Exelon Generation.

Training Id: **2015 NRC RO Admin COO1** Revision: **0.0**

Title: **Perform Jet Pump Flow Mismatch Checks IAW N2-OSP-LOG-D001, Attachment 10**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	6/1/15
Validated By	Brian Hilliker	9/29/15
Facility Reviewer	MARK GREER	10/2/15

Approximate Duration: 30 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: ________

References

1. N2-OSP-LOG-D001, Daily Checks Log
2. N2-OP-29, Reactor Recirculation System
3. NUREG 1123, 2.1.18 (3.6)

Instructor Information

A. JPM Information

1. Description
   a. This JPM tests the operator's ability to perform daily logs
   b. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:
   a. NS-OM202-03002, Review and Approve Operator Logs
   b. K/A 2.1.18 (3.6) Ability to make accurate, clear, and concise logs, records, status boards, and reports.

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Classroom
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location
   a. Training Classroom

5. JPM Setup (if required)
   a. Ensure each operator has a calculator.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is operating at 100% power. • N2-OSP-LOG-D001 is in progress. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, given the data provided on JPM Attachment 1, complete Attachment 10 of N2-OSP-LOG-D001. Summarize your results and document any recommended actions on JPM Attachment 2.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary.	P	SAT / UNSAT **STD:** Proper communications used.
2.	Obtain a copy of the reference procedure and review / utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** Refers to the provided N2-OSP-LOG-D001, attachment 10.
Evaluator Note:	The attached key shows N2-OSP-LOG-D001 completed as described in JPM steps 3-20		
3.	Record Recirc Pump Speed by checking appropriate choice	P Step 1	SAT / UNSAT **STD:** from JPM initial conditions, determines that Recirc Pump speed is 60 Hz and records in Step 1.0
4.	Record Recirc FCV Positions in Table 10-1	P Step 2.1	SAT / UNSAT **STD:** Records Recirc FCV Positions in Table 10-1: Loop A – 68 Loop B – 76

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
5.	Record Summed Jet Pump Loop Flows from indicators B22-R611A and B22-R611B in Table 10-1 and Table 10-2	P Step 2.2	SAT / UNSAT **STD:** Records Summed Jet Pump Loop Flows in Table 10-1 and Table 10-2: Loop A – 55 Loop B – 54
6.	Using the Recirc FCV Position for Loop A recorded in Table 10-1, obtain the Jet Pump Loop Flow High AND Low Limits for Loop A from Figure 10-1 AND record them in Table 10-1	P Step 2.3	SAT / UNSAT **STD:** Records flow limits for Loop A in Table 10-1: High – 57 (±0.5) Low – 46.5 (±0.5)
7.	Using the Recirc FCV Position for Loop B recorded in Table 10-1, obtain the Jet Pump Loop Flow High AND Low Limits for Loop B from Figure 10-2 AND record them in Table 10-1	P Step 2.3	SAT / UNSAT **STD:** Records flow limits for Loop B in Table 10-1: High – 57.5 (±0.5) Low – 47 (±0.5)
8.	Compare the actual Loop A AND Loop B Jet Pump Flows to the respective Loop High AND Low Limits, as recorded in Table 10-1, AND indicate below whether the actual values fall within the Limits	P Step 2.4	**PASS / FAIL** **STD:** Reviews the data in table 10-1 and indicates the values are within the limits for both loops
9.	Record Recirc Loop Drive Flows from recorder B35-R614, RECIRC FLOW LOOP B/FLOW LOOP A, on 2CEC*PNL602, in Table 10-2	P Step 3.2.1	SAT / UNSAT **STD:** Records Recirc Loop Drive Flows in Table 10-2: Loop A – 42 Loop B – 41
10.	Using the Recirc Loop A Drive Flow recorded in Table 10-2, obtain the Jet Pump Loop Flow High AND Low Limits for Loop A from Figure 10-3 AND record them in Table 10-2	P Step 3.3.1	SAT / UNSAT **STD:** Records Jet Pump Loop Flow High and Low Limits for Loop A in Table 10-2: High – 57 (±0.5) Low – 46 (±0.5)

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
11.	Using the Recirc Loop B Drive Flow recorded in Table 10-2, obtain the Jet Pump Loop Flow High AND Low Limits for Loop B from Figure 10-4 AND record them in Table 10-2	P Step 3.3.2	SAT / UNSAT **STD:** Records Jet Pump Loop Flow High and Low Limits for Loop B in Table 10-2: High – 55 (±0.5) Low – 45 (±0.5)
12.	Compare the actual Loop A AND Loop B Jet Pump Flows to the respective Loop High AND Low Limits, as recorded in Table 10-2, AND indicate below whether the actual values fall within the Limits	P Step 3.4	**PASS / FAIL** **STD:** Reviews the data in Table 10-2 and indicates the values are within the limits for both loops
13.	Record value for each Jet Pump ΔP in Loop A, as read on computer points NSSFA102 to NSSFA111, in Table 10-3	P Step 4.1	SAT / UNSAT **STD:** Records each Jet Pump ΔP in Loop A on Table 10-3
14.	Calculate Loop A Average Jet Pump ΔP and record in Table 10-3 **Note:** Reasonable error may be expected based on use of significant digits.	P Step 4.2	SAT / UNSAT **STD:** Calculates Loop A Average Jet Pump ΔP to be ~5.59
15.	Divide each Loop A Jet Pump ΔP by Loop A Average Jet Pump ΔP AND record the resulting Individual to Average ΔP Ratios in Table 10-3 **Note:** Reasonable error may be expected based on use of significant digits.	P Step 4.3	SAT / UNSAT **STD:** Divides each jet pump ΔP by the average and records in Table 10-3 ❑ Jet pump 1 = 1.05 ❑ Jet pump 2 = 0.88 ❑ Jet pump 3 = 0.97 ❑ Jet pump 4 = 0.95 ❑ Jet pump 5 = 1.12 ❑ Jet pump 6 = 1.14 ❑ Jet pump 7 = 0.97 ❑ Jet pump 8 = 0.95 ❑ Jet pump 9 = 0.97 ❑ Jet pump 10 = 1.00

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
16.	For ALL Jet Pumps in Loop A, compare each Jet Pump's Individual to Average ΔP Ratio to the Limits given in Table 10-3 AND indicate below whether the actual values are within the Limits	P Step 4.4	**PASS / FAIL** **STD:** Reviews the data in Table 10-3 and indicates that Jet Pumps 1-10 are all within limits
17.	Record value for each Jet Pump ΔP in Loop B, as read on computer points NSSFA112 to NSSFA121, on Table 10-3	P Step 4.5	SAT / UNSAT **STD:** Records each Jet Pump ΔP in Loop B on Table 10-3
18.	Calculate Loop B Average Jet Pump ΔP for AND record on Table 10-3 **Note:** Reasonable error may be expected based on use of significant digits.	P Step 4.6	SAT / UNSAT **STD:** Calculates Loop B Average Jet Pump ΔP to be ~5.39
19.	Divide each Loop B Jet Pump ΔP by Loop B Average Jet Pump ΔP AND record the resulting Individual to Average ΔP Ratios in Table 10-3 **Note:** Reasonable error may be expected based on use of significant digits.	P Step 4.7	SAT / UNSAT **STD:** Divides each jet pump ΔP by the average and record in table 10-3 ❑ Jet pump 11 = 1.04 ❑ Jet pump 12 = 0.98 ❑ Jet pump 13 = 0.76 ❑ Jet pump 14 = 0.96 ❑ Jet pump 15 = 1.11 ❑ Jet pump 16 = 1.16 ❑ Jet pump 17 = 1.04 ❑ Jet pump 18 = 0.98 ❑ Jet pump 19 = 1.01 ❑ Jet pump 20 = 0.96
20.	For ALL Jet Pumps in Loop B, compare each Jet Pump's Individual to Average ΔP Ratio to the Limits given in Table 10-3 AND indicate below whether the actual values are within the Limits	P Step 4.8	**PASS / FAIL** **STD:** Reviews the data in Table 10-3 and indicates that Jet Pumps 11, 12, 14-20 are all within limits; indicates that Jet Pump 13 is NOT within limits

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
21.	Informs CRS / SM that Jet Pump 13 is not within the limits of Table 10-3 **<u>Cue:</u>** As CRS / SM, inform candidate that appropriate actions will be taken for Jet pump 13	P	SAT / UNSAT **STD:** CRS /SM informed to take actions for Jet pump 13

TASK STANDARD	Attachment 10 of N2-OSP-LOG-D001 complete. Identify Jet pump number 13 differential pressure is outside of limits.

STOP TIME	

Evaluator's Answer Key

Do Not Provide to Candidate

Attachment 3: Evaluation and Recommendation(s)

Record your Results Below	
	Name:
	Summary of Evaluation Data:
	• Actual Loop A and Loop B jet pump flows are within limits of Table 10-2 • Loop A Jet Pumps are within limits of Table 10-3 • Loop B Jet Pump 13 is NOT within specified limits of Table 10-3. All other jet pumps are within Table 10-3 limits.
	Summary of Recommended Actions
	Reported to CRS/SM

JPM Handout

INITIAL CONDITIONS	Given: • The plant is operating at 100% power. • N2-OSP-LOG-D001 is in progress. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, given the data provided on JPM Attachment 1, complete Attachment 10 of N2-OSP-LOG-D001. Summarize your results and document any recommended actions on JPM Attachment 2.

JPM Attachment 1: N2-OSP-LOG-D001 Data Sheet

OK TO PROVIDE TO CANDIDATE

Item #	Description		Value	
1	**2RCS-HC1603A**, RECIRC LOOP A FLOW CONTROL		68%	
2	**2RCS-HC1603B**, RECIRC LOOP B FLOW CONTROL		76%	
3	**B22-R611A**, RECIRC LOOP 1A SUM JET PMP FLO		55 Mlbm/Hr (Flow Oscillations Minimal)	
4	**B22-R611B**, RECIRC LOOP 1B SUM JET PMP FLO		54 Mlbm/Hr (Flow Oscillations Minimal)	
5	**B35-R614** RECIRC FLOW LOOP A		42,000 gpm (Flow Oscillations Minimal)	
6	**B35-R614** RECIRC FLOW LOOP B		41,000 gpm (Flow Oscillations Minimal)	
7	**Computer Point Indications for Jet Pump Flows**			
	Loop A		**Loop B**	
	Jet pump 1	5.85	Jet pump 11	5.58
	Jet pump 2	4.90	Jet pump 12	5.30
	Jet pump 3	5.44	Jet pump 13	4.08
	Jet pump 4	5.44	Jet pump 14	5.17
	Jet pump 5	6.26	Jet pump 15	5.98
	Jet pump 6	6.53	Jet pump 16	6.26
	Jet pump 7	5.44	Jet pump 17	5.58
	Jet pump 8	5.44	Jet pump 18	5.30
	Jet pump 9	5.44	Jet pump 19	5.44
	Jet pump 10	5.71	Jet pump 20	5.17

JPM Attachment 2: Evaluation and Recommendation(s)

OK TO PROVIDE TO CANDIDATE

Record your Results Below	
	Name:
	Summary of Evaluation Data:
	Summary of Recommended Actions

Attachment 10, Two Loop Jet Pump Operability Verification

Sheet 1 of 15

N/A, Plant is in single loop operation .... (__)

N/A, Plant NOT in Mode 1 OR 2. .... (__)

Initials

1.0 Record Recirc Pump Speed by checking appropriate choice below:

- 15 Hz (__)
- 60 Hz (X)

2.0 Comparison of Indicated Jet Pump Loop Flows to Predicted Jet Pump Loop Flows by Recirc Flow Control Valve Positions (SR 3.4.3.1.a)

2.1 Record Recirc Flow Control Valve (FCV) Positions, as follows:

2.1.1 IF Recirc FCV Positions, as read on 2RCS-HC1603A, RECIRC LOOP A FLOW CONTROL, AND 2RCS-HC1603B, RECIRC LOOP B FLOW CONTROL, are less than or equal to 85% for FCV A AND less than or equal to 95% for FCV B, record Recirc FCV Positions in Table 10-1.

N/A, One OR BOTH Recirc FCV Positions, as read on 2RCS-HC1603A OR 2RCS-HC1603B, are greater than 85% for FCV A AND greater than 95% for FCV B.. (__) XX

2.1.2 IF one OR BOTH Recirc FCV Positions as read on 2RCS-HC1603A AND 2RCS-HC1603B, are greater than 85% for FCV A AND greater than 95% for FCV B, obtain Recirc FCV Positions from TARS as follows:

N/A, BOTH Recirc FCV Positions, as read on 2RCS-HC1603A OR 2RCS-HC1603B, are less than or equal to 85% for FCV A AND less than or equal to 95% for FCV B.. (X)

a. Using TARS Point ID 2002, obtain Recirc Loop A FCV Position AND record in Table 10-1. ______

b. Using TARS Point ID 2003, obtain Recirc Loop B FCV Position AND record in Table 10-1. ______

Initials

2.2 Record Jet Pump Loop Flows as follows:

2.2.1 IF flow oscillations on indicators do NOT make an accurate reading difficult, record Summed Jet Pump Loop Flows from Indicators B22-R611A, RECIRC LOOP 1A SUM JET PMP FLO, AND B22-R611B, RECIRC LOOP 1B SUM JET PMP FLO, on 2CEC*PNL602, in the following places:

N/A, TARS used due to flow oscillations .... (__)

- Table 10-1 XX
- Table 10-2 XX

2.2.2 IF flow oscillations on indicators make an accurate reading difficult, THEN perform the following:

N/A, 2CEC*PNL602 meters were used .... (X)

a. Obtain a 1 min mean of PID 2042, Loop A Jet Pump Flow using TARS Point ID 2674. ______

b. Record the value of Jet Pump Loop A Flow obtained in the Step above in the following places:

- Table 10-1 ______
- Table 10-2 ______

c. Obtain a 1 min mean of PID 2043, Loop B Jet Pump Flow using TARS Point ID 2673. ______

d. Record the value of Jet Pump Loop B Flow obtained in the Step above in the following places:

- Table 10-1 ______
- Table 10-2 ______

Initials

2.3 Determine the High AND Low Limits for Jet Pump Loop Flows as follows:

2.3.1 IF Recirc Pumps are in slow speed operation, enter the following in Table 10-1 for the High AND Low Limits:

N/A, Recirc Pumps are in high speed operation .... (X)

- High Limit: 21.43 Mlb_m/Hr
- Low Limit: 17.54 Mlb_m/Hr XX

2.3.2 IF the Recirc Pumps are in high speed operation, perform the following:

N/A, Recirc Pumps are in low speed operation .... (__)

a. Using the Recirc FCV Position for Loop A recorded in Table 10-1, obtain the Jet Pump Loop Flow High AND Low Limits for Loop A from Figure 10-1 AND record them in Table 10-1. XX

b. Using the Recirc FCV Position for Loop B recorded in Table 10-1, obtain the Jet Pump Loop Flow High AND Low Limits for Loop B from Figure 10-2 AND record them in Table 10-1. XX

2.4 Compare the actual Loop A AND Loop B Jet Pump Flows to the respective Loop High AND Low Limits, as recorded in Table 10-1, AND indicate below whether the actual values fall within the Limits:

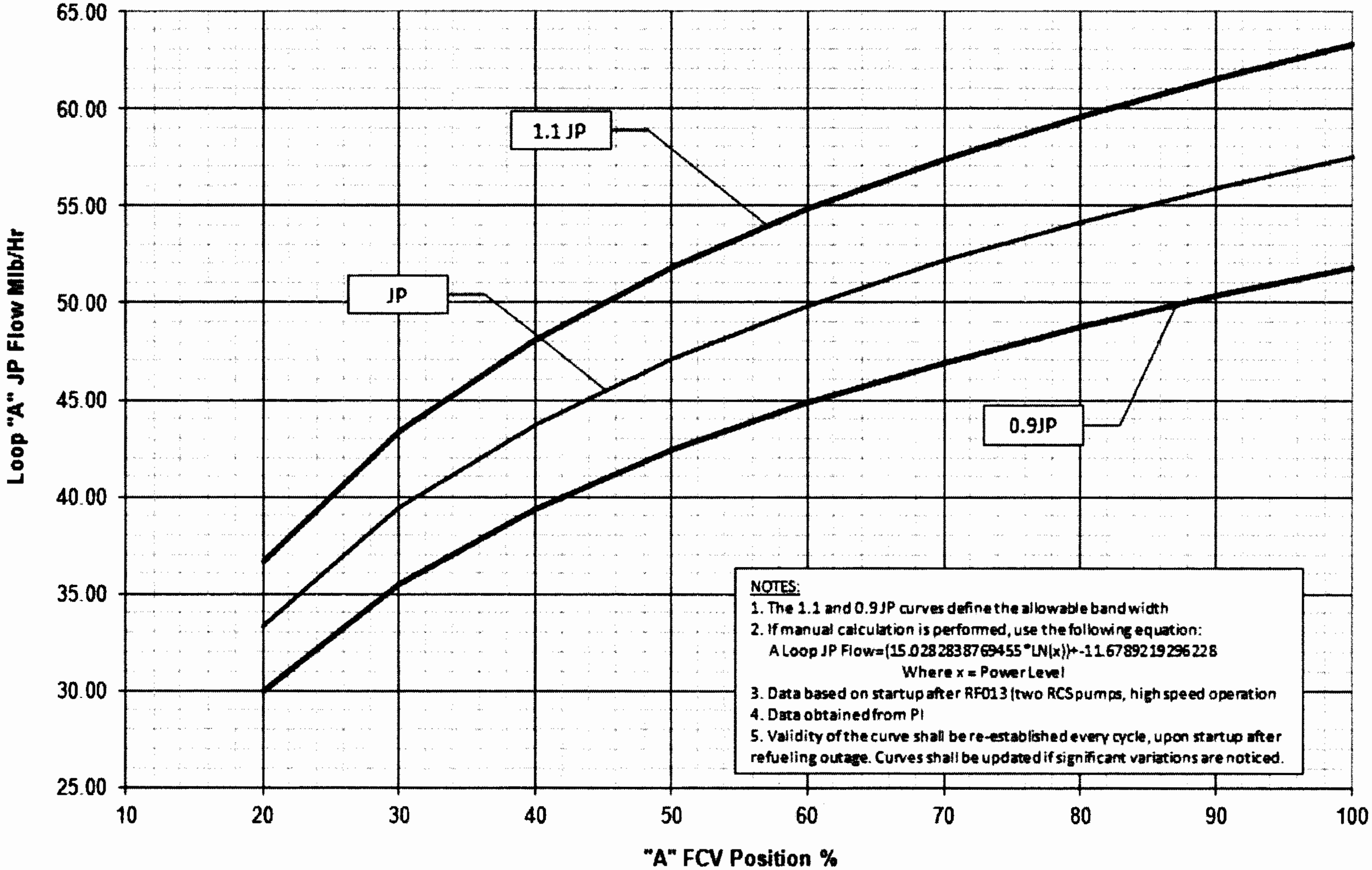
	Yes	No
• Loop A:	(X)	(__)
• Loop B:	(X)	(__)

XX

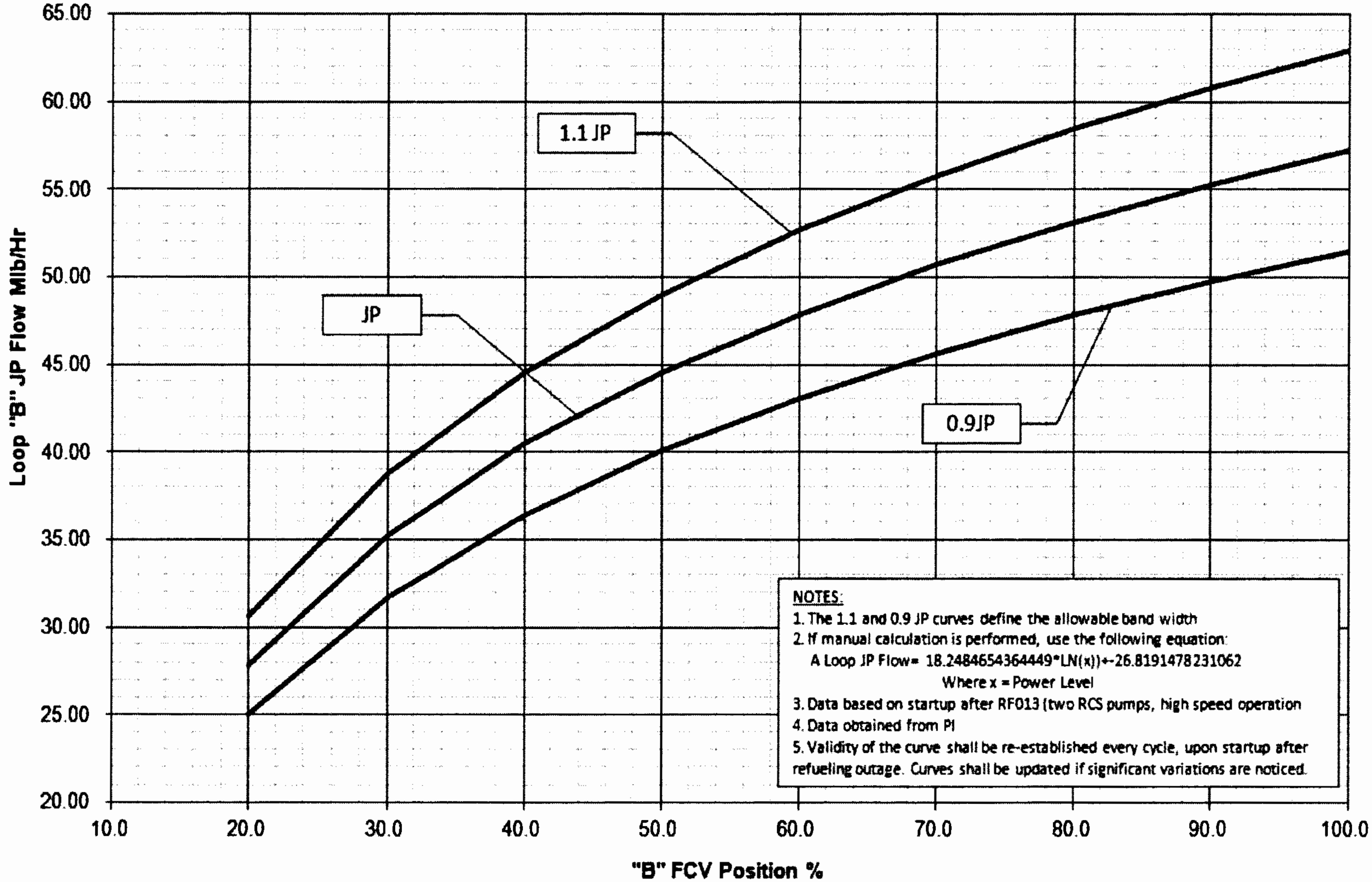
Table 10-1

Recirc Loop A				Recirc Loop B			
FCV A (%)	Loop A Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)	FCV B (%)	Loop B Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)
68	55	57	46.5	76	54	57.5	47

Predicted JP Loop A Flow By FCV Position (Figure 10-1)



Predicted JP Loop B Flow By FCV Position (Figure 10-2)



Initials

3.0 Comparison of Indicated Jet Pump Loop Flows to Predicted Jet Pump Loop Flows by Recirc Loop Drive Flows (TS SR 3.4.3.1.b)

3.1 Verify the Jet Pump Loop Flows have been recorded in Table 10-2. XX

3.2 Obtain Recirc Loop Drive Flows as follows:

3.2.1 IF flow oscillations on recorder do NOT make an accurate reading difficult, record Recirc Loop Drive Flows from recorder B35-R614, RECIRC FLOW LOOP B/FLOW LOOP A, on 2CEC*PNL602, in Table 10-2.

N/A, TARS used due to flow oscillations .... (__) XX

3.2.2 IF flow oscillations on recorder makes an accurate reading difficult, perform the following:

N/A, 2CEC*PNL602 recorder was used .... (X)

a. Obtain a 1 min mean of PID 2045, RCS Loop A Flow using TARS Point ID 2672. ______

b. Record the value of Recirc Loop A Drive Flow in Table 10-2. ______

c. Obtain a 1 min mean of PID 2046, RCS Loop B Flow using TARS Point ID 2671. ______

d. Record the value of Recirc Loop B Drive Flow in Table 10-2. ______

e. Attach TARS plot to this procedure. ______

3.3 Determine the High AND Low Limits for Jet Pump Loop Flow as follows:

- For High Speed Pump Operation, perform 3.3.1 AND 3.3.2.
- For Low Speed Pump Operation, perform 3.3.3 AND 3.3.4.

3.3.1 Using the Recirc Loop A Drive Flow recorded in Table 10-2, obtain the Jet Pump Loop Flow High AND Low Limits for Loop A from Figure 10-3 AND record them in Table 10-2.

N/A, Recirc Pumps in Low Speed Operation .... (__) XX

Initials

3.3.2 Using the Recirc Loop B Drive Flow recorded in Table 10-2, obtain the Jet Pump Loop Flow High AND Low Limits for Loop B from Figure 10-4 AND record them in Table 10-2.

N/A, Recirc Pumps in Low Speed Operation .... (__) XX

3.3.3 Using the Recirc Loop A Drive Flow recorded in Table 10-2, calculate the Jet Pump Loop Flow High AND Low Limits for Loop A using the following equation AND record them in Table 10-2.

NOTE: "WDA" in the equation is "A" Recirc Loop Drive Flow in gpm, not kgpm, and JP units as calculated are Mlbm/hr.

$JP = 12.197 + 0.0006WDA + 0.000000008WDA^2$
JP high limit = (1.1)JP
JP low limit = (0.9)JP

N/A, Recirc Pumps in High Speed Operation .... (X) ______

______
IV

3.3.4 Using the Recirc Loop B Drive Flow recorded in Table 10-2, calculate the Jet Pump Loop Flow High AND Low Limits for Loop B using the following equation AND record them in Table 10-2.

NOTE: "WDB" in the equation is "B" Recirc Loop Drive Flow in gpm, not kgpm, and JP units as calculated are Mlbm/hr.

$JP = 12.197 + 0.0006WDB + 0.000000008WDB^2$
JP high limit = (1.1)JP
JP low limit = (0.9)JP

N/A, Recirc Pumps in High Speed Operation .... (X) ______

______
IV

Initials

3.4 Compare the actual Loop A AND Loop B Jet Pump Flows to the respective Loop High AND Low Limits, as recorded in Table 10-2, AND indicate below whether the actual values fall within the Limits:

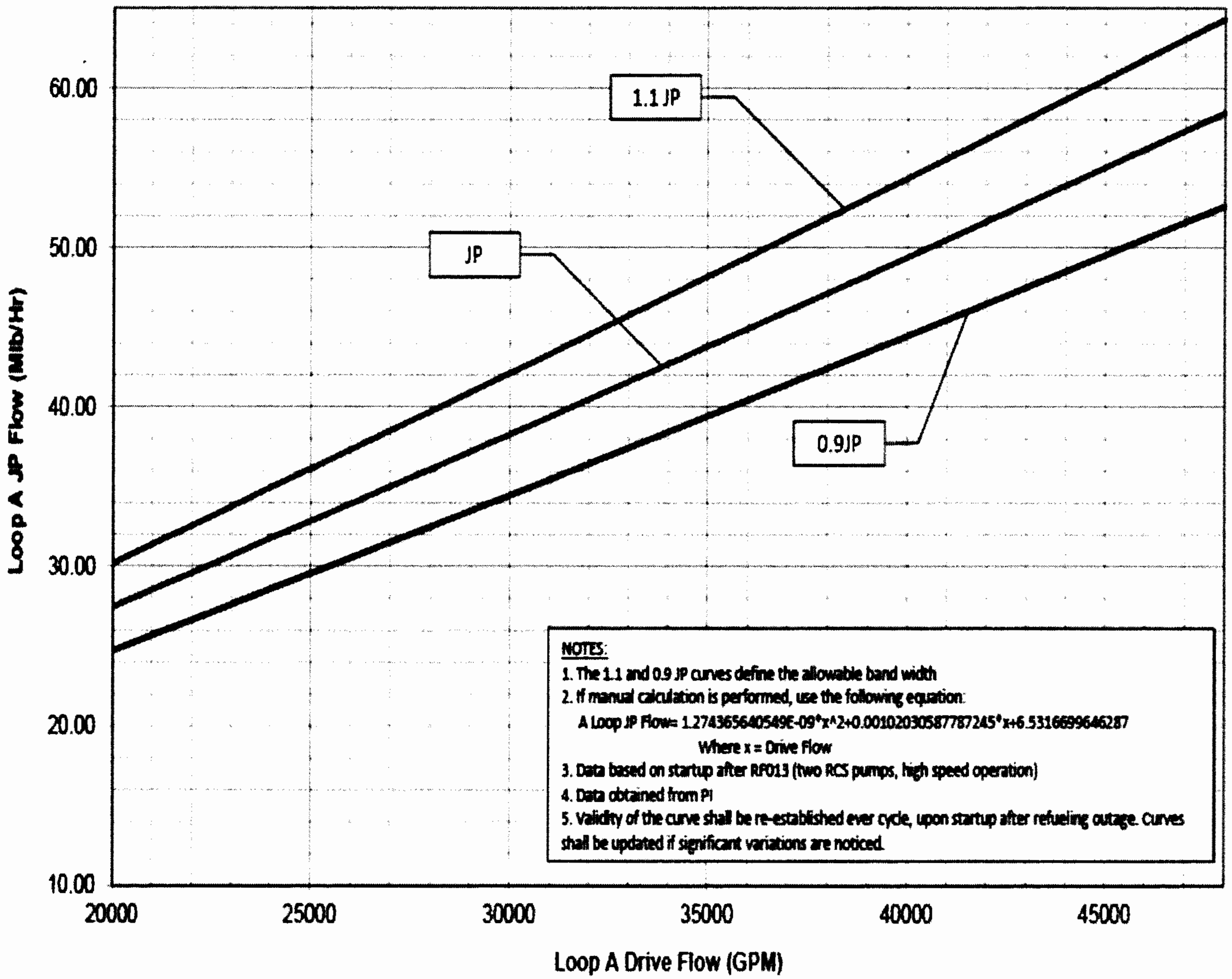
	Yes	No
• Loop A:	(X)	(_)
• Loop B:	(X)	(_)

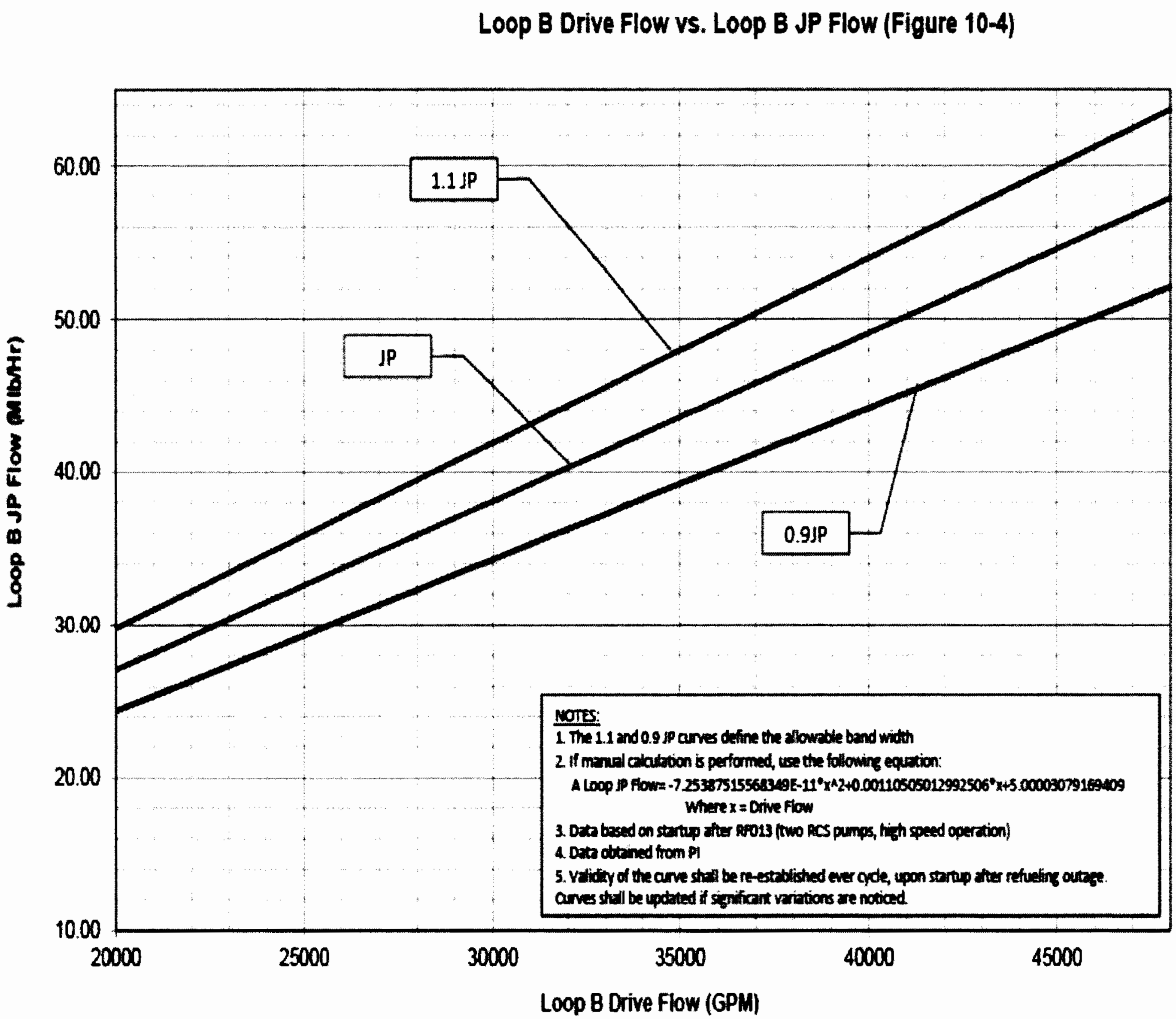
XX

Table 10-2

Recirc Loop A				Recirc Loop B			
Recirc Loop A Drive Flow (Kgpm)	Loop A Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)	Recirc Loop B Drive Flow (Kgpm)	Loop B Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)
42	55	57	46	41	54	55	45

Loop A Drive Flow vs. Loop A JP Flow (Figure 10-3)




Loop B Drive Flow vs. Loop B JP Flow (Figure 10-4)
Loop B JP Flow (Mlb/Hr)
60.00
50.00
40.00
30.00
20.00
10.00
20000
25000
30000
35000
40000
45000
Loop B Drive Flow (GPM)
1.1 JP
JP
0.9JP
NOTES:
1. The 1.1 and 0.9 JP curves define the allowable band width
2. If manual calculation is performed, use the following equation:
A Loop JP Flow= -7.25387515568349E-11*x^2+0.00110505012992506*x+5.00003079169409
Where x = Drive Flow
3. Data based on startup after RF013 (two RCS pumps, high speed operation)
4. Data obtained from PI
5. Validity of the curve shall be re-established ever cycle, upon startup after refueling outage.
Curves shall be updated if significant variations are noticed.

Initials

4.0 Comparison of Individual Jet Pumps ΔP to Average Jet Pump Loop ΔP (TS SR 3.4.3.1.c)

NOTE: Due to cracking in the Jet Pump #6 sensing line (reference CR-2008-002793), the potential for failure of the sensing line exists. If the Jet Pump #6 sensing line fails such that it reads downcomer pressure, its D/P reading will show a step jump of approximately 8% to 9% above its baseline and the indicated loop flow and core flow will increase. Jet Pump #5 D/P and generator output will not change. Should the step jump in Jet Pump #6 be observed, in addition to following the guidance in N2-OP-29, a CR shall be initiated.

4.1 Record value for each Jet Pump ΔP in Loop A, as read on computer points NSSFA102 to NSSFA111, in Table 10-3. XX

4.2 Calculate Loop A Average Jet Pump ΔP for AND record in Table 10-3. XX

4.3 Divide each Loop A Jet Pump ΔP by Loop A Average Jet Pump ΔP AND record the resulting Individual to Average ΔP Ratios in Table 10-3. XX

4.4 For ALL Jet Pumps in Loop A, compare each Jet Pump's Individual to Average ΔP Ratio to the Limits given in Table 10-3 AND indicate below whether the actual values are within the Limits:

Jet Pump	Yes	No
1	(X)	(_)
2	(X)	(_)
3	(X)	(_)
4	(X)	(_)
5	(X)	(_)
6	(X)	(_)
7	(X)	(_)
8	(X)	(_)
9	(X)	(_)
10	(X)	(_)

XX

Initials

4.5 Record value for each Jet Pump ΔP in Loop B, as read on computer points NSSFA112 to NSSFA121, on Table 10-3. XX

4.6 Calculate Loop B Average Jet Pump ΔP for AND record on Table 10-3. XX

4.7 Divide each Loop B Jet Pump ΔP by Loop B Average Jet Pump ΔP AND record the resulting Individual to Average ΔP Ratios in Table 10-3. XX

4.8 For ALL Jet Pumps in Loop B, compare each Jet Pump's Individual to Average ΔP Ratio to the Limits given in Table 10-3 AND indicate below whether the actual values are within the Limits:

Jet Pump	Yes	No
11	(X)	(_)
12	(X)	(_)
13	(_)	(X)
14	(X)	(_)
15	(X)	(_)
16	(X)	(_)
17	(X)	(_)
18	(X)	(_)
19	(X)	(_)
20	(X)	(_)

XX

Table 10-3 (Low Speed Operation) Sheet 13 of 15

Jet Pump	Computer Points (Mlbm/hr)	Individual to Average ΔP Ratio	Low Limit	High Limit
Loop A				
1	NSSFA102=		0.81	1.22
2	NSSFA103=		0.79	1.19
3	NSSFA104=		0.79	1.19
4	NSSFA105=		0.79	1.18
5	NSSFA106=		0.84	1.25
6	NSSFA107=		0.85	1.27
7	NSSFA108=		0.78	1.17
8	NSSFA109=		0.77	1.16
9	NSSFA110=		0.79	1.19
10	NSSFA111=		0.80	1.19
Total		Total ÷ 10 = __________ % Loop A Average Jet ΔP Pump		
Loop B				
11	NSSFA112=		0.81	1.21
12	NSSFA113=		0.78	1.16
13	NSSFA114=		0.78	1.18
14	NSSFA115=		0.77	1.16
15	NSSFA116=		0.83	1.25
16	NSSFA117=		0.84	1.27
17	NSSFA118=		0.81	1.21
18	NSSFA119=		0.78	1.18
19	NSSFA120=		0.79	1.19
20	NSSFA121=		0.80	1.20
Total		Total ÷ 10 = __________ % Loop B Average Jet ΔP Pump		
Calc Performed By (Initials):		Independently Verified By (Initials):		

Table 10-3 (40-74% Power)

Jet Pump	Computer Point (Mlbm/hr)	Individual to Average ΔP Ratio	Low Limit	High Limit
Loop A				
1	NSSFA102=		0.81	1.22
2	NSSFA103=		0.79	1.19
3	NSSFA104=		0.79	1.19
4	NSSFA105=		0.79	1.18
5	NSSFA106=		0.84	1.25
6	NSSFA107=		0.85	1.27
7	NSSFA108=		0.78	1.17
8	NSSFA109=		0.77	1.16
9	NSSFA110=		0.79	1.19
10	NSSFA111=		0.80	1.19
Total		Total ÷ 10 = __________ % Loop A Average Jet ΔP Pump		
Loop B				
11	NSSFA112=		0.81	1.21
12	NSSFA113=		0.78	1.16
13	NSSFA114=		0.78	1.18
14	NSSFA115=		0.77	1.16
15	NSSFA116=		0.83	1.25
16	NSSFA117=		0.84	1.27
17	NSSFA118=		0.81	1.21
18	NSSFA119=		0.78	1.18
19	NSSFA120=		0.79	1.19
20	NSSFA121=		0.80	1.20
Total		Total ÷ 10 = __________ % Loop B Average Jet ΔP Pump		
Calc Performed By (Initials):		Independently Verified By (Initials):		

Table 10-3 (75-100% Power) Sheet 15 of 15

Jet Pump	Computer Point (Mlbm/hr)	Individual to Average ΔP Ratio	Low Limit	High Limit
Loop A				
1	NSSFA102= 5.85	1.05	0.81	1.22
2	NSSFA103= 4.90	0.88	0.79	1.19
3	NSSFA104= 5.44	0.97	0.79	1.19
4	NSSFA105= 5.30	0.95	0.79	1.18
5	NSSFA106= 6.26	1.12	0.84	1.25
6	NSSFA107= 6.39	1.14	0.85	1.27
7	NSSFA108= 5.44	0.97	0.78	1.17
8	NSSFA109= 5.30	0.95	0.77	1.16
9	NSSFA110= 5.44	0.97	0.79	1.19
10	NSSFA111= 5.58	1.00	0.80	1.19
Total	55.89	Total ÷ 10 = 5.59 % Loop A Average Jet ΔP Pump		
Loop B				
11	NSSFA112= 5.58	1.04	0.81	1.21
12	NSSFA113= 5.30	0.98	0.78	1.16
13	NSSFA114= 4.08	0.76	0.78	1.18
14	NSSFA115= 5.17	0.96	0.77	1.16
15	NSSFA116= 5.98	1.11	0.83	1.25
16	NSSFA117= 6.26	1.16	0.84	1.27
17	NSSFA118= 5.58	1.04	0.81	1.21
18	NSSFA119= 5.30	0.98	0.78	1.18
19	NSSFA120= 5.44	1.01	0.79	1.19
20	NSSFA121= 5.17	0.96	0.80	1.20
Total	53.86	Total ÷ 10 = 5.386 % Loop B Average Jet ΔP Pump		
Calc Performed By (Initials):		Independently Verified By (Initials):		

Attachment 10, Two Loop Jet Pump Operability Verification

N/A, Plant is in single loop operation .... (__)

N/A, Plant NOT in Mode 1 OR 2. .... (__)

Initials

1.0 Record Recirc Pump Speed by checking appropriate choice below:

- 15 Hz (__)
- 60 Hz (__)

2.0 Comparison of Indicated Jet Pump Loop Flows to Predicted Jet Pump Loop Flows by Recirc Flow Control Valve Positions (SR 3.4.3.1.a)

2.1 Record Recirc Flow Control Valve (FCV) Positions, as follows:

2.1.1 IF Recirc FCV Positions, as read on 2RCS-HC1603A, RECIRC LOOP A FLOW CONTROL, AND 2RCS-HC1603B, RECIRC LOOP B FLOW CONTROL, are less than or equal to 85% for FCV A AND less than or equal to 95% for FCV B, record Recirc FCV Positions in Table 10-1.

N/A, One OR BOTH Recirc FCV Positions, as read on 2RCS-HC1603A OR 2RCS-HC1603B, are greater than 85% for FCV A AND greater than 95% for FCV B.. (__) ______

2.1.2 IF one OR BOTH Recirc FCV Positions as read on 2RCS-HC1603A AND 2RCS-HC1603B, are greater than 85% for FCV A AND greater than 95% for FCV B, obtain Recirc FCV Positions from TARS as follows:

N/A, BOTH Recirc FCV Positions, as read on 2RCS-HC1603A OR 2RCS-HC1603B, are less than or equal to 85% for FCV A AND less than or equal to 95% for FCV B.. (__)

a. Using TARS Point ID 2002, obtain Recirc Loop A FCV Position AND record in Table 10-1. ______

b. Using TARS Point ID 2003, obtain Recirc Loop B FCV Position AND record in Table 10-1. ______

Initials

2.2 Record Jet Pump Loop Flows as follows:

2.2.1 IF flow oscillations on indicators do NOT make an accurate reading difficult, record Summed Jet Pump Loop Flows from Indicators B22-R611A, RECIRC LOOP 1A SUM JET PMP FLO, AND B22-R611B, RECIRC LOOP 1B SUM JET PMP FLO, on 2CEC*PNL602, in the following places:

N/A, TARS used due to flow oscillations.. (__)

- Table 10-1 ______
- Table 10-2 ______

2.2.2 IF flow oscillations on indicators make an accurate reading difficult, THEN perform the following:

N/A, 2CEC*PNL602 meters were used .... (__)

a. Obtain a 1 min mean of PID 2042, Loop A Jet Pump Flow using TARS Point ID 2674. ______

b. Record the value of Jet Pump Loop A Flow obtained in the Step above in the following places:

   - Table 10-1 ______
   - Table 10-2 ______

c. Obtain a 1 min mean of PID 2043, Loop B Jet Pump Flow using TARS Point ID 2673. ______

d. Record the value of Jet Pump Loop B Flow obtained in the Step above in the following places:

   - Table 10-1 ______
   - Table 10-2 ______

Initials

2.3 Determine the High AND Low Limits for Jet Pump Loop Flows as follows:

2.3.1 IF Recirc Pumps are in slow speed operation, enter the following in Table 10-1 for the High AND Low Limits:

N/A, Recirc Pumps are in high speed operation .... (__)

- High Limit: 21.43 Mlb_m/Hr
- Low Limit: 17.54 Mlb_m/Hr ________

2.3.2 IF the Recirc Pumps are in high speed operation, perform the following:

N/A, Recirc Pumps are in low speed operation .... (__)

a. Using the Recirc FCV Position for Loop A recorded in Table 10-1, obtain the Jet Pump Loop Flow High AND Low Limits for Loop A from Figure 10-1 AND record them in Table 10-1. ________

b. Using the Recirc FCV Position for Loop B recorded in Table 10-1, obtain the Jet Pump Loop Flow High AND Low Limits for Loop B from Figure 10-2 AND record them in Table 10-1. ________

2.4 Compare the actual Loop A AND Loop B Jet Pump Flows to the respective Loop High AND Low Limits, as recorded in Table 10-1, AND indicate below whether the actual values fall within the Limits:

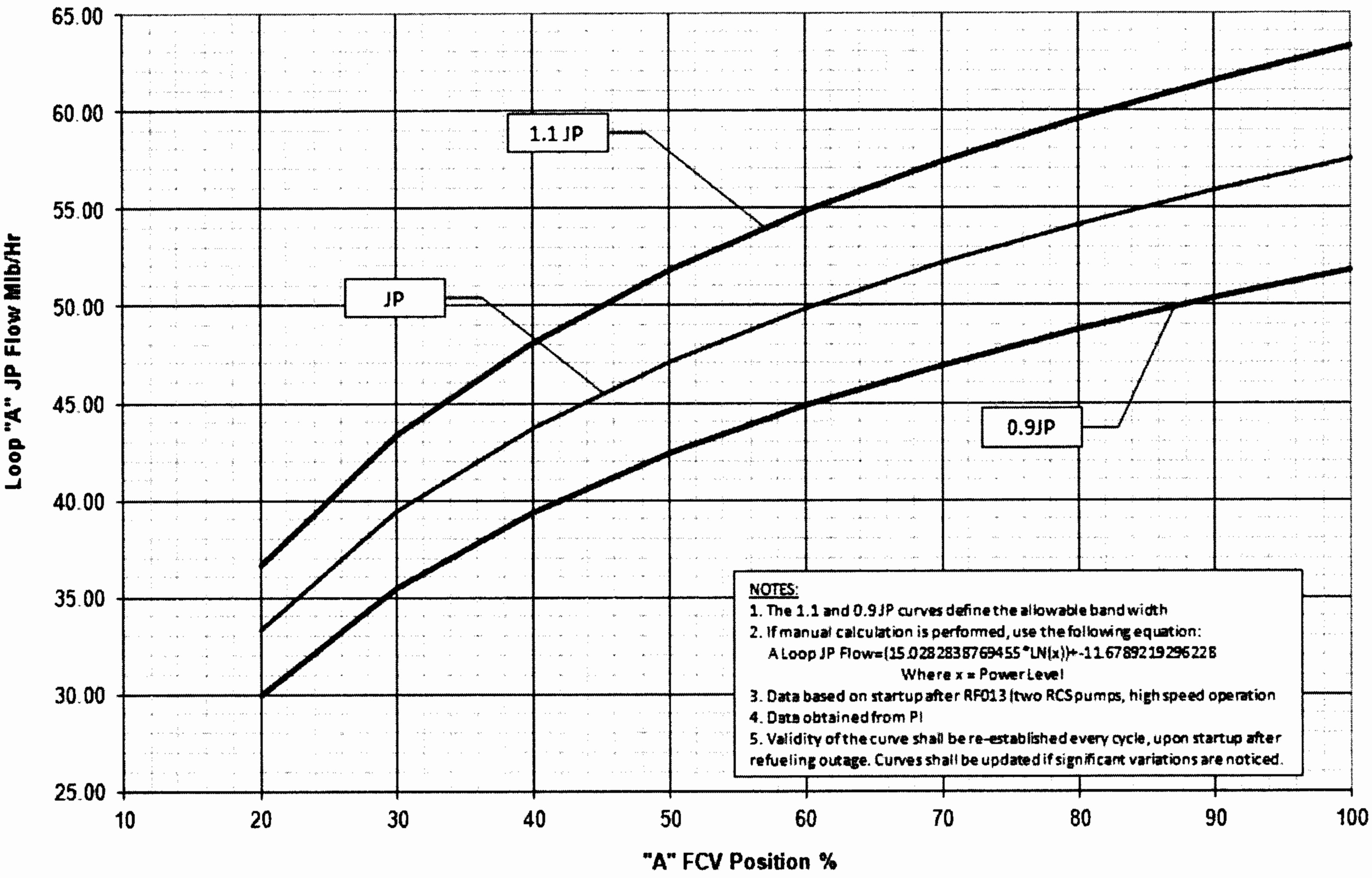
	Yes	No
• Loop A:	(__)	(__)
• Loop B:	(__)	(__)

____

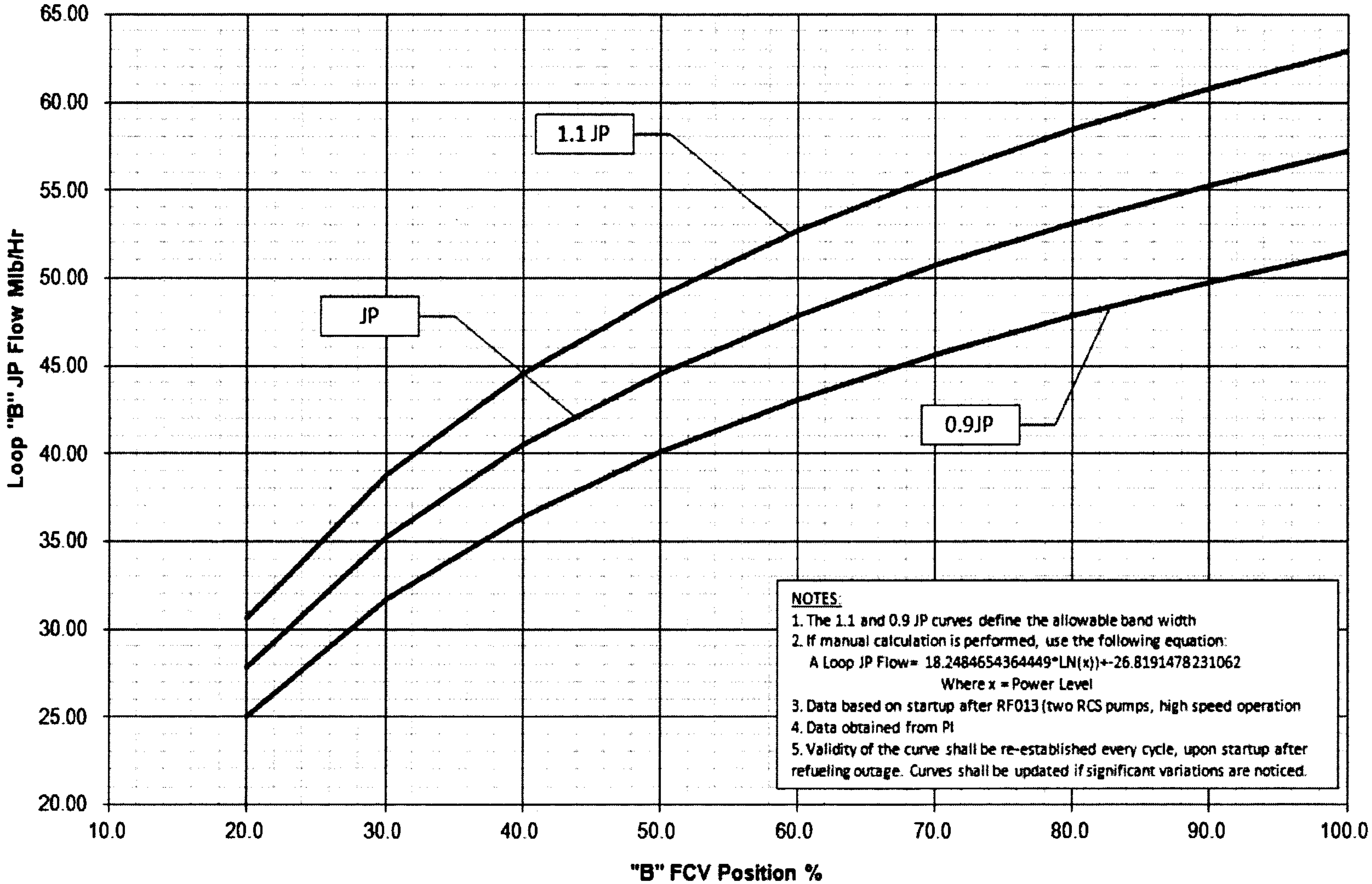
Table 10-1

Recirc Loop A				Recirc Loop B			
FCV A (%)	Loop A Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)	FCV B (%)	Loop B Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)

Predicted JP Loop A Flow By FCV Position (Figure 10-1)



Predicted JP Loop B Flow By FCV Position (Figure 10-2)



Initials

3.0 Comparison of Indicated Jet Pump Loop Flows to Predicted Jet Pump Loop Flows by Recirc Loop Drive Flows (TS SR 3.4.3.1.b)

3.1 Verify the Jet Pump Loop Flows have been recorded in Table 10-2. _______

3.2 Obtain Recirc Loop Drive Flows as follows:

3.2.1 IF flow oscillations on recorder do NOT make an accurate reading difficult, record Recirc Loop Drive Flows from recorder B35-R614, RECIRC FLOW LOOP B/FLOW LOOP A, on 2CEC*PNL602, in Table 10-2.

N/A, TARS used due to flow oscillations.. (__) _______

3.2.2 IF flow oscillations on recorder makes an accurate reading difficult, perform the following:

N/A, 2CEC*PNL602 recorder was used .... (__)

a. Obtain a 1 min mean of PID 2045, RCS Loop A Flow using TARS Point ID 2672. _______

b. Record the value of Recirc Loop A Drive Flow in Table 10-2. _______

c. Obtain a 1 min mean of PID 2046, RCS Loop B Flow using TARS Point ID 2671. _______

d. Record the value of Recirc Loop B Drive Flow in Table 10-2. _______

e. Attach TARS plot to this procedure. _______

3.3 Determine the High AND Low Limits for Jet Pump Loop Flow as follows:

- For High Speed Pump Operation, perform 3.3.1 AND 3.3.2.
- For Low Speed Pump Operation, perform 3.3.3 AND 3.3.4.

3.3.1 Using the Recirc Loop A Drive Flow recorded in Table 10-2, obtain the Jet Pump Loop Flow High AND Low Limits for Loop A from Figure 10-3 AND record them in Table 10-2.

N/A, Recirc Pumps in Low Speed Operation .... (__) _______

Initials

3.3.2 Using the Recirc Loop B Drive Flow recorded in Table 10-2, obtain the Jet Pump Loop Flow High AND Low Limits for Loop B from Figure 10-4 AND record them in Table 10-2.

N/A, Recirc Pumps in Low Speed Operation .... (__) _______

3.3.3 Using the Recirc Loop A Drive Flow recorded in Table 10-2, calculate the Jet Pump Loop Flow High AND Low Limits for Loop A using the following equation AND record them in Table 10-2.

NOTE: "WDA" in the equation is "A" Recirc Loop Drive Flow in gpm, not kgpm, and JP units as calculated are Mlbm/hr.

$JP = 12.197 + 0.0006WDA + 0.000000008WDA^2$
JP high limit = (1.1)JP
JP low limit = (0.9)JP

N/A, Recirc Pumps in High Speed Operation .... (__) _______

____
IV

3.3.4 Using the Recirc Loop B Drive Flow recorded in Table 10-2, calculate the Jet Pump Loop Flow High AND Low Limits for Loop B using the following equation AND record them in Table 10-2.

NOTE: "WDB" in the equation is "B" Recirc Loop Drive Flow in gpm, not kgpm, and JP units as calculated are Mlbm/hr.

$JP = 12.197 + 0.0006WDB + 0.000000008WDB^2$
JP high limit = (1.1)JP
JP low limit = (0.9)JP

N/A, Recirc Pumps in High Speed Operation .... (__) _______

____
IV

Initials

3.4 Compare the actual Loop A AND Loop B Jet Pump Flows to the respective Loop High AND Low Limits, as recorded in Table 10-2, AND indicate below whether the actual values fall within the Limits:

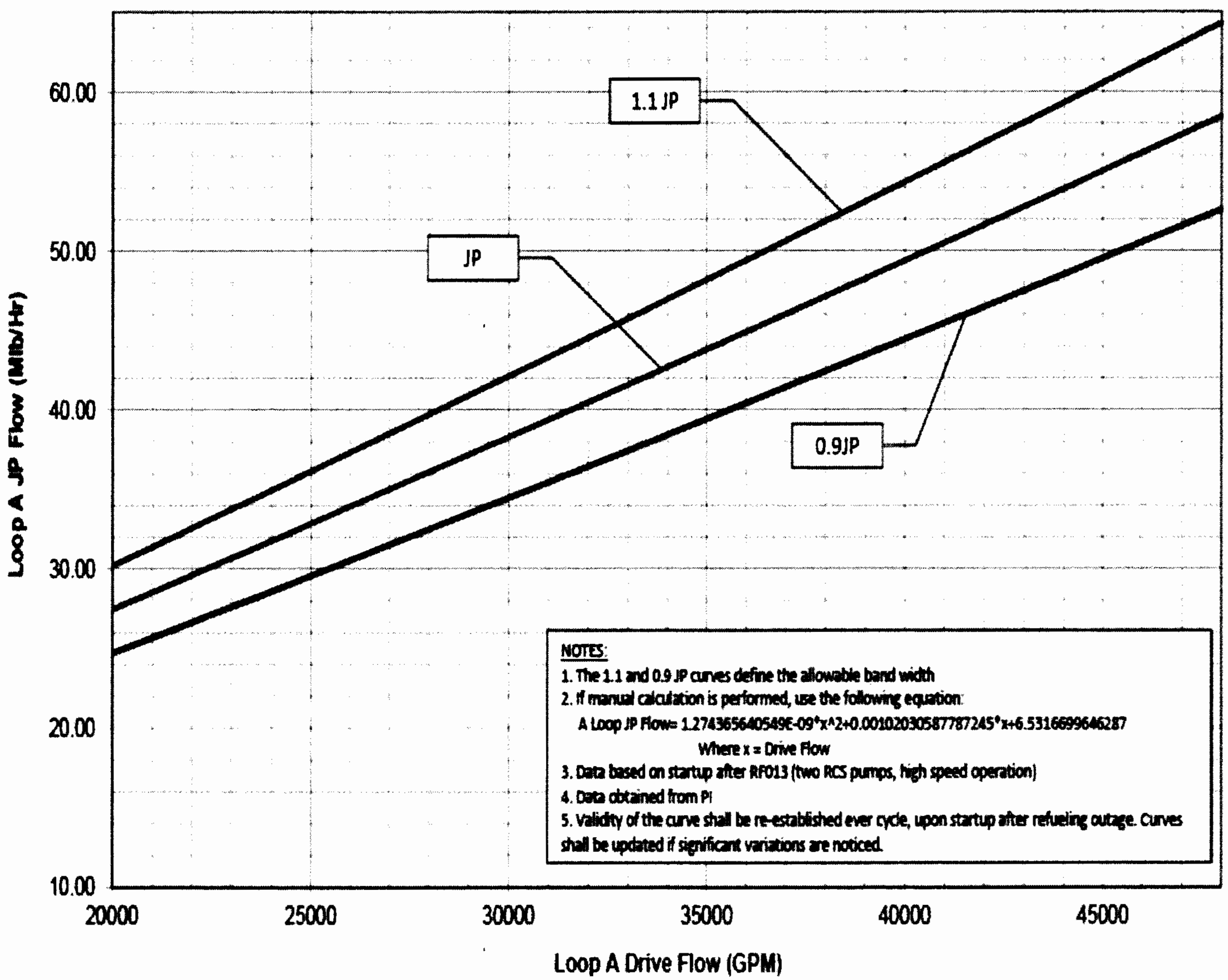
	Yes	No
• Loop A:	(__)	(__)
• Loop B:	(__)	(__)

____

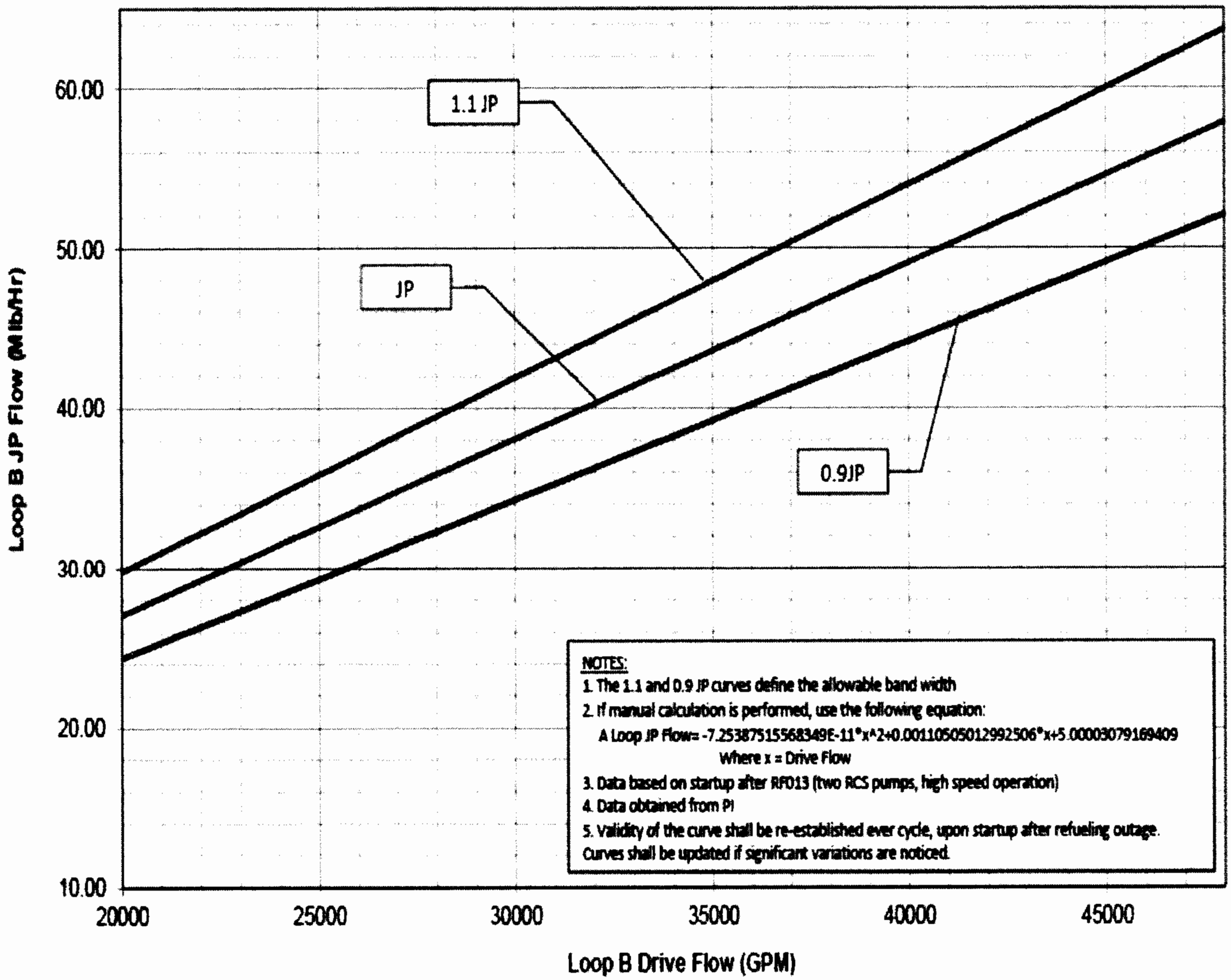
Table 10-2

Recirc Loop A				Recirc Loop B			
Recirc Loop A Drive Flow (Kgpm)	Loop A Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)	Recirc Loop B Drive Flow (Kgpm)	Loop B Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)

Loop A Drive Flow vs. Loop A JP Flow (Figure 10-3)



Loop B Drive Flow vs. Loop B JP Flow (Figure 10-4)



Initials

4.0 Comparison of Individual Jet Pumps ΔP to Average Jet Pump Loop ΔP (TS SR 3.4.3.1.c)

NOTE: Due to cracking in the Jet Pump #6 sensing line (reference CR-2008-002793), the potential for failure of the sensing line exists. If the Jet Pump #6 sensing line fails such that it reads downcomer pressure, its D/P reading will show a step jump of approximately 8% to 9% above its baseline and the indicated loop flow and core flow will increase. Jet Pump #5 D/P and generator output will not change. Should the step jump in Jet Pump #6 be observed, in addition to following the guidance in N2-OP-29, a CR shall be initiated.

4.1 Record value for each Jet Pump ΔP in Loop A, as read on computer points NSSFA102 to NSSFA111, in Table 10-3. ______

4.2 Calculate Loop A Average Jet Pump ΔP for AND record in Table 10-3. ______

4.3 Divide each Loop A Jet Pump ΔP by Loop A Average Jet Pump ΔP AND record the resulting Individual to Average ΔP Ratios in Table 10-3. ______

4.4 For ALL Jet Pumps in Loop A, compare each Jet Pump's Individual to Average ΔP Ratio to the Limits given in Table 10-3 AND indicate below whether the actual values are within the Limits:

Jet Pump	Yes	No
1	(_)	(_)
2	(_)	(_)
3	(_)	(_)
4	(_)	(_)
5	(_)	(_)
6	(_)	(_)
7	(_)	(_)
8	(_)	(_)
9	(_)	(_)
10	(_)	(_)

______

Initials

4.5 Record value for each Jet Pump ΔP in Loop B, as read on computer points NSSFA112 to NSSFA121, on Table 10-3. ______

4.6 Calculate Loop B Average Jet Pump ΔP for AND record on Table 10-3. ______

4.7 Divide each Loop B Jet Pump ΔP by Loop B Average Jet Pump ΔP AND record the resulting Individual to Average ΔP Ratios in Table 10-3. ______

4.8 For ALL Jet Pumps in Loop B, compare each Jet Pump's Individual to Average ΔP Ratio to the Limits given in Table 10-3 AND indicate below whether the actual values are within the Limits:

Jet Pump	Yes	No
11	(_)	(_)
12	(_)	(_)
13	(_)	(_)
14	(_)	(_)
15	(_)	(_)
16	(_)	(_)
17	(_)	(_)
18	(_)	(_)
19	(_)	(_)
20	(_)	(_)

______

Table 10-3 (Low Speed Operation) Sheet 13 of 15

Jet Pump	Computer Points (Mlbm/hr)	Individual to Average ΔP Ratio	Low Limit	High Limit
Loop A				
1	NSSFA102=		0.81	1.22
2	NSSFA103=		0.79	1.19
3	NSSFA104=		0.79	1.19
4	NSSFA105=		0.79	1.18
5	NSSFA106=		0.84	1.25
6	NSSFA107=		0.85	1.27
7	NSSFA108=		0.78	1.17
8	NSSFA109=		0.77	1.16
9	NSSFA110=		0.79	1.19
10	NSSFA111=		0.80	1.19
Total		Total ÷ 10 = ________ % Loop A Average Jet ΔP Pump		
Loop B				
11	NSSFA112=		0.81	1.21
12	NSSFA113=		0.78	1.16
13	NSSFA114=		0.78	1.18
14	NSSFA115=		0.77	1.16
15	NSSFA116=		0.83	1.25
16	NSSFA117=		0.84	1.27
17	NSSFA118=		0.81	1.21
18	NSSFA119=		0.78	1.18
19	NSSFA120=		0.79	1.19
20	NSSFA121=		0.80	1.20
Total		Total ÷ 10 = ________ % Loop B Average Jet ΔP Pump		
Calc Performed By (Initials):		Independently Verified By (Initials):		

Table 10-3 (40-74% Power)

Jet Pump	Computer Point (Mlbm/hr)	Individual to Average ΔP Ratio	Low Limit	High Limit
Loop A				
1	NSSFA102=		0.81	1.22
2	NSSFA103=		0.79	1.19
3	NSSFA104=		0.79	1.19
4	NSSFA105=		0.79	1.18
5	NSSFA106=		0.84	1.25
6	NSSFA107=		0.85	1.27
7	NSSFA108=		0.78	1.17
8	NSSFA109=		0.77	1.16
9	NSSFA110=		0.79	1.19
10	NSSFA111=		0.80	1.19
Total		Total ÷ 10 = __________ % Loop A Average Jet ΔP Pump		
Loop B				
11	NSSFA112=		0.81	1.21
12	NSSFA113=		0.78	1.16
13	NSSFA114=		0.78	1.18
14	NSSFA115=		0.77	1.16
15	NSSFA116=		0.83	1.25
16	NSSFA117=		0.84	1.27
17	NSSFA118=		0.81	1.21
18	NSSFA119=		0.78	1.18
19	NSSFA120=		0.79	1.19
20	NSSFA121=		0.80	1.20
Total		Total ÷ 10 = __________ % Loop B Average Jet ΔP Pump		
Calc Performed By (Initials):		Independently Verified By (Initials):		

Table 10-3 (75-100% Power)

Jet Pump	Computer Point (Mlbm/hr)	Individual to Average ΔP Ratio	Low Limit	High Limit
Loop A				
1	NSSFA102=		0.81	1.22
2	NSSFA103=		0.79	1.19
3	NSSFA104=		0.79	1.19
4	NSSFA105=		0.79	1.18
5	NSSFA106=		0.84	1.25
6	NSSFA107=		0.85	1.27
7	NSSFA108=		0.78	1.17
8	NSSFA109=		0.77	1.16
9	NSSFA110=		0.79	1.19
10	NSSFA111=		0.80	1.19
Total		Total ÷ 10 = ________ % Loop A Average Jet ΔP Pump		
Loop B				
11	NSSFA112=		0.81	1.21
12	NSSFA113=		0.78	1.16
13	NSSFA114=		0.78	1.18
14	NSSFA115=		0.77	1.16
15	NSSFA116=		0.83	1.25
16	NSSFA117=		0.84	1.27
17	NSSFA118=		0.81	1.21
18	NSSFA119=		0.78	1.18
19	NSSFA120=		0.79	1.19
20	NSSFA121=		0.80	1.20
Total		Total ÷ 10 = ________ % Loop B Average Jet ΔP Pump		
Calc Performed By (Initials):		Independently Verified By (Initials):		

Exelon Generation.

Training Id: **2015 NRC RO Admin COO2** Revision: **0.0**

Title: **Determine Core Thermal Power**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	6/10/15
Validated By	Jay Lawrence	10/2/15
Facility Reviewer	MARK GREER	10/5/15

Approximate Duration: 15 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: ________

Exelon Generation

References

1. N2-REP-11, Independent Methods of Determining Core Thermal Power
2. NUREG 1123, 2.1.45 (4.3)

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to manually calculate core thermal power using process computer data. Core thermal power will calculated in accordance with N2-REP-11, Attachment 3. The applicant should determine that the calculated power is not within 2% limit specified in the procedure and notifies SM and RE.

   b. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. K/A 2.1.45 (4.3) Ability to identify and interpret diverse indications to validate the response of another indication.

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Classroom
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

   a. Training Classroom

5. JPM Setup (if required)

   a. Ensure each operator has a calculator.

   b. Ensure each operator has an OD-3 with % Core Thermal Power = 99.94%

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant has been operating at steady-state power for greater than 8 hours. • MSR reheat steam is NOT optimized. • Turbine bypass valves are closed. • SM permission has been granted to perform this procedure. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, determine core thermal power using turbine first stage pressure in accordance with N2-REP-11. Any steps requiring an Independent Verification will be completed by another operator at the completion of the procedure.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary.	P	SAT / UNSAT **STD:** Proper communications used.
2.	Obtain a copy of the reference procedure and review / utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** Refers to the provided N2-REP-11, Attachment 3.
3.	Complete Preliminaries Section of REP-11, Att 3 for the following:		
3a	Verify all turbine bypass valves are fully closed.	P Step 8.1.1	SAT / UNSAT **STD:** Recognizes step completed based on initial conditions.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
3b	Verify MSR reheat steam is NOT optimized.	P Step 8.1.2	SAT / UNSAT **STD:** Recognizes step completed based on initial conditions.
3c	Verify reactor is operating in a steady state condition with core power level constant for the current control rod pattern and core flow.	P Step 8.1.3	SAT / UNSAT **STD:** Recognizes step completed based on initial conditions.
Evaluator Note	Candidate may obtain SM permission; and/or notify the CSO of procedure performance. If requested, provide concurrence to proceed.		
4.	Record data on N2-REP-11, Attachment 3. **Note:** Evaluator to provide Candidate a copy of JPM Attachment 1.	P Step 8.2	SAT / UNSAT **STD:** Data correctly entered on Attachment 3.
5.	Obtain Plant Process Computer Program OD-3, Option 2 printout. **Note:** Evaluator to provide Candidate a copy of JPM Attachment 2.	P Step 8.3	SAT / UNSAT **STD:** Obtains JPM attachment 2
6.	Calculate Core Thermal Power	P Step 8.4	**PASS / FAIL** **STD:** Core thermal power calculations completed as follows: % Core Thermal Power based on computer points = 97.87 $[(-.000041017 \times 675^2) + 0.17963(675)] \times (.97 + .97)/2 - 1.616 = 97.3\%$ +/- .5% % Core Thermal Power from OD-3 printout = 3985.75/3988 = 99.94

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
7.	Indicate if core thermal power values agree within ± 2%.	P Step 8.5	**PASS / FAIL** **STD:** Determines core thermal power values do **NOT** agree within ± 2% (99.94 – 97.3 = 2.6).
8.	Immediately notifies SM and Reactor Engineering Supervisor that Core Thermal Power determined using turbine first stage pressure does **NOT** agree within 2%.	P Step 8.6	SAT / UNSAT **STD:** SM and Reactor Engineering Supervisor notified that Core Thermal Power determined using turbine first stage pressure does **NOT** agree within 2%.

TASK STANDARD	Core thermal power calculated and determined to be outside of the 2% required band.

STOP TIME	

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JPM Handout

INITIAL CONDITIONS	Given: • The plant has been operating at steady-state power for greater than 8 hours. • MSR reheat steam is NOT optimized. • Turbine bypass valves are closed. • SM permission has been granted to perform this procedure.

INITIATING CUE	**(Operators Name)**, determine core thermal power using turbine first stage pressure in accordance with N2-REP-11. Any steps requiring an Independent Verification will be completed by another operator at the completion of the procedure.

JPM Attachment 1:

N2-REP-11 Data Sheet

OK TO PROVIDE TO CANDIDATE

Computer Point	Value
Turbine First Stage Pressure (MSSPA07)	675 psia
FW A Correction Factor (FWSFE102)	0.97
FW B Correction Factor (FWSFE103)	0.97

Exelon Generation

JPM Attachment 2:

OD-3 Core Thermal Power and APRM Calibration TODAY 09:50:02

Nine Mile Point 2

OK TO PROVIDE TO CANDIDATE

GMWE	CMWT	WT	WTSUB	WD	WT FLAG	IREC	ROD LIN
1338.75	3985.75	109.83	107.84	34.08	2.00	0	99.07

PR	RWL	DPCM	WFW	HFW	HD	DHS	CAEQ	CAQA
1034.6	182.01	20.38	17.32	408.6	520.4	19.80	.16	.17

	1-A	2-B	3-C	4-D
RAP	100.01	100.04	99.99	100.03
AGAP	1.0	1.0	1.0	1.0

RO COO2 Handout

NINE MILE POINT NUCLEAR STATION UNIT 2

REACTOR ENGINEERING PROCEDURE

N2-REP-11

Revision 00500

INDEPENDENT METHODS OF DETERMINING CORE THERMAL POWER

TECHNICAL SPECIFICATION REQUIRED

Approved By: Frank R. Payne

Manager Operations

11/3/2011

Date

Effective Date: 11/14/2011

LIST OF EFFECTIVE PAGES

Page No.	Change No.
Coversheet	
i..................	
ii.	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10...............	
11...............	
12...............	
13...............	
14...............	
15...............	
16...............	
17...............	
18...............	
19...............	
20...............	
21...............	
22...............	
23...............	
24...............	

Page No.	Change No.
25...............	
26...............	
27...............	
28...............	
29...............	
30...............	
31...............	
32...............	
33...............	
34...............	
35...............	
36...............	
37...............	
38...............	
39...............	
40...............	
41...............	
42...............	

TABLE OF CONTENTS

1.0 **PURPOSE [C1]**

To determine core thermal power (CTP) using methods independent of the calorimetric calculation performed by 3D MONICORE.

1.1 Frequency

When the process computer is unavailable and verification of core thermal power is desired.

When the accuracy/validity of the process computer core thermal power calculation is in question

When required to verify the process computer calculation of core thermal power.

2.0 REFERENCES AND COMMITMENTS

2.1 Technical Specifications

None

2.2 Licensee Documentation

None

2.3 Standards, Regulations, and Codes

None

2.4 Policies, Programs, and Procedures

None

2.5 Technical Information

Station Nuclear Engineers Manual, NEDO - 24810(A & B)

GE Steam Production Warranty N2-SUT-20-W

Alden Research Laboratories Report #ARL No. 95-76/C26

Process Computer Program Specifications SR-1A and OD-3

Memo from Andrew Ross to Tom Tomlinson dated June 21, 1994, NMP82753

ASME International Steam Tables for Industrial Use, © 2000 version

Memo from Andrew Ross to File dated May 26,1995, NMP82762

ECP-09-000148, High Turbine Rotor Replacement

2.6 **Commitments**

Sequence Number	Commitment Number	Description
1	SOER 90-03	Nuclear Instrumentation Miscalibration

3.0 **GENERAL TEST METHODS**

Reactor operating data is gathered and reactor core thermal power is calculated using an Excel spreadsheet program or with the provided manual calculations. Additionally, independent methods are provided to verify actual core thermal power agrees with indicated thermal power.

4.0 **TEST EQUIPMENT, SPECIAL TOOLS, AND MATERIALS**

Excel Spreadsheet – CTP-2 June 2004 version

5.0 **PRECAUTIONS**

5.1 Special care must be taken in recording data and performing calculations. Since the results from this procedure are used to support core performance and APRM calibrations, errors on the non-conservative side could cause operation that might lead to a violation of Technical Specifications or the Plant Operating License.

5.2 The correlations between CTP and turbine first stage pressure assumes normal turbine operation and may be inaccurate if the turbine and auxiliaries are in an abnormal configuration (e.g. reheaters not in service), or CTP is below 60%. MSR Reheat Steam Flow must be in automatic (i.e. NOT optimized) to correlate turbine first stage pressure with CTP.

5.3 At low powers or feedwater temperatures, core thermal power calculations may be inaccurate.

5.4 When entering data into the Excel spreadsheet CTP-2 all data must be entered manually in each cell. Do NOT use the cut, copy or paste feature of Excel or enter data in cells other than those indicated on the spreadsheet.

5.5 Use of Excel spreadsheet CTP-2 will result in a more accurate determination of core thermal power due to the limitations of steam tables. Manual calculations should only be used if spreadsheet CTP-2 cannot be accessed.

5.6 Items marked as follows will NOT be applicable until Extended Power Uprate has been implemented:

- Example 1 Table or list

2HVT-UC203A	Heater Bay A Unit Cooler	2NJS-PNL756-20
(EPU) 2HVT-UC228B	**Condensate Pump Area Unit Cooler**	**2NJS-PNL756-25**
2HVT-UC203B	Heater Bay A Unit Cooler	2NJS-PNL747-8

- Example 2 Information in a step or note:

  Turbine Building air temperature shall be maintained between 50° or 65°F to 120°F, **(EPU: 50° or 70°F to 120°F)** depending on location (Refer to USAR Table 9.4-1).

- Example 3 Action _ Will always require a CV to ensure proper component is manipulated or observed etc.

  a. Check 2HVT-AOD2A (2B, 2C,**(EPU: 2D)**) EXHAUST AIR FAN DISCH DMPR fully opens. Example_

  Example_

  CV

- Do not take any action or make decisions based on EPU data until such time as the SM has authorized EPU data usage.

Initials

6.0 LIMITATIONS AND ACTIONS

6.1 Immediately notify the Shift Manager and the Reactor Engineering Supervisor if the core thermal power calculated in this procedure does not meet its Acceptance Criteria.

6.2 Following periods of cleanup instability, allow twenty (20) minutes for an accurate thermal power calculation.

6.3 Process Computer Thermal Power Calculations and Displays will be inaccurate whenever reactor water cleanup is being rejected.

7.0 PREREQUISITES

7.1 Determine and indicate below the attachment(s) to be performed:

ATTACHMENT 1: DETERMINING CORE THERMAL POWER WITH PROCESS COMPUTER OUT OF SERVICE .... ☐

ATTACHMENT 2: DETERMINING CORE THERMAL POWER WITH PROCESS COMPUTER IN SERVICE .... ☐

ATTACHMENT 3: DETERMINING CORE THERMAL POWER USING TURBINE FIRST STAGE PRESSURE .... ☐

ATTACHMENT 4: CORE THERMAL POWER COMPARISON BETWEEN PLANT PROCESS COMPUTER AND 3D-MONICORE .... ☐ ________

ATTACHMENT 1:
DETERMINING CORE THERMAL POWER WILL PROCESS COMPUTER OUT OF SERVICE

8.0 **PROCEDURE**

8.1 Preliminaries

8.1.1 Verify Reactor Water Cleanup System has been operating steady state for a minimum of 20 minutes. ________

8.1.2 Verify reactor is operating in a steady state condition with core power level constant for the current control rod pattern and core flow. ________

8.1.3 Personnel responsible for the performance of this test have read AND thoroughly understand its contents PRIOR to test commencement. ________

8.1.4 Perform the following:

PLANT IMPACT: NONE.

a. Discuss Plant Impact with the SM. Obtain SM permission to perform procedure. ________ SM

b. Notify the CRO that procedure is to be performed. Discuss Plant Impact. ________ CRO

8.2 Determine RWCU flow as follows:

8.2.1 At panel 2CEC*PNL603, record the following parameter:

G33-R609 RWCU SYS FLOW__________ gpm ________

8.2.2 Calculate RWCU mass flow rate as follows:

_________ gpm x $3.8*10^{-4}$ Mlb/hr/gpm = __________ Mlb/hr
Step 8.2.1

____

________ IV

8.2.3 Enter result from step 8.2.2 in Table 1 as Item Number 46 value ________

________ IV

8.3 Determine RWCU reject flow as follows:

8.3.1 At panel 2CEC*PNL603, record the following parameter:

G33-R602 CLEANUP REJECT FLOW___________ gpm ________

8.3.2 Calculate RWCU reject mass flow rate as follows:

__________ gpm x $5*10^{-4}$ Mlb/hr/gpm = ___________ Mlb/hr
Step 8.3.1

____

____
IV

8.3.3 Enter result from step 8.3.2 in Table 1 as Item Number 49 value. ________

____
IV

8.4 Determine RWCU Seal Flow as follows:

8.4.1 At Rx Bldg 215' elevation, East of RWCU pump rooms, record the pump seal flows below:

a. 2WCS-FI 77A ___________ gpm

b. 2WCS-FI 77B ___________ gpm

c. 2WCS-FI 78A ___________ gpm

d. 2WCS-FI 78B ___________ gpm ________

8.4.2 Calculate total RWCU seal flow as follows:

_____gpm	+	_____gpm	+	_____gpm	+	_____gpm	=	_____gpm
Step 8.4.1.a		Step 8.4.1.b		Step 8.4.1.c		Step 8.4.1.d		RWCU total seal flow

____

____
IV

8.4.3 Calculate total RWCU seal mass flow rate as follows:

______________ gpm x 0.000499 Mlb/hr/gpm = _________Mlb/hr
RWCU total seal flow RWCU Seal Mass Flow

____

____
IV

8.4.4 Enter results in Table 1 as Item Number 56 value AND in step 8.5.2 where indicated.

____

____
IV

8.5 Determine CRD flow as follows:

8.5.1 At 2CEC*PNL603, record the following:

C12-R606, CRD System Flow ___________ gpm ________

8.5.2 Calculate Corrected CRD flow as follows:

(_____ gpm x 0.000499 Mlb/hr/gpm) + 0.00401Mlb/hr + _______ Mlb/hr =
Step 8.5.1 Step 8.4.3

________________ Mlb/hr
Corrected CRD Flow ________

____
IV

8.5.3 Enter result from step 8.5.2 in Table 1 as Item Number 50 value. ________

____
IV

8.6 Determine Recirc Pump Power as follows:

8.6.1 At 2CEC*PNL602, record the following:

a. B35-R634A, Recirc Motor A Current ________ amps

b. B35-R634B, Recirc Motor B Current ________ amps ________

8.6.2 Calculate Recirc Pump Power as Follows:

a. _________ amps X 0.023 MW/amp = ___________MW
step 8.6.1.a Recirc A power

b. _________ amps X 0.023 MW/amp = ___________MW
step 8.6.1.b Recirc B power

____

____
IV

8.6.3 Enter results of step 8.6.2.a in Table 1 as Item Number 52 value. ________

____
IV

8.6.4 Enter results of step 8.6.2.b in Table 1 as Item Number 53 value. ________

____
IV

Initials

8.7 Complete Table 1 data by taking readings from the indicated source instruments. ________

8.8 Perform analysis using the EXCEL spreadsheet as follows:

N/A, EXCEL spreadsheet unavailable .... ☐ ________

8.8.1 Open EXCEL Spreadsheet from the following location:

S:\Groups\OPSU2\ALLShared\N2REP11_Rev_02\CTP-2 June 2004 Version ________

NOTE

Some data cells in the spreadsheet will NOT have data entered into them with the process computer out of service and are NOT used in the calculation of Thermal Power.

CAUTION

- Do NOT enter information into cells not called for as this may adversely impact spreadsheet performance. The data entry portion of the spreadsheet is identified at the top of the spreadsheet below the heading "ENTER VALUES BELOW."
- Do NOT use the cut, copy or paste features of EXCEL when entering data.

8.8.2 Enter data collected in Table 1 in the applicable blocks of the EXCEL spreadsheet. ________

____
IV

8.8.3 Print the EXCEL spreadsheet. ________

8.8.4 Record Calculated Core Thermal Power. (Item 31 of EXCEL print out.)

____________________MWth

8.8.5 Using the "Save as" feature of EXCEL, save the spreadsheet in a date format similar to MM_DD_YYYY Heat Balance. ________

8.8.6 Close the EXCEL spreadsheet. ________

8.8.7 Sign all datasheet as indicated and attach to this procedure. ________

8.9 Performing analysis using manual calculations:

N/A, analysis performed using EXCEL spreadsheet. .... ☐

8.9.1 Obtaining data from table 1, determine feedwater average temperature as follows:

a. [____________ + ____________] ÷ 2 = __________ °F
2FWS-TI64A 2FWS-TI64B

____

________ IV

8.9.2 Using the data from table 1 calculate the average Feedwater Flow A d/p:

____________ ÷ 20 = ___________ psid
Total of table 1 Item numbers 1-20 — A side avg dp

____

________ IV

8.9.3 Using the data from table 1 calculate the average Feedwater Flow B d/p:

____________ ÷ 20 = ___________ psid
Total of table 1 Item numbers 21-40 — B side avg dp

____

________ IV

8.9.4 Using Table 3 determine the Specific Volume associated with the below Feedwater Temperatures:

a. ____________ = ______________ ft^3/lb
2FWS-TI64A — A Specific Volume

b. ____________ = ______________ ft^3/lb
2FWS-TI64B — B Specific Volume

____

________ IV

Initials

8.9.5 IF indicated Feedwater temperature is < 150°F THEN enter 1.0015 as the Thermal Expansion Factor(s) for the corresponding temperature element below. Otherwise perform the indicated calculation:

a. 0.9985 + (.0000191 X ________) = ________________
   2FWS-TI64A — A side Thermal Expansion Factor

b. 0.9985 + (.0000191 X ________) = ________________
   2FWS-TI64B — B side Thermal Expansion Factor

____

________ IV

8.9.6 Perform the following calculations to determine Feedwater flows:

a. [(0.2116 x ________ (Results 8.9.5.a)) ÷ ________ (Results 8.9.4.a)] X √(________ (Results 8.9.2) X ________ (Results 8.9.4.a)) X ________ (LEFM Loop A Corr. (Table 1 Item # 54)) =

________________ Mlb/hr
Channel A Feedwater Flow

b. [(0.2118 x ________ (Results 8.9.5.b)) ÷ ________ (Results 8.9.4.b)] X √(________ (Results 8.9.3) X ________ (Results 8.9.4.b)) X ________ (LEFM Loop B Corr. (Table 1 Item # 55)) =

________________ Mlb/hr
Channel B Feedwater Flow

c. ________ Mlb/hr (Channel A Feedwater Flow) + ________ Mlb/hr (Channel B Feedwater) = ________ Mlb/hr (Flow Total Feedwater Flow)

____

________ IV

NOTE

Steam table values below for enthalpy are provided in 10 degree increments. A formula for linear interpolation is provided in the next step to be used if feedwater average temperature does NOT correspond exactly to a temperature provided in the steam tables. Interpolation is required due to the large error that would be introduced by rounding to the nearest available steam table data point.

8.9.7 Using ASME International Steam Tables for Industrial Use, Table U-3, determine enthalpy at 1000 psia for the average Feedwater temperature determined in step 8.9.1.a. as follows:

a. IF the average feedwater temperature in step 8.9.1.a corresponds exactly to a value on the steam table enter the enthalpy below AND proceed to step 8.9.8

N/A, interpolation required .... ☐

_____________BTU/lb
FW Enthalpy ________

b. IF the average feedwater temperature in step 8.9.1.a does NOT correspond exactly to a value on the steam table perform the following linear interpolation to obtain a value for feedwater enthalpy.

N/A, interpolation NOT required .... ☐ ________

1. Complete the following table:

Table Item Number	Description of Parameter	Value	Units
1	Average Feedwater Temperature from Step 8.9.1.a		° F
2	Next temperature higher than average feedwater temperature with data available from steam table U-3		° F
3	Next temperature lower than average feedwater temperature with data available from steam table U-3		° F
4	Enthalpy listed for Item 2 temperature on the steam table U-3		Btu/lb
5	Enthalpy listed for item 3 temperature on the steam table U-3		Btu/lb

8.9.7 (Cont)

2. Perform the following calculations:

(__________ - __________) X [(__________ - __________) ÷10] = __________ Btu/lb
Table Item 1 — Table Item 3 — Table Item 4 — Table Item 5) — Δ Enthalpy

__________ Btu/lb + __________ Btu/lb = __________ Btu/lb
Δ Enthalpy — Table Item 5 — FW Enthalpy

____

____
IV

8.9.8 Calculate the Feedwater Energy Rate as follows:

__________ Mlb/hr	X	__________ BTU/lb	=	__________ MBTU/hr
Total Feedwater Flow Step 8.9.6.c		Feedwater Enthalpy Step 8.9.7.a <u>OR</u> 8.9.7b.2		Feedwater Energy Rate

____

____
IV

8.9.9 Calculate Actual Recirc Energy Rate as follows:

(__________ Mw + __________ Mw) x 3.413 MBTU/hr/Mw x 0.94(Efficiency)=
Recirc pump A power, Step 8.6.2.a — Recirc pump B power, Step 8.6.2.b

______________ MBTU/hr
Recirc Energy Rate

____

____
IV

8.9.10 Calculate Main Steam Flow as follows:

________ Mlb/hr +	________ Mlb/hr -	________ Mlb/hr =	__________ Mlb/hr
Total FW flow Step 8.9.6.c	CRD Flow Step 8.5.2	RWCU Reject Flow Step 8.3.2	Total Main Steam Flow

____

____
IV

Initials

8.9.11 Determine Absolute Main Steam pressure as follows:

_____________psig + 15 = __________psia
Table 1 Item # 45

____

____
IV

NOTE

Due to the small incremental difference between available data points on the steam table used below, interpolation is not required. A relatively small error is introduced in the final calculations and rounding down results in an enthalpy that is conservative in nature.

8.9.12 Using ASME International Steam Tables for Industrial Use, Table U-2, determine the Main Steam enthalpy for saturated steam at the absolute pressure determined in step 8.9.11. rounded DOWN to the nearest pressure available on the steam table.

______________BTU/lb

____

____
IV

8.9.13 Calculate the Main Steam Energy Rate as follows:

___________Mlb/hr	X	___________BTU/lb	=	_______________MBTU/hr
Total Main Steam Flow Step 8.9.10		Main Steam Enthalpy Step 8.9.12		Main Steam Energy Rate

____

____
IV

8.9.14 Calculate CRD Energy Rate as follows:

(____________Mlb/hr x 70.682 BTU/lb = __________________ MBTU/hr
Corrected CRD Flow
Step 8.5.2
CRD Energy Rate

____

____
IV

NOTE

Rounding of the temperature values below as indicated will result in a conservative determination of core thermal power while introducing a minimal impact on calculation accuracy.

8.9.15 Using ASME International Steam Tables for Industrial Use, Table U-3, determine the enthalpy at 1000 psia for the following temperature rounded as indicated to the nearest value available on the steam table:

a. RWCU Inlet Temp ____________________ = ____________BTU/lb
Table 1 Item Number 47 (Rounded UP) RWCU inlet Enthalpy

b. RWCU Outlet Temp ____________________ = ____________BTU/lb
Table 1 Item Number 48 (Rounded DOWN) RWCU Outlet Enthalpy

____

________ IV

8.9.16 Calculate the change in RWCU enthalpy as follows:

__________BTU/lb -	__________BTU/lb =	__________BTU/lb
RWCU inlet Enthalpy	RWCU Outlet Enthalpy	RWCU Δ Enthalpy
Step 8.9.15.a	Step 8.9.15.b	

____

________ IV

8.9.17 Calculate the RWCU Energy Rate as follows:

________Mlb/hr x	________BTU/lb +	[________Mlb/hr x	________BTU/lb] =
RWCU Flow	RWCU Δ Enthalpy	RWCU reject flow	RWCU Outlet Enthalpy
Step 8.2.2	Step 8.9.16	Step 8.3.2	Step 8.9.15b

______________________MBTU/hr
RWCU Energy Rate

____

________ IV

8.9.18 Calculate the Total Energy Rate Out of the Reactor as follows:

__________MBTU/hr +	________MBTU/hr +	3.754MBTU/hr =	__________MBTU/hr
Main Steam Energy Rate	RWCU Energy Rate	(Fixed Losses)	Total Energy Rate Out
Step 8.9.13	Step 8.9.17		

____

________ IV

8.9.19 Calculate the Total Energy Rate In for the Reactor as follows:

______MBTU/hr +	______MBTU/hr +	______MBTU/hr =
Feedwater Energy Rate Step 8.9.8	Recirc Energy Rate Step 8.9.9	CRD Energy Rate Step 8.9.14

______MBTU/hr
Total Energy Rate In ______

______
IV

8.9.20 Calculate the Core Thermal Power as follows:

[______MBTU/hr -	______MBTU/hr] x 0.293 =
Total Energy Rate Out Step 8.9.18 results	Total Energy Rate In Step 8.9.19 results

______ MW_t
Core Thermal Power ______

______
IV

9.0 **RETURN TO NORMAL**

None

10.0 **ACCEPTANCE CRITERIA**

10.1 Calculated Core Thermal Power ≤ 3467 MWth (Step 8.8.4 OR 8.9.20) ______

Initials

11.0 RECORD REVIEW AND DISPOSITION

11.1 Reactor Engineering Supervisor Review

- Satisfactory. Record any comments in Remarks .... ☐
- Unsatisfactory. Immediately notify SM AND Reactor Engineering Supervisor. Record explanation AND corrective actions in Remarks..... ☐

______________________________ ______/______
SM Notified Date/Time

______________________________ ______/______
Person Notified Date/Time

Remarks ____

____

____

____

____

____

____

______________________________________ ____________
Reactor Engineering Supervisor OR Designee Date

11.2 Disposition

When complete, this procedure shall be forwarded to Reactor Engineering for temporary storage and transfer to the Permanent Plant File in accordance with CNG-PR-3.01, Records Management, and CNG-PR-3.01-1000, Records Management.

