarm screen. New alarm points that come in subsequently will initiate a single re-flash of the Annunciator window and follow the same process.
	BOP	CONFIRM alarm using one or more of the following ERFIS points (GD ALB 14): **Point ID Description Alarm Reset** • ZMS1255A 1MS-60 SG B PORV NOT SHUT
Evaluator Note:		**No Emergency Plan entry is required per the following note.**
Procedure Note:		If PBD8410 is determined to be the alarm input, Flash Tank Relief Valve operation may have occurred. Continuous Calorimetric results may be unacceptable due to non-conservative program inputs. If the alarm input is a SG PORV, and that SG PORV fails to fully reset after operation, entry into the Emergency plan would be required. A SG Blowdown line break may require entry into the Emergency Plan.

Op Test No.: NRC	Scenario # 3	Event # 5	Page 35 of 72
Event Description:	**"B" SG PORV fails partially OPEN in AUTO and MANUAL**		

Time	Position	Applicant's Actions or Behavior
	BOP	CHECK instrumentation on MCB associated with the alarming point. • DEPRESS Manual Pushbutton for PK-308B1 to take manual control of 'B' SG PORV • LOWER output for PK-308B1 to Shut 'B' SG PORV 1MS-60 ○ Output responds as desired, however 1MS-60 remains open DISPATCH an operator to check local indications associated with the alarming point.
Simulator Communicator:		**IF contacted to investigate PORV failure acknowledge the request and report back after 2 -3 minutes that Steam is coming from the SG PORV exhaust manifold and the valve is open 5 to 10 %.**
	BOP	IF any SG PORV fails to fully reset after operation, THEN REFER to PEP-110, Emergency Classification and Protective Action Recommendations. • NOTIFIES SM to refer to the EAL Matrix
	SRO	The SRO should evaluate TS 3.3.3.5 and TS 3.6.3. TS 3.6.3 Action: Isolate the affected penetration within 4 hours. The redundant manual isolation valve per PLP-106, Attachment 5 is 1MS-61.
Simulator Operator:		**If requested to Shut 1MS-61 insert Trigger 21 and direct the Simulator Communicator to report "1MS-61 is shut" after 1 minute.**
AD-OP-ALL-1000	BOP	IDENTIFIES 'B' SG PORV is partially OPEN via status lights
	BOP	Takes actions in accordance with AD-OP-ALL-1000 when an automatic controller malfunctions DEPRESS Manual Pushbutton for PK-308B1 to take manual control of 'B' SG PORV LOWER output for PK-308B1 to SHUT 'B' SG PORV 1MS-60 • Output responds as desired, however 1MS-60 remains open

Op Test No.: NRC Scenario # 3 Event # 5 Page 36 of 72		
Event Description: **"B" SG PORV fails partially OPEN in AUTO and MANUAL**		
Time	Position	Applicant's Actions or Behavior
	BOP	DISPATCH operator to locally isolate 'B' SG PORV
Simulator Communicator:		**IF contacted to investigate PORV failure acknowledge the request and report back after 2 -3 minutes that Steam is coming from the SG PORV exhaust manifold and the valve is open 5 to 10 %.**
	SRO	The SRO will complete OMM-001 Attachment 5 Equipment Problem Checklist for the failure of SG B PORV The SRO should evaluate TS 3.3.3.5 and TS 3.6.3. TS 3.6.3 Action: Isolate the affected penetration within 4 hours. The redundant manual isolation valve per PLP-106, Attachment 5 is 1MS-61. Contacts WCC and support personnel for repairs.
Simulator Operator:		**If requested to Shut 1MS-61 insert Trigger 21 and direct the Simulator Communicator to report "1MS-61 is shut" after 1 minute.**
Lead Evaluator:		**Once the plant has stabilized, cue Event 6, RCP "A" rising vibrations**

Op Test No.: NRC	Scenario # 3	Event # 6	Page 37 of 72
Event Description:	**"A" RCP High Vibrations**		

Time	Position	Applicant's Actions or Behavior

Simulator Communicator:		**On cue from the Lead Evaluator insert Trigger 6:** **"A" RCP high vibration**
Indications Available:		• **ALB-010-1-5, RCP-A TROUBLE** • **"A" RCP vibration monitors increasing and red high vibration lights lit**
	RO	Responds to alarm ALB-010-1-5.
Evaluator Note:		**Crew may review ALB-010-1-5 but will likely go directly to AOP-018 when high vibration is recognized.**
AOP-018	SRO	ENTERS and directs actions of AOP-018, Reactor Coolant Pump Abnormal Operations. Makes PA announcement for AOP entry Holds a crew focus brief
	RO	Perform AOP-018 Immediate Action
Immediate Action		Check any CSIP running. (YES)
	SRO	Inform SM to refer to PEP-110 and enter the EAL Matrix.
	SRO	**EVALUATE** plant conditions **AND GO TO** the appropriate section:

MALFUNCTION	SECTION	PAGE
High Reactor Coolant Pump Vibration	3.2	8

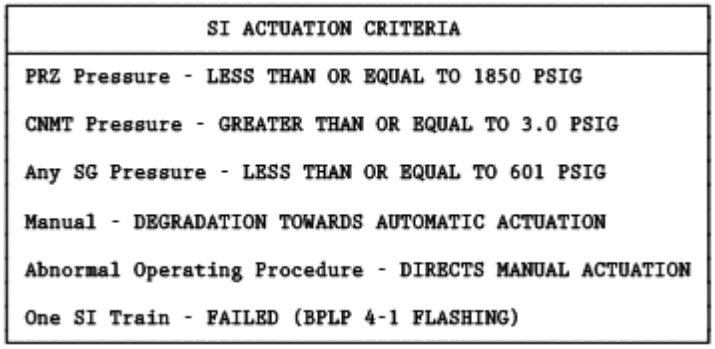
Op Test No.: NRC	Scenario # 3	Event # 6	Page 38 of 72
Event Description:	**"A" RCP High Vibrations**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**The answer to the following question may be YES at this time but the limit will be exceeded in short order. This is a continuous action step that should be implemented when the limit is exceeded. The scenario guide is therefore written as if the limit is exceeded when the step is read.**
	SRO/RO	Check all RCP's operating within limits of Att 1. (NO) ☐5. RCP vibration in excess of the following: **[A.1]** • 20 mils shaft • 15 mils shaft and increasing greater than 1 mil/hr • 5 mils frame • For A and C RCPs ONLY: 3 mils frame and increasing greater than 0.2 mil/hr • For B RCP ONLY: 3.5 mils frame and increasing greater than 0.2 mils/hr **When answer is NO (not operating w/limits) follow below:**
	SRO	CHECK the Reactor is TRIPPED. (NO)
	SRO	TRIP the Reactor AND GO TO EOP-E-0. (Perform Steps 4 through 7 as time permits.) Directs RO to manually trip the Reactor.

Op Test No.: NRC	Scenario # 3	Event # 6	Page 39 of 72
Event Description:	**"A" RCP High Vibrations**		

Time	Position	Applicant's Actions or Behavior
EOP-E-0	SRO	Steps through immediate actions with crew Makes plant PA announcement Makes PA announcement for EOP entry Holds a crew focus brief
Immediate Action	RO	Verifies Reactor is Tripped (YES) **REACTOR TRIP CONFIRMATION** Reactor Trip AND Bypass BKRs - OPEN Rod Bottom Lights (Zero Steps) - LIT Neutron Flux - DROPPING
Immediate Action	BOP	Verifies Turbine is Tripped – All throttle valves shut (YES) TURB STOP VLV 1 TSLB-2-11-1 TURB STOP VLV 2 TSLB-2-11-2 TURB STOP VLV 3 TSLB-2-11-3 TURB STOP VLV 4 TSLB-2-11-4
Immediate Action	BOP	Verify Power To AC Emergency Buses (YES) AC emergency buses – BOTH energized

Op Test No.: NRC	Scenario # 3	Event # 6	Page 40 of 72
Event Description:	**"A" RCP High Vibrations**		

Time	Position	Applicant's Actions or Behavior
Immediate Action	RO	Safety Injection Activated (NO) RNO action: Perform the following: a) Check Safety Injection – REQUIRED (NO)  SI ACTUATION CRITERIA PRZ Pressure - LESS THAN OR EQUAL TO 1850 PSIG CNMT Pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG Pressure - LESS THAN OR EQUAL TO 601 PSIG Manual - DEGRADATION TOWARDS AUTOMATIC ACTUATION Abnormal Operating Procedure - DIRECTS MANUAL ACTUATION One SI Train - FAILED (BPLP 4-1 FLASHING) b) IF Safety Injection actuation is NOT required, THEN GO TO ES-0.1, "REACTOR TRIP RESPONSE", Step 1.
	SRO	Directs RO/BOP to secure the 'A' RCP and continue with AOP-018 steps 4-7
	RO/BOP	STOPS 'A' RCP and places PK-444C.1 to manual then shuts valve with demand at 0%
	SRO	Transitions to ES-0.1, "REACTOR TRIP RESPONSE", Step 1.

Op Test No.: NRC	Scenario # 3	Event # 6	Page 41 of 72
Event Description:	**"A" RCP High Vibrations**		

Time	Position	Applicant's Actions or Behavior
EOP-ES-0.1		Reactor Trip Response
Procedure Note:		Foldout applies
	SRO	Assigns foldout items of ES-0.1.
Evaluator Aide:		

FOLDOUT

- **SI ACTUATION CRITERIA**

  IF any of the following occurs, **THEN** actuate SI **AND** GO TO E.0, "REACTOR TRIP OR SAFETY INJECTION", Step 1:

  - RCS subcooling - LESS THAN 10° F - C
    20° F - M
  - PRZ level - CAN **NOT** BE MAINTAINED GREATER THAN 5%

- **AFW SUPPLY SWITCHOVER CRITERIA**

  IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

	SRO	Initiate Monitoring Of Critical Safety Function Status Trees.
	SRO	Evaluate EAL Matrix.

Op Test No.: NRC	Scenario # 3	Event # 6	Page 42 of 72
Event Description:	**"A" RCP High Vibrations**		

Time	Position	Applicant's Actions or Behavior
	SRO / BOP	Check RCS Temperature: a. Check RCPs - ANY RUNNING (YES – 'B' and 'C') b. Check SG blowdown isolation valves shut (NO) Shut SG blowdown FCVs: • 1BD-18 (FCV-8405A) (SHUTS) • 1BD-37 (FCV-8405B) (SHUTS) • 1BD-56 (FCV-8405C) (SHUTS)
Evaluator Note:		**Since 'A' RCP was secured RCS temperature will continue to drop. The crew will most likely shut the MSIV's here. After the MSIV's are shut RCS temperature will recover.**
	BOP	Stabilize AND Maintain Temperature Between 555°F AND 559°F using Table 1.

TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP

- Guidance is applicable until another procedure directs otherwise.
- IF no RCPs running, THEN use wide range cold leg temperature.