Initials

ATTACHMENT 2:
DETERMINING CORE THERMAL POWER WITH PROCESS COMPUTER IN SERVICE

8.0 **PROCEDURE**

8.1 Preliminaries

8.1.1 Verify Reactor Water Cleanup System has been operating steady state for a minimum of 20 minutes. ________

8.1.2 Verify reactor is operating in a steady state condition with core power level constant for the current control rod pattern and core flow. ________

8.1.3 Personnel responsible for the performance of this test have read AND thoroughly understand its contents PRIOR to test commencement. ________

8.1.4 Perform the following:

PLANT IMPACT: NONE.

a. Review the Plant Impact. Indicate permission to perform procedure. ________ SM

b. Review the Plant Impact. Indicate acknowledgement that procedure is to be performed. ________ CRO

8.2 Demand Plant Process Computer Program OD-3 Option 2 (Long Form Edit) AND print out the edit for later use.

N/A, OD-3 Option 2 not available.. ☐ ________

8.3 Demand Special Log 22 from the Plant Process Computer AND print out the edit for later use. ________

8.4 Determine RWCU reject flow as follows:

8.4.1 At panel 2CEC*PNL603, record the following parameter:

G33-R602 CLEANUP REJECT FLOW__________ gpm ________

8.4.2 Calculate RWCU reject mass flow rate as follows:

_________ gpm X $5*10^{-4}$ Mlb/hr/gpm = __________ Mlb/hr
Step 8.4.1

____

________ IV

8.4.3 Enter result from step 8.4.2 in Table 2 as Item Number 49 value. ________

________ IV

Initials

8.5 Determine RWCU flow as follows:

N/A, Computer Point MSSFA101 indicates RWCU flow .... ☐ ________

8.5.1 At panel 2CEC*PNL603, record the following parameter:

G33-R609 RWCU SYS FLOW__________ gpm ________

8.5.2 Calculate RWCU mass flow rate as follows:

_________ gpm X $3.8*10^{-4}$ Mlb/hr/gpm = __________ Mlb/hr
Step 8.5.1

____

____
IV

8.5.3 Enter result from step 8.5.2 in Table 2 as Item Number 46 value. ________

____
IV

8.6 Determine RWCU Seal flow as follows:

N/A, Computer Point WCSFU100 indicates RWCU Seal Flow .... ☐ ________

8.6.1 At Rx Bldg 215' elevation, East of RWCU pump rooms, record the pump seal flows below:

a. 2WCS-FI 77A __________ gpm
b. 2WCS-FI 77B __________ gpm
c. 2WCS-FI 78A __________ gpm
d. 2WCS-FI 78B __________ gpm ________

8.6.2 Calculate total RWCU seal flow as follows:

_____ gpm	+	_____ gpm	+	_____ gpm	+	_____ gpm	=	_____ gpm
Step 8.6.1.a		Step 8.6.1.b		Step 8.6.1.c		Step 8.6.1.d		RWCU total seal flow

____

____
IV

8.6.3 Calculate total RWCU seal mass flow rate as follows:

_____ gpm X 0.000499 Mlb/hr/gpm = _________Mlb/hr
RWCU total seal flow / RWCU Seal Mass Flow
Step 8.6.2

____

____
IV

Initials

8.6.4 Enter result from step 8.6.3 in Table 2 as Item Number 60 value AND in step 8.7.2 where indicated. ________

________ IV

8.7 Determine CRD flow as follows:

N/A, Computer Point RDSFU102 indicates CRD Flow.................................. ☐ ________

8.7.1 At 2CEC*PNL603, record the following:

C12-R606, CRD System Flow ___________ gpm ________

8.7.2 Calculate Corrected CRD flow as follows:

(_______ gpm X 0.000499 Mlb/hr/gpm) + 0.00401Mlb/hr + _______ Mlb/hr =
CRD Sys Flow Step 8.7.1 | RWCU Seal Mass Flow Step 8.6.3

________________ Mlb/hr
Corrected CRD Flow ________

________ IV

8.7.3 Enter result from step 8.7.2 in Table 2 as Item Number 50 value. ________

________ IV

8.8 Determine Recirc Pump A Power as follows:

N/A, Computer Point RCSQA101 indicates Recirc Pump A Power................ ☐ ________

8.8.1 At 2CEC*PNL602, record the following:

B35-R634A, Recirc Motor A Current ________ amps ________

8.8.2 Calculate Recirc Pump A Power as Follows:

_________ amps X 0.023 MW/amp = ___________MW
step 8.8.1 | Recirc A Power

____

________ IV

8.8.3 Enter results of step 8.8.2 in Table 2 as Item Number 52 value. ________

________ IV

Initials

8.9 Determine Recirc Pump B Power as follows:

N/A, Computer Point RCSQA102 indicates Recirc Pump B Power................ ☐ ________

8.9.1 At 2CEC*PNL602, record the following:

B35-R634B, Recirc Motor B Current ________ amps ________

8.9.2 Calculate Recirc Pump B Power as Follows:

________ amps X 0.023 MW/amp = ___________MW
step 8.9.1 Recirc B Power

____

____
IV

8.9.3 Enter result of step 8.9.2 in Table 2 as Item Number 53 value. ________

____
IV

8.10 Complete Table 2 data and circle any data items obtained from an indicated Allowable Alternate Data Source. ________

8.11 Perform analysis using the EXCEL spreadsheet as follows:

N/A, EXCEL spreadsheet unavailable .... ☐ ________

8.11.1 Open EXCEL Spreadsheet from the following location:

S:\Groups\OPSU2\ALLShared\N2REP11_Rev_02\CTP-2 June 2004 Version ________

NOTE

"Allowable alternate data sources" listed in Table 2 may be utilized when the listed computer point is invalid provided such use is noted in the remarks section of this procedure.

CAUTION

- Do NOT enter information anywhere else in the spreadsheet as this may adversely impact spreadsheet performance. The data entry portion of the spreadsheet is identified at the top of the spreadsheet below the heading "ENTER VALUES BELOW."
- Do NOT use the cut, copy or paste features of EXCEL when entering data.

8.11.2 Enter data collected in Table 2 in the applicable blocks of the EXCEL spreadsheet. ________

____
IV

8.11.3 Print the EXCEL spreadsheet. ________

8.11.4 Record Calculated Core Thermal Power. (Item 31 of EXCEL print out.)

____________________MWth ________

8.11.5 Record difference between calculated Core Thermal Power in Step 8.11.4 and Core Thermal Power from OD-3 Option 2. (Item 33 of EXCEL print out.)

N/A, OD-3 Option 2 not available.. ☐

Difference between Calculated and OD-3 Core Thermal Power ________ %. ________

8.11.6 Using the "Save as" feature of EXCEL, save the spreadsheet in a date format similar to MM_DD_YYYY Heat Balance. ________

8.11.7 Close the EXCEL spreadsheet. ________

8.11.8 Sign all EXCEL generated datasheets where indicated and attach to this procedure. ________

Initials

8.12 Perform analysis using manual calculations:

N/A, analysis performed using EXCEL spreadsheet. .... ☐ ________

8.12.1 Obtaining data from table 2, determine feedwater average temperatures as follows:

a. [____________ + ____________ ÷ 2 = __________°F
NSSTA101 NSSTA102 A Side Avg Temp

b. [____________ + ____________ ÷ 2 = __________°F
NSSTA103 NSSTA104 B Side Avg Temp

c. [____________ + ____________ ÷ 2 = __________°F
A Side Avg Temp B Side Avg Temp Avg Feedwater Temp

____

____
IV

8.12.2 Using the data from table 2 calculate the average Feedwater Flow A d/p:

____________ ÷ 20 = ____________ psid
Total of table 1 Item numbers 1-20 A side avg dp

____

____
IV

8.12.3 Using the data from table 2 calculate the average Feedwater Flow B d/p:

____________ ÷ 20 = ____________ psid
Total of table 1 Item numbers 21-40 B side avg dp

____

____
IV

8.12.4 Using Table 3 determine the Specific Volume associated with the below Feedwater Temperatures:

a. ____________ = ____________ ft^3/lb
A Side Avg Temp (Step 8.12.1.a) A Specific Volume

b. ____________ = ____________ ft^3/lb
B Side Avg Temp (Step 8.12.1.b) B Specific Volume

____

____
IV

Initials

8.12.5 IF indicated Feedwater temperature is < 150°F THEN enter 1.0015 as the Thermal Expansion Factor(s) for the corresponding temperature element below. Otherwise perform the indicated calculation:

a. $0.9985 + (1.91 \times 10^{-5} \times$ __________ $)$ = ____________________
A Side Avg Temp (Step 8.12.1.a) — A side Thermal Expansion Factor

b. $0.9985 + (1.91 \times 10^{-5} \times$ __________ $)$ = ____________________
B Side Avg Temp (Step 8.12.1.b) — B side Thermal Expansion Factor

____

____
IV

8.12.6 Perform the following calculations to determine Feedwater flows:

a. [(0.2116 x __________) ÷ __________] X √(__________ X __________) X __________ =
Results 8.12.5.a; Results 8.12.4.a; Results 8.12.2; Results 8.12.4.a; LEFM Loop A Corr. (Table 1 Item # 54)

________________________ Mlb/hr
Channel A Feedwater Flow

b. [(0.2118 x __________) ÷ __________] X √(__________ X __________) X __________ =
Results 8.12.5.b; Results 8.12.4.b; Results 8.12.2.b; Results 8.12.4.b; LEFM Loop B Corr. (Table 1 Item # 55)

________________________ Mlb/hr
Channel B Feedwater Flow

c. _______________ Mlb/hr + _______________ Mlb/hr = _________________ Mlb/hr
Channel A Feedwater Flow 8.12.6.a results; Channel B Feedwater Flow 8.12.6.b results; Total Feedwater Flow

____

____
IV

8.12.7 Using ASME International Steam Tables for Industrial Use, Table U-3, determine enthalpy at 1000 psia for the average Feedwater temperature determined in step 8.12.1.c as follows:

a. IF the average feedwater temperature in step 8.12.1.c corresponds exactly to a value on the steam table enter the enthalpy below AND proceed to step 8.12.8

N/A, interpolation required .... ☐

______________BTU/lb
FW Enthalpy ________

b. IF the average feedwater temperature in step 8.12.1.c does NOT correspond exactly to a value on the steam table perform the following linear interpolation to obtain a value for feedwater enthalpy.

N/A, Interpolation NOT required .... ☐

1. Complete the following table:

Table Item Number	Description of Parameter	Value	Units
1	Average Feedwater Temperature from Step 8.12.1.c		° F
2	Next temperature higher than average feedwater temperature with data available from steam table U-3		° F
3	Next temperature lower than average feedwater temperature with data available from steam table U-3		° F
4	Enthalpy listed for Item 2 temperature on the steam table U-3		Btu/lb
5	Enthalpy listed for item 3 temperature on the steam table U-3		Btu/lb

2. Perform the following calculations:

(__________ - __________) x [(__________ - __________) ÷10] = __________Btu/lb
Table Item 1 Table Item 3 Table Item 4 Table Item 5) Δ Enthalpy

____________ Btu/lb + ____________ Btu/lb = ____________ Btu/lb
Δ Enthalpy Table Item 5 FW Enthalpy

____

____
IV

Initials

8.12.8 Calculate the Feedwater Energy Rate as follows:

____________Mlb/hr	X	____________BTU/lb	=	_____________MBTU/hr
Total Feedwater Flow Step 8.12.6.c		Feedwater Enthalpy Step 8.12.7		Feedwater Energy Rate

____

________ IV

8.12.9 Calculate Actual Recirc Energy Rate as follows:

(____________Mw	+	___________Mw)	x 3.413 MBTU/hr/Mw x 0.94(Efficiency)=
Recirc pump A power Table 2 Item 52		Recirc pump B power Table 2 Item 53	

__________________ MBTU/hr
Recirc Energy Rate

____

________ IV

8.12.10 Calculate Main Steam Flow as follows:

________Mlb/hr +	________Mlb/hr -	________Mlb/hr =	____________Mlb/hr
Total FW flow Step 8.12.6.c	CRD Flow Table 2 Item 50	RWCU Reject Flow Table 2 Item 49	Total Main Steam Flow

____

________ IV

8.12.11 Determine Absolute Main Steam pressure as follows:

___________psig + 15 = ________psia
Table 2 Item # 45

____

Initials

NOTE

Due to the small incremental difference between available data points on the steam table used below, interpolation is not required. A relatively small error is introduced in the final calculations and rounding down results in an enthalpy that is conservative in nature.

8.12.12 Using ASME International Steam Tables for Industrial Use, Table U-2 determine the Main Steam enthalpy for saturated steam at the absolute pressure determined in step 8.12.11. rounded DOWN to the nearest pressure available on the steam table.

______________BTU/lb

____

________ IV

8.12.13 Calculate the Main Steam Energy Rate as follows:

______________Mlb/hr	X	______________BTU/lb	=	_______________MBTU/hr
Total Main Steam Flow Step 8.12.10		Main Steam Enthalpy Step 8.12.12		Main Steam Energy Rate

____

________ IV

8.12.14 Calculate CRD Energy Rate as follows:

(____________Mlb/hr x 70.682 BTU/lb = __________________MBTU/hr

Corrected CRD Flow Table 2 Item 50 — CRD Energy Rate

____

________ IV

8.12.15 Using ASME International Steam Tables for Industrial Use, Table U-3, determine the enthalpy for subcooled water at 1000 psia for the following temperatures rounded UP to the nearest value available on the steam table:

a. RWCU Inlet Temp _______________ = ______________BTU/lb
Table 2 Item Number 47 — RWCU inlet Enthalpy

b. RWCU Outlet Temp ______________ = _____________BTU/lb
Table 2 Item Number 48 — RWCU Outlet Enthalpy

____

________ IV

8.12.16 Calculate the change in RWCU enthalpy as follows:

____________BTU/lb -	____________BTU/lb	=	____________BTU/lb	
RWCU inlet Enthalpy	RWCU Outlet Enthalpy		RWCU Δ Enthalpy	

____

________ IV

8.12.17 Calculate the RWCU Energy Rate as follows:

__________Mlb/hr x	__________BTU/lb +	[__________Mlb/hr x	__________BTU/lb] =
RWCU Flow Table 2 Item 46	RWCU Δ Enthalpy Step 8.12.16	RWCU reject flow Table 2 Item49	RWCU Outlet Enthalpy Step 8.12.15.b

________________________MBTU/hr
RWCU Energy Rate

____

________ IV

8.12.18 Calculate the Total Energy Rate Out of the Reactor as follows:

____________MBTU/hr +	____________MBTU/hr +	3.754MBTU/hr =	_____________MBTU/hr
Main Steam Energy Rate Step 8.12.13	RWCU Energy Rate Step 8.12.17	(Fixed Losses)	Total Energy Rate Out

____

________ IV

8.12.19 Calculate the Total Energy Rate In for the Reactor as follows:

__________MBTU/hr +	__________MBTU/hr +	__________MBTU/hr =	__________MBTU/hr
Feedwater Energy Rate Step 8.12.8	Recirc Energy Rate 8.12.9	CRD Energy Rate 8.12.14	Total Energy Rate In

____

________ IV

8.12.20 Calculate the % Core Thermal Power as follows:

[______________MBTU/hr -	______________MBTU/hr] x 0.293=	________________MW_t
Total Energy Rate Out Step 8.12.18	Total Energy Rate In Step 8.12.19	Core Thermal Power

(EPU: 39.88)
____________ MWt ÷ 34.67 = ______________ % rated thermal power ________

________ IV

 Initials

8.12.21 Calculate % rated thermal power from OD-3 Option 2 as follows:

N/A, OD-3 Option 2 not available.. ☐

(EPU: 39.88)

OD-3 Core Thermal Power ________ MW_t ÷ 34.67 = _____ % rated thermal power ________

8.12.22 Record difference in % rated thermal power between the value obtained in step 8.12.20 and 8.12.21.

N/A, OD-3 Option 2 not available.. ☐

_____________ % difference rated thermal power ________

9.0 **RETURN TO NORMAL**

None

10.0 **ACCEPTANCE CRITERIA**

10.1 The difference between Calculated and OD-3 Core Thermal Power < 1% rated thermal power. (Step 8.11.5 OR 8.12.22)

N/A, OD-3 Option 2 not available.. ☐ ________

10.2 Record Names and Initials of persons performing procedure.

Printed Name	Initials
________________	________________
________________	________________
________________	________________
________________	________________
________________	________________

____

Initials

11.0 RECORD REVIEW AND DISPOSITION

11.1 Reactor Engineering Supervisor Review

- Satisfactory. Record any comments in Remarks .... ☐
- Unsatisfactory. Immediately notify SM AND Reactor Engineering Supervisor. Record explanation AND corrective actions in Remarks..... ☐

______________________________ ______/______
SM Notified Date/Time

______________________________ ______/______
Person Notified Date/Time

Remarks ____

____

____

____

____

____

____

______________________________________ ____________
Reactor Engineering Supervisor OR Designee Date

11.2 Disposition

When complete, this procedure shall be forwarded to Reactor Engineering for temporary storage and transfer to the Permanent Plant File in accordance with CNG-PR-3.01, Records Management, and CNG-PR-3.01-1000, Records Management.

Initials

ATTACHMENT 3:
DETERMINING CORE THERMAL POWER USING TURBINE FIRST STAGE PRESSURE

8.0 **PROCEDURE**

8.1 Preliminaries

8.1.1 Verify all Turbine Bypass Valves are fully closed ________

8.1.2 Verify MSR reheat steam is NOT optimized. ________

8.1.3 Verify reactor is operating in a steady state condition with core power level constant for the current control rod pattern and core flow. ________

8.1.4 Personnel responsible for the performance of this test have read AND thoroughly understand its contents PRIOR to test commencement. ________

8.1.5 Perform the following:

PLANT IMPACT: NONE.

a. Review the Plant Impact. Indicate permission to perform procedure. ________ SM

b. Review the Plant Impact. Indicate acknowledgement that procedure is to be performed. ________ CRO

8.2 Record the following Process Computer points.

- Turbine First Stage Pressure = _______ psia (MSSPA07) .... ☐
- FW A Correction Factor = _______ (FWSFE102) .... ☐
- FW B Correction Factor = _______ (FWSFE103) .... ☐ ________

8.3 Demand Plant Process Computer Program OD-3, Option 2 and attach it to this procedure.

N/A, Process Computer is unavailable.. ☐ ________

8.4 Calculation of Core Thermal Power

8.4.1 Calculate the % core thermal power based on the computer points recorded in Step 8.2 using the following equation:

$$\text{EPU: \% CTP} = \left\{(-0.000041017) \times (\underset{\text{MSSPA07}}{\_\_\_\_})^2 + 0.17963(\underset{\text{MSSPA07}}{\_\_\_\_})\right\} \times (\underset{\text{FWSFE102}}{\_\_\_\_} + \underset{\text{FWSFE103}}{\_\_\_\_})/2 - 1.616$$

$$\text{\% CTP} = [(0.12464 \times \underset{\text{MSSPA07}}{\_\_\_\_\_\_}) + 12.6794] \times (\underset{\text{FWSFE102}}{\_\_\_\_\_\_} + \underset{\text{FWSFE103}}{\_\_\_\_\_\_})/2$$

% CTP = __________ __________

____
IV

8.4.2 Obtain CMWt from OD-3 Option 2 demanded in step 8.3 and calculate % core thermal power.

N/A, Process Computer is unavailable .... ☐

CMWt = __________MW_{th}

% CTP = (______) CMWt ÷ 34.67 = _______% (EPU: 39.88) __________

____
IV

8.5 Indicate if core thermal power determined in Steps 8.4.1 and 8.4.2 agree within ±2%.

N/A if Process Computer is not available.

YES ☐ NO ☐ N/A ☐ __________

8.6 IF Step 8.5 is checked NO, THEN immediately notify SM and Reactor Engineering Supervisor. Otherwise, N/A .... ☐ __________

9.0 **RETURN TO NORMAL**

None

Initials

10.0 ACCEPTANCE CRITERIA

10.1 Difference between Calculated and OD-3 Core Thermal Power ≤ 2%. (Step 8.5) ....

N/A, OD-3 Option 2 not available, attachment performed for information only .... ☐ ________

10.2 Record Names and Initials of persons performing procedure.

Printed Name	Initials

____

Initials

11.0 RECORD REVIEW AND DISPOSITION

11.1 Reactor Engineering Supervisor Review

- Satisfactory. Record any comments in Remarks .... ☐
- Unsatisfactory. Immediately notify SM AND Reactor Engineering Supervisor. Record explanation AND corrective actions in Remarks..... ☐

______________________________ ____/____
SM Notified Date/Time

______________________________ ____/____
Person Notified Date/Time

Remarks ____

____

____

____

____

____

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______________________________________ __________
Reactor Engineering Supervisor OR Designee Date

11.2 Disposition

When complete, this procedure shall be forwarded to Reactor Engineering for temporary storage and transfer to the Permanent Plant File in accordance with CNG-PR-3.01, Records Management, and CNG-PR-3.01-1000, Records Management.

Initials

ATTACHMENT 4:
CORE THERMAL POWER COMPARISON BETWEEN PLANT PROCESS COMPUTER AND 3D-MONICORE

8.0 **PROCEDURE**

8.1 Preliminaries

8.1.1 Demand or retrieve the following:

a. 3D-Monicore periodic log. .... ☐

b. Plant Process Computer Program OD-3, Option 2 .... ☐ ________

8.2 Calculate % rated Core Thermal Power from 3D-Monicore Log from Step 8.1.1.a.

3D-Monicore Core Thermal Power = __________ MWt

(EPU: 39.88)

% CTP = ________MWT ÷ 34.67 = ________% ________

8.3 Calculate % rated Core Thermal Power from OD3 Option 2 from Step 8.1.1b.

OD3 Option 2 = __________ MWt

(EPU: 39.88)

% CTP = ________MWT ÷ 34.67 = ________% ________

8.4 Indicate if % CTP from Step 8.2 and % CTP from 8.3 agree within 0.5% of Rated Thermal Power

YES ☐ NO ☐ ________

8.5 IF Step 8.4 is checked NO, THEN immediately notify SM and Reactor Engineering Supervisor. Otherwise, N/A... ☐ ________

9.0 **RETURN TO NORMAL**

None

Initials

10.0 ACCEPTANCE CRITERIA

10.1 Difference between Calculated and OD-3 Core Thermal Power < 0.5%. (Step 8.4) ________

10.2 Record Names and Initials of persons performing procedure.

Print Name	Signature	Initials

11.0 RECORD REVIEW AND DISPOSITION

11.1 Reactor Engineering Supervisor Review

- Satisfactory. Record any comments in Remarks .... ☐
- Unsatisfactory. Immediately notify SM AND Reactor Engineering Supervisor. Record explanation AND corrective actions in Remarks..... ☐

______________________ ____/____
SM Notified Date/Time

______________________ ____/____
Person Notified Date/Time

Remarks ____

____

____

____

____

____

____

______________________________ __________
Reactor Engineering Supervisor OR Designee Date

11.2 Disposition

When complete, this procedure shall be forwarded to Reactor Engineering for temporary storage and transfer to the Permanent Plant File in accordance with CNG-PR-3.01, Records Management, and CNG-PR-3.01-1000, Records Management.

TABLE 1 – DATA COLLECTION WITH PROCESS COMPUTER UNAVAILABLE

Item Number	Parameter	Data Source	Value	Units
1	Feedwater Flow A d/p-1	2FWS-PD11A		PSID
2	Feedwater Flow A d/p-2	2FWS-PD11A		PSID
3	Feedwater Flow A d/p-3	2FWS-PD11A		PSID
4	Feedwater Flow A d/p-4	2FWS-PD11A		PSID
5	Feedwater Flow A d/p-5	2FWS-PD11A		PSID
6	Feedwater Flow A d/p-6	2FWS-PD11A		PSID
7	Feedwater Flow A d/p-7	2FWS-PD11A		PSID
8	Feedwater Flow A d/p-8	2FWS-PD11A		PSID
9	Feedwater Flow A d/p-9	2FWS-PD11A		PSID
10	Feedwater Flow A d/p-10	2FWS-PD11A		PSID
11	Feedwater Flow A d/p-11	2FWS-PD11A		PSID
12	Feedwater Flow A d/p-12	2FWS-PD11A		PSID
13	Feedwater Flow A d/p-13	2FWS-PD11A		PSID
14	Feedwater Flow A d/p-14	2FWS-PD11A		PSID
15	Feedwater Flow A d/p-15	2FWS-PD11A		PSID
16	Feedwater Flow A d/p-16	2FWS-PD11A		PSID
17	Feedwater Flow A d/p-17	2FWS-PD11A		PSID
18	Feedwater Flow A d/p-18	2FWS-PD11A		PSID
19	Feedwater Flow A d/p-19	2FWS-PD11A		PSID
20	Feedwater Flow A d/p-20	2FWS-PD11A		PSID
21	Feedwater Flow B d/p-1	2FWS-PD11B		PSID
22	Feedwater Flow B d/p-2	2FWS-PD11B		PSID
23	Feedwater Flow B d/p-3	2FWS-PD11B		PSID
24	Feedwater Flow B d/p-4	2FWS-PD11B		PSID
25	Feedwater Flow B d/p-5	2FWS-PD11B		PSID
26	Feedwater Flow B d/p-6	2FWS-PD11B		PSID
27	Feedwater Flow B d/p-7	2FWS-PD11B		PSID
28	Feedwater Flow B d/p-8	2FWS-PD11B		PSID
29	Feedwater Flow B d/p-9	2FWS-PD11B		PSID
30	Feedwater Flow B d/p-10	2FWS-PD11B		PSID
31	Feedwater Flow B d/p-11	2FWS-PD11B		PSID
32	Feedwater Flow B d/p-12	2FWS-PD11B		PSID
33	Feedwater Flow B d/p-13	2FWS-PD11B		PSID
34	Feedwater Flow B d/p-14	2FWS-PD11B		PSID
35	Feedwater Flow B d/p-15	2FWS-PD11B		PSID
36	Feedwater Flow B d/p-16	2FWS-PD11B		PSID
37	Feedwater Flow B d/p-17	2FWS-PD11B		PSID
38	Feedwater Flow B d/p-18	2FWS-PD11B		PSID
39	Feedwater Flow B d/p-19	2FWS-PD11B		PSID
40	Feedwater Flow B d/p-20	2FWS-PD11B		PSID
41	Feedwater A1 Temp	2FWS-TI64A		°F
42	Feedwater A2 Temp	2FWS-TI64A		°F
43	Feedwater B1 Temp	2FWS-TI64B		°F
44	Feedwater B2 Temp	2FWS-TI64B		°F
45	Reactor Pressure	C33-R609		PSIG
46	RWCU Flow	Step 8.2.2		Mlb/hr
47	RWCU Inlet Temp	G33-R607 SW 1		°F
48	RWCU Outlet Temp	G33-R607 SW 4		°F
49	RWCU Reject Flow	Step 8.3.2		Mlb/hr
50	Corrected CRD Flow	Step 8.5.2		Mlb/hr
51	CRD Temp	ASSUMED	100	°F
52	Recirc Pump A Power	Step 8.6.2a		MW
53	Recirc Pump B Power	Step 8.6.2b		MW
54	LEFM Loop A Corr.	CRC Book		NONE
55	LEFM Loop B Corr.	CRC Book		NONE
56	RWCU Seals	Step 8.4.3		Mlb/hr

TABLE 2 – DATA COLLECTION WITH PROCESS COMPUTER AVAILABLE

Item Number	Parameter	Data Source	Allowable Alternate Data Source	Value	Units
1	Feedwater Flow A d/p-1	2FWS-PDI1A	NONE		PSID
2	Feedwater Flow A d/p-2	2FWS-PDI1A	NONE		PSID
3	Feedwater Flow A d/p-3	2FWS-PDI1A	NONE		PSID
4	Feedwater Flow A d/p-4	2FWS-PDI1A	NONE		PSID
5	Feedwater Flow A d/p-5	2FWS-PDI1A	NONE		PSID
6	Feedwater Flow A d/p-6	2FWS-PDI1A	NONE		PSID
7	Feedwater Flow A d/p-7	2FWS-PDI1A	NONE		PSID
8	Feedwater Flow A d/p-8	2FWS-PDI1A	NONE		PSID
9	Feedwater Flow A d/p-9	2FWS-PDI1A	NONE		PSID
10	Feedwater Flow A d/p-10	2FWS-PDI1A	NONE		PSID
11	Feedwater Flow A d/p-11	2FWS-PDI1A	NONE		PSID
12	Feedwater Flow A d/p-12	2FWS-PDI1A	NONE		PSID
13	Feedwater Flow A d/p-13	2FWS-PDI1A	NONE		PSID
14	Feedwater Flow A d/p-14	2FWS-PDI1A	NONE		PSID
15	Feedwater Flow A d/p-15	2FWS-PDI1A	NONE		PSID
16	Feedwater Flow A d/p-16	2FWS-PDI1A	NONE		PSID
17	Feedwater Flow A d/p-17	2FWS-PDI1A	NONE		PSID
18	Feedwater Flow A d/p-18	2FWS-PDI1A	NONE		PSID
19	Feedwater Flow A d/p-19	2FWS-PDI1A	NONE		PSID
20	Feedwater Flow A d/p-20	2FWS-PDI1A	NONE		PSID
21	Feedwater Flow B d/p-1	2FWS-PDI1B	NONE		PSID
22	Feedwater Flow B d/p-2	2FWS-PDI1B	NONE		PSID
23	Feedwater Flow B d/p-3	2FWS-PDI1B	NONE		PSID
24	Feedwater Flow B d/p-4	2FWS-PDI1B	NONE		PSID
25	Feedwater Flow B d/p-5	2FWS-PDI1B	NONE		PSID
26	Feedwater Flow B d/p-6	2FWS-PDI1B	NONE		PSID
27	Feedwater Flow B d/p-7	2FWS-PDI1B	NONE		PSID
28	Feedwater Flow B d/p-8	2FWS-PDI1B	NONE		PSID
29	Feedwater Flow B d/p-9	2FWS-PDI1B	NONE		PSID
30	Feedwater Flow B d/p-10	2FWS-PDI1B	NONE		PSID
31	Feedwater Flow B d/p-11	2FWS-PDI1B	NONE		PSID
32	Feedwater Flow B d/p-12	2FWS-PDI1B	NONE		PSID
33	Feedwater Flow B d/p-13	2FWS-PDI1B	NONE		PSID
34	Feedwater Flow B d/p-14	2FWS-PDI1B	NONE		PSID
35	Feedwater Flow B d/p-15	2FWS-PDI1B	NONE		PSID
36	Feedwater Flow B d/p-16	2FWS-PDI1B	NONE		PSID
37	Feedwater Flow B d/p-17	2FWS-PDI1B	NONE		PSID
38	Feedwater Flow B d/p-18	2FWS-PDI1B	NONE		PSID
39	Feedwater Flow B d/p-19	2FWS-PDI1B	NONE		PSID
40	Feedwater Flow B d/p-20	2FWS-PDI1B	NONE		PSID
41	Feedwater A1 Temp	NSSTA101	2FWS-TI64A		° F
42	Feedwater A2 Temp	NSSTA102	2FWS-TI64A		° F
43	Feedwater B1 Temp	NSSTA103	2FWS-TI64B		° F
44	Feedwater B2 Temp	NSSTA104	2FWS-TI64B		° F
45	Reactor Pressure	FWSPA101	C33-R609		PSIG
46	RWCU Flow	MSSFA101	Step 8.5.2		Mlb/hr
47	RWCU Inlet Temp	WCSTA101	G33-R607 SW 1		° F

TABLE 2 – DATA COLLECTION WITH PROCESS COMPUTER AVAILABLE

48	RWCU Outlet Temp	WCSTA102	G33-R607 SW 4		° F
49	RWCU Reject Flow	Step 8.4.2	NONE		Mlb/hr
50	Corrected CRD Flow	RDSFU102	Step 8.7.2		Mlb/hr
51	CRD Temp	ASSUMED	ASSUMED	100	° F
52	Recirc Pump A Power	RCSQA101	Step 8.8.2		MW
53	Recirc Pump B Power	RCSQA102	Step 8.9.2		MW
54	LEFM Loop A Corr.	FWSFE102	CRC Book		NONE
55	LEFM Loop B Corr.	FWSFE103	CRC Book		NONE
56	MWthermal	OD-3	NONE		Mlb/hr
57	FW Flow A	FWSFA100	C33-R604A		Mlb/hr
58	FW Flow B	FWSFA101	C33-R604B		Mlb/hr
59	Total FW Flow	FWSFU01	C33-R607		Mlb/hr
60	RWCU Seals	WCSFU100	Step 8.6.3		Mlb/hr

TABLE 3 - SPECIFIC VOLUME VS. FEEDWATER TEMPERATURE

Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume
50	0.015970	100	0.01608	150	0.01629	200	0.01658
51	0.015971	101	0.016084	151	0.016295	201	0.016587
52	0.015972	102	0.016088	152	0.016300	202	0.016594
53	0.015973	103	0.016092	153	0.016305	203	0.016601
54	0.015974	104	0.016096	154	0.016310	204	0.016608
55	0.015975	105	0.016100	155	0.016315	205	0.016615
56	0.015976	106	0.016104	156	0.016320	206	0.016622
57	0.015977	107	0.016108	157	0.016325	207	0.016629
58	0.015978	108	0.016112	158	0.016330	208	0.016636
59	0.015979	109	0.016116	159	0.016335	209	0.016643
60	0.015980	110	0.01612	160	0.01634	210	0.01665
61	0.015982	111	0.016124	161	0.016346	211	0.016657
62	0.015984	112	0.016128	162	0.016352	212	0.016664
63	0.015986	113	0.016132	163	0.016358	213	0.016671
64	0.015988	114	0.016136	164	0.016364	214	0.016678
65	0.015990	115	0.016140	165	0.016370	215	0.016685
66	0.015992	116	0.016144	166	0.016376	216	0.016692
67	0.015994	117	0.016148	167	0.016382	217	0.016699
68	0.015996	118	0.016152	168	0.016388	218	0.016706
69	0.015998	119	0.016156	169	0.016394	219	0.016713
70	0.016000	120	0.01616	170	0.0164	220	0.01672
71	0.016002	121	0.016164	171	0.016406	221	0.016727
72	0.016004	122	0.016168	172	0.016412	222	0.016734
73	0.016006	123	0.016172	173	0.016418	223	0.016741
74	0.016008	124	0.016176	174	0.016424	224	0.016748
75	0.016010	125	0.016180	175	0.016430	225	0.016755
76	0.016012	126	0.016184	176	0.016436	226	0.016762
77	0.016014	127	0.016188	177	0.016442	227	0.016769
78	0.016016	128	0.016192	178	0.016448	228	0.016776
79	0.016018	129	0.016196	179	0.016454	229	0.016783
80	0.01602	130	0.0162	180	0.01646	230	0.01679
81	0.016023	131	0.016204	181	0.0164660	231	0.025798
82	0.016026	132	0.016208	182	0.016472	232	0.034806
83	0.016029	133	0.016212	183	0.016478	233	0.043814
84	0.016032	134	0.016216	184	0.016484	234	0.052822
85	0.016035	135	0.016220	185	0.016490	235	0.061830

TABLE 3 - SPECIFIC VOLUME VS. FEEDWATER TEMPERATURE

Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume
86	0.016038	136	0.016224	186	0.016496	236	0.070838
87	0.016041	137	0.016228	187	0.016502	237	0.079846
88	0.016044	138	0.016232	188	0.016508	238	0.088854
89	0.016047	139	0.016236	189	0.016514	239	0.097862
90	0.01605	140	0.01624	190	0.01652	240	0.10687
91	0.016053	141	0.016245	191	0.016526	241	0.097877
92	0.016056	142	0.016250	192	0.016532	242	0.088884
93	0.016059	143	0.016255	193	0.016538	243	0.079891
94	0.016062	144	0.016260	194	0.016544	244	0.070898
95	0.016065	145	0.016265	195	0.016550	245	0.061905
96	0.016068	146	0.016270	196	0.016556	246	0.052912
97	0.016071	147	0.016275	197	0.016562	247	0.043919
98	0.016074	148	0.016280	198	0.016568	248	0.034926
99	0.016077	149	0.016285	199	0.016574	249	0.025933
100	0.01608	150	0.01629	200	0.01658	250	0.01694

TABLE 3 - SPECIFIC VOLUME VS. FEEDWATER TEMPERATURE

Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume
250	0.01694	300	0.01738	350	0.01791	400	0.01855
251	0.016949	301	0.017390	351	0.017922	401	0.018564
252	0.016958	302	0.017400	352	0.017934	402	0.018578
253	0.016967	303	0.017410	353	0.017946	403	0.018592
254	0.016976	304	0.017420	354	0.017958	404	0.018606
255	0.016985	305	0.017430	355	0.017970	405	0.018620
256	0.016994	306	0.017440	356	0.017982	406	0.018634
257	0.017003	307	0.017450	357	0.017994	407	0.018648
258	0.017012	308	0.017460	358	0.018006	408	0.018662
259	0.017021	309	0.017470	359	0.018018	409	0.018676
260	0.01703	310	0.01748	360	0.01803	410	0.01869
261	0.017038	311	0.017490	361	0.018042	411	0.018705
262	0.017046	312	0.017500	362	0.018054	412	0.018720
263	0.017054	313	0.017510	363	0.018066	413	0.018735
264	0.017062	314	0.017520	364	0.018078	414	0.018750
265	0.017070	315	0.017530	365	0.018090	415	0.018765
266	0.017078	316	0.017540	366	0.018102	416	0.018780
267	0.017086	317	0.017550	367	0.018114	417	0.018795
268	0.017094	318	0.017560	368	0.018126	418	0.018810
269	0.017102	319	0.017570	369	0.018138	419	0.018825
270	0.01711	320	0.01758	370	0.01815	420	0.01884
271	0.017119	321	0.017591	371	0.018163	421	0.018856
272	0.017128	322	0.017602	372	0.018176	422	0.018872
273	0.017137	323	0.017613	373	0.018189	423	0.018888
274	0.017146	324	0.017624	374	0.018202	424	0.018904
275	0.017155	325	0.017635	375	0.018215	425	0.018920
276	0.017164	326	0.017646	376	0.018228	426	0.018936
277	0.017173	327	0.017657	377	0.018241	427	0.018952
278	0.017182	328	0.017668	378	0.018254	428	0.018968
279	0.017191	329	0.017679	379	0.018267	429	0.018984
280	0.0172	330	0.01769	380	0.01828	430	0.019
281	0.017209	331	0.017701	381	0.018293	431	0.019017
282	0.017218	332	0.017712	382	0.018306	432	0.019034
283	0.017227	333	0.017723	383	0.018319	433	0.019051
284	0.017236	334	0.017734	384	0.018332	434	0.019068
285	0.017245	335	0.017745	385	0.018345	435	0.019085
286	0.017254	336	0.017756	386	0.018358	436	0.019102
287	0.017263	337	0.017767	387	0.018371	437	0.019119
288	0.017272	338	0.017778	388	0.018384	438	0.019136
289	0.017281	339	0.017789	389	0.018397	439	0.019153
290	0.01729	340	0.0178	390	0.01841	440	0.01917

TABLE 3 - SPECIFIC VOLUME VS. FEEDWATER TEMPERATURE

Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume
291	0.017299	341	0.017811	391	0.018424	441	0.019187
292	0.017308	342	0.017822	392	0.018438	442	0.019204
293	0.017317	343	0.017833	393	0.018452	443	0.019221
294	0.017326	344	0.017844	394	0.018466	444	0.019238
295	0.017335	345	0.017855	395	0.018480	445	0.019255
296	0.017344	346	0.017866	396	0.018494	446	0.019272
297	0.017353	347	0.017877	397	0.018508	447	0.019289
298	0.017362	348	0.017888	398	0.018522	448	0.019306
299	0.017371	349	0.017899	399	0.018536	449	0.019323
300	0.01738	350	0.01791	400	0.01855	450	0.01934

TABLE 3 - SPECIFIC VOLUME VS. FEEDWATER TEMPERATURE

Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume	Temp. in °F	Feedwater Specific Volume
450	0.01934	496	0.020268	542	0.021502
451	0.019358	497	0.020291	543	0.021533
452	0.019376	498	0.020314	544	0.021564
453	0.019394	499	0.020337	545	0.021595
454	0.019412	500	0.02036	546	0.021626
455	0.019430	501	0.020384	547	0.021657
456	0.019448	502	0.020408	548	0.021688
457	0.019466	503	0.020432	549	0.021719
458	0.019484	504	0.020456	550	0.02175
459	0.019502	505	0.020480		
460	0.01952	506	0.020504		
461	0.019539	507	0.020528		
462	0.019558	508	0.020552		
463	0.019577	509	0.020576		
464	0.019596	510	0.0206		
465	0.019615	511	0.020626		
466	0.019634	512	0.020652		
467	0.019653	513	0.020678		
468	0.019672	514	0.020704		
469	0.019691	515	0.020730		
470	0.01971	516	0.020756		
471	0.019731	517	0.020782		
472	0.019752	518	0.020808		
473	0.019773	519	0.020834		
474	0.019794	520	0.02086		
475	0.019815	521	0.020888		
476	0.019836	522	0.020916		
477	0.019857	523	0.020944		
478	0.019878	524	0.020972		
479	0.019899	525	0.021000		
480	0.01992	526	0.021028		
481	0.019941	527	0.021056		
482	0.019962	528	0.021084		
483	0.019983	529	0.021112		
484	0.020004	530	0.02114		
485	0.020025	531	0.021170		
486	0.020046	532	0.021200		
487	0.020067	533	0.021230		
488	0.020088	534	0.021260		
489	0.020109	535	0.021290		
490	0.02013	536	0.021320		
491	0.020153	537	0.021350		
492	0.020176	538	0.021380		
493	0.020199	539	0.021410		
494	0.020222	540	0.02144		
495	0.020245	541	0.021471		

Exelon Generation.

Training Id: **2015 NRC RO Admin EC** Revision: **0.0**

Title: **Defeat the HPCS Level 8 Interlock**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	6/10/15
Validated By	Jay Lawrence	10/2/15
Facility Reviewer	Mark Green	10/5/15

Approximate Duration: 30 minutes

Documentation of Performance:

Performer: ______________________

Evaluator: ______________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ______________________

Evaluators Signature: ______________________ Date: ________

References

1. N2-EOP-6.20, Defeating RPV Water level Interlocks
2. HPCS GE Prints and ESKs
3. NUREG 1123, 2.2.41 (3.5)

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to describe how the HPCS Level 8 Interlock is defeated.

   b. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. N2-EOP06-01001-20, Implement N2-EOP-6.20, Defeating RPV Water Level Interlocks

   b. 2.2.41 (3.5) Ability to obtain and interpret station electrical and mechanical drawings

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Classroom
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

   a. Training Classroom

5. JPM Setup (if required)

   a. Print out enough copies of N2-EOP-6.20 for each operator to have one.

   b. Ensure a copy of the following ESKs have been printed out for use by the operators. Print enough copies so that each operator has a set. 11X17 sheets or larger:

      1) HPCS GE Prints, All sheets (7 total)

      2) ESK-06CSH03, (the sheet with 2CSH*MOV107 on it)

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant has experienced a scram with RPV level control issues • HPCS Automatically initiated at Level 2. • HPCS raised level until 2CSH*MOV107 automatically shut on Level 8. • RPV Level is currently 180 inches and slowly lowering. • Drywell pressure is 0.5 psig. • The EOP Director has directed performance of N2-EOP-6.20, Section 6.2, Defeating HPCS Level 8 interlocks. • You are the operator assigned to perform N2-EOP-6.20. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, Using the provided HPCS GE Prints and ESK, complete the attached worksheets regarding Defeating the HPCS Level 8 interlocks.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary.	P	SAT / UNSAT **STD:** Proper communications used.
2.	Obtain a copy of the reference procedure and review / utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** Refers to the provided N2-EOP-6.20, HPCS GE Prints, and HPCS ESK
Evaluator Note:	The following steps may be performed in any order.		
Evaluator Note:	The Answer Key attached to this JPM will be used to assist in grading of the below steps.		

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
Evaluator Note:	Step 3 below should be graded by both reviewing the information the operator documented in Block 1 as well as a verbal discussion between the Evaluator and operator as to how the Level 8 interlock is defeated. When grading the below step, the Evaluator should take into account any information gained through verbal discussion with the operator even though it is not documented on the worksheet.		
3.	Describe how performing N2-EOP-6.20, Section 6.2 prevents 2CSH*MOV107 from automatically closing when RPV Level reaches Level 8.	P	**PASS / FAIL** **STD:** Documents in Block 1 how the HPCS LEVEL 8 Interlocks are defeated. If necessary, provides a verbal description to the Evaluator of how the interlocks are defeated. Key information needed:
			Step 6.2.1 • GE Print Location where S26 is located • The status of S26 contact 1 to 2 when the switch is in TEST. • A description of how Relay K13 works to seal itself in. • A description of how Contact K13 M2 to T2 causes MOV107 to automatically shut on Level 8 using ESK Sheet 3 or GE Sheet 6.
			Step 6.2.3 • A description of how depressing the SEAL IN RESET Pushbutton causes the K13 to deenergize using GE Sheet 3.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
4.	Determines what will happen if N2-EOP-6.20, Steps 6.2.3 and 6.2.4 are not performed with the current plant conditions.	P	**PASS / FAIL** **STD:** On the provided worksheet in Block 2, circles the following: 3. If the operator did not depress the seal in reset pushbutton, then with RPV water level at its current level, 2CSH*MOV107 could not be manually opened using the control switch on 2CEC*PNL601.

TASK STANDARD	The Operator has completed the JPM worksheet and returned it to the Evaluator. The Evaluator has discussed Step 3 with the operator to clarify any information.

STOP TIME	

Evaluator's Answer Key

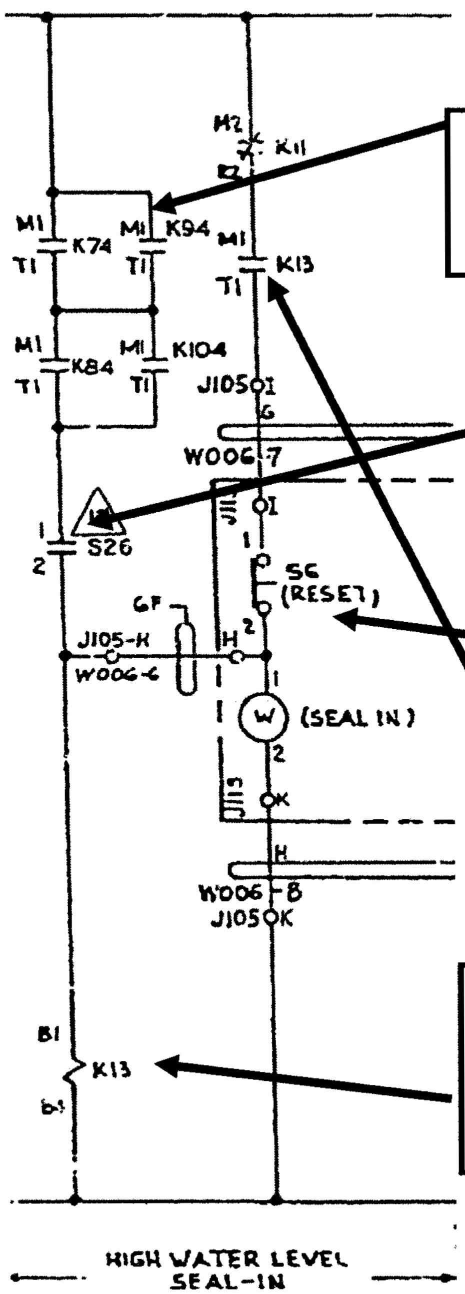
Do Not Provide to Candidate

1.	**Using the provided HPCS GE Prints and ESK, describe how performing N2-EOP-6.20, Section 6.2 prevents 2CSH*MOV107 from automatically shutting when RPV level reaches Level 8. Ensure to explain the function of each step of Section 6.2 regarding circuitry.** **Document as much information as possible in the space below. Additionally at the end of this JPM, you will be given the opportunity to verbally explain to the Evaluator your answer.**
Step 6.2.1	1. GE Print Sheet 3, Contact S26 1 to 2 is OPEN when the TEST SWITCH is placed in TEST. 2. This will prevent Relay K13 from ENERGIZING when RPV Level reaches LEVEL 8 (contacts K74, 84, 94, and 104 above the S26 contact). 3. By preventing K13 from energizing, then on the HPCS ESK Sheet 3, on the MOV107 CLOSE logic chain, the K13 M2 to T2 contact is prevented from closing and energizing the CLOSE relay 42R- which would cause the valve to automatically shut if open. Note: the Operator may choose to explain the affect on MOV107 using the GE print, instead of the ESK. This is acceptable. The GE Print designator is Valve NO E22-F004, PUMP INJECTION SHUTOFF VALVE and can be found on GE Sheet 4 in the upper right of the drawing. The description above can be used on the GE print as well. 4. Given the plant conditions that MOV107 automatically shut when level reached Level 8, the K13 relay is already energized and SEALED IN. 5. After the Test Switch is placed in TEST, the RESET SEAL IN pushbutton is DEPRESSED. This pushbutton can be found on GE Sheet 3 and is labeled S6 (RESET).
Step 6.2.3	6. By depressing the RESET pushbutton, this clears the seal in and deenergizes Relay K13.

Evaluator's Answer Key

Do Not Provide to Candidate

S26 from GE Sheet 3:



Each of the 4 contacts comes from a separate level transmitter. The contacts close when level reaches Level 8 and open when level drops below Level 8.

S26 Contact 1 to 2 is OPEN when the switch is placed in TEST.

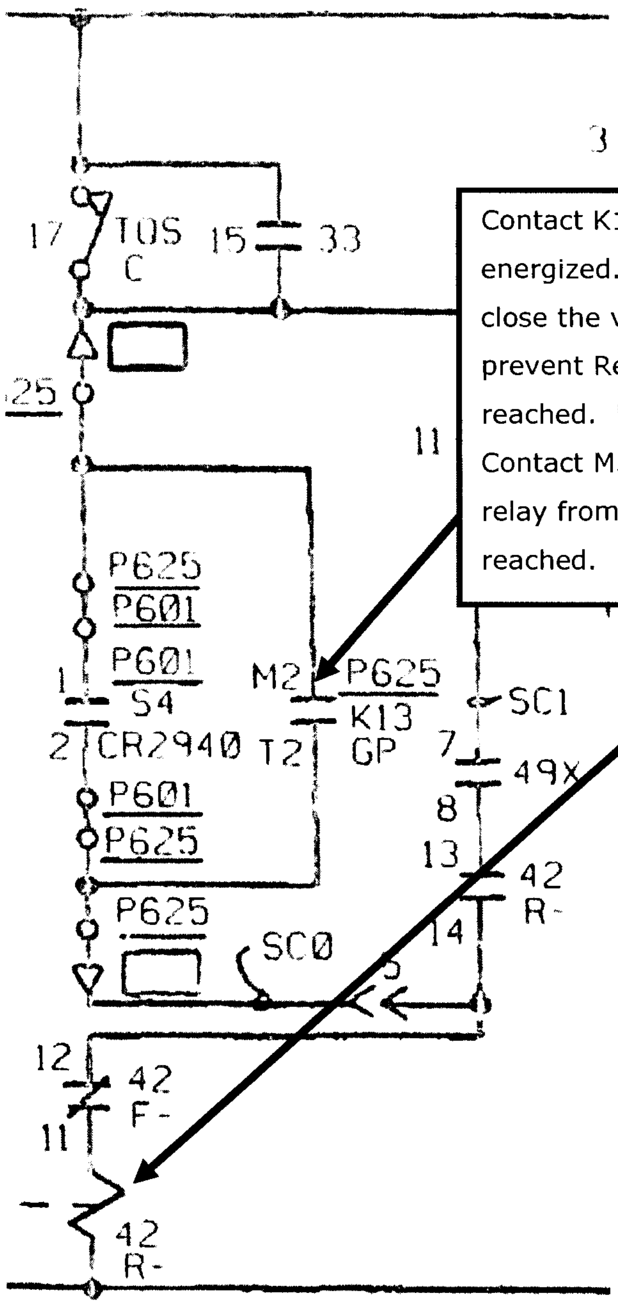
Depressing the RESET SEAL IN Pushbutton (S6) will break the SEAL IN caused by K13 and cause K13 to deenergize. K13 is then prevented from reenergizing because the S26 1 to 2 contact is OPEN.

Relay K13. When energized, sends a signal to MOV107, Contact M2 to T2 to CLOSE (ESK Sheet 3 or GE Sheet 4). With Relay K13 energized, it also seals itself in by shutting Contact M1 to T1.

Evaluator's Answer Key

Do Not Provide to Candidate

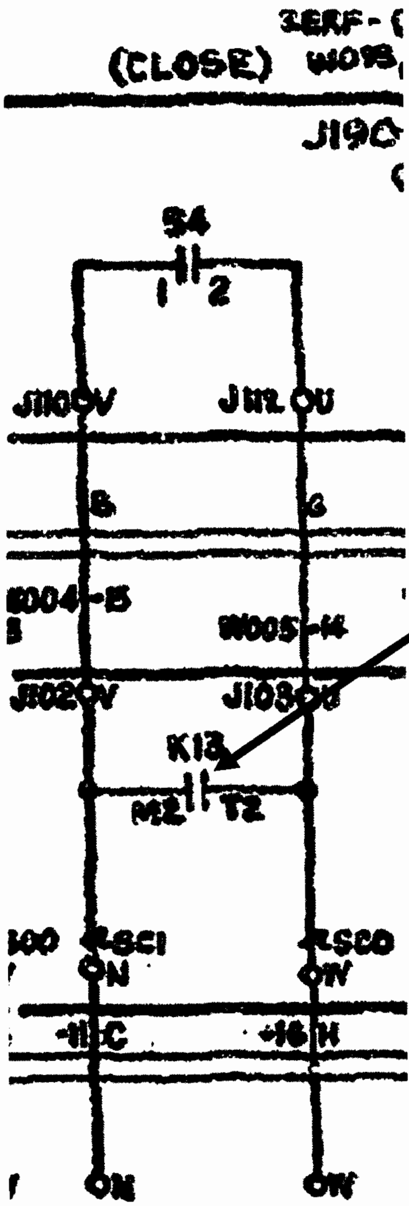
2CSH*MOV107 ESK Sheet 3:



Contact K13 M2 to T2 will CLOSE when Relay K13 is energized. This will cause the 42R- relay to energize and close the valve. Placing the TEST SWITCH in TEST will prevent Relay K13 from ENERGIZING when Level 8 is reached. Preventing K13 from energizing will prevent Contact M2 to T2 from closing. This will prevent the 42R- relay from energizing and closing the valve when Level 8 is reached.

Evaluator's Answer Key
Do Not Provide to Candidate

If the Operator chooses to use the GE print to explain the effect on 2CSH*MOV107. GE Print Sheet 4, E22-F004:



Contact K13 M2 to T2 will CLOSE when Relay K13 is energized. This will cause the 42R- relay (not shown) to energize and close the valve. Placing the TEST SWITCH in TEST will prevent Relay K13 from ENERGIZING when Level 8 is reached. Preventing K13 from energizing will prevent Contact M2 to T2 from closing. This will prevent the 42R- relay (not shown) from energizing and closing the valve when Level 8 is reached.

Evaluator's Answer Key

Do Not Provide to Candidate

2.	**Given the current plant conditions contained in the Initial Conditions of this JPM, what would happen if the operator defeating the HPCS Level 8 interlocks, did not perform Step 6.2.3 and 6.2.4, Depressing and releasing the HI WTR LEVEL SEAL IN RESET pushbutton and verifying the seal in white light was extinguished after the test switch was placed in TEST? (circle one)**
	1. There are no consequences for not depressing the HI WTR LEVEL SEAL IN RESET pushbutton. Given that RPV Water level is below Level 8, the HI WTR LEVEL SEAL IN RESET white light is already extinguished. 2. If the operator did not depress the seal in reset pushbutton, then 2CSH*MOV107 would not automatically open if RPV level reached Level 2. 3. If the operator did not depress the seal in reset pushbutton, then with RPV water level at its current level, 2CSH*MOV107 could not be manually opened using the control switch on 2CEC*PNL601. 4. If the operator did not depress the seal in reset pushbutton, then if RPV level reached Level 2 again and HPCS began to inject, 2CSH*MOV107 would still automatically close when RPV level reached Level 8.

JPM Handout

INITIAL CONDITIONS	Given: • The plant has experienced a scram with RPV level control issues • HPCS Automatically initiated at Level 2. • HPCS raised level until 2CSH*MOV107 automatically shut on Level 8. • RPV Level is currently 180 inches and slowly lowering. • Drywell pressure is 0.5 psig. • The EOP Director has directed performance of N2-EOP-6.20, Section 6.2, Defeating HPCS Level 8 interlocks. • You are the operator assigned to perform N2-EOP-6.20.

INITIATING CUE	**(Operators Name)**, Using the provided HPCS GE Prints and ESK, complete the attached worksheets regarding Defeating the HPCS Level 8 interlocks.

JPM Worksheet

3.	**Using the provided HPCS GE Prints and ESK, describe how performing N2-EOP-6.20, Section 6.2 prevents 2CSH*MOV107 from automatically shutting when RPV level reaches Level 8. Ensure to explain the function of each step of Section 6.2 regarding circuitry.** **Document as much information as possible in the space below. Additionally at the end of this JPM, you will be given the opportunity to verbally explain to the Evaluator your answer.**
Step 6.2.1	
Step 6.2.3	

1.	**Given the current plant conditions contained in the Initial Conditions of this JPM, what would happen if the operator defeating the HPCS Level 8 interlocks, did not perform Step 6.2.3 and 6.2.4, Depressing and releasing the HI WTR LEVEL SEAL IN RESET pushbutton and verifying the seal in white light was extinguished after the test switch was placed in TEST? (circle one)**
	1. There are no consequences for not depressing the HI WTR LEVEL SEAL IN RESET pushbutton. Given that RPV Water level is below Level 8, the HI WTR LEVEL SEAL IN RESET white light is already extinguished. 2. If the operator did not depress the seal in reset pushbutton, then 2CSH*MOV107 would not automatically open if RPV level reached Level 2. 3. If the operator did not depress the seal in reset pushbutton, then with RPV water level at its current level, 2CSH*MOV107 could not be manually opened using the control switch on 2CEC*PNL601. 4. If the operator did not depress the seal in reset pushbutton, then if RPV level reached Level 2 again and HPCS began to inject, 2CSH*MOV107 would still automatically close when RPV level reached Level 8.

RO EC Handout

NINE MILE POINT NUCLEAR STATION UNIT 2
EMERGENCY OPERATING PROCEDURE

N2-EOP-6.20

REVISION 00001

DEFEATING RPV WATER LEVEL INTERLOCKS

TECHNICAL SPECIFICATION REQUIRED

Approval Authority: Manager Operations

SUMMARY OF ALTERATIONS

Revision	Change	Summary of Revision or Change
000	00	New procedure number based on splitting of N2-EOP-6 into several procedures. New Procedure – No Rev Bars New Procedure to incorporate: PCR-12-02891 N2-EOP-6.20 relocated from N2-EOP-6 to stand alone procedure.
000	01	Editorial Change to incorporate: PCR-13-03135 Editorial change to add a template to the procedure for ease of use for future changes. <u>PCR-13-03135</u>: Legacy PM Procedure Template has been applied to allow auto-Step numbering and linking of Step numbers. Additionally, Notes, Cautions and Warnings are now in Text Boxes – the wording of Notes, Cautions, and Warnings remains unchanged unless other PCRs required changes. • Coversheet, Deleted "Effective Date: ________" per latest revision of PWM-PRO-0102.

TABLE OF CONTENTS

1.0 PURPOSE

To provide instruction for defeating the RPV Water Level Interlocks for:

- Feedwater System High Level (Level 8), to allow FWS system operation if sensed RPV level is above or may rise above 202.3" during execution of the EOPs/SAPs.
- High Pressure Core Spray System High Level (Level 8), to allow for HPCS system operation if sensed RPV water level is above or may raise above 202.3" during execution of the EOPs/SAPs.
- Reactor Core Isolation Cooling System High Level (Level 8), to allow for prolonged RCIC system operation if sensed RPV water level is above or may rise above 202.3" during execution of the EOPs/SAPs.
- Reactor Core Isolation Cooling System Low Level (Level 2), to allow for operation of RCIC system in the Tank-to-Tank line up for stabilizing RPV pressure when in Steam Cooling.

2.0 APPLICABILITY/SCOPE

2.1 Subsection 6.1 - when FWS is used to support N2-EOP-C4, RPV Flooding.

2.2 Subsection 6.2 - when HPCS is used to support N2-EOP-RPV, RPV Control; N2-EOP-C4, RPV Flooding; N2-EOP-C5, Failure To Scram; OR N2-SAP-1, Primary Containment Flooding

2.3 Subsection 6.3 - when RCIC is used to support N2-EOP-RPV, RPV Control; N2-EOP-C3, Steam Cooling; N2-EOP-C4, RPV Flooding; N2-EOP-C5, Failure To Scram; OR N2-SAP-1, Primary Containment Flooding

2.4 Subsection 6.4 - when RCIC is used to support N2-EOP-C3, Steam Cooling.

3.0 REFERENCES AND DEFINITIONS

3.1 Developmental References

3.1.1 NUREG 1358, Lessons learned from the Special Inspection Program for EOPs

3.1.2 S-ODP-PRO-0301, EOP Revisions

3.1.3 SER 90-145 Attachment 9, Engineering Analysis of the NMP2 Off Normal Operating Procedures

3.1.4 NMP2 Plant Specific Technical Guidelines

3.1.5 NMP2 Plant Specific Severe Accident Guidelines

3.1.6 NER-2M-039 NMP2 Emergency Operating Procedures (EOP) Basis Document

3.1.7 NRC Correspondence - Emergency Operating Procedures Inspection and Initial Examination - Report No.50-410/91-80

3.2 Performance References

3.2.1 NMP2 Emergency Operating/Severe Accident Procedures:

N2-EOP-RPV	RPV Control
N2-EOP-PC	Primary Containment Control
N2-EOP-SC	Secondary Containment Control
N2-EOP-RR	Radioactivity Release Control
N2-EOP-MSL	MSIV Leakage Control
N2-EOP-C2	RPV Blowdown
N2-EOP-C3	Steam Cooling
N2-EOP-C4	RPV Flooding
N2-EOP-C5	Failure to Scram
N2-SAP-1	Primary Containment Flooding
N2-SAP-2	RPV, Containment, and Radioactivity Release Control

3.3 Definitions

3.3.1 CHECK To observe an expected condition or characteristic; to determine; to ascertain.

3.3.2 ENSURE To confirm a condition. (NO subsequent action is implied to establish that condition if not already there.)

3.3.3 GO TO
1. To proceed to; to transport oneself to a given location.
2. To discontinue use of present procedure or section and execute another procedure or section.

3.3.4 VERIFY To confirm a condition AND take action to establish that condition if required.

4.0 PREREQUISITES

4.1 Special Tools and Equipment Recommended

NOTE

PA235, PA1235 and PA2235 are interchangeable.

TOOL/MATERIAL	QTY	LOCATION
EOP Jumper #2	1	2CEC*PNL612, Bay A(*Control Room)*
EOP Jumper #3	1	2CEC*PNL612, Bay A(*Control Room)*
EOP Jumper #1	1	2CEC*PNL612, Bay C(*Control Room)*
Flashlight	1	Control Room EOP Toolbox
PA235 KEY	1	Control Room EOP Toolbox
L660 KEY	1	Control Room EOP Toolbox
27379 KEY	1	SM Key Box-Hook #73

5.0 PRECAUTIONS AND LIMITATIONS

5.1 The Restoration section shall be performed only when specifically directed by the SM/EOP Director. This permission shall not be granted until the system/equipment is in a condition to support restoration.

5.2 All tools, materials, keys, etc. that are required to perform this procedure are listed in Section 4.1.

5.3 A Ⓣ notation in the left margin adjacent to a step number or note indicates that a tool or material is required for performance.

5.4 Common tools (screwdrivers, tape etc.) are not specified in procedure steps. Only special tools or situations where confusion may result have a particular tool specified in a step or note.

5.5 Independent verification is required in the Restoration section when restoring temporary alterations or returning permanent plant equipment to normal status. This verification may be delayed if emergency conditions still exist, and it is imperative that restoration be completed immediately. The EOP Director/SM permission is required to delay independent verification.

5.6 During plant conditions which require implementation of this procedure, environmental conditions may be potentially extreme (temperature, radiation, water levels).

In many cases this will require coordination and support from the OSC. Where access may be needed in areas of elevated temperatures, prudency dictates protective equipment be used and precautions taken. Stay times and activity levels should be minimized.

Consultation with the Safety Department is recommended when possible. Above 135°F personnel access may be significantly hampered.

When it is anticipated or known that radiation levels are elevated, radiation protection assistance should be sought. Some evolutions may require utilization of emergency exposure guidelines or emergency dosimetry.

5.7 Where applicable, this procedure provides locations of panels when installing jumpers and lifting leads. However, inside many panels there are Operator Aids providing amplifying instructions as to the exact locations of affected equipment.

6.0 PROCEDURE

Ⓣ 6.1 Defeating Feedwater Level 8 Interlocks

> **NOTE**
>
> A L660 Key may be necessary for entry to 2CEC*PNL612.

Ⓣ 6.1.1 Install EOP Jumper #2 on Alarm Card GEJ terminal 10 to Fuse C33A-F4 Point 2 (Figure 1), *(CEC*PNL612, Bay A)* .... ☐

Ⓣ 6.1.2 Install EOP Jumper #3 on Alarm Card GJA terminal 10 to Fuse C33A-F5B Point 2 (Figure 1), *(2CEC*PNL612, Bay A)* .... ☐

Ⓣ 6.1.3 Install EOP Jumper #1 on Terminal Points CC-23 AND CC-24 (Figure 2), *(2CEC*PNL612, Bay C)* .... ☐

6.1.4 Depress AND release the following pushbuttons: *(2CEC*PNL603)*

- HI LEVEL TRIP A RESET .... ☐
- HI LEVEL TRIP B RESET .... ☐
- HI LEVEL TRIP C RESET .... ☐

6.1.5 Observe extinguished the following amber lights: *(2CEC*PNL603)*

- HI LEVEL TRIP A RESET .... ☐
- HI LEVEL TRIP B RESET .... ☐
- HI LEVEL TRIP C RESET .... ☐

6.1.6 Notify EOP Director AND SM that Feedwater Level 8 interlocks are defeated .... ☐

6.2 Defeating HPCS Level 8 Interlocks

6.2.1 Place HPCS INJ VLV LEVEL 8 BYPASS TEST SWITCH in the TEST position *(2CEC*PNL625)* .... ☐

Ⓣ 6.2.2 Observe lit, HPCS IN TEST STATUS amber status light, *(2CEC*PNL601)* ... ☐

6.2.3 Depress AND release, HI WTR LEVEL SEAL IN RESET pushbutton, *(2CEC*PNL601)* .... ☐

6.2.4 Observe extinguished, HI WTR LEVEL SEAL IN RESET white light, *(2CEC*PNL601)* .... ☐

6.2.5 Notify EOP Director AND SM that HPCS Level 8 interlocks are defeated ...... ☐

6.3 Defeating RCIC Level 8 Interlocks

Ⓣ 6.3.1 Using a 27379 Key *(SM Key Box-Hook #73)*, remove the tamper bar for Card File E21A Z2-1, *(2CEC*PNL629)* .... ☐

6.3.2 Unfasten AND withdraw approximately 1 in., trip unit B22 N693A, RPV HI WTR LVL 8, *(Card File E21A Z2-1, 2CEC*PNL629)* .... ☐

6.3.3 Unfasten AND withdraw approximately 1 in., trip unit B22 N693E, RPV HI WTR LVL 8, *(Card File E21A Z2-1, 2CEC*PNL629)* .... ☐

Initials/Date

6.3.4 Notify EOP Director AND SM that RCIC Level 8 interlocks are defeated .... ☐

6.4 Defeating RCIC Level 2 Interlocks

(T) 6.4.1 Using a 27379 Key *(SM Key Box-Hook #73)*, remove the tamper bar for Card File E21A Z2-1, *(2CEC*PNL629)* .... ☐

6.4.2 Unfasten AND withdraw approximately 1 in., trip unit B22 N692A, RPV LO WTR LVL 2, *(Card File E21A Z2-1, 2CEC*PNL629)* .... ☐

(T) 6.4.3 Using a 27379 Key *(SM Key Box-Hook #73)*, remove the tamper bar for Card File E12A Z6-1, *(2CEC*PNL618)* .... ☐

6.4.4 Unfasten AND withdraw approximately 1 in., trip unit B22 N692F, RPV LO WTR LVL 2, *(Card File E12A Z6-1, 2CEC*PNL618)* .... ☐

6.4.5 Notify EOP Director AND SM that RCIC Level 2 interlocks are defeated .... ☐

7.0 RESTORATION

NOTE

- This section is not performed until specifically directed by the SM/EOP Director. This permission shall not be granted until the system/equipment is in a condition to support restoration.
- Independent verification may be delayed until emergency conditions no longer exist per SM/EOP Director.

7.1 Restoring Feedwater Level 8 Interlocks

N/A, Feedwater Level 8 Interlocks were NOT defeated .... ☐

(T)

NOTE

A L660 Key may be necessary for entry to 2CEC*PNL612.

7.1.1 Remove the following EOP Jumpers:

(T) • EOP Jumper #1 from Terminal Points CC-23 AND CC-24 (Figure 2), *(2CEC*PNL612, Bay C)* .... ☐

(T) • EOP Jumper #2 from Alarm Card GEJ terminal 10 to Fuse C33A-F4 Point 2 (Figure 1), *(2CEC*PNL612, Bay A)* .... ☐

(T) • EOP Jumper #3 from Alarm Card GJA terminal 10 to Fuse C33A-F5B Point 2 (Figure 1), *(2CEC*PNL612, Bay A)* .... ☐ _____/_____

_____/_____
IV

7.1.2 Notify EOP Director AND SM that Feedwater Level 8 interlocks are restored. _____/_____

Initials/Date

7.2 Restoring HPCS Level 8 Interlocks

N/A, HPCS Level 8 Interlocks were NOT defeated .... ☐

(T) 7.2.1 Place HPCS INJ VLV LEVEL 8 BYPASS TEST SWITCH in the NORMAL position. *(2CEC*PNL625)* _____/_____

_____/_____
IV

7.2.2 Observe extinguished, HPCS IN TEST STATUS amber status light. *(2CEC*PNL601)* _____/_____

_____/_____
IV

7.2.3 Notify EOP Director AND SM that HPCS Level 8 interlocks are restored. _____/_____

7.3 Restoring RCIC Level 8 Interlocks

N/A, RCIC Level 8 Interlocks were NOT defeated .... ☐

7.3.1 Insert AND fasten trip unit B22 N693A, RPV HI WTR LVL 8. *(Card File E21A Z2-1, 2CEC*PNL629)* _____/_____

_____/_____
IV

7.3.2 Insert AND fasten trip unit B22 N693E, RPV HI WTR LVL 8. *(Card File E21A Z2-1, 2CEC*PNL629)* _____/_____

_____/_____
IV

7.3.3 Reset gross failure trips as necessary on Card File E21A Z1-1 AND E21A Z2-1. (2CEC*PNL629) _____/_____

_____/_____
IV

(T) 7.3.4 Using a 27379 Key *(SM Key Box-Hook #73)*, install the tamper bar for Card File E21A Z2-1. *(2CEC*PNL629)*

N/A, will be restored in Subsection 7.4 .... ☐ _____/_____

_____/_____
IV

7.3.5 Notify SM AND EOP Director that RCIC Level 8 interlocks are restored. _____/_____

Initials/Date

7.4 Restoring RCIC Level 2 Interlocks

N/A, RCIC Level 2 Interlocks were NOT defeated .... ☐

7.4.1 Insert AND fasten trip unit B22 N692A, RPV LO WTR LVL 2. *(Card File E21A Z2-1, 2CEC*PNL629)* _____/_____

_____/_____
IV

7.4.2 Insert AND fasten trip unit B22 N692F, RPV LO WTR LVL 2. *(Card File E12A Z6-1, 2CEC*PNL618)* _____/_____

_____/_____
IV

7.4.3 Reset gross failure trips as necessary on Card File E21A Z2-1 (2CEC*PNL629) AND E12A Z6-1 (2CEC*PNL618). _____/_____

_____/_____
IV

Ⓣ 7.4.4 Using a 27379 Key *(SM Key Box-Hook #73)*, install the tamper bar for Card Files E21A Z2-1 (2CEC*PNL629) AND E12A Z6-1 (2CEC*PNL618) _____/_____

_____/_____
IV

7.4.5 Notify SM AND EOP Director that RCIC Level 2 interlocks are restored. _____/_____

7.5 SM Review

SM verify that restoration is complete. Record comments in Remarks below.

Remarks: ____

____

____

____

____

____________________________ / ________ / ________
SM Signature Date Time

8.0 BASES

None

9.0 RECORDS

None

		A

2CEC*PNL612, Bay A

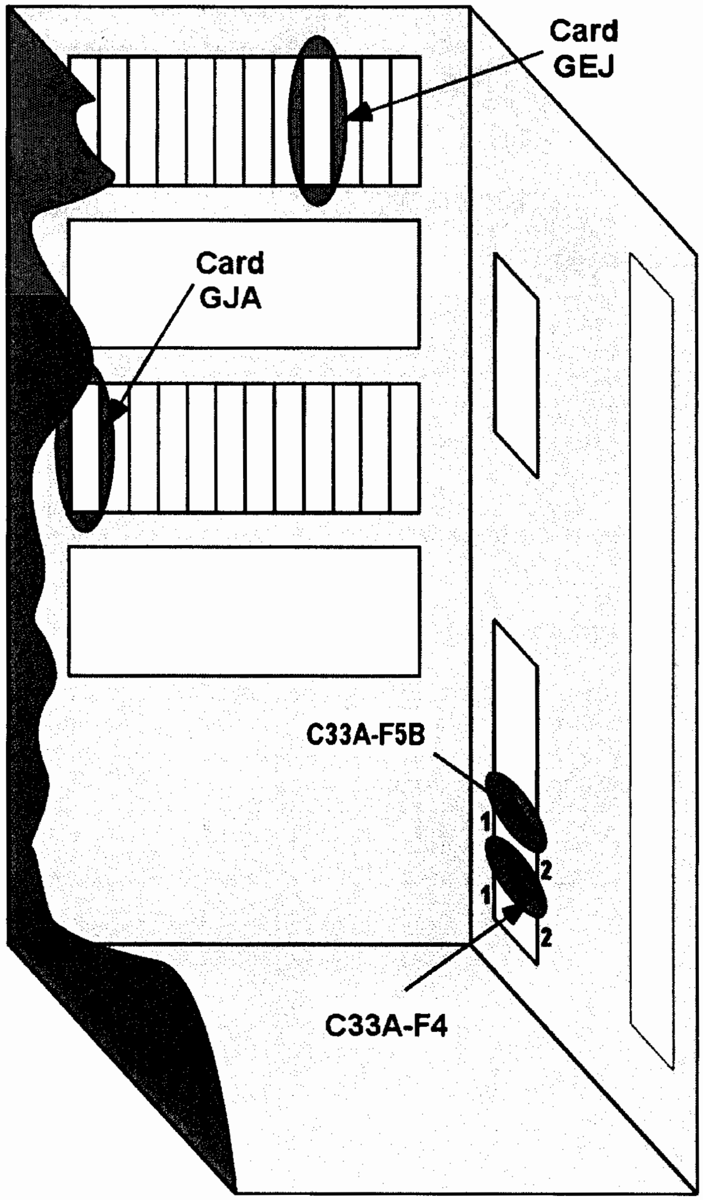


FIGURE 1

C		

2CEC*PNL612 Bay C

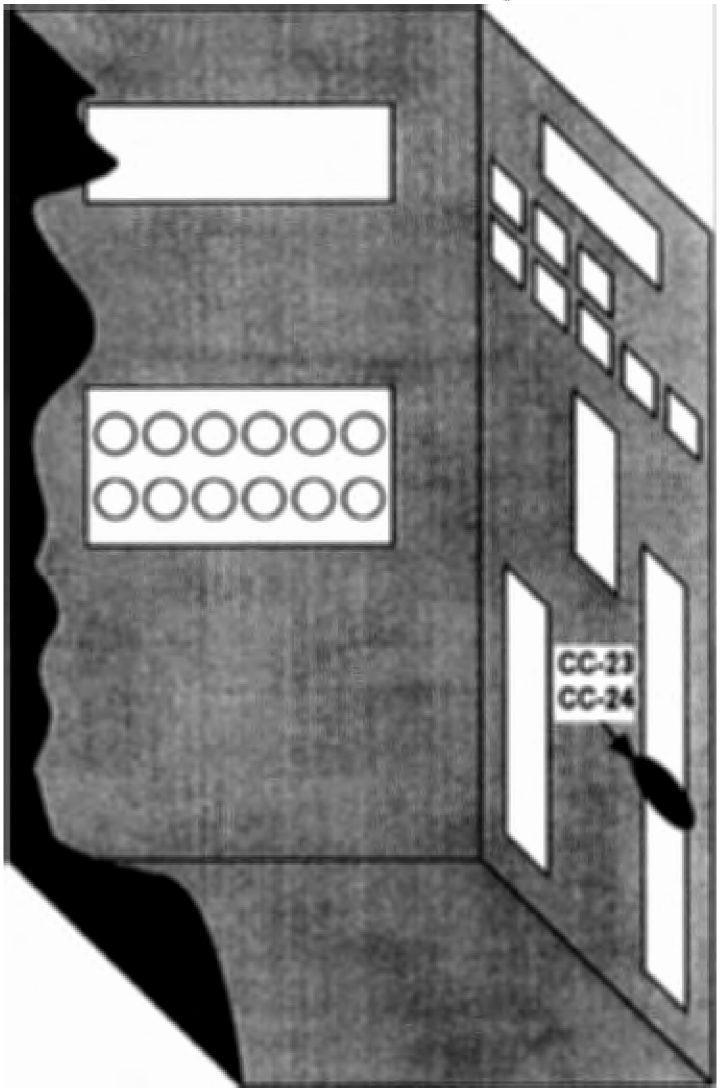


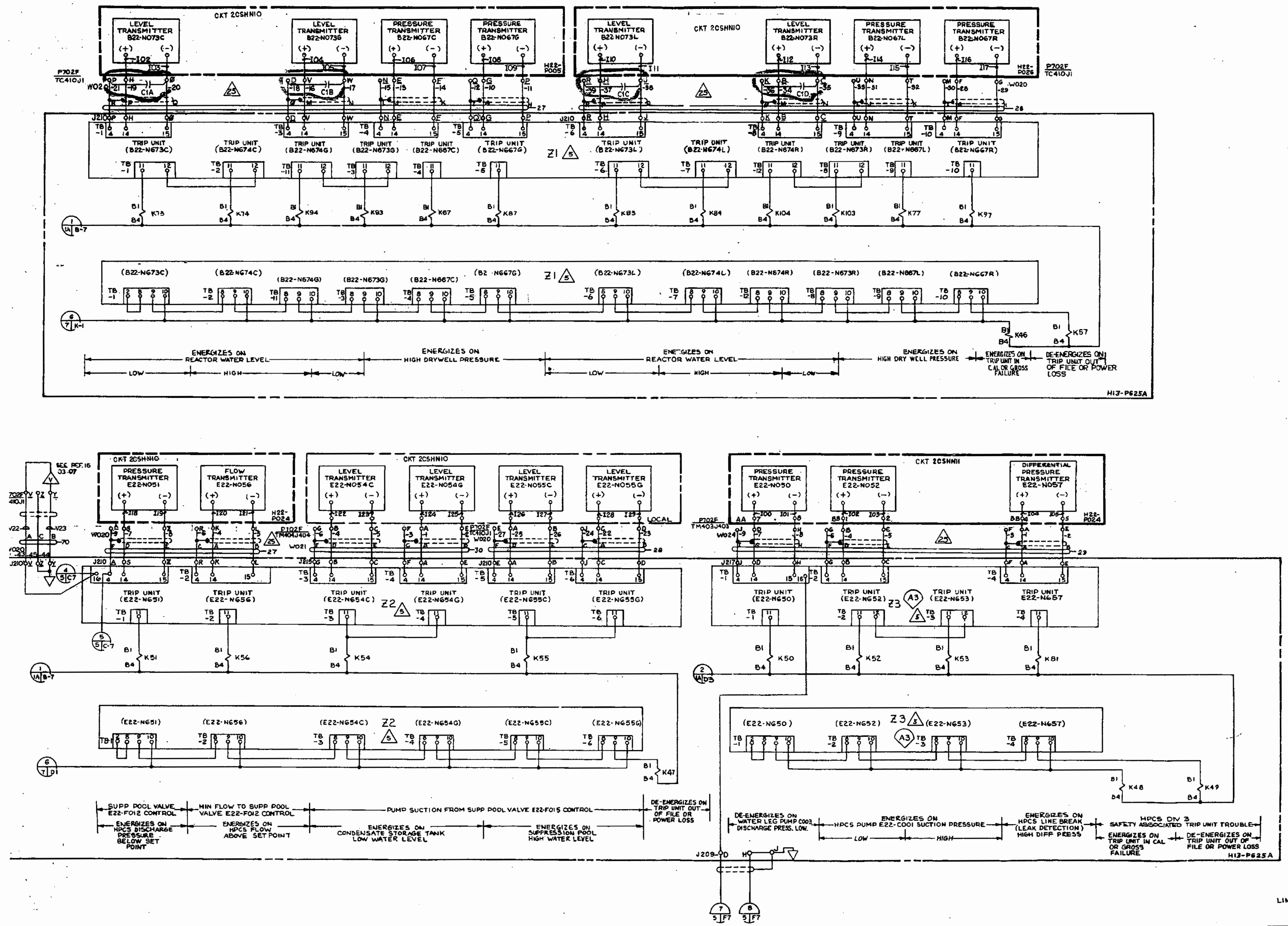
FIGURE 2

807E172TY

ELEM DIAG

HIGH PRESSURE CORE SPRAY SYSTEM

ALL WIRING IS (D3) UNLESS OTHERWISE INDICATED ON THIS SHEET



LINE CODES: 27-30

NMP2 807E172TY SH:007 REV:27
NMPC/SW:0007243001013R

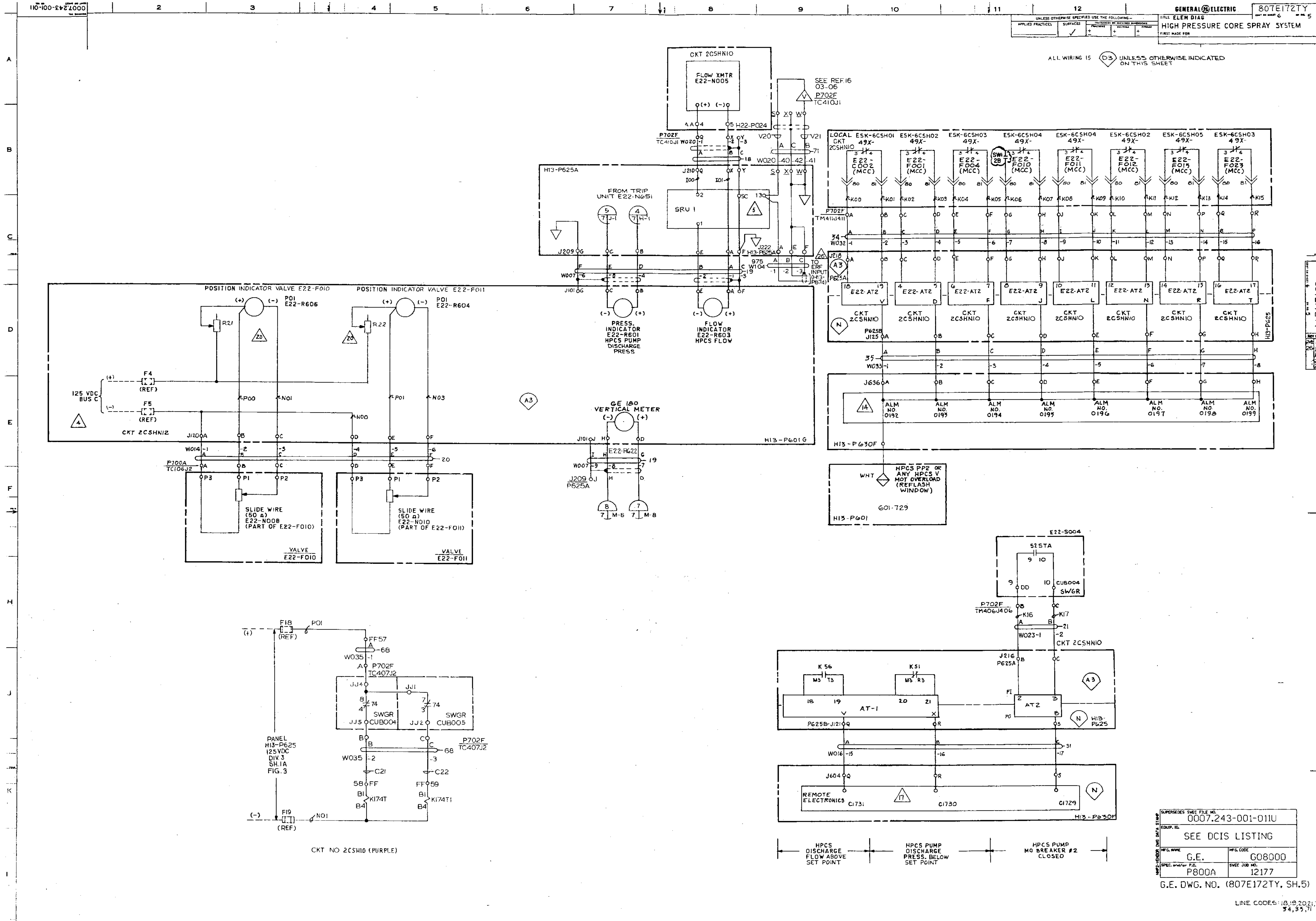
19	5/31/85 NJ64268	14	NJ52466 NJ51103	NJ41394 8/9/83	5 NJ23173
22	KG1-4560-0 KG1-4791-0 3-3-86	15	NJ54161		10 NJ27293 NJ36705
24	ATI ISSUE KG1-5399-0	17	NJ60392 NJ59720 NJ60646		11 NJ43130 NK00387
27	KG1-6186-2				12 NJ45004

4 G.STANDAU — NE97301 CHK'D BY: M.W. BANZHOF
3 Jul 16, 1980 — NE97221 CHKD BY:
2 V. BASSO — NJ13955 CHK'D BY:
1 GILMORE — NE93376 CHK'D BY: K. BIBY

NEBO — SAN JOSE — 807E172TY

CHKD BY: R.H. BAILEY 9-22-76

CI



SUPERSEDES SWEC FILE NO. 0007.243-001-011U

EQUIP. ID. SEE DCIS LISTING

MFG. NAME G.E. MFG. CODE G08000

SPEC. P800A SWEC JOB NO. 12177

G.E. DWG. NO. (807E172TY, SH.5)

LINE CODES: 18,19,20,21,31, 34,35,71

NIAGARA MOHAWK

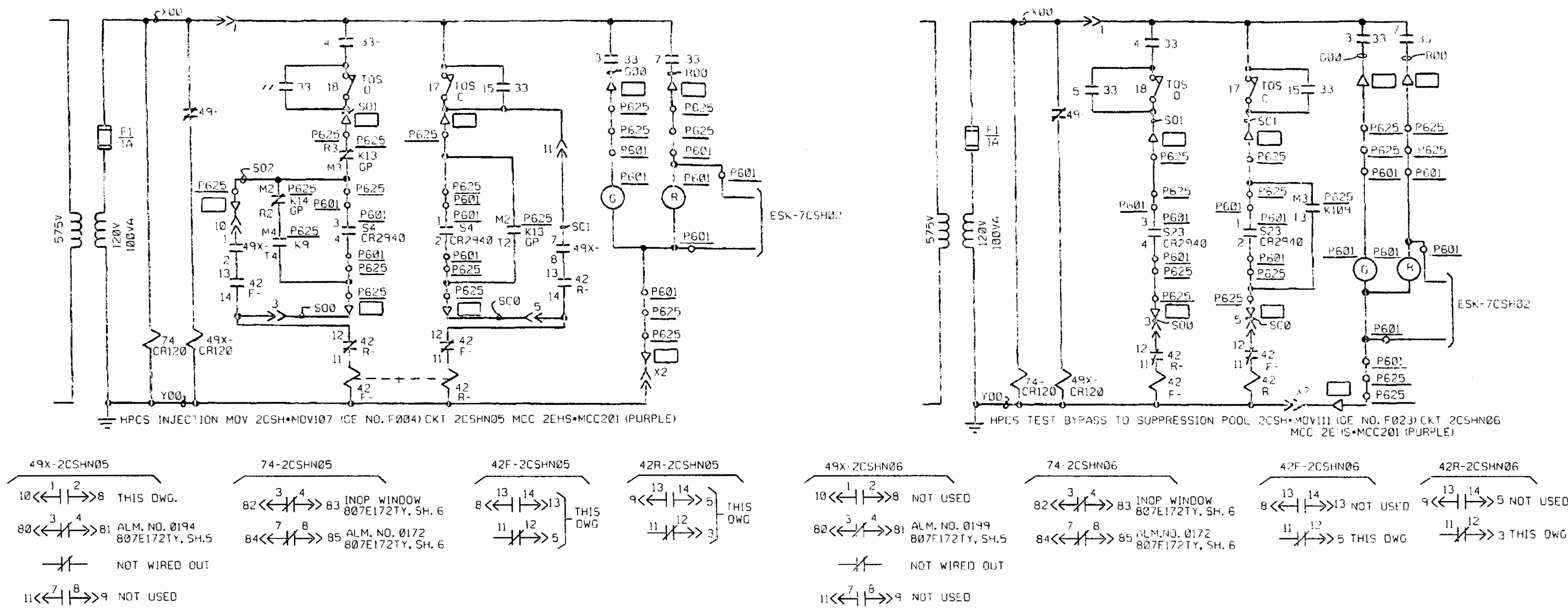
NINE MILE POINT NUCLEAR STATION - UNIT 2 SCRIBA, N.Y.

ELEMENTARY DIAGRAM HIGH PRESSURE CORE SPRAY SYSTEM

NO	DATE	BY	DESCRIPTION OF REVISION	CK	APP
1			ORIGINAL ISSUE- INCORP. EDC 2E10133A		

SCALE NONE

DRAWING NO 0007.243-001-011



FOR LIMIT SWITCH CONTACT SETTINGS SEE NOTE 7

ROTOR	33	VALVE POSITION (FULL OPEN 5% 95% FULL CLOSED)	2CSH*MOV107	2CSH*MOV111
1	1		SPARE	SPARE
	2		SPARE	SPARE
	3		GREEN LIGHT	GREEN LIGHT
	4		OPEN LIMIT	OPEN LIMIT
2	5		SPARE	BYPASS
	6		ESK-10SXS04	SPARE
	7		RED LIGHT	RED LIGHT
	8		SPARE	ESK-7SC139 (NOTE 5)
3	9		ESK-7SC139 (NOTE 5)	SPARE
	10		ESK-7SC139 (NOTE 5)	SPARE
	11		BYPASS	SPARE
	12		SPARE	SPARE
4	13		ESK-7SC139 (NOTE 5)	SPARE
	14		ESK-7SC139 (NOTE 5)	SPARE
	15		BYPASS	BYPASS
	16		SPARE	SPARE
TORQUE SW	17	CLOSING TORQUE SWITCH OPENS IF MECHANICAL OVERLOAD OCCURS DURING CLOSING CYCLE		
	18	OPENING TORQUE SWITCH OPENS IF MECHANICAL OVERLOAD OCCURS DURING OPENING CYCLE		

NOTES:

1. VALVE LIMIT SWITCHES LOCATED ON VALVE ACTUATOR. ALL OTHER EQUIPMENT LOCATED AT MCC UNLESS OTHERWISE NOTED.
2. APPLICABLE GE FCD-731E950.
3. APPLICABLE GE ELEMENTARY 807E172TY.
4. ALL GE CONTROL ELEMENTS PREFIXED BY "E22" DESIGNATOR.
5. THE OFF-NORMAL STATUS DISPLAY SYSTEM HAS [illegible] ABANDONED IN PLACE. THIS CONTACT NO LONGER PROVIDES A FUNCTION.
6. APPLICABLE GE MPL E22-S002 DRAWING 317A6149
7. FOR LIMIT SWITCH FIELD SETTING SEE ESK-2J, SH. 3.

NOTE: THIS DRAWING WAS [illegible]ED USING COMPUTER AIDED DRAFTING DO NOT MAKE MANUAL CHANGES

CONTROL ELEMENT	REFERENCE GE DRAWING
S4, S23, K9, K13, K14, K109	807E172TY, SH.4

ORIGINAL

NUCLEAR SAFETY RELATED

NIAGARA MOHAWK

NINE MILE POINT NUCLEAR STATION - UNIT 2 SCRIBA, N.Y.