	RCS TEMPERATURE TREND		
	LESS THAN 557°F AND DROPPING	GREATER THAN 557°F AND RISING	STABLE AT OR TRENDING TO 557°F
OPERATOR ACTION	• Stop dumping steam • Control feed flow • Maintain total feed flow greater than 210 KPPH until level greater than 25% at least one intact SG • IF cooldown continues, THEN, shut MSIVs AND BYPASS valves	• IF condenser available THEN transfer steam dump to STEAM PRESSURE mode using OP-126, Section 5.3 AND dump steam to condenser - OR - • Dump steam using intact SG PORVs • Control feed flow to maintain SG levels	• Control feed flow and steam dump to establish and maintain RCS temperature between 555°F AND 559°F

Informs CRS of cooldown then shuts ALL MSIV's

Evaluator Note:		**While the crew is stabilizing the plant after the MSIVs are shut and the crew sees that RCS temperature is stable or increasing then insert event 7** **Small Break LOCA inside Containment**

Op Test No.: NRC	Scenario # 3	Event # 7	Page 43 of 72
Event Description:	**Small Break LOCA**		

Time	Position	Applicant's Actions or Behavior
Simulator Communicator:		**On cue from the Lead Evaluator insert Trigger 7: Small Break LOCA**
	RO / BOP	Identifies changing Primary plant conditions and recommends SI based on fold out criteria of ES-0.1 for rapidly decreasing Subcooling approaching the setpoint and Pressurizer level will not be able to be maintained > 5%
	SRO	Directs RO to actuate Safety Injection
	RO	Manually actuates Safety Injection
EOP-E-0	SRO	Re-enters E-0 - performs a crew alignment brief then has crew verify: • Reactor Trip (YES) • Turbine Trip (YES) • AC emergency buses energized (YES) • Safety Injection – Actuated (Both Trains) (YES) BPLP 4-1,"SI ACTUATED" - LIT (CONTINUOUSLY)
	SRO	Assigns foldout items of E-0.

Op Test No.: NRC	Scenario # 3	Event # 7	Page 44 of 72
Event Description:	**Small Break LOCA**		

Time	Position	Applicant's Actions or Behavior

Evaluator Aide:	

REACTOR TRIP OR SAFETY INJECTION

FOLDOUT

- **RCP TRIP CRITERIA**

  IF both of the following occur, **THEN** stop all RCPs:

  - SI flow - GREATER THAN 200 GPM
  - RCS pressure - LESS THAN 1400 PSIG

- **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA**

  - **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT
  - **IF** RCS pressure rises to greater than 2200 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN

- **RHR RESTART CRITERIA**

  IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS.

- **RUPTURED SG AFW ISOLATION CRITERIA**

  IF all of the following occur to any SG, **THEN** stop feed flow by shutting the isolation valves (preferred) **OR** flow control valves to that SG:

  - Any SG level rises in uncontrolled manner **OR** has abnormal secondary radiation
  - Narrow range level - GREATER THAN 25% [40%]

- **AFW SUPPLY SWITCHOVER CRITERIA**

  IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

Op Test No.: NRC	Scenario # 3	Event # 7	Page 45 of 72
Event Description:	**Small Break LOCA**		

Time	Position	Applicant's Actions or Behavior
	CREW	Identifies Containment Adverse Conditions Containment Pressure > 3 psig
	SRO	Evaluate EAL Matrix.
	RO	Verifiy CSIPs – all running (YES) 'A' and 'B' running
	RO	Verify RHR Pumps – all running (YES) 'A' and 'B' running
	RO	Safety Injection flow > 200 gpm (NO)
	RO	Perform the following: a) Verify high head safety injection alignment: (1) CSIP suction from RWST valves - OPEN 1CS-291 (LCV-115B) (YES) 1CS-292 (LCV-115D) (YES) (2) VCT outlet valves - SHUT 1CS-165 (LCV-115C) (YES) 1CS-166 (LCV-115E) (YES) (3) Charging line isolation valves - SHUT 1CS-235 1CS-238 (4) BIT outlet valves - OPEN 1SI-3 (NO- under clearance) 1SI-4 (NO – unknown why) ATTEMPTS TO OPEN 1SI-4 (valve will NOT open) Informs SRO 1SI-4 will not OPEN
	SRO	Directs RO actions when high head safety injection flow path can NOT be aligned. Establish any other high head injection flow path (listed in order of preference): • Directs RO to OPEN 1SI-52 SA

Op Test No.: NRC	Scenario # 3	Event # 8, 9	Page 46 of 72
Event Description:	**SI-4 failure, RCP 'B' and 'C' manual Trip**		

Time	Position	Applicant's Actions or Behavior
Event 8 Critical Task #1	RO	Locates MCB controls for 1SI-52 SA and turns on control power and takes switch to OPEN Informs SRO that 1SI-52 SA is OPEN. Critical to establish SI flow using alternate high head safety injection to cold legs prior to exiting EOP-E-0. Identifies that Safety Injection flow is now exceeding 200 gpm
Evaluators Note:		**RCS pressure may be < 1400 psig by this point in the scenario. It may not be yet depending on the crews progression through the scenario. When the crew identifies that SI flow is > 200 gpm and RCS pressure is < 1400 psig they will secure RCPs IAW E-0 RCP trip criteria.**
Event 9 Critical Task #2	RO	Identifies that RCP trip criteria is met based on SI flow > 200 gpm with RCS pressure < 1400 psig and informs the SRO that RCP trip criteria is met and secures both **RCP 'B' and RCP 'C'** Critical to secure RCPs within 10 minutes of reaching RCP Trip criteria of SI flow > 200 gpm with RCS pressure < 1400 psig.
	SRO	RCS Pressure - LESS THAN 230 PSIG (NO)
	SRO	Main Steam Line Isolation – ACTUATED • NO – automatic MSLI is failed MAIN STEAM LINE ISOLATION ACTUATION CRITERIA CNMT pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG pressure - LESS THAN OR EQUAL TO 601 PSIG MANUAL - DEGRADATION TOWARDS AUTOMATIC ACTUATION Directs crew to actuate MSLI

Op Test No.: NRC	Scenario # 3	Event # 10	Page 47 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
Event 10	RO / BOP	Actuates MSLI Verifies MSIVs and Bypass Valves are SHUT The crew should identify that the MSIV before seat drain valves 1MS-231, 1MS-266 and 1MS-301 have failed to shut and SHUT each valve.
	BOP	Any SG pressure - 100 PSIG LOWER THAN PRESSURE IN TWO OTHER SGs (NO)
Evaluator Note:		**When Containment Spray is actuated a Phase "B" actuation signal will also be generated. Depending on the crews pace through the procedures they may reach this point with RCPs still in operation and RCS pressure above the E-0 fold out criteria for tripping RCPs. IF the crew has not secured RCPs at this point they will now.**
	RO	Check CNMT Pressure - HAS REMAINED LESS THAN 10 PSIG (YES / NO – it will exceed 10 psig) • Verify CNMT spray – ACTUATED (YES) • Stop all RCPs o Locates MCB switches for RCP's and STOPS 'B' and 'C' RCP (if not already done)
Evaluator Note:		**If SG Levels are high, RNO will be to establish greater than 40% level in all SGs. Abnormally high SG levels may be expected due to low steam demand at time of trip.**
	BOP	Verify AFW flow - AT LEAST 210 KPPH ESTABLISHED (YES)
	BOP	Sequencer Load Block 9 (Manual Loading Permissive) – ACTUATED (BOTH TRAINS) (YES)
	BOP	Energize AC buses 1A1 AND 1B1 • Locates control switches for breakers and energizes 1A1 and 1B1.

Op Test No.: NRC	Scenario # 3	Event # 10	Page 48 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**E-0, Attachment 3 is located in the back of this guide.**
Evaluator Note:		**E-0 Attachment 3 is included in the back of this scenario.** **The RO will perform all board actions until the BOP completes Attachment 3. The BOP is permitted to properly align plant equipment IAW E-0 Attachment 3 without SRO approval.** **The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 3 is not predictable.**
	BOP	Verify Alignment Of Components From Actuation Of ESFAS Signals Using Attachment 3, "Safeguards Actuation Verification", While Continuing With This Procedure.
	BOP	Directs AO to place 1A and 1B Air Compressor in the local control mode per E-0 Attachment 3 step 22
Simulator Communicator:		**Acknowledge the request to place 1A and 1B Air Compressor in the local control mode per E-0 Attachment 3 step 22**
Simulator Communicator:		**When directed to place the 1A and 1B Air Compressor in the local control mode:** **Run APP\air\acs_to_local**
Simulator Communicator:		**When the APP for 1A and 1B Air Compressor has completed running call the MCR and inform them that the air compressors are running in local control.**

Op Test No.: NRC	Scenario # 3	Event # 10	Page 49 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
	BOP	**D**irects AO to locally unlock **AND** turn ON the breakers for the CSIP suction **AND** discharge cross-connect valves, referring to E-0, Attachment 3, step 23.

MCC 1A35-SA		MCC 1B35-SB	
VALVE	CUBICLE	VALVE	CUBICLE
1CS-170	4A	1CS-171	4D
1CS-169	4B	1CS-168	7D
1CS-218	14D	1CS-220	9D
1CS-219	14E	1CS-217	12C

Simulator Communicator:		**Acknowledge request to unlock and turn on the breakers for the CSIP suction and discharge cross-connect valves E-0, Attachment 3, step 23.**
Simulator Communicator:		**When requested to unlock and turn on CSIP suction and discharge cross-connect valves: Run APP\cvc\E-0 Att 3 CSIP suct & disch valve power** **When the APP has completed running inform MCR that E-0, Attachment 3, step 23 is complete.**

Op Test No.: NRC	Scenario # 3	Event # 10	Page 50 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
Examiners Note:		**RCP's are secure therefore WR CL temperatures should be used when checking RCS temperature. RCS temp trend will be < 557° and dropping – control FF, maintain total FF > 210 KPPH until SG level > 40% (all MSIV's are shut)**
	RO	Stabilize AND Maintain Temperature Between 555°F AND 559°F Using Table 1.

TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP

- Guidance is applicable until another procedure directs otherwise.
- IF no RCPs running, THEN use wide range cold leg temperature.

	RCS TEMPERATURE TREND		
	LESS THAN 557°F AND DROPPING	GREATER THAN 557°F AND RISING	STABLE AT OR TRENDING TO 557°F
OPERATOR ACTION	• Stop dumping steam • Control feed flow • Maintain total feed flow greater than 210 KPPH until level greater than 25% [40%] in at least one on intact SG • IF cooldown continues, THEN, shut MSIVs AND BYPASS valves	• IF condenser available THEN transfer steam dump to STEAM PRESSURE mode using OP-126, Section 5.3 AND dump steam to condenser - OR - • Dump steam using intact SG PORVs • Control feed flow to maintain SG levels	• Control feed flow and steam dump to establish and maintain RCS temperature between 555°F AND 559°F

	RO	PRZ PORVs – SHUT (YES) PRZ Spray Valves – SHUT (YES - RCPs are secured) PRZ PORV Block Valves - AT LEAST ONE OPEN (YES)
	SRO	• Any SG pressure – DROPPING IN AN UNCONTROLLED MANNER OR COMPLETELY DEPRESSURIZED (NO) • Any SG - ABNORMAL RADIATION (NO) OR UNCONTROLLED LEVEL RISE (NO) • CNMT Pressure – NORMAL NO - GO TO E-1, "LOSS OF REACTOR OR SECONDARY COOLANT", Step 1.

Op Test No.: NRC	Scenario # 3	Event # 10	Page 51 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
EOP-E-1		Loss Of Reactor or Secondary Coolant
Procedure Note:		Foldout applies
	SRO	Performs focus brief with crew Assigns foldout items of E-1.
Evaluator Aide:		E-1 Foldout

FOLDOUT

- **RCP TRIP CRITERIA**

  IF both of the following occur, **THEN** stop all RCPs:

  - SI flow - GREATER THAN 200 GPM
  - RCS pressure - LESS THAN 1400 PSIG

- **AFW SUPPLY SWITCHOVER CRITERIA**

  IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

- **RHR RESTART CRITERIA**

  IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS.