A.C. ELEMENTARY DIAGRAM

600V MCC CIRCUIT

HIGH PRESSURE CORE SPRAY MOV'S

MK	DATE	BY	MF	DESCRIPTION	CK	APP
13		JAM		ADMIN. DOC. CHANGE (REF. DER 2-2000-3876)		

SCALE: NONE

DRAWING NO: ESK-6CSH03

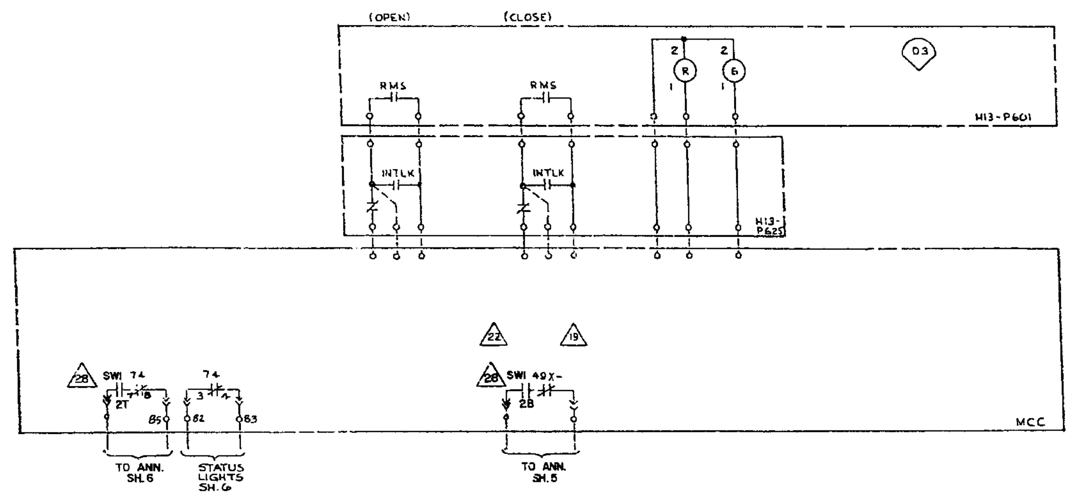


FIG. I

FOR MOTOR OPERATED VALVES SAFETY FUNCTION SEE REF 9

PUMP VALVE & CONTROL TABULATION							
DEVICE		SWITCH	INDICATOR LAMPS			LOCATION	
REF DESIG	DESCRIPTION		RED	GREEN	OTHER	MTG LOC	SH
E22-F001	PUMP SUCTION FROM CNDS STORAGE TNK MOV	S1	X	X	------	H13-P601	4
-------	MANUAL INITIATION	S2	---	---	-----		3,6
E22-C003	WATER LEG PUMP	S3	X	X	------		4
E22-F004	PUMP INJECTION SHUTOFF MOV (SEAL IN)	S4	--- / X	--- / X	X AMBER / ---		3 / 4
E22-F010	TEST BYPASS TO CNDS STORAGE TANK MOV	S10	---	---	----		4
E22-F011	TEST RETURN TO CNDS STORAGE TANK MOV	S11	---	---	----		4
E22-F012	MIN FLOW TO SUPPR POOL MOV	S12	X	X	----		4
E22-F015	PUMP SUCTION FROM SUPPR POOL MOV	S15	--- / X	--- / X	X AMBER / ---		3 / 4
E22-F023	TEST RETURN TO SUPPR POOL MOV	S23	X	X	---		4
------	RESET HIGH WATER LEVEL	S6	---	---	WHITE X		3
------	RESET INIT. SIGNAL	S7	---	---	WHITE X		3
------	TRIP UNIT IN CAL OR GROSS FAILURE	---	---	---	AMBER X		6
------	TRIP UNIT OUT OF FILE OR LOSS OF POWER	---	---	---	AMBER X		6
------	HPCS IN TEST STATUS	---	---	---	AMBER X		6
------	HPCS LOGIC POWER FAILURE	---	---	---	AMBER X		6
------	HPCS OUT OF SERVICE	S8	---	---	AMBER X		6
E22-F038	MANUAL INJECTION VALVE	---	X	X	---	H13-P601	4
------	LOGIC POWER TEST	S24	----	---	---	H13-P625	3
------	HPCS LINE BREAK LEAK DETECTION	---	---	---	AMBER X	H13-P601	6
------			---	---	---		
------	HPCS PUMP MOTOR FEEDER BRK NO. 2 INOPERABLE	---	---	---	AMBER X	H13-P601	6
------	TRANSFORMER FEEDER NO 3. INOPERABLE	---	---	---	AMBER X	H13-P601	6
------	HPCS INJ VLV LEVEL 8 BYPASS TEST SWITCH	S26	---	---	---	H13-P625	3

INDEX	
SH NO	CONTENT
1	VALVE AND PUMP TYPICALS, CONTROL TABULATIONS, NOTES AND REFERENCE DOCUMENTS.
1A	TESTABILITY CARD FILE TABULATION & PWR SUPPLIES.
2	SWITCH DEVELOPMENT. RELAY TABS & PWR DISTRIBUTIONS.
3	RELAY LOGIC.
4	PUMP & VALVES.
5	PROCESS INSTRUMENTATION & COMPUTER INPUTS.
6	ANNUNCIATORS AND STATUS LIGHTS.
7	TESTABILITY.

NOTES:

1. INTRA-PANEL PROCESS INSTRUMENTATION -(4-20MA) SIGNAL LEADS SHALL BE BUNDLED & ROUTED SEPARATELY FROM AC & DC POWER WIRING.
2. WIRING AND CABLING SHALL BE PER REF. DOCUMENT NO. 7.
3. PINS "I" & "J" ARE JUMPERED AT PLUG (REF. 6).
4. FOR POWER DISTRIBUTION SEE FIG 2, SH. 2.
5. FOR POWER DISTRIBUTION SEE FIG. 3, SH. 1A.
6. DELETE
7. FOR POWER DISTRIBUTION SEE FIG. 5, SH. 2.
8. ALL IND LIGHTS ARE GE TYPE ET16 AND SUPPLIED WITH PANEL.
9. UNLESS OTHERWISE INDICATED THE FOLLOWING REFERENCE DESIGNATIONS SHOWN ON THIS DIAGRAM ARE PREFIXED WITH E22A:

REFERENCE DESIGNATION	NAME
FXX	FUSE
KXX	RELAY
SXX	SWITCH
JXX	TEST PLUG
SRUX	SIGNAL RESISTOR UNIT
RXX	RESISTOR
ZXX	CARD FILE
PSXX	POWER SUPPLY
JBXY	JUNCTION BOX.
ATX	ISOLATOR
DSX	LIGHT
WXXX	CABLE

10. AC FEEDERS, VALVE AND PUMP MOTORS TO BE PROTECTED BY THERMAL OVERLOAD AND ALARM.
11. STATUS LIGHTS ARE MASTER SPECIALTY COLOR SERIES WITH INTEGRAL SWITCH AND ARE SUPPLIED WITH PANEL.
12. VALVES
    A. ALL MOTOR OPERATED VALVES SHALL HAVE IND LIGHTS ON THE CONTROL ROOM PANEL AS FOLLOWS:
       RED ON FOR OPEN POSITION
       RED AND GREEN ON FOR INTERMEDIATE POSITION
       GREEN ON FOR CLOSED POSITION
    B. VALVE CIRCUITS ARE BASED ON LIMITORQUE TYPE SMB CONTROLS
    C. VALVE MOTORS ARE TO BE PROVIDED WITH OVERLOAD TRIPS AND ALARMS. IN ADDITION, VALVE MOTOR CIRCUITS ARE TO BE PROVIDED WITH SHORT CIRCUIT CURRENT PROTECTIVE TRIPS.
13. AC PUMP AND MOTOR CONTROL, CIRCUIT CONNECTION TO BE SPECIFIED BY OTHERS
14. ALARMS TO BE RETRANSMITTED TO BOP COMPUTER PER S&W LOOP DIAGRAM 2IHC-3 PLANT COMPUTER I/O ALARM.
15. LOAD SHOWN ON POWER DISTRIBUTION CIRCUITS ARE ESTIMATED AND NOT MEASURED QUANTITIES. AC LOADS BASED ON 60HZ. SS MEANS STEADYSTATE, T MEANS TRANSIENT.
16. ANNUNCIATOR SHALL BE "OPEN TO ALARM" TYPE.
17. SOE POINTS TO BE RETRANSMITTED TO BOP COMPUTER PER S&W LOOP DIAGRAM 2IHC-5 PLANT COMPUTER I/O ÷ SOE.
18. "HPCS LEVEL 8 SEAL-IN BYPASS SWITCH E22A-S26 CAN BE IN TEST POSITION ONLY WHEN REACTOR IS IN COLD SHUTDOWN."
19. FIG. 1 FOR ALL MOTOR OPERATED AC VALVES SEE INDIVIDUAL VALVE CIRCUITS (BACK SHEETS).
20. LOCATED ON BACK OF PANEL.
21. OUTPUT WIRING FROM ISOLATORS TO COMPUTER AND ANNUNCIATOR ELECTRONICS PANEL SHALL BE TREATED AS NON-ESSENTIAL.
22. MCC FOR HPCS MAY BE PART OF GE SCOPE OF SUPPLY.
23. DELETE
24. INDIVIDUAL GROUND WIRES TO BE RUN FROM TERMINALS 3&4 TO COMMON BUS BAR TERMINALS 1,2,5,6 &7 FOR EACH TERMINAL BOARD ARE PREWIRED.
25. THE SHIELD ON INSTRUMENT WIRES SHALL PASS THROUGH THE TERMINATION CABINET ON A SEPARATE PIN AND SHALL BE CONNECTED TO THE SHIELD IN THE FIELD CABLE.
26. INTERFACE TO GE OPTICAL ISOLATOR 22A4969 IN PANEL H13-P874 REFERENCE ESK-7CSH02. INTERFACE TO GE ANALOG ISOLATOR 22A4909 IN PANEL H13-P874, REFERENCE S&W LOOP 2CSH*104.
27. TIME DELAY SETTING FOR E22A-KIII DETERMINED BY CUSTOMER BASED ON PRE-OPERATIONAL TESTING IS 4.4 SECONDS.
28. CONTROL SWITCH "SWI" IS MTD. ON MCC COMPARTMENT DOOR OF 2EHS*MCC201 UNIT 6B (AE)(VALVE E22-F010) ONLY.
29. THE OFF-NORMAL STATUS DISPLAY SYSTEM HAS BEEN ABANDONED IN PLACE. THIS CONTACT NO LONGER PROVIDES A FUNCTION.

REFERENCE DOCUMENTS:

1. E22-1030 HIGH PRESS CORE SPRAY FCD
2. E22-1010 HIGH PRESS CORE SPRAY P&ID
3. B22-1010 NUCLEAR BOILER P&ID
4. IEEE 279 CRITERIA FOR PROTECTION SYSTEMS
5. A62-4050 SEPARATION FOR SAFEGUARD SYSTEMS ELECT EQUIP.
6. 136B2524 TEST SWITCH ASSEMBLY
7. A62-4010 SPECIAL WIRE & CABLE SPECIFICATIONS
8. H22-4050 LOCAL INSTRUMENT PANELS
9. A42-1010 MOV & MCC STANDARDS
10. C91-4030 PROCESS COMPUTER I/O LIST
11. C72-1050 REACTOR PROTECTION SYSTEM ELEM DIAG (C72A)
12. E22-1070 HPCS POWER SUPPLY SYSTEM ELEM DIAG (E22B)
13. A62-2150 ECCS & RCIC SEP SCHEME
14. DELETE
15. DELETE
16. C88-1050 ENGINEERING TEST & INFORMATION SYSTEM.

LEGEND:

LOCATION USED ONLY WHEN NECESSARY FOR CLARITY
XXXX — PART NUMBER OR TERMINAL NUMBER
SYSTEM NUMBER OR TERMINAL BOARD IDENT
MATCH NUMBER
ZONE
SHEET NUMBER

MATCH CIRCLE
LAST NUMBER USED: 10

XXX INDICATES PGCC LINE CODE
INDICATES SIGNAL COMMON
INDICATES GROUND BUS
DX CLASS IE, DIV X, NUCLEAR SAFETY RELATED
AX ASSOCIATED WITH AND TREATED AS CLASS IE, DIV X
N NON-DIVISIONAL
C INDICATES PERFORMANCE MONITORING SYSTEM COMPUTER INPUT
V ENGINEERING TEST & INFORMATION SYSTEM (ETIS).

LINE CODES: NONE
LAST LINE CODE USED: 71

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING: APPLIED PRACTICES | SURFACES √ | FRACTIONS ± | DECIMALS ± | ANGLES ±

TITLE ELEM. DIAG.
HIGH PRESSURE CORE SPRAY SYS
FIRST MADE FOR NMP-2
807E172TY CONT. ON SH. 1A SH. NO. 1

GENERAL ELECTRIC

SUPERSEDES SWEC FILE NO. 0007.243-001-006Y
EQUIP. D. SEE CDS LISTING
MFG. NAME G.E. | MFG. CODE G00000
SPEC. and/or P.O. P800A | SWEC JOB NO. 12177
DRAWING NO. 807E172TY, SH.1
NMP2-VENDOR DWG DATA STAMP

NOTE: THIS DRAWING WAS CREATED USING COMPUTER AIDED DRAFTING DO NOT MAKE MANUAL CHANGES

NUCLEAR SAFETY RELATED

ORIGINAL

Constellation Energy Group
NINE MILE POINT NUCLEAR STATION UNIT 2 - SCRIBA, N.Y.

ELEMENTARY DIAGRAM
HIGH PRESSURE CORE SPRAY SYSTEM

MK	DATE	BY	MF	DESCRIPTION	CK	APP
6	4-30-04	JAM		REVISED PER CP #N2-02-182		

SCALE NONE
DRAWING NO 0007.243-001-006

0067.243-001-006

GENERAL ELECTRIC

887E172TY

TITLE ELEM DIAG — CONT. ON SH. 3 — SH. NO. 2

HIGH PRESSURE CORE SPRAY SYS

FIRST MADE FOR NMP-2

GENERAL ELECTRIC

ALL WIRING IS (D3) UNLESS OTHERWISE INDICATED ON THIS SHEET

PNL H13-P625

AGASTAT TYPE TR RELAY TABULATION

B1–B4	T1–M1	M1–R1	T2–M2	M2–R2	T3–M3	M3–R3	T4–M4	M4–R4
K111 SH.3	K31 SH.3	—	SP	SP	SP	SP	SP	SP

PNL H13-P625

GE TYPE HFA RELAY TABULATION

13–14	1–2	3–4	5–6	7–8	9–10	11–12
K3 SH.3	SP	ESK-1[illegible] SH.3	SEE SH.3	SEE SH.3	SEE SH.3	SEE SH.3

AGASTAT TYPE GPB RELAY TABULATION

B1–B4	T1–M1	M1–R1	T2–M2	M2–R2	T3–M3	M3–R3	T4–M4	M4–R4
K46 SH.7	SP	SP	STATUS LT. SH.6	—	SP	SP	ANN. SH.6	—
K47 SH.7	SP	SP	—	STATUS LT. SH.6	SP	SP	—	ANN. SH.6
K48 SH.7	SP	SP	SP	SP	SP	SP	ANN. SH.6	—
K49 SH.7	SP	SP	SP	SP	SP	SP	—	ANN. SH.6
K50 SH.7	—	ANN. SH.6	SP	SP	SP	SP	SP	SP
K51 SH.7	E22-F012 SH.4	—	—	E22-F012 SH.4	—	COMP SH.5	SP	SP
K52 SH.7	ANN. SH.6	—	SP	SP	SP	SP	SP	SP
K53 SH.7	ANN. SH.6	—	SP	SP	SP	SP	SP	SP
K54 SH.7	K111 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K55 SH.7	K31 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K56 SH.7	E22-F012 SH.4	—	—	E22-F012 SH.4	COMP SH.5	—	SP	SP
K57 SH.7	SP	SP	—	STATUS LT. SH.6	SP	SP	—	ANN. SH.6
K67 SH.7	K29 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K73 SH.7	K11 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K74 SH.7	K13 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K77 SH.7	K29 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K81 SH.7	SP	SP	STATUS LT. SH.6	—	SP	SP	ANN. SH.6	—
K83 SH.7	K11 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K84 SH.7	K13 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K87 SH.7	K29 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K93 SH.7	K11 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K97 SH.7	K29 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K94 SH.7	K13 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K103 SH.7	K11 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—
K104 SH.7	K13 SH.3	—	SP	SP	SP	SP	ANN. SH.6	—

AGASTAT TYPE GPD RELAY TABULATION

B1–B4	T1–M1	M1–R1	T2–M2	M2–R2	T3–M3	M3–R3	T4–M4	M4–R4
K9 SH.3	K3 SH.3	—	K14 SH.3	—	E22-F001 SH.4	—	E22-F004 SH.4	—
K11 SH.3	K3 SH.3	—	—	K13 SH.3	SP	K14 SH.3	SP	SP
K13 SH.3	K13 SH.3	—	E22-F004 SH.4	—	—	E22-F004 SH.4	SEE SH.3 (29)	—
K14 SH.3	K14 SH.3	—	—	E22-F004 SH.4	SP	SP	SP	SP
K19 SH.3	STATUS LT. SH.6	—	ANN. SH.3	—	SP	SP	SP	SP
K28 SH.3	—	STATUS LT. SH.6	—	ANN. SH.6	SP	SP	SP	SP
K29 SH.3	K3 SH.3	—	SP	SP	SP	SP	SP	SP
K30 SH.3	K31 SH.3	K31 SH.3	SP	SP	SP	SP	SP	SP
K31 SH.3	E22-F015 SH.4	—	SP	SP	SP	SP	SEE SH.3 (29)	—
K109 SH.3	E22-F018 SH.4	—	E22-F011 SH.4	—	E22-F023 SH.4	—	SEE SH.3 (29)	—
K110 SH.3	K10 SH.3	—	—	K9 SH.3	SP	SP	SP	SP

AGASTAT TYPE EGPD RELAY TABULATION

B1–B4	T1–M1	M1–R1	T2–M2	M2–R2	T3–M3	M3–R3	T4–M4	M4–R4
K174T SH.5	INOP SH.6	—	STATUS LT SH.6	—	SP	SP	SP	SP
K174T1 SH.5	INOP SH.6	—	STATUS LT SH.6	—	SP	SP	SP	SP

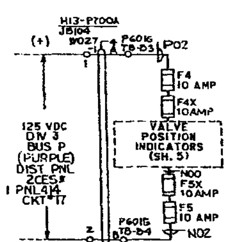


FIG 2

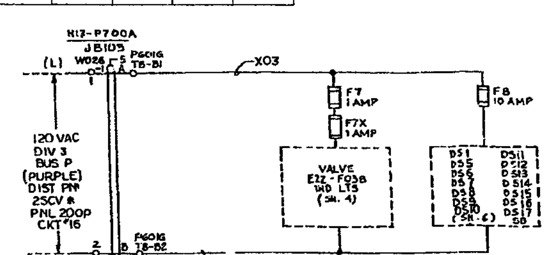
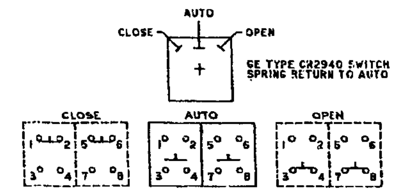
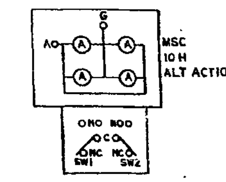


FIG 4

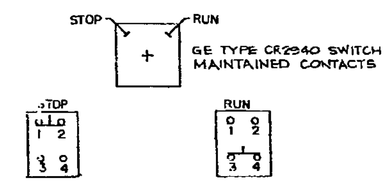


SWITCH DESIG	CONT	SH NO
S1	1 - 2	4
	3 - 4	4
	5 - 6	SP
	7 - 8	SP
S4	1 - 2	4
	3 - 4	4
	5 - 6	3
	7 - 8	SP
S10	1 - 2	4
	3 - 4	4
	5 - 6	SP
	7 - 8	SP
S11	1 - 2	4
	3 - 4	4
	5 - 6	SP
	7 - 8	SP

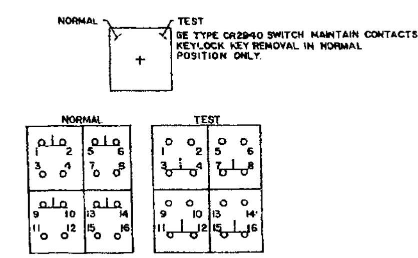
SWITCH DESIG	CONT	SH NO
S12	1 - 2	4
	3 - 4	4
	5 - 6	SP
	7 - 8	SP
S15	1 - 2	4
	3 - 4	4
	5 - 6	3
	7 - 8	SP
S23	1 - 2	4
	3 - 4	4
	5 - 6	SP
	7 - 8	SP



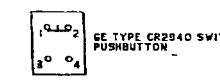
SWITCH DESIG	CONT	SH NO
S8	1NO-C	6
	1NC-C	SP
	2NO-C	6
	2NC-C	SP



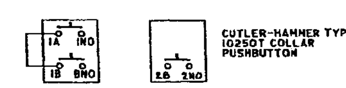
SWITCH DESIG	CONT	SH NO
S3	1-2	SP
	3-4	4



SWITCH DESIG	CONT	SH
S26	1-2	3
	3-4	6
	5-6	SP
	7-8	SP
	9-10	SP
	11-12	SP
	13-14	SP
	15-16	SP



SWITCH DESIG	CONT	SH NO
S6 (RESET)	1 - 2	3
	3 - 4	SP
S7 (RESET)	1 - 2	3
	3 - 4	3
S24 (TEST)	1 - 2	3
	3 - 4	SP



CONTACT	DISARMED N	DISARMED D	ARMED N	ARMED D
1A-1NO	O	X	O	X
1B-BNO	O	O	X	X
2B-2NO	O	O	X	X

N-- NORMAL D-- DEPRESSED
O-- OPEN X-- CLOSED

SWITCH DESIG	CONT	SH. NO.
S2 MANUAL INITIATION	1A-1NO	3
	1B-BNO	3
	2B-2NO	6

LINE CODES: 4, 5

SUPERSEDES SWEC F.A.P. NO. 0007.520-001-000Q	
EQUIP. ID. SEE CDS LISTING	
MFG. NAME G.E.	MFG. CODE G00000
SPEC. and/or P.O. P000A	SWEC JOB NO. 12177

DRAWING NO. 887E172TY, SH.2

NOTE: THIS DRAWING WAS CREATED USING COMPUTER AIDED DRAFTING DO NOT MAKE MANUAL CHANGES

NUCLEAR NON-SAFETY RELATED

ORIGINAL

Constellation Energy Group — NINE MILE POINT NUCLEAR STATION UNIT 2 - SCRIBA, N.Y.

ELEMENTARY DIAGRAM
HIGH PRESSURE CORE SPRAY SYSTEM

MK	DATE	BY	MF	DESCRIPTION	CK	APP
6	3-30-05	RJM		ADMIN. DOC. CHANGE (REF. DER NM-05-797) REVISED RELAY TYPE IDENTIFICATION IN TABLE		

SCALE NONE — DRAWING NO 0067.243-001-006

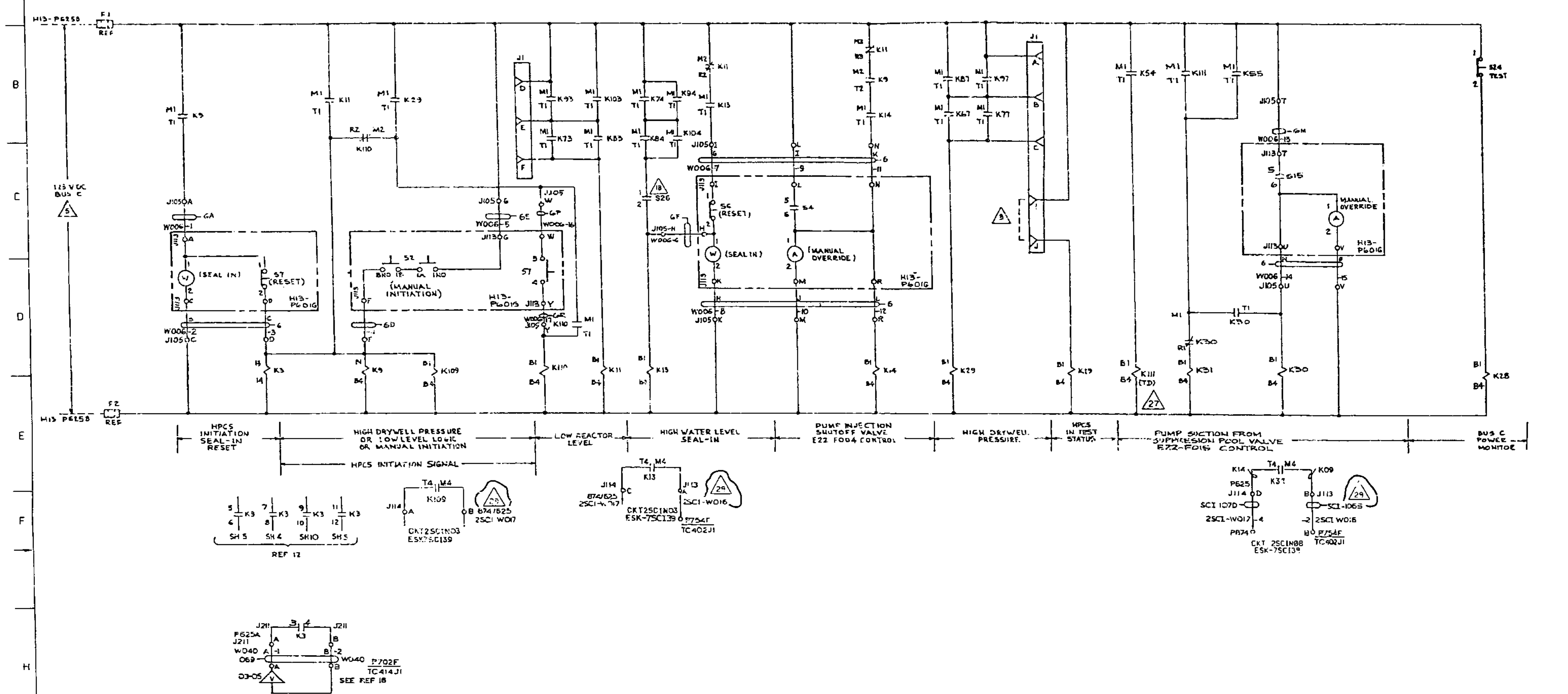
807E172TY

ELEMENTARY DIAGRAM

HIGH PRESSURE CORE SPRAY SYST

GENERAL ELECTRIC

ALL WIRING TO BE D3 UNLESS OTHERWISE INDICATED ON THIS SHEET



LINE CODES: 6,069

SUPERSEDES SWEC FILE NO.	0007.243-001-009Q
EQUIP. ID.	SEE CDS LISTING
MFG. NAME: C.E.	MFG. CODE: G08000
SPEC. and/or P.O.: P800A	SWEC JOB NO.: 12177

DRAWING NO. 807E172TY, SH. 3

NOTE: THIS DRAWING WAS CREATED USING COMPUTER AIDED DRAFTING DO NOT MAKE MANUAL CHANGES

NUCLEAR SAFETY RELATED

NIAGARA MOHAWK

NINE MILE POINT NUCLEAR STATION - UNIT 2 SCRIBA, N.Y.

ELEMENTARY DIAGRAM

HIGH PRESSURE CORE SPRAY SYSTEM

ORIGINAL

NO	DATE	BY	MF	DESCRIPTION	CK	APP
4	5-18-00	FOC		REVISED PER DDC 2E11383A		

SCALE: NONE

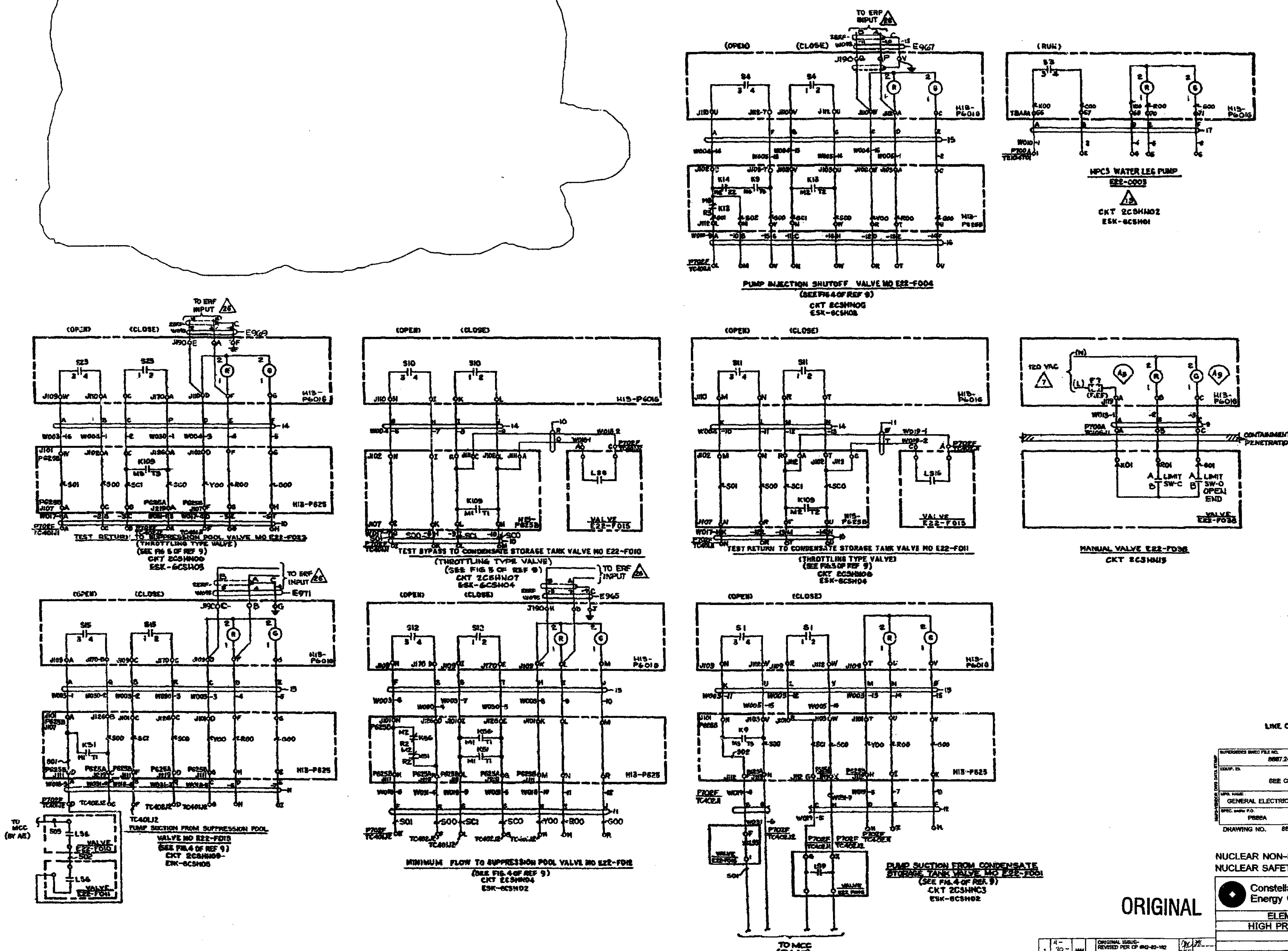
DRAWING NO 0007.243-001-009

887E172TY

HIGH PRESSURE CORE SPRAY SYSTEM

GENERAL ELECTRIC

ALL WIRING IS D3 UNLESS OTHERWISE INDICATED ON THIS SHEET



LINE CODES: 7-17,

SEE CDS LISTING

GENERAL ELECTRIC

NUCLEAR NON-SAFETY RELATED

NUCLEAR SAFETY RELATED

ORIGINAL

Constellation Energy Group

NINE MILE POINT NUCLEAR STATION UNIT 2 - SCRIBA, N.Y.

ELEMENTARY DIAGRAM

HIGH PRESSURE CORE SPRAY

SCALE NONE

DRAWING NO 0007.243-001-018

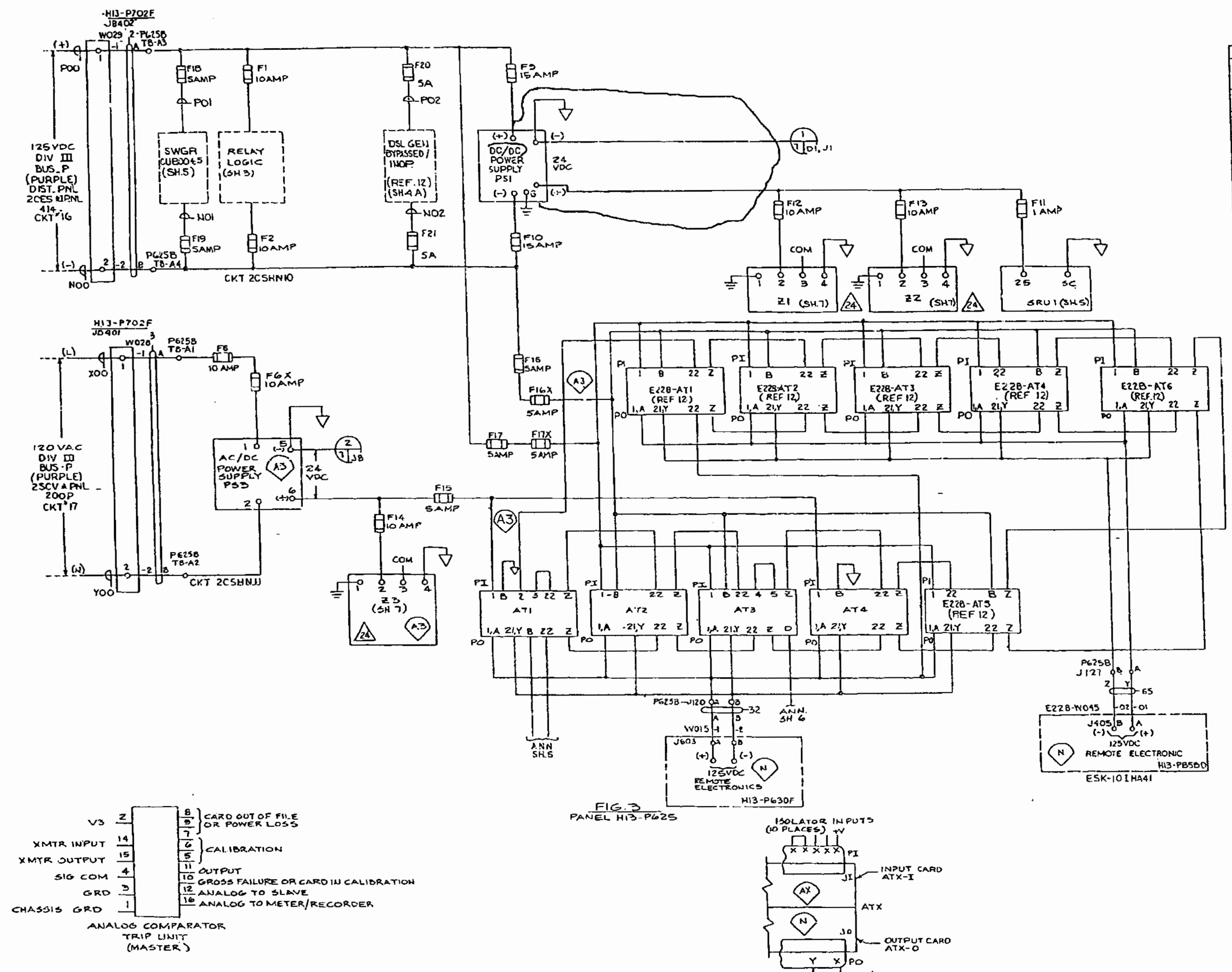
0007.243-001-007

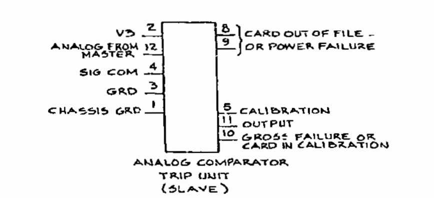
807E172TY

ELEM DIAG HIGH PRESSURE CORE SPRAY SYSTEM

GENERAL ELECTRIC

ALL WIRING IS D3 UNLESS OTHERWISE INDICATED ON THIS SHEET





JUMPER INPUT ISOLATORS (10 PLACES): A TO D, C TO F, E TO J, H TO L, K TO N, M TO R, P TO T, S TO V, U TO X, W TO Y.

RELAY OPTICAL ISOLATOR (SEE TABLE BELOW)

NOTE + PI # 13 OF E22B-AT3 AND PI # 9 OF E22B-AT2 ARE NOT USED

DIGITAL ISOLATOR ASSY TABULATION

MTG LOC	ISOLATOR ASSY.	CONN PINS PI 2 3 / PO B	CONN PINS PI 4 5 / PO D	CONN PINS PI 6 7 / PO F	CONN PINS PI 8 9 / PO J	CONN PINS PI 10 11 / PO L	CONN PINS PI 12 13 / PO N	CONN PINS PI 14 15 / PO R	CONN PINS PI 16 17 / PO T	CONN PINS PI 18 19 / PO V	CONN PINS PI 20 21 / PO X	FUNC
H13-P625	AT1	SH1A,6	SH.6	SH.6	SH.6	SH.6	SH.6	SH.6	SH.6	SH.5	SH.5	CR/ANN.
	AT2	SH.5	SH.5	SH.5	SH.5	SH.5	SH.5	SH.5	SH.5	SH.5	SP	FIELD/ ANN.
	AT3	SH.6	SH1A,6	SP	SP	SP	SP	SP	REF 12 SH 13	REF 12 SH 13	REF 12 SH 13	FIELD/ ANN.
	AT4	SH.6	SH.6	SH.6	SH.6	SH.6	SH.6	SH.6	SH 6	SH 6	SH 6	CR/ ANN.
	E22B-AT5	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP
	E22B-AT6	REF. 12 SH. 14	REF. 12 SH. 14	REF. 12 SH. 14	REF. 12 SH. 14	REF 12 SH 14	REF 12 SH 14	SP	SP	SP	SP	CR/ANN
	E22B-AT1	REF 12 SH.13	REF 12 SH.13	REF. 12 SH 13A	REF. 12 SH 13	REF. 12 SH. 13	REF. 12 SH. 13A	REF. 12 SH. 13	REF 12 SH 13A	REF 12 SH. 13	REF 12 SH. 13	FIELD/ ANN
	E22B-AT2	REF 12 SH. 13A	REF 12 SH 13A	REF 12 SH. 13	REF 12 SH 13A	REF 12 SH. 13A	REF 12 SH. 13A	REF 12 SH. 13A	REF 12 SH. 13A	REF 12 SH. 13A	REF 12 SH 13A	FIELD/ ANN
	E22B-AT3	REF 12 SH.13	REF 12 SH.13	REF 12 SH. 13	REF 12 SH 13A	REF 12 SH. 13A	REF 12 SH. 13A	REF 12 SH. 13	REF 12 SH. 13	REF 12 SH. 13	REF 12 SH. 13	FIELD/ ANN.
H13-P525	E22B-AT6	REF. 12 SH. 13A	REF. 12 SH 13A	REF 12 SH 13A	REF. 12 SH 13A	REF 12 SH 13A	REF. 12 SH. 13A	REF 12 SH13A	REF 12 SH 13A	REF 12 SH 13A	REF 12 SH 13A	
H13-P625	E22B-AT7	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP
H13-P625	E22B-AT8	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP

DIV 3 (H13-P625)

CARD FILE	LOCATION	DEVICE NO	FUNCTION	USE
Z1	1	B22-N673C	REAC VESSEL WTR LOW LEV. (2 TRIP)	HPCS INITIATION LOGIC
	2	B22-N674C	REAC VESSEL WTR HIGH LEV. (8 TRIP)	HPCS TRIP LOGIC
	3	B22-N673G	REAC VESSEL WTR LOW LEV. (2 TRIP)	HPCS INITIATION LOGIC
	4	B22-N667C	HIGH DRYWELL PRESS	HPCS INITIATION LOGIC
	5	B22-N667G	HIGH DRYWELL PRESS	HPCS INITIATION LOGIC
	6	B22-N673L	REAC VESSEL WTR LOW LEV. (2 TRIP)	HPCS INITIATION LOGIC
	7	B22-N674L	REAC VESSEL WTR HI LEV. (8 TRIP)	HPCS TRIP LOGIC
	8	B22-N673R	REAC VESSEL WTR LOW LEV (2 TRIP)	HPCS INITIATION LOGIC
	9	B22-N667L	HIGH DRYWELL PRESS	HPCS INITIATION LOGIC
	10	B22-N667R	HIGH DRYWELL PRESS	HPCS INITIATION LOGIC
	11	B22-N674G	REAC VESSEL WTR HI LEV (8 TRIP)	HPCS TRIP LOGIC
	12	B22-N674R	REAC VESSEL WTR HI LEV (8 TRIP)	HPCS TRIP LOGIC
	13	Z1-1	CALIBRATION UNIT	---
Z1	14			
Z2	1	E22-N651	HPCS DISCH PRESS LOW	MIN FLOW VLV E22-F012 CONT, MTR E22-R601
	2	E22-N656	HPCS FLOW ABOVE SET POINT	MIN FLOW VLV E22-F012 CONT
	3	E22-N654C	CNDS STORAGE TANK LOW WTR LEV	PUMP SUCT FROM SUPP POOL VLV E22-F015 CONT
	4	E22-N654G	CNDS STORAGE TANK LOW WTR LEV	PUMP SUCT FROM SUPP POOL VLV E22-F015 CONT
	5	E22-N655C	SUPP POOL WTR HIGH LEV	PUMP SUCT FROM SUPP POOL VLV E22-F015 CONT
	6	E22-N655G	SUPP POOL WTR HIGH LEV	PUMP SUCT FROM SUPP POOL VLV E22-F015 CONT
	7	SPARE	---	---
	8	SPARE	---	---
	9	SPARE	---	---
	10	SPARE	---	---
	11	SPARE	---	---
	12	SPARE	---	---
	13	Z2-1	CALIBRATION UNIT	---
Z2	14			
Z3	1	E22-N650	WTR LEG PUMP DISCH PRESS LOW	ANNUNCIATION AND INDICATION
	2	E22-N652	HPCS PUMP SUCT PRESS-LOW	ANNUNCIATION
	3	E22-N653	HPCS PUMP SUCT PRESS-HIGH	ANNUNCIATION
	4	E22-N657	HPCS LINE BREAK LEAK DET. HIGH DIFF PRESS	ANNUNCIATION
	5	SPARE	---	---
	6	SPARE	---	---
	7	SPARE	---	---
	8	SPARE	---	---
	9	SPARE	---	---
	10	SPARE	---	---
	11	SPARE	---	---
	12	SPARE	---	---
	13	Z3-1	CALIBRATION UNIT	---
Z3	14			

LINE CODES: 2, 3, 32, 65

SUPERSEDES SWEC FILE NO.	0007.243-001-007R
EQUIP. ID.	SEE CDS LISTING
MFG. NAME: G.E.	MFG. CODE: G08000
SPEC. and/or P.O.: P800A	SWEC JOB NO.: 12177

NMP2-VENDOR DWG DATA STAMP

DRAWING NO. 807E172TY, SH. 1A
CADD DESIGN FILE NO. VND00949.DGN

NOTE: THIS DRAWING WAS CREATED USING COMPUTER AIDED DRAFTING DO NOT MAKE MANUAL CHANGES

DOCUMENT USER: CONSULT APPLICABLE DOCUMENT CONTROL SYSTEM TO OBTAIN LATEST DOCUMENT INFORMATION

ORIGINAL

NUCLEAR NON-SAFETY RELATED

NIAGARA MOHAWK — NINE MILE POINT NUCLEAR STATION - UNIT 2 SCRIBA, N.Y.

ELEMENTARY DIAGRAM
HIGH PRESSURE CORE SPRAY (HPCS) SYSTEM

MK	DATE	BY	MF	DESCRIPTION OF REVISION AND M O	CK	APP
3	7-9-93	BAW		REVISED PER EDC 2E16674A		
2	11-28-94			REISSUED PER CAR 90.3035		
1	12-15-88			ORIGINAL ISSUE- INCORP. FDDR KG1-6158, REV. 1		

SCALE: NONE
DRAWING NO: 0007.243-001-007

TAMERAN

Exelon Generation

Training Id: **2015 NRC RO-SRO Admin RC** Revision: **0.0**

Title: **Radiological Requirements and Heat Stress Requirements Related to Operator Work In High Radiation Areas**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	5/14/15
Validated By	James Workman/Brian Hilliker	9/29/15
Facility Reviewer		10/2/15

Approximate Duration: 15/20 minutes (RO/SRO)

Documentation of Performance:

Performer: ______________________

Evaluator: ______________________

Start Time: __________ Stop Time: __________ Completion Time __________

Grade: **Pass / Fail**

Comments: ______________________

Evaluators Signature: ______________________ Date: __________

References

1. RP-AA-10 - RADIATION PROTECTION PROCESS DESCRIPTION
2. RP-AA-11- EXTERNAL DOSE CONTROL PROGRAM DESCRIPTION
3. RP-AA-12 - INTERNAL DOSE CONTROL PROGRAM DESCRIPTION
4. RP-AA-203 - EXPOSURE CONTROL AND AUTHORIZATION
5. RP-AA-403 - ADMINISTRATION OF THE RADIATION WORK PERMIT PROGRAM
6. RP-AA-460 - CONTROLS FOR HIGH AND LOCKED HIGH RADIATION AREAS
7. RP-AA-460-001 - CONTROLS FOR VERY HIGH RADIATION AREAS
8. SA-AA-111 – HEAT STRESS CONTROL
9. NUREG 1123, 2.3.7 (3.5/3.6)

Instructor Information

A. JPM Information

1. Description

   a. This JPM is used to test generic knowledge in calculation of overall dose and control mechanisms to allow the selection of individuals to continue or perform work in high dose areas. This JPM tests basic mathematics and understanding of heat stress stay times and remaining dose limitations.

   b. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. GAP-RPP07-00002, Comply with administrative exposure limits

   b. K/A 2.3.7 (3.5/3.6), Ability to comply with radiation work permit requirements during normal or abnormal conditions.

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Classroom
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

   a. Training Classroom

5. JPM Setup (if required)

a. Ensure sufficient copies of the following procedures are available in the exam area:

- RP-AA-10
- RP-AA-11
- RP-AA-12
- RP-AA-203
- RP-AA-403
- RP-AA-460
- RP-AA-460-001
- SA-AA-111

b. Ensure calculators are available.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is at 100% power. • A valve leak has developed in the WCS-P1B room. • Entry into the room is required to assist Maintenance with repairing valve WCS-V29B. • An updated survey map is provided. • Your current year-to-date exposure is 1800 mRem TEDE. • You have not received any dose extension this year. • Job conditions are as follows: o You will be performing Moderate Work for a total of 45 minutes at valve WCS-V29B. o You will be wearing vapor-impermeable coveralls over your work clothes. o The wet bulb temperature in the room is 93°F. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, address the radiological and heat stress aspects of performing this work, and record your findings on the provided scorecard.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** *Acknowledge repeat back providing correction if necessary.*	P	SAT / UNSAT **STD:** Proper communications used.
2.	Obtain a copy of the reference procedures and review / utilize the correct section of the procedures.	P	SAT / UNSAT **STD:** Associated procedures obtained
3.	Addresses radiological and heat stress aspects of working in WCS*P1B Room		

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
3a	Determines radiological classification of area.	P	**PASS / FAIL** **STD:** Determines area is a Locked High Radiation Area
3b	Determines highest dose rate in the room and location.	P	**PASS / FAIL** **STD:** 2000 mrem/hr by the pump
3c	Determines highest dose rate at the work location.	P	**PASS / FAIL** **STD:** 500 mrem/hr
3d	Determines highest contamination level in the room and location.	P	**PASS / FAIL** **STD:** 20000 dpm/100cm2 at location circle 5
3e	Determines contamination level the work location.	P	**PASS / FAIL** **STD:** 6000 dpm/100cm2
3f	Determines expected dose for job.	P	**PASS / FAIL** **STD:** 375 mrem (500 mrem/hr x .75 hr)
3g	Determines heat stress stay time.	P	**PASS / FAIL** **STD:** 20 minutes
SRO Only: Provide SRO candidates with the SRO Only cue sheet.			
4.	Determines dose extension required	P	**PASS / FAIL** **STD:** Determines annual exposure will exceed 2000 mRem dose control level. (1800 mRem + 375 mRem = 2175 mRem

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
5.	Identifies proper form for dose extension	P	**PASS / FAIL** **STD:** References RP-AA-203 and determines attachment 1 is the required form for dose extension
6.	Determines required approvals for dose extension	P	**PASS / FAIL** **STD:** Identifies required approvals as the Work Group Supervisor and the RP Manager.

TASK STANDARD	Radiological and heat stress requirements related to work in the WCS-P1B room addressed.

STOP TIME	

JPM Handout

INITIAL CONDITIONS	Given:
	• The plant is at 100% power.
	• A valve leak has developed in the WCS-P1B room.
	• Entry into the room is required to assist Maintenance with repairing valve WCS-V29B.
	• An updated survey map is provided.
	• Your current year-to-date exposure is 1800 mRem TEDE.
	• You have not received any dose extension this year.
	• Job conditions are as follows:
	  o You will be performing Moderate Work for a total of 45 minutes at valve WCS-V29B.
	  o You will be wearing vapor-impermeable coveralls over your work clothes.
	  o The wet bulb temperature in the room is 93°F.
	
	Evaluator: *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, address the radiological and heat stress aspects of performing this work, and record your findings on the provided scorecard.

Scorecard

Answer the following when performing this task:
1.
Classify the room based on radiation level (check one): ☐ Radiation Area ☐ High Radiation Area ☐ Locked High Radiation Area ☐ Very High Radiation Area
2.
Designate the highest dose rate in the room and the location:
3.
Designate the dose rate at the work location:
4.
Designate the highest contamination level in the area and the location:
5.
Designate the contamination level at the work location:
6.
Designate the expected dose for the duration of the job:
7.
Designate the heat stress stay time:

Exelon Generation

Examiner Scorecard. Do Not Provide to Applicant.

Answer the following when performing this task:
1.
Classify the room based on radiation level (check one): ☐ Radiation Area ☐ High Radiation Area ☒ **Locked High Radiation Area** ☐ Very High Radiation Area
2.
Designate the highest dose rate in the room and the location: **2000 mrem/hr near the pump**
3.
Designate the dose rate at the work location: **500 mRem/hr**
4.
Designate the highest contamination level in the area and the location: **20,000 dpm/100cm^2 at circle 5**
5.
Designate the contamination level at the work location: **6,000 dpm/100cm^2**
6.
Designate the expected dose for the duration of the job: **375 mRem**
7.
Designate the heat stress stay time: **20 minutes**

Exelon Generation®

SRO Only Handout

Cue:

"(Operator's name), determine if a dose extension is required to perform this work. If no extension is required, identify the expected margin to the dose limit upon completion of the task. If an extension is required, identify the form required to be completed for the dose extension and the levels of approval needed for the dose extension. Record your findings on the scorecard below."

SRO Only Scorecard

Answer the following when performing this task:
1.
Is a dose extension required? ☐ No (answer question 2 below only) ☐ Yes (answer questions 3 and 4 below only)
2.
Designate expected margin to dose limit upon completion of the job.
3.
Identify the form required to be completed for the dose extension.
4.
Check all appropriate boxes below for the approvals required for this dose extension. ☐ Work Group Supervisor ☐ Radiation Protection Manager ☐ Plant Manager ☐ Site Vice President

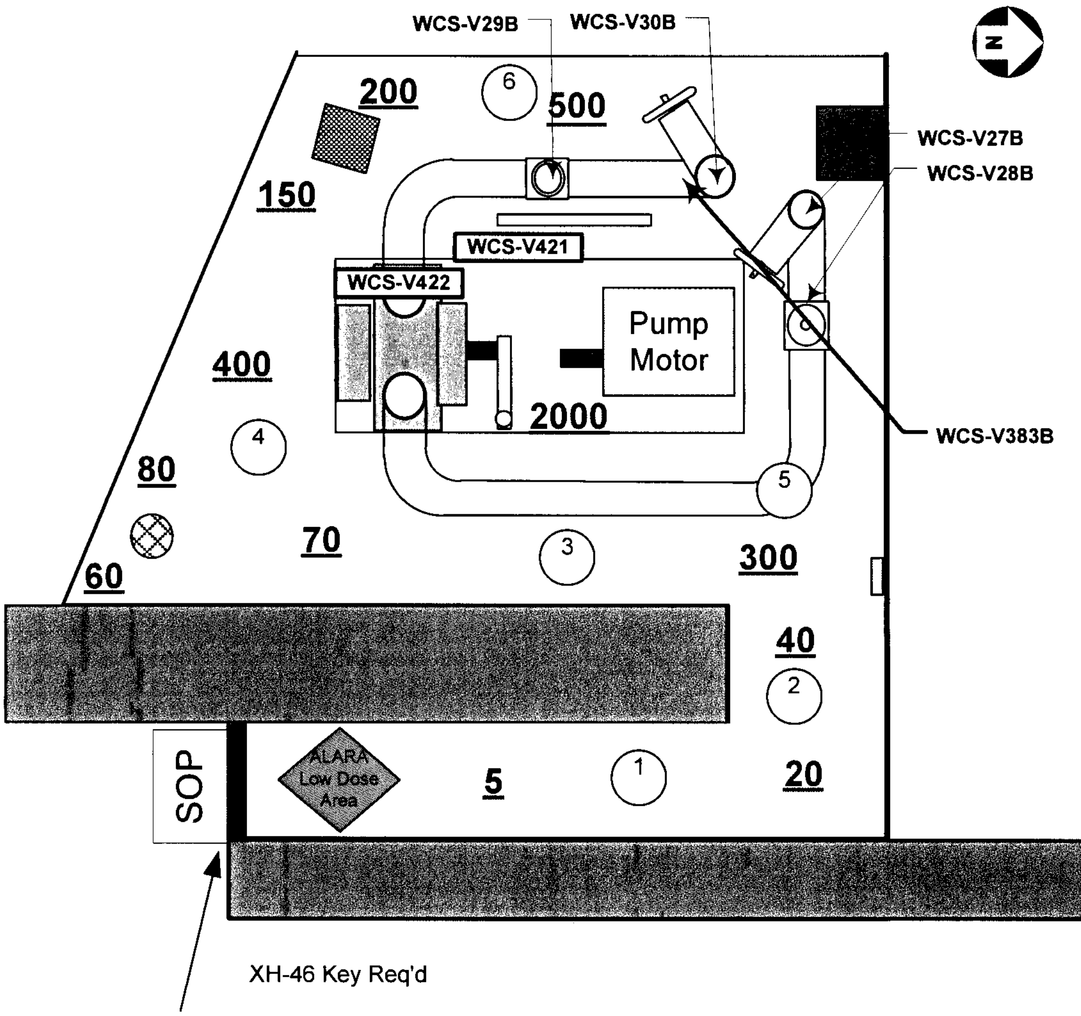
Examiner Scorecard. Do Not Provide to Applicant.

1.
Is a dose extension required? ☐ No (answer question 2 below only) ☒ **Yes (answer questions 3 and 4 below only)**
2.
Designate expected margin to dose limit upon completion of the job. **N/A**
3.
Identify the form required to be completed for the dose extension. **RP-AA-203 Attachment 1**
4.
Check all appropriate boxes below for the approvals required for this dose extension. ☒ **Work Group Supervisor** ☒ **Radiation Protection Manager** ☐ Plant General Manager ☐ Site Vice President

NMP	Reactor Building 215' WCS * P1B Room	Map No. 13B

Survey No.	2RB-26030
Page	of
Date / Time	12/1/15/ 03:30
RWP No.	NM-2-15-00304
Rx Power	100%
H2 Inj. Rate	13.7 scfm

#	Item	βγ dpm/100cm²	α dpm/100cm2
1	Floor	800	<20
2	Floor	1500	<20
3	Floor	1800	<20
4	Floor	3200	<20
5	Pipe	20000	<20
6	Floor	6000	<20
7			
8			
9			



Survey performed to support Maintenance and Operations in repairs on 2WCS-V29B.

1. = Rope/Area Boundary
2. (#) = Smear Location
3. # = General Area dose rate in mRem/hr, unless noted
4. *# / # | *# / # = γ / γ | β / β Contact / 30 cm
5. △# = Neutron (mRem/hr)
6. A/S = Air Sample
7. ◇# = Large Area Wipe
8. A = Area Rad Monitor
9. V # = VAMP Number

γ = Readings in mRem/hr. β = Readings in mRad/hr.

Instrument	Inst. #	Cal Due date
RO-2	5782	03/06/16
RM14	3948	03/10/16
SAC4	967	01/16/16

Surveyor: D. Falcetti Dose: 2.8 mRem Reviewed By: Date:

RADIATION PROTECTION PROCESS DESCRIPTION

1. **PURPOSE**

1.1. This document describes the major process elements for the Exelon radiation protection program and identifies responsibilities for the development, implementation, and review of those elements.

2. **TERMS AND DEFINITIONS** - None

3. **RESPONSIBILITIES**

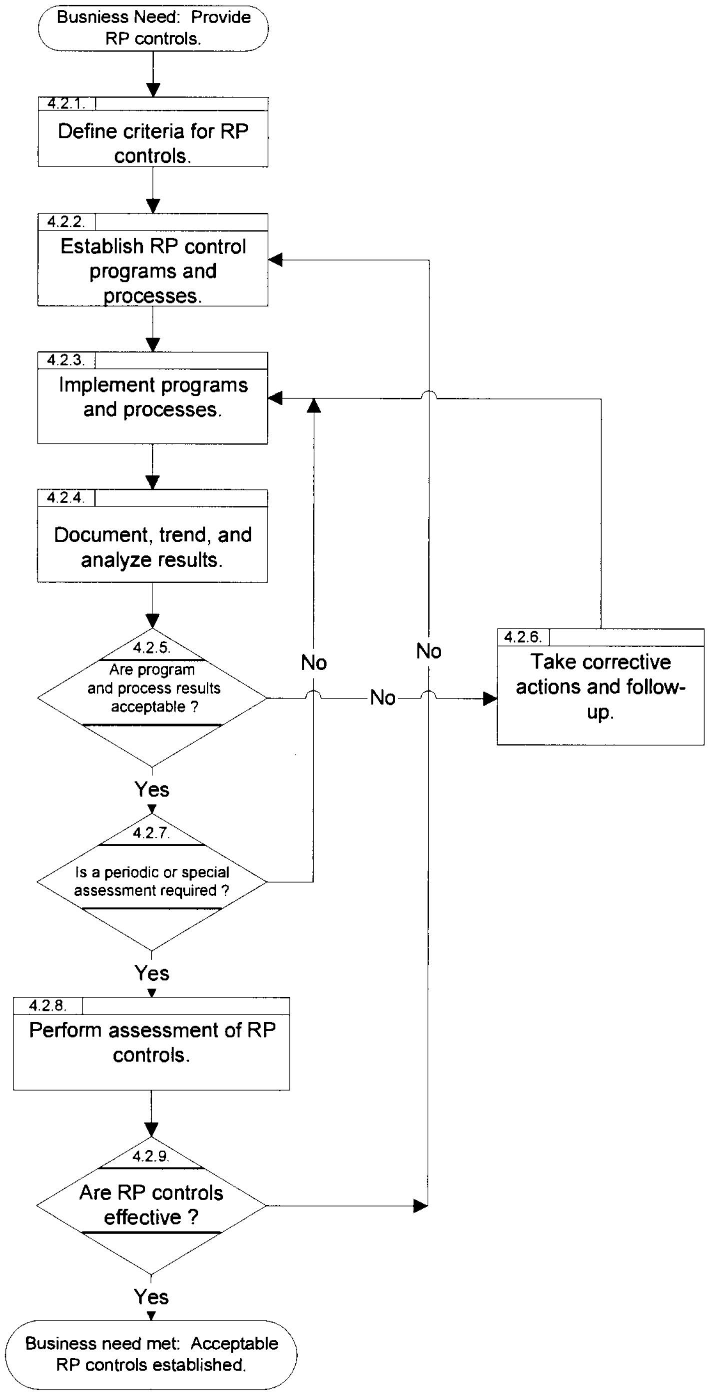
3.1. Radiation Protection processes are implemented through a combination of different Radiation Protection groups, including personnel in Exelon Nuclear Generation Support, and Site Support organizations. More information on roles and responsibilities is delineated in DD-28, "Radiation Protection Department Description."

4. **MAIN BODY**

4.1. Radiation protection involves the process of establishing and implementing radiation protection controls in a safe, reliable, and cost-effective manner while complying with industry standards, licensing, and regulatory requirements. The following flowchart contains the process activities needed to provide radiation protection controls to meet the appropriate standards and requirements.

4.2. The section following the flowchart provides more detail for each activity in the flowchart.

Radiation Protection Process Flowchart



Busniess Need: Provide RP controls.	**IMPLEMENT** radiation protection controls in a safe, reliable, and cost-effective manner while complying with industry standards, licensing, and regulatory requirements. **ENSURE** that objectives of the radiation protection program are met. These objectives are: – Ensure that individual and collective occupational radiation exposures are maintained As Low As Reasonably Achievable (ALARA). – Maintain positive control over radioactive material. – Minimize contamination of areas, equipment, and personnel. – Minimize the generation of solid radioactive waste.

4.2.1. Define criteria for RP controls.	4.2.1. Radiation protection control criteria shall contain, as a minimum, the following:
	– Procedural requirements and instructions for properly implementing the following radiation protection programs:
	  – External Dose Control
	  – Internal Dose Control
	  – Radiological Respiratory Protection
	  – Radioactive Material Control
	  – Contamination Control
	  – The ALARA Program
	  – Controls For Radiation Protection Instrumentation
	  – Radiological Postings, Labeling and Marking,
	  – High Radiation Area and Very High Radiation Area Controls
	  – Radworker Practices and Knowledge
	  – Public Dose Monitoring
	  – Radwaste Shipping.
	
	– Performance indicators and assessment requirements.
	– Reporting requirements.

	1. Requirements and standards for radiation protection criteria include but are not limited to the following references:
	– 10 CFR 19
	– Notices
	– Instructions
	– Reports to Workers:
	    – Inspection
	    – Investigations.
	– 10 CFR 20, Standards for Protection Against Radiation
	– INPO 05-008, Guidelines for Radiological Protection at Nuclear Power Stations
	– Site Technical Specifications and Offsite Dose Calculation Manual.

4.2.2. Establish RP control programs and processes.	4.2.2. **ESTABLISH** radiation protection processes and methods including resources required to implement the RP controls criteria. 1. The processes that need to be implemented are as follows: – Occupational Exposure Monitoring – Control of Licensed Material – Managing RP Instrumentation – ALARA and Work Control Processes – Radiological Hazard Identification and Control. **REFER** to Attachment 1 for more details on these processes.
4.2.3. Implement programs and processes.	4.2.3. **IMPLEMENT** required programs and processes using the established methods developed in steps 4.2.1. and 4.2.2. above.
4.2.4. Document, trend, and analyze results.	4.2.4. **DOCUMENT** process results in accordance with approved procedures, processes, and practices, e.g., documentation of survey results. 1. Using data management tools, **EVALUATE and TREND** process results.

4.2.5. Are program and process results acceptable ?	4.2.5. **If** process results are acceptable, **then PROCEED** to step 4.2.7. **Otherwise**, **PROCEED** to 4.2.6.
4.2.6. Take corrective actions and follow-up.	4.2.6. **TAKE** corrective actions **and FOLLOW-UP** as needed based upon Condition Report corrective actions or actions taken to prevent recurrence, **and CONTINUE** to implement RP controls in accordance with step 4.2.3.
4.2.7. Is a periodic or special assessment required ?	4.2.7. **EVALUATE** whether a periodic or special assessment is required for a program or process. 1. **If** an assessment is required, **then PROCEED** to step 4.2.8. **Otherwise**, **CONTINUE** to implement required programs and processes in accordance with step 4.2.3.
4.2.8. Perform assessment of RP controls.	4.2.8. **PERFORM/ DOCUMENT** an assessment of the radiation protection controls identified for review.
4.2.9. Are RP controls effective ?	4.2.9. **If** assessment results indicate that the radiation protection controls are effective, **then PROCEED**. **Otherwise**, **PROCEED** to step 4.2.2. to re-establish appropriate radiation protection controls.
Business need met: Acceptable RP controls established.	Acceptable radiation protection controls have been established and implemented. The business need has been met.

5. DOCUMENTATION

5.1. **RETAIN** copies of records generated during implementation of the radiation protection program in accordance with the provisions of the station records management program. This records program will include appropriate controls for storage and preservation. Generally, records are maintained consistent with the practices recommended by ANI Information Bulletin 80-1A, "Nuclear Liability Insurance Records Retention.

6. **REFERENCES**

6.1. RP-AA-1, "Radiation Protection."

6.2. DD-28, "Radiation Protection Department Description."

6.3. 10 CFR 19, "Notices, Instructions, and Reports to Workers: Inspection and Investigations."

6.4. 10 CFR 20, "Standards for Protection Against Radiation."

6.5. INPO 05-008, "Guidelines for Radiological Protection at Nuclear Power Stations."

6.6. Site Technical Specifications.

6.7. Offsite Dose Calculation Manual (ODCM).

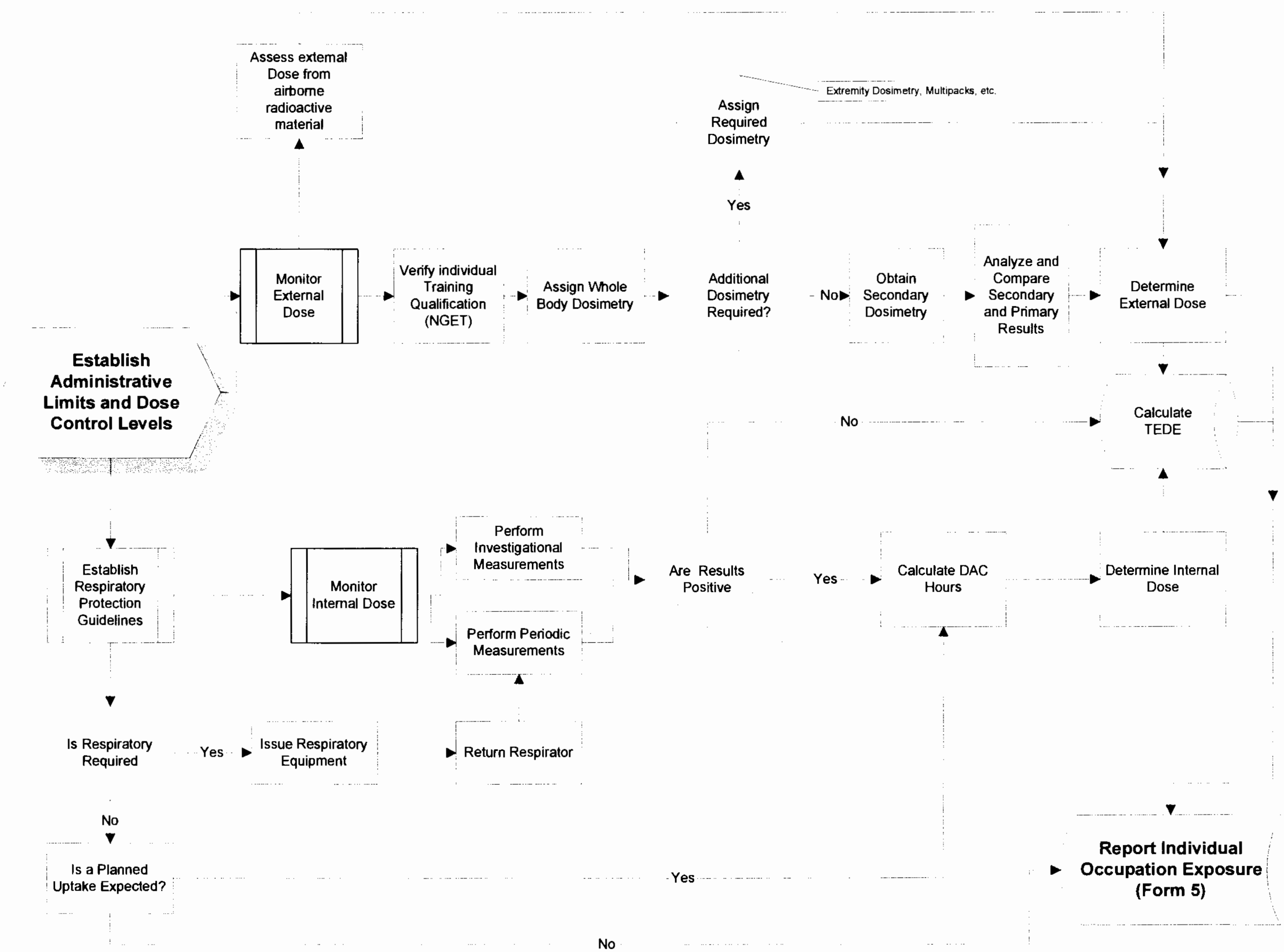
6.8. ANI Information Bulletin 80-1A, "Nuclear Liability Insurance Records Retention..

7. **ATTACHMENTS**

7.1. Attachment 1 – Radiation Protection Processes.

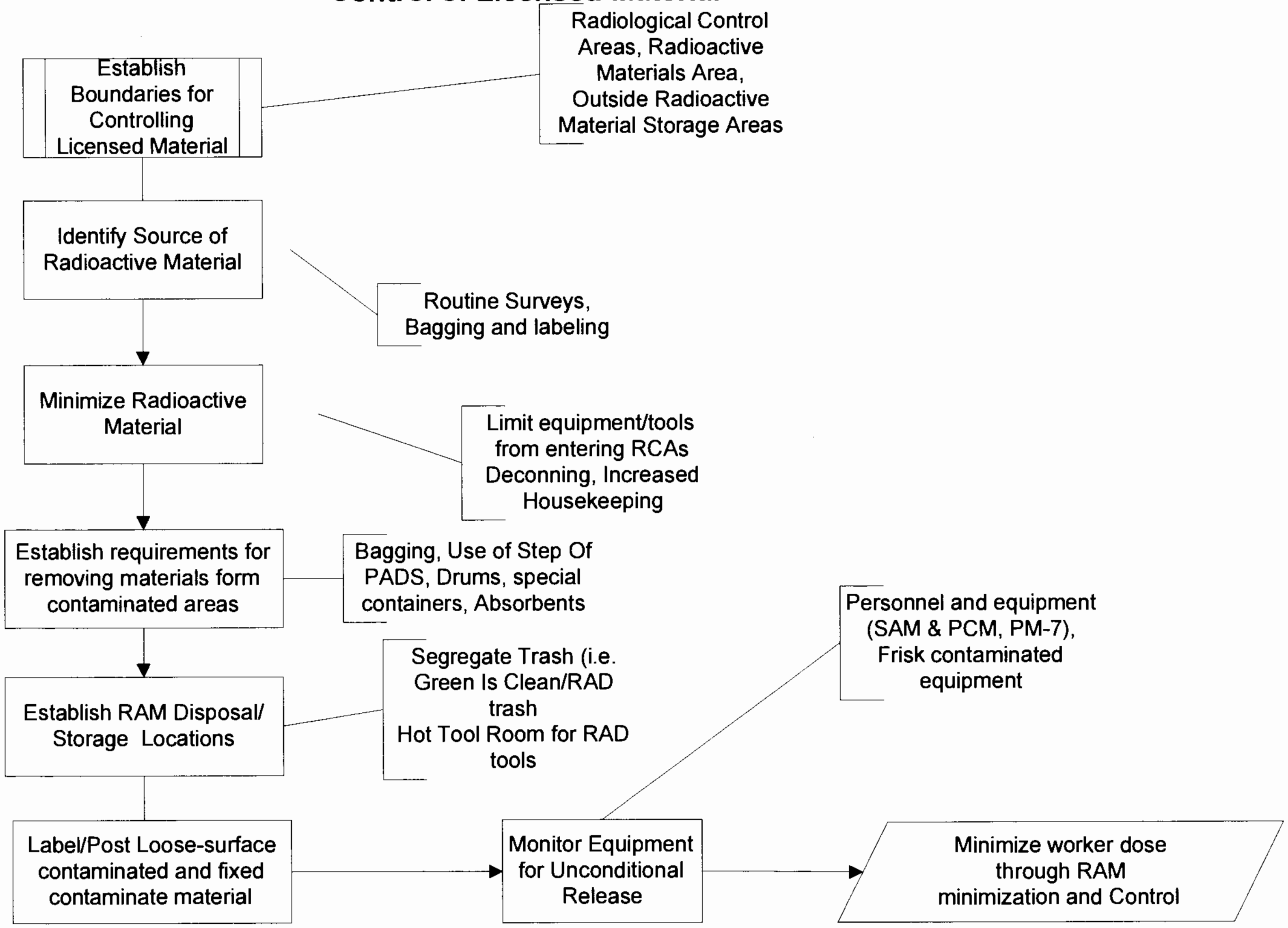
ATTACHMENT 1
Radiation Protection Processes

OCCUPATIONAL EXPOSURE MONITORING



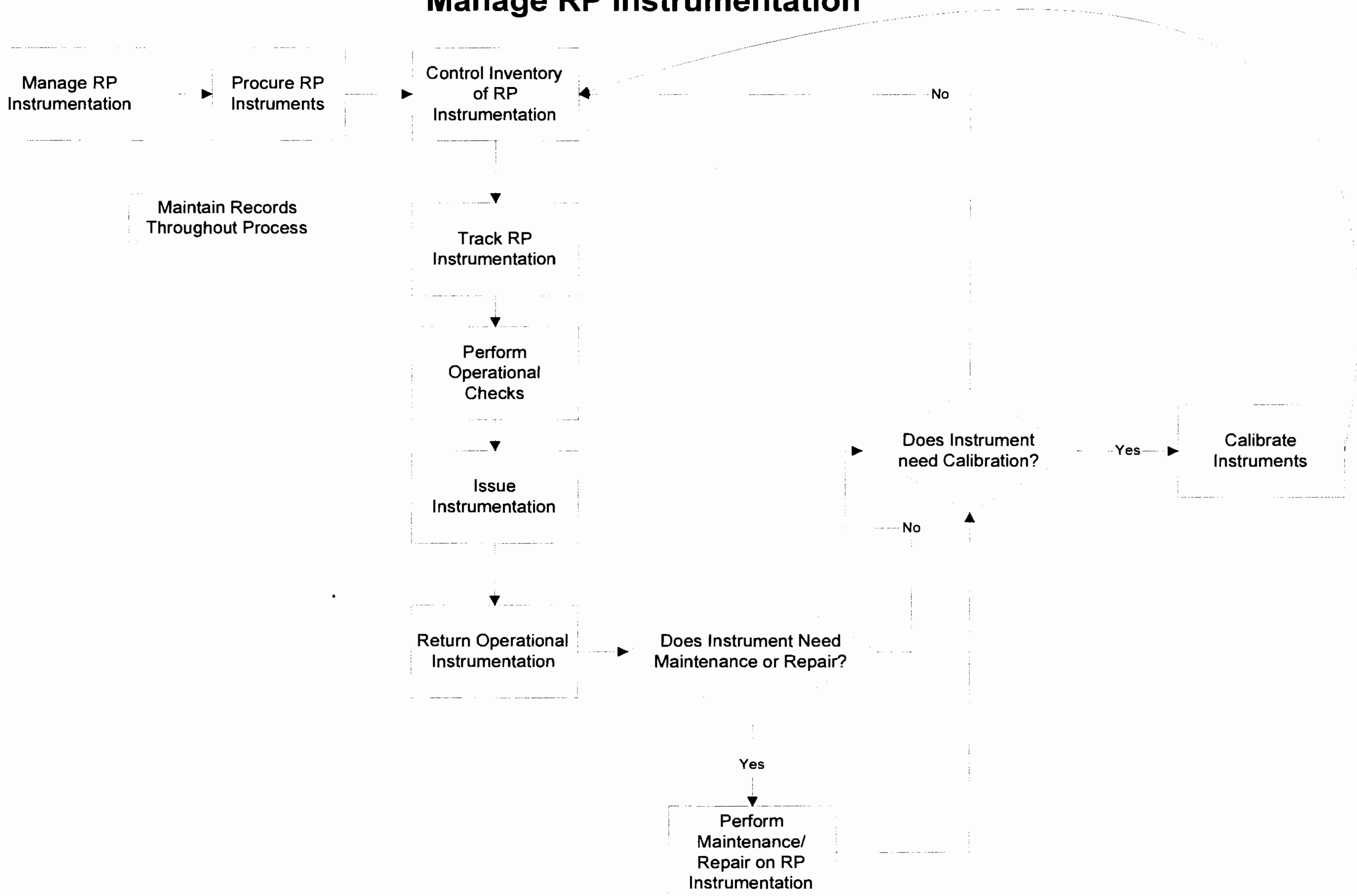
ATTACHMENT 1
Radiation Protection Processes

Control of Licensed Material



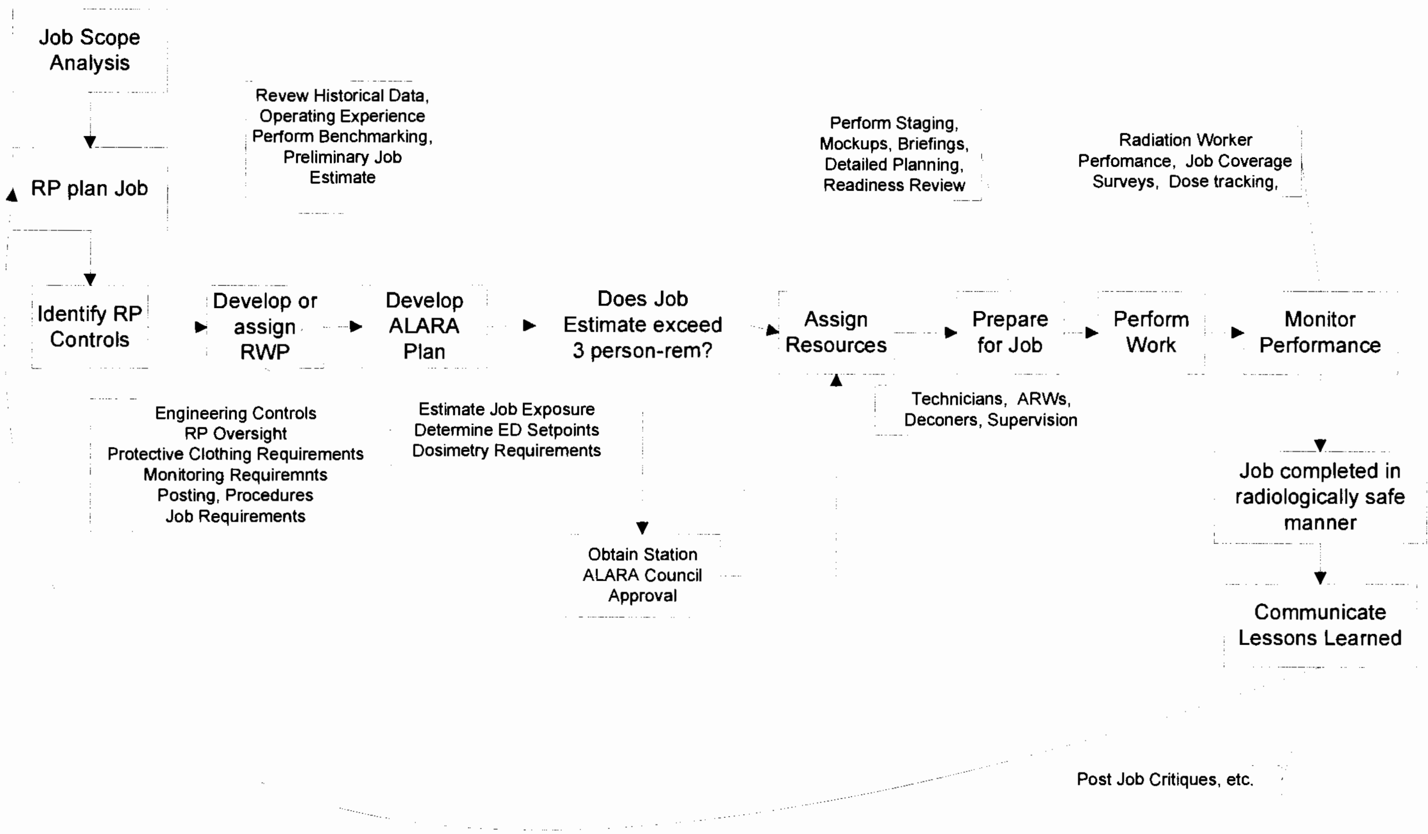
ATTACHMENT 1
Radiation Protection Processes

Manage RP Instrumentation



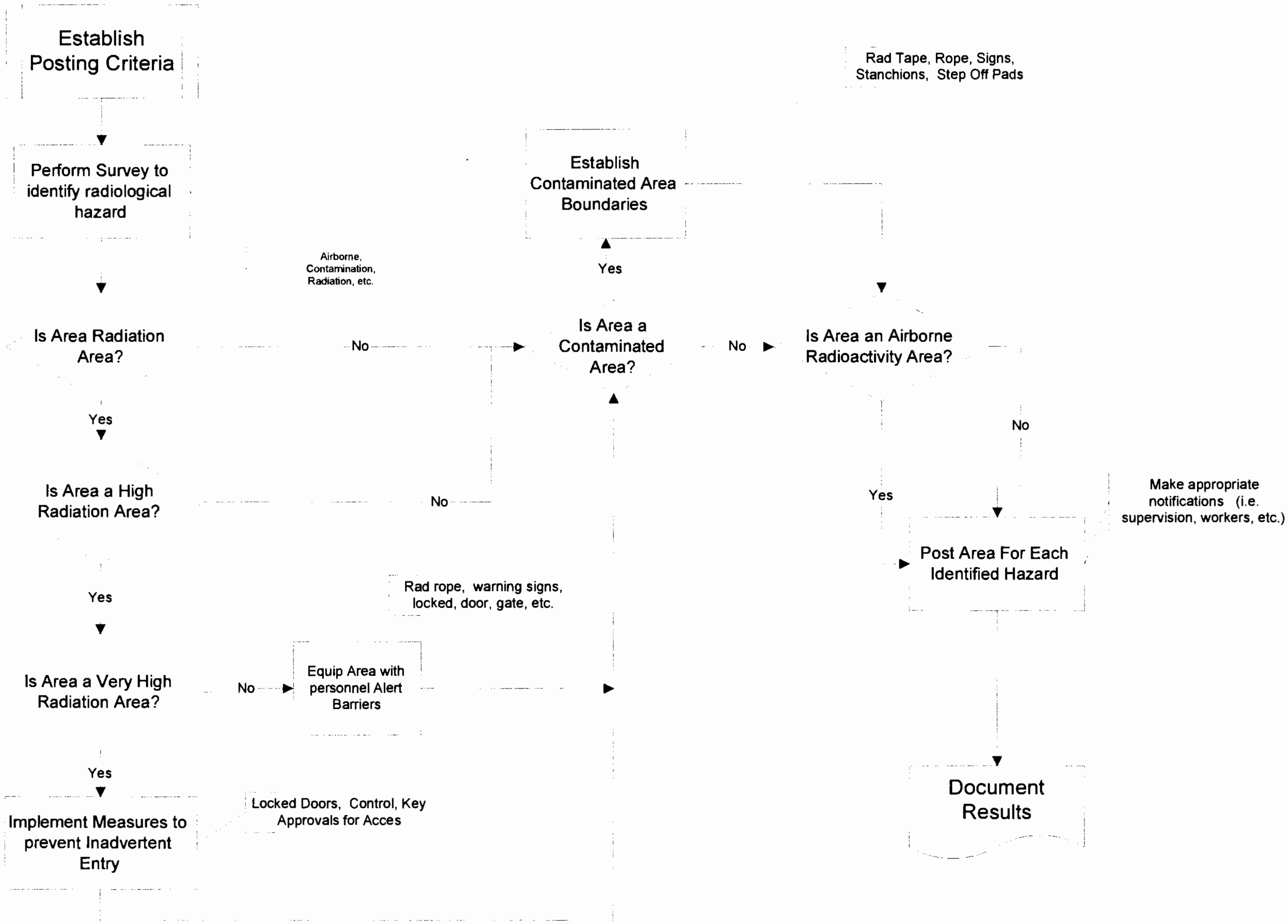
ATTACHMENT 1
Radiation Protection Processes

ALARA/ WORK CONTROL PROCESS



ATTACHMENT 1
Radiation Protection Processes

Radiological Hazard Identification and Recognition



Program Description

EXTERNAL DOSE CONTROL PROGRAM DESCRIPTION

1. **PURPOSE**

1.1. This document describes the requirements for External Dose Control.

1.2. The purpose of the External Dose Control Program is to limit annual and lifetime whole body dose, skin and extremity dose, dose to the embryo/fetus and dose during emergencies.

2. **TERMS AND DEFINITIONS**

2.1. External Dose – That portion of dose equivalent received from outside the body

2.2. Individual Monitoring Devices – Devices worn by a single individual for the assessment of dose equivalent

2.3. Other Terms – All terms and definitions described in this document are consistent with the definition described in 10CFR20.003

3. **RESPONSIBILITIES**

3.1. The Exelon Nuclear Radiation Protection Organization implements the External Dose Control Program. Management Controls shall be developed to assure compliance and measure performance.

4. **REGULATORY REQUIREMENTS**

4.1. 10 CFR20.1201 Occupational Dose Limits for Adults

4.2. 10CFR20.1502 Conditions Requiring Individual Monitoring of External and Internal Occupational Dose

4.3. 10CFR20.1203 Determination of External Dose from Airborne Radioactive Material

4.4. 10CFR19.12 Instructions to Workers

4.5. 10CFR20.1202 Summation of External and Internal Dose

4.6. 10CFR19.13 Notifications and Reports to Individuals

4.7. 10CFR 20.1206 Planned Special Exposure

5. MAIN BODY

5.1. External Whole Body Dose is the primary radiological hazard for occupational exposure at Exelon Nuclear.

5.2. External Dose Control is accomplished by monitoring personnel for occupational exposure, establishing dose limits and administrative dose control levels, and tracking and reporting dose received.

5.2.1. Occupational Dose Limits

1. Administrative Dose Control Levels are implemented to preclude exceeding the annual and lifetime dose limits for Adults, annual limit for minors, and the dose equivalent to an embryo or fetus.

2. Dose from Planned Special Exposures is accounted for separately from the annual limits, but shall be in compliance with 20.1206.

5.2.2. Monitoring For Occupational Exposure

1. Individual Monitoring Devices are used to monitor occupation dose at Exelon Nuclear.

2. Individuals required to be monitored are assigned a primary (Dosimeter of Legal Record) and a secondary dosimeter (Electronic Dosimeter) to monitor Whole Body Dose.

3. The Primary Dosimeter (DLR) is the dose of record and is used to assign Deep Dose Equivalent (DDE), Shallow Dose Equivalent (SDE) to the skin or to any extremity, and Lens Dose Equivalent (LDE) as defined in 10CFR20.003.

4. The Secondary Dosimeter is an alarming electronic dosimeter and provides increased assurance that limits will **not** be exceeded.

5. A Quality Assurance program for dosimetry processing (DLR) shall be established.

6. Dosimetry Processors shall be accredited by the National Voluntary Accreditation Program (NVLAP) in personnel radiation dosimetry.

5.2.3. Occupational Exposure Reporting

1. Records of doses received by all individuals for whom monitoring was required are maintained for life.

2. Records are provided to individuals annually and upon request.

3. Records of all individual monitoring results, covering the preceding years are submitted to Commission on or before April 30th of each year.

6. **DOCUMENTATION**

6.1. Maintaining accurate occupational exposure documentation is essential component of the External Dose Control Program. Exposure Records may be reviewed in future litigation against Exelon Nuclear.

6.2. Documentation Requirements for Dosimetry Records are described in the Exelon Nuclear Radiation Protection Procedures.

7. **REFERENCES**

7.1. Regulatory Guide 8.34, Monitoring Criterion and Methods to Calculate Occupational Radiation Does

7.2. Regulatory Guide 8.13, Instructions Concerning Pre-natal Exposure

7.3. Regulatory Guide 8.36 Radiation Dose to the Embryo/Fetus

7.4. NUREG/CR-6204, Questions and Answers Based on Revised 10CFR20

8. **ATTACHMENTS** - None

Program Description

INTERNAL DOSE CONTROL PROGRAM DESCRIPTION

1. PURPOSE

1.1. This document describes the requirement Internal Dose Control Compliance.

1.2. Internal Dose Control Program strives to minimize total effective dose equivalent by controlling airborne radioactivity.

2. TERMS AND DEFINITIONS

2.1. Internal Dose – That portion of the dose equivalent received for radioactive material taken in the body.

2.2. Airborne Radioactivity – Radioactive material dispersed in the form of dusts, fumes, particulate, mists, vapors, or gases.

2.3. Other Terms – All terms and definitions described in this document are consistent with the definition described in 10CFR20.1003.

3. RESPONSIBILITIES

3.1. The Exelon Nuclear Radiation Protection Organization implements the Internal Dose Control Program. Management Controls shall be developed to assure compliance and measure performance.

4. REGULATORY REQUIREMENTS

4.1. 10 CFR20.1201 Occupational Dose Limits for Adults

4.2. 10CFR20.1502 Monitoring Requirements

4.3. 10CFR20.1204, Determination of Internal Exposure

4.4. 10CFR20.1202 Summation of External and Internal Dose

4.5. 10CFR19.13 Reports to Individuals

4.6. 10CFR 20.1206 Individual Monitoring Results

5. **MAIN BODY**

5.1. Internal Dose is generally easier to prevent or minimize than external radiation dose. Internal Dose Control is achieved most effectively by controlling radioactivity at the source. The use of Respiratory Protection for internal dose control should carefully be evaluated against the total risk to the worker.

5.2. Internal Dose Control consists of establishing administrative limits, identifying and controlling Airborne Radioactivity, using work control methods (i.e. engineering controls, respirators, etc.), and monitoring for Internal Radioactivity. Planned Internal Exposure to minimized TEDE is a component of internal dose control.

5.2.1. Occupational Dose Limits

1. Internal dose control is required to comply with the 5.0 REM limit for Total Effective Dose Equivalent (TEDE = CEDE + DDE) and the 50 REM limit for Committed Dose Equivalent.

2. Limits for internal dose are based the Annual Limit On Intake values for inhalation and ingestion.

3. Administrative intake levels expressed as Derived Air Concentration hours are established to control the level of internal dose.

5.2.2. Airborne Radioactivity Identification and Control

1. Airborne Radioactivity Surveys are performed to assess the internal dose hazard. Airborne radioactive are performed during high-risk work activities and when the potential for Airborne Radioactivity exist. Such activities include but are **not** limited to grinding, hydrolyzing, etc., breaching systems, and changing plant conditions.

2. Posting and Controls should be used to minimize exposure to airborne radioactivity areas.

5.2.3. Monitoring for Occupational Exposure

1. Internal occupational dose monitoring is required for adults likely to receive in 1 year intakes in excess of 10% of the applicable Annual Limit On Intake (ALI's) for ingestion and inhalation and for minors and Declared Pregnant Women likely to receive in 1 year a committed effective dose equivalent in excess of 0.1 rem.

2. Individual Monitoring for internal exposure is performed daily through passive monitoring, in-vivo bioassay measurements an in-vitro bioassay measurements.

   A. Passive monitoring equipment is capable of detecting low levels of internal radioactivity.

B. Whole body counting is performed periodically to validate the passive monitoring program and when workers are suspected of internal exposure.

C. In-vitro bioassay techniques are used for radionuclides that **cannot** be detected using Whole Body Equipment.

3. Internal Dose Assessments should involve a series of bioassay measurements to determine biological retention.

5.2.4. Occupational Exposure Reporting

1. Records of doses received by all individuals for whom monitoring was required are maintained for life.

2. Records are provided to individuals annually and upon request.

3. Records of all individual monitoring results, covering the preceding years are submitted to Commission on or before April 30^{th} of each year

6. DOCUMENTATION

6.1. Maintaining accurate occupational exposure documentation is essential component of the Internal Dose Control Program. Exposure Records may be reviewed in future litigation against Exelon Nuclear.

6.2. Documentation requirements for Dosimetry Records are described in the Exelon Radiation Protection Procedures and Training and Reference Materials.

7. REFERENCES

7.1. Regulatory Guide 8.34, Monitoring Criterion and Methods to Calculate Occupational Radiation Does

7.2. Regulatory Guide 8.13, Instructions Concerning Pre-natal Exposure

7.3. Regulatory Guide 8.36 Radiation Dose to the Embryo/Fetus

7.4. NUREG/CR-6204, Questions and Answers Based on Revised 10CFR20

8. ATTACHMENTS - None

EXPOSURE CONTROL AND AUTHORIZATION

1. PURPOSE

1.1. This procedure describes the program by which the Radiation Protection Department evaluates and controls personnel occupational exposure.

2. TERMS AND DEFINITIONS

2.1. **Absent/ No record (A)**: Dose type used for monitoring periods entered under 10CFR20 for which hard copy dose documentation of dose data from the monitoring licensee is unobtainable. The quantity associated with A dose type is always "XX" or intentionally left blank.

2.2. **Administrative Dose Control Level (ADCL)**: An Exelon established dose guideline established to prevent personnel form exceeding the Federal dose limits and to help ensure equitable distribution of dose among workers with similar jobs.

2.3. **Emergency Exposure**: Exposure received during lifesaving, protection of valuable property, protection of large populations, or any immediate action taken in response to a situation or occurrence of a serious nature developing suddenly and unexpectedly.

2.4. **High Lifetime Exposure**: The cumulative TEDE (routine plus any PSE) in rem that is equal to or exceeds an individual's age in years.

2.5. **Lens Dose Equivalent (LDE)**: The external exposure of the lens of the eye and is taken at the dose equivalent at a tissue depth of 300 mg/cm^2.

2.6. **Planned Special Exposure (PSE)**: An infrequent exposure to radiation, separate from and in addition to the annual exposure limits (Refer to Table 1).

2.7. **Shallow Dose Equivalent (SDE)**: The external exposure of the skin or an extremity taken at a tissue depth of 7 mg/cm^2.

2.8. **Total Effective Dose Equivalent (TEDE)**: The sum of the deep dose equivalent (external exposure) and the committed effective dose equivalent (internal exposure).

2.9. **Total Organ Dose Equivalent (TODE)**: The sum of the deep dose equivalent and the committed dose equivalent to the organ receiving the highest dose.

3. RESPONSIBILITIES

3.1. Responsibility for approval of exposures in excess of administrative dose control levels resides with the Radiation Protection Manager (RPM), the Station/Plant Manager, and the Site Vice President.

4. **MAIN BODY**

4.1. Limitations

4.1.1. Exposures shall **not** exceed the 10CFR20 Exposure Limits as described in Table 1, "NRC Exposure Limits."

TABLE 1 - NRC EXPOSURE LIMITS

Individual and Limit Type	TEDE	LDE	SDE	TODE
(1) Occupational Worker, Minor, Routine Annual	0.5 rem	1.5 rem	5 rem	5 rem
(2) Occupational Worker, Adult, Routine Annual	5 rem	15 rem	50 rem	50 rem
(3) Occupational Worker, Adult, PSE Annual	5 rem	15 rem	50 rem	50 rem
(4) Occupational Worker, Adult, PSE Lifetime	25 rem	75 rem	250 rem	250 rem
(5) Declared Pregnant Woman	Dose equivalent to the embryo/fetus of 500 mrem, or 50 additional mrem if the dose equivalent to the embryo/fetus exceeds 450 mrem at the time the female declares, in writing, her pregnancy. (Note: The dose equivalent to the embryo/fetus equals the DDE to the declared pregnant woman plus the dose equivalent to the embryo/fetus from radionuclides in the embryo/fetus plus the dose equivalent to the embryo/fetus from radionuclides in the declared pregnant woman.)			
(6) Member of The Public	The total effective dose equivalent to individual members of the public shall **not** exceed 100 mrem in a year.			

NOTE: Any request to raise the administrative dose control level for a minor shall be approved and documented by the Radiation Protection Manager.

4.1.2. Administrative dose control levels have been established for Total Effective Dose Equivalent Limits as follows:

- 2000 mrem routine cumulative TEDE/yr.
- 200 mrem TEDE for minors.

NOTE: In the Midwest Regional Operating Group, controls for High Lifetime Exposure are **not** applicable for non-Exelon employees due to the limitations of the Exposure Tracking System.

4.1.3. An administrative dose control level of 1000 mrem TEDE plus PSE has been established for employees with High Lifetime Exposure.

4.1.4. The Radiation Protection Manger shall review an individual's occupational exposure when the dose equivalent reaches 80% of the NRC Limits for Lens Dose Equivalent (LDE), Shallow Dose Equivalent (SDE), and Total Organ Dose Equivalent (TODE). The 80% threshold values are as follows:

- 12 rem LDE.
- 40 rem SDE.
- 40 rem TODE.

4.1.5. **If** an individual's current year dose history documentation includes an absent/ **no** record (A) dose type, **then REDUCE** the individual's allowable exposure (normally 2000 mrem TEDE for the year) by 1250 mrem TEDE for each quarter of the current year for which dose history documentation is absent/ **no** record (A), until all of that dose is resolved.

4.1.6. **If** an individual is suspected of exceeding any of the NRC exposure limits in Table 1, **then PROHIBIT** the individual from entering the RCA until a detailed evaluation of the individual's actual dose equivalent has been conducted. Future access will depend upon the results of the evaluation.

1. **If** an exposure in excess of the applicable exposure limit has occurred, **then PROHIBIT** the individual from entering the RCA until the end of the current calendar year.
2. If an exposure in excess of the applicable exposure limit has **not** occurred, then the individual may be permitted to re-enter the RCA.

4.1.7. During a condition where the Generating Stations Emergency Plan has been initiated, emergency exposure authorizations shall be performed in accordance with the station's Emergency Plan Implementing Procedures.

4.2. Authorization To Raise Administrative Dose Control Levels (ADCLs)

4.2.1. **USE** Attachment 1, Dose Control Level Extension Form, or a computerized equivalent, to authorize exposures for adult individuals in excess of 2000 mrem routine TEDE in a year.

4.2.2. A supervisor from the department requesting approval shall complete Section I of Attachment 1 and submit the request to the Radiation Protection Department indicating:

- The name, identification number, and signature of the individual for whom a dose extension is being requested.
- Whether or **not** other qualified individuals with lower dose are available to perform the work.
- A detailed explanation of why the dose extension is necessary.
- The requested annual TEDE limit for the individual (expressed in 500 mrem increments, i.e. 2500 mrem, 3000 mrem, etc.)

4.2.3. The Radiation Protection Department shall complete Section II Attachment 1 or computerized equivalent.

4.2.4. Pending investigations or calculations of internal exposure shall be reviewed and evaluated to determine the individuals TEDE.

4.2.5. Non-Exelon Nuclear and non-ROG dose equivalent shall be included in the dose to determine the worker's current TEDE.

NOTE: An individual shall **not** be approved to receive greater than 2000 mrem TEDE if that person has any absent/ **no** record (A) dose equivalent for the year.

4.2.6. To raise the ADCL up to and including 3000 mrem TEDE in a calendar year, written approval is required by the Radiation Protection Manager and the work group supervisor.

4.2.7. To raise the ADCL to between 3001 and 4000 mrem TEDE in a calendar year, written approval is required by the Radiation Protection Manger, a work group supervisor, and the Station/Plant Manager.

NOTE: An individual being considered for approval greater than 4000 mrem TEDE for the year should **not** have significant estimated dose equivalent.

4.2.8. To raise the ADCL above 4000 mrem, **not** to exceed 5000 mrem, written approval is required by the Site Vice President.

4.3. Authorizations For High Lifetime Exposure

4.3.1. **USE** Attachment 2, High Lifetime Dose Control Level Extension Form, or a computerized equivalent, to authorize exposures above 1000 mrem for employees with High Lifetime Exposure.

4.3.2. A supervisor from the department requesting approval shall submit a request to the Radiation Protection Department indicating:

– The name and identification number of the individual for whom a dose extension is being requested.
– A detailed explanation of why the dose extension is necessary.
– The requested annual TEDE for the individual.

4.3.3. The Radiation Protection Department shall complete Section II of Attachment 2 or a computerized equivalent.

4.3.4. Written approval is required as follows for any employee who is categorized as having High Lifetime Exposure:

– Individual's supervisor and RPM for end of year dose equivalent exceeding 1000 mrem TEDE, **not** to exceed 2000 mrem TEDE.
– Individual's supervisor, RPM, Plant Manager, and Site Vice President for end of year dose equivalent exceeding 2000 mrem TEDE.

4.4. Planned Special Exposures (PSEs)

NOTE: PSEs are **not** the same as emergency doses. PSEs only apply to adult workers.

4.4.1. PSEs are to be authorized only in exceptional situations when alternatives that might avoid the dose estimated to result from the PSE are **not** available or are deemed impractical.

4.4.2. A manager from the department requesting a PSE shall submit a request to the Radiation Protection Department, indicating:

– The name and identification number of each individual for whom a PSE is being requested, and
– The nature of the task for which a PSE is being requested, and
– A detailed explanation of why the PSE is necessary.

4.4.3. Prior written approval is required before the PSE occurs.

4.4.4. Prior to participating in a PSE, individuals involved shall be:

1. Informed of the purpose of the PSE.
2. Informed of the estimated dose and associated potential risk or conditions involved in performing the PSE.
3. Instructed in dose reduction measures and techniques for the PSE.

4.4.5. PSE approval is granted when the PSE document is signed (by hand) and dated by:

- The individual(s) for whom a PSE is being requested, and
- The work group manager or other level of supervisory authority for the individual as chosen by the RPM or designee, and
- The RPM or designee, and
- The Plant Manager, and
- The Site Vice President.

NOTE: If there are any periods of exposure during the life of the monitoring individual that have **not** been determined or documented (i.e., Absent/ **No** record), then participation in a PSE is **not** permitted.

4.4.6. All of the individual's previous PSE dose equivalents and previous doses in excess of routine occupational limits must be determined from records for each individual who will participate in the PSE. Doses received in excess of the routine occupational dose limits in effect at the time of exposures during accidents and emergencies must also be determined and subtracted from the limits for PSEs.

4.4.7. **DOCUMENT** each individual's current year and previous years:

- PSE dose equivalents, and
- Dose equivalents in excess of the exposure limits in effect at the time of the exposures (rows (1) and (2) of Table 1, “NRC Exposure Limits,” and the former 10 CFR 20.101), and
- Dose equivalents in excess of any non-NRC exposure limits.

4.4.8. The maximum authorized dose equivalent an individual may receive for a PSE shall be limited to an amount that does **not** cause the individual to receive a dose equivalent in excess of the limits listed in rows (3) and (4) in Table 1.

4.4.9. **DOCUMENT** the Planned Special Exposure on Attachment 3, Planned Special Exposure PSE Approval Form, **and MAINTAIN** all records in accordance with 10CFR20.1205.

4.4.10. **SUBMIT** a written report to the Administrator of appropriate regional office within 30 days following the PSE in accordance with 10CFR20.1206.

4.4.11. **SUBMIT** a written report of the PSE assigned dose to the individuals involved within 30 days of the PSE.

4.4.12. The dose equivalent received from a PSE is always tracked separately from routine occupational exposure.

4.4.13. Once an exposure is authorized as a PSE, it **cannot** later be treated as a routine occupational exposure. It must be recorded as a PSE, and all the unique limitations, reporting, and record keeping requirements for PSEs shall apply.

4.5. Emergency Exposure Limits **(CM-1)**

4.5.1. Emergency exposure in excess of 25 rem TEDE is to be limited to once in a lifetime.

4.5.2. Emergency personnel are to be informed "before the fact" of possible health effects at the anticipated exposure levels.

4.5.3. For the control of personnel exposures under emergency conditions, **LIMIT** an individual's dose equivalent per activity as follows:

TABLE 2 – EMERGENCY EXPOSURE LIMITS (REM)

TEDE	LDE	SDE	TODE	ACTIVITY
10	30	100	100	Protecting Valuable Property
25	75	250	250	Lifesaving or Protection of Large Populations
> 25	> 75	>250	> 250	Lifesaving or Protection of Large Populations to Workers Fully Aware of the Risks Involved

4.5.4. Emergency exposures shall be voluntary on the part of the involved individual.

4.5.5. **CONSULT** the Emergency Plan Implementing Procedures regarding approval to exceed NRC exposure limits.

5. DOCUMENTATION

5.1. **RETAIN** completed exposure authorizations, including Attachments 1, 2, and 3, in accordance with the station records management program. This records program will include appropriate controls for storage and preservation.

6. **REFERENCES**

6.1. Commitments

6.1.1. CM-1 LaSalle Station AIR 1-81-330 regarding provisions for exposures to individuals during an emergency (Section 4.5.).

6.2. User References

6.2.1. 10 CFR 19.13, "Notifications and Reports to Individuals."

6.2.2. 10 CFR 20, "Standards for Protection against Radiation."

6.2.3. USNRC Regulatory Guide 8.7, "Instructions for Recording and Reporting Occupational Radiation Exposure Data," Revision 1, July 1992.

6.2.4. USNRC Regulatory Guide 8.35, "Planned Special Exposures," July 1992.

6.2.5. EPA-400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents."

7. **ATTACHMENTS**

7.1. Attachment 1, Dose Control Level Extension Form.

7.2. Attachment 2, High Lifetime Dose Control Level Extension Form.

7.3. Attachment 3, Planned Special Exposure (PSE) Approval Form.

ATTACHMENT 1
Dose Control Level Extension Form
Page 1 of 1

Section I: Reason For Extension

NAME: ______________________________ SSN: ______________________________

INDIVIDUAL SIGNATURE: __________________________

1. Are other qualified individuals with a lower current year routine TEDE available to perform this work?
   Yes___ No___ N/A ___

   Remarks____

2. State why an extension above 2000 mrem routine TEDE for the year is necessary for this individual.

   ____

   ____

3. It is requested that the individual named above be permitted to receive a TEDE for the current year of _____________mrem.

   Requestor ______________________________ Date ___/___/___

Section II: Dose Summary

CURRENT YEAR ROUTINE RECORD TEDE (mrem): _____________

CURRENT YEAR ROUTINE ESTIMATED TEDE (mrem)*: _____________

CURRENT YEAR ROUTINE TOTAL TEDE (mrem): _____________

LIFETIME DOSE (mrem): _____________

Verified By: _________________ Date: ____________

Section III: Approvals**

The individual named above is approved to exceed 2000 mrem but must remain below 5000 mrem routine TEDE for the current year.

Specific Approval Level in mrem TEDE: ______________

1. Work Group Supervisor __________________________ Date ___/___/___
2. RP Manager ______________________________ Date ___/___/___
3. Station Manager _____________________________ Date ___/___/___
4. Site Vice President ____________________________ Date ___/___/___

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* An individual being considered for approval greater than 4000 mrem TEDE for the year should **not** have significant estimated dose equivalent from a non-ROG facility. Additionally, an individual shall **not** be approved for greater than 2000 mrem TEDE if that person has any absent/ **no** record dose equivalent for the year.

** To raise the ADCL up to and including 3000 mrem, signatures 1 & 2 are required. To raise the ADCL to between 3001 and 4000 mrem, signatures 1,2, & 3 are required. To raise the ADCL above 4000 mrem, signatures 1,2,3, & 4 are required.

ATTACHMENT 2
High Lifetime Dose Control Level Extension Form
Page 1 of 1

Section I

NAME: ______________________________ AGE: _______ SSN: _________________________

INDIVIDUAL SIGNATURE: ___________________________

1. State why an extension in excess of the administrative dose control level listed below is necessary for this individual.

____

____

2. It is requested that the individual named above be permitted to receive a TEDE for the current year of _____________mrem.

Requestor _____________________________ Date ___/___/___

Section II: Dose Summary

CURRENT YEAR ROUTINE RECORD TEDE (mrem): _____________

CURRENT YEAR ROUTINE ESTIMATED TEDE (mrem):

____

CURRENT YEAR ROUTINE TOTAL TEDE (mrem): _____________

LIFETIME DOSE (mrem): ______________

Verified By: _________________ Date: ____________

Section III: Approvals

The individual named above is approved to exceed 1000 mrem TEDE.

Specific Approval Level in mrem TEDE: ______________

1. Work Group Supervisor __________________________ Date ___/___/___
2. RP Manager ___________________________________ Date ___/___/___
3. Station Manager ________________________________ Date ___/___/___
4. Site Vice President ______________________________ Date ___/___/___

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*To raise the ADCL to 2000 mrem, signatures 1 & 2 are required.

**To raise the ADCL above 2000 mrem, signatures 1,2,3 & 4 are required. If approval is being made to exceed 2000 mrem TEDE, this form should be used in conjunction with Attachment 1. Exceptional circumstances should exist to allow individuals with high lifetime dose to exceed 2000 mrem TEDE in a year.

***High lifetime exposure controls do **not** apply to Non-Exelon employees in Midwest due to the limitations of the Exposure Tracking System.

ATTACHMENT 3
Planned Special Exposure (PSE) Approval Form
Page 1 of 2

Employee Name: ____________________ SSN: __________________

Requested By: _______________________ Date: _________________

Exceptional Circumstances for Scope of Activity:

Actions Necessary:

Justification Why Actions Are Necessary:

Estimated Individual Exposure: _________ Actual Individual Exposure: ___________

Estimated Collective Exposure: _________ Actual Collective Exposure: ___________

Techniques used to maintain exposure ALARA:

	Annual Dose (mrem)	**Life Time Dose (mrem)**	**Previous PSE Dose**		**Dose in excess of limits (mrem)**	**Proposed PSE Dose (mrem)**	**Proposed Annual Dose (mrem)**
			Life Time (mrem)	**Annual (mrem)**			
TEDE							
LDE							
SDE-ME SDE-WB							
TODE							

ATTACHMENT 3
Planned Special Exposure (PSE) Approval Form
Page 2 of 2

STATEMENT OF UNDERSTANDING:

I have been informed of the purpose of the planned operation, the estimated doses, and the potential risks or other conditions that may be involved in performing this task. I have been given the opportunity to ask questions and understand the operation and the Planned Special Exposure estimate.

Employee Signature: ______________________________ Date: ______________

Employee Name: ______________________________ SSN: ______________

APPROVALS:

Work Group Manager: ____________________________ Date: ______________

Radiation Protection Manager: ______________________ Date: ______________

Plant Manger: ________________________________ Date: ______________

Site Vice President: ____________________________ Date: ______________

ADMINISTRATION OF THE RADIATION WORK PERMIT PROGRAM

1. PURPOSE

1.1. This procedure documents the administrative aspects of the Radiation Work Permit (RWP) Program and defines responsibilities of individuals involved with processing and use of an RWP.

2. TERMS AND DEFINITIONS

2.1. **Radiation Work Permit (RWP)**: A document that provides a method for documenting and controlling work with potential or actual radiological hazards in a Radiologically Controlled Area (RCA).

2.2. **Exposure Management System**: A computer system that is utilized to generate and manage radiation work permits and the exposure associated with implementation. REMS and Sentinel are examples.

2.3. **General RWP**: A permit that controls work tasks that do **not** involve a radiological risk, significant radiation exposure or the potential to spread contamination. This work involves recurring activities in the RCA and is of minor radiological significance. Radiation Protection coverage or support may be required.

2.4. **Specific RWP**: A permit that controls work tasks that require radiological/Alara control planning to support development of an exposure estimate, establishment of contamination controls or development of exposure reduction initiatives.

3. RESPONSIBILITIES

3.1. This procedure outlines responsibilities for station personnel who have a role in the processing of RWPs.

3.2. This procedure outlines responsibilities for radiation workers who must follow the provisions outlined in approved RWPs.

4. MAIN BODY

4.1. General Requirements

4.1.1. **INITIATE** an RWP **or UTILIZE** an appropriate currently active RWP when any of the following conditions exist:

- Work in or entry into a Radiologically Controlled Area (RCA), or
- Transfer of or work with radioactive materials (as determined by Radiation Protection Supervision (RPS) or designee), or

- Work involving opening, cutting, or welding on systems which contain radioactive material, or
- Radiography, or
- Any work as deemed necessary by RPS.

4.1.2. An RWP should **not** be issued until Radiation Protection (RP) has determined that work can commence in a radiologically safe manner and that exposures will be maintained As Low as Reasonably Achievable (ALARA).

4.1.3. Conditions can be present where work may involve transit through a dose rate that is higher than the work area or work activities that involve discrete actions of short duration that present a dose rate higher than the routine dose rate for the activity. In such cases, an planned dose rate alarm is appropriate for application to support a dose rate set point that is reflective of the dose rates for the activity and provide an alarm function that is beneficial to dose control.

4.2. Actions for the Work Group Supervisor/ Task Leader/ Work Planner

4.2.1. **INITIATE** an RWP through the work control process. **REFER** to ROG-specific or site-specific procedures and/ or training and reference materials as needed for more details.

4.2.2. **ENSURE** that the work crew has reviewed and signed the correct RWP and complies with all applicable RWP requirements.

4.2.3. **NOTIFY** RP of any condition in the work area that might alter existing radiological conditions.

4.2.4. **ENSURE** crew personnel maintain exposures ALARA.

4.2.5. **SUPERVISE** the work activity to ensure conditions of the RWP are being met and housekeeping conditions are maintained.

4.3. Actions for Radiation Protection Personnel

4.3.1. **PERFORM** surveys **and EVALUATE** radiological conditions for the work activity including dose rates, contamination surveys, or airborne radioactivity, as applicable.

4.3.2. **ENSURE** that surveys provide the necessary job specific information to determine possible extremity exposures, contact exposures, actual work area exposures, etc.

4.3.3. Job coverage in alpha Level II and Level III areas require special attention.

NOTE: In PIMS for continuous RPT coverage utilize at minimum a constant or positive code.

1. **PROVIDE** continuous RPT coverage when working in known alpha Level III areas or when a potentially exist for changing conditions while providing job coverage in an alpha Level II area.

4.3.4. **PROVIDE** workers entering an alpha Level II or Level III areas the following:

1. A RWP with Discontinue Work Criteria and RP Hold Points, and a current radiological survey.
2. In addition for entry to an alpha Level III area- a RP Brief is required.

4.3.5. **DETERMINE** the appropriate dosimetry and protective clothing requirements, including RP job coverage and remote monitoring requirements.

4.3.6. **DETERMINE** a person-rem estimate for the work activity using either actual or estimated survey data.

4.3.7. **DEVELOP** an ALARA Plan when required by RP-AA-401, "Operational ALARA Planning and Controls."

4.3.8. **CONSULT**, as necessary, with job supervisors or work group members regarding ALARA considerations and techniques prior to approval of an RWP.

4.3.9. **PROVIDE** ALARA review and job history data, as necessary, for inclusion in the RWP package.

4.3.10. **COMPLETE** a TEDE ALARA Evaluation when required.

4.3.11. **PLACE** the following statement or similar statement into the Special Instructions of Radiation Work Permits that allow access to High Radiation Area/Locked High Radiation Area:

1. THIS RWP ALLOWS HIGH RADIATION AREA ACCESS: A SPECIFIC HRA BRIEFING IS REQUIRED TO ENTER"

4.3.12. **ESTABLISH** electronic dosimeter settings based on the expected dose rates and stay times for the work to be performed. Refer to sections 4.4 for general RWP or section 4.5 for specific RWP.

4.3.13. On an annual basis, **REVIEW and ADJUST** the electronic dosimeter dose and dose rate alarm set points based on data from the RWP entries. Typically, this should be done as part of preparing RWPs for the start of a new year.

4.4. General RWP Electronic Dosimeter Alarm Setpoints

NOTE: The following are guidelines for setting Alarm Setpoints. RP Supervision can deviate from these guidelines as required.

4.4.1. General RWPs should not allow access into a high radiation or locked high radiation area except Operations and Radiation Protection

4.4.2. All work groups **except** Operations and Radiation Protection

1. Dose rate alarms: 150% x highest G/A dose rate of normal walking areas for general tours and inspections not to exceed a dose rate setting of 80 mrem/hr.

2. The RWP accumulated dose alarm: less than or equal to 10 mrem for PWRs and

3. The RWP accumulated dose alarm: less than or equal to 20 mrem for BWRs.

4.4.3. Operations and Radiation Protection

1. Dose rate alarms should be set at 400 mrem/hr.

2. Dose alarm set point should be 40 mrem.

4.5. <u>Specific RWPs Electronic Dosimeter Alarm Set-Points</u>

4.5.1. Dose rate alarms should be set at approximately 125% times the highest working dose rate (round up to the nearest multiple of 10). Dose rate alarm set-points for a radiographer shall be in accordance with RP-AA-462, Controls for Radiographic Operations.

4.5.2. The Accumulated dose alarm set-point should be set taking the following into consideration:

1. Estimated time in the area working dose rate

2. Historical accumulated dose plots for similar evolution adjusted for expected or actual dose rates and stay times.

3. Elevated alarm setpoints require RPM or designee approvals (see RP-AA-460-002 Additional High Radiation Exposure Controls)

4.5.3. **APPROVE** the RWP when all appropriate information has been included.

4.5.4. **ENSURE** that exposures are authorized in compliance with RP-AA-203, "Exposure Control and Authorization."

4.5.5. **When** radiological conditions change significantly such that a radiological hazard could exceed the protection afforded by the protective requirements established in the RWP, **then REVISE / SUPERSEDE** the RWP.

4.6. <u>Planned Dose Rate Alarm</u>

4.6.1. **Obtain** historical data that is relevant to the activity at hand to **determine** if a planned dose rate alarm is warranted and, if warranted, to support determination of the anticipated dose rate range that may result in the alarm.

4.6.2. **Complete** Attachment 2, Planned Dose Rate Alarm Form, if warranted. The anticipated dose rate range is the dose rate range that may/will be encountered,

warranting the planned alarm. Include the reason for the anticipated dose rate range. Specification of the workers need not be completed at this time.

4.6.3. **Obtain** the approval of RP Supervision for the planned alarm.

4.6.4. **Record** the name and signature of the workers prior to entry on the approved Attachment 2.

4.6.5. **When** the worker exits the RCA, **record** the highest dose rate encountered by the electronic dosimeter for the entry and determine if that value was within the anticipated dose rate range and caused by the activity anticipated to result in the alarm. Record on Attachment 2.

4.6.6. **If** the highest dose rate indicated by the electronic dosimeter is **within** the anticipated **dose rate range** and a result of the planned reason for the alarm, no further action is required and the completed Attachment 2 is filed with the RWP.

4.6.7. **If** the highest dose rate indicated by the electronic dosimeter is **greater than** the **anticipated dose rate range by more than 125% or is <u>not</u> the result of the planned reason**, initiate a Personnel Exposure Investigation and file the completed Attachment 2 with the RWP, and evaluate the increased dose rates in accordance with RP-AA-1004, "Radiation Protection Stop Work Authority and Corporate RPM Event Notification".

1. **OBTAIN** RP Supervision approval and Level 4 Manager, or above, concurrence to reinstate RCA access after review of Attachment 2.

4.7. <u>Actions for RP Personnel When Unplanned Work Activities Involve Emergency Response</u>

4.7.1. **When** immediate action is required to save personnel **or** plant equipment or to respond to plant security events, **then** entry to an area without an RWP may be authorized.

4.7.2. Immediately **NOTIFY** qualified RP personnel and **ENSURE** response to the event in a timely manner.

4.7.3. **If** authorization is given for the entry without an RWP, **then PROVIDE** RP coverage, as required, to meet the objectives of the RWP program. **NOTIFY** RP Supervision of the event in a timely manner.

4.7.4. **When** the job/situation is completed, **then DOCUMENT** the performance of the job/situation through the corrective action process and **ENSURE** accounting of dose equivalent received during the unplanned activities.

4.8. <u>RWP Temporary Revision</u>

4.8.1. A temporary revision to a RWP is applied to facilitate a change in protective requirements on a case by case basis and is limited to a particular entry or a specific

evolution within a job (example; reducing protective clothing requirements to allow a supervisor or QC inspector for a visual inspection of work completed).

4.8.2. Document a temporary revision to an RWP on Attachment-1, RWP Temporary Revision.

NOTE: Verify workers current year dose margin prior to any increase to the RWP Accumulative Dose Alarm Set Point.

4.8.3. A temporary revision to document set point change for electronic dosimetry is limited to the entry.

4.8.4. A temporary revision that supports an evolution is limited to the shift that the evolution will be implemented. **If** it is desired that the change be across multiple shifts, **then REVISE** the RWP.

4.8.5. **If** setting the accumulated dose alarm set-point greater than 500 mrem or the dose rate set-point greater than 1500 mR/hr **REFER** to the following procedures for additional guidance; RP-AA-401-1002, "Radiological Risk Management" and RP-AA-460-002, "Additional High Radiation Exposure Controls". **If** expected dose rate is greater than current ALARA plan discontinue work dose rate **then** ALARA plan waiver is required.

4.8.6. **If** there is an ALARA plan associated with the RWP, **REVIEW** the ALARA plan and identify if the proposed revision affects the following ALARA plan specifications:

1. Relaxing engineering controls
2. Relaxing discontinue work criteria
3. Changing a TEDE-ALARA evaluation

4.8.7. Complete Attachment-1, RWP Temporary Revision.

4.8.8. Obtain approval of RP Supervision for the temporary revision.

4.8.9. Obtain approval of Radiological Engineering if the revision affects a specification of the ALARA plan as determined in step 4.8.6.

4.8.10. If applicable, enter revised electronic dosimeter alarm set-point(s) in the exposure management system applicable to the station.

4.8.11. File the RWP temporary Revision, Attachment-1, with the hard copy RWP.

4.8.12. If applicable, re-set the electronic dosimeter alarm set-point(s) to the original values established in the RWP.

4.9. Actions for Radiation Workers Using RWPs

4.9.1. **ENSURE** use of the correct RWP for the job being worked.

4.9.2. Utilizing Access Control, **ENTER** the RCA for the work authorized.

1. By logging onto the RWP via Computerized Access Control (or a backup manual system if Computerized Access Control is unavailable), the worker is demonstrating that he/she has reviewed and understands the RWP requirements. At some sites, the worker demonstrates understanding of the RWP via written signature.

4.9.3. **COMPLY** with all the requirements of the RWP, as well as verbal instructions given by RP personnel.

4.9.4. Immediately **REPORT** to RP any change in conditions (job scope, area conditions or radiological conditions) for the work area.

5. <u>DOCUMENTATION</u>

5.1. **MAKE** the approved RWPs available to workers for review and signature, as required.

5.2. **RETAIN** closed or terminated RWPs and any associated documentation (i.e., surveys, authorization sheets, ALARA Plans, (either on computer or hard copy) in accordance with the provisions of the station records management program. This records program will include appropriate controls for storage and preservation.

5.3. Other computer generated RWP documentation may be used in lieu of documentation specified in this procedure as long as those documents contain the same information specified by this procedure.

6. <u>REFERENCES</u>

6.1. RP-AA-1004, "Radiation Protection Stop Work Authority and Corporate RPM Event Notification"

6.2. RP-AA-203, “Exposure Control and Authorization”

6.3. RP-AA-401, “Operational ALARA Planning and Controls”

6.4. RP-AA-401-1002, "Radiological Risk Management"

6.5. RP-MA-403-1001, “Radiation Work Permit Processing”

6.6. RP-MW-403-1001, “Radiation Work Permit Processing”

6.7. RP-MW-403-1002, “Passport Total Exposure RWP Desktop Instruction”

6.8. RP-AA-460-002, "Additional High Radiation Exposure Controls"

6.9. RP-AA-462, "Controls for Radiographic Operations"

6.10. ANI Criteria 8.9, Revision 6, “Radiation Work Permits”

6.11. INPO SOER 2001-1, “Unplanned Radiation Exposures”

6.12. EPRI Alpha Monitoring and Control Guidelines for Operating Nuclear Power Stations, Revision 2, GS-48, GS-50.

7. <u>**ATTACHMENTS**</u>:

7.1. Attachment 1, RWP Temporary Revision (Example)

7.2. Attachment 2, Planned Dose Rate Alarm Form

ATTACHMENT 1
RWP Temporary Revision (Example)
Page 1 of 1

RWP # ____________________ Rev # ____________

Effective Date: ____________

Description of task: ______________________________________

Justification: ______________________________________

Revision to dose rate alarm set point: ☐ **N/A**

Note: If setting the accumulated dose alarm set-point greater than 500 mrem or the dose rate set-point greater than 1500 mR/hr refer to the following procedures for additional guidance RP-AA-401-1002 and RP-AA-460-002. If expected dose rate is greater than current ALARA plan discontinue work dose rate then ALARA plan waiver is required.

RWP original dose rate alarm set point __________ (mrem/hr)

Temporary Revision dose rate alarm set point__________ (mrem/hr)

Current ALARA Plan Discontinue Work Dose Rate__________ (mrem/hr)

Revision to accumulated dose alarm set point: ☐ **N/A**

Note: Verify workers current year dose margin prior to any increase to the RWP Accumulative Dose Alarm Set Point.

RWP original dose accumulated alarm set point __________ (mrem)

Temporary Revision dose accumulated alarm set point__________ (mrem)

Method of Revision: Easy EPD/Sentinel EMS RWP Adjustment Step ____ added to RWP
circle one or ☐ **N/A**

Revision to other RWP Requirements: ☐ **N/A**

____

____

Revision to ALARA Plan Requirements: ☐ **N/A**

____

____

Preparer: __________/__________ Date: ____________
Print / Sign

RP Supervision: __________/__________ Date: ____________
Print / Sign

Verify ED alarms are re-set to original RWP set-points if using REMS/Sentinel RWP adjustment
__________ or ☐ **N/A**
Initials

Change to ALARA Plan requirements requires Rad Engineering Manager/Designee approval: ☐ **N/A**

REM/Designee: __________/__________ Date:____________
Print / Sign

ATTACHMENT 2
Planned Dose Rate Alarm Form
Page 1 of 1

RWP # ______________________ Rev # ______________

Effective Date: ______________

Activity to be performed/reason for alarm:____________________________________

Current RWP original dose rate alarm set point ___________ (mrem/hr)

Anticipated Dose Rate Range________________ (mrem/hr)

Current ALARA Plan Stop Work Dose Rate________________ (mrem/hr)

Justification for alarm:

____

____

____

____

Workers Authorized:

Name	Signature	Highest Dose Rate (mrem/hr)	Higher Than Anticipated
			Y N
			Y N
			Y N
			Y N
			Y N

See attached sheet for additional workers

Preparer: _____________/_____________ Date: ________________
Print / Sign

RP Supervision: _____________/_____________ Date: ________________
Print / Sign

Is a PEI required? Yes / No (circle one)

If YES then document RP Level 4 or above manager's approval below to remove the RCA lock out:

RP Level 4 or above Manager: _____________/_____________ Date: ___________
Print / Sign

CONTROLS FOR HIGH AND LOCKED HIGH RADIATION AREAS

1. PURPOSE

1.1. The purpose of this procedure is to provide administrative and physical controls and instructions for access to High Radiation Areas (HRAs) and Locked High Radiation Areas (LHRAs).

1.2. This procedure applies to those areas identified as HRAs and LHRAs in accordance with 10 CFR 20 and Station Technical Specifications and to personnel who enter or control those areas.

1.3. This procedure does **not** apply to Very High Radiation Areas (VHRAs) or radiography activities.

2. TERMS AND DEFINITIONS

2.1. **Access Control Guard**: An individual who has responsibility for direct surveillance of an HRA, and/or LHRA when the locks, barricades, and/or normal physical barriers for such an area have been defeated.

2.2. **Accessible Area**: An area that can reasonably be occupied by a major portion of an individual's whole body. An area is **not** accessible if tools or other exceptional measures are needed to access the area. For example, a tank or vessel that has its cover bolted in place is inaccessible, or an opening in a shield wall that is physically difficult to access without a ladder or mobile platform is considered inaccessible. In addition, a pool of water such as the spent fuel pool is considered inaccessible unless a diver enters the pool. Material tied off to railings around the fuel pool is considered inaccessible when secured using the appropriate locking mechanisms.

2.3. **Barricade**: A barricade can be a rope, ribbon, or other firmly secured, conspicuous obstacle that (by itself or used with physical barriers such as existing walls or hand railings) completely surrounds the area and obstructs inadvertent entry. Obstacles should be placed approximately waist high in doorways or through the approximate mid point of manways, portals or other openings.

2.4. **Barrier**: A conspicuous obstacle that blocks or is intended to block passage.

2.5. **Direct Surveillance**: A substitute means for controlling entries into a HRA/LHRA in lieu of locks, barricades, or physical barriers. Direct surveillance may be satisfied by use of continuous electronic surveillance if it is adequate to prevent unauthorized entry, e.g., by use of audible means an individual could be warned prior to entering.

2.6. **High Radiation Area (HRA)**: Any area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 0.1 rem in 1 hour at 30 centimeters from the radiation source or 30 centimeters from any surface that the radiation penetrates.

2.7. **HRA Key Controller**: An individual that is issued a key, who is responsible for controlling access and securing of a HRA.

2.8. **HRA Key Tag**: A tag attached to a HRA key as a visible indication for the individual assigned as the HRA Key Controller.

2.9. **Locked High Radiation Area (LHRA)**: Any area accessible to individuals in which deep dose equivalent rates are greater than or equal to 1 rem per hour (but less than 500 rads at 1 meter) in 1 hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates.

2.10. **LHRA Access Barrier:** A robust lockable barrier to control access to a LHRA. If a permanent door is not in place the access barrier needs to be made of a material as described in LHRA Physical Barrier definition below.

2.11. **LHRA Physical Barrier**: Physical barriers (such as chain link fencing or fabricated walls) used to prevent unauthorized personnel access to locked high. Barriers used to control access to a locked high radiation areas should provide reasonable assurance that they secure the area against unauthorized access and cannot be easily circumvented. (That is, an individual who incorrectly assumes, for whatever reason, that he or she is authorized to enter the area, would be unlikely to disregard and/or circumvent the barrier.) A fence that is a minimum of 2 meters (approximately 6 ft) high would normally be adequate to control access to a locked high radiation area at a nuclear power plant.

2.12. **RP Personnel:** For the purpose of this procedure RP Personnel includes, Qualified Senior Radiation Protection Technicians (RPTs) and RP Supervision (RP FLS, Rad Engineering, RP Technical Support and RP Field Ops Support).

2.13. **Review of Field Conditions**: For the purpose of this procedure field conditions means a field walk down assessing the physical status of the area's potentially missed liabilities (e.g. unsurveyed bags of rad trash, unsurveyed resin on the floor, etc...) as well as challenges to effective radiological barriers and postings

2.14. **Whole Body**: For purposes of external exposure, either the head, trunk (including male gonads), arm above the elbow, or leg above the knee.

3. RESPONSIBILITIES

3.1. Radiation Protection Manager is responsible for overall implementation of HRA/LHRA controls and authorizing deviations in cases allowed by this procedure.

3.2. Radiation Protection Supervision is responsible for ensuring RPT briefings and reviewing survey data, field conditions, boundaries and posting changes as required by this procedure.

3.3. Radiation Protection Technicians are responsible for performing HRA/LHRA briefings, area surveys, postings and down postings of areas and performing briefings as required by this procedure.

3.4. Access Control Guard is responsible for controlling access to HRA/LHRA in accordance with this procedure.

4. **<u>MAIN BODY</u>**

4.1. <u>Precautions, Limitations, and Prerequisites</u>

4.1.1. Precautions

NOTE: Locking a swing gate or turnstile while in the area is **<u>not</u>** considered preventing an individual from being able to exit the area.

1. A control device or locking mechanism shall **<u>not</u>** prevent individuals from exiting a posted/controlled HRA/LHRA when there are individuals in the area.
2. Entry barriers for HRA/LHRAs shall **<u>not</u>** be left open, defeated, or unlocked unless measures are provided for positive control over each individual entry, for example, direct surveillance of the access by an assigned individual.
   A. If a LHRA **<u>cannot</u>** be controlled by a barricade or locked door it may be controlled by direct surveillance of the boundary. However, in those situations, the area must still be posted in accordance with RP-AA-376, "Radiological Postings, Labeling, and Markings".

4.1.2. Limitations

1. For instances where locks, barricades, or physical barriers for a HRA/LHRA are defeated, the normal control method is to use an Access Control Guard as outlined in this procedure. As an alternative, **if** electronic means is used to provide direct surveillance, **then** the Radiation Protection Manager, or designee, will approve use by completing Attachment 8, Approval for HRA/LHRA Deviations.
2. **If** materials located in spent fuel pools, reactor vessels, and flooded refueling cavities are considered accessible **then** measures shall be taken as necessary, to ensure that activated materials are **<u>not</u>** inadvertently raised above or brought near the surface of the water.

NOTE: Pay special attention to scaffolds and other items that can allow individuals to circumvent HRA/LHRA barriers.

3. Physical barriers enclosing LHRAs must be robust enough to prevent unauthorized entry. Barriers used to control access to Locked High Radiation Areas should provide reasonable assurance that they secure the area against unauthorized access and **<u>cannot</u>** be easily circumvented. A fence that is 2 meters (approximately 6 ft) high would normally be adequate to control access to a locked high radiation area at a nuclear power plant.

4. **If** temporary or permanent shielding is used to down post an area **then** the following guidelines apply to shielding used for the purpose of controlling access:

    A. Blankets, bricks, or other portable shielding that could be moved by hand should be secured in place by a locking mechanism or by other robust means such as lock-wire, ties, bolts, or other fasteners that would require a tool to remove. Block walls that are designed into the plant and also provide shielding, or shielded hatches, plugs, or covers that require a hoist or crane to move, are not considered removable by hand. If no means exist to secure the shielding, the use of locks or robust barrier may be waived by the Radiation Protection Manager and documented on Attachment 8.

    B. The sign or label shall contain words such as the following: "Warning – Do **Not** Remove Without RP Approval. Elevated Radiation Levels Could Result."

    C. In addition, consider installation of a local radiation monitor with alarming capability to warn personnel of high exposure rates created by removal of shielding.

    D. Written approval from the Radiation Protection Manager or designee shall be obtained when using Attachment 8 for use of shielding for controlling access.

5. Loss of a HRA key does not constitute a loss of HRA controls as long as the area has the Tech Spec. Required barrier(s) in place.

6. An HRA found unlocked is **not** a Tech Spec violation, as long as the barrier remains intact.

7. Each site **shall** maintain a Preventive Maintenance Program for LHRA doors and LHRA locking mechanisms to mitigate failure of LHRA access barriers.

8. Steps in this procedure may be performed in any order, as long as regulatory and station Technical Specification requirements continue to be met.

4.1.3. Prerequisites - None

4.2. General Administrative Requirements

4.2.1. **ADMINISTER** padlocks and keys used for control of LHRAs through Radiation Protection Supervision.

1. When Master keys are available, **LIMIT** the use of such keys **not** in the possession of the Radiation Protection Department to emergency entries.

A. For this procedure emergency entries:

1. Are considered work having an immediate and direct impact on the health and safety of the general public or plant personnel,

2. Pose a significant industrial hazard,

3. Require immediate attention to prevent the deterioration of plant condition to a possible unsafe or unstable level.

2. With RPM or designee approval, Master keys can be used to perform preventive maintenance on multiple locks as long as no actual entry is made in to the area.

4.2.2. **KEEP** keys designated for access to LHRAs locked in a suitable cabinet or locker when **not** issued for use.

1. **USE** a "see-through" type cabinet to store the LHRA Keys.

2. These cabinets or lockers shall be kept locked while unattended by Radiation Protection and the key to the cabinet controlled by radiation protection personnel.

4.2.3. Check postings, barricades, and physical barriers for HRAs/LHRAs at least weekly to ensure that proper controls remain in place unless otherwise authorized by Radiation Protection Supervision.

4.2.4. Only qualified RPTs are authorized to alter radiological boundaries or barricades associated with HRA/LHRA. Alteration of a boundary would, for example, include moving a radiological boundary stanchion, increasing or decreasing the size of an area, dropping a rope so that equipment may be moved in or out of the area, or propping open a door. However, proceeding through a swing gate, turnstile, or door and ensuring proper closure does **not** constitute a radiological boundary alteration. **(CM-3)**

4.2.5. **LOCK and CONTROL** A-frame type movable cranes, hoists or lifting devices proximate to floor plugs that may be used to gain access to LHRAs or potential LHRAs (for example, lifting hoist to lift floor plugs to demin vessels) or the floor plugs themselves.

1. **ENSURE** a warning label or posting is present stating "Notify RP Before Removing Floor Plug", or equivalent.

NOTE: RP Supervision may waive posting verifications if the HRA is caused by a transient (e.g. caused by nuclear steam during RCIC or HPCI runs) if there are site specific procedures, T&RMs or other guidance available and documented on Attachment 8.

4.2.6. Controlling Materials from the Spent Fuel Pool (SFP) Handrail

1. **OBTAIN** approval from Radiation Protection personnel prior to securing highly radioactive items to handrails.

2. **If** irradiated items are secured by cable or chain and have been surveyed to be 1000 mrem/hr or greater (on contact), **then LOCK** those items to prevent inadvertent movement or removal of those items.

   A. Alternatively, **RELEASE** the item to the SFP or cask pit floor (for example, no rope or cable remains attached to the item that can be used to directly remove the item by hand) in a location acceptable to Radiation Protection, the SFP Material Coordinator and the Special Nuclear Material (SNM) Custodian.

   B. **If** a rope is attached to the irradiated item but **<u>cannot</u>** be used to directly remove it from the water, **then** the decision to lock the item will be at the discretion of Radiation Protection.

4.3. <u>High Radiation Area Controls (>100 mrem/hr at 30 cm)</u>

NOTE: The 80 mrem/hr at 30 cm criteria below is an Exelon administrative requirement, which may be deviated from with written approval of the Radiation Protection Manager via Attachment 8.

4.3.1. **POST and CONTROL** area as a High Radiation Area **when:**

1. Dose rates accessible to an individual(s) is 80 mrem/hr or greater at 30 cm, unless waived by the RPM using Attachment 8, **or**

2. Whenever dose rates accessible to an individual(s) exceeds 100 mrem/hr at 30 cm.

NOTE: When establishing and verifying HRA controls, apply special attention to scaffolds, permanent platforms, stairs, ladders, or other plant structures that could allow an individual to circumvent the barricades, or physical barriers for a HRA and no longer prevent unauthorized access.

4.3.2. Implementation or Modification of HRA Controls

1. **ESTABLISH** HRA controls per Attachment 1, "Establishing and Verifying HRA Controls."

   A. RP Supervision shall verify all HRA posting changes. Another RPT may verify posting change prior to RP Supervision verification.

   B. When on site, RP Supervision shall verify all up-postings of HRA. The RPT must **REMAIN** in area until RP Supervision verification is complete.

   C. When RP Supervision is **not** on site, HRA up-posting changes shall be immediately verified by another RPT. RP Supervision shall verify postings as soon as practicable upon arrival on site the next work day.

4.3.3. HRA Access Authorization and Requirements

1. **AUTHORIZE** access to a HRA by the appropriate Radiation Work Permit.

2. **REQUIRE** each individual entering a HRA to have a functioning electronic dosimeter (ED) per applicable RWP unless RPM authorizes a deviation using Attachment 8 (for example: welding activities that may cause interference with an ED) **and** implementing other compensatory measures in accordance with station Tech Specs.

3. **REQUIRE** individuals entering a HRA to be equipped with one or more of the following.

   A. A radiation monitoring device which continually indicates the radiation dose rate in the area.

   B. A radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a pre-set integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rate levels in the area have been established and personnel made aware of them.

   C. A RP individual qualified in radiation protection procedures with a radiation dose rate device, who is responsible for positive control over the activities in the area and shall perform periodic radiation surveillance at the frequencies specified in the RWP or by Radiation Protection Supervision.

Limerick, Peach Bottom, and LaSalle

Be under the surveillance, as specified in the RWP, by means of closed circuit television, of an RP qualified individual (i.e., qualified in radiation protection procedures), responsible for controlling personnel radiation exposure in the area, and with the means to communicate with the individuals in the area.

4. RP Personnel **CONDUCT and DOCUMENT** HRA briefing for each non-Radiation Protection individual making a HRA entry per Attachment 5, High Radiation Area (HRA) and Locked High Radiation Area (LHRA) Briefing Form, at the following frequencies:

   A. Prior to initial entry

   B. Shiftly thereafter

   C. Significant change in radiological conditions

4.3.4. Controlling Access to HRAs

1. **If** access point is **<u>not</u>** controlled by a lockable swing gate, turnstile or barricade **then** it must be controlled by RP Personnel or HRA Access Control Guard,

   A. **If** HRA access is to remain open assign a HRA Access Control Guard.

   B. **If** the Access Control Guard is **<u>not</u>** RP Personnel, **then:**

      1. RP **BRIEFS** individual **and ENSURES** individual **READS and SIGNS** Attachment 6, "Responsibilities for the HRA/LHRA Access Control Guard".

      2. **GIVE** a copy of Attachment 6 to the individual.

      3. **GIVE** a lime green Access Control Guard vest to the individual.

   C. RP Personnel or Access Control Guard **PERFORM** HRA Access Control functions per Attachment 6.

   D. Access Control Guard **VERIFIES** HRA access barrier is fully restored by RP Personnel prior to leaving area.

2. **If** HRA Access Control Guard function is being performed due to potential for locking personnel into HRA without an exit, **then COMPLETE** Attachment 7, Access Control Log, for each entry and exit. **(CM-1)**

3. **ISSUE** HRA key to HRA Key Controller, if necessary, using Attachment 9, HRA Key Log, or computer generated equivalent (CGE).

4. **ATTACH** the tag to the HRA key. See Attachment 11, "HRA Key Tag", for an example.

5. **If** a locking HRA access barrier is in use, **then** HRA Key Controller **VERIFIES** via physical challenge that barrier is locked prior to leaving area.

NOTE: RPTs that have an HRA key on a long term basis are **not** required to fill out Attachment 9.

6. HRA Key Controller **RETURNS** HRA key **and** tag to RP at completion of work, or end of shift (whichever occurs first) unless transferring the HRA key, **and** completes Attachment 9.

4.3.5. Down Posting HRA

1. **OBTAIN** authorization from RP Supervision to begin HRA down posting evolution.

2. **ENSURE** RP Supervision is onsite prior to commencing down posting evolution, unless waived by the RPM using Attachment 8.

3. **CONDUCT** HRA down posting per Attachment 2, "HRA Down Posting Actions and Verifications."

4.4. Locked High Radiation Area Controls (greater than or equal to 1000 mrem/hr at 30 cm; < 500 Rad/hr at 1 meter)

NOTE: The 800 mrem/hr at 30 cm criteria below is an Exelon administrative requirement, which may be deviated from with, written approval of the Radiation Protection Manager via Attachment 8.

4.4.1. **POST and CONTROL** area as a Locked High Radiation Area when:

1. Dose rates accessible to an individual(s) are 800 mrem/hr at 30 cm or greater, unless waived by the RPM using Attachment 8, **or**

2. Dose rate(s) accessible to an individual(s) equal **or** exceed 1000 mrem/hr at 30 cm.

NOTE: When establishing and verifying LHRA controls, apply special attention to scaffolds, permanent platforms, stairs, ladders, or other plant structures that could allow an individual to circumvent the barricades, or physical barriers for a LHRA and no longer prevent unauthorized access.

4.4.2. Implementation or Modification of LHRA Controls

1. RP Supervision **DETERMINE** LHRA boundary control method per the following **and DIRECT** RPT(s) and appropriate support personnel.

A. **If** access will **not** be required to the area, **then** completely **ENCLOSE** the area with a LHRA physical barrier (i.e. cocoon area).

1. RPM must **APPROVE** material used for a physical barrier. Examples include wire mesh

B. **If** periodic access to affected area is required, **then PERFORM** one of the following.

1. **ENCLOSE** affected area with LHRA physical barrier, at the LHRA Access, locked by a LHRA lock; **or**

Oyster Creek

The ability to control access to a LHRA through the use of a barricade and red flashing light in step 4.4.2.1.B.2 is **not** applicable at Oyster Creek.

NOTE: RPM authorization is required to use Red-flashing lights for LHRA controls and may **not** be delegated.

2. **If** no LHRA physical barrier exists **or cannot** be reasonably erected due to the LHRA location, **then PERFORM** the following.

   a. RPM **AUTHORIZES** the use of a flashing red light **and** barricade via Attachment 8.

   b. **BARRICADE** area **and ACTIVATE** red flashing light(s) as a warning device.

C. **If** a ladder lock is used to control access to a LHRA **then** the following minimum requirements shall be met.

1. Ladder lock length minimum of 6 ft.

2. Ladder lock must be two sided (i.e control access to both sides) unless only one side of the ladder provides access to the LHRA.

3. Ladder lock can't be lift or moved to provide access without unlocking.

D. RPM must **APPROVE** material used to fabricate a LHRA physical barrier.

1. Examples of acceptable materials include wire mesh, chain-link fence, or material that requires tooling to cut. Metal fasteners are required for use.

2. The barrier must be 2 meters (approximately 6 ft) high and constructed such that plant equipment or materials do not allow an individual to climb over the barrier. Minimum barrier height is 6 ft.

2. **ESTABLISH** LHRA controls per Attachment 3, "Establishing and Verifying LHRA Controls".

A. RP Supervision shall verify all LHRA posting changes. Another RPT may verify posting change prior to RP Supervision verification.

B. When on site, RP Supervision shall **VERIFY** all up-postings of LHRA. The RPT must **REMAIN** in area until RP Supervision verification is complete.

C. When RP Supervision is **<u>not</u>** on site, LHRA up-posting changes shall be immediately verified by another RPT. RP Supervision shall **VERIFY** postings as soon as practicable upon arrival on site the next work day.

4.4.3. LHRA Access Authorization Requirements

1. **AUTHORIZE** access to a LHRA by the appropriate Radiation Work Permit.

2. **REQUIRE** individuals entering a LHRA to be equipped with one or more of the following.

A. A radiation monitoring device which continually indicates the radiation dose rate in the area.

B. A radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a pre-set integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rate levels in the area have been established and personnel made aware of them.

C. A RP individual qualified in radiation protection procedures with a radiation dose rate device, who is responsible for positive control over the activities in the area and shall perform periodic radiation surveillance at the frequencies specified in the RWP.

Limerick, Peach Bottom, and LaSalle

Be under the surveillance, as specified in the RWP, by means of closed circuit television, of an RP qualified individual (i.e., qualified in radiation protection procedures), responsible for controlling personnel radiation exposure in the area, and with the means to communicate with the individuals in the area

3. RP Personnel **CONDUCTS and DOCUMENTS** LHRA briefing for each non Radiation Protection individual making a LHRA entry per Attachment 5 at the following frequencies:
   - A. Prior to initial entry
   - B. Shiftly thereafter
   - C. Significant change in radiological conditions
4. **If** work area dose rates are greater than 1500 mrem/hr or > 500 mrem per entry **then REFER** to RP-AA-460-002 AND **COMPLY** with applicable requirements.

4.4.4. Controlling Access to Self-Locking LHRA

1. **ISSUE** LHRA Key to RP Personnel using Attachment 10 or CGE.
2. **If** a locking LHRA barrier is in use, **then** LHRA Key Controller **VERIFIES** via physical challenge that barrier is locked prior to leaving area.
3. LHRA Key Controller **RETURNS** LHRA Key at conclusion of work, or end of shift (whichever occurs first) to RP, unless transferring the LHRA Key, and completes Attachment 10, "LHRA Key Log".

NOTE: RP should consider the experience level of the Access Control Guard. It is preferable that the Access Control Guard has at least 2 years of nuclear plant experience.

4. **ASSIGN** an Access Control Guard, if necessary.
   - A. **If** the Access Control Guard is **not** RP Personnel, **then** RP **BRIEFS** individual **and ENSURES** individual **READS** and **SIGNS** Attachment 6.
   - B. **GIVE** a copy of Attachment 6 to the individual.
   - C. **GIVE** a lime green Access Control Guard vest to the individual.
   - D. RP Personnel or Access Control Guard **PERFORM** LHRA Access Control functions per Attachment 6.
   - E. **WHEN** all personnel have exited area, Access Control Guard **ENSURES** the following.
     1. RP is **NOTIFIED** that all personnel have exited the area.
     2. **REMAINS** at the LHRA Access **until** RP Personnel arrive.
     3. RP Personnel **and** second individual shall **VERIFY** via individual physical challenge that the LHRA Access is closed **and** locked.
5. When RPTs are performing surveys of LHRA areas on exit they shall:

NOTE: When performing a survey of a LHRA the RPT is **not** required to wait at the area until the verification is completed.

A. Physically **CHALLENGE** the LHRA door to ensure it is closed **and** locked.

B. **REQUEST** a verification of the LHRA door.

6. **DOCUMENT** LHRA closure verification on Attachment 10 or CGE.

4.4.5. Controlling Access to NON Self-Locking LHRA

1. **ISSUE** LHRA Key to RP Personnel using Attachment 10 or CGE.

2. **If** a locking LHRA barrier is in use, **then** LHRA Key Controller **VERIFIES** via physical challenge that barrier is locked prior to leaving area.

3. LHRA Key Controller **RETURNS** LHRA Key at conclusion of work, or end of shift (whichever occurs first) to RP, unless transferring the LHRA Key, and completes Attachment 10.

NOTE: RP should consider the experience level of the Access Control Guard. It is preferable that the Access Control Guard has at least 2 years of nuclear plant experience.

4. **ASSIGN** an Access Control Guard, if necessary.

A. **If** the Access Control Guard is not RP Personnel, **then** RP **BRIEFS** individual **and ENSURES** individual **READS** and **SIGNS** Attachment 6.

B. **GIVE** a copy of Attachment 6 to the individual.

C. **GIVE** a lime green Access Control Guard vest to the individual.

D. RP Personnel or Access Control Guard **PERFORM** LHRA Access Control functions per Attachment 6.

Quad Cities

Dead bolts that allow egress are exempt from the completion of Attachment 7

E. **INITIATE and USE** Attachment 7 or CGE to document **all** entries **and** exits from LHRA. **If** Attachment 7 is lost while being used, or a card reader system fails while being used in lieu of completing the log in section 2 of Attachment 7, **then** prior to locking the area, **use** an additional accountability method to ensure that all personnel are out of the area upon completion of work, e.g.; a physical search or head count. **(CM-1)**

5. When all personnel have exited the area, Access Control Guard **ENSURES** the following.

   A. RP is **NOTIFIED** that all personnel have exited the area.

   B. **REMAINS** at the LHRA Access until RP Personnel arrive.

   C. RP Personnel **and** Access Control Guard shall **VERIFY** via individual physical challenge that the LHRA Access is closed **and** locked.

   D. **DOCUMENT** physical challenges to LHRA closure via Attachment 10 or CGE **and** on Attachment 7 or CGE.

4.4.6. Down Posting LHRA

1. **OBTAIN** authorization from RP Supervision to begin LHRA down-posting evolution.
2. **ENSURE** RP Supervision is onsite prior to commencing down posting evolution.
3. **CONDUCT** LHRA down posting per Attachment 4, "LHRA Down-Posting Actions and Verifications".

4.5. <u>Transfer of HRA/LHRA Keys</u>

4.5.1. The person or RPT taking control of the key to the HRA/LHRA **STARTS** and **COMPLETES** the following sections of Attachment 9 or 10 as appropriate:

1. Key number being taken over.
2. Location/Door number to be locked.
3. Key Issued By.
4. Key Issued to.
5. Date/Time
6. N/A the Key Returned, Verification section for personnel who currently have the key checked out.
7. Completes Key Transfer section for the personnel who currently have the key check out.
8. Transfer the HRA Key Tag to the person taking control of the key.

4.6. <u>Control and inventory of HRA and LHRA keys</u>

4.6.1. **CONDUCT** an accounting of non-emergency HRA and LHRA Keys on at least a daily basis.

4.6.2. **CONDUCT** an accounting of emergency use HRA and LHRA Keys on at least a monthly basis.

4.6.3. **If** any HRA or LHRA Key is <u>**not**</u> accounted for or is missing, **then:**

1. Attempt to determine location of the key **and VERIFY** that the door controlled by the key is locked and secure.
2. **VERIFY** that no personnel entered the HRA or LHRA since the key went unaccounted for.
3. **If** key cannot be located, **then NOTIFY** RP Supervision.
4. **If** it is determined that the HRA or LHRA key is lost, **then** immediately **NOTIFY** the RPM **and** RP Supervision will make a determination as to whether HRA or LHRA door(s)/padlock(s) will be re-keyed and new key(s) issued.

5. DOCUMENTATION

5.1. No records retention is required for attachments 1, 2 3, 4, 5, 6, and 11.

5.2. Attachments 7, 8, 9, and 10 shall be maintained in accordance with the SRRS.

6. REFERENCES

6.1. <u>Commitments</u>

6.1.2. CM-1 Dresden Commitment: 237-200-97-03202 for providing a log to track entry into LHRAs/VHRAs when a door locking mechanism would prevent free unobstructed egress from the area, and also for those cases, for using an additional accountability method to ensure all personnel are out of the area upon completion of work if the log is misplaced during use (Step 4.3.4.2 and 4.4.5.4.E).

6.1.3. CM-2 LaSalle Commitment: 3-2004-009 for providing Radiation Protection aid for conducting HRA briefings (Attachment 5).

6.1.4. CM-3 Clinton Commitment: 726499-31 identify that relocating or modifying any HRA/LHRA posting is a posting change. (step 4.2.4)

6.2. <u>User References</u>

6.2.1. 10 CFR Part 20.1601, "Control of Access to High Radiation Areas."

6.2.2. Station Technical Specifications (for all sites).

6.2.3. USNRC Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants."

6.2.4. USNRC Information Notice 86-107, "Licensee Alert to Reactor Cavity (Incore Shaft) Entries."

6.2.5. USNRC Information Notice 88-79, “Misuse of Flashing Lights for High Radiation Area Controls.”

6.2.6. WANO SOER 2001-1, “Unplanned Radiation Exposures.”

6.2.7. SOER 1985-03, "Excessive Personnel Radiation Exposures."

6.2.8. RP-AA-376, “Radiological Postings, Labeling and Markings”

6.2.9. RP-AA-460-002“Additional High Radiation Controls.”

6.2.10. INPO 05-008, "Guidelines for Radiological Protection at Nuclear Power Plants"

7. <u>**ATTACHMENTS**</u>

7.1. Attachment 1, Establishing and Verifying HRA Controls

7.2. Attachment 2, HRA Down Posting Actions and Verifications

7.3. Attachment 3, Establishing and Verifying LHRA Controls

7.4. Attachment 4, LHRA Down Posting Actions and Verifications,

7.5. Attachment 5, High Radiation Area (HRA) and Locked High Radiation Area (LHRA) Briefing Form **(CM-2)**

7.6. Attachment 6, Responsibilities for the HRA/ LHRA Access Control Guard

7.7. Attachment 7, Access Control Log

7.8. Attachment 8, Approval for HRA/LHRA Deviations

7.9. Attachment 9, HRA Key Log

7.10. Attachment 10, LHRA Key Log

7.11. Attachment 11, HRA Key Tag

Attachment 1

Establishing and Verifying HRA Controls
Page 1 of 2

Pre-Job Briefing

1. **PRIOR** to performing a HRA posting change, RPT will receive a pre-job brief from RP Supervision or a qualified RPT on shift.

You are preparing to establish a High Radiation Area. This is being performed to protect and inform radworkers of radiological hazards. You must remain focused on the task to ensure this posting change is performed error free.

Area involving posting change____

2. What are the Critical Steps in this task?
   - Recognize conditions of the area. (dose rates, contamination)
   - Post area correctly & consistently (Think of all posting requirements: HRA, LHRA, VHRA)
   - Documentation
   - Notify Operations and Security of changes if needed.

3. What is the Worst Thing that can go wrong from both an Operational and Industrial Safety perspective?
   - NRC Violation
   - Tech Spec. Violation
   - Electrical/Physical/Mechanical hazards within area cause an injury while performing the posting change.

4. What are the Error-Likely Situations?
   - Ladders, scaffolds, doors leading into or out of area not posted.
   - RAM transfer / changing conditions not considered

5. What Defenses are we relying on?
   - Procedures
   - Self-Check
   - Verification
   - OE Review

6. What actions will ensure proper Configuration Control?
   - 2 Minute Drill at the job site.

Briefing provided by (print/sign) ____________________________ Date/Time______________

Briefing received by (print/sign) ____________________________ ____________________________

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No Retention Required

Attachment 1
Establishing and Verifying HRA Controls
Page 2 of 2

Field Implementation

The following steps shall be performed when establishing and verifying HRA and signed/initialed once complete.

INITIALS

_____ 1. High Radiation Area(s) that allows access, are REQUIRED to be locked or guarded at the access point. Exceptions may be made by RPM via Attachment 8.

_____ 2. All barricades around the area have PROPER postings in accordance with RP-AA-376 to reflect conditions in the area.

- Ropes
- Stanchions
- Swing gates/turnstiles

_____ 3. **ENSURE** Human Performance (HU) HRA Stop Sign is located on or proximate to the HRA Access Point.

_____ 4. All ropes, swing gates or turnstiles HAVE BEEN positioned so that the HRA has proper barriers to prevent inadvertent access. (no significant gaps, i.e. > 6 inches nominal).

_____ 5. All barricades are at the APPROPRIATE height, i.e. sufficient to preclude inadvertent access, approximately waist high in doorways or through the approximate midpoint of manways, portals or other openings.

_____ 6. Scaffolds in or adjacent to the area HAVE proper postings in accordance with RP-AA-376 to reflect the conditions accessed by the scaffold. Ensure any scaffolding, permanent platforms, stairs, ladders or other plant structures that may allow unauthorized access are properly controlled.

_____ 7. All accesses into the area HAVE proper postings, including ladders and stairs.

_____ 8. Unauthorized personnel are EVACUATED prior to locking HRA.

_____ 9. **REVIEW** new area controls - are all postings consistent? Does it make sense to the radworker with nothing left to interpretation?

10. Survey of the area boundaries **PERFORMED** and **DOCUMENTED** confirming dose rates to be less then 80 mrem/hr (unless waived using Attachment 8).

RPT (print/sign) ______________________________Date/Time____________

_____ 11. RPT to remain in area directly outside of the HRA until RP Supervision verification is complete.

12. Independent confirmatory survey of the area boundaries **PERFORMED** and **DOCUMENTED** confirming dose rates to be less then 80 mrem/hr (unless waived using Attachment 8).

RPT (print/sign) ______________________________ Date/Time____________

13. Radiation Protection Supervision field review of barriers, postings and HRA locking device as applicable. Verify and ensure any scaffolds are properly controlled to prevent unauthorized access to the area.

Name (print/sign)______________________________Date/Time____________

_____ 14. Update the HRA list to reflect the posting change.

No Retention Required

Attachment 2
HRA Down Posting Actions and Verifications
Page 1 of 2

Pre-Job Briefing

1. **PRIOR** to performing HRA down posting change, RPT will receive pre-job brief from RP Supervision.

You are preparing to down post a High Radiation Area. This is being performed to protect and inform radiological workers of radiological hazards. You must remain focused with the task to ensure this posting change is performed error free.

Area involving posting change_______________________________________

2. What are the Critical Steps in this task?
   - Recognize conditions of the area. (dose, contamination, limits)
   - De-Post area correctly & consistently
   - Documentation
   - Notify Operations and Security of changes if needed.

3. What is the Worst Thing that can go wrong from both an Operational and Industrial Safety perspective?
   - NRC Violation
   - Tech Spec. Violation
   - Electrical/Physical/Mechanical hazards within area cause an injury while performing the posting change.

4. What are the Error-Likely Situations?
   - Ladders, scaffolds, doors leading into or out of area not posted/deposted.
   - RAM transfer / changing conditions not considered.
   - Material staged within the area not surveyed.

5. What Defenses are we relying on?
   - Procedures
   - Self-Check
   - Verification
   - OE Review

6. What actions will ensure proper Configuration Control?
   - 2 Minute Drill at the job site.

Briefing provided by (print/sign) ____________________________ Date/Time_____________

Briefing received by (print/sign) ____________________________ ____________________________

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Attachment 2
HRA Down Posting Actions and Verifications
Page 2 of 2

Field Implementation

The following steps to be signed/initialed once complete.

INITIALS

_____ 1. **OBTAIN** authorization from RP Supervision to begin HRA down-posting evolution.

_____ 2. **ENSURE** RP Supervision is onsite prior to commencing down posting evolution, unless waived by the RPM using Attachment 8.

_____ 3. **REVIEW** most current survey of area being down posted.

4. **PERFORM** and **DOCUMENT** an initial radiation survey.
   - Confirm dose rates to be 80 mrem/hr or less at 30 cm, unless waived by the RPM.
   - All items in the area (bags and containers) are included in the survey.

RPT__________________________ Date/Time___________

5. **PERFORM** and **DOCUMENT** an independent confirmatory survey, unless waived by the RPM.
   - Confirm dose rates to be 80 mrem/hr or less at 30 cm.
   - All items in the area (bags and containers) are included in the survey.

RPT__________________________ Date/Time___________

6. Radiation Protection Supervision **REVIEWS** survey documentation and **CONCURS** with down posting area

Name__________________________ Date/Time___________

7. Radiation Protection Supervision **REVIEWS** field conditions and **APPROVES** down posting:

Name__________________________ Date/Time___________

_____ 8. Area being released HAS the proper ropes and postings to reflect new conditions including:
   - Stairs and ladders
   - Scaffolding within the area
   - Affected adjacent areas
   - Removable shielding used to make HRA inaccessible secured in place by fasteners that would require a tool to remove and has signage such as "Warning – Do Not Remove Without RP Approval. Elevated Radiation Levels Could Result" and authorization waiver signed by RPM or designee using Attachment 8.
   - Any additional barriers that need to be set up are done prior to releasing the HRA

_____ 9. All swing gates or turnstiles have been REMOVED from the area and posting removed or covered.

_____ 10. **STOP** and **LOOK** at the area - are all postings consistent? Does it make sense to the radworker with nothing left to interpretation?

_____ 11. **UPDATE** the HRA list to reflect the posting change, as applicable.

12. Radiation Protection Supervision field review of barriers and postings.

Name (print/sign) __________________________ Date/Time___________

No Retention Required

Attachment 3
Establishing and Verifying LHRA Controls
Page 1 of 2

Pre-Job Briefing

1. **PRIOR** to performing LHRA posting change, RPT will receive pre-job brief from RP Supervision or a qualified RPT on shift.

You are preparing to establish a Locked High Radiation Area. This is being performed to protect and inform radworkers of radiological hazards. You must remain focused on the task to ensure this posting change is performed error free.

Area involving posting change______________________________________

2. What are the Critical Steps in this task?
    - Recognize conditions of the area. (dose, contamination, limits)
    - Post area correctly & consistently (Think of all posting requirements: HRA, LHRA, VHRA)
    - Documentation
    - Notify Operations and Security of changes if needed.
    - Ladders or other means do not give unauthorized access to area.

3. What is the Worst Thing that can go wrong from both an Operational and Industrial Safety perspective?
    - NRC Violation
    - Tech Spec. Violation
    - Electrical/Physical/Mechanical hazards within area cause an injury while performing the posting change.

4. What are the Error-Likely Situations?
    - Ladders, scaffolds, doors leading into or out of area not posted.
    - RAM transfer / changing conditions not considered

5. What Defenses are we relying on?
    - Procedures
    - Self-Check
    - Verification
    - OE Review

6. What actions will ensure proper Configuration Control?
    - 2 Minute Drill at the job site.

Briefing provided by (print/sign) ____________________________ Date/Time_____________

Briefing received by (print/sign) ____________________________ ____________________________

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Attachment 3
Establishing and Verifying LHRA Controls
Page 2 of 2

Field Implementation
The following steps shall be performed when establishing and verifying LHRA and signed/initialed once complete.

INITIALS

1. Physical barrier around the area;

_____ Is properly posted in accordance with RP-AA-376 to reflect conditions in the area.
_____ **ENSURE** HU HRA Stop Sign is located on or proximate to the LHRA Access Point.
_____ Is robust enough to prevent unauthorized entry
- o Physical barriers (such as chain link fencing or fabricated walls) used to prevent unauthorized personnel access
- o No pearl weave/light snow fence/nylon panels

_____ Physical barriers that are 2 meters (approximately 6 ft) high would normally be adequate to control access to a high radiation area at a nuclear power plant.
_____ Uses metal fasteners to secure to frame/supports.
_____ Is secured at ends to prevent movement.
_____ Does not have material staged beside boundary that could allow easy access over the LHRA physical barrier. (drums/boxes/rolling ladders)
_____ Have all openings in the physical barrier controlled to restrict access to the major portion of whole body. (no significant gaps, i.e. > 6 inches nominal).

2. All accesses into the area have proper postings and controls, ie.

_____ Are properly posted in accordance with RP-AA-376 to reflect conditions in the area.
_____ Ladders are secured by ladder locks or cocooned in fencing.
_____ Stairs are secured with fencing or equivalent.
_____ Doors locked.
_____ Open doorways are barricaded using fencing, lockable fence gates or equivalent.

_____ Scaffolds in the area have proper postings in accordance with RP-AA-376 to reflect the conditions accessed by the scaffold - access to any LHRA by the scaffold is controlled with the proper postings and LHRA access barriers.

_____ Perform final check to ensure any scaffolds, permanent platforms, stairs, ladders, or other plant structures are properly controlled to prevent unauthorized access to the area.

3. IF no enclosure exists for purposes of locking an LHRA located within a large area such as containment, and an enclosure cannot reasonably be constructed, then (N/A for Oyster Creek):

_____ **OBTAIN** the written approval of the Radiation Protection Manager, using Attachment 8 for use of a barricade and red flashing light to control access, and
_____ **BARRICADE** and conspicuously **POST** the area in accordance with RP-AA-376, and **ACTIVATE** a red flashing light(s) as a warning device. The rope barrier and postings should be placed approximately waist high in doorways or through the approximate midpoint of manways, portals or other openings.
_____ Unauthorized personnel are evacuated prior to locking LHRA.

_____ **REVIEW** new LHRA controls - are all postings consistent? Does it make sense to the radworker with nothing left to interpretation?

4. Survey of the area boundaries **PERFORMED** and **DOCUMENTED** confirming dose rates to be less than 800 mrem/hr. Ensure any additional HRA controls are in place beyond LHRA boundary if required.

RPT (print/sign) ____________________________ Date/Time____________

5. Independent confirmatory survey of boundary dose rates **PERFORMED** and **DOCUMENTED** by:

RPT (print/sign) ____________________________ Date/Time____________

6. Radiation Protection Supervision field review of barriers, posting and LHRA locking device as applicable. Verify and ensure any scaffolds, permanent platforms, stairs, ladders, or other plant structures are properly controlled to prevent unauthorized access to the area.

Name (print/sign) ____________________________ Date/Time____________

_____ 7. **UPDATE** the LHRA list to reflect the posting change, as applicable.

No Retention Required

Attachment 4
LHRA Down Posting Actions and Verifications
Page 1 of 2

Pre-Job Briefing

1. **PRIOR** to performing LHRA down posting change, RPT will receive pre-job brief from RP Supervision.

You are preparing to down post a Locked High Radiation Area. This is being performed to protect and inform radworkers of radiological hazards. You must remain focused with the task to ensure this posting change is performed error free.

Area involving posting change____

2. What are the Critical Steps in this task?
   - Recognize conditions of the area. (dose rates, contamination)
   - De-Post area correctly & consistently
   - Documentation
   - Notify Operations and Security of changes if needed.

3. What is the Worst Thing that can go wrong from both an Operational and Industrial Safety perspective?
   - NRC Violation
   - Tech Spec. Violation
   - Electrical/Physical/Mechanical hazards within area cause an injury while performing the posting change.

4. What are the Error-Likely Situations?
   - Ladders, scaffolds, doors leading into or out of area not posted/deposted.
   - RAM transfer / changing conditions not considered.
   - Material staged within the area not surveyed.

5. What Defenses are we relying on?
   - Procedures
   - Self-Check
   - Verification
   - OE Review

6. What actions will ensure proper Configuration Control?
   - 2 Minute Drill at the job site.

Briefing provided by (print/sign) __________________________ Date/Time_____________

Briefing received by (print/sign) __________________________ __________________________

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Attachment 4
LHRA Down Posting Actions and Verifications
Page 2 of 2

Field Implementation

The following steps to be signed/initialed once complete.

INITIALS

____ 1. **OBTAIN** authorization from RP Supervision to begin LHRA down-posting evolution

____ 2. **ENSURE** RP Supervision is onsite prior to commencing down posting evolution.

____ 3. **REVIEW** most current survey of area being down posted.

4. **PERFORM** and **DOCUMENT** an initial radiation survey.
   - Confirm dose rates to be 800 mrem/hr or less at 30cm, unless waived by the RPM.
   - All items in the area (bags and containers) are included in the survey.

RPT (print/sign) ____________________________ Date/Time____________

5. **PERFORM** and **DOCUMENT** independent confirmatory survey of area, unless waived by the RPM.
   - Confirm dose rates to be 800 mrem/hr or less at 30cm.
   - All items in the area (bags and containers) are included in the survey.

RPT (print/sign) ____________________________ Date/Time____________

6. Radiation Protection Supervision **REVIEW** survey documentation and **CONCURS** with down-posting the area.

Name (print/sign) ____________________________ Date/Time____________

7. Radiation Protection Supervision review of field conditions and **APPROVES** down posting.

Name (print/sign) ____________________________ Date/Time____________

____ 8. Area being released has the proper ropes and postings to reflect new conditions including:
   - Stairs and ladders
   - Scaffolding within the area
   - Affected adjacent areas
   - Removable shielding used to make LHRA inaccessible secured in place by fasteners that would require a tool to remove and has signage such as "Warning – Do Not Remove Without RP Approval. Elevated Radiation Levels Could Result" and authorization waiver signed by RPM or designee.
   - Any additional barriers that need to be set up are done prior to releasing the LHRA

____ 9. All Red Flashing Lights have been removed from the area (N/A for Oyster Creek).

____ 10 **STOP** and **LOOK** at the area - are all postings consistent? Does it make sense to the radworker with nothing left to interpretation?

____ 11. **UPDATE** the LHRA list to reflect the posting change, as applicable

12. Radiation Protection Supervision field review of final conditions.

Name (print/sign) ____________________________ Date/Time____________

ATTACHMENT 5
High Radiation Area (HRA) and Locked High Radiation Area (LHRA) Briefing Form (CM-2)
Page 1 of 1

Briefing: Date/Time ________________________ RWP # ____________ Rev# ______

HRA/LHRA to be entered: ____

Task Description/Purpose of Entry ______________________________________

Discussion Points

RWP ED ALARM Set points: ________ mrem ________ mrem/hr Stay time:__________ RPT Initial: __________
Check each box as item is covered

- ☐ **INTRODUCE** the start of the brief, the purpose, and the duration the HRA/LHRA briefing is valid for.
- ☐ **ASK** the worker(s) if they have read and understand the RWP, and if they have any questions. The most recent revision of the governing RWP **shall** be referenced during the briefing to ensure access to a HRA/LHRA is allowed.
- ☐ **UTILIZE** survey or location maps as appropriate to accurately identify locations of work
- ☐ **DISCUSS** scope of work activities to occur during the entries
- ☐ **DISCUSS** the posting of the area, control devices and access requirements
- ☐ **DISCUSS** anticipated radiological condition ranges in the work area and travel path
- ☐ **IDENTIFY** sources of radiation and low dose area information in work area
- ☐ **IDENTIFY** required dosimetry
- ☐ **DISCUSS** the need for the worker to verify their ED alarm set points match their pocket RWP set points just prior to initial entry into the area.
- ☐ **DISCUSS** the need to check their ED frequently, at least every 15 minutes while in the area.
- ☐ **INFORM** workers **not** to move items within the area that could increase boundary dose rates without a RPT present.
- ☐ **DISCUSS** proper controls for barricades and postings upon entering and exiting the area.
- ☐ **INFORM** worker that if they are unable to hear their ED for any reason, they are required to notify RP at the brief, utilize a modified ED, or have other approved means to control their exposure for the entry.
- ☐ **ASK** if anyone involved in the brief has any questions regarding the entry.
- ☐ **INFORM** all involved of the conclusion of the brief.

Briefing and Acknowledgment

HRA/LHRA Brief Provided By: ______________________ / ______________________
(Print) (Signature)

Briefing Received By:

(Print)	(Signature)	(Print)	(Signature)

No Retention Required

ATTACHMENT 6
Responsibilities for the HRA/ LHRA Access Control Guard
Page 1 of 1
(For Completion by Non-RP Personnel Only)

Date____________ Time _____________
Area to be Attended: ____
Individual signing as the Access Control Guard has read, understands, and accepts the following responsibilities:

1. **REMAIN** outside the assigned area and **MAINTAIN** direct "line-of-sight" surveillance of the access to the HRA/LHRA until the access/barrier is re-secured.

2. **HAVE** a means of instant communications (i.e. radio, portable phone, etc.) in order to report any problems or call for a relief if needed. (Phone x__________, x_________ Radio Channel ___________)

3. **PREVENT** unauthorized entry into the HRA/LHRA by performing the following actions for any individual requesting access to the area.

   - Prior to entry into the HRA/LHRA, Access Control Guard will VERIFY worker's ED alarm set points are the same as on the worker's Radiation Worker Pocket RWP Data Sheet (Trip Ticket).
   - **OBTAIN** verbal acknowledgement from the individual that he/she has contacted RP and is covered under the provisions of an RWP authorizing access to the HRA/LHRA.
   - **If** a satisfactory response is received to the above communications, **then PERMIT** entry to the area. **Otherwise**, **DENY** entry **and INSTRUCT** the individual to contact RP.

4. **VERIFY** that personnel are able to exit the HRA/LHRA at any time, i.e., **<u>not</u>** prevented from leaving the area by a locked or obstructed access.

5. **If** the HRA/LHRA Access Control Guard function is being performed due to the presence of a non-self-locking door (e.g., a door normally locked with a hasp and padlock), **then COMPLETE** Attachment 7, Access Control Log for each entry and exit. For identification purposes, for each Access Control Guard, **PRINT** your name in the appropriate blank on Attachment 7. Also, prior to the re-securing the access/barrier, **VERIFY** that Attachment 7 is complete and all personnel are out of the area, signing the applicable blank on the form. **If** Attachment 7 is lost **or** a card reader system fails while being used in lieu of completing the log in Section 2 of Attachment 7, **then** prior to locking the area, **USE** an additional accountability method to ensure all personnel are out of the area.

6. For an HRA (< 1000 mrem/hr at 30 cm), upon completion of the work in the area, **OBSERVE** a Radiation Protection individual re-establish the barricade for the area.

7. For an LHRA, upon completion of the work in the area and **prior** to leaving area, **ENSURE** that the following actions have occurred:

   - Barrier has been locked, and signed off on Attachment 7.
   - Barrier has been verified locked, and signed off on Attachment 7.
   - Access Control Guard may perform one of these functions under the direct supervision of RP Technician.

8. **Prior** to transferring Access Control Guard responsibilities between non RP personnel, **VERIFY:**

   - The relief individual has a signed copy of this form.
   - The relief individual is aware of the conditions of the work area.
   - The relief individual has a lime green Access Control Guard Vest that is passed between access control guards to clearly establish when turnover at the assigned area is complete.

9. **RETURN** a completed Attachment 7 to Radiation Protection after the LHRA is re-secured, if completion of such form was required in accordance with this procedure. The Access Control Guard may transfer the completed LHRA Access Log to the Access Control Guard/ RP individual in lieu of returning it to the RP Office in person.

Access Control Guard Signature (print/sign): ______________________________ Date: __________

RP Individual performing Access Control Brief (print/sign):________________________ Date: __________

ATTACHMENT 7
Access Control Log
Page 1 of 1

Section 1: Access Control Guard Information:

Date of log initiation: __________ Location: ________________________________

Access Control Guard Using Log (Print): #1 ________________________________

#2 ________________________________

#3 ________________________________

Section 2: Record of Personnel Entering/Exiting Area:

Name of Person Entering Area: (Print)	RWP #	Individual ED Verified	Time In	Time Out	Time In	Time Out

___ Card reader data or access control programs were used to confirm that all personnel exited the area in lieu of completing the above log. **If** confirmation is by talking with another individual reviewing card reader/ access control data, **RECORD** the name of the individual:

Name: ________________________.

Section 3: Verification

Upon completion of work, **VERIFY** all persons are logged out of the area and barrier is secured and verified.

Barrier Locked: _________________ Barrier Verified Locked: ____________________

Access Control Guard: _________________________

RP Supervision Review (print/sign): _________________________ Date: _______________

ATTACHMENT 8
Approval for HRA/LHRA Deviations
Page 1 of 1

This form is to be used for approval to deviate from standard High Radiation Area / Locked High Radiation Area processes. Exceptions must comply with the controls required by 10CFR20 and station specific Technical Specifications.

Location of Deviation: ______________________________

RWP #: ______________________________

Description of Deviation:

___ Approval for USE of Barricade and Red Flashing Light for controlling LHRA access and specify the frequency for verifying Red Flashing Light is Operable ________________

___ Approval for USE of shielding/signage for controlling HRA/LHRA access.

___ Approval for USE of temporary shielding/signage for controlling HRA/LHRA access without the ability to secure the shielding with a locking mechanism or other robust means.

___ Approval for NOT posting High Radiation Area at 80 mrem/hr at 30cm but <100 mrem/hr at 30cm.

___ Approval for NOT posting Locked High Radiation Area at 800 mrem/hr at 30cm but <1000 mrem/hr at 30cm.

___ Approval for NOT using Radiation Protection High Radiation Area Lock.

___ Approval for entering HRA/LHRA WITHOUT electronic dosimetry **AND** implementing other compensatory measures in accordance with station Tech Specs.

___ Approval for Continuous Electronic Surveillance IN LIEU OF Access Control Guard.

___ Approval to commence HRA down posting without RP Supervision on site.

___ Approval for NOT requiring posting transient HRA verification.

___ Other:(provide description) ______________________________

Justification and/or Comments:

Deviation Requested By (print/sign): ______________________________ Date: __________

Deviation Approved By (print/sign): ______________________________ Date: __________
Radiation Protection Manager (or designee)

ATTACHMENT 9
HRA Key Log
Page 1 of 1

KEY ISSUE						KEY RETURN	KEY TRANSFER
Key #	Location/ Door Number To Be Locked	Key Issued By:	Key Issued To: (Print Name) (Signature)	Date/Time Phone Number	Supervisor's Name Phone Number	* Area Locked By: Initials/Date/Time Key Returned By: Initials/Date/Time	Notified of Key Transfer To: (Print Name) Initials/Date/Time

RP Supervision Review (print/sign): ______________________ **Date:** ____________

*If an RPT is down posting an area and a lock is **no** longer required, then the appropriate blank in this column should be marked "Downposted," in addition to Initials/Date/Time.

HRA Key Controller Responsibilities: 1) **MAINTAIN** personal control of HRA key until returned to RP. 2) **ALLOW** access to only those who have had an HRA brief. 3) **VERIFIES** via physical challenge that barrier is locked when entering and leaving the HRA. 4) **REQUEST** Peer Check to ensure barrier is locked. 5) **RETURN HRA key to RP**.

ATTACHMENT 10
LHRA Key Log
Page 1 of 1

KEY ISSUE						KEY RETURN	VERIFICATION (required for LHRA only)	KEY TRANSFER
Key #	Location/ Door Number To Be Locked	Key Issued By:	Key Issued To: (Print Name) (Signature)	Date/Time Phone Number	Supervisor's Name Phone Number	* Area Locked By: Initials/Date/Time Key Returned By: Initials/Date/Time	Area Verified Locked By: Initials/Date/Time	Notified of Key Transfer To: (Print Name) Initials/Date/Time

RP Supervision Review (print/sign): ______________________ **Date:** ____________

* If an RPT is downposting an area and a lock is <u>no</u> longer required, then the appropriate blank in this column should be marked "Downposted," in addition to Initials/Date/Time. LHRA Key Controller Responsibilities: 1) **MAINTAIN** personal control of LHRA key until returned to LHRA key locker or until the LHRA key is transferred to another RP personnel. 2) **ALLOW** access to only those who have had an LHRA brief. 3) **VERIFIES** <u>via physical</u> challenge that barrier is locked when entering and leaving the LHRA. 4) **REQUEST** <u>Peer Check</u> to ensure barrier is locked. 5) **RETURN LHRA key to RP**.

Attachment 11
HRA Key Tag
Page 1 of 1

HRA

Key

Controller

HRA Key Controller Responsibilities:

1. **MAINTAIN** personal control of HRA key until returned to RP.
2. **ALLOW** access to only those who have had an HRA brief.
3. **VERIFIES** via physical challenge that barrier is locked prior to entering and after leaving the HRA.
4. **REQUEST** Peer Check to ensure barrier is locked.
5. RETURN **HRA key to RP.**

CONTROLS FOR VERY HIGH RADIATION AREAS

1. PURPOSE

1.1. The purpose of this document is to provide administrative controls and instructions for Very High Radiation Areas (VHRAs).

1.2. This procedure applies to those areas identified as VHRAs in accordance with 10 CFR 20. Note that alternative controls for HRAs and LHRAs specified in accordance with station Technical Specifications do **not** apply and shall **not** be used for the control of VHRAs.

2. TERMS AND DEFINITIONS

2.1. **Access Control Guard**: An individual who has responsibility for direct surveillance of a VHRA when the locks, barricades, and/or normal physical barriers for such an area where these controls have been defeated.

2.2. **Accessible Area**: An area that can reasonably be occupied by a major portion of an individual's whole body. An area is **not** accessible if tools or other exceptional measures are needed to access the area. For example, a tank or vessel that has its cover bolted in place is inaccessible, or an opening in a shield wall that is physically difficult to access without a ladder or mobile platform is considered inaccessible. In addition, a pool of water such as the spent fuel pool is considered inaccessible unless a diver enters the pool.

2.3. **Barricade**: A barricade can be a rope, ribbon, or other firmly secured, conspicuous obstacle that (by itself or used with physical barriers such as existing walls or hand railings) completely surrounds the area and obstructs inadvertent entry. Obstacles should be placed approximately waist high in doorways or through the approximate mid point of manways, portals or other openings.

2.4. **Barrier**: A conspicuous obstacle, something material that blocks or is intended to block passage.

2.5. **Direct Surveillance**: A substitute means for controlling entries into a VHRA in lieu of locks, barricades, or physical barriers. Direct surveillance may be satisfied by use of continuous electronic surveillance if it is adequate to prevent unauthorized entry, e.g., by use of audible means an individual could be warned prior to entering.

2.6. **Key Controller**: An individual that is issued a key, who is responsible for controlling access and securing of VHRAs.

2.7. **RP Personnel:** For the purpose of this procedure RP Personnel includes RP supervision, RP Technicians (RPTs), Rad Engineering and RP Technical Support.

2.8. **Review of Field Conditions**: For the purpose of this procedure field conditions means a field walk down assessing the physical status of the area potential missed liabilities (e.g. unsurveyed bags of rad trash, unsurveyed resin on the floor, etc...) as well as challenges to effective radiological barriers and postings

2.9. **Very High Radiation Area (VHRA)**: An area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads (5 grays) in 1 hour at 1 meter from a radiation source or 1 meter from any surface that the radiation penetrates.

2.10. **VHRA Physical Barrier:** An obstruction, such as chain-link fencing or a fabricated wall, which may be used to prevent unauthorized entry to an area. A physical barrier used in conjunction with a VHRA should be sufficient to prevent inadvertent entry, To the extent practicable, physical barriers should completely enclose VHRA in a manner that is sufficient to thwart undetected circumvention of the barrier. That is, fencing around VHRA should extend to the overhead and preclude anyone from climbing over the fencing. Material that can be readily cut using common cutting tools (e.g. razor knife, box knife, scissors, etc.) is not acceptable as VHRA barrier material.

2.11. **Whole Body**: For purposes of external exposure, either the head, trunk (including male gonads), arm above the elbow, or leg above the knee.

3. RESPONSIBILITIES

3.1. Radiation Protection Manager is responsible for overall implementation of VHRA controls and authorizing deviations in cases allowed by this procedure.

3.2. Radiological Engineer is responsible for initiating a Radiological Risk Assessment in accordance with RP-AA-401-1002.

3.3. Radiation Protection Supervisor is responsible for performing briefings and reviewing survey data, field conditions, boundaries and posting changes as required by this procedure.

3.4. Radiation Protection Technicians are responsible for performing area surveys, postings and down posting area and performing briefings as required by this procedure.

3.5. Access Control Guard is responsible for controlling access to VHRA in accordance with this procedure.

4. MAIN BODY

4.1. Precautions, Limitations, and Prerequisites

4.1.1. Precautions

1. A control device or locking mechanism shall **not** prevent individuals from exiting a posted/controlled VHRA when there are individuals in the area.

2. VHRAs shall **not** be left open or unlocked unless measures are provided for positive control over each individual entry, e.g., direct surveillance of the access by a Radiation Protection Technician.

3. If VHRA **cannot** be controlled by a barricade or locked door, it may be controlled by direct surveillance of the boundary. However, in those situations, the area must still be posted in accordance with RP-AA-376.

4.1.2. Limitations

1. For instances where locks, barricades, or physical barriers for a VHRA are defeated, the normal control method is to use an Access Controller as outlined in this procedure. As an alternative, if electronic means is used to provide direct surveillance, then the Radiation Protection Manager, or designee, will approve use by completing Attachment 8, Approval for Very High Radiation Area Deviations.
2. Materials located in spent fuel pools, reactor vessels, and flooded refueling cavities could create a LHRA/VHRA when unshielded. If materials are considered inaccessible due to being stored and covered by several feet of water, then measures shall be taken, as necessary, to ensure that activated materials are **not** inadvertently raised above or brought near the surface of the water.
3. If shielding is readily removable by hand (such as lead blankets, bricks, or other portable shielding), and such shielding is used to make an area inaccessible and is **no** longer posted or controlled as a VHRA, then a sign or label shall be placed on or near the shielding. The sign or label shall contain words such as the following: "Warning – Do **Not** Remove Without RP Approval. Elevated Radiation Levels Could Result." In addition, consider locking shielding in place or installation of a local radiation monitor with alarming capability to warn personnel of high exposure rates created by removal of shielding. Written approval from the Radiation Protection Manager or designee shall be obtained when using Attachment 8 for use of shielding for controlling access.
4. Steps in this procedure may be performed in any order, as long as regulatory and station Technical Specification requirements continue to be met.

4.1.3. Prerequisites

1. **INITIATE** a radiological risk assessment in accordance with RP-AA-401-1002, Radiological Risk Management.
2. Entry to a VHRA is classified as High Radiological Risk

4.2. General Administrative Requirements

4.2.1. Additional radiological planning and controls are necessary for entry into a Very High Radiation Area.

4.2.2. **ADMINISTER** padlocks and keys used for control of VHRAs through the Radiation Protection Manager. When Master keys are available, **LIMIT** the use of such keys, **not** in the possession of the Radiation Protection Department to emergency entries. In the event that use of a Master key is needed for access, contact RP prior to area entry.

4.2.3. **USE** a unique key to control access to VHRAs

4.2.4. Keep keys designated for access to VHRAs locked in a suitable cabinet or locker when **not** issued for use, and this cabinet or locker shall be kept locked while unattended by Radiation Protection. **(CM-1)**

1. Keys designated for VHRAs are to be maintained in a separate cabinet from ALL other keys and **CONTROLLED** by the RPM.

4.2.5. **CHECK** postings, barricades, and physical barriers for VHRAs at least weekly to ensure that proper controls remain in place unless otherwise authorized by Radiation Protection Supervision.

4.2.6. Only Qualified RPTs are authorized to alter the position of radiological boundaries or barricades associated with VHRA. **(CM-4)**

4.2.7. **LOCK, POST and CONTROL** cranes, hoists or proximate lifting devices that may be used to gain access to VHRAs or potential VHRAs (e.g. lifting hoist to lift floor plugs to demin vessels, overhead crane that can transit over a wall into an VHRA, etc.).

1. Ensure a warning label or posting is present stating "Notify RP Before Removing Shield Plug", or equivalent, to notify the worker in accordance with 10CFR19 requirements.

4.2.8. **CONDUCT** an inventory/accounting of VHRA keys once per shift.

4.3. <u>VHRA Controls (>500 Rad in one hour at one meter)</u>

4.3.1. Identification of Very High Radiation Areas

1. **POST <u>AND</u> CONTROL** area as a Very High Radiation Area **WHEN** dose rate accessible to the whole body is greater than or equal to 500 rad in 1 hour at 1 meter.

4.3.2. Implementation of VHRA Controls

1. RP management **DETERMINE** VHRA boundary control method per the following **<u>AND</u> DIRECT** RPT(s) and appropriate support personnel.

   A. **<u>IF</u>** access will **NOT** be required to area, **<u>THEN</u>** completely **ENCLOSE** area with VHRA physical barrier (i.e.; cocoon area).

   B. **<u>IF</u>** periodic access to affected area is required, **<u>THEN</u> ENCLOSE** affected area with VHRA physical barrier with VHRA Access **LOCKED** with a VHRA lock.

2. Only qualified RPTs are authorized to alter the position of radiological boundaries or barricades associated with VHRAs. **ESTABLISH** VHRA controls per Attachment 1, "Establishing and Verifying VHRA Controls."

4.3.3. VHRA Access Authorization Requirements

NOTE: When possible, down-post a VHRA prior to entry based upon operational parameters and remote radiation monitor readings.

CAUTION
To the extent possible, entry into a VHRA should be forbidden unless there is a sound operational or safety reason for entering. Without proper controls and monitoring, personnel entering these areas could receive radiation exposure with severe or life-threatening consequences.

1. **OBTAIN** approval of the Radiation Protection Manager or designee **and OBTAIN** approval of the Site VP, Plant Manager, or designee prior to entry. These approvals may be made by telephone. Such approvals may only be granted following a documented evaluation of the risks and alternatives.

    A. **DOCUMENT** approval on Attachment 7.

2. **APPLY** radiological controls for entry to VHRAs based upon appropriate procedures. As a minimum, these procedures should contain the following criteria:

    A. **ENSURE** adequate communications exist among all workers supporting the entry (i.e., pre-job brief, who will enter area, what type of work will be performed, when entry is complete, etc.).

    B. **ESTABLISH** the RPT job coverage requirements for entry, **and** continuously **MONITOR** personal entries.

    C. **REQUIRE** a specific RWP for entry to the area with electronic dosimetry that has the capability to display accumulated dose and integrates the radiation dose rates in the area and alarms when a preset integrated dose is received.

3. **AUTHORIZE** access to a VHRA via Radiation Work Permit applicable to the area.

    A. **REQUIRE** each individual entering a VHRA to have a functioning electronic dosimeter as applicable RWP.

    B. **REQUIRE** individuals entering a VHRA to be equipped with one or more of the following.

        1. A radiation monitoring device which continually indicates the radiation dose rate in the area.

2. A radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a pre-set integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rate levels in the area have been established and personnel made aware of them.

3. A RP individual qualified in radiation protection procedures with a radiation dose rate device, who is responsible for positive control over the activities in the area and shall perform periodic radiation surveillance at the frequencies specified in the RWP.