- **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA**

  - **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT
  - **IF** RCS pressure rises to greater than 2200 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN

- **SECONDARY INTEGRITY CRITERIA**

  IF any of the following occurs, **THEN** GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1.

  - Any SG pressure - DROPS IN AN UNCONTROLLED MANNER **AND** THAT SG HAS **NOT** BEEN ISOLATED
  - Any SG - COMPLETELY DEPRESSURIZED **AND** THAT SG HAS **NOT** BEEN ISOLATED

- **E-3 TRANSITION CRITERIA**

  IF any SG level rises in an uncontrolled manner **OR** any SG has abnormal radiation levels, **THEN** GO TO E-3, "STEAM GENERATOR TUBE RUPTURE", Step 1.

- **COLD LEG RECIRCULATION SWITCHOVER CRITERIA**

  IF RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1 .

Op Test No.: NRC	Scenario # 3	Event # 10	Page 52 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
	SRO	Initiate Monitoring Of Critical Safety Function Status Trees.
	RO	Maintain RCP Seal Injection Flow Between 8 GPM And 13 GPM.
	BP	• Check Intact SG Levels: Any level - > 25% [40%] (YES / NO depends on monitoring and control – should be YES IF NO then Maintain total FF > 210 KKPH until level > 40% in at least 1 intact SG) • Control feed flow to maintain all intact levels between 25% And 50% [40% And 50%]. • Any level – Rising in an uncontrolled manner (NO)
	RO	Check PRZ PORV AND Block Valves: • Verify AC buses 1A1 AND 1B1 – ENERGIZED (YES) • Check PRZ PORVs – SHUT (YES) • Check block valves - AT LEAST ONE OPEN (YES) • IF a PRZ PORV opens on high pressure, THEN verify it shuts after pressure drops to less than opening setpoint.
	RO	Check SI Termination Criteria: RCS subcooling - > 10°F [40°F] - C 20°F [50°F] – M (NO)
	SRO	Check CNMT Spray Status: • Check any CNMT spray pump – RUNNING (YES) • Consult plant operations staff to determine if CNMT spray should be placed in standby.
Simulator Communicator:		**IF contacted for CNMT spray pump evaluation tell CRS that at this time leave the CNMT spray pumps running.**

Op Test No.: NRC	Scenario # 3	Event # 10	Page 53 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
	RO	Check Source Range Detector Status: Intermediate range flux - < 5x10-11 AMPS (YES) Verify source range detectors – ENERGIZED (YES) Transfer nuclear recorder to source range scale. (Transfers NR-45 to source range scale)
	RO	Check RHR Pump Status: Check RHR pump suction – ALIGNED TO RWST RWST Suction OPEN • RHR A: 1SI-322 (YES) • RHR B: 1SI-322 (YES) RCS Pressure - > 230 psig (YES) RCS pressure - STABLE OR RISING (NO)
	BOP / RO	Check RCS And SG Pressures: Check for both of the following: All SG pressures – Stable or Rising (YES) RCS pressure - Stable or Dropping (YES)
	RO	Establish CCW Flow To The RHR Heat Exchangers: • Verify both CCW pumps – RUNNING (No only 'B' CCW) • Open 1CC-167 • Verify CCW flow to the RHR heat exchanger
	BOP	Check EDG Status: Check AC emergency buses 1A-SA AND 1B-SB – ENERGIZED BY OFFSITE POWER (YES) Check bus voltages Check breakers 105 and 125 CLOSED (YES) Check any EDG – RUNNING UNLOADED (YES)
Evaluator Note:		**FR-P.1 may be entered. Implementation will not be required with RCS pressure < 230psig and RHR HX Flows > 1000gpm.**

Op Test No.: NRC	Scenario # 3	Event # 10	Page 54 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
	RO	Reset SI
	BOP	Manually realign safeguards equipment following a loss of offsite power Shutdown any unloaded EDGs using OP-155 section 7
Simulator Communicator:		**Acknowledge the request, state that you are heading out to the EDGs and will call back when you are there.**
	SRO	Initiate Evaluation Of Plant Status: • RHR system - CAPABLE OF COLD LEG RECIRCULATION (YES) • Check auxiliary AND radwaste processing building radiation – NORMAL (YES) Check RCS Status: Check for both of the following: • RCS pressure – LESS THAN 230 PSIG (NO) • Any RHR HX header flow - GREATER THAN 1000 GPM (NO) GO TO ES-1.2, "POST LOCA COOLDOWN AND DEPRESSURIZATION", Step 1.

Op Test No.: NRC	Scenario # 3	Event # 10	Page 55 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
EOP-ES-1.2		POST LOCA COOLDOWN AND DEPRESSURIZATION
	SRO	Implements ES-1.2 Performs crew focus brief
	RO	• Reset SI • Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. • Reset Phase A AND Phase B Isolation Signals. • Open Instrument Air AND Nitrogen To CNMT: o 1IA-819 o 1SI-287
	BOP	Monitor AC Buses: • Check AC emergency buses 1A-SA AND 1B-SB – ENERGIZED BY OFFSITE POWER (YES) • Check bus voltages • Check breakers 105 and 125 CLOSED (YES) • Check all non-emergency AC buses – ENERGIZED (YES)
Procedure Caution		PRZ heaters should **NOT** be energized until PRZ water level indicates greater than minimum recommended by plant operations staff to ensure heaters are covered.