Limerick, Peach Bottom, and LaSalle

Be under the surveillance, as specified in the RWP, by means of closed circuit television, of an RP qualified individual (i.e., qualified in radiation protection procedures), responsible for controlling personnel radiation exposure in the area, and with the means to communicate with the individuals in the area.

NOTE: RP personnel may not conduct self-briefings for VHRAs

4. The RP Technician or RP Supervision **CONDUCTS AND DOCUMENTS** VHRA briefing for each individual making a VHRA entry per Attachment 3 at the following frequencies:

   A. PRIOR to initial entry

   B. Shiftly thereafter

   C. Significant change in radiological conditions

5. IF work area dose rates greater than 1500 mR/hr or > 500 mrem per entry **REFER** to RP-AA-460-002 AND **THEN COMPLY** with applicable requirements.

4.3.4. Controlling Access to Self-Locking VHRA

1. **ISSUE** VHRA Key to a Qualified RPT using Attachment 6 or computerized equivalent.

2. RPT **PERFORMS** the following VHRA access control functions.

   A. **VERIFIES** each entrant has **ALL** required dosimetry.

   B. **VERIFIES** each entrant's Radiation Worker Pocket RWP Data Sheet reflects appropriate RWP **AND** that entrant has had VHRA brief.

C. **VERIFIES** each entrant's ED setpoints are as required by Radiation Worker Pocket RWP Data Sheet.

D. **VERIFIES** workers have been briefed in accordance with step 4.3.3.4.

E. **ALLOWS OR DENIES** entry as appropriate.

3. **WHEN** a worker exits a VHRA while other personnel are still in the area, the RPT **OR** worker **SHALL** physically challenge the VHRA door to ensure is closed **AND** locked.

4. **WHEN ALL** personnel have exited area, the last individual out **NOTIFIES** the RPT that all personnel have exited the area.

5. RPT and remaining worker **VERIFY** via physical challenge that VHRA Access is closed **AND** locked.

6. **DOCUMENT** VHRA closure verification and peer check via Attachment 6 or computerized equivalent.

4.3.5. Controlling Access to NON Self-Locking VHRA

1. **ISSUE** VHRA Key to a Qualified RPT using Attachment 6 or computerized equivalent.

2. **DESIGNATE** an VHRA Access Control Guard

   A. **IF** VHRA Access Control Guard is a non-RP individual, **THEN** RP **BRIEFS** individual **AND ENSURES** individual **READS** and **SIGNS** Attachment 4.

3. **INITIATE AND USE** Attachment 5 or equivalent to document **ALL** entries and exits from VHRA.

4. VHRA Access Control Guard **PERFORMS** the access control functions per Attachment 4.

5. When all personnel have exited from the area, the VHRA Control Guard ENSURES the following.

   A. RP is **NOTIFED** that all personnel have exited the area.

   B. **IF** Attachment 5 is lost while being used, or a card reader system fails while being used in lieu of completing the log in section 2 of Attachment 5, **THEN** prior to locking the area, **USE** an additional accountability method to ensure that all personnel are out of the area upon completion of work, e.g.; a physical search or head count (CM-2)

6. RPT **AND** VHRA Access Control Guard **VERIFY** via physical challenge that the VHRA access point barrier is closed and locked.

7. **DOCUMENT** the verified and peer-checked VHRA closure via Attachment 6.

4.3.6. Down Posting VHRA

1. **OBTAIN** authorization from RPM or designee to begin VHRA down-posting evolution.

2. **ENSURE** RP Supervision is onsite prior to commencing down posting evolution.

3. **CONDUCT** VHRA down posting per Attachment 2, "VHRA Down-Posting Actions and Verifications".

4.3.7. **If** a transfer of Radiation Protection Technicians responsibilities from one individual to another is necessary, **PERFORM** the following:

1. New Radiation Protection Technician: **COMPLETE** the appropriate entries in the "Key Issue" columns on Attachment 6 or computerized equivalent, **or** have another person complete the entries (e.g., by phone) to accept responsibility from the current Radiation Protection Technician.

2. Current Radiation Protection Technician: **TRANSFER** the VHRA key to the new Radiation Protection Technician, **and NOTIFY** the RP Office (e.g., in person or by phone) that the transfer is complete.

4.3.8. Accounting for VHRA Keys

1. The RPM or designee shall **ACCOUNT** for VHRA keys used during the shift. This accounting should be documented in RP logbook, or a site-specific document or equivalent.

5. DOCUMENTATION

5.1. There are no retention requirements for Attachments 3.

5.2. Attachments 1,2,4,5,7, and 8 shall be retained with the applicable RWP.

5.3. Attachment 6 shall be maintained in accordance with SRRS.

6. REFERENCES

6.1. Commitments

6.1.1. CM-1 Oyster Creek and TMI Commitment: 1982T0065 regarding upgraded administrative controls for HRA-related keys and associated key locker. (Step 4.2.3.)

6.1.2. CM-2 Dresden Commitment: 237-200-97-03202 for providing a log to track entry into LHRAs/VHRAs when a door locking mechanism would prevent free unobstructed egress from the area, and also for those cases, for using an additional accountability method to ensure all personnel are out of the area upon completion of work if the log is misplaced during use. (Step 4.3.5.5.B)

6.1.3. CM-3 LaSalle Commitment: 3-2004-009 for providing Radiation Protection aid for conducting HRA briefings (Attachment 3).

6.1.4. CM-4 Clinton Commitment 726499-31 identify that relocating or modifying any VHRA posting is a posting change. (Step 4.2.5)

6.2. <u>User References</u>

6.2.1. 10 CFR Part 20.1602, "Control of Access to Very High Radiation Areas."

6.2.2. USNRC Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants."

6.2.3. USNRC Information Notice 86-107, "Licensee Alert to Reactor Cavity (Incore Shaft) Entries."

6.2.4. WANO SOER 2001-1, "Unplanned Radiation Exposures."

6.2.5. RP-AA-376, "Radiological Postings, Labeling and Markings"

6.2.6. RP-AA-460-002, " Additional High Radiation Exposure Controls"

6.2.7. RP-401-1002, "Radiological Risk Management"

7. ATTACHMENTS

7.1. Attachment 1, Establishing and Verifying VHRA Controls

7.2. Attachment 2, VHRA Down Posting Actions and Verifications,

7.3. Attachment 3, Very High Radiation (VHRA) Briefing Sheet

7.4. Attachment 4, Responsibilities for the VHRA Access Controller

7.5. Attachment 5, VHRA Access Log

7.6. Attachment 6, VHRA Key Log

7.7. Attachment 7, Access to VHRA Approval Form

7.8. Attachment 8, Approval for VHRA Deviations

Attachment 1
Establishing and Verifying VHRA Controls
Page 1 of 2

Pre-Job Briefing

1. **PRIOR** to performing VHRA posting change, RPT will receive pre-job brief from RP Supervision or Senior RPT on shift.

You are preparing to establish a Very High Radiation Area. This is being performed to protect and inform radworkers of radiological hazards. You must remain focused with the task to ensure this posting change is performed error free.

Area involving posting change____

2. What are the Critical Steps in this task?
   - Recognize conditions of the area. (dose, contamination, limits)
   - Post area correctly & consistently (Think of all posting requirements: HRA, LHRA, VHRA)
   - Documentation
   - Notify Operations and Security of changes if needed.
   - Ladders or other means do not give unauthorized access to area.

3. What is the Worst Thing that can go wrong from both an Operational and Industrial Safety perspective?
   - NRC Violation
   - Tech Spec. Violation
   - Electrical/Physical/Mechanical hazards within area cause an injury while performing the posting change.

4. What are the Error-Likely Situations?
   - Ladders, scaffolds, doors leading into or out of area not posted.
   - RAM transfer / changing conditions not considered

5. What Defenses are we relying on?
   - Procedures
   - Self-Check
   - Peer Check
   - OE Review

6. What actions will ensure proper Configuration Control?
   - 2 Minute Drill at the job site.

Briefing provided by (print/sign) ____________________________ Date/Time_____________

Briefing received by (print/sign) ____________________________ Date/Time_____________

____________________________ Date/Time_____________

____________________________ Date/Time_____________

____________________________ Date/Time_____________

____________________________ Date/Time_____________

____________________________ Date/Time_____________

Attachment 1
Establishing and Verifying VHRA Controls
Page 2 of 2

Field Implementation

The following steps shall be performed for establishing and verifying VHRA and signed/initialed once complete.

INITIALS

1. Physical barrier around the area;

_____ Is properly posted in accordance with RP-AA-376 to reflect conditions in the area.
_____ Is robust enough to prevent unauthorized entry

- Physical barriers (such as chain link fencing or fabricated walls) used to prevent unauthorized personnel access.
- No pearl weave/light snow fence/nylon panels
- Material that can be readily cut using common cutting tools (e.g. razor knife, box knife, scissors, etc.) is not acceptable as VHRA barrier material

_____ A physical barrier used in conjunction with an VHRA should be sufficient to prevent inadvertent entry, To the extent practicable, physical barriers should completely enclose VHRA in a manner that is sufficient to thwart undetected circumvention of the barrier. That is, fencing around VHRA should extend to the overhead and preclude anyone from climbing over the fencing.
_____ Uses metal fasteners to secure to frame/supports.
_____ Is secured at ends to prevent movement.
_____ Does not have material staged beside boundary that could allow easy access over the VHRA physical barrier. (drums/boxes/rolling ladders)
_____ Have all openings in the physical barrier controlled to restrict access to the major portion of whole body. (no significant gaps, i.e. > 6 inches nominal).

2. All accesses into the area have proper postings and controls, i.e.

_____ Are properly posted in accordance with RP-AA-376 to reflect conditions in the area.
_____ Ladders are secured by ladder locks or cocooned in fencing.
_____ Stairs are secured with fencing or equivalent.
_____ Doors can be locked.
_____ Open doorways are barricaded using fencing, lockable fence gates or equivalent.

_____ Scaffolds in the area have proper postings in accordance with RP-AA-376 to reflect the conditions accessed by the scaffold - access to any VHRA by the scaffold is controlled with the proper postings and VHRA access barriers.

_____ **PERFORM** final check to ensure any scaffolds, permanent platforms, stairs, ladders, or other plant structures are properly controlled to prevent unauthorized access to the area.

_____ Unauthorized personnel are evacuated prior to locking VHRA.

_____ **REVIEW** new VHRA controls - are all postings consistent? Does it make sense to the radworker with nothing left to interpretation?

3. Survey of the area boundaries **PERFORMED** and **DOCUMENTED** confirming dose rates to be 500 rad/hr or less. Ensure any additional HRA/LHRA controls are in place beyond VHRA boundary if required.

RPT (print/sign) ____________________________ Date/Time____________

4. Independent confirmatory survey of boundary dose rates **PERFORMED** and **DOCUMENTED** by:

RPT (print/sign) ____________________________ Date/Time____________

5. Radiation Protection Management field review of barriers, posting and VHRA locking device as applicable.

RPT (print/sign) ____________________________ Date/Time____________

Retain with RWP

Attachment 2
VHRA Down Posting Actions and Verifications
Page 1 of 2

Pre-Job Briefing

1. **PRIOR** to performing VHRA down posting change, RPT will receive pre-job brief from RP Supervision.

You are preparing to down post a Very High Radiation Area. This is being performed to protect and inform radworkers of radiological hazards. You must remain focused with the task to ensure this posting change is performed error free.

Area involving posting change______________________________

2. What are the Critical Steps in this task?
   - Recognize conditions of the area. (dose, contamination, limits)
   - De-Post area correctly & consistently
   - Documentation
   - Notify Operations and Security of changes if needed.

3. What is the Worst Thing that can go wrong from both an Operational and Industrial Safety perspective?
   - NRC Violation
   - Tech Spec. Violation
   - Electrical/Physical/Mechanical hazards within area cause an injury while performing the posting change.

4. What are the Error-Likely Situations?
   - Ladders, scaffolds, doors leading into or out of area not posted.
   - RAM transfer / changing conditions not considered.
   - Material staged within the area not surveyed.

5. What Defenses are we relying on?
   - Procedures
   - Self-Check
   - Independent Verification
   - Peer Check
   - OE Discussion

5. What actions will ensure proper Configuration Control?
   - 2 Minute Drill at the job site.

Briefing provided by____________________ Date/Time__________

Briefing received by:

Print and Sign: __________________	Print and Sign: __________________
Print and Sign: __________________	Print and Sign: __________________
Print and Sign: __________________	Print and Sign: __________________
Print and Sign: __________________	Print and Sign: __________________

Retain with RWP

Attachment 2
Page 2 of 2

Field Implementation

The following steps to be signed/initialed once complete.

INITIALS

_____ 1. **OBTAIN** authorization from RP Supervision to begin VHRA down-posting evolution

_____ 2. **ENSURE** RP Supervision is onsite prior to commencing down posting evolution.

_____ 3. **REVIEW** most current survey of area being down posted.

4. **PERFORM** and **DOCUMENT** an initial radiation survey.
   - Confirm dose rates to be less than 500 rad/hr.
   - All items in the area (bags and containers) are included in the survey.

RPT (print/sign) ______________________________ Date/Time____________

5. **PERFORM** and **DOCUMENT** independent confirmatory survey of area
   - Confirm dose rates to be 500 rad/hr or less.
   - All items in the area (bags and containers) are included in the survey.

RPT (print/sign)______________________________ Date/Time____________

6. Radiation Protection Supervision **REVIEW** survey documentation and **CONCURS** with down-posting the area.

Name (print/sign)______________________________ Date/Time____________

7. Radiation Protection Management review of field conditions and **APPROVES** down posting.

Name (print/sign)______________________________ Date/Time____________

_____ 8. Area being released has the proper ropes and postings to reflect new conditions including:
   - Stairs and ladders
   - Scaffolding within the area
   - Affected adjacent areas
   - Removable shielding used to make VHRA inaccessible secured in place by fasteners that would require a tool to remove and has signage such as "Warning – Do Not Remove Without RP Approval. Elevated Radiation Levels Could Result" and authorization waiver signed by RPM or designee.
   - Any additional barriers that need to be set up are done prior to releasing the VHRA

_____ 9. **STOP** and **LOOK** at the area - are all postings consistent? Does it make sense to the radworker with nothing left to interpretation?

10. Radiation Protection Management field review of final conditions.

Name (print/sign)______________________________ Date/Time____________

Retain with RWP

ATTACHMENT 3
VERY HIGH RADIATION AREA (VHRA) BRIEFING FORM (CM-3)
Page 1 of 1

Briefing: Date/Time ______________________ RWP # ____________ Rev# ______

VHRA to be entered: ____

Task Description/Purpose of Entry ____

Discussion Points

RWP ED ALARM Set points: ________mrem ___________mrem/hr Stay time:________ RPT Initial: _________
Check each box as item is covered

- ☐ **INTRODUCE** the start of the brief, the purpose, and the duration the VHRA briefing is valid for.
- ☐ **ASK** the worker(s) if they have read and understand the RWP, and if they have any questions. The most recent revision of the governing RWP **shall** be referenced during the briefing to ensure access to a VHRA is allowed.
- ☐ **UTILIZE** survey or location maps as appropriate to accurately identify locations of work
- ☐ **DISCUSS** scope of work activities to occur during the entries
- ☐ **DISCUSS** the posting of the area, control devices and access requirements
- ☐ **DISCUSS** anticipated radiological condition ranges in the work area and travel path
- ☐ **IDENTIFY** sources of radiation and low dose area information in work area
- ☐ **IDENTIFY** required dosimetry
- ☐ **DISCUSS** the need for the worker to verify their ED alarm set points match their pocket RWP set points just prior to initial entry into the area.
- ☐ **DISCUSS** the need to check their ED frequently, at least every 15 minutes while in the area.
- ☐ **INFORM** workers **not** to move items within the area that could increase boundary dose rates without a RPT present.
- ☐ **DISCUSS** proper controls for barricades and postings upon entering and exiting the area.
- ☐ **INFORM** worker that if they are unable to hear their ED for any reason, they are required to notify RP at the brief, utilize a modified ED, or have other approved means to control their exposure for the entry.
- ☐ **ASK** if anyone involved in the brief has any questions regarding the entry.
- ☐ **INFORM** all involved of the conclusion of the brief.

Briefing and Acknowledgment

VHRA Brief Provided By: ______________________ / ______________________
(Print) (Signature)

Briefing Received By:

(Print)	(Signature)	(Print)	(Signature)

No Retention Required

ATTACHMENT 4
Responsibilities for the VHRA Access Controller
Page 1 of 1

(For Completion by Non-RP Personnel Only)

Date____________ Time ____________

Area to be attended: ____

Individual signing as the Access Controller has read, understands, and accepts the following responsibilities:

1. **REMAIN** outside the assigned area and **MAINTAIN** direct "line-of-sight" surveillance of the access to the VHRA until the access/barrier is re-secured.
2. **PREVENT** unauthorized entry into the VHRA by performing the following actions for any individual requesting access to the area.
   - Prior to entry into the VHRA, Access Controller will VERIFY worker's ED alarm set points are the same as on the worker's Radiation Worker Pocket RWP Data Sheet (Trip Ticket).
   - **OBTAIN** verbal acknowledgement from the individual that he/she has contacted RP and is covered under the provisions of an RWP authorizing access to the VHRA.
   - **If** a satisfactory response is received to the above communications, **then PERMIT** entry to the area. **Otherwise**, **DENY** entry **and INSTRUCT** the individual to contact RP.
3. **VERIFY** that personnel are able to exit the VHRA at any time, i.e., **<u>not</u>** prevented from leaving the area by a locked or obstructed access.
4. **If** the VHRA Access Controller function is being performed due to the presence of a non-self-locking door (e.g., a door normally locked with a hasp and padlock), **then COMPLETE** Attachment 5, VHRA Access Log for each entry and exit. For identification purposes, for each Access Control Guard, **PRINT** your name in the appropriate blank on Attachment 5. Also, prior to the Key Custodian re-securing the access/barrier, **VERIFY** that Attachment 5 is complete and all personnel are out of the area, signing the applicable blank on the form. **If** Attachment 5 is lost **or** a card reader system fails while being used in lieu of completing the log in Section 2 of Attachment 5, **then** prior to locking the area, **USE** an additional accountability method to ensure all personnel are out of the area.
5. For an VHRA, upon completion of the work in the area and **prior** to leaving area, **ENSURE** that the following actions have occurred:
   - Barrier has been locked, and signed off on Attachment 6.
   - Barrier has been verified locked, and signed off on Attachment 6.
   - Access Controller may perform one of these functions under the direct supervision of RP personnel.
6. **Prior** to transferring Access Controller responsibilities, **VERIFY:**
   - The relief individual has a signed copy of this form.
   - The relief individual is aware of the conditions of the work area.
   - The relief individual has a lime green Access Control Guard Vest that is passed between access control guards to clearly establish when turnover at the assigned area is complete.
7. **RETURN** a completed Attachment 5 to Radiation Protection after the VHRA is re-secured, if completion of such form was required in accordance with this procedure. **The Access** Controller may transfer the completed VHRA Access Log to the Access Controller/ RP individual in lieu of returning it to the RP Office in person.

Access Control Guard Signature (print/sign): ______________________________ Date: _________

RP Individual performing Access Control Brief (print/sign):______________________ Date: _________

Retain with RWP

ATTACHMENT 5
VHRA Access Log
Page 1 of 1

Section 1: Access Controller Information:

Date of log initiation: __________ Location: ______________________________

Access Controller Using Log (Print): #1 ____________________________

#2 ____________________________

#3 ____________________________

Section 2: Record of Personnel Entering/Exiting Area:

Name of Person Entering Area: (Print)	RWP #	Individual ED Verified	Time In	Time Out	Time In	Time Out

___ Card reader data or access control programs were used to confirm that all personnel exited the area in lieu of completing the above log. **If** confirmation is by talking with another individual reviewing card reader/ access control data, **RECORD** the name of the individual:

Name: ______________________.

Section 3: Peer Check

Upon completion of work, **VERIFY** all persons are logged out of the area and barrier is secured and verified.

Barrier Locked: ________________ Barrier Verified Locked: ____________________

Access Controller: ______________________

RP Supervisor Review: ______________________ Date: ______________

Retain with RWP

ATTACHMENT 6
VHRA Key Log
Page 1 of 1

KEY ISSUE					KEY RETURN	PEER CHECK (required for VHRA)	KEY TRANSFER
Key #	Location/ Door Number To Be Locked	Key Issued By:	RP Key Custodian (Print Name) (Signature)	Date/Time	* Area Locked By: Initials/Date/Time Key Returned By: Initials/Date/Time	Area Verified Locked By: Initials/Date/Time	Notified of Key Transfer To: (Print Name) Initials/Date/Time

RP Supervisor (or designee) Review: ______________________ **Date:** _____________

* If an RPT is downposting an area and a lock is **no** longer required, then the appropriate blank in this column should be marked "Downposted," in addition to Initials/Date/Time. .

ATTACHMENT 7
Access to VHRA Approval Form
Page 1 of 1

Location/Description of Area: ______________________________

Date of Request: ____________

Requestor: ________________ Department: ___________

Applicable RWP #: ___________ RWP Revision #: _________

Access Review and Approval:

___ The RWP instructions are adequate to address radiological conditions expected for this work.

___ The ALARA or Micro-ALARA Plan Review (if required by station procedure) for this work is complete and signed.

___ A briefing has been performed for all personnel involved with this work.

___ A documented evaluation of the risks and alternatives associated with this entry has been performed and is adequate, including assessment of the radiological risk in accordance with RP-401-1002, Radiological Risk Management.

___ Key is issued to RP individual.

Approval: ____________________ Date: _____ Time: ______
Radiation Protection Manager, or designee

Approval: ____________________ Date: _____ Time: ______
Site VP, Plant Manager, or designee

___ Approval for access to VHRA was granted by the Site VP, Plant Manager, or designee by telephone

ATTACHMENT 8
Approval for VHRA Deviations
Page 1 of 1

This form is to be used for approval to deviate from standard Very High Radiation Area processes. Exceptions must comply with the controls required by 10CFR20 and station specific Technical Specifications.

Location of Deviation: ______________________________

RWP #: ______________________________

Description of Deviation:

___ Approval for USE of shielding/signage for controlling VHRA access.

___ Approval for Continuous Electronic Surveillance IN LIEU OF Access Controller.

Justification and/or Comments:

Deviation Requested By: ______________________________ Date: __________

Deviation Approved By: ______________________________ Date: __________
Radiation Protection Manager

Retain with RWP

HEAT STRESS CONTROL

1. **PURPOSE**

1.1. To establish the responsibilities and administrative controls for protecting employees from the adverse effects of performing work in thermally elevated environments.

1.2. Applicability

1.2.1. This procedure must be used to minimize the effects of heat stress conditions on personnel working high temperature jobs (See 2.16 for definition of high temperature jobs).

1.2.2. This procedure, including the establishment of action and recovery times, etc., is not applicable when using heart rate monitors in accordance with SA-AA-111-1001 except in work areas with dry bulb temperatures >= 120°F **or** WBGT >= 110°F.

1.2.3. The use of heart rate monitors in accordance with SA-AA-111-1001, in lieu of this procedure, is recommended for use (i.e., most effective) when performing work in thermally elevated environments for which the action time determined by this procedure is <= to 60 minutes (i.e., the lower the action time, then the more beneficial the heart rate monitor becomes).

1.2.4. This procedure does **not** apply to emergency situations where there is potential for loss of life or loss of property. However, heat stress concerns should be addressed during briefings for emergency situations when possible.

1.2.5. Action and recovery times outlined in this procedure do **not** apply to frequently performed tours that require personnel to transit through multiple areas while performing low to moderate tasks (i.e., Operator rounds, Security patrols, Security physical fitness tests, Security range activities, etc.) because, due to the varying nature of the tasks and multiple areas covered by the tour or activities, specific stay times cannot be calculated. Personnel performing such activities in warm environments should be cognizant of their personal limitations, stay well hydrated, take breaks as needed, and report any excessive conditions.

1.3. Limitations

1.3.1. Use of Attachment 1, WBGT Estimate Table is for information use only and must **not** be used for determining Action Times, Check Times and Recovery Times for specific activities. Only WBGT values obtained with a WBGT instrument can be used for the purpose of determining Action Times, Check Times or other administrative controls.

Exception:
Dry Bulb Temperatures may be used to determine Action Times, Check Times or other administrative controls for initial entries into normally unoccupied areas such as containment, drywell, and steam tunnels, etc., as long as they are verified or adjusted soon after using WGBT values.

1.3.2. This procedure **<u>cannot</u>** be used in Extremely High Temperatures. Work in Extremely High Temperatures can be accomplished only through a specific safety plan that includes engineering controls and personal protective equipment adequate to protect the worker.

1.3.3. The instrument used to obtain WBGT values shall be calibrated in accordance with vendor recommendations (i.e., method, frequency, etc.) and the calibration shall be current at the time of use.

2. TERMS AND DEFINITIONS

2.1. **<u>Acclimation</u>:** A gradual adjustment of an individual's body systems, due to daily heat exposure, that leads to improved heat tolerance.

Note: The terms "action time" and "stay time" are synonymous.

2.2. **<u>Action Time (AT)</u>:** A calculated work time limit for which most individuals can be expected to perform work activities in thermally elevated environments without experiencing heat stress symptoms or heat illnesses.

2.3. **<u>Action Time Matrix</u>:** Matrix used to determine a specific Action Time based on the WBGT, Work Rate for the activity and clothing ensemble. This matrix is contained in Attachment 3, Heat Stress Action Time Limits.

2.4. **<u>Actual Work Time (AWT)</u>:** The time period that an individual employee is exposed to heat stress conditions while performing work activities.

2.5. **<u>Administrative Controls</u>:** Management processes that control the work environment and work activities to ensure that worker exposure to thermally elevated environments is limited to time periods and conditions which reduce the effects of heat stress.

2.6. **<u>Check Times (CT)</u>:** The prescribed time intervals for which the physical condition of a worker must be evaluated to determine if work can be safely continued after reaching the Action Time.

2.7. **<u>Cooling Garments</u>:** A garment worn by employees performing work activities in thermally elevated environments that accomplishes body cooling or heat removal

from the body through the action of cooled air, cool liquid, or application of frozen fluid on the body.

2.8. **Cool Area:** An area (indoors or outdoors) which is designated for the rest and recovery of employees performing work in thermally elevated environments. Cool Areas should have a Wet Bulb Globe Temperature of <27°C or <81°F.

2.9. **Dry Bulb Temperature:** Direct measurement of ambient air temperature, in °F or °C, measured with a dry bulb thermometer.

2.10. **Engineering Controls:** Controls which reduce heat stress on employees by changing the conditions of the job environment. The purpose is to reduce the heat gain within the body due to performing work in thermally elevated environments or to increase the heat loss from the body while performing work activities.

2.11. **Extremely High Temperature:** Dry bulb temperatures greater than 160°F or WBGT greater than 120°F. Work in extremely high temperature conditions is beyond the scope of this procedure.

2.12. **Heat Illness:** Also known as Heat Disorder. Serious health impairment caused by a significant rise in core body temperature or by the loss of salt and dehydration due to excessive sweating. These illness symptoms and adverse physical conditions include heat rash, heat cramps, heat exhaustion and heat stroke. See 4.5.2 for definitions.

2.13. **Heat Stress:** The physiological condition which occurs when moderate to high temperatures and/or humidity, work conditions, physical condition and protective clothing requirements combine to exceed the ability of the body to cool itself. These physiological and environmental conditions can lead to heat related illness and symptoms.

2.14. **Heat Stress Conditions:** Environmental or physical conditions in which a worker may be susceptible to heat stress or heat illness.

2.14.1. These conditions may include but are **not** limited to:

- Areas of high heat and/or humidity (i.e., drywell, steam or hot water leak areas, or hot exterior weather conditions).
- Areas with significant sources of radiant heat (i.e., boiler rooms, diesel generator areas, steam piping and other heated vessels or the reactor cavity).
- Conditions involving the use of protective clothing such as anti-contamination clothing, fire resistant clothing, etc.

2.15. **Heat Stress Hygiene Practices**: Actions taken by or physical condition of an individual employee that reduce the risk of heat stress related illnesses, these include:

- Fluid replacement and drinking fluids prior to entering a thermally elevated environment to perform work activities
- Self-determination of exposure
- Diet, lifestyle, and physical health
- Acclimation to high temperatures

2.16. **High Temperature Jobs**: Specific work activities, often involving the use of protective clothing or respirators, in environments that can be expected to induce heat stress in workers performing the activity. High Temperature Jobs are defined as activities that have calculated heat stress action times. Heat stress action times can begin with a Wet Bulb Globe Temperature of 63°F for people working in impermeable (plastic) clothing at a high work rate.

2.17. **Humidity**: Also known as Relative Humidity. The ratio of the amount of water vapor present in ambient air to the greatest amount of water vapor possible at a given dry bulb air temperature.

2.18. **Protective Clothing (PC's)**: Suits, coveralls, jackets, and other types of clothing required as dictated by radiological and non-radiological conditions. Protective clothing insulates the body and retards heat loss. Protective clothing can increase the risk of heat stress.

2.19. **Radiant Heat**: Heat given off by hot surfaces in the line-of-sight of the worker. Sources include steam lines, valves, reactor vessel, etc.

2.20. **Recovery Time (RT):** Also known as Rest Time. The time required for an individual to remain in a cool area, following heat exposure.

2.21. **Self-Determination**: The process by which a worker assesses his/her ability to work beyond or less than the Action Time.

2.22. **Service Time:** An estimate of the time required for the frozen media used as a heat sink in a cooling garment to melt. Either the frozen media must be replaced or the worker must leave the high temperature environment before the end of the Service Time. Service times may be adjusted based on experience gained in similar work environments.

2.23. **Wet Bulb Globe Temperature (WBGT)**: A derived temperature which takes into effect several environmental conditions including air temperature (dry bulb temp.), humidity and radiant heat in a work environment.

2.23.1. **Wet Bulb Globe Temperature – Indoor (WBGTi):** Wet bulb globe temperature reading to be used for all indoor measurements and Form 4 calculations (WBGTi = 0.7 Wet Bulb + 0.3 Globe).

2.23.2. **Wet Bulb Globe Temperature – Outdoor (WBGTo):** Wet bulb globe temperature reading to be used for all outdoor measurements and Form 4 calculations (WBGTo = 0.7 Wet Bulb + 0.2 Globe + 0.1 Dry Bulb).

2.24. **Work Rate:** Characterization or estimate of the level of physical effort needed to perform an individual work activity or series of activities. The work rate for an individual or group of activities is characterized as Light, Moderate, or Heavy based on guidance contained in Attachment 2, Work Rate Metabolism Guideline.

2.25. **Very High Temperatures:** Work areas with dry bulb temperatures between 120°F and 160°F **or** WBGT between 110°F and 120°F.

3. RESPONSIBILITIES

3.1. Site Safety Professional

3.1.1. Designate instrumentation for evaluating environmental conditions relating to heat stress based on the available approved equipment options.

3.1.2. Provide assistance to supervisors in determining Action Times, Check Times and Recovery Times.

3.1.3. Provide assistance to supervisors in utilizing instrumentation to evaluate and characterize environmental working conditions.

3.1.4. Provide assistance to supervisors in selecting and implementing countermeasures to address high temperature jobs.

3.2. Radiation Protection

3.2.1. Evaluate anti-contamination protective clothing to ensure it serves its purpose without imposing undue heat stress risks on employees.

3.2.2. Provide guidance to supervisors in identifying appropriate cool areas for high temperature jobs in Radiologically Controlled Areas.

3.2.3. Promptly perform radiological monitoring of workers exiting contaminated areas in order to minimize the delay in doffing anti-contamination clothing and commencing the cool down process.

3.3. Supervisor

NOTE: Supervisors may designate Lead Workers to assist them with performing responsibilities as needed.

3.3.1. Obtain WBGT measurements for high temperature jobs.

3.3.2. Perform the Pre-Job Brief as outlined in 4.5 of this procedure.

3.3.3. Ensure that workers are familiar with heat stress hygiene practices.

3.3.4. Identify high temperature jobs and select appropriate heat stress hygiene practices, cool areas, engineering controls and administrative controls as needed.

3.3.5. Determine required Action Times, Check Times, Service Times and Recovery Times for high temperature jobs when heat stress conditions justify the implementation of this procedure.

3.3.6. Perform the Check Time process when employees are exposed to heat stress conditions beyond the Action Time or designate an individual employee to perform the Check Time process.

3.3.7. Require an employee exhibiting symptoms of heat stress to terminate their exposure to heat stress conditions.

3.3.8. Monitor, on a periodic basis, workers for signs of heat stress.

3.3.9. Ensure the work environment is periodically assessed for changes in temperature and humidity.

3.3.10. Communicate to employees the specific administrative and engineering controls in place to address identified heat stress conditions through the pre-job brief.

3.3.11. Develop safety plans for work in Very High Temperatures per section 4.10.

3.4. Occupational Health

3.4.1. Assist Supervisors in evaluating personnel regarding their ability to perform work in heat stress conditions.

3.4.2. Assist Supervisors during high temperature job activities to ensure that heat stress hygiene practices are implemented effectively.

3.4.3. Assist Supervisors during high temperature job activities to ensure that employees remain physically capable of performing work activities.

3.5. Employees

WARNING

If Heat Illness symptoms are ignored or untreated they can lead to heat stroke, a life threatening illness. Notify site occupational health services if any of the symptoms outlined in 4.5.2 are identified.

3.5.1. Inform Occupational Health or the immediate Supervisor of any physical condition which may reduce heat tolerance (i.e., heart condition, illness, fatigue, use of prescription drugs or other medical condition which can affect the employees heat tolerance).

3.5.2. Perform self-checks and leave the heat stress conditions immediately when experiencing symptoms of heat illness.

3.5.3. Comply with the Action Times, Check Times and Recovery Times specified by the responsible Supervisor.

3.5.4. Comply with designated engineering and administrative controls.

3.5.5. Notify supervision if there is a noticeable change in heat stress conditions (i.e., temperature and humidity).

4. MAIN BODY

4.1. Temperature

WARNING

When conducting initial surveys, careful planning is required to ensure the safety of those conducting monitoring until action times based on measured conditions can be determined. Personnel conducting initial surveys must immediately exit the area if Extremely High Temperature conditions are encountered.

NOTE: Charts used to determine and post heat stress Action Times for specific areas (e.g., Drywell) may be used in lieu of Attachment 4.

NOTE: Similar department, organization, and/or site-specific hard copy, web based, and/or other electronic forms may be used in lieu of Attachment 4 provided the information required by Attachment 4 is covered on the form.

4.1.1. **OBTAIN** the Dry Bulb and Wet Bulb Globe Temperatures in the location where employees will be physically performing work activities. Heat Stress surveys may be conducted in conjunction with radiation surveys. Remote temperature monitors may be used to obtain dry bulb temperatures. **RECORD** the temperatures in lines 1 and 2 of Attachment 4.

1. For locations such as the drywell, areas with multiple elevations, areas with changing ventilation or areas where work is being performed in various physical locations, temperatures should be obtained, at a minimum, at the location where most work activities will be performed (>50% of work time).

2. In areas where varied environmental conditions exist or if the worker may be exposed to varied environmental conditions, due to the type of activity performed, the worst case area WBGT must be used for determining Action Times. This method represents the only practical solution to this set of circumstances.

3. For indoor locations, WBGTi = 0.7 Wet Bulb + 0.3 Globe.

4. For outdoor locations, WBGTo = 0.7 Wet Bulb + 0.2 Globe + 0.1 Dry Bulb.

4.1.2. **CLASSIFY** the work environment as High Temperature (HT), Very High Temperature (VHT), or Extremely High Temperature (EHT). **RECORD** in line 3 of Attachment 4.

1. High Temperature: Environmental and work conditions that result in a calculated Action Time.

2. Very High Temperatures: Work areas with dry bulb temperatures between 145°F and 160°F **or** WBGT between 110°F and 120°F.

WARNING

Work in Extremely High Temperatures is beyond the scope of this procedure.

3. Extremely High Temperature: Dry bulb temperatures greater than 160°F or WBGT greater than 120°F. Work in extremely high temperature conditions is beyond the scope of this procedure.

4.2. Evaluation of Work Rate as Low, Moderate or High

WARNING

Use of negative pressure, air purifying respirators increases the Work Rate Metabolism. See Section 4.2.1.2 below.

4.2.1. **DETERMINE** Work Rate through the use of Attachment 2, Work Rate Metabolism Guideline. **RECORD** results in line 4 of Attachment 4.

1. When determining the work rate, the clothing ensemble for the exposed employees should **not** be considered. Determination should be limited to the physical effort of activities. The table utilized in Attachment 3, Heat Stress Action Time Limits, takes clothing into account.

2. Adjust for negative pressure, air purifying respirators, if applicable:

   - Low Work Rate activities involving the use of negative pressure, air-purifying respirators should, at minimum, be classified as Moderate Work Rate activities.

- Moderate Work Rate activities should be classified as High Work Rate if they involve the use of negative pressure, air-purifying respirators.
- The Action Time for High Work Rate activities should be reduced by 50% if they involve the use of negative pressure, air-purifying respirators.

3. When determining the work rate using Attachment 2, Work Rate Metabolism Guideline, the evaluator should use the most frequent workload activity (>50% of work time) to characterize the overall activity as being Low, Moderate or High exertion. Higher exertion levels result in higher metabolic body heat generation.

   A. Low Work Rate is defined as sedentary activities involving sitting, standing still, and low physical effort. These include inspections and operation of instruments and powered equipment.

   B. Moderate Work Rate is defined as activities that are easily accomplished in a thermally comfortable environment. These types of tasks include pump and valve rebuilds and the sorting of materials. Additionally, heavy exertion activities that are broken up by periods of light activity or rest and do **not** involve the use of negative pressure, air-purifying respirators should be classified as Moderate Work Rate.

   C. High Work Rate is defined as demanding physical work for greater than 50% of work time. Activities characterized as High Work Rate include lifting and movement of heavy objects and manual decontamination of internal plant locations. Additionally, all Moderate Work Rate activities involving the use of negative pressure, air-purifying respirators should be classified as High Work Rate activities.

4.3. Identification of Clothing Ensemble

4.3.1. **IDENTIFY** the description of clothing, from the following five options, that best describe what workers will be wearing during the work activity. **RECORD** results in line 5 of Attachment 4.

Note: Each of the following options assumes that short sleeve and short leg undergarments are also being worn. Therefore, undergarments are not considered an additional layer of clothing.

Note: Scrubs with cut off sleeves and legs being worn as modesty garments are considered undergarments.

1. Work Clothes/Scrubs - Standard work ensemble, cotton scrubs, or disposable OREX garment that includes a shirt with short or long sleeves and long pants.

2. Cloth Coveralls - Also known as single PC's. A standard configuration of cloth coveralls, OREX Deluxe disposable coveralls, or Protech 2000 anti-contamination coveralls, with hood, hand and foot coverings. The fabric is cotton, a blend of cotton/polyester, or another permeable material.

3. Cloth Coveralls + Scrubs - Cloth Coveralls (single PC's) over a set of surgical cotton scrubs or disposable OREX garments.

4. Double Cloth Coveralls - Also known as double PC's. Clothing ensemble composed of two sets of cloth coveralls, including hood, hand, and foot coverings.

5. Cloth Coveralls or Work Clothes Plus Vapor Impermeable Coverall - Also known as Cotton Coveralls or Work Clothes plus Plastics (i.e., outer layer of water protective clothing for wet applications, such as Dry-Guard Plus, Casi suit, etc.). Clothing ensemble comprised of work clothes or cloth coveralls with an outer garment made of polyethylene, polyvinylchloride or another impermeable type material.

Exceptions:

- Plastics over scrubs may be considered equivalent to Double Cloth Coveralls.
- Plastics over Cotton Coveralls or Work Clothes that have been slit in the back to improve breathability may be considered equivalent to Double Cloth Coveralls.
- A plastic apron over Cotton Coveralls or Work Clothes may be considered equivalent to Double Cloth Coveralls.

4.4. Determination of Action Times

4.4.1. **DETERMINE** the Action Time by using the WBGT values obtained in 4.1, the work rate determined in 4.2 and the clothing ensemble identified in 4.3 by the following step-by-step process:

1. **LOCATE** the table in Attachment 3, Heat Stress Action Time Limits.

2. At the top of the table are the five columns for each type of clothing ensemble. **LOCATE** the clothing ensemble most applicable to the work activity as described in 4.3.

3. Each clothing ensemble column has three columns for low, moderate or high work rates. **LOCATE** the work rate column most applicable to the work activity as described in 4.2.

4. The left side of the table has WBGT value. **FIND** the WBGT value most applicable to the work activity as described in 4.1.

5. **DETERMINE** the Action Time by moving from left to right use the WBGT to move through the columns stopping at the column identified in steps 1-3. Record this value in line 6 of Attachment 4.

    A. The number contained in this cell is either the Action Time in minutes or is designated with an X.

    B. The X indicates that the Action Time is less than 15 minutes. The use of cooling garments is required unless a waiver is granted in accordance with granting PPE exemptions contained in SA-AA-116.

4.5. Pre-Job Brief

4.5.1. **INCLUDE** the following information in the Pre-Job Briefing:

1. WBGT readings in the work area or the method of obtaining the necessary readings when entry to the work area is accomplished.

2. Work area Action Time for employees.

3. Signs and symptoms of Heat Stress Illness/Disorders as contained in 4.5.2.

4. Engineering controls available and/or in effect.

5. Information regarding at-risk medical conditions, prescription medications and previous heat stress exposure history as contained in 4.5.3.

6. Type of communication that is available.

7. Emergency actions in event of a problem in work area.

8. Reporting changes (i.e., temperature and humidity) in the environment that increase or decrease the heat stress conditions. Environmental changes that affect heat stress conditions include:

    A. Starting or securing ventilation in the work area

    B. Outdoor temperature changes that also change the work environment

    C. Removing insulation from hot surfaces

    D. Changes in plant conditions

    E. Changes in the work area configuration (e.g., opening/closing doors)

9. Location of rest area.

10. Required Recovery Time.

11. Heat stress hygiene practices.

A. Drink fluids during recovery periods and prior to performing the work activity. Flavored, electrolyte drinks are recommended although cold water is acceptable.

B. Fluids provided for hydration purposes should **not** contain greater than 15 grams of sugar per 8 fluid ounces to prevent nausea.

C. For planning purposes it is recommended that 1 liter of fluid be provided to employees for every man-hour of exposure to heat stress conditions.

D. The buddy system is recommended for all work activities characterized as Moderate or High Work Rate. The buddy system will provide a method of limiting the physical demands of the activity and provide for assistance in case an employee experiences symptoms of heat illness.

12. Other specific area hazards.

4.5.2. **REVIEW** these Heat Illness/Heat Disorder symptoms during the Pre-Job Briefing.

1. Heat Stroke: Hot, dry skin with a red or flushed appearance; extremely high body temperature >104°F, There may be dizziness, nausea, headache, rapid pulse and/or unconsciousness.

2. Heat Exhaustion: Pale clammy skin, profuse sweating, and extreme fatigue or weakness. The body temperature is normal or slightly elevated. There may be headache, extreme lassitude, faintness, fatigue and nausea.

3. Heat Cramps: Muscle cramps in arms, legs, or stomach.

4. Heat Rash: Pinpoint redness and general skin irritation with itchiness, pain and/or burning sensation.

4.5.3. **REVIEW** the following information in the Pre-Job Briefing. **If** an employee has any physical condition, which may reduce heat tolerance (i.e., heart condition, illness, fatigue, use of prescription drugs or other medical condition which can affect the employees heat tolerance, etc.), **then** the employee shall report to Occupational Health (i.e., Site Nurse) for evaluation prior to working in the thermally elevated environment.

1. Prescription medications and caffeine can adversely affect a worker's ability to perform work in heat stress conditions (e.g., diuretics, antihistamines, blood pressure medication).

2. Medical conditions involving diabetes, thyroid, heart disease, lung and respiratory disease, skin disease, adverse genetic conditions and other medical conditions can place employees at-risk of heat stress illness and disorders when these employees are exposed to heat stress conditions.

3. Employees that have experienced a heat stress related illness in their past work history are likely to experience similar health effects when exposed to subsequent heat stress conditions.

4. Employees have both the right and the responsibility to report to Occupational Health personnel and their Supervisor medical conditions or past medical history that may effect their ability to perform work in heat stress conditions.

5. Failure to report pre-existing medical conditions can result in serious injury to employees.

6. Employees that have been performing work activities in cold temperature conditions (outside in winter or fall conditions) are acclimatized to those conditions. Placing employees that are acclimatized to cold temperature conditions into high temperature job conditions increases the risk of heat illness in these workers.

4.6. Extending the Action Time through the use of Check Times

WARNING

Once the Action Time is exceeded, employees may begin experiencing heat stress symptoms, depending on each employee's tolerance to the heat stress environment.

4.6.1. The following limitations apply to the use of Check Times.

1. **USE** Check Times **only** for work activities involving Action Times contained in Attachment 3, Heat Stress Action Time Limits that are **not** designated by an X.

   A. For work activities where the Action Time is designated with an X, the use of a cooling garment is required unless a PPE exemption is granted in accordance with SA-AA-116.

2. Check Times **cannot** be used to extend beyond 1.5 times the established Action Time for a given work activity. (1.5 X AT)

3. The Check Time process is designed to supplement self-determination by employees. Essentially, the process allows Action Times to be extended if a set method of determining the physical condition of employees has been established.

4. The Check Time Process begins when the Action Time period established for the work activity has been reached and is being exceeded.

5. The Check Time Process **REQUIRES** that a Supervisor or a designated employee perform the duty of checking employees for signs of heat

illness/heat disorder symptoms. Further, the Supervisor or a designated employee must obtain from each employee, confirmation, usually verbal, that they are capable of continuing to work.

6. For the purpose of checking employees, communication can be accomplished verbally, by hand signal or by radio communication provided that the method is clearly communicated to employees and ensures that both parties can communicate information.

4.6.2. **DETERMINE** the Check Time Frequency **and RECORD** this value in line 7 of Attachment 4.

1. For work activities involving Action Times of 30 minutes or less, each employee must be checked by the Supervisor or the designated employee at 5-10 minute intervals.

2. For work activities involving Action Times of greater than 30 minutes, each employee must be checked by the Supervisor or the designated employee at 10 to 15 minute intervals.

4.6.3. **RECORD** the Maximum Extended Action Time in line 8 of Attachment 4.

1. The maximum extended Action Time when using the Check Time Process is 1.5 times the Action Time determined in 4.4.1. (1.5 X AT)

4.6.4. **DETERMINE** employee condition during Extended Action Time.

1. The checking of employees for signs of heat stress symptoms is accomplished by asking employees performing the work activities two specific questions:

   A. Is the employee experiencing any symptoms of Heat Illness or Heat Disorder?

   B. Does the employee have any sense of a diminished capacity to perform work or continue the work activity?

2. An affirmative or yes answer to either of the questions is sufficient to terminate the employee exposure to heat stress conditions. A visual observation of suspected heat illness symptoms by the Supervisor or designee is sufficient to terminate exposure.

4.7. <u>Use of Cooling Garments</u>

4.7.1. Cooling garments shall be used when the Action Time is less than 15 minutes as indicated by an "X" in Attachment 3, Heat Stress Action Time Limits. Cooling garments can also be used to extend Action Times.

4.7.2. The following general limitations apply to the use of cooling garments.

1. When frozen media is used as a heat sink, the media must be replaced or the worker must exit the heat stress environment **before** all frozen media melts.

2. Cooling garments of the type which are immersed in water and then donned by employees are **not** sufficient, by either design or intended use, to increase the Action Time for individual work activities. Use of this type of garment shall **not** be used for the purpose of extending Action Times or used in environments where the Action Time is less than 15 minutes. Use of this garment for comfort purposes or in conjunction with the Check Time process is acceptable at the discretion of the responsible Supervisor.

WARNING

Garments containing liquid material, at body temperature, provide no defense against heat stress conditions and, in fact, increase the stress on the body due to the weight and insulating effect of the garment. Either the media must be replaced or the worker must exit the heat stress environment before all frozen media melts.

4.7.3. **DETERMINE** the type of cooling garment to be used and the specific limitations of the garment. **RECORD** the type of cooling garment in line 9 of Attachment 4.

WARNING

Excessive cooling of the skin due to direct application of cold packs can result in injury. Follow the manufacturer recommendations on the use of undergarments.

4.7.4. **DETERMINE** the frozen material Service Time for the type cooling garment. **RECORD** in line 10 of Attachment 4. For frozen material other than ice, use the manufacturers instructions for that material. Service time for cooling garments using ice are determined as follows:

1. Ice Vests

   A. **DETERMINE**, based on experience, the expected Service Time for the make and model ice vest being used.

      1. **If** necessary, **then CONSULT** the Site Safety Professional for Service Time information.

      2. **If** a Service Time **cannot** be determined based on experience, **then CALCULATE** the Service Time per paragraph 4.7.4.1.B below.

B. **MULTIPLY** the Service Time Increment by the weight of ice **and ADD** the fixed time

Metabolism	Service Time Increment (min/lb)	Fixed Time (min)
Low	7	30
Moderate	4	20
Heavy	3	10

2. Liquid Cooling Garments

A. **DETERMINE**, based on experience, the expected Service Time for the make and model liquid cooling garment being used.

1. **If** necessary, **then CONSULT** the Site Safety Professional for Service Time information.

2. **If** a Service Time **cannot** be determined based on experience, **then CALCULATE** the Service Time per paragraph 4.7.4.2.B below.

B. **MULTIPLY** the Service Time Increment by the weight of ice.

Metabolism	Service Time Increment (min/lb)
Low	12
Moderate	6
Heavy	4

4.7.5. **DETERMINE** the Extended Action Time for the cooling garment in use **and RECORD** on line 11 of Attachment 4.

1. Ice Vests

A. The following requirements for use must be met:

1. The vests must utilize a frozen material as the means of removing heat from the body. Cool water in packets is **not** sufficient.

2. The frozen material must be switched out on a frequency sufficient to ensure that the employee is protected by frozen material at all times or the worker must exit the heat stress environment before all frozen material melts.

3. Service times for the frozen material must be calculated.

4. A thin undergarment such as a T-shirt should be worn under the ice vest to prevent excessive cooling of the skin.

5. The manufacturer's instructions for use must be followed at all times. Where the manufacturer's instructions are more restrictive than the requirements of this procedure, the manufacturer's instructions must be followed.

6. The employee must be frequently monitored for signs of heat stress.

B. Extended Action Times for Ice Vests

1. Four times the WBGT Action Time if the frozen material is replaced before melting completely. Sixty minutes if the WBGT action time is less than 15 minutes.

2. Equal to the Service Time if the frozen material is **not** replaced

2. Liquid Cooling Garments

A. The following requirements for use must be met:

1. The work activity is terminated or the worker exits the heat stress environment before the frozen material has melted.

2. Service times for the frozen material are calculated.

3. The garment must utilize a combination of frozen and liquid material as a means of removing heat from the body.

4. The employee must be frequently monitored for signs of heat stress.

5. The entire liquid cooling garment must be worn. Normally this includes coverage of the trunk of the body, the legs and the head.

6. The manufacturer specifications for use must be followed at all times. Where the manufacturer' instructions are more restrictive than the requirements of this procedure, the manufacturer's instructions must be used for garment use.

B. Extended Action Times for Liquid Cooling Garments

1. Indefinite for Low and Moderate metabolic rates provided the frozen material does **not** melt completely.

2. Four times the WBGT Action Time for High metabolic work rates.

3. Sixty minutes if the WBGT Action Time is less than 15 minutes provided the frozen material is replaced before melting completely.

4. Equal to the service time if the frozen material is **not** replenished.

3. Circulating Air Garments can be used to extend the Action Time indefinitely for any work activity if the following requirements for use are met:

A. The employee must be frequently monitored for signs of heat stress illness.

B. The garment must provide, at minimum, complete enclosure of the trunk or torso of the body and provide continuous flow of air throughout the garment. Garments that fully enclose the body are also acceptable.

C. The system can utilize a vortex tube to ensure cooling of the supplied air or provide cool air through a controlled cool air source.

D. Vortex tubes should be expected to reduce the temperature of air delivered to the suit by **no** more than 27°F to 50°F. Manufacturer specifications can be used to expand this estimate.

E. For work activities determined to have a Low Work Rate (see 4.2.1.3) air blowing into the suit **cannot** be greater than a dry bulb temperature of 100°F.

F. For work activities determined to have a Moderate Work Rate (see 4.2.1.3) air blowing into the suit **cannot** be greater than a dry bulb temperature of 90°F.

G. For work activities determined to have a High Work Rate (see 4.2.1.3) air blowing into the suit **cannot** be greater than a dry bulb temperature of 82°F.

H. The manufacturer specifications for use must be followed at all times when using the cooling garment. Where the manufacturer specifications are more restrictive than the requirements of this procedure, the manufacturer specifications should be considered mandatory for garment use.

4.8. Determination and Application of Recovery Times

4.8.1. **DETERMINE** the Recovery Time. **RECORD** the Recovery Time in line 12 of Attachment 4.

1. The Recovery Time calculation is used to determine the amount of time necessary for employees to recover from a high temperature job exposure.

A. **CALCULATE** the Recovery Time (RT) as follows:

1. (Actual Work Time / Action Time) x 60 minutes

2. When using liquid cooling garments under high metabolic rate conditions or when using ice-vests, use four times the Attachment 3 Action Time for computing recovery time.

3. **If** the Attachment 3 Action Time is less than 15 minutes and cooling garments are worn, **then** use an Action Time of 60 minutes for calculating Recovery Time.

2. The calculated Recovery Time for a worker may be reduced following an evaluation of the individual by Occupational Health or personnel designated by Occupational Health.

3. The Recovery Time for an individual work activity is intended to provide a sufficient rest period to allow stored heat to be dissipated and lost water replaced.

4. The recovery of employees should take place in locations meeting the criteria contained in 4.9 of this procedure.

4.9. Determination of Cool Areas

4.9.1. **DETERMINE** the Cool Area. **RECORD** the Cool Area location in line 13 of Attachment 4.

1. The cool area should have a WBGT of less than 81°F.

2. The cool area should be in an area where employees can wear light clothing and remove PC's when applicable. In situations where PC removal **cannot** be accomplished due to ALARA concerns, special planning involving Radiation Protection and Industrial Safety is required.

3. The cool area should be in an area where fluids can be provided to the employees for the purposes of re-hydrating.

4.10. Very High Temperature Jobs

4.10.1. Discussion

1. Work in very high temperatures increases the potential for worker injury due to heat stress and burns, and increases the difficulty for rescue should that become necessary.

   A. Worker tolerance to heat stress environments must be a consideration when working in very high temperatures.

   B. Workers must be protected against burns should they come in contact with hot surfaces.

2. When working in very high temperatures, workers can expect to experience some upper respiratory discomfort such as dryness in the mouth and throat.

3. Oral temperature **cannot** be used as an indicator of core body temperature.

4.10.2. **DETERMINE** if a Very High Temperature condition exists.

4.10.3. **DETERMINE** the type of cooling garment to be used.

Note: The safety plan may be documented in a JHA, Work Package, and/or Action Request, as determined most appropriate by the Supervisor with input from Site Safety.

4.10.4. **DEVELOP** a safety plan, approved by Site Safety and the Station Manager (or designee), that ensures the following conditions and control are satisfied:

1. The system producing heat is isolated, if possible.

2. Maximum distance from radiant heat sources is maintained.

3. Additional ventilation is provided, if possible.

4. Employees are trained and qualified to work in heat stress environments, knowledge of onset of heat stress symptoms, and must be approved by site medical to work in VHT environment.

5. Employees are in good physical condition (i.e., respirator qualified, weight, age, and personal fitness appropriate, free of illness and/or use of prescription medication that would adversely impact resistance to heat, etc.).

6. Employees are properly hydrated (Hydration should begin the night before). This includes limiting alcohol and caffeine intake. Employees are to drink water, preferable mixed with a commercially prepared activity beverage (that is Gatorade) at regular intervals preferable not less than 16oz. per hour. This should continue until time of entry into excessive heat environment.

7. The Site Confined Space Rescue Team and/or Fire Brigade is consulted for emergency rescue plan development.

8. Site Medical, First Aid Responders, and Control Room are notified before entry into this heat stress environment, and the Confined Space Rescue Team must be on-site prior to and during the entry if the rescue plan .

9. If possible, employees working in the area wear shorts and t-shirt with cotton coveralls (PCs) over them. If burn protection is required due to incidental contact with hot surfaces, appropriate gloves should be worn.

10. Core body cooling devices and/or cooling garments are used and worn over light weight clothing (if wearing t-shirt, the vest would be worn over this).

11. Appropriate PPE is utilized (i.e., burn protection, etc.).

12. Consider use of heart rate monitors for additional protection.

13. Standby equipment is provided, as necessary (e.g., , replacement ice packs, spare pumps, battery packs, etc.)

14. Radio communications with the Control Room is maintained by outside personnel.

15. The buddy system is used with backup personnel available at the entry point and personnel entering this environment remain in verbal communication with each other.

16. A peer check of 4 minutes is established (i.e., employees are to stop what they are doing and ask their partner if they are OK to continue).

17. A maximum stay time of 30 minutes is established (may not be extended any further).

18. Once removed from the excessive heat environment, the employees pulse should be taken by site medical (site medical will need to be on scene to do this). If in excess of 110 beats / minute, then they will be further assessed by site medical and will need to have core temperature taken.

19. Employees are not to be moved from an excessive heat environment directly into an air conditioned environment because the body's cooling system can shut down in response to the external cooling. They must remain in an area with ambient temperatures approximately 70°F - 85°F for a minimum of 30 minutes (cool-down period). An air conditioned environment is acceptable after this cool-down period. Employees are to continue hydration practices as described above for an additional 2 hours post exposure to the excessive high environment.

5. **DOCUMENTATION** - None

6. **REFERENCES**

6.1. Commitments - None

6.2. Electrical Power Research Institute (EPRI), Heat Stress Management Program for Power Plants, EPRI NP-4453 Rev.1, August 1991.

6.3. National Institute for Occupational Safety and Health (NIOSH), Criteria for a Recommended Standard-Occupational Exposure to Hot Environments, DHHS Publication No. 85-115, 1985.

6.4. Occupational Safety and Health Administration, OSHA Technical Manual.

6.5. American Conference of Government Industrial Hygienists (ACGIH), Threshold Limit Values for Chemical Substances and Physical Agents - Biological Exposure Indices, March 1999.

6.6. National Safety Council, Fundamentals of Industrial Hygiene, Fourth Edition 1996.

6.7. Electrical Power Research Institute (EPRI), Heat Stress Management Program for Power Plants, EPRI NP-4453 Rev.1, July 1998.

6.8. NGG Radiation Protection Technical Note 03-003.

7. ATTACHMENTS

7.1. Attachment 1, WBGT Estimate Table

7.2. Attachment 2, Work Rate Metabolism Guideline

7.3. Attachment 3, Heat Stress Action Time Limits

7.4. Attachment 4, Job Evaluation Worksheet

ATTACHMENT 1
WBGT Estimate Table
Page 1 of 1

Note: The table is typically for planning purpose only (i.e., information use) and must **not** be used for determining Action Times, Check Times and Recovery Times for specific activities, except as allowed in Section 1.3.1.

Dry Bulb Temp In °F	**Relative Humidity**								
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**
70	61°F	62°F	65°F	67°F	69°F	71°F	72°F	74°F	75°F
75	65°F	68°F	70°F	73°F	74°F	75°F	77°F	79°F	80°F
80	69°F	70°F	73°F	75°F	77°F	79F	80°F	82°F	85°F
85	72°F	75°F	77°F	80°F	82°F	85°F	86°F	87°F	90°F
90	76°F	79°F	82°F	84°F	87°F	89°F	91°F	93°F	95°F
95	80°F	83°F	86°F	89°F	92°F	94°F	96°F	98°F	100°F
100	83°F	86°F	89°F	92°F	95°F	97°F	100°F	102°F	105°F
105	87°F	90°F	93°F	95°F	98°F	101°F	104°F	107°F	110°F
110	91°F	94°F	97°F	100°F	103°F	106°F	109°F	112°F	115°F

ATTACHMENT 2
Work Rate Metabolism Guideline
Page 1 of 1

Work Rate	Type of Activity	Examples
Low	• sitting or standing with light arm and trunk movement	1. inspections/surveys 2. supervising or monitoring areas and equipment
Moderate	• standing, moderate work at machine or bench • some walking and minimal climbing • occasional ladder or stair climbing • lifting and pulling	1. stationary welding 2. bench work 3. painting 4. floor cleaning 5. surveys or inspection with moderate climbing
High	• walking with frequent stair of ladder climbing • heavy lifting • pushing or pulling • work in tented non-ventilated areas	1. transporting heavy equipment by hand 2. shoveling 3. scaffold erection 4. asbestos removal 5. gross area decontamination

ATTACHMENT 3
Heat Stress Action Time Limits
Page 1 of 1

WBGT °F	Work Clothes/Scrubs			Cloth Coveralls (Single PC's)			Cloth Coveralls + Scrubs (Single PC's + Scrubs)			Double Cloth (Double PC's)			Cloth Coveralls or Work Clothes + Plastics		
	Work Rate			Work Rate			Work Rate			Work Rate			Work Rate		
	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High
115	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X
113-114	25	15	X	15	X	X	X	X	X	X	X	X	X	X	X
111-112	25	20	X	20	X	X	15	X	X	X	X	X	X	X	X
109-110	30	20	X	20	X	X	20	X	X	15	X	X	X	X	X
107-108	40	25	X	25	15	X	20	X	X	20	X	X	X	X	X
105-106	50	25	15	25	20	X	25	15	X	20	X	X	X	X	X
103-104	60	30	15	30	20	X	25	20	X	25	15	X	15	X	X
101-102	75	35	20	40	25	X	30	20	X	25	20	X	20	X	X
99-100	90	35	20	50	25	15	40	25	X	30	20	X	20	X	X
97-98	110	40	25	60	30	15	50	25	15	40	25	X	25	15	X
95-96	135	45	30	75	35	20	60	30	15	50	25	15	25	20	X
93-94	165	55	35	90	35	20	75	35	20	60	30	15	30	20	X
91-92	195	65	45	110	40	25	90	35	20	75	35	20	40	25	X
89-90	240	90	55	135	45	30	110	40	25	90	35	20	50	25	15
87-88	NL	120	75	165	55	35	135	45	30	110	40	25	60	30	15
85-86	NL	180	90	195	65	45	165	55	35	135	45	30	75	35	20
83-84	NL	240	120	240	90	55	195	65	45	165	55	35	90	35	20
81-82	NL	NL	180	NL	120	75	240	90	55	195	65	45	110	40	25
79-80	NL	NL	240	NL	180	90	NL	120	75	240	90	55	135	45	30
77-78	NL	NL	NL	NL	240	120	NL	180	90	NL	120	75	165	55	35
75-76	NL	NL	NL	NL	NL	180	NL	240	120	NL	180	90	195	65	45
73-74	NL	NL	NL	NL	NL	240	NL	NL	180	NL	240	120	240	90	55
71-72	NL	NL	NL	NL	NL	NL	NL	NL	240	NL	NL	180	NL	120	75
69-70	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	240	NL	180	90
67-68	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	240	120
65-66	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	180
63-64	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	240

NL = No limit X = Action Time less than 15 minutes, cooling garment required unless exempted per SA-AA-116

REQUIRED Recovery Time: Recovery Time = (Actual Work Time / Action Time) x 60 minutes

COOLING GARMENTS: Action times may be extended through the use of cooling garments

WARNING

Use of a negative pressure respirator increases Metabolic Work Rate. See Section 4.2.1.2.

ATTACHMENT 4
Job Evaluation Worksheet
Page 1 of 1

Heat Stress Environmental Conditions and Action Time	
1. Record the dry bulb temperature (4.1.)	°F
2. Record the Wet Bulb Globe Temperature (WBGT) (4.1.)	°F
3. Classify the work environment (HT, VHT, EHT) (4.1.)	
4. Record the metabolic rate (Low, Moderate, High) (4.2.)	
5. Record the clothing ensemble (4.3.)	
6. Record the Action Time (4.4.)	Min
Extending Action Times through Check Times (if applicable)	
7. Record Check Time Frequency (4.6.2.)	Min
8. Record the Maximum Extended Action Time (4.6.3.)	Min
Use of Cooling Garments (if applicable)	
9. Record the type of cooling garment in use (4.7.3.)	
10. Record the frozen material Service Time (4.7.4.)	Min
11. Record the Extended Action Time for using cooling garments (4.7.5)	Min
Recovery Time Calculation	
12. Record the Recovery Time (4.8.1.)	Min
Recovery Area and Heat Stress Hygiene Practices	
13. Record the Cool Area location (4.9.1.)	

Date:______ Work Location: ______________________________ Supervisor: ____________

Remarks:
____
____
____
____
____

Exelon Generation.

Training Id: **2015 NRC SRO Admin COO1** Revision: **0.0**

Title: **Review Daily Logs (Jet Pumps)**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	6/10/15
Validated By	James Workman	8/10/15
Facility Reviewer	MARK GREER	10/2/15

Approximate Duration: 30 minutes

Documentation of Performance:

Performer: ______________________

Evaluator: ______________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ______________________

Evaluators Signature: ______________________ Date: ________

References

1. N2-OSP-LOG-D001, Daily Checks Log
2. N2-OP-29, Reactor Recirculation System
3. NUREG 1123, 2.1.18 (3.8)

Exelon Generation

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to review daily logs and determine if there are any actions necessary to take.

   b. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. NS-OM202-03002, Review and Approve Operator Logs

   b. K/A 2.1.18 (3.8) Ability to make accurate, clear, and concise logs, records, status boards, and reports.

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Classroom
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

   a. Training Classroom

5. JPM Setup (if required)

   a. Ensure book carts are available for the operators to use and that each operator has a copy of the applicable daily logs attached to this JPM.

   b. Ensure N2-OP-29 and Tech Specs are available for use.

   c. Ensure each operator has a calculator.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
3.	Performs a review of Attachment 8	P	SAT / UNSAT **STD:** Reviews Attachment 8 and determines all data is acceptable. Marks Step 10.1.5 as SAT.
4.	Reviews Attachment 10 as follows: • Reviews Section 1.0 though 3.0.	P	SAT / UNSAT **STD:** Reviews Attachment 10, Section 1.0 though 3.0 and determines all data is acceptable. Marks Step 10.1.7 and 10.1.8 as SAT.
Evaluator Note:	For grading of the below steps, the critical step is to Mark Step 10.1.9 as UNSAT and document the reason in the Remarks Section. Specifically determining that Jet Pump 6 is above its high limit is an intermediate step which will lead to the UNSAT determination in Step 10.1.9 so it does not need to be specifically documented at this time.		
5.	• Reviews Section 4.0	P	**PASS / FAIL** **STD:** Reviews Section 4.0. Determines per Table 10-3 that Jet Pump 6 ΔP Ratio is above the HIGH LIMIT. Determines in Step 4.4 that Jet Pump 6 was incorrectly marked as YES and should have been marked as NO. Marks Step 10.1.9 as UNSAT.

INITIAL CONDITIONS	Given: • The plant has been at 100% power for the last 3 months. • Due to questions regarding Core Flow and Jet Pump readings, the Core Flow and Jet Pump Operability Verification portions of N2-OSP-LOG-D001, Daily Checks Log are being redone. • An operator has just completed the applicable portions of N2-OSP-LOG-D001 and has provided them to you for review. • You are the SRO assigned to perform the review of the logs. • The Evaluator will provide any additional information necessary for this JPM when *asked.* **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, Complete the Operations Review portion of N2-OSP-LOG-D001, Steps 10.1.5, 10.1.7 through 10.1.9, and 10.1.14. Document the results of your review in the remarks section. Document any required actions on the below worksheet.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary.	P	SAT / UNSAT **STD:** Proper communications used.
2.	Obtain a copy of the reference procedure and review / utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** Refers to the provided N2-OSP-LOG-D001
Evaluator Note:	The following steps may be performed in any order.		

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
Evaluator Note:	When the operator performs the review of Section 4.0, he may begin asking the evaluator for plant information. Provide the following cue and only provide the information in which the operator asks for: **Cue:** Which plant information would you like? • If asked, Pi indicates no change in MWth, Generator Output, or reactor power for the two days. • If asked, Pi indicates that Core DP has remained steady for the last two days. • If asked for any Jet Pump flows on the previous day, provide the Table 10-3 handout. • If asked for any Jet Pump Total Loop Flows, Recirc Flow Control Valve Position, or any other information from Table 10-1 and 10-2, provide them with the Table 10-1 and 10-2 handout. • If asked, Jet Pump 5 reads within baseline reading (Normal). • If asked, Jet Pump 6 **baseline reading** is 5.94 Mlbm/hr (NSSFA107). • If asked, Jet Pump 6 "%" flow is **currently reading** 64% and its **baseline flow** is 55%. • If asked, Jet Pump 6 saw a step change of 9% (~1.3 Mlbm/hr) ~2 hours ago. • If asked, Total Core Flow as indicated on 2CEC*PNL603 saw a step increase of 1.3 Mlbm/hr ~2 hours ago. Prior to the change, core flow was at 111.7 Mlbm/hr. • If asked, Recirc Loop 1A Sum Jet Pump Flow saw a step change of just over 1 Mlbm/hr ~2 hours ago.		
Evaluator Note:	Jet Pump 6 is not considered inoperable due to meeting the requirements of TS 3.4.3. Based on no TS actions required, the operator may choose to mark Step 10.1.14 as SATISFACTORY - CORRECTIVE ACTION REQUIRED or UNSATISFACTORY. Either is acceptable.		
6.	Documents review results in Step 10.1.14.	P	**PASS / FAIL** **STD:** Marks Step 10.1.14 as SATISFACTORY-CORRECTIVE ACTION REQUIRED or UNSATISFACTORY.
7.	May Contact the General Supervisor Operations and/or the SM **Cue:** If necessary as the GSO and/or SM, acknowledge that you have been notified.	P	SAT / UNSAT **STD:** Contacts the GSO and/or SM informs him of the abnormal reading on Jet Pump 6.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
8.	Initiates a Condition Report **Cue:** If asked, inform the operator that IR-003789 has been issued for Jet Pump 6.	P	**PASS / FAIL** **STD:** Documents IR-003789 in the REMARKS section of Step 10.1.14.
9.	Documents information in the Remarks Section	P	**PASS / FAIL** **STD:** In the Remarks section of Step 10.1.14, documents that Jet Pump 6 ΔP Ratio is outside the allowed limits -or- that the Jet Pump sensing line for Jet Pump 6 has failed, (or similar wording).
Evaluator Note:	For grading of the below step, it is not necessary for the operator to calculate the exact core flow needed to achieve a 5% reduction. If the operator, through discussion and/or documentation shows that he has recognized and is attempting to apply P&L 43, then the below step should be graded as PASS.		
10.	Refers to N2-OP-29 and determines the following: • A core flow reduction of 5% from the previous core flow value is required	P	**PASS / FAIL** **STD:** Determines per N2-OP-29, P&L 42 and 43 that Jet Pump 6 sensing line has failed. On the provided worksheet, documents that CORE FLOW is required to be maintained 5% lower than core flow prior to the sensing line failure (or similar wording)
Evaluator Note:	The operator may attempt to perform other actions of P&L 43, however they are not required. As necessary, provide cues as Engineering, SM, or other groups to acknowledge any additional actions from P&L 43.		

TASK STANDARD	The Operator has completed the OSP review and documented the required actions in the space provided.

STOP TIME	

JPM Handout

INITIAL CONDITIONS	Given: • The plant has been at 100% power for the last 3 months. • Due to questions regarding Core Flow and Jet Pump readings, the Core Flow and Jet Pump Operability Verification portions of N2-OSP-LOG-D001, Daily Checks Log are being redone. • An operator has just completed the applicable portions of N2-OSP-LOG-D001 and has provided them to you for review. • You are the SRO assigned to perform the review of the logs. • The Evaluator will provide any additional information necessary for this JPM when *asked*.

INITIATING CUE	**(Operators Name)**, Complete the Operations Review portion of N2-OSP-LOG-D001, Steps 10.1.5, 10.1.7 through 10.1.9, and 10.1.14. Document the results of your review in the remarks section. Document any required actions on the below worksheet.

YESTERDAY'S JET PUMP FLOW DATA
Table 10-3 (75-100% Power)

Jet Pump	Computer Point (Mlbm/hr)	Individual to Average ΔP Ratio	Low Limit	High Limit
Loop A				
1	NSSFA102= **5.61**	**1.02**	0.81	1.22
2	NSSFA103= **5.44**	**0.98**	0.79	1.19
3	NSSFA104= **5.39**	**0.98**	0.79	1.19
4	NSSFA105= **5.08**	**0.92**	0.79	1.18
5	NSSFA106= **5.95**	**1.08**	0.84	1.25
6	NSSFA107= **5.94**	**1.08**	0.85	1.27
7	NSSFA108= **5.37**	**0.97**	0.78	1.17
8	NSSFA109= **5.31**	**0.96**	0.77	1.16
9	NSSFA110= **5.56**	**1.01**	0.79	1.19
10	NSSFA111= **5.60**	**1.01**	0.80	1.19
Total	**55.25**	Total) 10 = **5.525** % Loop A Average Jet ΔP Pump		
Loop B				
11	NSSFA112= **5.43**	**1.00**	0.81	1.21
12	NSSFA113= **5.1**	**0.94**	0.78	1.16
13	NSSFA114= **5.24**	**0.97**	0.78	1.18
14	NSSFA115= **5.14**	**0.95**	0.77	1.16
15	NSSFA116= **5.94**	**1.10**	0.83	1.25
16	NSSFA117= **5.96**	**1.10**	0.84	1.27
17	NSSFA118= **5.39**	**0.99**	0.81	1.21
18	NSSFA119= **5.24**	**0.97**	0.78	1.18
19	NSSFA120= **5.33**	**0.98**	0.79	1.19
20	NSSFA121= **5.44**	**1.00**	0.80	1.20
Total	**54.21**	Total) 10 = **5.421** % Loop B Average Jet ΔP Pump		
Calc Performed By (Initials): **JO**		Independently Verified By (Initials): **CO**		

YESTERDAY'S TABLE 10-1:

Table 10-1

Recirc Loop A				Recirc Loop B			
FCV A (%)	Loop A Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)	FCV B (%)	Loop B Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)
85	**56**	**60.5**	**49.5**	**91**	**56**	**61**	**50**

YESTERDAY'S TABLE 10-2

Table 10-2

Recirc Loop A				Recirc Loop B			
Recirc Loop A Drive Flow (Kgpm)	Loop A Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)	Recirc Loop B Drive Flow (Kgpm)	Loop B Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)
45	**56**	**60**	**50**	**45**	**56**	**60**	**49**

NINE MILE POINT NUCLEAR STATION UNIT 2

SURVEILLANCE TEST PROCEDURE

N2-OSP-LOG-D001

REVISION 01902

DAILY CHECKS LOG

TECHNICAL SPECIFICATION REQUIRED

Approval Authority: Manager Operations

TABLE OF CONTENTS

3.4 Commitments

Sequence Number	Commitment Number	Description
1	NRC SER 68571	NRC Staff Safety Evaluation pertaining to NMP2 response to Station Blackout Rule
2	PRNM MOD	Verify APRMs receiving correct Mode Switch input
3	PRNM MOD	Verify APRM/LPRM Chassis Self-test
4	DER 2-97-3357	Deviation from Design Specification Recommendations for RHR Heat Exchangers
5	CR-2007-007742	Surveillance Procedure Overdue for Diesel Fire Pump
6	L1-IER-11-2, Recommendation 2	Calculate the time for SFP to reach 200°F and establish controls when this time is less than 72 hours.

4.0 GENERAL TEST METHODS

4.1 Test Description

4.1.1 This procedure contains surveillance requirements such as instrument checks, pressure/level/temperature readings, and other checks that are to be performed on a daily basis.

4.1.2 Special requirements associated with Items, including details of Operational Condition requirements, are listed in footnotes on the page with the affected Item.

4.1.3 Items that fall outside normal operating limits and require increased surveillance frequency are tested using S-OSP-LOG-@001.

4.1.4 If the same operator records all data on a page, a single set of initials may be entered in the INITIALS column.

4.1.5 If more than one operator records data on a page, each operator shall initial for the data he/she recorded. Include dividing lines to indicate responsibility for readings.

4.1.6 Attachments 8, 10, and 11 will not all be performed or completed each time this procedure is performed. Only the attachments required, based on Recirc system operation in two loop or one loop configuration, need to be completed. The attachments required for the two configurations are as follows:

a. Two Loop:

- Attachment 8
- Attachment 10

b. One Loop:

- Attachment 11

4.2 Definitions

4.2.1 Channel Check

A CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter.

4.2.2 Operational Conditions

- 1: Power Operation
- 2: Startup
- 3: Hot Shutdown
- 4: Cold Shutdown
- 5: Refueling

4.3 Use of Not Applicable (N/A) or Not Required (N/R) for Procedure Steps

Use of N/A may only be used as directed in this procedure, except as allowed by CNG-PR-1.01-1009, Procedure and Work Order Use and Adherence Requirements.

4.4 General Notes

4.4.1 Obtain readings using Computer Points from the Process Computer.

4.4.2 Obtain readings using ERF Computer Points from the ERF/SPDS Computer.

4.4.3 Record Max Difference means to calculate and record the difference between the highest and lowest readings of the Items referenced.

4.4.4 Obtain Radiation Monitor readings from the DRMS computer. If the DRMS computer is unavailable, readings may be obtained from the LICs (Local) or, for Safety Related Rad Monitors, the RICs on 2CEC*PNL880.

4.4.5 Indications in yellow print on DRMS indicate that the ALERT value has been exceeded. Indications in red print indicate that the ALARM value has been exceeded.

5.0 TEST EQUIPMENT

Fluke Digital Multimeter (DMM) Series 8060, (Only if required, M&TE Issue)

6.0 PRECAUTIONS AND LIMITATIONS

6.1 The Shift Manager (SM) shall be notified immediately when a step cannot be completed as stated or if acceptance criteria are not met.

6.2 Applicable radiological precautions shall be observed. Radiation Protection shall be contacted for guidance.

6.3 ALARA practices shall be observed to minimize personnel exposure and spread of contamination.

6.4 Prior to initialing any step in this procedure, all individuals shall place their initials, signatures, and printed names on Attachment 1, Test Personnel Signature and Initial Log.

6.5 Due to cracking in the Jet Pump #6 sensing line (reference CR-2008-002793), the potential for failure of the sensing line exists. If the Jet Pump #6 sensing line fails such that it reads downcomer pressure, its D/P reading will show a step jump of about 8% to 9% above its baseline and the indicated loop flow and core flow will increase. Jet Pump #5 D/P and generator output will not change. Should the step jump in Jet Pump #6 be observed, in addition to following the guidance in N2-OP-29, a CR shall be initiated.

Initials

7.0 PREREQUISITES

7.1 Specify the reason for test performance:

(__) Routine Surveillance
(__) As Required by N2-OP-101A, Plant Start-up
(X) Retest to verify questionable data
(__) Post Maintenance Testing, Work Document Number _______
(__) Other (specify) ________________________ MA

7.2 Ensure that NO other testing is in progress that affects this procedure. MA

7.3 Verify personnel responsible for the performance of this procedure have reviewed the procedure in its entirety. MA

7.4 Perform the following:

PLANT IMPACT: **NONE**

7.4.1 Review the Plant Impact. Indicate permission to perform procedure. JA / TODAY
SM Date

7.4.2 Review the Plant Impact. Indicate acknowledgement that procedure is to be performed. EB / TODAY
CRO Date

7.5 Record procedure start date AND time: MA

TODAY / 30 min ago
Date Time

NOTE: Steps (Items) in Attachment 2 may be performed in any order, as required.

8.0 PROCEDURE

8.1 Observe AND record the required data for each Item on Attachment 2, Daily Checks Log. N/A

8.2 Compare data with Acceptance Criteria listed in the LIMITS column, OR footnotes associated with special readings, on each Attachment. N/A

Initials

8.3 Review of PM 112.5% and Grace Dates

8.3.1 Check Surveillances with upcoming late end date are scheduled PRIOR to late end date. N/A SRO

8.3.2 IF Surveillance with upcoming late end date is NOT scheduled OR is scheduled beyond late end date,
THEN perform the following:

- Contact Work Week Manager.
- Generate CR documenting action taken OR needed as applicable. N/A SRO

8.3.3 Verify equipment with overdue Surveillance requirement(s) is/are tracked in ESL as required. N/A SRO

8.3.4 Check PMs with upcoming late end date are scheduled PRIOR to late end date. N/A SRO

8.3.5 IF PM with upcoming late end date is NOT scheduled OR is scheduled beyond late end date,
THEN perform the following:

- Contact Work Week Manager.
- Generate CR documenting action taken OR needed as applicable. N/A SRO

8.3.6 Verify equipment with overdue PM requirement(s) is/are tracked in ESL as required. N/A SRO

Initials

9.0 RETURN TO NORMAL

9.1 Verify Attachment 2, Daily Checks Log, is complete. N/A

9.2 Verify Attachment 3, Primary Containment AC Circuit Check, is complete. N/A

9.3 IF a Single Control Rod is to be removed,
THEN verify Attachment 4, Single Control Rod Removal Checks, is complete.

N/A, NO Control Rods are to be removed .... (X) ______

9.4 IF Multiple Control Rods are to be removed,
THEN verify Attachment 5, Multiple Control Rod Removal Checks, is complete.

N/A, Multiple Control Rods are NOT to be removed .... (X) ______

9.5 IF ERF Computer Point CMSTU100 was unavailable,
THEN verify Attachment 6, Suppression Pool Average Water Temperature, is complete.

N/A, ERF Computer Point CMSTU100 was available .... (X) ______

9.6 IF Computer Point CMSTU05 was unavailable,
THEN verify Attachment 7, Drywell Average Temperature, is complete.

N/A, Computer Point CMSTU05 was available .... (X) ______

9.7 IF Plant is in two loop operation,
THEN verify the following attachments are complete:

N/A, Plant is in single loop operation .... (X)

- Attachment 8, Jet Pump Loop Flow Mismatch MA
- Attachment 10, Two Loop Jet Pump Operability Verification MA

9.8 IF Plant is in single loop operation,
THEN verify the following attachment is complete:

N/A, Plant is in two loop operation .... (X)

- Attachment 11, Single Loop Jet Pump Operability Verification ______

Initials

9.9 IF compliance with TS Special Operations LCO 3.10.2, Reactor Mode Switch Interlock Testing, is required,
THEN verify the following attachment is complete:

N/A, Reactor Mode Switch Interlock Testing NOT required .... (X)

- Attachment 9, Reactor Mode Switch Interlock Testing _______

9.10 IF compliance with TS Special Operations LCO 3.10.3, Single Control Rod Withdrawal - Hot Shutdown, is required,
THEN verify the following attachment is complete:

N/A, Single Control Rod Withdrawal - Hot Shutdown NOT required to be performed .... (X)

- Attachment 12, Single Control Rod Withdrawal – Hot Shutdown _______

9.11 IF compliance with TS Special Operations LCO 3.10.4, Single Control Rod Withdrawal - Cold Shutdown, is required,
THEN verify the following attachment is complete:

N/A, Single Control Rod Withdrawal - Cold Shutdown NOT required to be performed .... (X)

- Attachment 13, Single Control Rod Withdrawal - Cold Shutdown _______

9.12 IF SWP supply header discharge water temperature is less than 35°F OR IF additional instrument accuracy is required,
THEN verify Attachment 14, SWP Supply Header Discharge Water Temperature, is complete.

N/A, Attachment 14 NOT required to be performed .... (X) _______

(C6) 9.13 Verify Attachment 15, Spent Fuel Pool Time to 200°F, is complete. N/A

9.14 Verify ALL test personnel performing this procedure have initialed AND signed Attachment 1, Test Personnel Signature and Initial Log. MA

9.15 Notify SM AND CRO that procedure is completed.

EB / TODAY
CRO Date

JA / TODAY
SM Date

Initials

9.16 Record procedure stop date AND time:

TODAY / NOW — MA

Date / Time

10.0 ACCEPTANCE CRITERIA

10.1 Operations Review

10.1.1 Each Item meets Acceptance Criteria listed in LIMIT column on Attachment 2, Daily Checks Log.

[__] SAT [__] UNSAT [X] N/A

NOTES: ~~1.~~ Performing Attachment 3 meets the requirements of TRM TRSR 3.8.2.1.1.

~~2.~~ Credit is conservatively given for performing monthly surveillance TRM TRSR 3.8.2.1.2 upon successful completion of this Attachment. All the listed devices will be checked on a daily basis due to not being able to lock or otherwise secure most of the devices in the tripped or off position.

10.1.2 Each Primary Containment AC Circuit is in position specified in the Required Position column on Attachment 3, Primary Containment AC Circuit Check.

[__] SAT [__] UNSAT [X] N/A

10.1.3 Attachment 4, Single Control Rod Removal Checks, was performed as required by TS 3.10.5.

[__] SAT [__] UNSAT [X] N/A

10.1.4 Attachment 5, Multiple Control Rod Removal Checks, was performed as required by TS 3.10.6.

[__] SAT [__] UNSAT [X] N/A

10.1.5 IF Plant is in two loop operation, Jet Pump Loop Flow Mismatch is within Technical Specification limits given on Attachment 8 (Steps 3.1 or 3.2).

[__] SAT [__] UNSAT [__] N/A

10.1.6 Attachment 9, Reactor Mode Switch Interlock Testing, was performed as required by TS 3.10.2.

[__] SAT [__] UNSAT [X] N/A

10.1.7 Operating loop Jet Pump Loop Flow(s), as compared to Recirc Flow Control Valve Position, falls within allowable bands as determined on Attachment 10, Two Loop Jet Pump Operability Verification, OR Attachment 11, Single Loop Jet Pump Operability Verification (Attachment 10, Step 2.4 OR Attachment 11, Step 3.4).

[__] SAT [__] UNSAT [__] N/A

10.1.8 Operating loop Jet Pump Loop Flow(s), as compared to operating loop(s) Recirc Loop Drive Flow(s), fall within the allowable bands as determined on Attachment 10, Two Loop Jet Pump Operability Verification, or Attachment 11, Single Loop Jet Pump Operability Verification (Attachment 10, Step 3.4 or Attachment 11, Step 4.4).

[__] SAT [__] UNSAT [__] N/A

10.1.9 IF Attachment 10 was performed, each Individual to Average Jet Pump Loop ΔP Ratio falls within the limits given in the Low Limit and High Limit columns on Table 10-3.

[__] SAT [__] UNSAT [__] N/A

10.1.10 IF Attachment 11 was performed, each operating loop´s Individual to Average Jet Pump Loop ΔP Ratio falls within the limits given in the Low Limit and High Limit columns on Table 11-3 or 11-4.

[__] SAT [__] UNSAT [X] N/A

10.1.11 IF Attachment 11 was performed, each non-operating loops Individual Jet Pump ΔP is less than the limits given in the Maximum Limit column on Table 11-3 OR 11-4.

[__] SAT [__] UNSAT [X] N/A

10.1.12 Attachment 12, Single Control Rod Withdrawal - Hot Shutdown, was performed as required by TS 3.10.3.

[__] SAT [__] UNSAT [X] N/A

10.1.13 Attachment 13, Single Control Rod Withdrawal - Cold Shutdown, was performed as required by TS 3.10.4.

[__] SAT [__] UNSAT [X] N/A

10.1.14 SRO Review

- Satisfactory. No corrective action required .... [__]
- Satisfactory. Corrective action required. Record explanation and CR number (if required) in Remarks .... [__]
- Unsatisfactory. Immediately notify General Supervisor – Shift Operations or his Designee. Initiate a CR. Record explanation and CR/WD number (if required) in Remarks .... [__]

______________________/____________/________
Person Notified Date Time

Remarks: ____

____

____

____

____

____

____

____

____

____

____

____

______________________________/__________
Signature Date

10.2 Second Operations Review

______________________________/__________
Signature Date

Attachment 1, Test Personnel Signature and Initial Log

Sheet ___ of ___

NOTE: Completing this attachment signifies that each person has reviewed the applicable portions of this procedure.

PRINTED NAME	SIGNATURE	INITIALS
Mike Adams	*Mike Adams*	MA
Ed Brown	*Ed Brown*	EB
Jack Adams	*Jack Adams*	JA
Todd Hopper	*Todd Hopper*	*TH*

N/A, Plant is in single loop operation .... (__)

Initials

NOTES: 1. This Attachment compares Jet Pump Loop flows to meet the requirement of TS SR 3.4.1.1.

2. Effective Core Flow shall be the Core Flow that would result if both Jet Pump Loop Flows were assumed to be at the smaller of the two values.

1.0 Determine Effective Core Flow as follows:

1.1 Record Recirc Loop Summed Jet Pump Flows as follows:

- For Loop A use the following:
  - B22-R611A, RECIRC LOOP 1A SUM JET PMP FLO, OR
  - TARS Point 2674, 1MIN MEAN PID 2042, LOOP A JET PUMP FLOW
- For Loop B use the following
  - B22-R611B, RECIRC LOOP 1B SUM JET PMP FLO, OR
  - TARS Point 2673, 1MIN MEAN PID 2043, LOOP B JET PUMP FLOW

Loop A Summed Jet Pump Flow = 57 $\times 10^6$ lb_m/Hr

Loop B Summed Jet Pump Flow = 56 $\times 10^6$ lb_m/Hr MA

1.2 Using the smaller of the two readings recorded in the Step above, calculate Percent Effective Core Flow:

$$\frac{(2\times 56 \times 10^6 lb_m/Hr)}{108.5\times 10^6 lb_m/Hr}\times 100\% = \frac{103.2\ \%}{\%\ \text{Total Core Flow}}$$ MA

1.3 Independently verify the above calculation. TH IV

2.0 Subtract the two values of Summed Jet Pump Loop Flows, as recorded in Step 1.1, AND record the absolute value of the difference as Jet Pump Loop Flow Mismatch below:

Jet Pump Loop Flow Mismatch: 1.0 $\times 10^6$ lb_m/Hr MA

Initials

3.0 Using the value for Effective Core Flow calculated in Step 1.2, confirm the Jet Pump Loop Flow Mismatch recorded in Step 2.0 meets the following criteria:

3.1 IF Effective Core Flow is less than 70%, confirm Jet Pump Loop Flow Mismatch is less than or equal to 10.85×10^6 lb_m/Hr.

N/A, Effective Core Flow is greater than or equal to 70% .... (X) ______

3.2 IF Effective Core Flow is greater than or equal to 70%, confirm Jet Pump Loop Flow Mismatch is less than or equal to 5.425×10^6 lb_m/Hr.

N/A, Effective Core Flow is less than 70%.. (__) MA

N/A, Plant is in single loop operation .... (__)

N/A, Plant NOT in Mode 1 <u>OR</u> 2. .... (__)

<u>Initials</u>

1.0 Record Recirc Pump Speed by checking appropriate choice below:

- 15 Hz (__)
- 60 Hz (X)

2.0 <u>Comparison of Indicated Jet Pump Loop Flows to Predicted Jet Pump Loop Flows by Recirc Flow Control Valve Positions (SR 3.4.3.1.a)</u>

2.1 Record Recirc Flow Control Valve (FCV) Positions, as follows:

2.1.1 IF Recirc FCV Positions, as read on 2RCS-HC1603A, RECIRC LOOP A FLOW CONTROL, <u>AND</u> 2RCS-HC1603B, RECIRC LOOP B FLOW CONTROL, are less than or equal to 85% for FCV A <u>AND</u> less than or equal to 95% for FCV B, record Recirc FCV Positions in Table 10-1.