Op Test No.: NRC	Scenario # 3	Event # 10	Page 56 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
	RO	Secure PRZ Heaters: • Place backup heaters in the OFF position. • Verify control heaters – OFF (YES) • Consult Plant Ops Staff for recommended minimum PRZ water level to keep heaters covered Check RHR Pump Status: (OFF) • Aligned to RWST (YES) • RCS Pressure > 230 psig (YES) • RCS Pressure – stable or increasing (NO) • Check RHR pump suction aligned to RWST (YES) • Stop RHR pumps
Evaluator Note:		**At some point during the implementation of ES-1.2 the break will clear and the Safety Injection flow filling the RCS with cold RWST water will cause pressure and temperature reduction.** **Soon afterward the pressure will decrease to < 650 psig allowing the Safety Injection Accumulators to inject into the RCS. The injection will cause further temperature and pressure reductions. The critical safety function status tree for RCS integrity will begin to toggle from Green to Yellow to Orange to Red. Eventually RCS Integrity will remain RED and the crew will transition to FR-P.1**
	BOP	• Check Intact SG Levels: Any level - GREATER THAN 25% [40%] (YES) • Control feed flow to maintain all intact levels between 25% and 50% [40% and 50%].
Procedure Note:		After the low steam pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.

Op Test No.: NRC	Scenario # 3	Event # 10	Page 57 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
	RO	• Check PRZ Pressure: Pressure - LESS THAN 2000 PSIG (YES) o Block low steam pressure SI o Initiate RCS Cooldown To Cold Shutdown: Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR
EOP FR-P.1		Response to Imminent Pressurized Thermal Shock
	SRO	Implements FR-P.1 Performs crew focus brief
	SRO	Foldout applies Assigns RO and BOP foldout actions
Evaluator Aide:		**FR-P.1 Foldout**

RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK

FOLDOUT

- **AFW SUPPLY SWITCHOVER CRITERIA**

  IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

- **COLD LEG RECIRCULATION SWITCHOVER CRITERIA**

  IF RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1.

Op Test No.: NRC	Scenario # 3	Event # 10	Page 58 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
	RO	Check RCS Pressure: Check for both of the following: • RCS pressure - LESS THAN 230 PSIG (NO / YES – it will be soon) • Any RHR HX header flow - > 1000 GPM RO restarts RHR pumps when RCS pressure < RHR shutoff head – EOP-ES-1.2 foldout action item
	RO	Check RCS Cold Leg Temperature Trend: • Check RCS Cold Leg Temperatures - STABLE OR RISING (NO)
Procedure Note:		A faulted SG is any SG that is depressurizing in an uncontrolled manner or is completely depressurized.
	BOP	Stop RCS Cooldown: Verify SG PORVs – SHUT (YES) Verify condenser steam dump valves – SHUT (YES) Check RHR system – IN SHUTDOWN COOLING MODE (NO) Any non-faulted SG level - > 25% [40%] (YES) Control feed flow to non-faulted SG(s) to stop RCS cooldown.
Procedure Caution:		IF the TDAFW pump is the only available source of feed flow, THEN maintain steam supply to the TDAFW pump from one SG.
	BOP	Minimize RCS Cooldown From Faulted SG(s): Check any SG – FAULTED (NO)
	RO	Check PRZ PORV Block Valves: • Verify power to block valves – AVAILABLE (YES) • Check block valves - AT LEAST ONE OPEN (YES)
Procedure Note:		IF PRZ PORV opens on high pressure, Step 6 should be repeated after pressure drops to less than PORV setpoint.

Op Test No.: NRC	Scenario # 3	Event # 10	Page 59 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
	RO	Check PRZ PORVs: Check all of the following: • Check LTOPS control switches - IN NORMAL (NOT BLOCKED) (NO – BLOCKED) • Check PRZ pressure - < 2335 psig (YES) • Verify PRZ PORVs – SHUT (YES)
	RO	Check SI Flow - > 200 gpm (YES)
	SRO	Check SI Termination Criteria: Check for both of the following: RCS subcooling - > 60°F [90°F] – C (NO)
Procedure Caution:		Following a complete loss of normal seal cooling, the affected RCP(s) should NOT be started prior to a status evaluation.
	SRO	Check If An RCP Should Be Started: RCS subcooling - GREATER THAN 10°F [40°F] – C (NO) Go to step 32
Procedure Caution:		Following an excessive cooldown, reactor vessel stress must be relieved to enhance and maintain vessel integrity. Do NOT perform any actions that raise pressure OR cause an RCS cooldown until the soak is complete.
Procedure Note:		Even if a soak period is required, steam may be released from intact SGs with pressure higher than the saturation pressure for lowest cold leg temperature.
	SRO	Determine RCS Soak Requirements: RCS cooldown rate - > 100°F in any 60 min period Perform one hour RCS soak: • Maintain RCS temperature stable. • Maintain RCS pressure stable. • Perform actions of other procedures that do NOT cause an RCS cooldown OR raise pressure.
Examiners Note:		END OF SCENARIO

Op Test No.: NRC	Scenario # 3	Event # 10	Page 60 of 72
Event Description:	**MSLI failure**		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator		**Instruct the Simulator Operator to place the Simulator in FREEZE and announce "I have the shift, remain in the Simulator and don't discuss the scenario. There may be follow up questions asked prior to your release."**
Simulator Operator		**When directed by the Lead Evaluator go to FREEZE**

Op Test No.: NRC	Scenario # 3	Event # 1	Page 61 of 72
Event Description:	**OP-134 Section 5.6 – Second Condensate Booster Pump Start Up**		

Time	Position	Applicant's Actions or Behavior

5.6. Second Condensate Booster Pump Start Up

NOTE: Letters and/or numbers in the parenthesis are for Condensate Booster Pump A.

5.6.1. Initial Conditions

1. One Condensate Booster Pump is in service per Section 5.5. _____
2. Condensate Booster Pump B (A) Lock-Out Relay reset. _____

CAUTION

To prevent damaging the CBP recirc valves, do not operate the second Condensate Booster Pump for more than 1.5 hours with MFP suction flow less than 4500 kpph.