N/A, One OR BOTH Recirc FCV Positions, as read on 2RCS-HC1603A <u>OR</u> 2RCS-HC1603B, are greater than 85% for FCV A <u>AND</u> greater than 95% for FCV B.. (__) MA

2.1.2 IF one OR BOTH Recirc FCV Positions as read on 2RCS-HC1603A <u>AND</u> 2RCS-HC1603B, are greater than 85% for FCV A <u>AND</u> greater than 95% for FCV B, obtain Recirc FCV Positions from TARS as follows:

N/A, BOTH Recirc FCV Positions, as read on 2RCS-HC1603A OR 2RCS-HC1603B, are less than or equal to 85% for FCV A <u>AND</u> less than or equal to 95% for FCV B.. (X)

a. Using TARS Point ID 2002, obtain Recirc Loop A FCV Position AND record in Table 10-1. ______

b. Using TARS Point ID 2003, obtain Recirc Loop B FCV Position AND record in Table 10-1. ______

Initials

2.2 Record Jet Pump Loop Flows as follows:

2.2.1 IF flow oscillations on indicators do NOT make an accurate reading difficult, record Summed Jet Pump Loop Flows from Indicators B22-R611A, RECIRC LOOP 1A SUM JET PMP FLO, AND B22-R611B, RECIRC LOOP 1B SUM JET PMP FLO, on 2CEC*PNL602, in the following places:

N/A, TARS used due to flow oscillations.. (__)

- Table 10-1 MA
- Table 10-2 MA

2.2.2 IF flow oscillations on indicators make an accurate reading difficult, THEN perform the following:

N/A, 2CEC*PNL602 meters were used .... (X)

a. Obtain a 1 min mean of PID 2042, Loop A Jet Pump Flow using TARS Point ID 2674. ______

b. Record the value of Jet Pump Loop A Flow obtained in the Step above in the following places:

- Table 10-1 ______
- Table 10-2 ______

c. Obtain a 1 min mean of PID 2043, Loop B Jet Pump Flow using TARS Point ID 2673. ______

d. Record the value of Jet Pump Loop B Flow obtained in the Step above in the following places:

- Table 10-1 ______
- Table 10-2 ______

Initials

2.3 Determine the High AND Low Limits for Jet Pump Loop Flows as follows:

2.3.1 IF Recirc Pumps are in slow speed operation, enter the following in Table 10-1 for the High AND Low Limits:

N/A, Recirc Pumps are in high speed operation .... (X)

- High Limit: 21.43 Mlb_m/Hr
- Low Limit: 17.54 Mlb_m/Hr ______

2.3.2 IF the Recirc Pumps are in high speed operation, perform the following:

N/A, Recirc Pumps are in low speed operation .... (__)

a. Using the Recirc FCV Position for Loop A recorded in Table 10-1, obtain the Jet Pump Loop Flow High AND Low Limits for Loop A from Figure 10-1 AND record them in Table 10-1. MA

b. Using the Recirc FCV Position for Loop B recorded in Table 10-1, obtain the Jet Pump Loop Flow High AND Low Limits for Loop B from Figure 10-2 AND record them in Table 10-1. MA

2.4 Compare the actual Loop A AND Loop B Jet Pump Flows to the respective Loop High AND Low Limits, as recorded in Table 10-1, AND indicate below whether the actual values fall within the Limits:

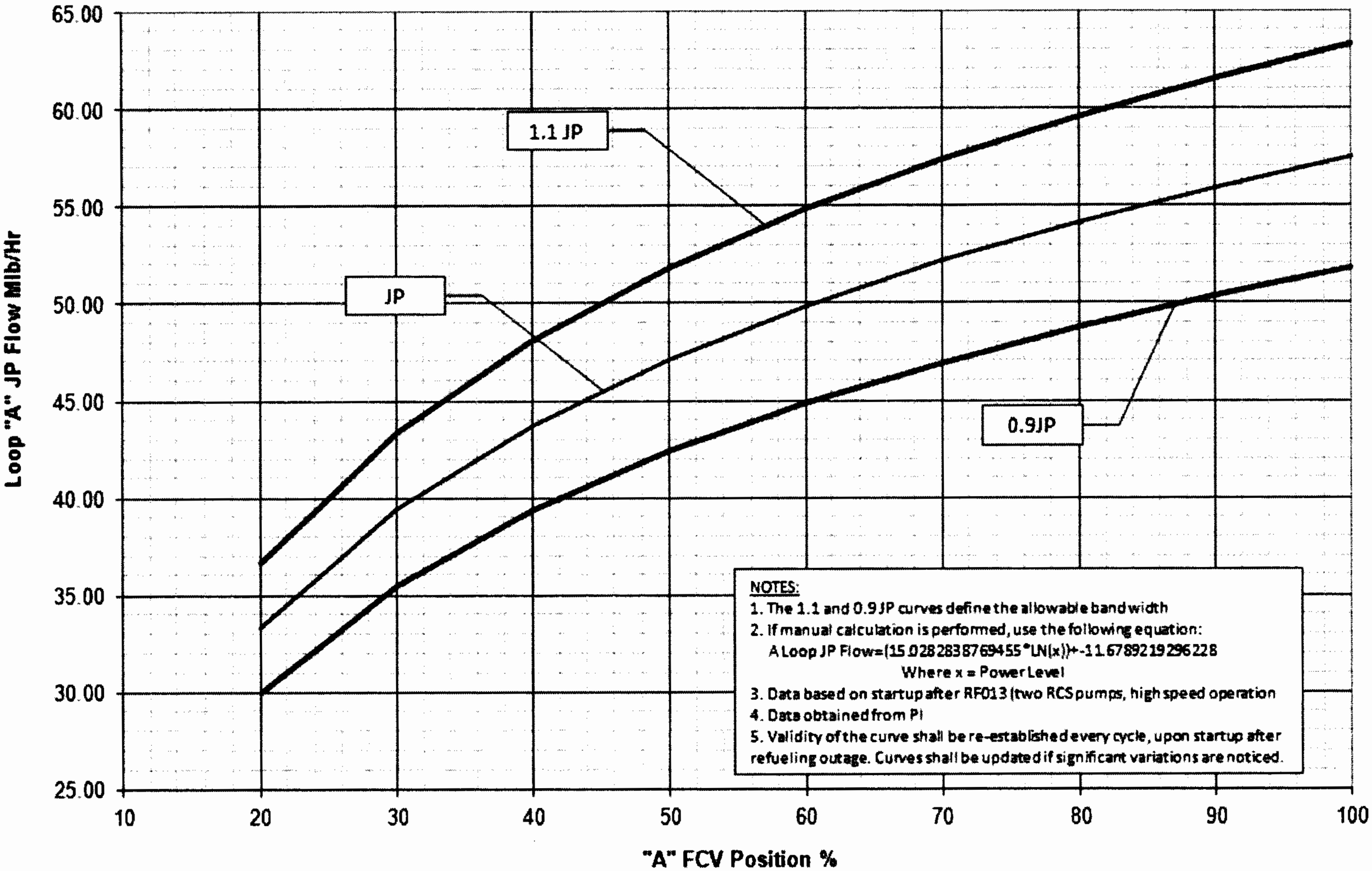
	Yes	No
• Loop A:	(X)	(__)
• Loop B:	(X)	(__)

MA

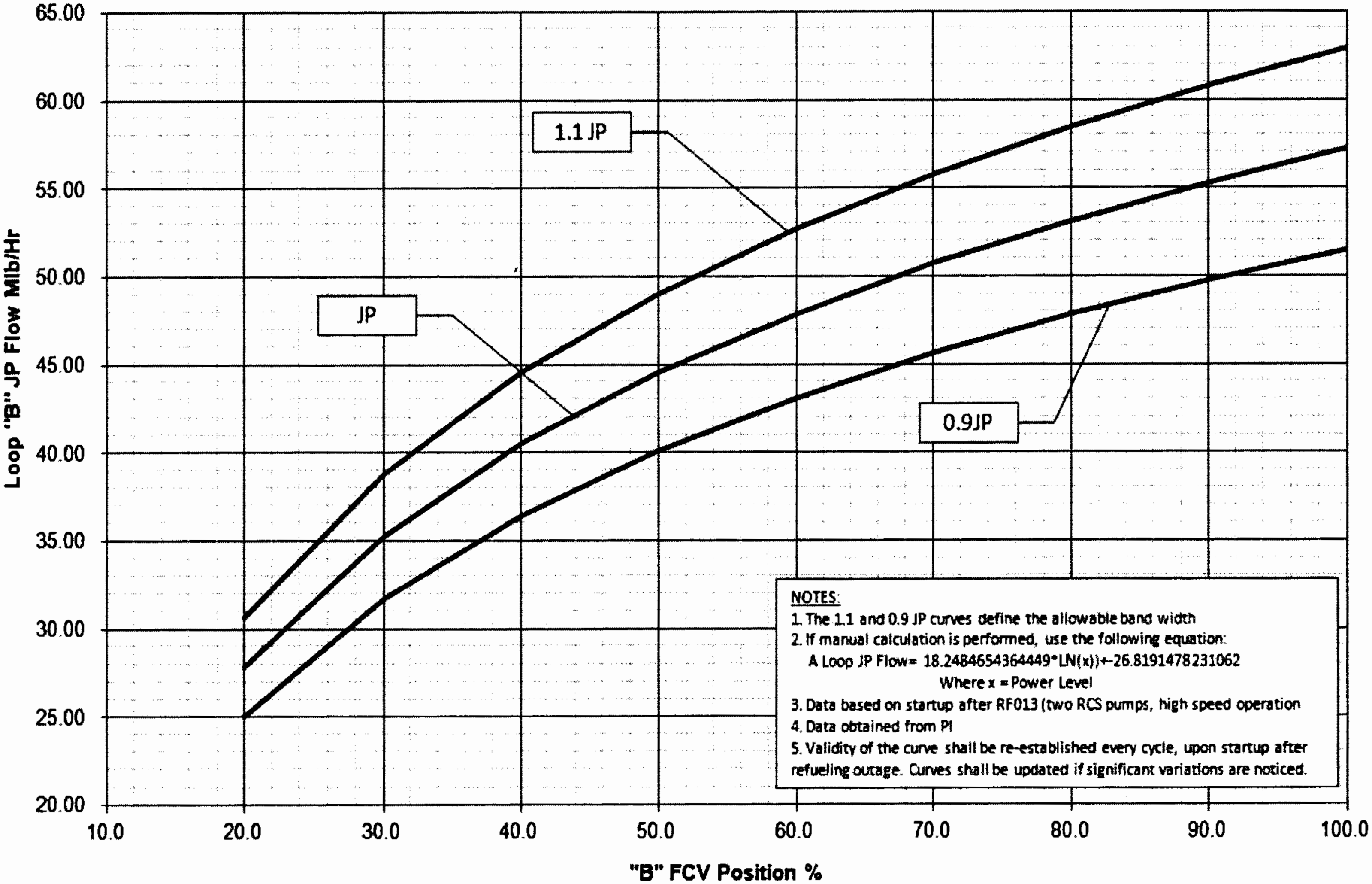
Table 10-1

Recirc Loop A				Recirc Loop B			
FCV A (%)	Loop A Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)	FCV B (%)	Loop B Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)
85	57	60.5	49.5	91	56	61.0	50.0

Predicted JP Loop A Flow By FCV Position (Figure 10-1)



Predicted JP Loop B Flow By FCV Position (Figure 10-2)



Initials

3.0 Comparison of Indicated Jet Pump Loop Flows to Predicted Jet Pump Loop Flows by Recirc Loop Drive Flows (TS SR 3.4.3.1.b)

3.1 Verify the Jet Pump Loop Flows have been recorded in Table 10-2. MA

3.2 Obtain Recirc Loop Drive Flows as follows:

3.2.1 IF flow oscillations on recorder do NOT make an accurate reading difficult, record Recirc Loop Drive Flows from recorder B35-R614, RECIRC FLOW LOOP B/FLOW LOOP A, on 2CEC*PNL602, in Table 10-2.

N/A, TARS used due to flow oscillations .... (__) MA

3.2.2 IF flow oscillations on recorder makes an accurate reading difficult, perform the following:

N/A, 2CEC*PNL602 recorder was used .... (X)

a. Obtain a 1 min mean of PID 2045, RCS Loop A Flow using TARS Point ID 2672. ______

b. Record the value of Recirc Loop A Drive Flow in Table 10-2. ______

c. Obtain a 1 min mean of PID 2046, RCS Loop B Flow using TARS Point ID 2671. ______

d. Record the value of Recirc Loop B Drive Flow in Table 10-2. ______

e. Attach TARS plot to this procedure. ______

3.3 Determine the High AND Low Limits for Jet Pump Loop Flow as follows:

- For High Speed Pump Operation, perform 3.3.1 AND 3.3.2.
- For Low Speed Pump Operation, perform 3.3.3 AND 3.3.4.

3.3.1 Using the Recirc Loop A Drive Flow recorded in Table 10-2, obtain the Jet Pump Loop Flow High AND Low Limits for Loop A from Figure 10-3 AND record them in Table 10-2.

N/A, Recirc Pumps in Low Speed Operation .... (__) MA

Initials

3.3.2 Using the Recirc Loop B Drive Flow recorded in Table 10-2, obtain the Jet Pump Loop Flow High AND Low Limits for Loop B from Figure 10-4 AND record them in Table 10-2.

N/A, Recirc Pumps in Low Speed Operation .... (__) MA

3.3.3 Using the Recirc Loop A Drive Flow recorded in Table 10-2, calculate the Jet Pump Loop Flow High AND Low Limits for Loop A using the following equation AND record them in Table 10-2.

NOTE: "WDA" in the equation is "A" Recirc Loop Drive Flow in gpm, not kgpm, and JP units as calculated are Mlbm/hr.

$JP = 12.197 + 0.0006WDA + 0.000000008WDA^2$
JP high limit = (1.1)JP
JP low limit = (0.9)JP

N/A, Recirc Pumps in High Speed Operation .... (X) ______

______
IV

3.3.4 Using the Recirc Loop B Drive Flow recorded in Table 10-2, calculate the Jet Pump Loop Flow High AND Low Limits for Loop B using the following equation AND record them in Table 10-2.

NOTE: "WDB" in the equation is "B" Recirc Loop Drive Flow in gpm, not kgpm, and JP units as calculated are Mlbm/hr.

$JP = 12.197 + 0.0006WDB + 0.000000008WDB^2$
JP high limit = (1.1)JP
JP low limit = (0.9)JP

N/A, Recirc Pumps in High Speed Operation .... (X) ______

______
IV

Initials

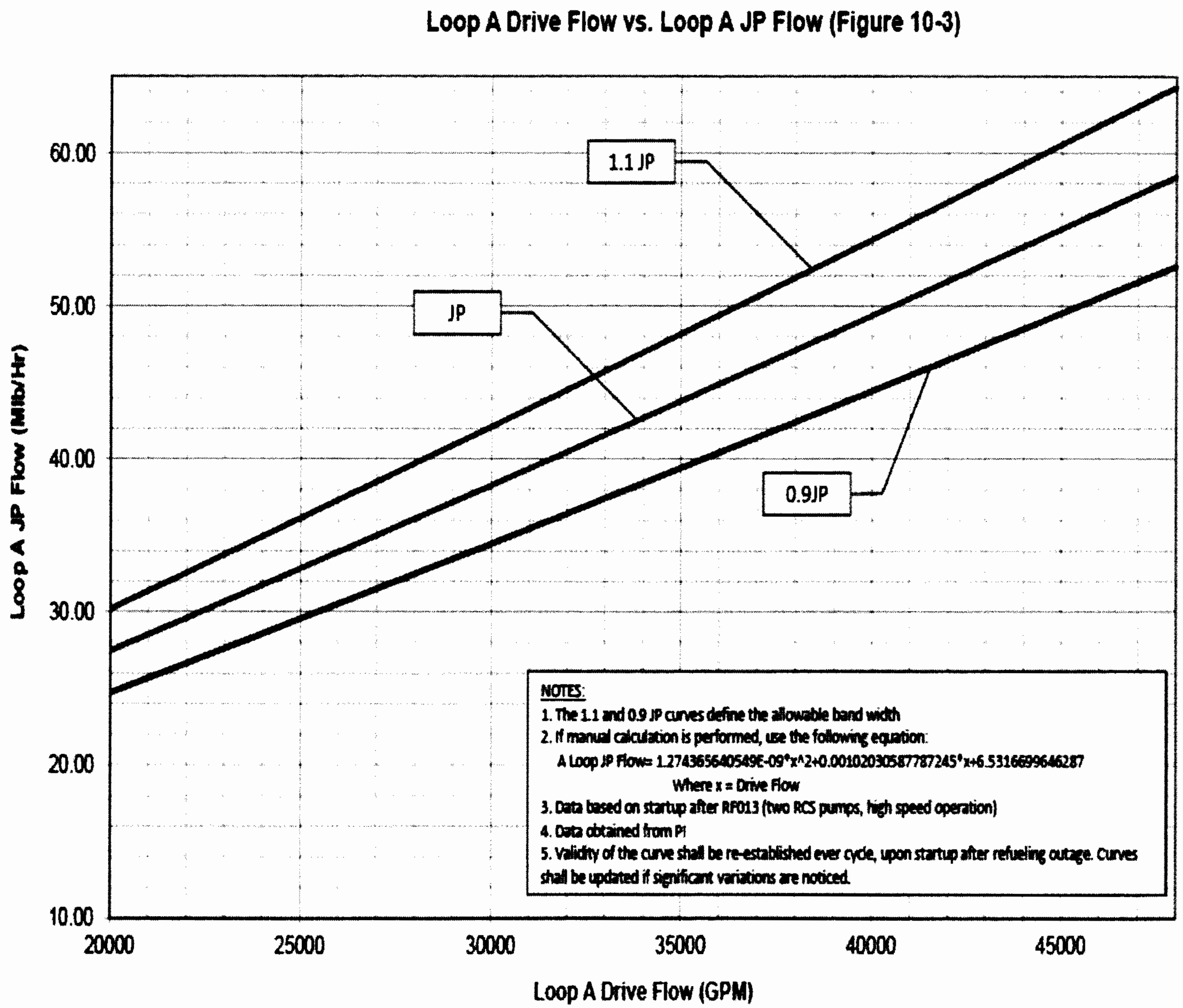
3.4 Compare the actual Loop A AND Loop B Jet Pump Flows to the respective Loop High AND Low Limits, as recorded in Table 10-2, AND indicate below whether the actual values fall within the Limits:

	Yes	No
• Loop A:	(X)	(_)
• Loop B:	(X)	(_)

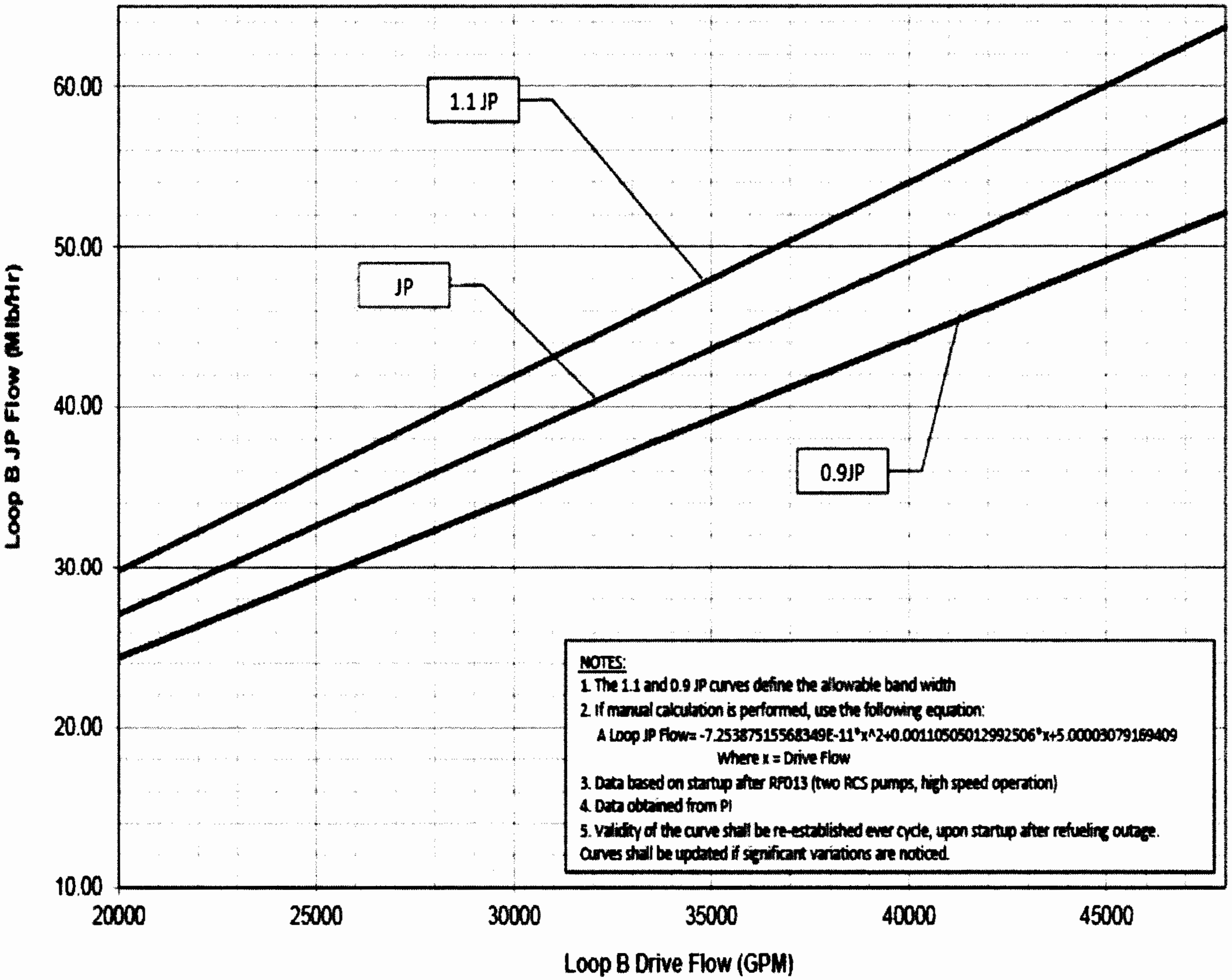
MA

Table 10-2

Recirc Loop A				Recirc Loop B			
Recirc Loop A Drive Flow (Kgpm)	Loop A Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)	Recirc Loop B Drive Flow (Kgpm)	Loop B Jet Pump Flow (Mlb_m/Hr)	High Limit (Mlb_m/Hr)	Low Limit (Mlb_m/Hr)
45	57	60	50	45	56	60	49


Loop A Drive Flow vs. Loop A JP Flow (Figure 10-3)
1.1 JP
JP
0.9JP
Loop A JP Flow (Mlb/Hr)
Loop A Drive Flow (GPM)
60.00
50.00
40.00
30.00
20.00
10.00
20000
25000
30000
35000
40000
45000
NOTES:
1. The 1.1 and 0.9 JP curves define the allowable band width
2. If manual calculation is performed, use the following equation:
A Loop JP Flow= 1.274365640549E-09*x^2+0.00102030587787245*x+6.5316699646287
Where x = Drive Flow
3. Data based on startup after RF013 (two RCS pumps, high speed operation)
4. Data obtained from PI
5. Validity of the curve shall be re-established ever cycle, upon startup after refueling outage. Curves shall be updated if significant variations are noticed.

Loop B Drive Flow vs. Loop B JP Flow (Figure 10-4)



NOTES:
1. The 1.1 and 0.9 JP curves define the allowable band width
2. If manual calculation is performed, use the following equation:
A Loop JP Flow= -7.25387515568349E-11*x^2+0.00110505012992506*x+5.00003079169409
Where x = Drive Flow
3. Data based on startup after RF013 (two RCS pumps, high speed operation)
4. Data obtained from PI
5. Validity of the curve shall be re-established ever cycle, upon startup after refueling outage. Curves shall be updated if significant variations are noticed.

Initials

4.0 Comparison of Individual Jet Pumps ΔP to Average Jet Pump Loop ΔP (TS SR 3.4.3.1.c)

NOTE: Due to cracking in the Jet Pump #6 sensing line (reference CR-2008-002793), the potential for failure of the sensing line exists. If the Jet Pump #6 sensing line fails such that it reads downcomer pressure, its D/P reading will show a step jump of approximately 8% to 9% above its baseline and the indicated loop flow and core flow will increase. Jet Pump #5 D/P and generator output will not change. Should the step jump in Jet Pump #6 be observed, in addition to following the guidance in N2-OP-29, a CR shall be initiated.

4.1 Record value for each Jet Pump ΔP in Loop A, as read on computer points NSSFA102 to NSSFA111, in Table 10-3. MA

4.2 Calculate Loop A Average Jet Pump ΔP for AND record in Table 10-3. MA

4.3 Divide each Loop A Jet Pump ΔP by Loop A Average Jet Pump ΔP AND record the resulting Individual to Average ΔP Ratios in Table 10-3. MA

4.4 For ALL Jet Pumps in Loop A, compare each Jet Pump's Individual to Average ΔP Ratio to the Limits given in Table 10-3 AND indicate below whether the actual values are within the Limits:

Jet Pump	Yes	No
1	(X)	(_)
2	(X)	(_)
3	(X)	(_)
4	(X)	(_)
5	(X)	(_)
6	(X)	(_)
7	(X)	(_)
8	(X)	(_)
9	(X)	(_)
10	(X)	(_)

MA

Initials

4.5 Record value for each Jet Pump ΔP in Loop B, as read on computer points NSSFA112 to NSSFA121, on Table 10-3. MA

4.6 Calculate Loop B Average Jet Pump ΔP for AND record on Table 10-3. MA

4.7 Divide each Loop B Jet Pump ΔP by Loop B Average Jet Pump ΔP AND record the resulting Individual to Average ΔP Ratios in Table 10-3. MA

4.8 For ALL Jet Pumps in Loop B, compare each Jet Pump's Individual to Average ΔP Ratio to the Limits given in Table 10-3 AND indicate below whether the actual values are within the Limits:

Jet Pump	Yes	No
11	(X)	(__)
12	(X)	(__)
13	(X)	(__)
14	(X)	(__)
15	(X)	(__)
16	(X)	(__)
17	(X)	(__)
18	(X)	(__)
19	(X)	(__)
20	(X)	(__)

MA

Table 10-3 (Low Speed Operation) Sheet 13 of 15

Jet Pump	Computer Points (Mlbm/hr)	Individual to Average ΔP Ratio	Low Limit	High Limit
Loop A				
1	NSSFA102=		0.81	1.22
2	NSSFA103=		0.79	1.19
3	NSSFA104=		0.79	1.19
4	NSSFA105=		0.79	1.18
5	NSSFA106=		0.84	1.25
6	NSSFA107=		0.85	1.27
7	NSSFA108=		0.78	1.17
8	NSSFA109=		0.77	1.16
9	NSSFA110=		0.79	1.19
10	NSSFA111=		0.80	1.19
Total		Total ÷ 10 = __________ % Loop A Average Jet ΔP Pump		
Loop B				
11	NSSFA112=		0.81	1.21
12	NSSFA113=		0.78	1.16
13	NSSFA114=		0.78	1.18
14	NSSFA115=		0.77	1.16
15	NSSFA116=		0.83	1.25
16	NSSFA117=		0.84	1.27
17	NSSFA118=		0.81	1.21
18	NSSFA119=		0.78	1.18
19	NSSFA120=		0.79	1.19
20	NSSFA121=		0.80	1.20
Total		Total ÷ 10 = __________ % Loop B Average Jet ΔP Pump		
Calc Performed By (Initials):		Independently Verified By (Initials):		

Table 10-3 (40-74% Power)

Jet Pump	Computer Point (Mlbm/hr)	Individual to Average ΔP Ratio	Low Limit	High Limit
Loop A				
1	NSSFA102=		0.81	1.22
2	NSSFA103=		0.79	1.19
3	NSSFA104=		0.79	1.19
4	NSSFA105=		0.79	1.18
5	NSSFA106=		0.84	1.25
6	NSSFA107=		0.85	1.27
7	NSSFA108=		0.78	1.17
8	NSSFA109=		0.77	1.16
9	NSSFA110=		0.79	1.19
10	NSSFA111=		0.80	1.19
Total		Total ÷ 10 = _________ % Loop A Average Jet ΔP Pump		
Loop B				
11	NSSFA112=		0.81	1.21
12	NSSFA113=		0.78	1.16
13	NSSFA114=		0.78	1.18
14	NSSFA115=		0.77	1.16
15	NSSFA116=		0.83	1.25
16	NSSFA117=		0.84	1.27
17	NSSFA118=		0.81	1.21
18	NSSFA119=		0.78	1.18
19	NSSFA120=		0.79	1.19
20	NSSFA121=		0.80	1.20
Total		Total ÷ 10 = _________ % Loop B Average Jet ΔP Pump		
Calc Performed By (Initials):		Independently Verified By (Initials):		

Table 10-3 (75-100% Power)

Jet Pump	Computer Point (Mlbm/hr)	Individual to Average ΔP Ratio	Low Limit	High Limit
Loop A				
1	NSSFA102= 5.61	0.99	0.81	1.22
2	NSSFA103= 5.44	0.96	0.79	1.19
3	NSSFA104= 5.39	0.95	0.79	1.19
4	NSSFA105= 5.08	0.90	0.79	1.18
5	NSSFA106= 5.95	1.05	0.84	1.25
6	NSSFA107= 7.23	1.28	0.85	1.27
7	NSSFA108= 5.37	0.95	0.78	1.17
8	NSSFA109= 5.31	0.94	0.77	1.16
9	NSSFA110= 5.56	0.98	0.79	1.19
10	NSSFA111= 5.6	0.99	0.80	1.19
Total	56.54	Total ÷ 10 = 5.654 % Loop A Average Jet ΔP Pump		
Loop B				
11	NSSFA112= 5.43	1.00	0.81	1.21
12	NSSFA113= 5.1	0.94	0.78	1.16
13	NSSFA114= 5.24	0.97	0.78	1.18
14	NSSFA115= 5.14	0.95	0.77	1.16
15	NSSFA116= 5.94	1.10	0.83	1.25
16	NSSFA117= 5.96	1.10	0.84	1.27
17	NSSFA118= 5.39	0.99	0.81	1.21
18	NSSFA119= 5.24	0.97	0.78	1.18
19	NSSFA120= 5.33	0.98	0.79	1.19
20	NSSFA121= 5.44	1.00	0.80	1.20
Total	54.21	Total ÷ 10 = 5.421 % Loop B Average Jet ΔP Pump		
Calc Performed By (Initials): MA		Independently Verified By (Initials): TH		

Exelon Generation.

Training Id: **2015 NRC SRO Admin COO2** Revision: **0.0**

Title: **Determine Plant Impact for Inoperable Unit Cooler**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	6/10/15
Validated By	James Workman	8/12/15
Facility Reviewer	Mark Green	10/2/15

Approximate Duration: 30 minutes

Documentation of Performance:

Performer: ______________________

Evaluator: ______________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ______________________

Evaluators Signature: ______________________ Date: ________

References

1. N2-OP-53E, Standby Switchgear/Battery Room Ventilation System
2. NMP Unit 2 Technical Specifications
3. NUREG 1123, 2.1.32 (4.0)

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to determine the plant impact of an inoperable unit cooler.
   b. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. NS-PS115-02003, Initiate Action to Comply With Technical Specifications
   b. K/A 2.1.32 (4.0) Ability to explain and apply system limits and precautions.

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Classroom
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location
   a. Training Classroom

5. JPM Setup (if required)

   a. Ensure book carts are available for the operators to use and that there is an up to date copy of N2-OP-53E and Unit 2 Technical Specifications.

   b. Ensure PIDs 53E and 11J are available

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is operating at 100% power. • While taking building rounds, an operator notices the Division 1 Chiller Equipment Room is warmer than normal. • Upon investigation, operators found 2SWP*V221A, HVC*UC103A INLET ISOL valve shut. • All attempts to re-open 2SWP*V221A have failed. **Evaluator:** Ask trainee if he/she has any questions after presenting initial conditions

INITIATING CUE	**(Operators Name)**, Determine the impact of this valve failure on plant operations. Document your results on the provided worksheet.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary.	P	SAT / UNSAT **STD:** Proper communications used.
2.	Obtain a copy of the reference procedure and review / utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** Obtains any of the following as necessary to determine the plant impact: • N2-OP-53E • PID 53E • PID 11J • Unit 2 Technical Specifications
Evaluator Note:	The following steps may be performed in any order.		
Evaluator Note:	The operator may choose to use different nomenclature to represent the affected component. This is acceptable provided it is obvious to the evaluator which component is affected. The Evaluators Aid at the end of this JPM may be used to assist in the grading of the below steps. The listing of the references on the Evaluator's Aid is for ease of grading and review by the Evaluator, however it is not required for successful completion of the JPM.		

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
3.	Determines the following: • The closure of 2SWP*V221A makes 2HVC*UC103A inoperable	P	**PASS / FAIL** **STD:** On the provided worksheet, documents that 2HVC*UC103A, DIVISION 1 CHILLER ROOM UNIT SPACE COOLER is INOPERABLE
4.	• With 2HVC*UC103A inoperable, 2HVK*CHL1A is inoperable	P	**PASS / FAIL** **STD:** On the provided worksheet, documents that 2HVK*CHL1A, DIVISION 1 CONTROL AND RELAY ROOM CHILLER is INOPERABLE
5.	• Determines TS 3.7.3 Conditions A and B are applicable.	P	**PASS / FAIL** **STD:** References TS 3.7.3, Conditions A and B and documents the following as a minimum on the provided worksheet: • Restore the Division 1 Control Room Envelope AC Subsystem for the Main Control Room to OPERABLE status within 30 days • Restore the Division 1 Control Room Envelope AC Subsystem for the Relay Room to OPERABLE status within 30 days

TASK STANDARD	The Operator has documented the unit cooler status and the required actions on the provided worksheet.

STOP TIME	

Evaluator's Answer Key

Do Not Provide to Candidate

1.	**Status of 2HVC*UC103A:**
	INOPERABLE
2.	**List any other impacted equipment and its status:**
	2HVK*CHL1A, DIVISION 1 CONTROL AND RELAY ROOM CHILLER is INOPERABLE
3.	**List actions required to be performed (include reference document and section).**
	Enter TS 3.7.3, Conditions A and B. (N2-OP-53E, Attachment 1, Action 4) Condition A: Restore Division 1 control room envelope AC subsystem for the Main Control Room area to OPERABLE status within 30 days. Condition B: Restore Division 1 control room envelope AC subsystem for the Relay Room area to OPERABLE status within 30 days.

JPM Handout

INITIAL CONDITIONS	Given: • The plant is operating at 100% power. • While taking building rounds, an operator notices the Division 1 Chiller Equipment Room is warmer than normal. • Upon investigation, operators found 2SWP*V221A, HVC*UC103A INLET ISOL valve shut. • All attempts to re-open 2SWP*V221A have failed.

INITIATING CUE	**(Operators Name)**, Determine the impact of this valve failure on plant operations. Document your results on the provided worksheet.

JPM Worksheet

1.	**Status of 2HVC*UC103A:**
2.	**List any other impacted equipment and its status:**
3.	**List actions required to be performed (include reference document and section).**

NINE MILE POINT NUCLEAR STATION UNIT 2

OPERATING PROCEDURE

N2-OP-53E

REVISION 00701

STANDBY SWITCHGEAR/BATTERY ROOM VENTILATION SYSTEM

TECHNICAL SPECIFICATION REQUIRED

Approved By: M. A. Philippon	M. A. [signature] Manager Operations	12/28/10 Date

Effective Date: Jan 5, 2011

LIST OF EFFECTIVE PAGES

Page No.	Change No.
Coversheet	
i..................	
ii.................	
iii.	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10................	
11................	
12................	
13................	
14................	
15................	
16................	
17................	
18................	
19................	
20................	
21................	

TABLE OF CONTENTS

TABLE OF CONTENTS

A. REFERENCES AND COMMITMENTS

1.0 Technical Specifications

- 3.3.3.2, Remote Shutdown System
- 3.7.3, Control Room Envelope Air Conditioning (AC) System
- 3.8.8, Distribution Systems - Operating
- 3.8.9, Distribution Systems - Shutdown
- 3.8.7, Inverters - Operating

2.0 Licensee Documentation

USAR Section 9.4.1, Control Building and Normal Switchgear Building Heating, Ventilating, and Air Conditioning System

3.0 Technical Information

3.1 Flow Diagrams

PID 53C - F, Control Building Ventilation and Air Conditioning

3.2 Electrical Diagrams

- ESK 6HVC05, 06, 08-14, 22 & 24: Control Bldg Air Conditioning
- ESK 7HVC03, 05, 10-15, 19-34 & 36: Control Bldg Air Conditioning
- LSK 22-9.2J, 22-9.3A to P: Control Building Air Conditioning

4.0 Supplemental References

- File Code ESB2-M95-0235, Letter to D. Richards from S. Heimovitz, Eng Calculation HVC-064 Rev 02, Disposition 02M.
- SE 98-067 Logic Changes for Control Building Ventilation Fans

5.0 Commitments

Sequence Number	Commitment Number	Description
1	DER 2-93-2770	TSI #25 Rev 13 issued without required procedure changes

B. SYSTEM DESCRIPTION

The standby switchgear/battery room ventilation system supplies tempered outdoor air to all areas of the 261', 237' and 214' (basement) elevations of the control building. The system also provides for exhausting air from these areas. The following are the specific areas served by this system.

Div I, II, & III Switchgear Rooms	Div I, II, & III Cable Chase
Div I, II, & III Battery Rooms	Div I, II, & III Cable Areas
24V Battery Rooms	Remote Shutdown Rooms A & B
Div I & II Chiller Equipment Rooms	Halon Storage Area

Two redundant standby switchgear room supply air trains provide filtered outside air to the El. 261' corridor. This air in turn is used as makeup for the El. 261' areas and rooms. Each train consist of a fan (2HVC*FN11A or *FN11B), duct heater (2HVC*CH6A or CH6B), intake filter (2HVC*FLT3A or *FLT3B) and suction damper (2HVC*AOD54A or *AOD54B). One train is normally running with the second train in auto. On low air flow, the running fan will trip and the fan in auto will start. The associated suction dampers close and open respectively.

Unit coolers 2HVC*UC101A and *UC108A (2HVC*UC101B and *UC108B) recirculate and provide cooling of the air in the Div I (Div II) Switchgear and Battery Rooms. The unit cooler fans are normally running with service water being supplied as necessary to maintain the room temperatures. A temperature switch located in each switchgear room provides the signal to open or close the associated service water supply valves to the unit coolers.

Two redundant battery room exhaust Fans (2HVC*FN4A and *FN4B) provide for exhausting air from the Div I, II and III Battery Rooms to the outside. One fan is normally running with the second fan in auto. On low air flow, the running fan will trip and the fan in auto will auto start.

Basement Cable Spreading Unit Coolers (2HVC*UC106 and *UC107) provide ventilation and cooling to the Div I and II basement area respectively. Both unit coolers are normally running with most of the air in these areas being recirculated with a small amount of makeup air from the outside. The service water system provides the cooling water to the unit coolers. A temperature element in the cable area return air duct for both unit coolers provides the signal for opening and closing the associated service water supply valves to the unit coolers. Each unit cooler is supplied with a flow switch in the inlet that trips the unit cooler on low air flow.

2HVC-FN21A and FN21B exhaust air from the 24V and computer battery rooms to the outside. Normally, one fan is running with the second fan in auto. The running fan will trip on low air flow and the second fan will auto start anytime the running fan is tripped.

2HVC-ACU5 provides cooling and humidity control specifically for the records storage vault. The air conditioning unit is controlled by its associated thermostat located in the records storage vault.

Unit cooler 2HVC*UC102 provides ventilation to the Div III Switchgear and Cable Areas. The unit cooler fan is normally running and recirculates the air in the switchgear and cable area. Cooling water is supplied to the unit cooler by the service water system. A temperature element in the switchgear room provides the signal for opening or closing the service water supply valve as required to maintain area temperature.

B. SYSTEM DESCRIPTION

The Div I & II Chiller Equipment Rooms are each supplied with a unit cooler 2HVC*UC103A and *UC103B for recirculating the room air and cooling as required. Service water is supplied to both unit coolers. The unit cooler fans start and stop as required to maintain area temperature. A temperature switch located in each chiller room provides the signal to start or stop its associated unit cooler fan. Normally running ventilating fan (2HVC-FN8) provides for exhausting air from the Div I & II Chiller Equipment Rooms and the halon storage area to the outside.

Remote Shutdown Rooms A and B are supplied with individual air conditioning units 2HVC*ACU3A and *ACU3B. Control Building Chilled Water System normally supplies the cooling water to these air conditioning units. If at any time the control building chilled water system becomes inoperable, service water can be supplied. A temperature switch in each room provides the signal to start or stop the air conditioning units as needed to cool the rooms.

Unit Heaters 2HVC-UHE105 and UHE110 are supplied in the Div II & III Cable Chase and El. 261' corridor respectively. A temperature switch in the vicinity of each unit heater turns the heater on or off as necessary.

Smoke Removal

Div I, II & III Switchgear Rooms and Cable Chases, Div III Cable Area and Div I & II Basements are provided with fans and damper for smoke removal.

2HVC-FN6 is provided for smoke removal in the Div I, II and III Switchgear Rooms, Cable Chases and Div III Cable Areas. Each of these areas is supplied with a smoke removal damper. During smoke removal operation, air from the corridor is used as makeup. If CO_2 is discharged into any area served by 2HVC-FN6, then FN6 will not start or will trip if running to prevent pulling the CO_2 out. To initiate smoke removal, the smoke removal mode switch for the area affected on 2HVC-IPNL270 must be placed in the smoke removal position. The associated smoke removal damper will open and FN6 will start. 2HVC-FN8 will trip any time FN6 is started.

2HVC-FN12 and FN14 is provided for smoke removal in the Div I & II Basement areas respectively. During smoke removal operation, air from the outside is used to provide makeup air to the corridor which in turn provides makeup air to the smoke removal areas. To initiate smoke removal, the associated area unit cooler (2HVC*UC106 or *UC107) must be stopped to prevent spreading of the smoke to any unaffected areas and allow 2HVC-FN12 or FN14 to draw the smoke from the affected areas, then start 2HVC-FN12 or FN14 by placing the Div I or II Basement mode switch on 2HVC-IPNL270 to the smoke removal position. The associated smoke removal damper will open and FN12 or FN14 will start.

C. <u>OPERATING REQUIREMENTS</u>

1.0 SYSTEMS

N2-OP-11,	Service Water System
N2-OP-19,	Instrument and Service Air System
N2-OP-53A,	Control Building Ventilation System
N2-OP-71C,	600V A.C. Power Distribution
N2-OP-72,	Standby and Emergency A.C. Distribution System
N2-OP-73A,	Normal DC Distribution
N2-OP-74A,	Emergency DC Distribution
N2-OP-74B,	HPCS 125VDC System

D. PRECAUTIONS AND LIMITATIONS

1.0 If CO_2 is discharged into any area served by 2HVC-FN6, then FN6 will not start or will trip if running. 2HVC-FN6 cannot be started until the CO_2 fire protection logic is reset.

2.0 The control building chilled water system that supplies cooling water to remote shutdown room 2HVC*ACU3A and *ACU3B is provided with backup cooling water from the service water system if necessary.

3.0 On a loss of cooling water or ventilation to any area, monitor that area temperature and establish means of temporary ventilation as necessary to control area temperature.

4.0 If 2HVC*UC106, *UC107, *FN4A, *FN4B, *FN11A, *FN11B, FN21A or FN21B trip on low air flow, the associated control switch must be momentarily placed to the STOP position to reset the trip logic before it can be restarted.

5.0 In the case of a LOOP the control building HVAC equipment is set up to sequence on in the following manner:

- 2HVC*FN4A (5 sec) is primary and 2HVC*FN4B (12 sec) is the backup.
- 2HVC*FN11A (5 sec) is primary and 2HVC*FN11B (12 sec) is the backup.

NOTE

- The "B" fan should not start so long as the "A" fan starts and is operating.
- If both the 4 or 11 fans are operating, within one hour secure one of the redundant operating fans to prevent damaging these fans.

6.0 If 2HVC*UC106 (*UC107) is unavailable, then 2VBA*UPS2C (*UPS2D) will be inoperable since the LOCA heat loads without a unit cooler would exceed the UPS rated inlet temperature of 122°F.

7.0 Use of N/A may only be used as directed in this procedure, except as allowed by CNG-PR-1.01-1009, Procedure Use and Adherence Requirements.

8.0 Stroking of unit cooler service water valves does not render the associated unit cooler inoperable.

Initials

E. STARTUP

1.0 System Startup

1.1 Verify N2-ELU-01, Attachment 53E, WALKDOWN ELECTRIC LINEUP is completed. ________

1.2 Verify N2-VLU-01, Attachment 53E, WALKDOWN VALVE LINEUP is completed. ________

2.0 Standby Switchgear Rooms Supply Air Fans 2HVC*FN11A, *FN11B.

2.1 Verify E.1.0 has been completed to support this subsection. ________

2.2 Start HVC*FN11A (*FN11B), STANDBY SWGR ROOM SUPPLY AIR FAN on 2CEC*PNL870 (871) by momentarily placing control switch to START (spring return to Normal-After-START). ________

2.3 Verify HVC*AOD54A (*AOD54B), STBY SWGR RMS MAKEUP AIR FAN SUCT DAMPER opens on 2CEC*PNL870 (871). ________

2.4 AFTER 2HVC*FN11A (*FN11B) air flow has been established (ran for greater than 35 seconds), place 2HVC*FN11B (*FN11A) control switch on 2CEC*PNL871 (870) in Normal-After-STOP. ________

2.5 Place the following 2HVC-CH6A AND CH6B, Standby Switchgear Rooms Supply Air Duct Heaters local disconnect switches to ON:

- At 2HVC-PNLCH6A, Div. 1 Chiller room, El. 278' on mezzanine. .... ☐
- At 2HVC-PNLCH6B, Div. 1 Chiller room, El. 261' East wall. .... ☐ ________

3.0 A/C Equipment Room Normal Ventilating Fan 2HVC-FN8

3.1 Verify E.1.0 has been completed to support this subsection. ________

3.2 Start 2HVC-FN8, NORMAL VENTILATING FAN 2HVC-FN8 on 2CES-IPNL403 by momentarily placing control switch to the START position (spring return to mid position). ________

4.0 Control Building El. 261' Unit Coolers 2HVC*UC101A, *UC101B, *UC108A and *UC108B

4.1 Verify E.1.0 has been completed to support this subsection. ________

4.2 Start the following Unit Coolers by momentarily placing their control switches to START (spring return to Normal-After-START):

- HVC*UC101A, CONTROL BLDG EL 261 UNIT COOLER on 2CEC*PNL870 .... ☐
- HVC*UC108A, CONTROL BLDG EL 261 UNIT COOLER on 2CEC*PNL870 .... ☐
- HVC*UC101B, CONTROL BLDG UNIT COOLER on 2CEC*PNL871 .... ☐
- HVC*UC108B, CONTROL BLDG EL 261 UNIT COOLER on 2CEC*PNL871 .... ☐ ________

E. STARTUP (Continued) — Initials

5.0 Battery Rooms A and B Exhaust Fans 2HVC*FN4A, *FN4B

5.1 Verify E.1.0 has been completed to support this subsection. ________

5.2 Start HVC*FN4A (*FN4B), BATTERY ROOM A(B) EXHAUST FAN on 2CEC*PNL870 (871) by momentarily placing control switch to START (spring return to Normal-After-START). ________

5.3 AFTER 2HVC*FN4A (*FN4B) air flow has been established (ran for greater than 35 seconds), place 2HVC*FN4B (*FN4A) control switch on 2CEC*PNL871 (870) in Normal-After-STOP. ________

6.0 Basement Cable Spreading Area Unit Coolers 2HVC*UC106, *UC107

6.1 Verify E.1.0 has been completed to support this subsection. ________

6.2 At 2CEC*PNL870, verify SWP*AOV573, BSMT CABLE SPRDR AREA UNIT COOLER control switch is in AUTO. ________

6.3 At 2CEC*PNL870, verify HVC*AOD170, BSMT CABLE SPRDR AREA UNIT CLR DISCH DMPR control switch is in AUTO. ________

NOTE

In the following step, the Unit Cooler control switch will be held in the START position until the Unit Cooler has started.

6.4 At 2CEC*PNL870, place AND hold HVC*UC106, BSMT CABLE SPRDR AREA UNIT COOLER control switch to START AND verify the following:

- 2HVC*AOD170 opens. ☐
- 2HVC*UC106 starts. ☐ ________

6.5 At 2CEC*PNL871, verify SWP*AOV574, BSMT CABLE SPRDR AREA UNIT COOLER control switch is in AUTO. ________

6.6 At 2CEC*PNL871, verify HVC*AOD178, BSMT CABLE SPRDR AREA UNIT CLR DISCH DMPR control switch is in AUTO. ________

NOTE

In the following step, the Unit Cooler control switch will be held in the START position until the Unit Cooler has started.

6.7 At 2CEC*PNL871, place AND hold HVC*UC107, BSMT CABLE SPRDR AREA UNIT CLR control switch to START AND verify the following:

- 2HVC*AOD178 opens. ☐
- 2HVC*UC107 starts. ☐ ________

NOTE

The desired area temperature range for the batteries and 2VBB-UPS1G on CB 214' elevation is 68°- 86°F.

6.8 IF additional cooling is required,
THEN place the control switch for the following to OPEN:

- At 2CEC*PNL870, 2SWP*AOV573 .... ☐
- At 2CEC*PNL871, 2SWP*AOV574 .... ☐ ________

6.9 WHEN additional cooling is NO longer required, place the following control switches to AUTO:

- At 2CEC*PNL870, 2SWP*AOV573 .... ☐
- At 2CEC*PNL871, 2SWP*AOV574 .... ☐ ________

7.0 Control Building 24V Battery Rooms Exhaust Fans 2HVC-FN21A, FN21B

7.1 Verify E.1.0 has been completed to support this subsection. ________

7.2 Start 2HVC-FN21A (FN21B), EXHAUST FAN on 2CES-IPNL403 by momentarily placing control switch to START (spring return to Normal-After-START). ________

7.3 AFTER 2HVC-FN21A (FN21B) air flow has been established (ran for greater than 15 seconds), place 2HVC-FN21B (FN21A) control switch on 2CES-IPNL403 in Normal-After-STOP. ________

8.0 HPCS Switchgear Room Unit Cooler 2HVC*UC102

8.1 Verify E.1.0 has been completed to support this subsection. ________

8.2 Start HVC*UC102, HPCS SWGR ROOM UNIT COOLER on 2CEC*PNL871 by momentarily placing control switch to START (spring return to Mid Position After Start). ________

9.0 Chiller Equipment Room Unit Coolers 2HVC*UC103A,*UC103B

9.1 Verify E.1.0 has been completed to support this subsection. ________

NOTE

The unit cooler fans will be thermostatically controlled by its associated room temperature indicating switch.

9.2 Place HVC*UC103A, DIV 1 CHILLER EQUIP RM UNIT COOLER on 2CEC*PNL870 in auto by placing its control switch in Normal-After-STOP. ________

9.3 Place HVC*UC103B, DIV 2 CHILLER EQUIP RM UNIT COOLER on 2CEC*PNL871 in auto by placing its control switch in Normal-After-STOP. ________

E. STARTUP (Continued) Initials

10.0 Remote Shutdown Rooms Air Conditioning Units 2HVC*ACU3A, *ACU3B

10.1 Verify E.1.0 has been completed to support this subsection. ________

NOTE
The air conditioning unit fans will be thermostatically controlled by its associated remote shutdown room temperature indicating switch.

10.2 Place HVC*ACU3A AND *ACU3B, REMOTE SHUTDOWN ROOM AIR CONDITIONING in auto by placing their control switches on 2CES*PNL405 in Normal-After-STOP. ________

11.0 Records Storage Vault Air Conditioning Unit 2HVC-ACU5

11.1 Verify E.1.0 has been completed to support this subsection. ________

NOTE
2HVC-ACU5 will be controlled by its associated thermostat in the records storage vault.

11.2 Place 2HVC-ACU5 in service by depressing the FAN pushbutton located on ACU5 (red backlight comes on). ________

12.0 Unit Heaters 2HVC-UHE105 and UHE110

12.1 Verify E.1.0 has been completed to support this subsection. ________

NOTE
The unit heaters control switches are located locally in the vicinity underneath their associated unit heater.

12.2 Place the following control switches in AUTO:

- 2HVC-UHE105, Div 2 & 3 Cable Chase Unit Heater (El. 261' East cable chase south) .... ☐
- 2HVC-UHE110, Control Building Elev. 261' Corridor Unit Heater (SE by 2FPM-PNL125) .... ☐ ________

Initials

F. NORMAL OPERATIONS

NOTE

Normal operation of the standby switchgear/battery room ventilation system requires no operator action.

1.0 SHIFTING FANS (2HVC*FN11A/*FN11B; *FN4A/*FN4B; -FN21A/-FN21B)

NOTE

The time required for auto swap of the fans could be lengthy. It could take several minutes due to draft flow interactions on the flow switches.

1.1 Verify the standby fan is in Normal-After-STOP (auto) in accordance with Subsection E. ________

1.2 Stop the fan to be removed from service by taking its applicable control switch to PULL-TO-LOCK. ________

1.3 Verify the standby fan starts. ________

1.4 Place the control switch for the now running fan in Normal-After-START. ________

1.5 Place the control switch for the fan that was stopped in Normal-After-STOP (auto), AND confirm that the stopped fan does NOT restart. ________

Initials

G. SHUTDOWN

CAUTION

Shutting down any fan(s) or unit cooler(s), may cause the affected areas temperature to not be maintained.

1.0 Unit Heaters 2HVC-UHE105 and UHE110

NOTE

The unit heaters control switches are located locally in the vicinity underneath their associated unit heater.

1.1 Place the following control switches in OFF:

- 2HVC-UHE105, Div 2 & 3 Cable Chase Unit Heater (El. 261' East cable chase south) .... ☐
- 2HVC-UHE110, Control Building Elev. 261' Corridor Unit Heater (SE by 2FPM-PNL125) .... ☐ ________

2.0 Records Storage Vault Air Conditioning Unit 2HVC-ACU5

2.1 Take 2HVC-ACU5 out of service by depressing the FAN pushbutton located on ACU5 (red backlight goes off). ________

3.0 Remote Shutdown Rooms Air Conditioning Units 2HVC*ACU3A, *ACU3B

3.1 Review Attachment 1, Control Building Unit Coolers, for Technical Specification applicability. **[C1]** ________

3.2 Take HVC*ACU3A (*ACU3B), REMOTE SHUTDOWN ROOM AIR CONDITIONING out of service by placing its control switch on 2CES*PNL405 in PULL-TO-LOCK. ________

4.0 Chiller Equipment Room Unit Coolers 2HVC*UC103A,*UC103B

4.1 Review Attachment 1, Control Building Unit Coolers, for Technical Specification Applicability. **[C1]** ________

4.2 Place the following control switches in PULL-TO-LOCK:

- HVC*UC103A, DIV 1 CHILLER EQUIP RM UNIT COOLER on 2CEC*PNL870 .... ☐
- HVC*UC103B, DIV 2 CHILLER EQUIP RM UNIT COOLER on 2CEC*PNL871 .... ☐ ________

G. SHUTDOWN (Continued) Initials

5.0 HPCS Switchgear Room Unit Cooler 2HVC*UC102

5.1 Review Attachment 1, Control Building Unit Coolers, for Technical Specification Applicability. **[C1]** ________

5.2 Place HVC*UC102, HPCS SWGR ROOM UNIT COOLER control switch on 2CEC*PNL871 in PULL-TO-LOCK. ________

6.0 Control Building 24V Battery Rooms Exhaust Fans 2HVC-FN21A, FN21B

6.1 Place the non-running (standby) 2HVC-FN21A OR FN21B control switch on 2CES-IPNL403 in PULL-TO-LOCK. ________

6.2 Place the running 2HVC-FN21B OR FN21A control switch on 2CES-IPNL403 in PULL-TO-LOCK. ________

7.0 Basement Cable Spreading Area Unit Coolers 2HVC*UC106, *UC107

7.1 Review Attachment 1, Control Building Unit Coolers, for Technical Specification Applicability. **[C1]** ________

7.2 Place the following control switches in PULL-TO-LOCK:

- HVC*UC106, BSMT CABLE SPRDR AREA UNIT COOLER on 2CEC*PNL870 .... ☐
- HVC*UC107, BSMT CABLE SPRDR AREA UNIT COOLER on 2CEC*PNL871 .... ☐ ________

8.0 Battery Rooms A and B Exhaust Fans 2HVC*FN4A, *FN4B

8.1 Place the non-running (standby) HVC*FN4A (*FN4B), BATTERY ROOM A(B) EXHAUST FAN control switch on 2CEC*PNL870 (871) in PULL-TO-LOCK. ________

8.2 Place the running 2HVC*FN4B (*FN4A) control switch in PULL-TO-LOCK. ________

8.3 IF 2HVC*FN4A AND 2HVC*FN4B are secured, THEN perform the following:

8.3.1 Place supplemental ventilation (for example, box fans in addition to door breaches.) .... ☐

8.3.2 Sample at least once per shift for hydrogen gas. .... ☐ ________

G. SHUTDOWN (Continued) Initials

9.0 Control Building Elev. 261' Unit Coolers 2HVC*UC101A, *UC101B, *UC108A and *UC108B

9.1 Review Attachment 1, Control Building Unit Coolers, for Technical Specification applicability. **[C1]** ________

9.2 Place the following unit cooler control switches in PULL-TO-LOCK:

- HVC*UC101A, CONTROL BLDG EL 261 UNIT COOLER on 2CEC*PNL870 .... ☐
- HVC*UC108A, CONTROL BLDG EL 261 UNIT COOLER on 2CEC*PNL870 .... ☐
- HVC*UC101B, CONTROL BLDG UNIT COOLER on 2CEC*PNL871 .... ☐
- HVC*UC108B, CONTROL BLDG EL 261 UNIT COOLER on 2CEC*PNL871 .... ☐ ________

10.0 A/C Equipment Room Normal Ventilating Fan 2HVC-FN8 **[SOP]**

10.1 Stop 2HVC-FN8, NORMAL VENTILATING FAN by momentarily placing its control switch on 2CES-IPNL403 to the STOP position (spring return to mid position). ________

11.0 Standby Switchgear Rooms Supply Air Fans 2HVC*FN11A, *FN11B **[SOP]**

11.1 Place 2HVC-CH6A AND CH6B, Standby Switchgear Rooms Supply Air Duct Heaters local disconnect switches to OFF as follows:

- At 2HVC-PNLCH6A, Div. 1 Chiller room, El. 278' on mezzanine. .... ☐
- At 2HVC-PNLCH6B, Div. 1 Chiller room, El. 261' East wall. ...... ☐ ________

11.2 Place the non-running (standby) HVC*FN11A (*FN11B), STANDBY SWGR ROOM SUPPLY AIR FAN control switch on 2CEC*PNL870 (871) in PULL-TO-LOCK. ________

11.3 Place the running 2HVC*FN11B (*FN11A) control switch in PULL-TO-LOCK. ________

11.4 Verify the previously running fan suction damper 2HVC*AOD54A (*AOD54B) closes on 2CEC*PNL870 (871). ________

H. <u>OFF NORMAL PROCEDURES</u>

1.0 <u>Smoke Removal</u>

1.1 Div. I, II & III Switchgear Rooms, Cable Chases and Div. III Cable Area Smoke Removal

NOTE

- All controls and indications are located on 2HVC-IPNL270, Control Building El. 288' corridor unless otherwise indicated.
- If CO_2 is discharged into any area served by FN6, then it will not start or trip if running. FN6 cannot be started until the CO_2 fire protection logic is reset.
- If applicable, zone must be placed in disconnect prior to CO_2 fire protection logic being reset.
- 2HVC-FN6 is provided for smoke removal in these areas. During smoke removal operation, air from the corridor is used as makeup. Each of these areas is supplied with a smoke removal damper as shown in the following:

Div I Swgr Room	2HVC-AOD167
Div II Swgr Room	2HVC-AOD157
Div III Swgr Room	2HVC-AOD162
Div I Cable Chase	2HVC-AOD152
Div II Cable Chase	2HVC-AOD154
Div III Cable Chase	2HVC-AOD164

1.1.1 IF CO2 DISCHARGE red reset light is lit,
THEN press CO2 DISCHARGE reset pushbutton.

N/A, CO2 DISCHARGE red reset light is NOT lit. .... ☐ ________

1.1.2 To provide smoke removal to any of the above areas, place the associated area smoke removal mode switch to the SMOKE RMV position AND verify the following occur:

a. IF CO_2 discharge needs to be secured AND CO_2 logic must be reset,
THEN perform N2-OP-45, Section G.1.0.

N/A, securing discharge AND logic reset NOT required. ☐ ________

1.1.2 (Continued)

b. Place the associated area smoke removal mode switch to the SMOKE RMV position AND verify the following:

1. Associated smoke removal damper opens. .... ☐

2. HVC-FN6, SWGR ROOMS CABLE CHASE AREAS SMOKE REMOVAL starts. .... ☐

3. HVC-FN8, NORMAL VENTILATING FAN stops if running on 2CES-IPNL403 in the Normal Switchgear Building. .... ☐ ________

1.1.3 WHEN smoke removal operation is NO longer required for an area, perform the following:

a. Place the associated area smoke removal mode switch to the NORMAL position. .... ☐

b. Verify that the associated smoke removal damper closes. .... ☐ ________

1.1.4 IF ALL the smoke removal mode switches associated with areas served by 2HVC-FN6 are in the NORMAL position, THEN perform the following:

a. Verify HVC-FN6, SWGR ROOMS CABLE CHASE AREAS SMOKE REMOVAL stops. .... ☐

b. Start 2HVC-FN8, NORMAL VENTILATING FAN by momentarily placing its control switch on 2CES-IPNL403 in START. .... ☐ ________

1.2 Div. I (II) Basement Smoke Removal

NOTE

- All controls and indications are located on 2HVC-IPNL270, Control Building, El. 288' unless otherwise indicated.
- 2HVC-FN12 (FN14) is provided for smoke removal in the Div I (II) Basement Area. Area from the outside is used to provide makeup air to the corridor which in turn provides makeup air to the smoke removal areas.

1.2.1 To provide smoke removal to the Div I (II) Basement areas, perform the following:

a. Review Attachment 1, Control Building Unit Coolers, for Technical Specification Applicability for removing 2HVC*UC106 (*UC107) from service. ________

b. At 2CEC*PNL870 (871), Verify 2HVC*AOD171 (*AOD179), CABLE AREA SMOKE REMOVAL DAMPER, Arm and Depress switch is in the TURN TO OPEN position. ________

1.2.1 (Continued)

c. At 2CEC*PNL870 (871), Stop 2HVC*UC106 (*UC107), BSMT CABLE SPREAD AREA UNIT COOLER by momentarily placing the control switch to the STOP position (switch springs return to Normal-After-Stop). ________

d. At 2CEC*PNL870 (871), Verify 2HVC*AOD170 (*AOD178), BSMT CABLE SPRDR AREA UNIT CLR DISCH DMPR, closes. ________

e. At 2CEC*PNL870 (871), Shutdown 2HVC*FN4A and *FN4B, BATTERY ROOMS A AND B EXHAUST FANS, by performing the following:

1. Place the non-running (STBY) 2HVC*FN4A(FN4B), BATTERY ROOM A(B) EXHAUST FAN, control switch in PULL-TO-LOCK. .... ☐

2. Place the running 2HVC*FN4B (*FN4A) control switch in PULL-TO-LOCK. .... ☐ ________

f. Start 2HVC-FN12 (FN14), by placing the control switch for DIV I (II) BASEMENT MODE to the SMOKE RMV position. ________

g. Verify 2HVC*AOD171 (AOD179), DIV I (II) CABLE AREA SMOKE REMOVAL, opens. ________

h. Verify 2HVC-FN12 (FN14), DIV I (II) BASEMENT SMOKE REMOVAL, is running. ________

1.2.2 WHEN smoke removal is NO longer required, perform the following:

a. Stop 2HVC-FN12 (FN14), by placing the control switch for DIV I (II) BASEMENT MODE to the NORMAL position. ________

b. Verify 2HVC*AOD171 (AOD179), DIV I (II) CABLE AREA SMOKE REMOVAL, closes. ________

c. At 2CEC*PNL870 (871), Start 2HVC*UC106 (*UC107), BSMT CABLE SPRDR AREA UNIT COOLER,by momentarily placing the control switch to the START position (Switch springs return to Normal-After-Start). ________

d. At 2CEC*PNL870 (871), Verify 2HVC*AOD170 (*AOD178), BSMT CABLE SPRDR AREA UNIT CLR DISCH DMPR, opens. ________

1.2.2 (Continued)

e. At 2CEC*PNL 870 (871), Restore the BATTERY ROOMS A AND B EXHAUST FANS, 2HVC*FN4A AND *FN4B, by performing the following:

1. Start 2HVC*FN4A (*FN4B), BATTERY ROOM A(B) EXHAUST FAN, by momentarily placing the control switch to START (Switch springs return to Normal-After-Start). .... ☐

2. After 2HVC*FN4A (*FN4B) air flow has been established (ran for greater than 35 seconds), place 2HVC*FN4B (*FN4A) control switch in Normal-After-Stop. .... ☐ ________

2.0 Loss of Cooling Water

The following identifies the air conditioning units AND unit coolers supplied by service water OR control building chilled water.

NOTE

- The control building chilled water system that supplies cooling water to remote shutdown room 2HVC*ACU3A and *ACU3B is provided with backup cooling water from the service water system if necessary.
- Stroking of unit cooler service water valves does not render the associated unit cooler inoperable.

Service Water	Control Building Chilled Water
2HVC*UC101A/B	
2HVC*UC108A/B	2HVC*ACU3A/B
2HVC*UC106	
2HVC*UC107	
2HVC*UC102	
2HVC*UC103A/B	

2.1 On a loss of cooling water to any of the above, monitor the temperature of the areas served by the unit. ________

2.2 Notify Site Engineering to develop a plan to establish a means of temporary ventilation to control the area temperatures. ________

2.3 Review Attachment 1, Control Building Unit Coolers, for Technical Specification applicability. **[C1]** ________

 Initials

3.0 Loss of Unit Cooler HVC*UC106(*UC107)

3.1 IF HVC*UC106(*UC107) is out of service AND cooling is required in the Division I (II) Basement Area,
THEN perform the following:

3.1.1 Shutdown the Battery Room A AND B exhaust fans 2HVC*FN4A and 2HVC*FN4B in accordance with Section G.8.0. ________

3.1.2 Place the Division I (II) Basement Smoke Removal in service in accordance with Section H.1.2. ________

3.1.3 Refer to Attachment 1 for equipment operability impact. ________

3.2 Monitor the temperatures of the areas served by the Basement Smoke Removal in service. ________

NOTE

The USAR temperature range for this area is 50° and 104°F.

3.3 Maintain the area temperatures between 60°F AND 104°F. ________

3.4 WHEN HVC*UC106(*UC107) is returned to service, OR cooling is NO longer required,
THEN perform the following:

3.4.1 Remove the Division I (II) Basement Smoke Removal from service in accordance with Section H.1.2 ________

3.4.2 Start the Battery Room A and B exhaust fans 2HVC*FN4A(B) in accordance with Section E.5.0. ________

ATTACHMENT 1: CONTROL BUILDING UNIT COOLERS **[C1]**

UNIT COOLER	AREA	DIV	ACTION	LCO
2HVC*ACU3A/B	Remote Shutdown	I/II	1	3.3.3.2
2HVC*UC101A&108A	Switchgear Room	I	2[1]	
2HVC*UC101B&108B	Switchgear Room	II	2[1]	3.8.8, 3.8.9
2HVC*UC102	Switchgear Room	III	3	
2HVC*UC103A/B	Chiller Room	I/II	4	3.7.3
2HVC*UC106	Cable Area	I	5[1]	3.8.7, 3.8.8, 3.8.9
2HVC*UC107	Cable Area	II	5[1]	3.8.7, 3.8.8, 3.8.9

[1]Refer to N2-OP-78 Attachment 11 for potential compensatory actions prior to de-energizing the unit coolers or isolating their cooling water supply.

ACTION 1

a. With one remote shutdown unit cooler inoperable in a division, verify remote shutdown room temperature is less than 90°F. Use S-OSP-LOG-@001 to monitor room temperature every 4 hours.

b. With two remote shutdown unit coolers inoperable OR remote shutdown room temperature above 90°F, THEN declare BOTH divisions of the Remote Shutdown System inoperable AND take actions required by LCO 3.3.3.2.

ACTION 2

a. As indicated below, under certain service water supply header temperature conditions, one switchgear room unit cooler per Division may be removed from service without impacting operability of the switchgear. The table references the Unit Cooler that is taken out of service and the associated service water header temperature that must be met to maintain the switchgear operable provided the redundant Unit Cooler is in service.

UNIT COOLER	SERVICE WATER SUPPLY HEADER TEMPERATURE
2HVC*UC108A	≤ 60°F
2HVC*UC108B	≤ 62°F
2HVC*UC101A	≤ 82°F
2HVC*UC101B	≤ 79°F

b. The control valves for 2HVC*UC101A & B AND 2HVC*UC108A & B may be failed open without impacting the operability of any unit cooler.

c. With one switchgear room unit cooler in Division I OR II inoperable verify the service water supply header temperature within the above limits.

d. With one switchgear room unit cooler in Division I OR II inoperable AND the service water supply header temperature exceeding the above limits for single unit cooler operation, declare the associated AC, DC, AND UPS electrical power distribution subsystems inoperable AND take actions required by LCO 3.8.7 & 3.8.8 OR, when NOT in Operational Condition 1, 2, OR 3, take actions required by LCO 3.8.9. Entry into conditions and required actions is NOT required if the allowance provided by LCO 3.0.6 is applied.

e. With more than one switchgear room unit cooler in Division I OR II inoperable, declare the associated AC, DC, AND UPS electrical power distribution subsystems inoperable AND take actions required by LCO 3.8.7 & 3.8.8 OR, when NOT in Operational Condition 1, 2 OR 3, take actions required by LCO 3.8.9. Entry into condition and required actions is NOT required if the allowance provided by LCO 3.0.6 is applied.

ACTION 3

With the unit cooler inoperable, declare Division III switchgear inoperable AND take actions required by LCO 3.8.8 OR when NOT in Operational Condition 1, 2, OR 3 take actions required by LCO 3.8.9.

.ACTION 4

a. With 2HVC*UC103A inoperable declare 2HVK*CHL1A inoperable AND enter Conditions A AND B in LCO 3.7.3.

b. With 2HVC*UC103B inoperable declare 2HVK*CHL1B inoperable and enter Conditions A AND B in LCO 3.7.3.

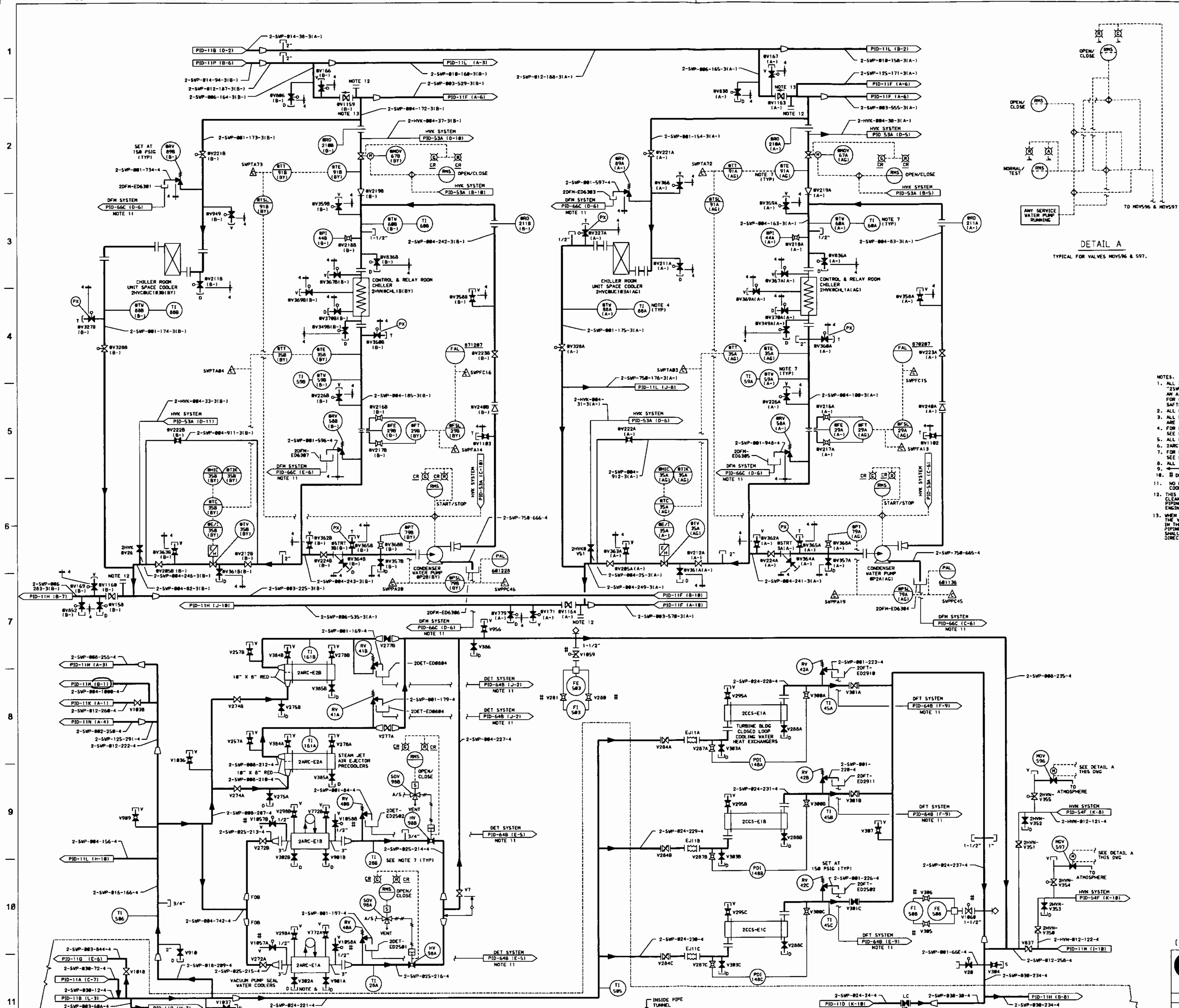
c. With BOTH 2HVC*UC103A AND 2HVC*UC103B inoperable, enter Conditions C AND D in LCO 3.7.3.

ACTION 5

a. IF a unit cooler is taken out of service, THEN temperature should be monitored periodically to ensure temperature is less than or equal to 104°F. This action is applicable for 2HVC*UC106 when 2VBA*UPS2C is not in service and for 2HVC*UC107 when 2VBA*UPS2D is not in service.

b. IF area temperature is less than OR equal to 104°F, no action is required. However, IF temperature exceeds 104°F, THEN engineering shall be notified to perform an evaluation. Equipment cooled by that unit cooler is considered OPERABLE until an engineering evaluation determines otherwise. This action is applicable for 2HVC*UC106 when 2VBA*UPS2C is not in service and for 2HVC*UC107 when 2VBA*UPS2D is not in service.

c. IF unit cooler 2HVC*UC106(UC107) is unavailable, THEN 2VBA*UPS2C(UPS2D) will be inoperable since the LOCA heat loads without a unit cooler would exceed the UPS rated temperature.



MARK NUMBER	VALVE DESCRIPTION	SIZE	NO. OF VALVES
HV98A,B	VOW015-F-4KQ	2-1/2"	2
MOV67A,B	VGW015-P-3KQ	4"	2
MOV596,597	VBT015-VC-4Q	3/4"	2
V7	VGW015-Q-4K	4"	1
V8, 284A,B,C	VVF000-F-4RQ	24"	4
V20	VBM015-CA-4	1"	1
V949	VBS015-CA-3	3/4"	1
V158,166,167,169, V171,211A,B,226A, V226B,327A,B,349A V349B,359A,B,360A V360B,366,367A,B, V369A,B,370A,B, V779 ,806, V836A,836B, V838,852	VBM015-CA-3	3/4"	30
V205A,B,212A,B, V223A,B,224A,B	VGW015-P-3K	4"	8
V216A,B,217A,B, V218A,B,358A,B, V362A,B,363A,B, V365A,B,368A,B, V1102,1103	VOS060-D-3	3/4"	18
V219A,B	VCW015-E-3K	4"	2
V221A,B	VBS015-CA-3	1"	2
V222A	VOW030-D-2K	4"	1
V222B	VOW015-H-3K	4"	1
V257A,B, 278A,B, V287A,B,C,295A,B, V295C,298A,B,300A V300B,C,304,307, V384A,B,772A,B, V909,956,1036	VOS060-D-4	3/4"	24
V272A,B	VGW015-Q-4K	2-1/2"	2
V274A,B	VGW015-Q-4K	8"	2
V275A,B,288A,B,C, V302A,B,303A,B,C, V385A,B,386, V901A,B	VGS060-C-4	3/4"	15
V277A,B,837	VV1000-G-4Q	12"	3
V280,281,305,306	BY VENDOR	3/4"	4
V301A,B,C	VVF000-F-4RQ	24"	3
V910,1037	VGS060-C-4	2"	2
V328A,B	VBS015-CB-3	1"	2
V357A,B,361A,B, V364A,B	VGS060-C-3	3/4"	6
V1038	VGW015-Q-4K	12"	1
V1018	VGW015-Q-4K	3"	1
V1057A,B, V1058A,B	BY VENDOR	1/2"	4
V1059,1060	BY VENDOR	1-1/2"	2
V240A,B	VCF015-A-3	4"	2
V1163,1164 V1159,1160	VVF000-D-3R	6"	4

NOTES:

1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "2SWP"- EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFTEY FEATURES SYSTEM.
2. ALL PIPING IS CLASS 151 UNLESS SHOWN OTHERWISE.
3. ALL PRESSURE, DRAIN, VENT, SAMPLE AND FLOW CONNECTIONS ARE 3/4" UNLESS SHOWN OTHERWISE.
4. FOR DETAILS OF PIPING DESIGN FOR THERMOWELL CONNECTIONS SEE DESIGN DIVISION STANDARD SP-1051-12-2.
5. ALL RV ARE 3/4" X1" UNLESS OTHERWISE NOTED.
6. 2ARC-E1A & B ARE 2 PASS HEAT EXCHANGERS.
7. FOR DETAILS OF PIPING DESIGN FOR THERMOWELL CONNECTIONS SEE DESIGN DIVISION STANDARD 12177-K-48A-1.
8. ALL TEMPERATURE CONNECTIONS ARE 1-1/4".
9. DENOTES MINIMUM DISTANCE FOR INSTALLATION.
10. # DENOTES EQUIPMENT SUPPLIED BY ANNUBAR VENDOR.
11. NO FLAG SHOWN ON CORRESPONDING DOCUMENT. COORDINATES PROVIDE INTERFACE LOCATION.
12. THIS CONNECTON WAS DESIGNED FOR USE DURING CHEMICAL CLEANING, ANY OTHER USE REQUIRING THE ATTACHMENT OF PIPING, FITTINGS, OR EQUIPMENT SHALL BE EVALUATED BY ENGINEERING PRIOR TO USE.
13. WHEN AN ARROW APPEARS ADJACENT TO A VALVE, THE VALVE SHALL BE INSTALLED WITH THE BRIDGEWALL MARKING IN THE SAME DIRECTION AS THE ARROW REGARDLESS OF THE PIPING FLOW DIRECTION. WHEN NO ARROW APPEARS, THE VALVE SHALL BE INSTALLED WITH THE BRIDGEWALL MARKING IN THE SAME DIRECTION AS THE PIPELINE FLOW.

NOTE: THIS DRAWING WAS CREATED USING COMPUTER AIDED DRAFTING DO NOT MAKE MANUAL CHANGES

(REF. SAR FIG. 9.2-1j & ISPT-11J)

REV	DATE	DESCRIPTION OF REVISION	PREP	CHKD	ENGR			ELEC	MECH	STR
20	SEE FCMS	REVISED CONTINUATION ARROW COORDINATES PER ADC-13-001164	SEE FCMS	SEE FCMS	SEE FCMS					

Constellation Energy Group

Nine Mile Point Nuclear Station

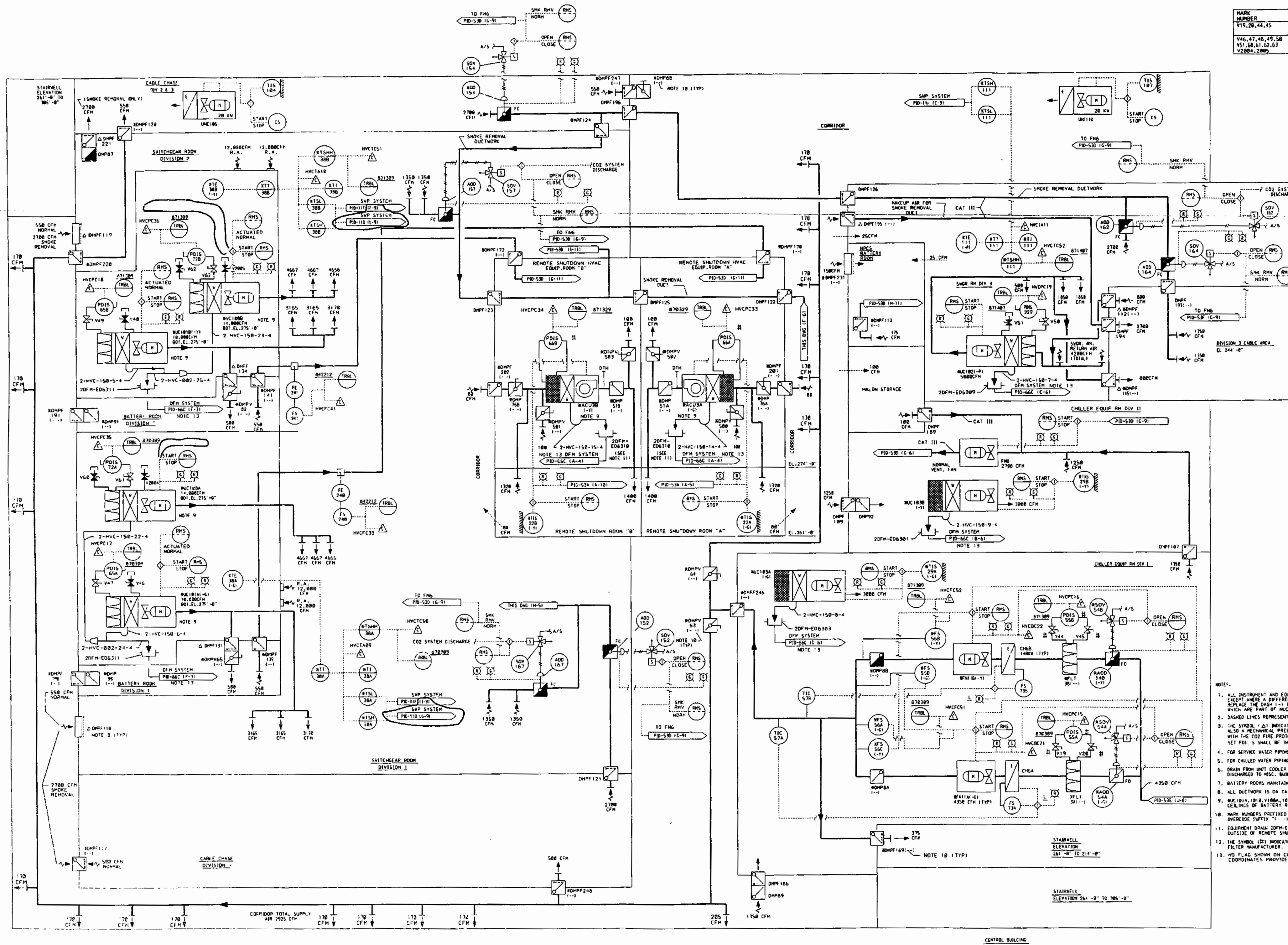
UNIT 2

PIPING & INSTRUMENTATION DIAGRAM
SERVICE WATER
SYSTEM

INDEX	SCALE	DRAWING NO	SHEET
NONE	NONE	PID-11J	NONE

PID-53E-16

MARK NUMBER	VALVE DESCRIPTION	SIZE	NO. OF VALVES
V19,20,44,45	BY FILTER MANUFACTURER	1/4"	4
V46,47,48,49,50 V51,60,61,62,63 V2004,2005	BY CONTROLS	1/4"	12



NOTES.

1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "2HVC-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.
2. DASHED LINES REPRESENT INDUCED AIR PASSAGES.
3. THE SYMBOL (△) INDICATES THAT FIRE DAMPER HAS A FUSIBLE LINK AND ALSO A MECHANICAL PRESSURE TRIP MECHANISM WHICH IS INTERLOCKED WITH THE CO2 FIRE PROTECTION SYSTEM. (FIRE DAMPER REGULATOR SET POIL S SHALL BE IN THE RANGE OF 15 - 125 PSI.)
4. FOR SERVICE WATER PIPING TO UNIT COOLER COILS, SEE PID-11.
5. FOR CHILLED WATER PIPING TO AIR CONDITIONING UNIT COILS, SEE PID-53A.
6. DRAIN FROM UNIT COOLER AND AIR CONDITIONING UNITS SHALL BE DISCHARGED TO MISC. BUILDING FLOOR AND EQUIP DRAINS, SEE PID-66.
7. BATTERY ROOMS MAINTAINED UNDER A SLIGHTLY NEGATIVE PRESSURE.
8. ALL DUCTWORK IS OA CAT I EXCEPT WHERE NOTED.
9. *UC101A,101B,V108A,108B AND *ACU3A AND B PHYSICALLY LOCATED ABOVE CEILINGS OF BATTERY ROOM AND REMOTE SHUTDOWN ROOM.
10. MARK NUMBERS PREFIXED WITH AN ASTERISK (*) ALSO HAVE THE OVERCODE SUFFIX "(- -1)" UNLESS OTHERWISE SHOWN.
11. EQUIPMENT DRAIN 2DFM-ED6310 IS LOCATED IN THE CORRIDOR OUTSIDE OF REMOTE SHUTDOWN EQUIPMENT ROOMS.
12. THE SYMBOL (‡) INDICATES EQUIPMENT SUPPLIED BY FILTER MANUFACTURER.
13. NO FLAG SHOWN ON CORRESPONDING DOCUMENT. COORDINATES PROVIDE INTERFACE LOCATION.

THIS DRAWING WAS PRODUCED ELECTRONICALLY. DO NOT MAKE ANY CHANGES MANUALLY.

SAFETY RELATED
QUALITY RELATED
NON-SAFETY RELATED
(REF. SAR FIG. 9.4-1e)

NIAGARA MOHAWK
NINE MILE POINT NUCLEAR STATION - UNIT 2
SCRIBA, N.Y.

PIPING & INSTRUMENTATION DIAGRAM
CONTROL BUILDING VENTILATION AND AIR CONDITIONING

SCALE NONE
DRAWING NO. PID-53E-16

ORIGINAL

Exelon Generation

Training Id: **2015 NRC SRO Admin EC** Revision: **0.0**

Title: **Review Surveillance N2-OSP-SWP-Q002, SERVICE WATER PUMP AND VALVE OPERABILITY TEST**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	6/10/15
Validated By	James Workman	8/12/15
Facility Reviewer	Mark Grau	10/2/15

Approximate Duration: 30 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: ________

References

1. Technical Specifications (3.7.1)
2. N2-OSP-SWP-Q002, SERVICE WATER PUMP AND VALVE OPERABILITY TEST
3. NUREG 1123, 2.2.12 (4.1)

Instructor Information

A. JPM Information

1. Description
   a. This JPM tests the operator's ability to evaluate plant surveillance data to ensure compliance with technical specifications.
   b. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.
2. Task Information:
   a. NS-REL-03002, Review Results of Surveillance Tests to Ensure Compliance with Specifications.
   b. K/A 2.2.12 (4.1), Knowledge of Surveillance Procedures.
3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Classroom
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location
   a. Training Classroom
5. JPM Setup (if required)
   a. Provide marked up copies of surveillance procedure.
      1) Step 8.3.6 – "Acceptance Range" box checked and "N/A, differential pressure is greater than or equal to 73 psid" checked, with differential pressure reading 70.1 psid.
      2) Step 8.5.6 – Suction pressure transposed in calculation, such that calculation is erroneously high; actual calculation to be above Acceptance Range but below 73 psid
      3) Attachment 2 for 2SWP*P1A – Vibration level for point 3H above ASME Required Action level, but only "AL" box checked
   b. Ensure tech specs are available.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is operating at approximately 100% power. • Service Water Pump 2SWP*P1F is being rebuilt and is inoperable. • N2-OSP-SWP-Q002, SERVICE WATER PUMP AND VALVE OPERABILITY TEST, has just been completed for Service Water pumps A, B, C, D and E. • Lake temperature is 65°F and B, C, D, E Service Water pumps are in service. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, complete the reviews for sections 10.1 and 10.2 of N2-OSP-SWP-Q002 and determine if any additional actions are required.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** *Acknowledge repeat back providing correction if necessary.*	P	SAT / UNSAT **STD:** Proper communications used.
2.	Obtain a copy of the reference procedure and review / utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** N2-OSP-SWP-Q002 obtained.
3.	Reviews test results for "A" Service Water Pump 2SWP*P1A as follows:		
3a	Reviews data for pump operability and forward flow exercising of associated check valve	P	SAT / UNSAT **STD:** Determines that all data is within acceptable limits

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
3b	Reviews data for vibration readings	P	**PASS / FAIL** **STD:** Determines that ASME vibration point "3H" was incorrectly marked as "Alert" when it had actually entered the "Required Action" range
3c	Determines pump operability status **Note:** If any IST parameter in support of ASME testing is in the Required Action Range then the pump is to be declared inoperable.	P	**PASS / FAIL** **STD:** Determines that Service Water pump A is inoperable
4.	Reviews test results for "B" Service Water Pump 2SWP*P1B as follows:		
4a	Reviews data for pump operability and forward flow exercising of associated check valve	P	**PASS / FAIL** **STD:** Determines that the pump differential pressure obtained is below the ASME and Engineering Limits and that the step incorrectly indicates that the limits of the step were satisfied
4b	Reviews data for vibration readings	P	SAT / UNSAT **STD:** Determines that all vibration data are within Acceptable Limits
4c	Determines pump operability status	P	**PASS / FAIL** **STD:** Determines that Service Water pump B is inoperable
5.	Reviews test results for "C" Service Water Pump 2SWP*P1C as follows:		
5a	Reviews data for pump operability and forward flow exercising of associated check valve	P	SAT / UNSAT **STD:** Determines that all data is within acceptable limits

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
5b	Reviews data for vibration readings	P	SAT / UNSAT **STD:** Determines that all vibration data are within Acceptable Limits
5c	Determines pump operability status	P	**PASS / FAIL** **STD:** Determines that Service Water pump C is operable
6.	Reviews test results for "D" Service Water Pump 2SWP*P1D as follows:		
6a	Reviews data for pump operability and forward flow exercising of associated check valve	P	SAT / UNSAT **STD:** Determines that all data is within acceptable limits
6b	Reviews data for vibration readings	P	SAT / UNSAT **STD:** Determines that all vibration data are within Acceptable Limits
6c	Determines pump operability status	P	**PASS / FAIL** **STD:** Determines that Service Water pump D is operable
7.	Reviews test results for "E" Service Water Pump 2SWP*P1E as follows:		
7a	Reviews data for pump operability and forward flow exercising of associated check valve	P	SAT / UNSAT **STD:** Determines that all data is within acceptable limits
7b	Reviews data for vibration readings	P	SAT / UNSAT **STD:** Determines that all vibration data are within acceptable Limits

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
7c	Determines pump operability status	P	**PASS / FAIL** **STD:** Determines that Service Water pump E is operable
8.	Determines Tech Spec required actions **Note:** Div I is comprised of pumps "A", "C", and "E". Div II is comprised of pumps "B", "D", and "F". The "F" pump is out of service due to the initial conditions. With "B" pump now being declared inoperable there is only one remaining operable pump in that division. IAW with the Tech Spec bases for LCO 3.7.1, a subsystem requires two operable pumps to be considered operable. Additionally, since "B" is now inoperable, only 3 operable service water pumps are in operation.	P	**PASS / FAIL** **STD:** Determines the Division 2 Service Water subsystem is inoperable LCO 3.7.1, Condition C
		P	**PASS / FAIL** **STD:** Determines only 3 operable service water pumps are in operation and enters LCO 3.7.1 Condition E

TASK STANDARD	The status of Service Water Pumps has been determined and Division II Service Water subsystem has been declared inoperable.

STOP TIME	

JPM Handout

INITIAL CONDITIONS	Given: • The plant is operating at approximately 100% power. • Service Water Pump 2SWP*P1F is being rebuilt and is inoperable. • N2-OSP-SWP-Q002, SERVICE WATER PUMP AND VALVE OPERABILITY TEST, has just been completed for Service Water pumps A, B, C, D and E. • Lake temperature is 65°F and B, C, D, E Service Water pumps are in service. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, complete the reviews for sections 10.1 and 10.2 of N2-OSP-SWP-Q002 and determine if any additional actions are required.

NINE MILE POINT NUCLEAR STATION UNIT 2
SURVEILLANCE TEST PROCEDURE

N2-OSP-SWP-Q002

Revision 01301

SERVICE WATER PUMP AND VALVE OPERABILITY TEST

TECHNICAL SPECIFICATION REQUIRED

Approval Authority: Manager Operations

1.0 SUMMARY OF ALTERATIONS

Revision	Change	Summary of Revision or Change
013	00	Minor Revision to incorporate: PCR-11-04504 New pump installed, resulting in a new baseline, revise the Acceptance Criteria for 2SWP*P1B. PCR-11-01429 Enhancements to clarify intent PMT and Operator Actions. PCR-11-01429: • Step 4.3, Added to step about post maintenance testing of comprehensive pump testing. • Step 10.1.1, Removed engineering alert description and added Alert range and Action range description. PCR-11-04504: • Step 8.3.6, Changed ASME Limits: Acceptance range to ≥70.69 psid to 86.39 psid; Required Action (low) to <70.69 psid; Required Action (hi) to >86.39 psid. • Step 8.9.6, Changed ASME Limits: Acceptance range to ≥73.04 psid to 80.89 psid; Alert Range (low) 70.69 psid to <73.04 psid; Required Action (low) to <70.69 psid; Required Action (hi) to > 80.89 psid. • Attachment 2, 2SWP*P1B, Changed all values IAW NMP2 IST Pump References and Acceptance Criteria Datasheet (RDS).
013	01	This procedure revision does not follow format and content requirements due to an exemption granted per Procedure CNG-PR-1.01-1005, Section 1.2.C.2.d, by the PDU Work Leaders. Updated format to latest revision of PWM-PRO-0102 including replacement of Approval Authority signature with Approval Authority title and deletion of the Date Effective on the Cover Page, addition of Summary of Alterations, deletion of List of Effective Pages, and changing page numbering to a Page x of y format starting with the Cover Page as page number one (page number is not shown on the Cover Page). Editorial Change to incorporate: PCR-13-06555 Revise Acceptance Criteria for 2SWP*P1E. New pump installed per Work Order C91343276. New Acceptance Criteria developed per NMP2 IST Pump Reference and Acceptance Criteria Datasheet (RDS). PCR-13-06555: • Step 8.6.6, Changed ASME Limits: Acceptance range to ≥72.27 psid to 88.33 psid; Required Action (low) to <72.27 psid; Required Action (hi) to >88.33 psid.

SUMMARY OF ALTERATIONS (Continued)

Revision	Change	Summary of Revision or Change
013 (Cont)	01	PCR-13-06555: (Continued)

- Step 8.12.6, Changed ASME Limits: Acceptance range to ≥74.68 psid to 82.70 psid; Alert Range (low) to 72.27 psid to <74.68 psid; Required Action (low) to <72.27 psid; Required Action (hi) to >82.70 psid.

- Attachment 2, 2SWP*P1E, Changed all values in accordance with NMP2 IST Pump References and Acceptance Criteria Datasheet (RDS).

TABLE OF CONTENTS

1.0 PURPOSE

To perform Service Water System (SWP) Pump and Valve Operability Testing in accordance with the NMP Pump and Valve Inservice Testing Program on:

- 2SWP*P1A and 2SWP*V1A
- 2SWP*P1B and 2SWP*V1B
- 2SWP*P1C and 2SWP*V1C
- 2SWP*P1D and 2SWP*V1D
- 2SWP*P1E and 2SWP*V1E
- 2SWP*P1F and 2SWP*V1F

2.0 TECHNICAL SPECIFICATIONS

2.1 Surveillance Requirements (SR)

- 5.5.6, Inservice Testing Program

2.2 Limiting Conditions for Operation (LCO)

- 3.7.1, Service Water (SW) System and Ultimate Heat Sink (UHS)

2.3 Frequency

- The normal Pump Operability Test is performed as required by the PM/ST tracking system.
- The Comprehensive Pump Operability Test is also performed as required by the Site PMST tracking system and for Post-Maintenance Testing (PMT) following Major Pump Maintenance.

3.0 REFERENCES AND COMMITMENTS

3.1 Licensee Documentation

3.1.1 Technical Requirements Manual (TRM)

- TRM 3.7.1, Service Water (SW) System - Shutdown

3.2 Policies, Programs, and Procedures

N2-OP-11, Service Water System

3.3 Technical Information

Drawings

P&ID 11 A through Q, Service Water

3.4 Supplemental References

- N2-TDP-IIT-0102, Inservice Test Result Analysis and Trending
- NMPNS-IST-001, Pump and Valve Inservice Testing Program
- N2-TDP-IIT-0105, Establishment of IST Pump and Valve Acceptance Criteria
- SM2-M94-0033, SWP Pump Minimum Flow Curve
- DER 1997-000547 Pump Calculation Inaccuracies

3.5 Standards, Regulations, and Codes

- ASME OM Code-2004, "Code for Operation and Maintenance of Nuclear Power Plants"
- NUREG-1482, Revision 1, "Guidelines for Inservice Testing at Nuclear Power Plants"

3.6 Commitments

Sequence Number	Commitment Number	Description
1	LER 90-14	SWP Pump IST tests not in compliance with ASME XI
2	DER 1996-001516	SWP Design Bases

4.0 GENERAL TEST METHODS

4.1 Test Description

4.1.1 Strainers are placed in continuous backwash to alleviate excessive cycling of the Backwash Motor Operated valves as a result of increased pump flows.

4.1.2 Discharge valves of running Service Water pumps are adjusted such that data is obtained in a range of 9,900 to 10,000 gpm discharge flow on the pump being tested.

4.1.3 Pump parameters are allowed to stabilize before pump parameter data is recorded.

4.1.4 Vibration readings are obtained by the Condition Monitoring Group, (CMG).

4.1.5 When all testing is complete, the Service Water pumps discharge valve position is verified for condition of pump.

4.2 All indications and controls are located at 2CEC*PNL601 unless otherwise specified.

4.3 This procedure may be used for Post Maintenance Testing and/or verification of operability for any of the equipment covered by this procedure. When used for this purpose, Section 1.0 through 6.0, and the applicable subsections/steps of Section 7.0 through 10.0 shall be performed. All IST tests applicable to a particular component are required to be performed to verify operability.

All Post-Maintenance Testing following Major Pump Maintenance (i.e., rotating element replacement) is to be performed using Section 8.8 thru 8.13: Comprehensive Pump tests. Note that in accordance with ASME O&M code section ISTB-3310, when a reference value may have been affected by repair, replacement, or routine servicing of a pump, a new reference value shall be determined or the previous value reaffirmed. Therefore IST should be notified prior to the start of performance for PMT purposes following repair, replacement, or routine servicing of the pump where the reference values may have been affected so they can be on standby in the event that test results are found outside the Acceptance Criteria, requiring immediate new reference values and Acceptance Criteria.

4.4 Use of N/A may only be used as directed in this procedure, except as allowed by CNG-PR-1.01-1009, Procedure Use and Adherence Requirements.

4.5 Steps with a "☐" shall be checked to indicate that an item has been observed or verified.

4.6 Acceptance criteria for steps required for compliance with Inservice Inspection Program are shown in parenthesis, such as (< 20 sec).

4.7 Credit for performance of this test may be taken if the equivalent sections of N2-OSP-SWP-@001 are satisfactorily completed. Prior to this occurring, concurrence must be obtained from IST and Operations reviewers.

4.8 Subsections 8.2 through 8.13 may be performed in any order.

5.0 TEST EQUIPMENT

5.1 Portable Test Equipment

> ~~NOTE~~
>
> No substitution of the portable test equipment specified below is allowed without prior authorization from the Inservice Test Group (may be per telecom). Such substitutions and the IST authorization shall be documented in Section 10.0, Remarks.

Portable Vibration Monitor, CSi™ Model 2120 or 2130, combined accuracy of ±5% or better with pickup

5.2 Acceptance Criteria Instrumentation

Instrument ID	Instrument Name	Location
2SWP*FI96A	2SWP*P1A DISCH FLOW	2CEC*PNL601
2SWP*PT4A (SWPPA01)	2SWP*P1A SUCT PRESS	2CEC*PNL601
2SWP*PT6A (SWPPA09)	2SWP*P1A DISCH PRESS	2CEC*PNL601
2SWP*FI96B	2SWP*P1B DISCH FLOW	2CEC*PNL601
2SWP*PT4B (SWPPA02)	2SWP*P1B SUCT PRESS	2CEC*PNL601
2SWP*PT6B (SWPPA10)	2SWP*P1B DISCH PRESS	2CEC*PNL601
2SWP*FI96C	2SWP*P1C DISCH FLOW	2CEC*PNL601
2SWP*PT4C (SWPPA03)	2SWP*P1C SUCT PRESS	2CEC*PNL601
2SWP*PT6C (SWPPA11)	2SWP*P1C DISCH PRESS	2CEC*PNL601
2SWP*FI96D	2SWP*P1D DISCH FLOW	2CEC*PNL601
2SWP*PT4D (SWPPA04)	2SWP*P1D SUCT PRESS	2CEC*PNL601
2SWP*PT6D (SWPPA12)	2SWP*P1D DISCH PRESS	2CEC*PNL601
2SWP*FI96E	2SWP*P1E DISCH FLOW	2CEC*PNL601
2SWP*PT4E (SWPPA05)	2SWP*P1E SUCT PRESS	2CEC*PNL601
2SWP*PT6E (SWPPA13)	2SWP*P1E DISCH PRESS	2CEC*PNL601
2SWP*FI96F	2SWP*P1F DISCH FLOW	2CEC*PNL601
2SWP*PT4F (SWPPA06)	2SWP*P1F SUCT PRESS	2CEC*PNL601
2SWP*PT6F (SWPPA14)	2SWP*P1F DISCH PRESS	2CEC*PNL601
AM-2SWPA51 (P601)	2SWP*M1A AMPS	2CEC*PNL601
AM-2SWPB51 (P601)	2SWP*M1B AMPS	2CEC*PNL601
AM-2SWPC51 (P601)	2SWP*M1C AMPS	2CEC*PNL601
AM-2SWPD51 (P601)	2SWP*M1D AMPS	2CEC*PNL601
AM-2SWPE51 (P601)	2SWP*M1E AMPS	2CEC*PNL601
AM-2SWPF51 (P601)	2SWP*M1F AMPS	2CEC*PNL601

6.0 PRECAUTIONS AND LIMITATIONS

6.1 Shift Management shall be notified immediately if a step cannot be completed as stated or if acceptance criteria are not met.

6.2 Prior to initialing any step in this procedure, all individuals shall place their initials, signatures, and printed names on Attachment 1, Test Personnel Signature and Initial Log.

6.3 No substitution of the portable test equipment specified in Section 5.1 is allowed without prior authorization from the Inservice Test Department (may be per telecom). Such substitutions and the IST authorization shall be documented in Section 10.0, Remarks.

6.4 Vibration measurements shall be taken in accordance with Attachment 2.

6.5 The heat load associated with three operating Service Water pumps in one pump bay may be slightly greater that the capacity of a single HVY unit cooler. Therefore, it may be necessary to place the second SWP pump bay unit cooler in service when operating three pumps in one bay continuously, due to long term EQ concerns. For short term operation, i.e., SWP pump rotation, placing second HVY unit cooler in service is not required. Refer to N2-OP-58, Subsection H.6.0, and Attachment 1 of N2-OP-58. **[C2]**

6.6 With less than four operable Service Water pumps available and in operation and not in Operational Condition 1, 2, OR 3, the ability to maintain Service Water Divisional Cross-tie header pressure as indicated by SWPPA07(08) or 2SWP*P12A(B) greater than or equal to 63.5 psig ensures all safety related components will receive the required Service Water Flow and prevents pump runout following auto initiation of LOCA loads. This will ensure that the cooling water operability requirements of equipment required to be operable during Operational Condition 4, 5, during movement of recently irradiated fuel assemblies in the secondary containment OR during Operations with a Potential for Draining the Reactor Vessel (OPDRVs). See N2-FHP-003 for OPDRV definition.

If Service Water divisional cross-tie header pressure is < 63.5 psig with < 4 OPERABLE Service Water pumps in operation, then restore pressure to ≥ 63.5 psig within one hour or declare the associated safety related equipment inoperable and take actions required by the applicable Technical Specifications.

6.7 See N2-OP-11, subsection F.12.0, Additional Restrictions on Service Water System Operations, for actions and limitations in addition to Technical Specifications and TRM with regards to the Service Water system.

6.8 The "Engineering Limits" specified throughout this procedure are not to be used to determine pump operability. If measured pump d/P is less than the specified Engineering Limit, then the action to be taken is:

- Notify the IST Program Engineer.
- Initiate a Work Document (WD) to rebuild the pump.
- Generate a CR to identify the degrading pump condition.

6.9 Maintain Service Water Pump flows > 2,500 gpm during the performance of this test. Maximum flow from a single Service Water Pump shall not exceed 10,000 gpm during the performance of this test.

6.10 The procedure shall be stopped and immediate action taken as specified in CNG-PR-1.01-1009, Procedure Use and Adherence Requirements, if unexpected conditions occur.

Initials

7.0 PREREQUISITES

7.1 Specify the reason for test performance:

[X] Routine Surveillance

[ ] Post Maintenance Testing, WD Number ______________

[ ] Inoperable Component

[ ] Other (specify) ______________ MA

7.2 Ensure that NO other testing is in progress that affects this procedure. MA

7.3 Personnel responsible for the performance of this test have read AND thoroughly understand its contents PRIOR to test commencement. MA

7.4 Notify Condition Monitoring Group, (CMG), to provide technicians for taking vibration readings:

Joe Smith / Today / 0700
Person Notified / Date / Time MA

7.5 IF procedure is being performed for Post-Maintenance Testing following Major Pump Maintenance,
THEN notify IST to be on standby in the event new reference values AND Acceptance Criteria are needed,
OTHERWISE mark this step N/A:

______________ ______________
Person Notified Date/Time N/A

7.6 Identify SWP Pump(s) AND Valve(s) to be tested. Record reason for NOT testing pump(s) in Remarks.

Pump	Tested	Not Tested
2SWP*P1A and 2SWP*V1A	[X]	[ ]
2SWP*P1B and 2SWP*V1B	[X]	[ ]
2SWP*P1C and 2SWP*V1C	[X]	[ ]
2SWP*P1D and 2SWP*V1D	[X]	[ ]
2SWP*P1E and 2SWP*V1E	[X]	[ ]
2SWP*P1F and 2SWP*V1F	[ ]	[X]

MA

7.7 Ensure that the Service Water System is in operation in accordance with N2-OP-11. IF exceptions exist, ensure that they do NOT have an impact on procedure performance. MA

Initials

7.8 Ensure installed plant instrumentation is available for use for pumps to be tested. Mark N/A for pump NOT being tested:

Instrument Name	Instrument ID Number	Verified Available	N/A
2SWP*P1A DISCH FLOW	2SWP*FI96A	☒	☐
2SWP*P1A SUCT PRESS	2SWP*PT4A (SWPPA01)	☒	☐
2SWP*P1A DISCH PRESS	2SWP*PT6A (SWPPA09)	☒	☐
2SWP*P1B DISCH FLOW	2SWP*FI96B	☒	☐
2SWP*P1B SUCT PRESS	2SWP*PT4B (SWPPA02)	☒	☐
2SWP*P1B DISCH PRESS	2SWP*PT6B (SWPPA10)	☒	☐
2SWP*P1C DISCH FLOW	2SWP*FI96C	☒	☐
2SWP*P1C SUCT PRESS	2SWP*PT4C (SWPPA03)	☒	☐
2SWP*P1C DISCH PRESS	2SWP*PT6C (SWPPA11)	☒	☐
2SWP*P1D DISCH FLOW	2SWP*FI96D	☒	☐
2SWP*P1D SUCT PRESS	2SWP*PT4D (SWPPA04)	☒	☐
2SWP*P1D DISCH PRESS	2SWP*PT6D (SWPPA12)	☒	☐
2SWP*P1E DISCH FLOW	2SWP*FI96E	☒	☐
2SWP*P1E SUCT PRESS	2SWP*PT4E (SWPPA05)	☒	☐
2SWP*P1E DISCH PRESS	2SWP*PT6E (SWPPA13)	☒	☐
2SWP*P1F DISCH FLOW	2SWP*FI96F	☐	☒
2SWP*P1F SUCT PRESS	2SWP*PT4F (SWPPA06)	☐	☒
2SWP*P1F DISCH PRESS	2SWP*PT6F (SWPPA14)	☐	☒
AM-2SWPA51 (P601)	2SWP*M1A AMPS	☒	☐
AM-2SWPB51 (P601)	2SWP*M1B AMPS	☒	☐
AM-2SWPC51 (P601)	2SWP*M1C AMPS	☒	☐
AM-2SWPD51 (P601)	2SWP*M1D AMPS	☒	☐
AM-2SWPE51 (P601)	2SWP*M1E AMPS	☒	☐
AM-2SWPF51 (P601)	2SWP*M1F AMPS	☐	☒

MA

7.9 This test requires EITHER 4 OR 5 SWP Pumps in service. Record SWP Pump Lineup:

☒ 4 Pumps ☐ 5 Pumps

MA

Initials

7.10 Perform the following:

~~PLANT IMPACT:~~ **THROTTLING OF SWP PUMP DISCHARGE MOV'S**

7.10.1 Review the Plant Impact. Indicate permission to perform procedure. JA SM

7.11 Review the Plant Impact. Indicate acknowledgment that procedure is to be performed. EB CRO

7.12 Record test start Date AND Time: MA

Date	Time
Today	0710

8.0 PROCEDURE

8.1 Preliminary Actions

8.1.1 Select AND perform the applicable test subsections for the frequency AND SWP pumps to be tested. Mark N/A for pumps NOT being tested.

Pump	Quarterly	Biennial	N/A
2SWP*P1A	8.2 ☒	8.8 ☐	☐
2SWP*P1B	8.3 ☒	8.9 ☐	☐
2SWP*P1C	8.4 ☒	8.10 ☐	☐
2SWP*P1D	8.5 ☒	8.11 ☐	☐
2SWP*P1E	8.6 ☒	8.12 ☐	☐
2SWP*P1F	8.7 ☐	8.13 ☐	☒

MA

8.2 2SWP*P1A Operability Test AND 2SWP*V1A Forward Flow Exercise Test

8.2.1 Verify 2SWP*P1A in operation AND 2SWP*MOV74A is full open. MA

8.2.2 At 2CES*PNL504, place Control Switch for 2SWP*MOV1A, SWP STR BACKWASH, in open. MA

8.2.3 Verify 2SWP*MOV1A opens. MA

8.2.4 Adjust 2SWP*MOV74B, C, D, E AND F as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96A. MA

8.2.5 Verify 2SWP*P1A has been running for at least two minutes AFTER flow parameters have stabilized. **[IST]** MA

Initials

> **NOTE**
>
> IST Acceptance/Evaluation criteria requires that Pump flow data be taken at 9,900 - 10,000 gpm.

8.2.6 Record the following data AND evaluate differential pressure per acceptance criteria: **[IST] [C1]**

2SWP*M1A AMPS (AM-2SWPA51)	70 amps
2SWP*P1A DISCH FLOW (2SWP*FI96A)	9900 gpm (9,900 to 10,000 gpm)
2SWP*P1A DISCH PRESS (SWPPA09)	85 psig
2SWP*P1A SUCT PRESSURE (SWPPA01)	8.0 psig (5.5 to 10 psig) (alarm setpoint <4.8)

Differential Pressure 85 (Discharge) - 8.0 (Suction) = 77 psid
(DISCH - SUCT)

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance Range	≥ 74.61 psid to 91.19 psid	☒
Required Action Range - Low:	< 74.61 psid	☐
Required Action Range - High:	> 91.19 psid	☐

MA

TH
IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, differential pressure is ≥73 psid. .... ☒

a. Notify the IST Program Engineer. .... ☐

b. Initiate a WD to rebuild the pump. .... ☐

c. Generate a CR to identify the degrading pump condition. .... ☐

MA

Initials

8.2.7 Verify 2SWP*V1A forward flow exercise requirements are satisfied: **[IST]**

Acceptance Criteria: ≥ 9,900 gpm discharge flow.

Exercise Test: ☒ SAT ☐ UNSAT MA

8.2.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2 **[IST]** JS CMG

8.2.9 Fully open 2SWP*MOV74B, C, D, E AND F that were throttled in Step 8.2.4. MA

8.2.10 At 2CES*PNL504, place Control Switch for 2SWP*MOV1A, SWP STR BACKWASH, in auto. MA TH CV

8.2.11 Verify 2SWP*MOV1A closes. MA TH CV

8.3 2SWP*P1B Operability Test AND 2SWP*V1B Forward Flow Exercise Test

8.3.1 Verify 2SWP*P1B in operation AND 2SWP*MOV74B is full open. MA

8.3.2 At 2CES*PNL505, place Control Switch for 2SWP*MOV1B, SWP STR BACKWASH, in open. MA

8.3.3 Verify 2SWP*MOV1B opens. MA

8.3.4 Adjust 2SWP*MOV74A, C, D, E AND F as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96B. MA

8.3.5 Verify 2SWP*P1B has been running for at least two minutes AFTER flow parameters have stabilized. **[IST]** MA

Initials

> **~~NOTE~~**
>
> IST Acceptance/Evaluation criteria requires that Pump flow data be taken at 9,900 - 10,000 gpm.

8.3.6 Record the following data AND evaluate differential pressure per acceptance criteria: **[IST] [C1]**

2SWP*M1B AMPS (AM-2SWPB51)	72 amps
2SWP*P1B DISCH FLOW (2SWP*FI96B)	9900 gpm. (9,900 to 10,000 gpm)
2SWP*P1B DISCH PRESS (SWPPA10)	79 psig
2SWP*P1B SUCT PRESSURE (SWPPA02)	8.9 psig (5.5 to 10 psig) (alarm setpoint < 5.0)

Differential Pressure (DISCH - SUCT) 79 (Discharge) - 8.9 (Suction) = 70.1 psid

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance Range	≥ 70.69 psid to 86.39 psid	☒	
Required Action Range - Low:	< 70.69 psid	☐	
Required Action Range - High:	> 86.39 psid	☐	MA
			TH IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, differential pressure is ≥73 psid. .... ☒

a. Notify the IST Program Engineer. .... ☐

b. Initiate a WD to rebuild the pump. .... ☐

c. Generate a CR to identify the degrading pump condition. .... ☐ MA

Initials

8.3.7 Verify 2SWP*V1B forward flow exercise requirements are satisfied. **[IST]**

Acceptance Criteria: ≥ 9,900 gpm discharge flow.

Exercise Test: ☒ SAT ☐ UNSAT MA

8.3.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2 **[IST]** JS CMG

8.3.9 Fully open 2SWP*MOV74A, C, D, E AND F that were throttled in Step 8.3.4. MA

8.3.10 At 2CES*PNL505, place Control Switch for 2SWP*MOV1B, SWP STR BACKWASH, in auto. MA

TH CV

8.3.11 Verify 2SWP*MOV1B closes. MA

TH CV

8.4 <u>2SWP*P1C Operability Test AND 2SWP*V1C Forward Flow Exercise Test</u>

8.4.1 Verify 2SWP*P1C in operation AND 2SWP*MOV74C is full open. MA

8.4.2 At 2CES*PNL504, place Control Switch for 2SWP*MOV1C, SWP STR BACKWASH, in open. MA

8.4.3 Verify 2SWP*MOV1C opens. MA

8.4.4 Adjust 2SWP*MOV74A, B, D, E AND F as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96C. MA

8.4.5 Verify 2SWP*P1C has been running for at least two minutes AFTER flow parameters have stabilized. **[IST]** MA

Initials

NOTE

IST Acceptance/Evaluation criteria requires that Pump flow data be taken at 9,900 - 10,000 gpm.

8.4.6 Record the following data AND evaluate differential pressure per acceptance criteria. **[IST] [C1]**

2SWP*M1C AMPS (AM-2SWPC51)	71 amps
2SWP*P1C DISCH FLOW (2SWP*FI96C)	9900 gpm (9,900 to 10,000 gpm)
2SWP*P1C DISCH PRESS (SWPPA11)	84 psig
2SWP*P1C SUCT PRESSURE (SWPPA03)	7.8 psig (5.5 to 10 psig) (alarm setpoint < 5.0)

Differential Pressure (DISCH - SUCT) 84 (Discharge) - 7.8 (Suction) = 76.2 psid

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance Range	≥ 72.64 psid to 88.78 psid	[X]
Required Action Range - Low:	< 72.64 psid	[ ]
Required Action Range - High:	> 88.78 psid	[ ]

MA

TH

IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, Differential pressure is ≥73 psid. [X]

a. Notify the IST Program Engineer. [ ]

b. Initiate a WD to rebuild the pump. [ ]

c. Generate a CR to identify the degrading pump condition. [ ] MA

		Initials
8.4.7	Verify 2SWP*V1C forward flow exercise requirements are satisfied. **[IST]**	
	Acceptance Criteria: ≥ 9,900 gpm discharge flow.	
	Exercise Test: ☒ SAT ☐ UNSAT	MA
8.4.8	CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2 **[IST]**	JS CMG
8.4.9	Fully open 2SWP*MOV74A, B, D, E <u>AND</u> F that were throttled in Step 8.4.4.	MA
8.4.10	At 2CES*PNL504, place Control Switch for 2SWP*MOV1C, SWP STR BACKWASH, in auto.	MA TH CV
8.4.11	Verify 2SWP*MOV1C closes.	MA TH CV
8.5	<u>2SWP*P1D Operability Test AND 2SWP*V1D Forward Flow Exercise Test</u>	
8.5.1	Verify 2SWP*P1D in operation AND 2SWP*MOV74D is full open.	MA
8.5.2	At 2CES*PNL505, place Control Switch for 2SWP*MOV1D, SWP STR BACKWASH, in open.	MA
8.5.3	Verify 2SWP*MOV1D opens.	MA
8.5.4	Adjust 2SWP*MOV74A, B, C, E <u>AND</u> F as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96D.	MA
8.5.5	Verify 2SWP*P1D has been running for at least two minutes AFTER flow parameters have stabilized. **[IST]**	MA

Initials

> **NOTE**
>
> IST Acceptance/Evaluation criteria requires that Pump flow data be taken at 9,900 - 10,000 gpm.

8.5.6 Record the following data AND evaluate differential pressure per acceptance criteria. **[IST] [C1]**

2SWP*M1D AMPS (AM-2SWPD51)	75 amps
2SWP*P1D DISCH FLOW (2SWP*FI96D)	9900 gpm (9,900 to 10,000 gpm)
2SWP*P1D DISCH PRESS (SWPPA12)	80 psig
2SWP*P1D SUCT PRESSURE (SWPPA04)	5.7 psig (5.5 to 10 psig) (alarm setpoint < 5.0)

Differential Pressure (DISCH - SUCT) 80 (Discharge) - 5.7 (Suction) = 74.3 psid

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance range:	≥ 67.4 psid to 82.4 psid	☒
Required Action Range - Low:	< 67.4 psid	☐
Required Action Range - High:	> 82.4 psid	☐

MA

TH

IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, Differential pressure is ≥73 psid. ☒

a. Notify the IST Program Engineer. ☐

b. Initiate a WD to rebuild the pump. ☐

c. Generate a CR to identify the degrading pump condition. ☐

MA

Initials

8.5.7 Verify 2SWP*V1D forward flow exercise requirements are satisfied. **[IST]**

Acceptance Criteria: ≥ 9,900 gpm discharge flow.

Exercise Test: ☒ SAT ☐ UNSAT MA

8.5.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2 **[IST]** JS CMG

8.5.9 Fully open 2SWP*MOV74A, B, C, E AND F that were throttled in Step 8.5.4. MA

8.5.10 At 2CES*PNL505, place Control Switch for 2SWP*MOV1D, SWP STR BACKWASH, in auto. MA

TH CV

8.5.11 Verify 2SWP*MOV1D closes. MA

TH CV

8.6 2SWP*P1E Operability Test AND 2SWP*V1E Forward Flow Exercise Test

8.6.1 Verify 2SWP*P1E in operation AND 2SWP*MOV74E is full open. MA

8.6.2 At 2CES*PNL504, place Control Switch for 2SWP*MOV1E, SWP STR BACKWASH, in open. MA

8.6.3 Verify 2SWP*MOV1E opens. MA

8.6.4 Adjust 2SWP*MOV74A, B, C, D AND F as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96E. MA

8.6.5 Verify 2SWP*P1E has been running for at least two minutes AFTER flow parameters have stabilized. **[IST]** MA

Initials

> ~~NOTE~~
>
> IST Acceptance/Evaluation criteria requires that Pump flow data be taken at 9,900 - 10,000 gpm.

8.6.6 Record the following data AND evaluate differential pressure per acceptance criteria. **[IST] [C1]**

2SWP*M1E AMPS (AM-2SWPE51)	70 amps
2SWP*P1E DISCH FLOW (2SWP*FI96E)	9900 gpm (9,900 to 10,000 gpm)
2SWP*P1E DISCH PRESS (SWPPA13)	86 psig
2SWP*P1E SUCT PRESSURE (SWPPA05)	8.0 psig (5.5 to 10 psig) (alarm setpoint < 4.8)

Differential Pressure (DISCH - SUCT) 86 (Discharge) - 8.0 (Suction) = 78 psid

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance Range	≥ 72.27 psid to 88.33 psid	☒
Required Action Range - Low:	< 72.27 psid	☐
Required Action Range - High:	> 88.33 psid	☐

MA

TH
IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, Differential pressure is ≥73 psid. ☒

a. Notify the IST Program Engineer. ☐

b. Initiate a WD to rebuild the pump. ☐

c. Generate a CR to identify the degrading pump condition. ☐ MA

Initials

8.6.7 Verify 2SWP*V1E forward flow exercise requirements are satisfied. **[IST]**

Acceptance Criteria: ≥ 9,900 gpm discharge flow.

Exercise Test: ☒ SAT ☐ UNSAT MA

8.6.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2 **[IST]** JS
CMG

8.6.9 Fully open 2SWP*MOV74A, B, C, D AND F that were throttled in Step 8.6.4. MA

8.6.10 At 2CES*PNL504, place Control Switch for 2SWP*MOV1E, SWP STR BACKWASH, in auto. MA

TH
CV

8.6.11 Verify 2SWP*MOV1E closes. MA

TH
CV

8.7 2SWP*P1F Operability Test and 2SWP*V1F Forward Flow Exercise Test

8.7.1 Verify 2SWP*P1F in operation AND 2SWP*MOV74F is full open. ________

8.7.2 At 2CES*PNL505, place Control Switch for 2SWP*MOV1F, SWP STR BACKWASH, in open. ________

8.7.3 Verify 2SWP*MOV1F opens. ________

8.7.4 Adjust 2SWP*MOV74A, B, C, D AND E as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96F. ________

8.7.5 Verify 2SWP*P1F has been running for at least two minutes AFTER flow parameters have stabilized. **[IST]** ________

Initials

NOTE
IST Acceptance/Evaluation criteria requires that Pump flow data be taken at 9,900 - 10,000 gpm.

8.7.6 Record the following data AND evaluate differential pressure per acceptance criteria: **[IST] [C1]**

2SWP*M1F AMPS (AM-2SWPF51)	________ amps
2SWP*P1F DISCH FLOW (2SWP*FI96F)	________ gpm (9,900 to 10,000 gpm)
2SWP*P1F DISCH PRESS (SWPPA14)	________ psig
2SWP*P1F SUCT PRESSURE (SWPPA06)	________ psig (5.5 to 10 psig) (alarm setpoint < 5.0)

Differential Pressure ________ - ________ = ________ psid
(DISCH - SUCT) (Discharge) (Suction)

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance Range	≥ 73.28 psid to 89.56 psid	☐
Required Action Range - Low:	< 73.28 psid	☐
Required Action Range - High:	> 89.56 psid	☐

____

____
IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, Differential pressure is ≥73 psid. ☐

a. Notify the IST Program Engineer. ☐

b. Initiate a WD to rebuild the pump. ☐

c. Generate a CR to identify the degrading pump condition. ☐ ________

Initials

8.7.7 Verify 2SWP*V1F forward flow exercise requirements are satisfied: **[IST]**

Acceptance Criteria: ≥ 9,900 gpm discharge flow.

Exercise Test: ☐ SAT ☐ UNSAT ________

8.7.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2 **[IST]** ________ CMG

8.7.9 Fully open 2SWP*MOV74A, B, C, D AND E that were throttled in Step 8.7.4. ________

8.7.10 At 2CES*PNL505, place Control Switch for 2SWP*MOV1F, SWP STR BACKWASH, in auto. ________

________ CV

8.7.11 Verify 2SWP*MOV1F closes. ________

________ CV

8.8 2SWP*P1A Comprehensive Test AND 2SWP*V1A Forward Flow Exercise Test

8.8.1 Verify 2SWP*P1A in operation AND 2SWP*MOV74A is full open. ________

8.8.2 At 2CES*PNL504, place Control Switch for 2SWP*MOV1A, SWP STR BACKWASH, in open. ________

8.8.3 Verify 2SWP*MOV1A opens. ________

8.8.4 Adjust 2SWP*MOV74B, C, D, E AND F as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96A. ________

8.8.5 Verify 2SWP*P1A has been running for at least two minutes AFTER flow parameters have stabilized. **[IST]** ________

NOTE

IST Acceptance/Evaluation criteria requires that pump flow data be taken at 9,900-10,000 gpm.

8.8.6 Record the following data AND evaluate differential pressure per acceptance criteria: **[IST] [C1]**

2SWP*M1A AMPS (AM-2SWPA51)	______________	amps
2SWP*P1A DISCH FLOW (2SWP*FI96A)	______________ (9,900 to 10,000 gpm)	gpm
2SWP*P1A DISCH PRESS (SWPPA09)	______________	psig
2SWP*P1A SUCT PRESSURE (SWPPA01)	______________ (5.5 to 10 psig) (alarm setpoint <4.8)	psig

Differential Pressure ____________ - ____________ = ____________ psid
(DISCH - SUCT) (Discharge) (Suction)

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance Range: ≥77.09 psid to 85.38 psid ..... ☐

Alert Range - Low: 74.61 psid to <77.09 psid ..... ☐

Required Action Range - Low: <74.61 psid ..... ☐

Required Action Range - High: >85.38 psid ..... ☐ ________

____
IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, differential pressure is ≥73 psid. ..... ☐

a. Notify the IST Program Engineer. ..... ☐

b. Initiate a WD to rebuild the pump. ..... ☐

c. Generate a CR to identify the degrading pump condition. ..... ☐ ________

8.8.7 Verify 2SWP*V1A forward flow exercise requirements are satisfied: **[IST]**

Acceptance Criteria: ≥ 9,900 gpm discharge flow.

Exercise Test: ☐ SAT ☐ UNSAT ________

Initials

8.8.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2. **[IST]** ________ CMG

8.8.9 Fully open 2SWP*MOV74B, C, D, E AND F that were throttled in Step 8.8.4. ________

8.8.10 At 2CES*PNL504, place Control Switch for 2SWP*MOV1A, SWP STR BACKWASH, in auto. ________

________ CV

8.8.11 Verify 2SWP*MOV1A closes. ________

________ CV

8.9 <u>2SWP*P1B Comprehensive Test and 2SWP*V1B Forward Flow Exercise Test</u>

8.9.1 Verify 2SWP*P1B in operation AND 2SWP*MOV74B is full open. ________

8.9.2 At 2CES*PNL505, place Control Switch for 2SWP*MOV1B, SWP STR BACKWASH, in open. ________

8.9.3 Verify 2SWP*MOV1B opens. ________

8.9.4 Adjust 2SWP*MOV74A, C, D, E <u>AND</u> F as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96B. ________

8.9.5 Verify 2SWP*P1B has been running for at least two minutes AFTER flow parameters have stabilized. **[IST]** ________

Initials

NOTE

IST Acceptance/Evaluation criteria requires that pump flow data be taken at 9,900-10,000 gpm.

8.9.6 Record the following data AND evaluate differential pressure per acceptance criteria: **[IST] [C1]**

2SWP*M1B AMPS (AM-2SWPB51) ____________ amps

2SWP*P1B DISCH FLOW (2SWP*FI96B) ____________ gpm
(9,900 to 10,000 gpm)

2SWP*P1B DISCH PRESS (SWPPA10) ____________ psig

2SWP*P1B SUCT PRESSURE (SWPPA02) ____________ psig
(5.5 to 10 psig)
(alarm setpoint <5.0)

Differential Pressure ________ - ________ = ________ psid
(DISCH - SUCT) (Discharge) (Suction)

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance Range: ≥73.04 psid to 80.89 psid ☐

Alert Range - Low: 70.69 psid to <73.04 psid ☐

Required Action Range - Low: <70.69 psid ☐

Required Action Range - High: >80.89 psid ☐ ________

____
IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, differential pressure is ≥73 psid. ☐

a. Notify the IST Program Engineer. ☐

b. Initiate a WD to rebuild the pump. ☐

c. Generate a CR to identify the degrading pump condition. ☐ ________

Initials

8.9.7 Verify 2SWP*V1B forward flow exercise requirements are satisfied: **[IST]**

Acceptance Criteria: ≥9,900 gpm discharge flow.

Exercise Test: ☐ SAT ☐ UNSAT ________

8.9.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2. **[IST]** ________ CMG

8.9.9 Fully open 2SWP*MOV74A, C, D, E AND F that were throttled in Step 8.9.4. ________

8.9.10 At 2CES*PNL505, place Control Switch for 2SWP*MOV1B, SWP STR BACKWASH, in auto. ________

________ CV

8.9.11 Verify 2SWP*MOV1B closes. ________

________ CV

8.10 <u>2SWP*P1C Comprehensive Test AND 2SWP*V1C Forward Flow Exercise Test</u>

8.10.1 Verify 2SWP*P1C in operation AND 2SWP*MOV74C is full open. ________

8.10.2 At 2CES*PNL504, place Control Switch for 2SWP*MOV1C, SWP STR BACKWASH, in open. ________

8.10.3 Verify 2SWP*MOV1C opens. ________

8.10.4 Adjust 2SWP*MOV74A, B, D, E AND F as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96C. ________

8.10.5 Verify 2SWP*P1C has been running for at least two minutes AFTER flow parameters have stabilized. ________

Initials

NOTE

IST Acceptance/Evaluation criteria requires that pump flow data be taken at 9,900-10,000 gpm.

8.10.6 Record the following data AND evaluate differential pressure per acceptance criteria: **[IST] [C1]**

2SWP*M1C AMPS (AM-2SWPC51)	______________	amps
2SWP*P1C DISCH FLOW (2SWP*FI96C)	______________ (9,900 to 10,000 gpm)	gpm
2SWP*P1C DISCH PRESS (SWPPA11)	______________	psig
2SWP*P1C SUCT PRESSURE (SWPPA03)	______________ (5.5 to 10 psig) (alarm setpoint <5.0)	psig

Differential Pressure ____________ - ____________ = ____________ psid
(DISCH - SUCT) (Discharge) (Suction)

<u>Differential Pressure Acceptance Criteria</u> (check one)

<u>ASME Limits</u>:

Acceptance Range: ≥75.06 psid to 83.13 psid .... ☐

Alert Range - Low: 72.64 psid to <75.06 psid .... ☐

Required Action Range - Low: <72.64 psid .... ☐

Required Action Range - High: >83.13 psid .... ☐ ________

____
IV

<u>Engineering Limits</u>:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, differential pressure is ≥73 psid. .... ☐

a. Notify the IST Program Engineer. .... ☐

b. Initiate a WD to rebuild the pump. .... ☐

c. Generate a CR to identify the degrading pump condition. .... ☐ ________

Initials

8.10.7 Verify 2SWP*V1C forward flow exercise requirements are satisfied: **[IST]**

Acceptance Criteria: ≥9,900 gpm discharge flow.

Exercise Test: ☐ SAT ☐ UNSAT ________

8.10.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2. **[IST]** ________ CMG

8.10.9 Fully open 2SWP*MOV74A, B, D, E AND F that were throttled in Step 8.10.4. ________

8.10.10 At 2CES*PNL504, place Control Switch for 2SWP*MOV1C, SWP STR BACKWASH, in auto. ________

________ CV

8.10.11 Verify 2SWP*MOV1C closes. ________

________ CV

8.11 <u>2SWP*P1D Comprehensive Test AND 2SWP*V1D Forward Flow Exercise Test</u>

8.11.1 Verify 2SWP*P1D in operation AND 2SWP*MOV74D is full open. ________

8.11.2 At 2CES*PNL505, place Control Switch for 2SWP*MOV1D, SWP STR BACKWASH, in open. ________

8.11.3 Verify 2SWP*MOV1D opens. ________

8.11.4 Adjust 2SWP*MOV74A, B, C, E AND F as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96D. ________

8.11.5 Verify 2SWP*P1D has been running for at least two minutes AFTER flow parameters have stabilized. **[IST]** ________

Initials

NOTE
IST Acceptance/Evaluation criteria requires that pump flow data be taken at 9,900-10,000 gpm.

8.11.6 Record the following data AND evaluate differential pressure per acceptance criteria: **[IST] [C1]**

2SWP*M1D AMPS (AM-2SWPD51) ____________ amps

2SWP*P1D DISCH FLOW (2SWP*FI96D) ____________ gpm
(9,900 to 10,000 gpm)

2SWP*P1D DISCH PRESS (SWPPA12) ____________ psig

2SWP*P1D SUCT PRESSURE (SWPPA04) ____________ psig
(5.5 to 10 psig)
(alarm setpoint <5.0)

Differential Pressure ________ - ________ = ________ psid
(DISCH - SUCT) (Discharge) (Suction)

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance Range: ≥72.17 psid to 79.92 psid .... ☐

Alert Range - Low: 69.84 psid to <72.17 psid .... ☐

Required Action Range - Low: <69.84 psid .... ☐

Required Action Range - High: >79.92 psid .... ☐ ________

____
IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, differential pressure is ≥73 psid. .... ☐

a. Notify the IST Program Engineer. .... ☐

b. Initiate a WD to rebuild the pump. .... ☐

c. Generate a CR to identify the degrading pump condition. .... ☐ ________

Initials

8.11.7 Verify 2SWP*V1D forward flow exercise requirements are satisfied: **[IST]**

Acceptance Criteria: ≥9,900 gpm discharge flow.

Exercise Test: ☐ SAT ☐ UNSAT ________

8.11.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2. **[IST]** ________ CMG

8.11.9 Fully open 2SWP*MOV74A, B, C, E AND F that were throttled in Step 8.11.4. ________

8.11.10 At 2CES*PNL505, place Control Switch for 2SWP*MOV1D, SWP STR BACKWASH, in auto. ________

________ CV

8.11.11 Verify 2SWP*MOV1D closes. ________

________ CV

8.12 2SWP*P1E Comprehensive Test AND 2SWP*V1E Forward Flow Exercise Test

8.12.1 Verify 2SWP*P1E in operation AND 2SWP*MOV74E is full open. ________

8.12.2 At 2CES*PNL504, place Control Switch for 2SWP*MOV1E, SWP STR BACKWASH, in open. ________

8.12.3 Verify 2SWP*MOV1E opens. ________

8.12.4 Adjust 2SWP*MOV74A, B, C, D AND F as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96E. ________

8.12.5 Verify 2SWP*P1E has been running for at least two minutes AFTER flow parameters have stabilized. ________

Initials

NOTE
IST Acceptance/Evaluation criteria requires that pump flow data be taken at 9,900-10,000 gpm.

8.12.6 Record the following data AND evaluate differential pressure per acceptance criteria: **[IST] [C1]**

2SWP*M1E AMPS (AM-2SWPE51) ________________ amps

2SWP*P1E DISCH FLOW (2SWP*FI96E) ________________ gpm
(9,900 to 10,000 gpm)

2SWP*P1E DISCH PRESS (SWPPA13) ________________ psig

2SWP*P1E SUCT PRESSURE (SWPPA05) ________________ psig
(5.5 to 10 psig)
(alarm setpoint <5.0)

Differential Pressure ____________ - ____________ = ____________ psid
(DISCH - SUCT) (Discharge) (Suction)

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance Range: ≥74.68 psid to 82.70 psid .... ☐

Alert Range - Low: 72.27 psid to <74.68 psid .... ☐

Required Action Range - Low: <72.27 psid .... ☐

Required Action Range - High: >82.70 psid .... ☐ ________

____
IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, differential pressure is ≥73 psid. .... ☐

a. Notify the IST Program Engineer. .... ☐

b. Initiate a WD to rebuild the pump. .... ☐

c. Generate a CR to identify the degrading pump condition. .... ☐ ________

Initials

8.12.7 Verify 2SWP*V1E forward flow exercise requirements are satisfied. **[IST]**

Acceptance Criteria: ≥9,900 gpm discharge flow.

Exercise Test: ☐ SAT ☐ UNSAT ________

8.12.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2. **[IST]** ________ CMG

8.12.9 Fully open 2SWP*MOV74A, B, C, D AND F that were throttled in Step 8.12.4. ________

8.12.10 At 2CES*PNL504, place Control Switch for 2SWP*MOV1E, SWP STR BACKWASH, in auto. ________

________ CV

8.12.11 Verify 2SWP*MOV1E closes. ________

________ CV

8.13 2SWP*P1F Comprehensive Test AND 2SWP*V1F Forward Flow Exercise Test

8.13.1 Verify 2SWP*P1F in operation AND 2SWP*MOV74F is full open. ________

8.13.2 At 2CES*PNL505, place Control Switch for 2SWP*MOV1F, SWP STR BACKWASH, in open. ________

8.13.3 Verify 2SWP*MOV1F opens. ________

8.13.4 Adjust 2SWP*MOV74A, B, C, D AND E as necessary to establish 9,900 to 10,000 gpm on 2SWP*FI96F. ________

8.13.5 Verify 2SWP*P1F has been running for at least two minutes AFTER flow parameters have stabilized. **[IST]** ________

Initials

> **NOTE**
>
> IST Acceptance/Evaluation criteria requires that pump flow data be taken at 9,900-10,000 gpm.

8.13.6 Record the following data AND evaluate differential pressure per acceptance criteria: **[IST] [C1]**

2SWP*M1F AMPS (AM-2SWPF51)	____________	amps
2SWP*P1F DISCH FLOW (2SWP*FI96F)	____________ (9,900 to 10,000 gpm)	gpm
2SWP*P1F DISCH PRESS (SWPPA14)	____________	psig
2SWP*P1F SUCT PRESSURE (SWPPA06)	____________ (5.5 to 10 psig) (alarm setpoint <5.0)	psig

Differential Pressure ________ - ________ = ________ psid
(DISCH - SUCT) (Discharge) (Suction)

Differential Pressure Acceptance Criteria (check one)

ASME Limits:

Acceptance Range: ≥75.72 psid to 83.86 psid ☐

Alert Range - Low: 73.28 psid to <75.72 psid ☐

Required Action Range - Low: <73.28 psid ☐

Required Action Range - High: >83.86 psid ☐ ________

____
IV

Engineering Limits:

IF differential pressure is <73 psid,
THEN perform the following:

N/A, differential pressure is ≥73 psid. ☐

a. Notify the IST Program Engineer. ☐

b. Initiate a WD to rebuild the pump. ☐

c. Generate a CR to identify the degrading pump condition. ☐ ________

Initials

8.13.7 Verify 2SWP*V1F forward flow exercise requirements are satisfied. **[IST]**

Acceptance Criteria: ≥9,900 gpm discharge flow.

Exercise Test: ☐ SAT ☐ UNSAT ________

8.13.8 CMG Technicians obtain vibration readings for ALL data points indicated on Attachment 2. **[IST]** ________ CMG

8.13.9 Fully open 2SWP*MOV74A, B, C, D AND E that were throttled in Step 8.13.4. ________

8.13.10 At 2CES*PNL505, place Control Switch for 2SWP*MOV1F, SWP STR BACKWASH, in auto. ________

________ CV

8.13.11 Verify 2SWP*MOV1F closes. ________

________ CV

9.0 RETURN TO NORMAL

9.1 Check AND independently verify SWP Pump discharge valve positions. The valve should be fully open for running pumps AND closed for pumps NOT in operation:

Pump	Discharge Valve	Fully Open	Closed
2SWP*P1A	2SWP*MOV74A	☐	☒
2SWP*P1B	2SWP*MOV74B	☒	☐
2SWP*P1C	2SWP*MOV74C	☒	☐
2SWP*P1D	2SWP*MOV74D	☒	☐
2SWP*P1E	2SWP*MOV74E	☒	☐
2SWP*P1F	2SWP*MOV74F	☐	☒

MA

TH

IV

Initials

9.2 Verify Attachment 2, SWP Pump Vibration Data Points, is complete MA

9.3 Ensure ALL test personnel have signed Attachment 1, Test Personnel Signature and Initial Log. MA

9.4 Notify SM AND CRO that procedure is field complete. JA
SM
EB
CRO

9.5 Record test stop Date AND Time:

TODAY	NOW
Date	Time

MA

10.0 ACCEPTANCE CRITERIA

10.1 Operations Review

10.1.1 ASME Pump Testing

Pump test results meet Inservice Testing (IST) acceptance criteria.
Mark N/A if pump not tested.

Alert Range: IF the measured test parameter values (DP or vibrations) fall within the alert range, note that the pump is still fully operable, but considered degraded, therefore complete the following actions:

1) Notify the IST Program Engineer.

2) Generate a CR to document the degraded condition.

3) Initiate a WD to repair the degraded pump.

4) Initiate a PM/ST change to double the testing frequency of the degraded pump UNTIL the cause of the deviation is determined AND the condition is corrected.

Action Range: IF the measured test parameter values (DP or vibrations) fall within the required action range, immediately declare the pump inoperable UNTIL either the cause the deviation has been determined AND the condition corrected, OR an analysis of the pump condition by Engineering has been completed. IF pump falls into the required action range complete have the following actions:

1) Notify the IST Program Engineer.

2) Generate a CR to document the inoperable condition.

3) Initiate a WD to repair the pump.

Pump	Step	Accept	Alert	REQUIRED ACTION	N/A
2SWP*P1A	8.2.6 or 8.8.6	☐	☐	☐	☐
2SWP*P1B	8.3.6 or 8.9.6	☐	☐	☐	☐
2SWP*P1C	8.4.6 or 8.10.6	☐	☐	☐	☐
2SWP*P1D	8.5.6 or 8.11.6	☐	☐	☐	☐
2SWP*P1E	8.6.6 or 8.12.6	☐	☐	☐	☐
2SWP*P1F	8.7.6 or 8.13.6	☐	☐	☐	☐

10.1.2 ASME Vibration Points

NOTE

- If IST parameters are in the ALERT range, testing frequency shall be doubled until an evaluation is performed in accordance with N2-TDP-IIT-0102 and corrective action is taken.
- If IST parameters are in the REQUIRED ACTION range, declare the pump inoperable and enter the action statement as required by Technical Specifications or the TRM.

Pump	Step	Accept	Alert	Required Action	N/A
2SWP*P1A	8.2.8 or 8.8.8	☐	☐	☐	☐
2SWP*P1B	8.3.8 or 8.9.8	☐	☐	☐	☐
2SWP*P1C	8.4.8 or 8.10.8	☐	☐	☐	☐
2SWP*P1D	8.5.8 or 8.11.8	☐	☐	☐	☐
2SWP*P1E	8.6.8 or 8.12.8	☐	☐	☐	☐
2SWP*P1F	8.7.8 or 8.13.8	☐	☐	☐	☐

IF parameters are in the ALERT range notify IST to initiate corrective action.

Person Notified: ______________________________ N/A ☐

10.1.3 <u>Machinery Vibration Monitoring Program (MVMP) (Non-ASME) Vibration Points</u> (for ASME Vibration Points use Acceptance Criteria in Step 10.1.2)

NOTE

- The NMP2 Machinery Vibration Monitoring Program (MVMP) has been expanded to include the drivers for the ASME XI IST Program pumps.
- Vibration readings for MVMP points in the "Concern" or "Investigate" range does not require the pump to be declared inoperable.
- A "Concern" is the equivalent of an ASME "Alert" which may require increased component monitoring. An "Investigate" indicates that the vibration level has increased at least six times greater than its reference value.
- Declaring the <u>driver</u> inoperable and entering the Action Statement as required by Technical Specifications or the TRM is <u>not</u> mandatory for <u>MVMP</u> points.

Pump	Step	Accept	Concern	Investigate	N/A
2SWP*P1A	8.2.8 or 8.8.8	☐	☐	☐	☐
2SWP*P1B	8.3.8 or 8.9.8	☐	☐	☐	☐
2SWP*P1C	8.4.8 or 8.10.8	☐	☐	☐	☐
2SWP*P1D	8.5.8 or 8.11.8	☐	☐	☐	☐
2SWP*P1E	8.6.8 or 8.12.8	☐	☐	☐	☐
2SWP*P1F	8.7.8 or 8.13.8	☐	☐	☐	☐

IF parameters are in the INVESTIGATE range notify IST to initiate corrective action.

Person Notified: ______________________________ N/A ☐

10.1.4 Check valve test results meet IST forward flow exercise criteria. **[IST]**

N/A if not tested.

Valve	Step	Sat	Unsat	N/A
2SWP*V1A	8.2.7 or 8.8.7	☐	☐	☐
2SWP*V1B	8.3.7 or 8.9.7	☐	☐	☐
2SWP*V1C	8.4.7 or 8.10.7	☐	☐	☐
2SWP*V1D	8.5.7 or 8.11.7	☐	☐	☐
2SWP*V1E	8.6.7 or 8.12.7	☐	☐	☐
2SWP*V1F	8.7.7 or 8.13.7	☐	☐	☐

10.2 SM Review

☐ Satisfactory. No corrective action required

☐ Satisfactory, corrective action required. (Document in Remarks and initiate a WD)

☐ Unsatisfactory. (Document in Remarks and initiate a WD/CR. Immediately notify Manager Operations or Designee.)

_______________________/__________/__________
Person Notified Date Time

Remarks ____

____

____

____

_______________________ ________
SM Signature Date

10.3 Second OPS Review

_______________________ ________
Second OPS Signature Date

10.4 Engineering Programs Review

☐ Satisfactory, no corrective action required.

☐ Unsatisfactory, correction action required (document in Remarks).

☐ Recommendations. (Record explanation in Remarks).

Remarks ____

____

____

____

_______________________ ________
IST Analyst Signature Date

Attachment 1, Test Personnel Signature and Initial Log

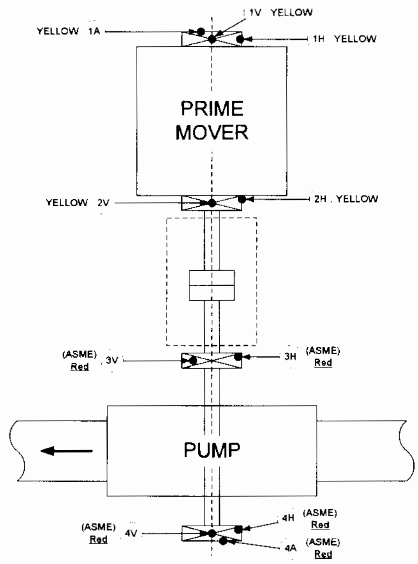
Sheet ___ of ___

NOTE

Completing this attachment signifies that each person has reviewed the applicable portions of this procedure.

PRINTED NAME	SIGNATURE	INITIALS
Mike Adams	Mike Adams	MA
Todd Hopper	Todd Hopper	TH
Joe Smith	Joe Smith	JS
Jack Adams	Jack Adams	JA
Ed Brown	Ed Brown	EB

Attachment 2, SWP Pump Vibration Data Points



NOTE:

1. ASME POINTS=RED DOTS
2. MVMP POINTS=YELLOW DOTS
3. PUMP RPM = 1185
4. CSi™ M&TE combined accuracy of ± 5% is required.

CAUTION:
ENSURE THAT TEST EQUIPMENT AND PERSONNEL DO NOT COME IN CONTACT WITH ROTATING PARTS.

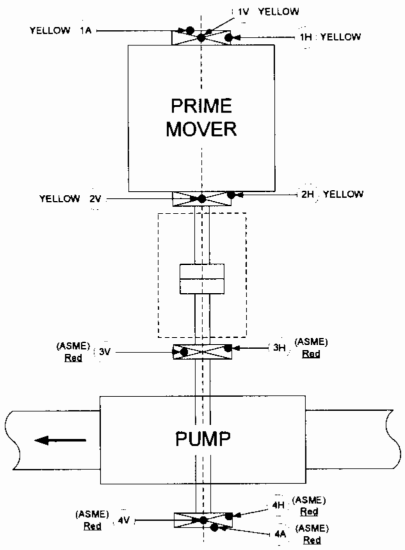
2SWP*P1A

LEAD TECHNICIAN: Joe Smith
DATE: Today / /

M&TE NUMBER	MANU.	MODEL	DUE DATE
793	CSi™	x-100	12/20/2015

PT	TEST DATA	REF. VALUE	ASME=ACCEPT (AC) MVMP=ACCEPT (AC)	ASME=ALERT (AL) MVMP=CONCERN (CO)	ASME=REQ. ACTION (RA) MVMP= INVESTIGATE (IN)	RESULT (√) AC	AL	CO	RA	IN
1H	0.01947	0.01938	0-0.200	>0.200-0.300	>0.300	X				
1V	0.01598	0.01634	0-0.200	>0.200-0.300	>0.300	X				
1A	0.00992	0.01063	0-0.200	>0.200-0.300	>0.300	X				
2H	0.02570	0.0262	0-0.200	>0.200-0.300	>0.300	X				
2V	0.02738	0.02981	0-0.200	>0.200-0.300	>0.300	X				
2A	N/A	N/A	N/A	N/A	N/A					
3H	0.4140	0.06743	0-0.168	>0.168-0.404	>0.404		X			
3V	0.06012	0.05441	0-0.136	>0.136-0.326	>0.326	X				
3A	N/A	N/A	N/A	N/A	N/A					
4H	0.06648	0.06652	0-0.166	>0.166-0.399	>0.399	X				
4V	0.04913	0.05688	0-0.142	>0.142-0.341	>0.341	X				
4A	0.15930	0.1578	0-0.325	>0.325-0.700	>0.700	X				
5H	N/A	N/A	N/A	N/A	N/A					
5V	N/A	N/A	N/A	N/A	N/A					
6H	N/A	N/A	N/A	N/A	N/A					
6V	N/A	N/A	N/A	N/A	N/A					

Additional vibration readings and/or signatures may be required as directed by CM personnel.



NOTE:

1. ASME POINTS=RED DOTS
2. MVMP POINTS=YELLOW DOTS
3. PUMP RPM=1185
4. CSi™ M&TE combined accuracy of ± 5% is required.

CAUTION:
ENSURE THAT TEST EQUIPMENT AND PERSONNEL DO NOT COME IN CONTACT WITH ROTATING PARTS.

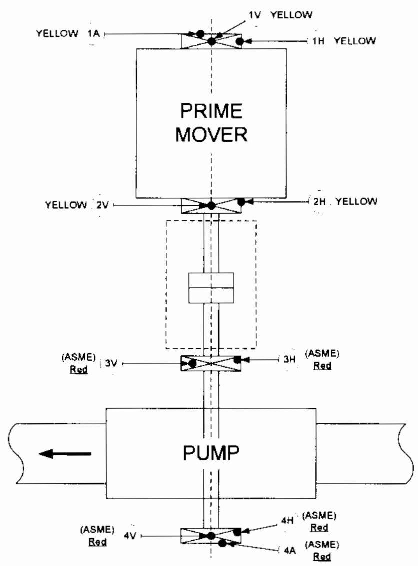
2SWP*P1B

LEAD TECHNICIAN: Joe Smith
DATE: Today / /

M&TE NUMBER	MANU.	MODEL	DUE DATE	
793	CSi™	x-100	12/20/2015	

PT	TEST DATA	REF. VALUE	ASME=ACCEPT (AC) MVMP=ACCEPT (AC)	ASME=ALERT (AL) MVMP=CONCERN (CO)	ASME=REQ. ACTION (RA) MVMP= INVESTIGATE (IN)	RESULT (√)				
						AC	AL	CO	RA	IN
1H	0.0492	0.03993	0-0.0998	>0.0998-0.2395	>0.2395	X				
1V	0.0294	0.02613	0-0.0653	>0.0653-0.1567	>0.1567	X				
1A	0.0210	0.01535	0-0.0383	>0.0383-0.0921	>0.0921	X				
2H	0.0712	0.06064	0-0.1516	>0.1516-0.3638	>0.3638	X				
2V	0.0587	0.05197	0-0.1299	>0.1299-0.3118	>0.3118	X				
2A	N/A	N/A	N/A	N/A	N/A					
3H	0.1244	0.1077	0-0.2692	>0.2692-0.6462	>0.6462	X				
3V	0.1092	0.1269	0-0.3172	>0.3172-0.7000	>0.7000	X				
3A	N/A	N/A	N/A	N/A	N/A					
4H	0.1245	0.09472	0-0.2368	>0.2368-0.5683	>0.5683	X				
4V	0.0842	0.2061	0-0.3250	>0.325-0.7000	>0.7000	X				
4A	0.1800	0.2633	0-0.3250	>0.3250-0.7000	>0.7000	X				
5H	N/A	N/A	N/A	N/A	N/A					
5V	N/A	N/A	N/A	N/A	N/A					
6H	N/A	N/A	N/A	N/A	N/A					
6V	N/A	N/A	N/A	N/A	N/A					

Additional vibration readings and/or signatures may be required as directed by CM personnel.



NOTE:

1. ASME POINTS=RED DOTS
2. MVMP POINTS=YELLOW DOTS
3. PUMP RPM=1185
4. CSi™ M&TE combined accuracy of ± 5% is required.

CAUTION:

ENSURE THAT TEST EQUIPMENT AND PERSONNEL DO NOT COME IN CONTACT WITH ROTATING PARTS.

2SWP*P1C

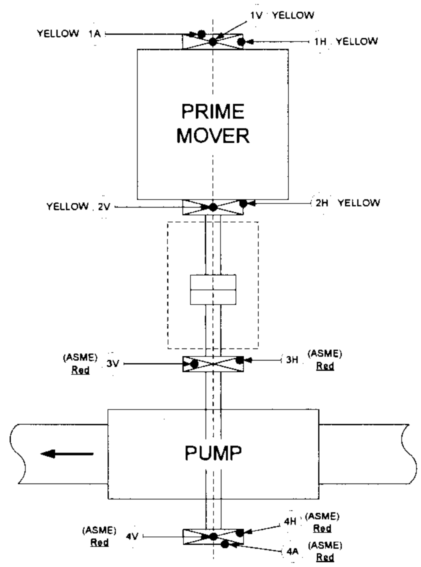
LEAD TECHNICIAN: JOE SMITH

DATE: TODAY / /

M&TE NUMBER	MANU.	MODEL		DUE DATE
793	CSi™	X-100	12/20/2015	

PT	TEST DATA	REF. VALUE	ASME=ACCEPT (AC) MVMP=ACCEPT (AC)	ASME=ALERT (AL) MVMP=CONCERN (CO)	ASME=REQ. ACTION (RA) MVMP= INVESTIGATE (IN)	RESULT (√)				
						AC	AL	CO	RA	IN
1H	0.0247	0.0231	0-0.200	>0.200-0.300	>0.300	X				
1V	0.0156	0.0149	0-0.200	>0.200-0.300	>0.300	X				
1A	0.0122	0.0111	0-0.200	>0.200-0.300	>0.300	X				
2H	0.0488	0.0476	0-0.200	>0.200-0.300	>0.300	X				
2V	0.0300	0.0316	0-0.200	>0.200-0.300	>0.300	X				
2A	N/A	N/A	N/A	N/A	N/A					
3H	0.1120	0.1032	0-0.258	>0.258-0.619	>0.619	X				
3V	0.0699	0.0757	0-0.189	>0.189-0.454	>0.454	X				
3A	N/A	N/A	N/A	N/A	N/A					
4H	0.0920	0.0921	0-0.230	>0.230-0.553	>0.553	X				
4V	0.0796	0.0791	0-0.198	>0.198-0.475	>0.475	X				
4A	0.1900	0.1847	0-0.461	>0.461-0.7000	>0.7000	X				
5H	N/A	N/A	N/A	N/A	N/A					
5V	N/A	N/A	N/A	N/A	N/A					
6H	N/A	N/A	N/A	N/A	N/A					
6V	N/A	N/A	N/A	N/A	N/A					

Additional vibration readings and/or signatures may be required as directed by CM personnel.



NOTE:

1. ASME POINTS=RED DOTS
2. MVMP POINTS=YELLOW DOTS
3. PUMP RPM=1185
4. CSi™ M&TE combined accuracy of ± 5% is required.

CAUTION:
ENSURE THAT TEST EQUIPMENT AND PERSONNEL DO NOT COME IN CONTACT WITH ROTATING PARTS.

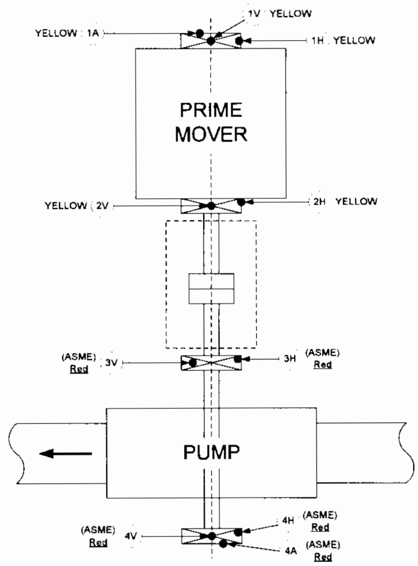
2SWP*P1D

LEAD TECHNICIAN: JOE SMITH
DATE: TODAY / /

M&TE NUMBER	MANU.	MODEL	DUE DATE
793	CSi™	X-100	12/20/2015

PT	TEST DATA	REF. VALUE	ASME=ACCEPT (AC) MVMP=ACCEPT (AC)	ASME=ALERT (AL) MVMP=CONCERN (CO)	ASME=REQ. ACTION (RA) MVMP= INVESTIGATE (IN)	RESULT (√)				
						AC	AL	CO	RA	IN
1H	0.0282	.028	0-0.200	>0.200-0.300	>0.300	X				
1V	0.0193	.019	0-0.200	>0.200-0.300	>0.300	X				
1A	0.0119	.012	0-0.200	>0.200-0.300	>0.300	X				
2H	0.0360	.036	0-0.200	>0.200-0.300	>0.300	X				
2V	0.0307	.030	0-0.200	>0.200-0.300	>0.300	X				
2A	N/A	N/A	N/A	N/A	N/A					
3H	0.0981	0.103	0-0.2598	>0.2598-0.6234	>0.6234	X				
3V	0.0623	0.062	0-0.1573	>0.1573-0.3774	>0.3774	X				
3A	N/A	N/A	N/A	N/A	N/A					
4H	0.1021	0.094	0-0.2360	>0.2360-0.5664	>0.5664	X				
4V	0.1523	0.175	0-0.325	>0.325-0.700	>0.700	X				
4A	0.1001	0.105	0-0.263	>0.263-0.630	>0.630	X				
5H	N/A	N/A	N/A	N/A	N/A					
5V	N/A	N/A	N/A	N/A	N/A					
6H	N/A	N/A	N/A	N/A	N/A					
6V	N/A	N/A	N/A	N/A	N/A					

Additional vibration readings and/or signatures may be required as directed by CM personnel.



NOTE:

1. ASME POINTS=RED DOTS
2. MVMP POINTS=YELLOW DOTS
3. PUMP RPM=1185
4. CSi™ M&TE combined accuracy of ± 5% is required.

CAUTION:
ENSURE THAT TEST EQUIPMENT AND PERSONNEL DO NOT COME IN CONTACT WITH ROTATING PARTS.

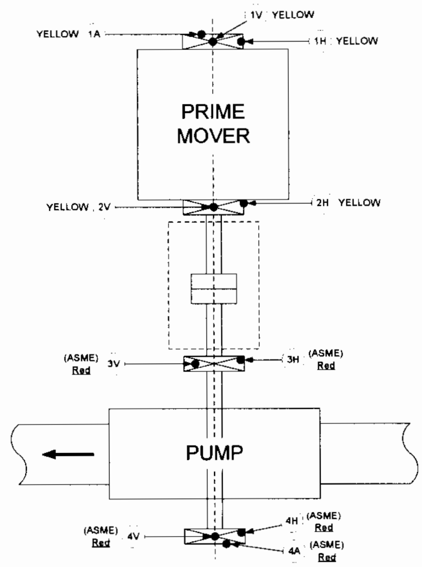
2SWP*P1E

LEAD TECHNICIAN: Joe Smith
DATE: Today / /

M&TE NUMBER	MANU.	MODEL	DUE DATE
793	CSi™	X-100	12/20/2015

PT	TEST DATA	REF. VALUE	ASME=ACCEPT (AC) MVMP=ACCEPT (AC)	ASME=ALERT (AL) MVMP=CONCERN (CO)	ASME=REQ. ACTION (RA) MVMP= INVESTIGATE (IN)	RESULT (√)				
						AC	AL	CO	RA	IN
1H	0.0203	0.0214	0-0.200	>0.200-0.300	>0.300	X				
1V	0.0157	0.0149	0-0.200	>0.200-0.300	>0.300	X				
1A	0.0130	0.0125	0-0.200	>0.200-0.300	>0.300	X				
2H	0.0339	0.0296	0-0.200	>0.200-0.300	>0.300	X				
2V	0.0250	0.0257	0-0.200	>0.200-0.300	>0.300	X				
2A	N/A	N/A	N/A	N/A	N/A					
3H	0.1070	0.1645	0-0.325	>0.325-0.700	>0.700	X				
3V	0.0590	0.1130	0-0.282	>0.282-0.678	>0.678	X				
3A	N/A	N/A	N/A	N/A	N/A					
4H	0.1117	0.1620	0-0.325	>0.325-0.700	>0.700	X				
4V	0.0809	0.1505	0-0.325	>0.325-0.700	>0.700	X				
4A	0.1403	0.1588	0-0.325	>0.325-0.700	>0.700	X				
5H	N/A	N/A	N/A	N/A	N/A					
5V	N/A	N/A	N/A	N/A	N/A					
6H	N/A	N/A	N/A	N/A	N/A					
6V	N/A	N/A	N/A	N/A	N/A					

Additional vibration readings and/or signatures may be required as directed by CM personnel.



NOTE:

1. ASME POINTS=RED DOTS
2. MVMP POINTS=YELLOW DOTS
3. PUMP RPM=1185
4. CSi™ M&TE combined accuracy of ± 5% is required.

CAUTION:
ENSURE THAT TEST EQUIPMENT AND PERSONNEL DO NOT COME IN CONTACT WITH ROTATING PARTS.

2SWP*P1F

LEAD TECHNICIAN: ________
DATE: ________/________/________

M&TE NUMBER	MANU.	MODEL	DUE DATE
	CSi™		

PT	TEST DATA	REF. VALUE	ASME=ACCEPT (AC) MVMP=ACCEPT (AC)	ASME=ALERT (AL) MVMP=CONCERN (CO)	ASME=REQ. ACTION (RA) MVMP= INVESTIGATE (IN)	RESULT (√)				
						AC	AL	CO	RA	IN
1H		0.0264	0-0.200	>0.200-0.300	>0.300					
1V		0.0169	0-0.200	>0.200-0.300	>0.300					
1A		0.0149	0-0.200	>0.200-0.300	>0.300					
2H		0.0479	0-0.200	>0.200-0.300	>0.300					
2V		0.0252	0-0.200	>0.200-0.300	>0.300					
2A	N/A	N/A	N/A	N/A	N/A					
3H		0.1239	0-0.309	>0.309-0.700	>0.700					
3V		0.0684	0-0.171	>0.171-0.410	>0.410					
3A	N/A	N/A	N/A	N/A	N/A					
4H		0.143	0–0.357	>0.357-0.700	>0.700					
4V		0.0735	0-0.184	>0.184-0.441	>0.441					
4A		0.2646	0-0.661	>0.661-0.700	>0.700					
5H	N/A	N/A	N/A	N/A	N/A					
5V	N/A	N/A	N/A	N/A	N/A					
6H	N/A	N/A	N/A	N/A	N/A					
6V	N/A	N/A	N/A	N/A	N/A					

Additional vibration readings and/or signatures may be required as directed by CM personnel.

Exelon Generation

Training Id: **2015 NRC SRO Admin EP** Revision: **0.0**

Title: **Post-Scenario Emergency Event Classification**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	6/10/15
Validated By	James Workman	8/12/15
Facility Reviewer	Mark Gan	10/2/15

Approximate Duration: 15 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: ________

References

1. NUREG 1123 K/A 2.4.29, (4.4)
2. EPIP-EPP-02 EAL Flowchart
3. EP-AA-1013 Addendum 4, NMPNS Unit 2 Emergency Classification Technical Bases
4. EP-CE-111, Emergency Classification and PAR

Exelon Generation

Instructor Information

A. JPM Information

1. Description

    a. This JPM tests the SRO's knowledge of the emergency plan by having them determine any applicable EALs, post-scenario.

    b. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

    a. NS-EP101-03005, Classify Emergency Events Requiring Emergency Plan Implementation

    b. NUREG 1123 K/A 2.4.29 (4.4), Knowledge of the Emergency Plan.

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Simulator
Time Critical Task	Yes
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

    a. Unit 2 Simulator or Classroom

5. JPM Setup

    a. Provide a copy of EPIP-EPP-02-EAL, UNIT 2 EAL MATRIX

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • None **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, based on the events that have just occurred, determine if the conditions warranted emergency classification. If so, determine the appropriate emergency classification. This is a time critical task. Your time starts now.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** *Acknowledge repeat back providing correction if necessary.*	P	SAT / UNSAT **STD:** Proper communications used
2.	Obtain a copy of the EAL Matrix	P	SAT / UNSAT **STD:** EAL Matrix is obtained
3.	Reviews plant conditions and determines if emergency classification is warranted. **Examiner Note:** The listed EAL is the expected EAL based on scenario validation. If scenario deviates from the expected course, examiner discretion will be required to determine the actual classification.	P	SAT / UNSAT **STD:** Determines an emergency classification is required.

Exelon Generation.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
4	Classifies the emergency for 2015 NRC Scenario #2. **Time difference below must be 15 minutes or less:** JPM start time: _________ Time of Classification: _____________	P	**PASS / FAIL** **STD:** Determines the emergency classification level is Alert **PASS / FAIL** **STD:** Determines the Emergency Action Level (EAL) designator is FA-1.1
5	Classifies the emergency for 2015 NRC Scenario #3. **Time difference below must be 15 minutes or less:** JPM start time: _________ Time of Classification: _____________	P	**PASS / FAIL** **STD:** Determines the emergency classification level is Site Area Emergency **PASS / FAIL** **STD:** Determines the Emergency Action Level (EAL) designator is FS-1.1

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
6	Classifies the emergency for 2015 NRC Scenario #4. **Time difference below must be 15 minutes or less:** JPM start time: ________ Time of Classification: ____________	P	**PASS / FAIL** **STD:** Determines the emergency classification level is Alert **PASS / FAIL** **STD:** Determines the Emergency Action Level (EAL) designator is FA-1.1

TASK STANDARD	Emergency classification requirement is determined.

STOP TIME	

JPM Handout

INITIAL CONDITIONS	Given: • None

INITIATING CUE	**(Operators Name)**, based on the events that have just occurred, determine if the conditions warranted emergency classification. If so, determine the appropriate emergency classification. This is a time critical task. Your time starts now.

Exelon Generation

Training Id: **NMP 2015 NRC JPM S-1** Revision: **0.0**

Title: **Perform N2-OSP-RMC-W@002 One Rod Out Interlock Test (Alternate Path)**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	06/11/15
Validated By	Brian Moore	11/3/15
Facility Reviewer	Mark Greer	11/13/15

Approximate Duration: 20 minutes

Documentation of Performance:

Performer: ______________________

Evaluator: ______________________

Start Time: __________ Stop Time: __________ Completion Time __________

Grade: **Pass / Fail**

Comments: ______________________

Evaluators Signature: ______________________ Date: __________

References

1. N2-OSP-RMC-W@002, Reactor Mode Switch Functional Test of Refuel Interlocks
2. N2-OP-96, Reactor Manual Control and Rod Position Indication System
3. N2-OP-92, Neutron Monitoring
4. N2-ARP-603215, SRM Downscale

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to perform the one rod out surveillance test and respond to downscale failure of an SRM detector.

   b. This JPM is considered alternate path because an SRM failure occurs which generates a rod block. The operator will be required to respond per the applicable ARP and bypass the faulty SRM channel and clear the rod out block to complete the surveillance test.

   c. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. N2-215000-01018, Respond to annunciator 603215, SRM Downscale

   b. K/A 201002, A3.01 (3.2/3.1)

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Simulator
Time Critical Task	No
Alternate Path	Yes
LOD >1.0	Yes

4. Recommended Start Location

   a. Unit 2 Simulator

5. Simulator Setup (if required)

   a. Reset simulator to IC-161

   b. This JPM can be performed with mode switch in REFUEL.

   c. Mode Switch in REFUEL

   d. Set the following **Event Trigger** on **Event 1**:

   Event Action: **zdrdwdrw==1**

   Command: **imf NM02A (1 30)**

   Description: Control rod 26-55 is selected on the Rod Select Matrix

   e. Fail off annunciator 603307

6. JPM Setup (if required)

   a. Prepare a copy of N2-OSP-RMC-W@002 marked up for performing section 8.2 only. Include the desired control rod (26-55) to be withdrawn in step 7.15.1.

   b. Provide adequate copies of N2-OP-30 and N2-OP-96 for pre-briefing.

   c. If this JPM is run multiple times, ensure alarm typers are cleared after each JPM.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is in Mode 5 • The rod worth minimizer is inoperable and bypassed. • A human rod worth minimizer is stationed. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, perform N2-OSP-RMC-W@002 section 8.2 One Rod Out Interlocks Test.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary.	P	SAT / UNSAT **STD:** Proper communications used.
2.	Obtain a copy of N2-OSP-RMC-W@002 and review / utilize the correct section of the procedure	P	SAT / UNSAT **STD:** N2-OSP-RMC-W@002 obtained and section 8.2 reviewed.
3.	Verify ROD SELECT BLOCK status light extinguished.	P (Step 8.2.1)	SAT/UNSAT **STD:** Observe amber ROD SELECT BLOCK status light extinguished at 2CEC*PNL603.
4.	Verify both SELECT PERMIT status LEDs, KFS, are illuminated on 2CEC*PNL616: FROM ACTIVITY CONTROL NO. 1 FROM ACTIVITY CONTROL NO. 2 **Cue:** Both status LEDs are illuminated.	P (Step 8.2.2)	SAT/UNSAT **STD:** Acknowledge Both status lights are illuminated and initial appropriate procedure step.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
5.	At 2CEC*PNL603, select ONE of the following control rods: • Control rod identified in Step 7.15.1 • Control rod 02-43, IF Attachment 2 will be used to simulate control rod withdraw) **Cue:** If asked, Control rod 26-55 identified in Step 7.15.1 is to be used.	P (Step 8.2.3)	**PASS / FAIL** **STD:** Depresses rod select button for the control rod 26-55 identified in step 7.15.1. Observes white light for the rod is illuminated at Rod Select Matrix.
Alternate Path:	Following time delay, Malfunction NM02A SRM A Failure Downscale becomes active, 603215 SRM DOWNSCALE and 603442 CONTROL ROD OUT BLOCK alarms		
6.	Reference 603215 SRM DOWNSCALE Operator Actions 1. Determine which SRM is downscale using white downscale lights on P603B. 2. IF withdrawing detector, insert to clear alarm. 3. Consult SM AND bypass the faulty channel. **Cue:** If requested, direct operator to bypass the SRM	P	SAT/UNSAT **STD:** Identifies and reports downscale failure of SRM A and identifies the rod block.
	Reference N2-OP-92 H.2.0 to bypass SRM A		
7.	Verify NO other SRM/IRM/RBM/APRM in bypass for the instrument to be bypassed.	P	SAT/UNSAT **STD:** Observes no other SRM channels are bypassed.
8.	IF SRM, IRM OR APRM is to be bypassed, perform a Channel Check (SRMs/IRMs within 2 decades, APRMs within 2%) to verify NO other SRM/IRM/APRM is INOPERABLE for the division being bypassed.	P	SAT/UNSAT **STD:** Observe other SRM count rate meters to ensure proper indication, within 2 decades.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
9.	Place the SRM/IRM/RBM/APRM BYPASS joystick to the bypass position.	P	**PASS / FAIL** **STD:** Place SRM Bypass joystick to bypass position for SRM A
10.	IF SRM A (B – D) was bypassed, THEN verify the SRM A (B – D) BYPASS light is lit on 2CEC*PNL603 OR H13-P606(P633). NOTE: Steps H.2.5 - 2.7 will be marked N/A since IRM, RBM, APRM since these instruments will not be bypassed.	P	SAT/UNSAT **STD:** Observe SRM A BYPASS light is lit on 2CEC*PNL603 OR H13-P606
	Continue N2-OSP-RMC-W@002 at step 8.2.4		
11.	Perform ONE of the following: • Pull the selected rod to notch 02 in accordance with N2-OP-96 • Perform Attachment 2 to simulate rod 02-43 withdrawn	P (Step 8.2.4)	**PASS / FAIL** **STD:** Depresses WITHDRAW pushbutton and confirms rod motion per N2-OP-96.
12.	Verify withdrawn (actual or simulated) Control Rod Position Indication at Position 02.	P (Step 8.2.5)	SAT / UNSAT **STD:** STD: Selected rod is moved and confirmed at position 02 per N2-OP-96.
13.	Verify FULL IN light for withdrawn control rod is not illuminated.	P (Step 8.2.6)	SAT / UNSAT **STD:** Observe FULL IN light for withdrawn control rod is not lit per N2-OP-96.
14.	Verify Rod Select Block Status light is illuminated.	P (Step 8.2.7)	SAT / UNSAT **STD:** Observe Rod Select Block Status light is lit.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
15.	Verify both SELECT PERMIT status LEDs, KFS, are extinguished on 2CEC*PNL616: FROM ACTIVITY CONTROL NO. 1 FROM ACTIVITY CONTROL NO. 2 **Cue:** Both status LEDs are extinguished.	P (Step 8.2.8)	SAT / UNSAT **STD:** Acknowledge Both status lights are extinguished and initial appropriate procedure step.
16.	Attempt to select another rod AND verify the RDCS system will not select that rod. **Cue:** If a step verification is requested, inform the operator the verification is complete.	P (Step 8.2.9)	**PASS / FAIL** **STD:** Depresses rod select button for another control rod and confirms rod cannot be selected.
17.	Perform ONE of the following: • Fully insert the withdrawn rod • Perform Attachment 3 to restore normal position indication for control rod 02-43	P Step 8.2.10	**PASS / FAIL** **STD:** Depresses INSERT pushbutton and confirms rod motion per N2-OP-96.Obtains verification signoff for step.
18.	Report completion.	P	SAT/UNSAT

Evaluator Note:	When selected control rod is returned to position 00, the task is complete.

TASK STANDARD	N2-OSP-RMC-W@002 section 8.2 One Rod Out Interlocks Test is complete with the selected rod is returned to position 00.

STOP TIME	

Exelon Generation.

JPM Handout

INITIAL CONDITIONS	Given: • The plant is in Mode 5

INITIATING CUE	**(Operators Name)**, perform N2-OSP-RMC-W@002 section 8.2 One Rod Out Interlocks Test.

NRC JPM S-1 Handout

NINE MILE POINT NUCLEAR STATION UNIT 2

SURVEILLANCE TEST PROCEDURE

N2-OSP-RMC-W@002

REVISION 05

REACTOR MODE SWITCH FUNCTIONAL TEST OF REFUEL INTERLOCKS

TECHNICAL SPECIFICATION REQUIRED

Approved by: M. T. Navin — M. Conway for M. Navin — Manager Operations — Date: 12-5-03

THIS IS A FULL REVISION

Effective Date: 12/12/2003

LIST OF EFFECTIVE PAGES

TABLE OF CONTENTS

1.0 PURPOSE

1.1 To provide detailed steps necessary to perform a functional test of the Reactor Mode Switch Refuel Interlocks in accordance with Technical Specification SR 3.9.1.1 and SR 3.9.2.2. Additionally, this procedure partially satisfies TRM TRSR 3.3.1.2.1 by verifying shorting links removed prior to Control Rod withdrawal when shutdown margin is not demonstrated.

1.2 Applicability

1.2.1 The Refueling Equipment Interlock portion of this procedure is required during in-vessel fuel movement with equipment associated with the Refueling Equipment Interlocks when the reactor mode switch is in the refuel position.

1.2.2 The One-Rod-Out Interlock portion of this procedure is required to be current prior to exceeding one hour when in Mode 5 with the reactor mode switch in the refuel position and any control rod withdrawn.

1.3 Discussion

1.3.1 This procedure is written such that the Auxiliary Hoists and Service Platform Hoist do not have to be tested if they are not required for use.

1.3.2 Per TS 3.9.2 Bases, to perform the required test to verify that the one-rod-out interlock will function properly, the applicable condition must be entered, i.e. a control rod must be withdrawn from its full-in position. Therefore, SR 3.9.2.2 is modified by a note that states the CHANNEL FUNCTIONAL TEST is NOT required to be performed until 1 hour after any control rod is withdrawn.

2.0 TECHNICAL SPECIFICATIONS

2.1 Surveillance Requirements

- TS SR 3.9.1.1, Refueling Equipment Interlocks Channel Functional Test
- TS SR 3.9.2.2, Refuel Position One-Rod-Out Interlock Channel Functional Test
- TS SR 3.9.4.1, Control Rod Position Indication

2.2 Limiting Conditions for Operation

- TS 3.9.1, Refueling Equipment Interlocks
- TS 3.9.2, Refuel Position One-Rod-Out Interlock
- TS 3.9.4, Control Rod Position Indication
- TS 3.9.5, Control Rod Operability-Refueling

2.3 Frequency

2.3.1 The refueling equipment interlock portion of this procedure is required to be performed at least once per 7 days during in-vessel fuel movement with equipment associated with the refueling equipment interlocks when the reactor mode switch is in the refuel position.

2.3.2 The one-rod-out interlock portion of this procedure is required to be performed at least once per 7 days while in mode 5 with the reactor mode switch in the refuel position and any control rod withdrawn.

3.0 REFERENCES AND COMMITMENTS

3.1 Licensee Documentation

3.1.1 Updated Safety Analysis Report (USAR)

- Section 7.7.1.4, Refueling Interlocks-Instrumentation and Controls

3.1.2 Technical Requirements Manual (TRM)

- Section 3.3.1.2, Reactor Protection System (RPS) Shorting Links
- TRSR 3.3.1.2.1, Reactor Protection System (RPS) Shorting Links
- Section 3.3.2, Control Rod Block Instrumentation
- Section 3.9.4, Refueling Platform

3.2 Policies, Programs and Procedures

- N2-OP-96, Reactor Manual Control and Rod Position Indication System
- N2-FHP-3, Refueling Manual
- N2-OP-39, Fuel Handling and Reactor Service Equipment
- N2-OP-92, Neutron Monitoring
- N2-OP-95A, Rod Worth Minimizer System

3.3 Technical Information

- GEK-83320, Reactor Manual Control System
- 7.221-001-012, Reactor Manual Control System Elem Diag
- 7.221-001-013, Reactor Manual Control System Elem Diag
- 7.221-001-014, Reactor Manual Control System Elem Diag
- 7.221-001-019, Reactor Manual Control System Elem Diag
- 7.221-001-020, Reactor Manual Control System Elem Diag
- 7.221-001-024, Reactor Manual Control System Elem Diag
- 7.221-001-025, Reactor Manual Control System Elem Diag
- 7.221-001-035, Reactor Manual Control System Elem Diag
- 7.221-001-036, Reactor Manual Control System Elem Diag
- 7.221-001-037, Reactor Manual Control System Elem Diag
- 7.221-001-041, Reactor Manual Control System Elem Diag

3.4 Commitments

Sequence Number	Commitment Number	Description
None		

4.0 GENERAL TEST METHODS

4.1 Use of Not Applicable (N/A) or Not Required (N/R) for Procedure Steps

4.1.1 N/A or N/R may be used where the procedure specifically allows it.

4.1.2 N/A or N/R may be used to eliminate steps when only a portion of the procedure is being performed, such as Post-Maintenance Testing, retest to verify questionable data, or other testing to be specified in Section 10.0, Remarks.

4.2 Steps with a "(__)" shall be marked to indicate that an item has been observed, verified, or satisfied.

4.3 All indicators and controls for this test are located on panel 2CEC*PNL603 unless otherwise specified.

5.0 TEST EQUIPMENT

5.1 Sound Powered Headsets or Equivalent

NOTE: The Dummy Fuel Bundle may be used as the dummy loads required in 5.2 and 5.3 below.

5.2 Dummy Load of at least 700 pounds for use in the spent fuel pool.

5.3 Dummy Load of at least 400 pounds for use in the spent fuel pool.

5.4 Acceptance Criteria Instrumentation

Instrument ID	Instrument Name	Location
None		

6.0 PRECAUTIONS AND LIMITATIONS

6.1 The Station shift Supervisor (SSS) shall be notified immediately whenever a procedural step cannot be completed as stated, or if any other problem develops during the test.

6.2 Applicable radiological precautions shall be observed. Radiological Protection shall be contacted for guidance, as required.

6.3 ALARA practices shall be observed to minimize personnel exposure and spread of contamination.

6.4 Prior to initialing any step in this procedure, each individual shall place his initials, signature, AND printed name, on Attachment 1, Test Personnel Signature and Initial Log.

6.5 All control rod movement shall be done in accordance with Reactor Analyst instructions.

6.6 The SSS shall verify that all Technical Specification and Technical Requirements Manual requirements for operable SRM's are met, including Control Rod Block Instrumentation, BEFORE installing jumpers to defeat SRM downscale interlocks.

6.7 Care must be exercised when jumpers are applied to SRM relays, not to short contacts, to prevent damage to equipment.

6.8 When lowering the fuel grapple near the bottom of the Spent Fuel Pool, the grapple should be lowered very slowly to prevent damage to the grapple when it reaches the bottom.

6.9 Installing a jumper to defeat SRM Downscale Interlocks will inop SRM Downscale Rod Block Function (TRM 3.3.2) until the jumper is removed and the surveillance requirements of TRM TRSR 3.3.2.1-1.d are satisfied.

Initials

6.10 A control rod may be withdrawn for up to 1 hour with the Refuel Position One-Rod-Out Interlock Channel Functional Test (TS SR 3.9.2.2) not current, to allow performance of the Channel Functional Test.

6.11 If core verifications have been completed and the "one rod out" interlock is operable, it is permissible for reactor re-assembly to occur concurrent with rod movement.

7.0 PREREQUISITES

7.1 The Control Rod Drive Hydraulic System is operating. MM

7.2 Obtain a specific RWP, if required. 12345 (RWP#) MM

7.3 Ensure no other testing is in progress that affects this procedure. MM

7.4 Ensure all control rods are fully inserted. MM

7.5 Specify the reason for test performance:

(X) Routine Surveillance
(__) Post Maintenance Testing, WO Number________________
(__) Inoperable Component
(__) Other (specify) ________________________________ MM

7.6 Ensure the plant is in one of the following:

- Operational Condition 5
- Core offloaded
- Operational Condition 3 OR 4 for testing the one-rod-out interlock only. MM

Initials

NOTE: The reactor mode switch position may be changed to include the Refuel position and operation considered not to be in Mode 2, to allow withdrawal of a single control rod (TS 3.10.3, TS 3.10.4).

7.7 IF in Mode 3 OR 4, verify the following:

N/A, NOT in Mode 3 OR 4 .... (X) MM

NOTE: Channel Functional Test is not required to be performed until 1 hour AFTER a rod is withdrawn.

- One-rod-out interlock Channel Functional Test is OR will be satisfied when Step 8.2 is complete. (TS SR 3.9.2.2) .... (X)
- ALL control rod position indication channels are operable. (TS 3.9.4) .... (X)
- All control rods are fully inserted .... (X)
- EITHER a OR b of the following:

a.1 The following Mode 5 RPS functions are operable:

- IRMs (TS Table 3.3.1.1-1.1) .... (X)
- SDV water level (TS Table 3.3.1.1-1.7) .... (X)
- Mode switch (TS Table 3.3.1.1-1.10) .... (X)
- Manual scram (TS Table 3.3.1.1-1.11) .... (X)

a.2 Each control rod to be withdrawn is operable (TS 3.9.5) .... (X)

a.3 2RPM*ACB1A, 1B, 2A, 2B are operable (TS 3.3.8.3) .... (X)

b. ALL other control rods in a five by five array centered on the control rod being withdrawn are disarmed .... (_) MM

7.8 IF in Mode 3, verify N2-OSP-LOG-D001, Attachment 12 has been completed.

N/A, NOT in Mode 3 .... (X) MM

7.9 IF in Mode 4 verify the following:

N/A, NOT in Mode 4 .... (X)

2VBS*ACB1A, 1B, 2A, 2B are operable (TS 3.3.8.2) .... (_)

N2-OSP-LOG-D001, Attachment 13 has been completed .... (_) MM

Initials

7.10 Ensure the Reactor Mode Switch is LOCKED in the REFUEL position. MM

7.11 Ensure the refueling platform is NOT over OR near the core. MM

7.12 Ensure the refuel platform hoists are NOT loaded. MM

7.13 Ensure there are NO rod blocks present. MM

7.14 IF the Service Platform interlocks are to be tested, verify the Service Platform has been installed on the reactor vessel.

N/A, Service Platform interlocks are NOT to be tested .... (X) MM

7.15 IF the Core is NOT completely off-loaded OR rod withdraw will NOT be simulated, perform the following BEFORE withdrawing a control rod:

NOTE: This control rod should be in sequence or RRCS and RWM may need to be bypassed.

7.15.1 Obtain the coordinates for a control rod to be withdrawn from Reactor Engineering AND record below.

Control Rod: 26-55
XX-YY

N/A, Rod withdraw will be simulated .... (_) MM

7.15.2 Review the Equipment Status Log for conditions preventing control rod withdrawal.

N/A, Rod withdraw will be simulated .... (_) MM

7.15.3 For the selected control rod verify the following listed Technical Specifications are satisfied:

TS 3.9.5, Control Rod Operability - Refueling Control Rod Scram Accumulator ≥940 psig .... (X)

TS 3.9.4, Control Rod Position Indication .... (X)

N/A, Rod withdraw will be simulated .... (_) MM

7.15.4 IF in Mode 5 AND a control rod will be withdrawn, verify Core Alteration Technical Specifications listed in N2-FHP-3, Attachment 5 are met.

N/A, NOT in Mode 5 OR rod withdraw will be simulated .... (_) MM

Initials

7.16 Establish communications between the Main Control Room AND the refuel platform.

N/A, Only Section 8.2, One-Rod-Out Interlocks Test, to be performed.................... (X) MM

7.17 Verify N2-OSP-NMS-@002, Source Range Monitor Check During Core Offload/Reload is current.

N/A, Core is NOT in Offload/Reload OR the core is fully offloaded .... (__) MM

7.18 Personnel performing steps in this procedure shall review the applicable portions prior to performance AND indicate review complete by placing their printed name, signature and initials on Attachment 1, Test Personnel Procedure Review, Signature and Initial Log. MM

7.19 Discuss the plant impact, and resulting plant status with the SSS and CSO. MM

PLANT IMPACT:

1. **THIS TEST WILL CAUSE CONTROL ROD BLOCKS TO BE RECEIVED.**

2. **IF A CONTROL ROD WILL BE WITHDRAWN AND IF SRM DOWNSCALES ARE IN, AND CAN NOT BE BYPASSED USING THE SRM JOYSTICK, JUMPERS WILL BE REQUIRED TO DEFEAT THE SRM DOWNSCALE INTERLOCKS. REFER TO TRM 3.3.2.**

3. **IF A CONTROL ROD WITH FUEL IN ITS CELL WILL BE WITHDRAWN AND IF SHUTDOWN MARGIN HAS NOT BEEN DEMONSTRATED PER TS 3.1.1, THE SHORTING LINKS WILL BE REMOVED PER TRM 3.3.1.2.**

4. **A CONTROL ROD WITHDRAWAL IN MODE 5 WITH FUEL ASSEMBLIES IN ITS ASSOCIATED CELL IS CONSIDERED A CORE ALTERATION.**

5. **IF ROD WITHDRAWAL IS NOT PERMITTED OR DESIRED, ROD WITHDRAWAL WILL BE SIMULATED BY LIFTING LEADS AND INSTALLING JUMPERS IN 2CEC*PNL709F IN ACCORDANCE WITH ATTACHMENT 2.**

Initials

7.20 Record test start date and time.

Today / Now
Date Time MM

7.21 Obtain SSS permission to perform this procedure, AND acknowledgement that temporary alterations may be used. PI
SSS

7.22 Notify CSO that procedure is to be performed, AND that temporary alterations may be used. DL
CSO

8.0 PROCEDURE

8.1 Preliminary Actions

NOTE: During fuel loading one or more SRMs may be downscale. This will make it necessary to bypass an SRM or jumper SRM downscale interlocks to allow one control rod to be withdrawn one notch.

****

CAUTION

Care must be exercised when jumpers are applied to avoid shorting contacts to prevent damage to equipment.

****

8.1.1 IF SRM Downscales are in, AND a control rod will be withdrawn, defeat SRM Downscale Interlocks, by performing the following:

N/A, SRM's NOT downscale OR a control rod will NOT be withdrawn .... (X)

a. SSS verify that all Tech Spec and TRM requirements for operable SRM's are met, including Control Rod Block Instrumentation, BEFORE installing jumpers to defeat SRM downscale interlocks.
SSS

Initials

8.1.1 (Cont)

b. IF any affected SRM is in a quadrant other than that of the control rod being moved, bypass one SRM in accordance with N2-OP-92, Section H.3.0.

Indicate SRM bypassed below:

- N/A, SRM is already bypassed/jumpered OR cannot be bypassed using the joystick .... (__)
- SRM A .... (__)
- SRM B .... (__)
- SRM C .... (__)
- SRM D .... (__) _______

____
Verif.

NOTE: The following step inops the SRM Downscale Rod Block Function. Refer to TRM 3.3.2.

c. IF more than one SRM is Downscale, OR IF the only SRM Downscale is in the quadrant of the control rod being moved, defeat SRM Downscale Interlocks for additional SRM's by installing jumpers as follows:

1. IF bypassing SRM A, install jumper from contact 4 to contact 6, on the back of relay K2 in Trip Aux Unit A in 2CEC*PNL606 in accordance with Figure 1.

   N/A, NOT bypassing SRM A .... (__) _______

   ____
   Verif.

2. IF bypassing SRM B, install jumper from contact 4 to contact 6, on the back of relay K2 in Trip Aux Unit B in 2CEC*PNL633 in accordance with Figure 1.

   N/A, NOT bypassing SRM B .... (__) _______

   ____
   Verif.

8.1.1.b (Cont)

3. IF bypassing SRM C, install jumper from contact 4 to contact 6, on the back of relay K2 in Trip Aux Unit C in 2CEC*PNL606 in accordance with Figure 1.

   N/A, NOT bypassing SRM C .... (__) ______

   ______ Verif.

4. IF bypassing SRM D, install jumper from contact 4 to contact 6, on the back of relay K2 in Trip Aux Unit D in 2CEC*PNL633 in accordance with Figure 1.

   N/A, NOT bypassing SRM D .... (__) ______

   ______ Verif.

5. Notify SSS which SRM Downscale Interlocks have been defeated. ______

Figure 1: SRM Downscale Relay K2 Jumper Points

* The relay connections (as seen from the rear) are as shown below:			
4°	3°	2°	1°
°8	°7	°6	°5

NOTES:

1. Removal of RPS Shorting Links will place RPS in non-coincident logic mode. A trip from any single Neutron Monitoring detector will result in a full reactor scram.

2. Loading any Fuel Bundle into the core, or moving any Fuel Bundle in the core to a new location in the core, will invalidate the Shutdown Margin Demonstration Test.

8.1.2 IF the current Shutdown Margin Demonstration Test has been invalidated, verify removed RPS Shorting Links in accordance with N2-FHP-3, Attachment 3.

N/A, Shutdown Margin Demonstration Test has NOT been invalidated .... (X) MM

8.1.3 [TRM] If Shorting Link removal is required within 12 hours PRIOR to control rod withdrawal, verify Shorting Links removed.

N/A, Shorting Link removal NOT required .... (X) MM

DL
Verif.

Initials

8.2 One-Rod-Out Interlocks Test

8.2.1 Verify ROD SELECT BLOCK status light extinguished. _______

8.2.2 [T/S] Verify both SELECT PERMIT status LEDs, K_{FS}, are illuminated on 2CEC*PNL616:

FROM ACTIVITY CONTROL NO. 1 .... (__)

FROM ACTIVITY CONTROL NO. 2 .... (__) _______

8.2.3 At 2CEC*PNL603, select ONE of the following control rods:

- Control rod identified in Step 7.15.1 .... (__)
- Control rod 02-43, IF Attachment 2 will be used to simulate control rod withdraw .... (__) _______

****

CAUTION

IF being performed in Mode 5, the following step is a core alteration IF the control rod being withdrawn has fuel assemblies in its associated cell. Refer to N2-FHP-3, Attachment 5 for applicable Tech Spec sections which must be met prior to withdrawing a control rod.