3. Reactor Power is greater than 5%. (This initial Condition is N/A for short term starts, such as swapping pumps) _____
4. CPD Operator and Chemistry have been notified of potential flow and pressure changes in the Condensate System. _____

5.6.2. Procedural Steps

1. **PERFORM** prestart checks on Condensate Booster Pump B(A) per Attachment 6. _____
2. **VERIFY** CONDENSATE BOOSTER PUMP B (A) RECIRC, 1CE-261 (1CE-220) in MODU and shut. _____

CAUTION

There are no Condensate Booster Pump trips to protect the pump from running without seal water.

3. **PLACE** PK-2308 (PK-2307) CNDST BSTR PUMP B (A) SPEED CONTROLLER to MAN and zero the demand signal. _____
4. **VERIFY OPEN** 1CE-268 (1CE-227), CONDENSATE BOOSTER PUMP B (A) DISCHARGE. _____

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Event Description:	**OP-134 Section 5.6 – Second Condensate Booster Pump Start Up**		

Time	Position	Applicant's Actions or Behavior

5.6.2 Procedural Steps (continued)

NOTE: Computer points listed in Section 6.0 of this procedure may be monitored for information.

NOTE: When the Condensate Booster Pump control switch is placed to the START position, the Aux Lube Oil Pump will start and supply the VSF Coupling with oil until oil pressure is greater than or equal to 10 psig as indicated on PI-01LO-2304B(A), at which time the Condensate Booster Pump starts.

CAUTION

The amount of time the associated recirc valve, 1CE-261 (1CE-220) is open, should be minimized due to lack of lubrication without Condensate Booster Pump running.

5. **PLACE** the control switch CONDENSATE BOOSTER PUMP B (A) RECIRC, 1CE-261 (1CE-220) in the OPEN position immediately prior to starting Condensate Booster Pump B (A). _____

NOTE: Starting the second Condensate Booster Pump may cause the previously running pump controller to reject to Manual. This is due to the speed sensor on the pump being started initially providing a speed input signal that is based on electrical noise. If the running CBP controller rejects to manual, it is permissible to return the controller to Auto once the CBP being started reaches the no-load speed. If the controller again rejects to manual, then further investigation would be required.

6. **START** B (A) Condensate Booster Pump. _____

7. Locally **VERIFY** Condensate Booster Pump B (A) Aux Lube Oil Pump has stopped. _____

8. **CHECK** differential pressure across the Pall Replaceable Duplex Filter, as indicated between PI-01LO-2304B1 and PI-01LO-2304B2 (PI-01LO-2304A1 and PI-01LO-2304A2) is less than 15 PSI (less than 7 PSI when oil temperature has warmed up to normal). _____

9. **IF** differential pressure across the Pall Replaceable Duplex Filter is greater than or equal to 15 PSI,
THEN SWAP to the idle/out of service filter per Section 8.15 (greater than or equal to 7 PSI when oil temperature has warmed up to normal). _____

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Op Test No.: NRC	Scenario # 3	Event # 1	Page 63 of 72
Event Description:	**OP-134 Section 5.6 – Second Condensate Booster Pump Start Up**		

Time	Position	Applicant's Actions or Behavior

5.6.2 Procedural Steps (continued)

10. **SLOWLY INCREASE** the demand signal on PK-2308 (PK-2307) CNDST BSTR PUMP B (A) SPEED CONTROLLER to match the demand signal on the previously running Condensate Booster Pump Speed Controller. _____

11. **WHEN** the demand signals are matched,
THEN PLACE PK-2308 (PK-2307) CNDST BSTR PUMP B (A) SPEED CONTROLLER to AUTO. _____

12. **PLACE** the control switch for CONDENSATE BOOSTER PUMP B (A) RECIRC, 1CE-261 (1CE-220) in the MODU position. _____

13. After 5 to 10 minutes of running, **VERIFY** the VSF coupling oil level is in the normal operating range. _____

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REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 1 of 8
Safeguards Actuation Verification

NOTE

- General guidance for verification of safeguards equipment is contained in Attachment 4 of this procedure.
- ERFIS displays of safeguards equipment status are not reliable while any associated safety-related electrical buses are de-energized.

☐ 1. Verify Two CSIPs - RUNNING

☐ 2. Verify Two RHR Pumps - RUNNING

☐ 3. Verify Two CCW Pumps - RUNNING

☐ 4. Verify All ESW **AND** ESW Booster Pumps - RUNNING

☐ 5. Verify SI Valves - PROPERLY ALIGNED

(Refer to Attachment 1.)

☐ 6. Verify CNMT Phase A Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 4.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 2 of 8
Safeguards Actuation Verification

☐ 7. Verify SG Blowdown **AND** SG Sample Isolation Valves In Table 1 - SHUT

Table 1: SG Blowdown And Sample Isolation Valves

Process Line	Outside CNMT (MLB-1A-SA)	Inside CNMT (MLB-1B-SB)
SG A Sample	1SP-217	1SP-214/216
SG B Sample	1SP-222	1SP-219/221
SG C Sample	1SP-227	1SP-224/226
SG A Blowdown	1BD-11	1BD-1
SG B Blowdown	1BD-30	1BD-20
SG C Blowdown	1BD-49	1BD-39

8. **IF** Main Steam Line Isolation Actuated **OR** Is Required By Any Of The Following, **THEN** Verify MSIVs **AND** MSIV Bypass Valves - SHUT

☐ • Steam line pressure - LESS THAN 601 PSIG

☐ • CNMT pressure - GREATER THAN 3.0 PSIG

9. **IF** CNMT Spray Actuation Signal Actuated **OR** Is Required, **THEN** Verify The Following:

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 9.)

☐ • CNMT spray pumps - RUNNING

☐ • CNMT spray valves - PROPERLY ALIGNED

☐ • Phase B isolation valves - SHUT

☐ • All RCPs - STOPPED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 3 of 8
Safeguards Actuation Verification

☐ 10. Verify Both Main FW Pumps - TRIPPED

☐ 11. Verify FW Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 6.)

☐ 12. Verify both MDAFW pumps - RUNNING

13. **IF** any of the following conditions exist, **THEN** verify the TDAFW pump - RUNNING

☐ • Undervoltage on either 6.9 KV emergency bus

☐ • Level in two SGs - LESS THAN 25%

☐ • Manual actuation to control SG level

14. Verify AFW Valves - PROPERLY ALIGNED

☐ • **IF** no AFW Isolation Signal, **THEN** verify isolation and flow control valves - OPEN

NOTE

An AFW Isolation signal signal requires a Main Steam Line Isolation coincident with one SG pressure 100 PSIG below the other two SGs.

☐ • **IF** AFW Isolation Signal present, **THEN** verify MDAFW and TDAFW isolation and flow control valves to affected SG - SHUT

☐ 15. Verify Both EDGs - RUNNING

☐ 16. Verify CNMT Fan Coolers - ONE FAN PER UNIT RUNNING IN SLOW SPEED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 4 of 8
Safeguards Actuation Verification

☐ 17. Verify CNMT Ventilation Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 7.)

☐ 18. Verify Control Room Area Ventilation - MAIN CONTROL ROOM ALIGNED FOR EMERGENCY OPERATION

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 5, Sheets 1 and 2, Sections for MAIN CONTROL BOARD, SLB-5 and SLB-6.)

19. Verify Essential Service Chilled Water System Operation:

☐ • Verify both WC-2 chillers - RUNNING

☐ • Verify both P-4 pumps - RUNNING

☐ (Refer to AOP-026, "LOSS OF ESSENTIAL SERVICE CHILLED WATER SYSTEM" for loss of any WC-2 chiller.)

20. Verify CSIP Fan Coolers - RUNNING

☐ AH-9 A SA
☐ AH-9 B SB
☐ AH-10 A SA
☐ AH-10 B SB

NOTE

Security systems are powered by bus 1A1 (normal supply) or bus 1B1 (alternate supply). Backup power will be available for approximately 30 MINUTES after the supplying bus is de-energized. (Refer to OP-115, "CENTRAL ALARM STATION ELECTRICAL SYSTEMS", Section 8.9 and 8.10.)

☐ 21. Verify AC buses 1A1 **AND** 1B1 - ENERGIZED

☐ 22. Place Air Compressor 1A **AND** 1B In The LOCAL CONTROL Mode.

(Refer to Attachment 7.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 5 of 8
Safeguards Actuation Verification

CAUTION

The maximum calculated dose rate in the vicinity of MCC 1A35-SA and MCC 1B35-SB is between 10 MREM/HR and 150 MREM/HR.

☐ 23. Dispatch An Operator To Unlock **AND** Turn ON The Breakers For The CSIP Suction **AND** Discharge Cross-Connect Valves:

(Refer to Attachment 2.)

MCC 1A35-SA		MCC 1B35-SB	
VALVE	CUBICLE	VALVE	CUBICLE
1CS-170	4A	1CS-171	4D
1CS-169	4B	1CS-168	7D
1CS-218	14D	1CS-220	9D
1CS-219	14E	1CS-217	12C

24. Check If C CSIP Should Be Placed In Service:

☐ • **IF** two charging pumps can **NOT** be verified to be running, **AND** C CSIP is available, **THEN** place C CSIP in service in place of the non-running CSIP using OP-107, "CHEMICAL **AND** VOLUME CONTROL SYSTEM, Section 8.5 or 8.7.

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 6 of 8
Safeguards Actuation Verification

25. Start The Spent Fuel Pump Room Ventilation System:

a. At AEP-1, verify the following ESCWS isolation valves - OPEN

1) SLB-11 (Train A)

☐ • AH-17 SUP CH 100 (Window 9-1)

☐ • AH-17 RTN CH 105 (Window 10-1)

2) SLB-9 (Train B)

☐ • AH-17 SUP CH 171 (Window 9-1)

☐ • AH-17 RTN CH 182 (Window 10-1)

b. At AEP-1, start one SFP PUMP ROOM FAN COOLER:

☐ • AH-17 1-4A SA

☐ • AH-17 1-4B SB

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 7 of 8
Safeguards Actuation Verification

NOTE

- Fuel pool levels **AND** temperatures should be monitored approximately every 1 to 2 HOURS.
- Following the initial check of fuel pool levels and temperature, monitoring responsibilities may be assumed by the plant operations staff (including the TSC or STA).
- Only fuel pools containing fuel are required to be monitored.

26. Check Status Of Fuel Pools:

☐ a. Operate spent fuel cooling pumps to maintain fuel pool temperatures between 85°F and 105°F.

b. Monitor fuel pool levels **AND** temperatures:

☐ • Refer to AOP-041, "SPENT FUEL POOL EVENT" Attachments 7, 8, 9, 10 and 11 for SFP parameter monitoring methods.

☐ • Refer to Curves H-X-24, H-X-25 and H-X-26 for SFP time to 200°F.

☐ • Levels - GREATER THAN LO ALARM (284 FT, 0 IN)

☐ • Temperatures - LESS THAN HI TEMP ALARM (105°F)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 8 of 8
Safeguards Actuation Verification

NOTE

IF control room ventilation was previously aligned to an emergency outside air intake for post-accident operations, **THEN** follow-up actions will be required to restore the alignment.

27. Consult Plant Operations Staff Regarding Alignment Of The Control Room Ventilation System:

☐ • Site Emergency Co-ordinator - Control Room

☐ • Site Emergency Co-ordinator - Technical Support Center

(Refer to PEP-230, "CONTROL ROOM OPERATIONS".)

- END -

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Event Description:	**Scenario Guide Revision Summary**		

Rev. 0

Initial Development

Rev. 1

NRC D-1 Outline comments incorporated

Rev. 2

Operation validation comments incorporated

Rev. 3

NRC 60 day submittal comments incorporated

Rev. 4

NRC Prep Week comments incorporated

Rev. Final

Approved for administration by NRC Region II