****

8.2.4 [T/S] Perform ONE of the following:

- Pull the selected rod to notch 02 in accordance with N2-OP-96 .... (__)
- Perform Attachment 2 to simulate rod 02-43 withdrawn .... (__) _______

8.2.5 [T/S] Verify withdrawn (actual or simulated) Control Rod Position Indication at Position 02. _______

8.2.6 [T/S] Verify FULL IN light for withdrawn control rod is not illuminated.

N/A, Control rod withdraw was simulated .... (__) _______

8.2.7 [T/S] Verify Rod Select Block Status light is illuminated. _______

8.2.8 [T/S] Verify both SELECT PERMIT status LEDs, K_{FS}, are extinguished on 2CEC*PNL616:

- FROM ACTIVITY CONTROL NO. 1 .... (__)
- FROM ACTIVITY CONTROL NO. 2 .... (__) _______

Initials

8.2.9 [T/S] Attempt to select another rod AND verify the RDCS system will not select that rod. _______

____
Verif.

8.2.10 Perform ONE of the following:

N/A, Section 8.3 to be performed .... (__)

- Fully insert the withdrawn rod .... (__)
- Perform Attachment 3 to restore normal position indication for control rod 02-43 .... (__) _______

____
Verif.

8.3 Refuel Platform Main Hoist Interlocks Test

N/A, Refuel Platform Main Hoist Interlocks will NOT be tested .... (__)

* *

CAUTION

WHEN lowering the fuel grapple near the bottom of the pool, lower the grapple very slowly to prevent damage to the grapple when it reaches the bottom.

* *

8.3.1 [TRM] Using the Refuel Platform Main Hoist AND Fuel Grapple, perform the following:

a. Slowly lower the grapple AND verify that WHEN the SLACK CABLE indicating light illuminates, the hoist drive motor stops .... (__)

b. Raise the grapple AND verify the hoist drive motor stops WHEN the NORMAL UP indicating light illuminates .... (__) _______

8.3.2 [TRM] IF Shorting Link removal is required, within 12 hours PRIOR to Control Rod withdrawal, verify Shorting Links removed.

N/A, Shorting Link removal not required .... (__) _______

____
Verif.

Initials

8.3.3 At 2CEC*PNL603, select ONE of the following control rods:

N/A, Control rod is withdrawn OR Attachment 2 has been performed .... (__)

- Control rod identified in Step 7.15.1 .... (__)
- Control rod 02-43, IF Attachment 2 will be used to simulate control rod withdraw .... (__) _______

****

CAUTION

IF being performed in Mode 5, the following step is a core alteration IF the control rod being withdrawn has fuel assemblies in its associated cell. Refer to N2-FHP-3, Attachment 5 for applicable Tech Spec sections which must be met prior to withdrawing a control rod.

****

8.3.4 [T/S] Perform ONE of the following:

N/A, Control rod is withdrawn OR Attachment 2 has been performed .... (__)

- Pull the selected rod to notch 02 in accordance with N2-OP-96 .... (__)
- Perform Attachment 2 to simulate rod 02-43 withdrawn .... (__) _______

8.3.5 [T/S] Verify withdrawn (actual OR simulated) Control Rod Position Indication at position 02. _______

8.3.6 [T/S] Verify FULL IN light for withdrawn control rod is NOT illuminated.

N/A, Control rod withdraw was simulated .... (__) _______

8.3.7 Verify withdraw block status light on 2CEC*PNL603 is not lit. _______

8.3.8 Grapple the dummy bundle on the Main Hoist of the Refueling Platform per applicable steps of N2-OP-39 Subsection F.18.0. _______

8.3.9 Raise the dummy bundle in its storage location in spent fuel pool such that it remains grappled AND approximately 12 inches from being fully seated.

Verify Hoist Loaded Light Lit .... (__) _______

Initials

8.3.10 Position refueling platform limit switch #1 in UP position (located on the lower west side of the platform, located farther from the spent fuel pool) AND verify:

- Annunciator #603442 CONTROL ROD OUT BLOCK (control room 2CEC*PNL603) alarms .... (__)
- Block interlock #1 status light is lit (refuel platform) .... (__)
- Bridge rev stop #1 status light is lit (refuel platform) .... (__)
- Fuel hoist interlock status light is lit (refuel platform) .... (__) ______

8.3.11 Attempt to raise the dummy bundle AND verify that the hoist drive MOTOR does NOT energize. ______

8.3.12 Attempt to lower the dummy bundle AND verify that the hoist drive MOTOR does NOT energize. ______

8.3.13 Return refuel platform limit switch #1 to normal down position AND Verify:

- Annunciator #603442 CONTROL ROD OUT BLOCK (control room 2CEC*PNL603) clear .... (__)
- Block interlock #1 status light is extinguished (refuel platform) .... (__)
- Bridge rev stop #1 status light is extinguished (refuel platform) .... (__)
- Fuel hoist interlock status light is extinguished (refuel platform) .... (__) ______

8.3.14 Raise the dummy bundle to grapple NORMAL UP position. ______
[T/S]

Initials

8.3.15 On the refuel floor, slowly move the Refueling Platform towards the core,
[T/S] AND verify the following WHEN the platform is near the core:

- The refueling platform drive motor stops .... (__)
- The ROD BLOCK INTERLOCK #1 status light, on the platform status panel is illuminated .... (__)
- The BRIDGE REVERSE STOP #1 status light on the platform status panel is illuminated .... (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 1, Ko, is illuminated on 2CEC*PNL616.. (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 2, Ko, is extinguished on 2CEC*PNL616... (__)
- The WITHDRAW BLOCK status light is illuminated on 2CEC*PNL603...... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK has alarmed .... (__) ______

8.3.16 Fully insert the withdrawn rod OR perform Attachment 3 AND verify the
[T/S] following:

- The WITHDRAW BLOCK status light is illuminated at 2CEC*PNL603........ (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 1, Ko, is illuminated on 2CEC*PNL616.. (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 2, Ko, on 2CEC*PNL616 is extinguished .... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK is still alarmed ..... (__)
- The BRIDGE REVERSE STOP #1 status light on the platform status panel is extinguished .... (__) ______

Initials

8.3.17 On the Refuel Floor, move the Refueling Platform towards the core,
[T/S] AND verify the following WHEN the platform crosses the over the core limit:

- The WITHDRAW BLOCK status light is illuminated on 2CEC*PNL603....... (__)
- BOTH WITHDRAW BLOCK status LEDs, Ko, are illuminated on 2CEC*PNL616:
  - FROM ACTIVITY CONTROL NO. 1 .... (__)
  - FROM ACTIVITY CONTROL NO. 2 .... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK has alarmed .... (__)
- The ROD BLOCK INTERLOCK #2 status light, on the platform status panel is illuminated .... (__) _______

8.3.18 Return the dummy bundle to its fully seated stored position AND release the
[T/S] grapple. _______

____
Verif.

8.3.19 Verify the following status lights are extinguished AND the annunciator
[T/S] has cleared:

- The WITHDRAW BLOCK status light on 2CEC*PNL603 .... (__)
- Both WITHDRAW BLOCK status LEDs, Ko, on 2CEC*PNL616:
  - FROM ACTIVITY CONTROL NO. 1 .... (__)
  - FROM ACTIVITY CONTROL NO. 2 .... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK .... (__)
- The ROD BLOCK INTERLOCK #1 status light, on the platform status panel.. (__)
- The ROD BLOCK INTERLOCK #2 status light, on the platform status panel.. (__)
- The BRIDGE REVERSE STOP #1 status light on the platform status panel.. (__) _______

8.3.20 Return the grapple to its normal up position. _______

Initials

8.4 Refuel Platform Frame Mounted Auxiliary Hoist Interlocks Test

N/A, Refuel Platform Frame Mounted Auxiliary Hoist Interlocks will NOT be tested .... (__)

8.4.1 [TRM] IF Shorting Link removal is required, within 12 hours PRIOR to Control Rod withdrawal, verify Shorting Links removed.

N/A, Shorting Link removal NOT required .... (__) _______

____
Verif.

8.4.2 At 2CEC*PNL603, select ONE of the following control rods:

- Control rod identified in Step 7.15.1 .... (__)
- Control rod 02-43, IF Attachment 2 will be used to simulate control rod withdraw .... (__) _______

****

CAUTION

IF being performed in Mode 5, the following step is a core alteration IF the control rod being withdrawn has fuel assemblies in its associated cell. Refer to N2-FHP-3, Attachment 5 for applicable Tech Spec sections which must be met prior to withdrawing a control rod.

****

8.4.3 [T/S] Perform ONE of the following:

- Pull the selected rod to notch 02 in accordance with N2-OP-96 .... (__)
- Perform Attachment 2 to simulate rod 02-43 withdrawn .... (__) _______

8.4.4 [T/S] Verify withdrawn (actual OR simulated) Control Rod Position Indication at position 02. _______

8.4.5 [T/S] Verify FULL IN light for withdrawn control rod is NOT illuminated.

N/A, Control rod withdraw was simulated .... (__) _______

8.4.6 [T/S] Place a dummy load of greater than or equal to 400 pounds on the frame Mounted Auxiliary Hoist of the Refueling Platform. _______

Initials

8.4.7 [T/S] On the refuel floor slowly move the Refueling Platform towards the core, AND verify the following WHEN the platform is near the core:

- The refueling platform drive motor stops .... (__)
- The WITHDRAW BLOCK status light is illuminated on 2CEC*PNL603....... (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 1, Ko, is illuminated on 2CEC*PNL616... (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 2, Ko, is extinguished on 2CEC*PNL616... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK has alarmed .... (__)
- The ROD BLOCK INTERLOCK #1 status light on the platform status panel is illuminated .... (__)
- The BRIDGE REVERSE STOP #1 status light on the platform status panel is illuminated .... (__) _______

8.4.8 [T/S] Fully insert the withdrawn rod OR perform Attachment 3 AND verify the following:

- The WITHDRAW BLOCK status light is illuminated .... (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 1, Ko, on 2CEC*PNL616 is illuminated.. (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 2, Ko, on 2CEC*PNL616 is extinguished.. (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK is still alarmed ..... (__)
- The BRIDGE REVERSE STOP #1 status light on the platform status panel is extinguished .... (__) _______

Initials

8.4.9 [T/S] On the refuel floor move the Refueling Platform towards the core, AND verify the following when the platform crosses the over the core limit:

- The WITHDRAW BLOCK status light is illuminated .... (__)
- BOTH WITHDRAW BLOCK status LEDs, Ko, are illuminated on 2CEC*PNL616:
  - FROM ACTIVITY CONTROL NO. 1 .... (__)
  - FROM ACTIVITY CONTROL NO. 2 .... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK has alarmed .... (__)
- The ROD BLOCK INTERLOCK #2 status light, on the platform status panel is illuminated .... (__) _______

8.4.10 [T/S] Return the dummy load on the Refuel Platform frame Mounted Auxiliary Hoist to its stored position. _______

8.4.11 [T/S] Verify the following status lights are extinguished, AND the annunciator has cleared:

- The WITHDRAW BLOCK status light on 2CEC*PNL603 .... (__)
- Both WITHDRAW BLOCK status LEDs, Ko, on 2CEC*PNL616:
  - FROM ACTIVITY CONTROL NO. 1 .... (__)
  - FROM ACTIVITY CONTROL NO. 2 .... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK .... (__)
- The ROD BLOCK INTERLOCK #1 status light, on the platform status panel.. (__)
- The ROD BLOCK INTERLOCK #2 status light, on the platform status panel.. (__)
- The BRIDGE REVERSE STOP #1 status light on the platform status panel.. (__) _______

Initials

8.5 Refuel Platform Monorail Auxiliary Hoist Interlocks Test

N/A, Refuel Platform Monorail Auxiliary Hoist Interlocks will NOT be tested .... (__)

8.5.1 [TRM] IF Shorting Link removal is required, within 12 hours PRIOR to Control Rod withdrawal, verify Shorting Links removed.

N/A, Shorting Link removal NOT required .... (__)

____
Verif.

8.5.2 At 2CEC*PNL603, select ONE of the following control rods:

- Control rod identified in Step 7.15.1 .... (__)
- Control rod 02-43, IF Attachment 2 will be used to simulate control rod withdraw .... (__) _______

****

CAUTION

IF being performed in Mode 5, the following step is a core alteration IF the control rod being withdrawn has fuel assemblies in its associated cell. Refer to N2-FHP-3, Attachment 5 for applicable Tech Spec sections which must be met prior to withdrawing a control rod.

****

8.5.3 [T/S] Perform ONE of the following:

- Pull the selected rod to notch 02 in accordance with N2-OP-96................. (__)
- Perform Attachment 2 to simulate rod 02-43 withdrawn .... (__) _______

8.5.4 [T/S] Verify withdrawn (actual OR simulated) Control Rod Position Indication at position 02. _______

8.5.5 [T/S] Verify FULL IN light for withdrawn control rod is NOT illuminated.

N/A, Control rod withdraw was simulated .... (__) _______

8.5.6 [T/S] Place a dummy load of greater than OR equal to 400 pounds on the Monorail Hoist of the Refueling Platform. _______

Initials

8.5.7 [T/S] On the refuel floor slowly move the Refueling Platform toward the core, AND verify the following WHEN the platform is near the core:

- The refueling platform drive motor stops .... (__)
- The WITHDRAW BLOCK status light is illuminated on 2CEC*PNL603....... (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 1, Ko, is illuminated on 2CEC*PNL616... (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 2, Ko, is extinguished on 2CEC*PNL616.. (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK has alarmed .... (__)
- The ROD BLOCK INTERLOCK #1 status light on the platform status panel is illuminated .... (__)
- The BRIDGE REVERSE STOP #1 status light on the platform status panel is illuminated .... (__) ________

8.5.8 [T/S] Fully insert the withdrawn rod OR perform Attachment 3 AND verify the following:

- The WITHDRAW BLOCK status light is illuminated on 2CEC*PNL603....... (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 1, Ko, on 2CEC*PNL616 is illuminated .... (__)
- The WITHDRAW BLOCK status LED from Activity Control No. 2, Ko, on 2CEC*PNL616 is extinguished .... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK is still alarmed ..... (__)
- The BRIDGE REVERSE STOP #1 status light on the platform status panel is extinguished .... (__)

Initials

8.5.9 [T/S] On the Refuel Floor, move the Refueling Platform towards the core, AND verify the following WHEN the platform crosses the over the core limit:

- The WITHDRAW BLOCK status light is illuminated on 2CEC*PNL603....... (__)
- BOTH WITHDRAW BLOCK status LEDs, Ko, are illuminated on 2CEC*PNL616:
  - FROM ACTIVITY CONTROL NO. 1 .... (__)
  - FROM ACTIVITY CONTROL NO. 2 .... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK has alarmed .... (__)
- The ROD BLOCK INTERLOCK #2 status light, on the platform status panel is illuminated .... (__) _______

8.5.10 [T/S] Return the dummy load on the Refuel Platform Monorail Hoist to its stored position. _______

8.5.11 [T/S] Verify the following status lights are extinguished AND the annunciator has cleared:

- The WITHDRAW BLOCK status light on 2CEC*PNL603 .... (__)
- BOTH WITHDRAW BLOCK status LEDs, Ko, on 2CEC*PNL616:
  - FROM ACTIVITY CONTROL NO. 1 .... (__)
  - FROM ACTIVITY CONTROL NO. 2 .... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK .... (__)
- The ROD BLOCK INTERLOCK #1 status light, on the platform status panel... (__)
- The ROD BLOCK INTERLOCK #2 status light on the platform status panel... (__)
- The BRIDGE REVERSE STOP #1 status light on the platform status panel... (__) _______

Initials

8.6 Service Platform Interlocks Test

N/A, Service Platform NOT installed AND Interlocks will NOT be tested .... (__)

8.6.1 IF the Service Platform Interlocks are to be tested, perform the following:

N/A, the Service Platform is NOT being tested .... (__) _______

8.6.2 Mount a Jib Crane on the Service Platform. _______

8.6.3 [T/S] Place a dummy load of greater than or equal to 400 pounds on the jib crane AND verify the following:

- The WITHDRAW BLOCK status light is illuminated on 2CEC*PNL603....... (__)
- BOTH WITHDRAW BLOCK status LEDs, Ko, are illuminated on 2CEC*PNL616:
- FROM ACTIVITY CONTROL NO. 1 .... (__)
- FROM ACTIVITY CONTROL NO. 2 .... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK has alarmed .... (__)

8.6.4 [T/S] Remove the dummy load from the jib crane AND verify the following:

- The WITHDRAW BLOCK status light is extinguished on 2CEC*PNL603.... (__)
- BOTH WITHDRAW BLOCK status LEDs, Ko, on 2CEC*PNL616 are extinguished:
  - FROM ACTIVITY CONTROL NO. 1 .... (__)
  - FROM ACTIVITY CONTROL NO. 2 .... (__)
- Annunciator No. 603442 CONTROL ROD OUT BLOCK has cleared.......... (__) _______

Initials

9.0 RETURN TO NORMAL

9.1 All control rods are fully inserted. _______

____
Verif.

9.2 IF control rod position was simulated, Attachment 3 is complete.

N/A, control rod position was NOT simulated .... (__) _______

____
Verif.

9.3 IF any SRM was bypassed with the SRM joystick in Step 8.1.1.b, THEN verify the SRM joystick is taken out of bypass:

N/A, NO SRM was bypassed with the joystick in Step 8.1.1.b................................. (__)

- SRM A .... (__)
- SRM B .... (__)
- SRM C .... (__)
- SRM D .... (__)

____
Verif.

NOTE: The following step restores SRM Downscale Rod Block function availability. TRM TRSR 3.3.2.1 must be satisfied for operability. Restoration of SRM Downscale Rod Block to operable is not required by this procedure.

9.4 IF jumpers were installed in Step 8.1.1.c, remove jumpers as follows:

9.4.1 IF SRM A was jumpered, remove jumper from contact 4 and contact 6, on the back of relay K2 in Trip Aux Unit A in 2CEC*PNL606.

N/A, jumper NOT installed on SRM A... (__) _______

____
Verif.

Initials

9.4.2 IF SRM B was jumpered, remove jumper from contact 4 and contact 6, on the back of relay K2 in Trip Aux Unit B in 2CEC*PNL633.

N/A, jumper NOT installed on SRM B .... (__) _______

____
Verif.

9.4.3 IF SRM C was jumpered, remove jumper from contact 4 and contact 6, on the back of relay K2 in Trip Aux Unit C in 2CEC*PNL606.

N/A, jumper NOT installed on SRM C .... (__) _______

____
Verif.

9.4.4 IF SRM D was jumpered, remove jumper from contact 4 and contact 6, on the back of relay K2 in Trip Aux Unit D in 2CEC*PNL633.

N/A, jumper NOT installed on SRM D .... (__) _______

____
Verif.

9.5 Verify the refueling platform is NOT over OR near the core. _______

____
Verif.

9.6 Verify the refuel platform hoists are NOT loaded. _______

____
Verif.

9.7 IF RPS Shorting Links were removed, install Shorting Links in accordance with N2-FHP-3, Attachment 4.

N/A, Shorting Links were NOT removed .... (__) _______

____
Verif.

9.8 IF the RWM was bypassed in Attachment 2 verify the RWM is NOT bypassed. _______

____
Verif.

Initials

9.9 Verify there are NO rod blocks present. ______

______
Verif.

9.10 Notify SSS and CSO that procedure is completed AND that Temporary Alterations have been returned to normal.

______
SSS

______
CSO

9.11 Record test stop date and time.

__________/__________
Date Time ______

Initials

10.0 ACCEPTANCE CRITERIA

10.1 Operation Review

10.1.1 The following Mode Switch Refuel Position interlock has satisfactorily completed a channel functional test:

N/A, Mode Switch One-Rod-Out Interlock NOT tested .... (__)

Mode Switch in Refuel Position One-Rod-Out Interlock. Section 8.2.0 TS SR 3.9.2.2)

[__] SATISFACTORY [__] UNSATISFACTORY _______

10.1.2 Each of the following Refuel Platform Main Hoist refuel interlocks has satisfactorily completed a channel functional test:

N/A, Refuel Platform Main Hoist refuel interlocks NOT tested .... (__)

All Rods In, Refuel Platform Main Hoist. Steps 8.3.4-8.3.19, (TS SR 3.9.1.1.a)

[__] SATISFACTORY [__] UNSATISFACTORY

Refuel Platform Position (Main Hoist) Steps 8.3.15-8.3.19 (TS SR 3.9.1.1.b).

[__] SATISFACTORY [__] UNSATISFACTORY

Main Hoist Loaded. Steps 8.3.14-8.3.19. (TS SR 3.9.1.1.c)

[__] SATISFACTORY [__] UNSATISFACTORY

Fuel Hoist Interlocks. Steps 8.3.8 through 8.3.13 (USAR Section 7.7.1.4.3)

[__] SATISFACTORY [__] UNSATISFACTORY

Grapple Position. Step 8.3.1 (TRM TRSR 3.9.4.5)

[__] SATISFACTORY [__] UNSATISFACTORY _______

Initials

10.1.3 Each of the following Refuel Platform Frame Mounted Auxiliary Hoist refuel interlocks has satisfactorily completed a channel functional test:

N/A, Refuel Platform Frame Mounted Auxiliary Hoist refuel interlocks NOT tested .... (__)

All Rods In, Refuel Platform Frame Mounted Auxiliary Hoist. Steps 8.4.3-8.4.9, (TS SR 3.9.1.1.a).

[__] SATISFACTORY [__] UNSATISFACTORY

Frame Mounted Auxiliary Hoist Loaded. Steps 8.4.6-8.4.11 (TS SR 3.9.1.1.e).

[__] SATISFACTORY [__] UNSATISFACTORY

Refuel Platform Position (Frame Mounted Auxiliary Hoist). Steps 8.4.7-8.4.11 (TS SR 3.9.1.1.b).

[__] SATISFACTORY [__] UNSATISFACTORY ______

10.1.4 Each of the following Refuel Platform Monorail Auxiliary Hoist refuel interlocks has satisfactorily completed a channel functional test:

N/A, Refuel Platform Monorail Auxiliary Hoist refuel interlocks NOT tested .... (__)

All Rods In, Refuel Platform Monorail Auxiliary Hoist. Steps 8.5.3-8.5.9, TS SR 3.9.1.1.a).

[__] SATISFACTORY [__] UNSATISFACTORY

Monorail Hoist Loaded. Steps 8.5.6-8.5.11 (TS SR 3.9.1.1.d).

[__] SATISFACTORY [__] UNSATISFACTORY

Refuel Platform Position (Monorail Auxiliary Hoist). Steps 8.5.7-8.5.11 (TS SR 3.9.1.1.b).

[__] SATISFACTORY [__] UNSATISFACTORY ______

10.1.5 Each of the following Service Platform Hoist refuel interlocks has satisfactorily completed a channel functional test:

N/A, Service Platform Hoist refuel interlocks NOT tested .... (__)

Service Platform Hoist Loaded. Section 8.6 (TS SR 3.9.1.1.f).

[__] SATISFACTORY [__] UNSATISFACTORY ______

Initials

10.1.6 Shorting Links verified removed within 12 hours before withdrawal of each control rod moved, Steps 8.1.3, 8.3.1, 8.4.1, and 8.5.1 (TRM TRSR 3.3.1.2.1).

N/A, NOT Required with adequate shutdown margin demonstrated per TS 3.1.1 .... (__)

[__] SATISFACTORY [__] UNSATISFACTORY _______

10.1.7 Control Rod Position Full-In Indication was verified extinguished at position 02 for each rod withdrawn. One or more of the following steps: 8.2.6, 8.3.5, 8.4.5, 8.5.5 (TS SR 3.9.4.1).

N/A, No control rod was withdrawn for this surveillance .... (__)

[__] SATISFACTORY [__] UNSATISFACTORY _______

10.1.8 SSS Review

(__) Satisfactory, no corrective action required

(__) Satisfactory, corrective action required (Document in Remarks section and initiate an ACR)

(__) Unsatisfactory (Document in Remarks section and initiate an ACR. Immediately notify Manager Operations or his Designee)

_____________________ / ___________ / ________
Person Notified Date Time

IF any interlock does not meet acceptance criteria, declare that interlock inoperable AND enter into required action as required by Technical Specifications OR Technical Requirements Manual.

Remarks: ____

____

____

____

____

____

_______________________________________ / _______________
SSS Signature Date

10.2 Second OPS Review

_______________________________________ / _______________
Second OPS Signature Date

ATTACHMENT 1: TEST PERSONNEL SIGNATURE AND INITIAL LOG

Sheet ____ of ____

NOTE: Completing this attachment signifies that each person has reviewed the applicable portions of this procedure.

PRINTED NAME	SIGNATURE	INITIALS
Mitch Adams	Mitch McAdams	MM
Doug Lewis	Doug Lewis	DL
Peter Ingulls	Peter Ingulls	PI

Initials

ATTACHMENT 2: <u>SIMULATING POSITION 02 ON CONTROL ROD 02-43</u>

NOTE: In the following section, the "Rod Drift" alarm may or may not be received. This is based on RWM scan times and is NOT abnormal.

1.0 Indicate the procedural step that this attachment is being performed for:

_______________________________ _______

2.0 Perform the following steps to simulate rod withdrawal to position 02:

2.1 At Termination cabinet 2CEC*PNL709F, Termination Module TM407, lift lead on terminal 11, by removing Pomona Jack device with a 5/16" nut driver or socket and ratchet. _______

____
Verif.

2.2 At Termination cabinet 2CEC*PNL709F, Termination Module TM407, lift lead on terminal 06 AND verify FULL IN light extinguishes AND position 00 no longer indicated, by removing Pomona Jack device with a 5/16" nut driver or socket and ratchet _______

____
Verif.

2.3 At Termination cabinet 2CEC*PNL709F, Termination Module TM407, jumper terminals 10 to 02 AND verify position 02 is indicated. _______

____
Verif.

2.4 Reset Rod Drift Alarm by depressing reset pushbutton on RDCS panel.

N/A, no rod drift was received... (__) _______

____
Verif.

2.5 IF WITHDRAW BLOCK status light on 2CEC*PNL603 is illuminated, bypass the RWM in accordance with N2-OP-95A, H.1.0. _______

____
Verif.

2.6 IF WITHDRAW BLOCK status light on 2CEC*PNL603 is illuminated, select SEQ B with the SELECT pushbutton on 2RDS-PNLZ6 on 2CEC*PNL603. _______

____
Verif.

Initials

ATTACHMENT 3: RETURNING CONTROL ROD 02-43 PROPER INDICATION

1.0 Indicate the procedural step that this attachment is being performed for

________________________ ______

2.0 Perform the following steps to return rod 02-43 to normal indication:

2.1 At Termination cabinet 2CEC*PNL709F, Termination Module TM407, remove jumper from terminals 10 AND 02 AND verify position 02 is no longer indicated. ______

______
Verif.

2.2 At Termination cabinet 2CEC*PNL709F, Termination Module TM407, land lead on terminal 11, by installing Pomona Jack device and torquing to 14-16 inch pounds. ______

______
Verif.

2.3 At Termination cabinet 2CEC*PNL709F, Termination Module TM407, land lead on terminal 06 AND verify FULL IN light AND position 00 are indicated, by installing Pomona Jack device and torquing to 14-16 inch pounds. ______

______
Verif.

2.4 Reset Rod Drift Alarm by depressing pushbutton on RDCS panel.

N/A, no rod drift was received... (__) ______

______
Verif.

Exelon Generation

Training Id: **NMP 2015 NRC JPM S-2** Revision: **0.0**

Title: **Restore Shutdown Cooling to Service**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	06/02/15
Validated By	Brian Moore	11/3/15
Facility Reviewer	Mark Greer	11/13/15

Approximate Duration: 15 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: __________ Stop Time: __________ Completion Time __________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: __________

References

1. N2-OP-31, Residual Heat Removal System
2. N2-SOP-31, Loss of Shutdown Cooling
3. NUREG 1123 K/A 205000 A4.01 (3.7/3.7)

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to manipulate controls associated with RHR. The operator will restore SDC per the Operating Procedure.

   b. This JPM is considered alternate path. When the SDC pump started, the injection valve will fail to open. The operator will need to establish alternate shutdown cooling in order to prevent exceed 200F reactor water temperature.

   c. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. N2-205000-01003, Initiate RHR Shutdown Cooling Operation

   b. K/A 205000 A4.01 (3.7/3.7)

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Simulator
Time Critical Task	No
Alternate Path	Yes
LOD >1.0	Yes

4. Recommended Start Location

   a. Unit 2 Simulator

5. Simulator Setup (if required)
   a. Initialize simulator to IC 161
      i. From a shutdown IC, SDC secured IAW OP-31 section H.3.0
   b. RHS*MOV40A is tagged out of service
   c. Verify the following overrides are inserted
      i. 01A2S145DI0468, CLOSE RHR SHUTDOWN COOLING INJECTION ISOL VLV MOV 4, ON
      ii. 01A2S145DI0469, OPEN RHR SHUTDOWN COOLING INJECTION ISOL VLV MOV 40, OFF
      iii. 01A2DS162LO06710, OFF RHR SHUTDOWN COOLING INJECTION ISOL VLV MOV, OFF
      iv. 01A2DS163LO06711, ON RHR SHUTDOWN COOLING INJECTION ISOL VLV MOV, OFF
      v. 01A1S163DI076, ON SDC A INJECT MOV 40A INOP AMBER, ON
   d. Verify the following remotes are loaded on **TRG2**
      i. RH33, RHS*MOV24A 600 V BKR STATUS, OPEN
      ii. RH10, OP32.H.9 2RHS*MOV24A INJECTION THROTTLE, THROTTLE

6. JPM Setup (if required)
   a. Provide adequate pre-brief copies of N2-OP-31
   b. Ensure stopwatch is available

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is in Mode 4 • SDC has been secured in accordance with N2-OP-31 Section H.3.0 • 2RHS*MOV40A is out of service for maintenance **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, Restart RHR Loop "B" in Shutdown Cooling per N2-OP-31, Section H.4.0.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary	P	SAT / UNSAT **STD:** Proper communications used
2.	Obtain a copy of the reference procedure and review/utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** N2-OP-31 obtained and Section H.4.0 reviewed
3.	IF RDS Backfill Injection is out of service to one OR more RPV Level Reference Legs in Mode 3, THEN perform the following: **Cue:** RDS Backfill Injection is NOT out of service.	P Step 4.1	SAT / UNSAT **STD:** Determines step is NA

Procedure Caution:	The RHR pump is without minimum flow protection, Minimum flow of greater than or equal to 1000 gpm must be established within 40 seconds of pump start. Use of a stopwatch is recommended to ensure the pump is tripped within the required time if minimum flow is not achieved. Running pump for more 15 seconds deadheaded is prohibited.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
4.	At 2CEC*PNL601, start 2RHS*P1A(B).	P Step 4.2	**PASS / FAIL** **STD:** Control switch in red flagged. 2RHS*P1B red running light illuminated
Alternate Path	The alternate path begins when the operator attempts to open RHS*MOV40B. The valve will not respond as expected.		
5.	Throttle RHS*MOV40A(B), SDC A(B) RETURN THROTTLE open to greater than or equal to 1000 gpm.	P Step 4.3	SAT / UNSAT **STD:** Operator attempts to open 2RHS*MOV40B to obtain ≥ 1000 gpm and observes green closed indication only.
6.	IF RHS*MOV40B does NOT begin to open in 15 seconds OR system flow is NOT greater than or equal to 1000 gpm 40 seconds after pump start, THEN place RHS*P1B control switch to STOP AND release to Normal-After-Stop.	P Step 4.4	**PASS / FAIL** **STD:** RHS*MOV40B will not open to provide flow ≥ 1000 gpm. The operator will then trip RHS*P1B by placing the control switch to STOP, then release to Normal-After-Stop
Evaluator Cue:	Reactor Coolant Temperature is 195F and slowly rising.		
7.	Enter N2-SOP-31, Loss of Shutdown Cooling	P	SAT / UNSAT **STD:** Determines the need to Enter N2-SOP-31, Loss of Shutdown Cooling
Evaluator Cue:	If the operator indicates the necessity to monitor Reactor coolant temperature (N2-OSP-RCS-@001), report another operator will monitor temperature.		
Evaluator Cue:	If the operator indicates the necessity to initiate actions to restore Secondary Containment, report Secondary Containment is restored.		

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
8.	IF In Mode 4 AND coolant temperature can NOT be maintained <200°F, THEN Place Alternate Shutdown Cooling in service to maintain temperature <200°F per Attachment 1 (preferred) **Cue:** If requested, or if the operator attempts to use the non-preferred method of alternate shutdown cooling, direct the use of the preferred method <u>with RHR Loop 'A'</u>.	P	SAT / UNSAT **STD:** Determines Alternate Shutdown Cooling is required per attachment 1 of N2-SOP-31.
Procedure Notes:	1. If time permits, Operations Management should be consulted prior to initiation of Alternate Shutdown Cooling. 2. This Subsection should be utilized only if normal shutdown cooling cannot be established and it is determined that Alternate Shutdown Cooling is required. This section requires either RHS Loop A or B available for LPCI injection via the RHS Heat Exchanger. 3. Cooldown limits can be violated if a significant temperature differential exists between the Suppression Pool and RPV. Injection flow should be throttled as necessary to maintain cooldown limits.		
Evaluator Note:	JPM steps 9 – the end are from N2-SOP-31 Attachment 1, Alternate Shutdown Cooling (Preferred Method)		
9.	Reduce Reactor pressure as low as possible using Bypass Valves OR SRVs with a cooldown rate less than OR equal to 100°F/hr **Cue:** Another operator will lower reactor pressure as necessary.	P (step 1.0)	SAT / UNSAT **STD:** Determines step is being performed by another operator.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
10.	Make one of the following LPCI Injection Valves throttleable per Attachment 3: • 2RHS*MOV24A, LPCI A INJECTION VLV • 2RHS*MOV24B, LPCI B INJECTION VLV **Console Operator: Insert TRG2**, then toggle RH33 back to **close**. **Cue:** Report 2RHS*MOV24A, LPCI A INJECTION VLV has been made throttleable in accordance with attachment 3. **Note:** This step would involve lifting leads	P (step 2.0)	**PASS / FAIL** **STD:** Acknowledges 2RHS*MOV24A, LPCI A INJECTION VLV has been made throttleable
11.	At 2CEC*PNL602, verify closed the following valves: <u>RPV Head Vents</u> • 2MSS*MOV108, REACTOR VESSEL VENT • 2MSS*MOV118, REACTOR VESSEL VENT • 2MSS*MOV119, REACTOR VESSEL VENT	P	**PASS / FAIL** **STD:** Verifies RPV head vents all closed. MOV 118 and MOV 119 must be manually closed.
	<u>Main Steam Line Drains</u> • 2MSS*MOV111, MAIN STM LINE DRAIN ISOL VLV • 2MSS*MOV112, MAIN STM LINE DRAIN ISOL VLV	P	SAT / UNSAT **STD:** Verifies the main stem line drains closed
	<u>MSIVs</u> • 2MSS*AOV6A, MSIV-6A • 2MSS*AOV6B, MSIV-6B • 2MSS*AOV6C, MSIV-6C • 2MSS*AOV6D, MSIV-6D • 2MSS*AOV7A, MSIV-7A • 2MSS*AOV7B, MSIV-7B • 2MSS*AOV7C, MSIV-7C • 2MSS*AOV7D, MSIV-7D	P	**PASS / FAIL** **STD:** Verifies MSIVs closed. MSIVs 6A-6D must be manually closed.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
12.	At 2CEC*PNL601, verify closed the following RCIC Steam Isolation Valves: • 2ICS*MOV121, TURB STM SUPPLY OUTBOARD ISOL VLV • 2ICS*MOV128, TURBINE STM SUPPLY INBOARD ISOL VLV • 2ICS*MOV170, TURBINE STM SUPPLY INBOARD WARM-UP	P (step 4.0)	SAT / UNSAT **STD:** Verifies RCIC Steam IVs shut
13.	Establish SWP flow to RHR*E1A as follows: **Cue:** Another operator will establish SWP flow to RHR*E1A, steps 5.1-5.4.	P (step 5.0)	SAT / UNSAT **STD:** Acknowledges another operator will establish SWP flow to RHR*E1A
Procedure Caution:	Flow through the SRVs should be initiated with Reactor Pressure as low as possible. Two phase flow may cause excessive loads on the SRV discharge tailpipe.		
14.	At 2CEC*PNL601, place two SRV keylock switches to OPEN **Note:** SRVs will not provide an open indication due to low reactor pressure.	P (step 6.0)	**PASS / FAIL** **STD:** Inserts keys into two SRVs switches and rotates switches to open SRVs
15.	Slowly raise RPV water level to approximately 255 inches on Shutdown Range indication **Cue:** RPV water level is approximately 255 inches on Shutdown Range indication	P (step 7.0)	SAT / UNSAT **STD:** Acknowledges reactor water level is approximately 255 inches on Shutdown Range indication
Procedure Caution:	Cooldown limits can be violated if a significant temperature differential exists between the Suppression Pool and RPV. Injection flow should be throttled as necessary to maintain cooldown limits.		
16.	At 2CEC*PNL601, start 2RHS*P1A	P (step 8.0)	**PASS / FAIL** **STD:** Rotates control switch CW to start.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
Procedure Note:	Injection to the RPV should be performed slowly due to the significant amount of time it takes to fill the RPV and Main Steam lines up to the point where water is discharging through open SRVs. After SRV discharge flow is achieved, SRV Tailpiece temperature indications on 2CEC*P614 can be used to monitor temperature.		
17.	Establish injection to the RPV by throttling open 2RHS*MOV24A, LPCI A INJECTION VLV	P (step 9.0)	**PASS / FAIL** **STD:** Rotates LPCI injection valve control switch to open the valve and establish flow >0 gpm and <7450 gpm.
Evaluator Note:	**Cue:** Your task is complete.		

TASK STANDARD	After tripping RHS*P1B, Alternate shutdown cooling has been placed in service.

STOP TIME	

JPM Handout

INITIAL CONDITIONS	Given: • The plant is in Mode 4 • SDC has been secured in accordance with N2-OP-31 Section H.3.0 • 2RHS*MOV40A is out of service for maintenance

INITIATING CUE	**(Operators Name)**, Restart RHR Loop "B" in Shutdown Cooling per N2-OP-31, Section H.4.0.

Exelon Generation.

Training Id: **2015 NRC JPM S-3** Revision: **0.0**

Title: **Transfer RCIC Lineup Post-Scram For Pressure Control (Alternate Path)**

Approvals:

	Signature / Printed Name	Date
Developed By	G. Bobka	06/12/15
Validated By	James Workman	8/13/15
Facility Reviewer	Mark Gron	10/1/15

Approximate Duration: 20 minutes

Documentation of Performance:

Performer: ______________________

Evaluator: ______________________

Start Time: __________ Stop Time: __________ Completion Time __________

Grade: **Pass / Fail**

Comments: ______________________

Evaluators Signature: ______________________ Date: __________

References

1. N2-EOP-HC
2. N2-OP-35, Reactor Core Isolation Cooling
3. N2-ARP-601300
4. NUREG 1123 K/A 217000, A4.07 (3.9/3.8)

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to transfer RCIC lineup from injection to CST to CST pressure control lineup.

   b. This JPM is considered alternate path because once RCIC lineup is transferred, a low oil pressure condition occurs. RCIC shutdown is required.

   c. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. N2-217000-01010, Respond to annunciator 601303, RCIC Turbine Brg Oil Press Low

   b. K/A 217000, A4.07 (3.9/3.8)

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Simulator
Time Critical Task	No
Alternate Path	Yes
LOD >1.0	Yes

4. Recommended Start Location

   a. Unit 2 Simulator

5. Simulator Setup (if required)

   a. Reset to IC 162

   b. This JPM can be performed under post scram conditions with RPV water level above 108.5 inches.

   c. Set the following **Event Trigger** on **Event 1**:

   Event Action: **hzlrcvs07(2)==1**

   Command: **imf an601303 1 90**

   d. Verify the following remote is inserted:

      1) RC02A RCIC LEVEL 8 TRIP DEFEAT: WITHDRAW TRIP UNITS N693A,E, DEFEATED

6. JPM Setup (if required)

   a. If this JPM is run multiple times, ensure alarm typers are erased after each JPM.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is shutdown following a reactor scram • RCIC is injecting **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, realign RCIC for injection with reject to the CST, in accordance with N2-EOP-HC section 5.3.3.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** *Acknowledge repeat back providing correction if necessary.*	P	SAT / UNSAT **STD:** Proper communications used.
2.	Obtain a copy of N2-EOP-HC Attachment 5 and review / utilize the correct section of the procedure	P	SAT / UNSAT **STD:** N2-EOP-HC Attachment 5 obtained and section 5.3.3 reviewed.
3.	IF injection with reject to CST is required: Open ICS*MOV124, TEST BYPASS TO CONDENSATE STORAGE TK	P Step 5.3.3a	**PASS / FAIL** **STD:** Opens ICS*MOV124 using control switch.
4.	Control injection flow to reactor by throttling ICS*FV108, TEST BYPASS TO CONDENSATE STOR TK, as follows: • Open ICS*FV108 to lower RPV injection • Close ICS*FV108 to raise RPV injection	P Step 5.3.3b	**PASS / FAIL** **STD:** Manipulates ICS*FV108 as appropriate to control flow without tripping the RCIC turbine on overspeed.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
5.	IF injecting with suction from CST, open 2CNS-AOV123, CONDENSATE STORAGE TKS MAKE UP VLV	P Step 5.3.4	SAT/UNSAT **STD:** Opens 2CNS-AOV123 using control switch.
Console Operator:	**Verify** Trigger 1 inserted - **Malfunction AN601303**, RCIC Turbine Bearing Oil Press Low		
Alternate Path:	Annunciator 601303 RCIC TURBINE BRG OIL PRESS LOW alarms		
6.	Recognize and report Annunciator 601303 RCIC TURBINE BRG OIL PRESS LOW alarms References ARP for 601303 **Cue:** If computer point is checked, report ISPC04 RCIC TURB BRG OIL PRESS is in alarm condition (display and alarm typer)	P	SAT/UNSAT **STD:** Report alarm condition
Evaluator Note:	JPM Steps 7-10 are actions from ARP 601303		
7.	CONFIRM that RCIC Turbine Speed is ≥1500 RPM, minimum rated speed.	P	SAT / UNSAT **STD:** Observe RCIC speed indication at P601 >/= 1500 rpm.
8.	IF required, RAISE RCIC Turbine Speed using 2ICS*FC101, FLOW CONTROLLER.	P	SAT / UNSAT **STD:** Determines raising speed is not required.
9.	DISPATCH an operator to RCIC Room (Rx. 175') to VERIFY proper oil levels on 2ICS*T1, RCIC TURBINE, AND to MONITOR oil pressure locally. **Cue:** Acknowledge direction	P	SAT/UNSAT **STD:** Dispatches operator to RCIC Room to verify proper oil levels and monitor oil pressure

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
10.	IF RCIC Turbine Speed is ≥ 1500 RPM, AND annunciator has NOT cleared, AND RCIC is NOT required for Rx. Level/Pressure control, THEN SHUTDOWN RCIC System using N2-OP-35, Subsection G.1.0. **Cue:** Feedwater is available for injection. **Cue:** If in ARP, cue RCIC is not needed for level and pressure control.	P	SAT/UNSAT **STD:** Determines RCIC shutdown is required.
Evaluator Note:	JPM Steps 11-25 are actions from N2-OP-35 Section G.1.0		
11.	Depress RCIC INITIATION SEAL-IN RESET pushbutton AND verify white SEAL-IN light out.	P (step G.1.1)	SAT/UNSAT **STD:** Depress RCIC INITIATION SEAL-IN RESET pushbutton AND verify white SEAL-IN light out at 2CEC*PNL601
12.	Verify ICS*P2, WTR LEG PUMP, running.	P (step G.1.2)	SAT / UNSAT **STD:** Observe red light on for ICS*P2, WTR LEG PUMP at 2CEC*PNL601.
13.	Place ICS*FC101, FLOW CONTROLLER, in MANUAL.	P (step G.1.3)	SAT / UNSAT **STD:** Depresses "M" pushbutton on ICS*FC101, FLOW CONTROLLER Observe amber manual light on at 2CEC*PNL601.
14.	Using RCIC FLOW CONTROLLER, reduce RCIC turbine speed to between 1500 - 2000 RPM.	P (step G.1.4)	SAT / UNSAT **STD:** Depress Close pushbutton 2ICS*FC101. Observe turbine speed lowering to 1500-2000 rpm

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
15.	Stop RCIC Discharge Flow as follows: IF RCIC is injecting to Reactor Vessel, close ICS*MOV126, PMP 1 DISCH TO REACTOR. IF RCIC is in full flow test, close the following valves: • ICS*FV108, TEST BYPASS TO CONDENSATE STOR TK • ICS*MOV124, TEST RETURN TO CONDENSATE STOR TK	P (step G.1.5)	SAT / UNSAT **STD**: At 2CEC*PNL601, valves closed using control switches and green lights are ON and red lights are OFF. ICS*MOV126, PMP 1 DISCH TO REACTOR closed ICS*FV108, TEST BYPASS TO CONDENSATE STOR TK closed ICS*MOV124, TEST RETURN TO CONDENSATE STOR TK closed
16.	Verify ICS*MOV143, PMP MINIMUM FLOW TO SUPPRESSION POOL, opens.	P (step G.1.6)	SAT / UNSAT **STD**: Observe ICS*MOV143, PMP MINIMUM FLOW TO SUPPRESSION POOL, opens red light is ON and green light is OFF at 2CEC*PNL601.
17.	IF time permits, close ICS*MOV150, TURBINE TRIP THROTTLE VLV. **Cue:** RCIC is making abnormal noises and there is no visible oil level in the sight glass.	P (step G.1.7)	SAT / UNSAT **STD**: Acknowledge, time does not permit closing the turbine trip throttle valve

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
18.	Depress TURBINE TRIP pushbutton AND verify the following: • ICS*MOV150, TURBINE TRIP THROTTLE VLV, closed. • ICS*MOV126, PMP 1 DISCH TO REACTOR, closed. • ICS*MOV143, PMP MINIMUM FLOW TO SUPPRESSION POOL, closed. • RCIC Turbine Speed lowers to 0 RPM. **Note:** Only depressing the Turbine Trip pushbutton is critical.	P (step G.1.8)	**PASS / FAIL** **STD**: Depress TURBINE TRIP pushbutton. Verifies: • ICS*MOV150, TURBINE TRIP THROTTLE VLV, closed. • ICS*MOV126, PMP 1 DISCH TO REACTOR, closed. • ICS*MOV143, PMP MINIMUM FLOW TO SUPPRESSION POOL, closed. • RCIC Turbine Speed lowering.
19.	Close ICS*MOV120, TURB STM SUPPLY VLV.	P (step G.1.9)	SAT / UNSAT **STD**: Closes ICS*MOV120 using control switch until green light is ON and red light is OFF.
20.	Verify ICS*AOV130, TURBINE STM SUPPLY DRAIN POT 1 EXH VLV, open.	P (step G.1.10)	SAT / UNSAT **STD**: Observes ICS*AOV130 red light ON and green light OFF.
21.	Stop GLAND SEAL SYSTEM AIR COMPRESSOR.	P (step G.1.11)	SAT / UNSAT **STD**: GLAND SEAL SYSTEM AIR COMPRESSOR stopped using control switch until green light is ON and red light is OFF.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
22.	Close ICS*MOV116, LUBE OIL COOLING WTR SUPPLY.	P (step G.1.12)	SAT / UNSAT **STD**: Closes ICS*MOV116 using control switch until green light is ON and red light is OFF.
23.	Set ICS*FC101, FLOW CONTROLLER, to 600 GPM AND place in AUTO.	P (step G.1.13)	SAT / UNSAT **STD**: Controller tape setting is 600 gpm and and controller selected to A (Auto).
24.	Relatch AND open 2ICS*MOV150 as follows: • Place control switch for 2ICS*MOV150 in CLOSE, UNTIL BOTH green valve closed lights are lit. • Open 2ICS*MOV150.	P (step G.1.14)	SAT / UNSAT **STD**: Closes ICS*MOV150 using control switch until both green lights are lit and red lights are OFF. Reopens until both red lights are ON and green lights are OFF, indicating trip and throttle valve is latched and open at 2CEC*PNL601
25.	Verify Standby Condition Status Checks per Subsection F.1.0. **Cue:** Another operator will complete Standby Status Checks	P	SAT / UNSAT **STD**: Proper communications used.
26.	Report completion	P	SAT / UNSAT

TASK STANDARD	RCIC has been tripped.

STOP TIME	

JPM Handout

INITIAL CONDITIONS	Given: • The plant is shutdown following a reactor scram • RCIC is injecting

INITIATING CUE	**(Operators Name)**, realign RCIC for injection with reject to the CST, in accordance with N2-EOP-HC section 5.3.3.

Exelon Generation

Training Id: **2015 NRC JPM S-4** Revision: **0.0**

Title: **Augment RPV Pressure Control Using MSL Drains (RO Only)**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	06/02/15
Validated By	Dave Bottorf	8/13/15
Facility Reviewer	Mark Garza	10/1/15

Approximate Duration: 15 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: ________

References

1. N2-EOP-6.27, Augmenting RPV Pressure Control With MSL Drains
2. NUREG 1123 K/A 239001 A4.02, (3.2/3.2)

Exelon Generation

Instructor Information

A. JPM Information

1. Description

    a. This JPM tests the operators ability to augment RPV pressure control using MSL Drains.

    b. This JPM is NOT considered alternate path.

    c. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

    a. N2-EOP-6.27, IMPLEMENT N2-EOP-6.27, AUGMENTING RPV PRESSURE CONTROL WITH MSL DRAINS

    b. K/A 239001 A4.02, (3.2/3.2)

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Simulator
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

    a. Unit 2 Simulator

5. Simulator Setup (if required)
    a. Initialize simulator to IC 162
        i. From a full power IC, place MS in shutdown
        ii. Place the ARC Pumps in service per N2-SOP-101C and secure Aux Steam to the Air Ejectors.
        iii. Place the control switches for the outboard and inboard MSIVs to CLOSE.
        iv. **Insert Malfunctions AD09A and AD09B**, SRV SOLENOID POWER FAILURE (Division 1 and 2)
        v. **Insert Remote Function MS05B**, 2MSS*MOV112 APPENDIX R CKT BKR, FV=CLOSE
        vi. Allow plant conditions to stabilize and SRVs to cycle.

6. JPM Setup (if required)
    a. Prepare a copy of N2-EOP-6.27, Section 6.0. Include a copy of the Precautions and Limitations.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant has scrammed from 100% power • The MSIV's have closed and cannot be reopened • All electrical power has been lost to the A, B, and C Solenoids for the SRVs. • The CRS has determined alternate pressure control systems are needed to assist with RPV pressure control. • The power supply breaker for 2MSS*MOV112 is ON • The Alarm Circuit control switch for 2MSS*MOV112 is in ENABLE. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, Augment RPV Pressure Control with MSL Drains per N2-EOP-6.27, Section 6.1

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary	P	SAT / UNSAT **STD:** Proper communications used
2.	Obtain a copy of N2-EOP-6.27 and review / utilize the correct section of the procedure. **Note:** A CAT 60 key may be needed to gain entry to 2EHS*MCC102.	P	SAT / UNSAT **STD:** Current version of N2-EOP-6.27 obtained and Section 6.1 reviewed
3.	Verify 2EHS*MCC102-7A, 2MSS*MOV112, MAIN STEAM LINE DRAIN OUTBD in ON. (Aux Bay North, EL240)	P (step 6.1.1)	SAT / UNSAT **STD:** Determines per the initial conditions that the breaker for 2MSS*MOV112 has already been closed.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
4.	Verify 2EHS*MCC102-7A ALARM CIRCUIT control switch in ENABLE	P (step 6.1.2)	SAT / UNSAT **STD:** Determines per the initial conditions that the alarm circuit control switch for 2MSS*MOV112 has already been enabled.
5.	Verify closed the following valves: (2CEC*PNL602) • MSS*MOV208, MSIV DRAIN VLV	P (step 6.1.3)	SAT / UNSAT **STD:** At 2CEC*PNL602, determines 2MSS*MOV208 is already closed by observing the RED OPEN light not lit and the GREEN CLOSED light lit.
6.	• MSS-MOV187, MAIN STM LINE PRESS EQL/WARMING	P	SAT / UNSAT **STD:** At 2CEC*PNL602, determines 2MSS-MOV187 is already closed by observing the RED OPEN light not lit and the GREEN CLOSED light lit.
7.	Verify closed MSS*MOV207, INSIDE MSIV'S UPSTREAM DRAIN VLV. (2CEC-PNL824)	P (step 6.1.4)	SAT / UNSAT **STD:** At 2CEC*PNL602, determines 2MSS*MOV207 is already closed by observing the RED OPEN light not lit and the GREEN CLOSED light lit.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
8.	IF MSS*MOV189, RCIC STM DRAIN VLV, is open, perform the following: • Lift AND tape lead on terminal point AA-7 in CEC-PNL856, Bay D (Figure 1), (Relay Room • Verify closed 2MSS*MOV189. (2CEC-PNL824) **Cue:** If requested to perform steps 6.1.5.a&b, acknowledge request. Cue around.	P (step 6.1.5)	SAT / UNSAT **STD:** At 2CEC*PNL602, determines 2MSS*MOV189 is already closed by observing the RED OPEN light not lit and the GREEN CLOSED light lit.
Evaluators Note:	Steps 9 and 10 may be performed in any order or concurrently.		
9.	Verify open the following valves: (2CEC*PNL602): • 2MSS*MOV111	P (step 6.1.6)	**PASS / FAIL** **STD:** At 2CEC*PNL602, places the KEYLOCK SWITCH for 2MSS*MOV111 to OPEN. Observes the RED OPEN light lit and the GREEN CLOSED light not lit.
10.	• 2MSS*MOV112	P	**PASS / FAIL** **STD:** At 2CEC*PNL602, places the KEYLOCK SWITCH for 2MSS*MOV112 to OPEN. Observes the RED OPEN light lit and the GREEN CLOSED light not lit.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
11.	Throttle open 2MSS*MOV207 to augment RPV pressure control as directed by the EOP Director. (2CEC-PNL824). **Cue:** *As the CRS, inform the operator to fully open 2MSS*MOV207.*	P (step 6.1.7)	**PASS / FAIL** **STD:** At 2CEC-PNL824, places the CONTROL SWITCH for 2MSS*MOV207 to OPEN. Observes the RED OPEN light lit and the GREEN CLOSED light not lit.

Evaluator Note:	**Cue:** Your task is complete.

TASK STANDARD	Augmented RPV pressure control has been established, with 2MSS*MOV207 open.

STOP TIME	

JPM Handout

INITIAL CONDITIONS	Given: • The plant has scrammed from 100% power • The MSIV's have closed and cannot be reopened • All electrical power has been lost to the A, B, and C Solenoids for the SRVs. • The CRS has determined alternate pressure control systems are needed to assist with RPV pressure control. • The power supply breaker for 2MSS*MOV112 is ON • The Alarm Circuit control switch for 2MSS*MOV112 is in ENABLE.

INITIATING CUE	**(Operators Name)**, Augment RPV Pressure Control with MSL Drains per N2-EOP-6.27, Section 6.1

Exelon Generation

Training Id: **NMP 2015 NRC Simulator S-5** Revision: **0.0**

Title: **Rotate Drywell Unit Coolers (Alternate Path)**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	11/2/15
Validated By	Carl Jones	11/3/15
Facility Reviewer	Mark Greer	11/13/15

Approximate Duration: 15 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: ________

References

1. N2-OP-60, Drywell Cooling
2. N2-ARP-873200

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to rotate the Drywell Unit Coolers 3A and B and respond to a degraded condition on Unit Cooler 3B

   b. This JPM is considered alternate path because once the unit coolers have been rotated, the operator will receive indication that the unit cooler placed in service has degraded. The operator will be required to respond per the applicable ARP and place the previously running unit cooler back in service and place in pull to lock the degraded unit cooler.

2. Task Information:

   a. N2-223004-01002, Rotate Drywell Unit Coolers 3A and 3B

   b. K/A 223001, A4.12 (3.5/3.6)

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Simulator
Time Critical Task	No
Alternate Path	Yes
LOD >1.0	Yes

4. Recommended Start Location

   a. Unit 2 Simulator

5. Simulator Setup (if required)

   a. Initialize simulator to IC 166

   b. This JPM can be performed in Mode 1, 2, or 3 as long as power is available to both Unit Coolers 3A and B

   c. Ensure Drywell Unit Cooler 3A is running and 3B is secured

   d. Set **Malfunction PC36B**, DW Unit Cooler 3B Vibration High on **Trigger 4** with a **3 second delay**.

   e. Set the following **Event Trigger** on **Event 4**:

   Event Action: **HZLCW2CCPMOV3A(1)==1 .AND. HZLPC1DRSB03(2)==1**

   Command: **Blank**

   Description: 2CCP-MOV3A Green Light On and UC3B Red Light On

6. JPM Setup (if required)

   a. Prepare a copy of N2-OP-60, Section 2.0. Include a copy of the Precautions and Limitations. No steps need to be marked up.

   b. If this JPM is run multiple times, ensure ARP 873214 is erased after each JPM.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is in Mode 1 • 2DRS-UC3A is running and 2DRS-UC3B is in standby • Unit Coolers 3A and 3B need to be rotated to equalize runtime **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, Rotate Drywell Unit Coolers by starting 2DRS-UC3B and stopping 2DRS-UC3A in accordance with N2-OP-60, Section F.2.0

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary.	P	SAT / UNSAT **STD:** Proper communications used.
2.	Obtain a copy of N2-OP-60 and review / utilize the correct section of the procedure	P	SAT / UNSAT **STD:** Current version of N2-OP-60 obtained and section F.2.0 reviewed.
Procedure Note:	• 2DRS-UC3A and UC3B should be rotated occasionally to equalize operating time and equipment wear. • All control switches and indicating lights are located on 2CEC*PNL873, unless otherwise noted.		
3.	Open CCP-MOV3B (3A), UNIT COOLER 3B (3A) RBCLC INLET to the standby unit cooler.	P (Step 2.1)	**PASS / FAIL** **STD:** Places CCP-MOV3B switch to OPEN at 2CEC*PNL873.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
4.	Start standby unit cooler DRS-UC3B (UC3A)	P (Step 2.2)	**PASS / FAIL** **STD:** Places DRS-UC3B switch to START at 2CEC*PNL873 and observes the RED running light is lit and the GREEN off light is not lit.
5.	Stop DRS-UC3A (UC3B) by placing control switch to STOP	P (Step 2.3)	**PASS / FAIL** **STD:** Places DRS-UC3A switch to STOP at 2CEC*PNL873 and observes the RED running light is not lit and the GREEN off light is lit.
Alternate Path:	Two seconds after completion of the following step, a high vibration condition will occur on 2DRS-UC3B. The operator will reference ARP 873214 which will direct restarting UC3A and placing in Pull To Lock UC3B		
6.	Close CCP-MOV3A (3B), UNIT COOLER 3A (3B) RBCLC INLET to the standby unit cooler.	P (Step 2.4)	**PASS / FAIL** **STD:** Places CCP-MOV3A switch to CLOSE at 2CEC*PNL873.
7.	Recognizes and reports Annunciator 873214 in alarm References ARP for 873214	P	SAT / UNSAT **STD:** Proper alarm response used.
8.	IF 2DRS-UC3A, UNIT COOLER is available, PERFORM the following:	P	SAT / UNSAT **STD:** Determines 2DRS-UC3A is available.
9.	• Open CCP-MOV3A, UNIT COOLER 3A RBCLC INLET.	P	**PASS / FAIL** **STD:** Places CCP-MOV3A switch to OPEN at 2CEC*PNL873.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
10.	• Start 2DRS-UC3A	P	**PASS / FAIL** **STD:** Places DRS-UC3A switch to START at 2CEC*PNL873 and observes the RED running light is lit and the GREEN off light is not lit.
11.	• STOP 2DRS-UC3B by placing control switch in PULL TO LOCK	P	**PASS / FAIL** **STD:** Places DRS-UC3B switch to PULL TO LOCK at 2CEC*PNL873 and observes the RED running light is not lit and the GREEN off light is lit.
12.	• CLOSE CCP-MOV3B, UNIT COOLER 3B RBCLC INLET	P	SAT / UNSAT **STD:** Places CCP-MOV3B switch to CLOSE at 2CEC*PNL873.

Evaluator Note:	Once CCP-MOV3B is closed, provide the following Cue: **Cue:** Your task is complete, another operator will complete the remainder of the ARP actions.

TASK STANDARD	CCP-MOV3B is closed with UC-3B secured and UC-3A placed in service.

STOP TIME	

Exelon Generation

JPM Handout

INITIAL CONDITIONS	Given: • The plant is in Mode 1 • 2DRS-UC3A is running and 2DRS-UC3B is in standby • Unit Coolers 3A and 3B need to be rotated to equalize runtime

INITIATING CUE	**(Operators Name)**, *Rotate Drywell Unit Coolers by starting 2DRS-UC3B and stopping 2DRS-UC3A in accordance with N2-OP-60, Section F.2.0*

Exelon Generation

Training Id: **2015 NRC JPM S-6** Revision: **0.0**

Title: **Energizing 2ENS*SWG103 from the Div II EDG & 2NNS-SWG015 from 2ENS*SWG103**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	06/05/15
Validated By	Dave Bottorff	8/13/15
Facility Reviewer	Marie Gam	10/1/15

Approximate Duration: 15 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: ________

References

1. N2-SOP-3, Loss of AC Power
2. NUREG 1123 K/A 262001 A4.01 (3.4/3.7)

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to manipulate controls associated with a loss of AC power. The operator will restore power to 2NNS-SWG015 and 2ENS*SWG103.

   b. This JPM is NOT considered alternate path.

   c. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. N2-SOP-03-01001, Respond to a loss of AC power (PRA)

   b. K/A 262001 A4.01 (3.4/3.7)

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Simulator
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

   a. Unit 2 Simulator

5. Simulator Setup (if required)
    a. Initialize simulator to IC 164
        i. Station Blackout
        ii. Div II EDG running. SWG 103 and SWG 015 de-energized
        iii. **Insert override** 05A2S030DI72311, OFF
    b. Verify the following **malfunctions** are **inserted**:
        i. ED02A, LOSS OF OFF-SITE 115KV LINE 5
        ii. ED02B, LOSS OF OFF-SITE 115KV LINE 6
        iii. DG01A, DIESEL GENERATOR NUMBER 1 FAILURE TO START
        iv. DG07, EDG2 FAIL TO START

6. JPM Setup (if required)
    a. Fault identification section 1.6 complete. (Provide to applicant with handout)

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The Reactor has just been manually scrammed. • A Station Blackout (SBO) is in progress. • A loss of coolant condition does NOT exist. • 2ENS*SWG 103 & 2NNS-SWG015 are required for SBO recovery. • Division II Emergency Diesel Generator is running • Fault identification per N2-SOP-03, Attachment 1, Section 1.6 is complete. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, Energize 2ENS*SWG103 from the DIV II EDG and 2NNS-SWG015 from 2ENS* SWG103, in accordance with N2-SOP-03, Attachment 1, Section 1.7.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary	P	SAT / UNSAT **STD:** Proper communications used
2.	Obtain a copy of the reference procedure and review/utilize the correct section of the procedure. **Note:** Section 1.7.5 is referenced which directs the candidate to Attachment 8, Section 8.4.	P	SAT / UNSAT **STD:** N2-SOP-3 obtained and Section 1.7 reviewed. Determines Step 1.7.5 is the appropriate step

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
3.	Attachment 8 step 8.4.1: At 2ENS*SWG103 (CB 261') verify reset the following lockouts: • 86 2EGPY01 for Breaker 103-13. • 86-2-2EGPY02 for Breaker 103-14. 86-1-2EGPY02 for Breaker 103-14. **Cue:** Respond as Plant Operator sent to reset the lockouts that the lockouts are reset.	P	SAT / UNSAT **STD:** Contacts field operator to verify the following lockouts are reset at 2ENS*SWG103 (CB 261') • 86 2EGPY01 for Breaker 103-13. • 86-2-2EGPY02 for Breaker 103-14. • 86-1-2EGPY02 for Breaker 103-14
4.	Place the SYNC switch to ON (SYNCHRONIZE TO BUS 103).	P (step 8.4.2)	**PASS / FAIL** **STD:** Places the SYNC switch to ON (SYNCHRONIZE TO BUS 103)
5.	Close 103-14.	P (step 8.4.3)	**PASS / FAIL** **STD:** Closes 103-14.
6.	Place the SYNC switch to OFF. **Note:** Candidate may not monitor CST level due to responding to the CSH pump trip	P (step 8.4.4)	SAT / UNSAT **STD:** Places the SYNC switch to OFF.
7.	At Panel 601, verify started, one Division II service water pump.	P (step 8.4.5)	SAT / UNSAT **STD:** At Panel 601, verifies started, one Division II service water pump.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
8.	Start additional loads as directed by SM/CRS in accordance with Attachment 12. Section 12.1. **Cue:** No additional loads are required at this time.	P (step 8.4.6)	SAT / UNSAT **STD:** Asks CRS if any additional loads must be started.
9.	Return to Attachment 1 Section 1.7.10. **Cue:** If asked, Prerequisite 9.1.4, lockout 86-2NNSY15 (4.16KVBUS NNS-015 PROTECTION LOCKOUT RELAY) at Panel 804 is reset.	P (step 8.4.7)	SAT / UNSAT **STD:** References Attachment 1 Section 1.7.10 and then goes to procedure Section 9.3 to power 2NNS-SWG015 from SWG103
10.	Place 15-3 in Pull-to-Lock. **Note:** Breaker 15-3 is already in Pull-to-Lock.	P (step 9.3.1)	SAT / UNSAT **STD:** Places (verifies) 15-3 in Pull-to-Lock.
11.	IF 2NNS-SWG015 is needed for SBO recovery, THEN at Panel 852, place the Div II LOCA SIGNAL BYPASS switch to ON.	P (step 9.3.2)	**PASS / FAIL** **STD:** Obtains Key and at Panel 852, places the Div II LOCA SIGNAL BYPASS switch to ON.
12.	Do NOT exceed the emergency diesel generator rating, 4400 KW (4840 KW 2 hour limit) WHEN re-energizing STUB Bus 2NNS-SWG015.	P (step 9.3.3)	SAT / UNSAT **STD:** Reads step and checks diesel load when performing the next step

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
13.	At 2ENS*SWG103 (CB 261'), verify reset 86-2ENSY12. (Breaker 103-8) **Cue:** Breaker is reset	P (step 9.3.4)	SAT / UNSAT **STD:** Contacts field operator to verify reset 86-2ENSY12. (Breaker 103-8) at 2ENS*SWG103 (CB 261').
14.	Close 103-8	P (step 9.3.5)	**PASS / FAIL** **STD:** Closes 103-8
15.	Close 15-8	P (step 9.3.6)	**PASS / FAIL** **STD:** Closes 15-8
16.	Return to Attachment 1 Section 1.6. **Cue:** When candidate returns to Att.1 Section 1.6, the JPM is completed	P	SAT / UNSAT **STD:** Returns to Attachment 1 Section 1.6

Evaluator Cue:	**Cue:** Your task is complete.

TASK STANDARD	2NNS-SWG015 is re-energized from 2ENS*SWG103.

STOP TIME	

JPM Handout

INITIAL CONDITIONS	Given: • The Reactor has just been manually scrammed. • A Station Blackout (SBO) is in progress. • A loss of coolant condition does NOT exist. • 2ENS*SWG 103 & 2NNS-SWG015 are required for SBO recovery. • Division II Emergency Diesel Generator is running • Fault identification per N2-SOP-03, Attachment 1, Section 1.6 is complete.

INITIATING CUE	**(Operators Name)**, Energize 2ENS*SWG103 from the DIV II EDG and 2NNS-SWG015 from 2ENS* SWG103, in accordance with N2-SOP-03, Attachment 1, Section 1.7.

Exelon Generation

Training Id: **2015 NRC JPM S-7** Revision: **0.0**

Title: **Temper Service Water Using Circ Water (Alternate Path)**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	06/05/15
Validated By	Ken Cherchio	8/13/15
Facility Reviewer		10/1/15

Approximate Duration: 15 minutes

Documentation of Performance:

Performer: ______________________

Evaluator: ______________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ______________________

Evaluators Signature: ______________________ Date: ________

References

1. N2-OP-11, Service Water System
2. NUREG 1123 K/A 202002 A2.03 (2.9/3.0)

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to manipulate controls associated with Service Water.

   b. This JPM is considered alternate path because the operator will be required to respond to Annunciator 601137, SERVICE WATER INTAKE TUNNEL DIV 1/DIV 2 WATER TEMP LOW. The operator will determined the Division 1 Bar Rack Heaters failed to energize as required and manually energize the heaters.

   c. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. N2-276000-01030, RESPOND TO ANNUNCIATOR 601137, SERVICE WATER INTAKE TUNNEL DIV 1/DIV 2 WATER TEMP LOW

   b. K/A 202002 A2.03 (2.9/3.0)

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Simulator
Time Critical Task	No
Alternate Path	Yes
LOD >1.0	Yes

4. Recommended Start Location

   a. Unit 2 Simulator

5. Simulator Setup (if required)
   a. Initialize simulator to IC 166
      i. Full Power IC
   b. **Insert Remote Function MT03**, LAKE ONTARIO TEMPERATURE, FV=40
   c. **Insert Override OVR-01A2S004DI0392**, OFF RACK HTR TL 1D, FV=ON
   d. Set the following **Event Trigger** on **Event 1**:
      - Event Action: **HZACWSWPFI511>0.075**
      - Event Command: **IRF MT03 (1 0) 37 1:00**
      - Description: Tempering flow is >3000 gpm
   e. Set the following **Event Trigger** on **Event 2**:
      - Event Action: **ZDCW2SWPSSR1A(2)==1**
      - Event Command: **DOR OVR-01A2S004DI0392**
      - Description: Division 1 Bar Heater Control Switch placed in ON

6. JPM Setup (if required)
   a. Prepare a copy of N2-OP-11, Section F.9.0. Include a copy of the Precautions and Limitations

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is at 100% power • Intake Bay Temperature is ~40°F and continuing to slowly lower • CWS blowdown is in service • The crew is preparing to temper Service Water with Circulating Water • Initial in-plant actions for placing SWP tempering in service are complete • An operator is available in the field to support any additional actions for SWP tempering. • SWP and CWS Radiation Monitors are in service with normal readings • Chemistry has been informed that SWP tempering will be performed. • N2-OP-11 is complete through step F.9.4 **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, Place SWP tempering in service (~3500 gpm) using CWS with 2SWP-TIK512 in MANUAL; in accordance with N2-OP-11, Section F.9.0, starting at step F.9.5.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary	P	SAT / UNSAT **STD:** Proper communications used
2.	Obtain a copy of N2-OP-11 and review / utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** N2- OP-11 obtained and Section F.9.0 reviewed

Procedure Note:	Manual Control of Tempering is the normal method of Tempering Flow control, however Automatic Control may also be used.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
3.	Place 2SWP-TIK512, SCREENWELL INTAKE TEMPERING FLOW, in M (Manual).	P (step 9.5.1)	SAT / UNSAT **STD:** At 2CEC*PNL601, determines that 2SWP-TIK512 is already in MAN by observing the M light is lit on the controller.
Procedure Note:	This Controller works in reverse of most controllers in that the manual slider must be taken to the right to close the valve. 100% Controller Output is maximum Close Demand.		
4.	Using 2SWP-TIK512 manual slider, close 2SWP-TV512.	P (step 9.5.2)	SAT / UNSAT **STD:** At 2CEC*PNL601, determines 2SWP-TV512 is already closed by observing the HORIZONTAL OUTPUT indicates 100%.
5.	Open 2SWP-V902, CIRC WATER TO TEMPERING CUT OUT. **Cue:** As the PO contacted to open V902, acknowledge the direction and inform the operator that 2SWP-V902 is open.	P (step 9.5.3)	**PASS / FAIL** **STD:** Contacts a PO and directs them to open 2SWP-V902.
Procedure Note:	This Controller works in reverse of most controllers in that the manual slider must be taken to the left to open the valve. 0% Controller Output is maximum Open Demand.		
6.	Using 2SWP-TIK512 manual slider, open 2SWP-TV512 to establish desired Tempering Flow less than or equal to 5000 gpm as indicated on 2SWP-FI511, INTAKE TEMPERING FLOW, OR NOT to exceed limit provided by Environmental Protection Department.	P (step 9.5.4)	**PASS / FAIL** **STD:** At 2CEC*PNL601, OPENS 2SWP-TV512 by placing the MANUAL SLIDER on 2SWP-TIK512 to the LEFT until flow indicates ~3500 gpm on 2SWP-FI511. Credit can be taken to establish >3000 gpm if Annunciator 601137 alarms before establishing ~3500 gpm.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
Alternate Path:	Once Intake Tempering Flow has exceeded 3000 gpm, intake bay temperature will begin to lower to 37°F over the course of 1 minute. When temperature drops below 39.6°F, Annunciator 601137 will alarm. The operator will reference the ARP and determine the Division 1 Bar Rack Heaters did not energize as expected. The operator will take manual action to energize the heaters.		
7.	Responds to Annunciator 601137 by referring to the ARP. **Cue:** If necessary, as the CRS, acknowledge any reports by the operator and if asked, direct the operator to respond per the appropriate procedures. Additionally, if the operator looks for computer points, inform the operator that SWPTA49 through 52 are all in alarm and indicate 37F and lowering.	P	SAT / UNSAT **STD:** References ARP 601137 and reviews the Automatic Response and required actions sections.
8.	ARP for 601137: VERIFY DIV I AND DIV II Bar Rack Heaters on, at P601.	P	**PASS / FAIL** **STD:** At 2CEC*PNL60, determines the Division 1 Tunnel 1 Bar Rack Heaters did not energize. Places the DIV 1 BAR RACK HEATER TUNNEL 1 control switch to ON. Observes the RED ON LIGHT lit and the GREEN OFF LIGHT not lit.
Evaluator Cue:	Once the operator has energized the Division 1 Bar Rack Heaters, provide the following cue: **Cue:** Your task is complete.		

TASK STANDARD	Tempering has been established with the bar rack heaters energized.

STOP TIME	

JPM Handout

INITIAL CONDITIONS	Given: • The plant is at 100% power • Intake Bay Temperature is ~40°F and continuing to slowly lower • CWS blowdown is in service • The crew is preparing to temper Service Water with Circulating Water • Initial in-plant actions for placing SWP tempering in service are complete • An operator is available in the field to support any additional actions for SWP tempering. • SWP and CWS Radiation Monitors are in service with normal readings • Chemistry has been informed that SWP tempering will be performed. • N2-OP-11 is complete through step F.9.4

INITIATING CUE	**(Operators Name)**, Place SWP tempering in service (~3500 gpm) using CWS with 2SWP-TIK512 in MANUAL; in accordance with N2-OP-11, Section F.9.0, starting at step F.9.5.

Exelon Generation

Training Id: **2015 NRC JPM S-8** Revision: **0.0**

Title: **Insert Substitute Rod Position Information in the RWM**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	06/05/15
Validated By	James Workman	8/13/15
Facility Reviewer	Mark Grr	10/1/15

Approximate Duration: 10 minutes

Documentation of Performance:

Performer: ______________________

Evaluator: ______________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ______________________

Evaluators Signature: ______________________ Date: ________

References

1. N2-OP-95, Rod Worth Minimizer System
2. NUREG 1123 K/A 201006 A4.06 (3.2/3.2)

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to manipulate controls associated with RWM computer. The operator will manipulate the RWM display to display a substitute rod position.

   b. This JPM is NOT considered alternate path.

   c. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. N2-201006-01004, Insert substitute rod position information in the RWM

   b. K/A 201006 A4.06 (3.2/3.2)

3. Evaluation / Task Criteria

Evaluation Method	Perform
Evaluation Location	Simulator
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

   a. Unit 2 Simulator

5. Simulator Setup (if required)

   a. Initialize simulator to IC 165

      i. Rod Group 23 control rod 58-31 is at position 12 and is the next control rod to be withdrawn. (A2UP pg. 5)

      ii. Verify there are no control rods that have substitute rod positions currently inserted in the RWM.

      iii. Verify: 58-31 has failed reed switch at position 12

      iv. Insert Malfunction RD-11, Reed Switch Failed Open for Selected Rod

      v. Verify the following:

         - Annunciator 603443, Control Rod Drift, alarms
         - “xx” displayed on 4-Rod Display for selected Rod
         - RWM rod position for selected rod indicates “FF”

      vi. Select a different control rod

6. JPM Setup (if required)

   a. None

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The reed switch for control rod 58-31 has failed open. • The control rod was known to have been at position 12 prior to the reed switch failure. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name),** Insert a substitute rod position of 12 for control rod 58-31 IAW procedure N2-OP-95A, section F. 2.0.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary	P	SAT / UNSAT **STD:** Proper communications used
2.	Obtain a copy of the reference procedure and review/utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** N2-OP-95A obtained. Precautions & limitations reviewed & section F.2.0 referenced.

Evaluator Note:	The following notes are contained in the procedure. • Substitute Position function is available at the Operator Display in all modes except INOP. • Inferred Position is displayed as the recommended POS TO SUB based on the previous position, travel time and direction of motion. • A total of eight control rods may have substitute positions installed when their position indication is invalid.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
3.	Presses ETC softkey	P (step 2.1.1)	**PASS / FAIL** **STD:** The following function indications are displayed at the bottom of screen: Messages, Rod Bypass Options, Substitute Options, ETC
4.	Selects the rod to have its position substituted on the rod select matrix.	P (step 2.1.2)	**PASS / FAIL** **STD:** Rod selected on matrix. Rod position on 4-Rod display indicates "XX"
5.	Determines that the next step (step 2.2) is not applicable as the rod was not MOVED to an invalid position.	P	SAT / UNSAT **STD:** Candidate progresses to step 2.3 of procedure.
6.	Presses SUBSTITUTE OPTIONS softkey and verifies the following information is displayed:	P (step 2.3)	**PASS / FAIL** **STD:** Selects the Substitute Options page of the RWM displays and verifies this is the correct page by verifying the following information is displayed **Note:** Only selecting the correct page is critical
6a	SUBSTITUTE RODS - POSITIONS SUBSTITUTE SR 58-31 :FF	P (step 2.4)	SAT / UNSAT **STD:** Verifies SUBSTITUTE RODS - POSITIONS SUBSTITUTE is displayed on RWM screen for rod 58-31
6b	A message display indicating that a substitution will be allowed at this time.	P (step 2.4)	SAT / UNSAT **STD:** Verifies that a substitution allowed at this time message is displayed on the RWM display.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
6c	EXIT softkey function available **Cue:** If the candidate selects 58-31 and the Substitute Options then hesitates, prompt them that substitution is allowed at this time.	P	SAT / UNSAT **STD:** Verifies that the EXIT softkey indicates it is available on the RWM display.
7.	Verifies the following function indications are displayed: • NEW POSITION TO SUBSTITUTE • INCREMENT POSITION • DECREMENT POSITION • ENTER SUBSTITUTE • EXIT	P (step 2.5)	SAT / UNSAT **STD:** Checks that the specified functions are displayed on the bottom of the screen
8.	Selects substitute position by pressing the Increment AND Decrement softkeys UNTIL the desired position is indicated at NEW POSITION TO SUBSTITUTE.	P (step 2.6)	**PASS / FAIL** **STD:** Rod position associated with the failed reed switch provided in the turnover is displayed.
9.	Presses ENTER SUBSTITUTE softkey and verifies the following indications are displayed • Selected rod listed in the SUBSTITUTE RODS • Selected position listed in the POSITIONS SUBSTITUTED	P (step 2.7 and 2.8)	**PASS / FAIL** **STD:** The selected rod is displayed in the "SUSTITUTE RODS". The rod position associated with the failed reed switch provided in the turnover is displayed for "POSITIONS SUBSTITUTED"
Evaluator Cue:	**Cue:** Your task is complete.		

TASK STANDARD	Rod worth minimizer displays proper rod position.

STOP TIME	

Exelon Generation

JPM Handout

INITIAL CONDITIONS	Given: • The reed switch for control rod 58-31 has failed open. • The control rod was known to have been at position 12 prior to the reed switch failure.

INITIATING CUE	**(Operators Name)**, Insert a substitute rod position of 12 for control rod 58-31 IAW procedure N2-OP-95A, section F. 2.0.

Exelon Generation

Training Id: **NMP 2015 NRC JPM P-1** Revision: **0.0**

Title: **Align Firewater to RHS B**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	06/08/15
Validated By	Dan Delaney	11/3/15
Facility Reviewer	Mark Greer	11/13/15

Approximate Duration: 20 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: ________

References

1. N2-EOP-6.6 RHR Fire Water Cross-Tie
2. NUREG 1123 K/A 203000 A2.02 (3.5/3.5)

Instructor Information

A. JPM Information

1. Description

    a. This JPM tests the operator's ability to align Fire Water to the RHS System.

    b. This JPM is NOT considered alternate path.

    c. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

    a. N2-EOP06-01001-06, Implement N2-EOP-6.6, Cross-Tie RHR Fire Water System

    b. K/A 203000, A2.02 (3.5/3.5)

3. Evaluation / Task Criteria

Evaluation Method	Perform / Simulate
Evaluation Location	Plant
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

    a. Unit 2 WEC

5. JPM Setup (if required)

    a. Prepare a copy of N2-EOP-6.6, Section 6.2. Include a copy of the precautions and limitations.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • A LOCA has occurred. • The CRS has determined Fire Water is needed for injection into the RPV via RHS B. • N2-EOP-6.6, Steps 6.2.1 through 6.2.5 have been completed. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, Align Fire Water to RHS Loop B per N2-EOP-6.6, Section 6.2.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary	P	SAT / UNSAT **STD:** Proper communications used
2.	Obtain a copy of the reference procedure and review/utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** N2-EOP-6.6 obtained and Section 6.2 referenced
3.	Verify closed 2CNS-V622, CNS TO RHR SUPPLY ISOL (Rx Bldg, EL289 Southside across from CRD maintenance room) **Cue:** 2CNS-V622 is closed.	S Step 6.2.6	SAT / UNSAT **STD:** Checks 2CNS-V622 is closed by rotating the hand wheel in the clockwise direction and observing no movement.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
4.	Verify closed 2RHS*V79, CONDENSATE FLUSH TO HEAD SPRAY HDR ISOL. (Rx Bldg EL 289) **Cue:** 2RHS*V79 is closed.	S Step 6.2.7	SAT / UNSAT **STD:** Checks 2RHS*V79 is closed by rotating the hand wheel in the clockwise direction and observing no movement.

Procedure Caution:	Residual pressure may exist when removing the test connection blind flange between valves 2CNS-V622 and 2RHS*V79 (Figure 4).
Evaluators Note	Several of the remaining steps require specific tools and/or equipment from the EOP Gang Box Located on RB 289'. The operator should show the evaluator where the gang box is, but ***SHOULD NOT*** *open the gang box or break the inventory seal for any step in this JPM. As necessary the evaluator may question the operator as to what tools he/she is obtaining from the box.*

5.	Remove test connection blind flange from between valves 2CNS-V622 AND 2RHS*V79 (Figure 4). (Rx Bldg EL 289) **Cue:** Blank Flange is removed.	S Step 6.2.8	**PASS / FAIL** **STD:** Identifies that tools are needed from the EOP Gang Box. Simulates obtaining the tools and simulates using the tools to remove the blank flange downstream of 2CNS-V622.
6.	Install 2½" firehose adapter to test connection flange (Figure 4). (Rx Bldg EL 289) **Cue:** The 2.5" firehose adapter to test connection flange is installed.	S Step 6.2.9	**PASS / FAIL** **STD:** Identifies that tools are needed from the EOP Gang Box. Simulates obtaining the tools and simulates installing the firehose adapter to test connection flange.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
7.	Connect male end of 2½" firehose from EOP gangbox, to test connection flange adapter(Figure 4). (Rx Bldg EL 289 **Cue:** The male end of the 2.5" firehose is connected to the test connection flange adapter.	S Step 6.2.10	**PASS / FAIL** **STD:** Identifies that tools are needed from the EOP Gang Box. Simulates obtaining the tools and simulates connecting the firehose to the test connection flange adapter.
Procedure Note:	FHR 78 (Rx Bldg EL 289 near South stairwell entrance) OR FHR 86 (Rx Bldg EL 289 Across from SLS Tank) may be used to supply firewater to RHS B.		
Evaluators Note:	N2-EOP-6.6 allows the operator to lineup fire water from either FHR 78 or FHR 86. The operator may choose either one.		
8.	Align firewater supply to RHR B via test connection flange adapter as follows: (Rx Bldg, EL 289, near South stairwell entrance) • Disconnect firehose at FHR 78 OR FHR 86 **Cue:** The firehose is disconnected from FHR 78(86)	S Step 6.2.11	**PASS / FAIL** **STD:** At FHR 78 or 86, disconnects the firehose by rotating the union connection in the counter clockwise direction.
9.	• Connect 2½" EOP firehose from test connection flange adapter, to FHR 78 OR FHR 86 **Cue:** The EOP firehose is connected to FHR 78(86)	S Step 6.2.11	**PASS / FAIL** **STD:** Simulates routing the EOP firehose from the test connection flange to FHR 78 or 86. Connects the firehose to FHR 78 or 86 by rotating the union in the clockwise direction.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
10.	• Open 2FPW-V375, FHR 78 ANGLE VALVE OR 2FPW-V383, FHR 86 ANGLE VALVE **Cue:** 2FPW-V375 -or- 2FPW-V383 is open. The firehose is pressurizing.	S Step 6.2.11	**PASS / FAIL** **STD:** Opens 2FPW-V375 -or- 2FPW-V383 by rotating the hand wheel in the counter clockwise direction until the valve is open.
11.	• Unlock AND open 2RHS*V79. (Rx Bldg EL 289) **Cue:** 2RHS*V79 is open.	S Step 6.2.11	**PASS / FAIL** **STD:** Opens 2RHS*V79 by rotating the hand wheel in the counter clockwise direction until the valve is open.

Evaluator Note:	**Cue:** Your task is complete.

TASK STANDARD	The firehose has been connected to the test flange and is pressurized. 2RHS*V79 is open.

STOP TIME	

Exelon Generation

JPM Handout

INITIAL CONDITIONS	Given: • A LOCA has occurred. • The CRS has determined Fire Water is needed for injection into the RPV via RHS B. • N2-EOP-6.6, Steps 6.2.1 through 6.2.5 have been completed.

INITIATING CUE	**(Operators Name)**, Align Fire Water to RHS Loop B per N2-EOP-6.6, Section 6.2.

NINE MILE POINT NUCLEAR STATION UNIT 2
EMERGENCY OPERATING PROCEDURE

N2-EOP-6.6
REVISION 00101

RHR FIRE WATER SYSTEM CROSS-TIE

TECHNICAL SPECIFICATION REQUIRED

Approval Authority: Manager Operations

SUMMARY OF ALTERATIONS

Revision	Change	Summary of Revision or Change
001	00	This procedure change does not follow the format and content requirements of CNG-PR-1.01-1005 due to an exemption granted per Section 1.2.C.2.d by the NMP Plant General Manager and the Procedure Development Unit on May 2, 2011, for changes other than major revisions. This exemption applies only to changes associated with plant needs, including work week and outage preparations; and procedure alterations necessary to close corrective actions and action items.

Minor Revision to incorporate:

PCR-12-01287 Add guidance for operating breaker for 2RHS*MOV104 due to changing to an APPENDIX R normally de-energized format (ECP-12-000039).

PCR-12-01287:

- 6.2.4, Deleted 5th bullet verifying RHS*MOV104, RHR B TO REACTOR HEAD SPRAY closed.
- 6.2.12.e.3, Added step to place breaker 2EHS*MCC103-20D in ON.
- 6.2.13.b, Deleted 2nd bullet verifying RHS*MOV104, RHR B TO REACTOR HEAD SPRAY closed.
- 6.2.14.c, Deleted 1st bullet verifying RHS*MOV104, RHR B TO REACTOR HEAD SPRAY closed. Changed step from having bullets to single step.
- 6.2.15.b, Deleted 2nd bullet verifying RHS*MOV104, RHR B TO REACTOR HEAD SPRAY closed.
- 7.2.2, Added step to place breaker 2EHS*MCC103-20D for 2RHS*MOV104 in OFF.

Revision	Change	Summary of Revision or Change
001	01	Editorial Change to incorporate:

PCR-13-03109 Editorial change to add a template t the procedure for ease of use for future changes.

PCR-13-03109:

Legacy PM Procedure Template has been applied to allow auto-Step numbering and linking of Step numbers. Additionally, Notes, Cautions and Warnings are now in Text Boxes – the wording of Notes, Cautions, and Warnings remains unchanged unless other PCRs required changes.

- Coversheet, Deleted "Effective Date: ________" per latest revision of PWM-PRO-0102.

TABLE OF CONTENTS

1.0 PURPOSE

To provide instruction for cross connection of the Fire Water System (FPW) and Residual Heat Removal (RHS) System as an alternate injection source into the RPV and Primary Containment. This will be accomplished using temporary fire hoses and connecting them from Fire Hose Reel (FHR) Stations to permanent plant piping.

2.0 APPLICABILITY/SCOPE

2.1 When used to support RPV injection for N2-EOP-RPV, RPV Control; N2-EOP-C3, Steam Cooling; N2-EOP-C4, RPV Flooding; or N2-EOP-C5, Failure To Scram.

2.2 When used to support RPV injection, containment sprays or containment flooding for; N2-SAP-1, Primary Containment Flooding or N2-SAP-2, RPV, Containment And Radioactivity Release Control.

2.3 When used to support containment sprays for N2-EOP-PC, Primary Containment Control, or N2-EOP-PCH, Hydrogen Control.

2.4 N2-OP-31 Residual Heat Removal System is used to place RHS loops A and B in standby.

3.0 REFERENCES AND DEFINITIONS

3.1 Developmental References

3.1.1 NUREG 1358, Lessons learned from the Special Inspection Program for EOPs

3.1.2 S-ODP-PRO-0301, EOP Revisions

3.1.3 SER 90-145 Attachment 9, Engineering Analysis of the NMP2 Off Normal Operating Procedures

3.1.4 NMP2 Plant Specific Technical Guidelines

3.1.5 NMP2 Plant Specific Severe Accident Guidelines

3.1.6 NER-2M-039 NMP2 Emergency Operating Procedures (EOP) Basis Document

3.1.7 NRC Correspondence - Emergency Operating Procedures Inspection and Initial Examination - Report No.50-410/91-80

3.2 Performance References

3.2.1 NMP2 Emergency Operating/Severe Accident Procedures:

N2-EOP-RPV	RPV Control
N2-EOP-PC	Primary Containment Control
N2-EOP-SC	Secondary Containment Control
N2-EOP-RR	Radioactivity Release Control
N2-EOP-MSL	MSIV Leakage Control
N2-EOP-C2	RPV Blowdown
N2-EOP-C3	Steam Cooling
N2-EOP-C4	RPV Flooding
N2-EOP-C5	Failure to Scram
N2-SAP-1	Primary Containment Flooding
N2-SAP-2	RPV, Containment, and Radioactivity Release Control

3.3 Definitions

3.3.1 CHECK — To observe an expected condition or characteristic; to determine; to ascertain.

3.3.2 ENSURE — To confirm a condition. (NO subsequent action is implied to establish that condition if not already there.)

3.3.3 GO TO
1. To proceed to; to transport oneself to a given location.
2. To discontinue use of present procedure or section and execute another procedure or section.

3.3.4 VERIFY — To confirm a condition AND take action to establish that condition if required.

4.0 PREREQUISITES

4.1 Special Tools and Equipment Recommended

TOOL/MATERIAL	QTY	LOCATION
Firehose 21/2" Diameter, 50 ft Length	2	(RHR A X-Conn) EOP Gangbox on Rx Bldg El289 between the North stair tower and 2HVR*UC413. (RHR B X-Conn) EOP Gangbox on Rx Bldg El289 outboard between the South stairtower door and the CRD maintenance room wall. (Quantities shown are for the number of items in each gangbox)
Flange Adapter	1	
Gasket	1	
Bolts	4	
Wrenches(1 1/16")	2	
Spanner Wrenches	2	
PA235 Key	2	Control Room CRO Desk
PL-3 Key	1	Control Room EOP Toolbox
L660 Key	1	Control Room EOP Toolbox
Flathead Screwdriver	1	Control Room EOP Toolbox
Electrical Tape (roll)	1	Control Room EOP Toolbox
EOP Jumper #24	1	2CEC*PNL623
EOP Jumper #35	1	2CEC*PNL705B
EOP Jumper #36	1	2CEC*PNL705B
EOP Jumper #9	1	2CEC*PNL622
EOP Jumper #22	1	2CEC*PNL623
EOP Jumper #33	1	2CEC*PNL704A
EOP Jumper #34	1	2CEC*PNL704A
EOP Jumper #42	1	2CEC*PNL629, Bay B
EOP Jumper #43	1	2CEC*PNL618, Bay C

5.0 PRECAUTIONS AND LIMITATIONS

5.1 The Restoration section shall be performed only when specifically directed by the SM/EOP Director. This permission shall not be granted until the system/equipment is in a condition to support restoration.

5.2 All tools, materials, keys, etc. that are required to perform this procedure are listed in Section 4.1.

5.3 A Ⓣ notation in the left margin adjacent to a step number or note indicates that a tool or material is required for performance.

5.4 Common tools (screwdrivers, tape etc.) are not specified in procedure steps. Only special tools or situations where confusion may result have a particular tool specified in a step or note.

5.5 Independent verification is required in the Restoration section when restoring temporary alterations or returning permanent plant equipment to normal status. This verification may be delayed if emergency conditions still exist, and it is imperative that restoration be completed immediately. The EOP Director/SM permission is required to delay independent verification.

5.6 During plant conditions which require implementation of this procedure, environmental conditions may be potentially extreme (temperature, radiation, water levels).

In many cases this will require coordination and support from the OSC. Where access may be needed in areas of elevated temperatures, prudency dictates protective equipment be used and precautions taken. Stay times and activity levels should be minimized.

Consultation with the Safety Department is recommended when possible. Above 135°F personnel access may be significantly hampered.

When it is anticipated or known that radiation levels are elevated, radiation protection assistance should be sought. Some evolutions may require utilization of emergency exposure guidelines or emergency dosimetry.

5.7 Where applicable, this procedure provides locations of panels when installing jumpers and lifting leads. However, inside many panels there are Operator Aids providing amplifying instructions as to the exact locations of affected equipment.

5.8 The following lines of RHS re-entering the primary containment downstream of the RHS heat exchanger have a lower permissible lowest service metal temperature (PLSMT) of 55°F for GDC-51.

- Suppression pool cooling return
- Supply to the suppression pool spray ring
- Supply to the drywell spray ring

6.0 PROCEDURE

> **NOTE**
>
> Subsections 6.1 and 6.2 may be performed separately, concurrently, or in any order.

6.1 Injection of FPW via RHS Train A

N/A, Subsection 6.1, FPW via RHR A will NOT be used .... ☐

6.1.1 Verify Firewater system is available by performing one of the following:

- Start FPW-P1 (*2CEC*PNL849*) .... ☐
- Start FPW-P2 (*2CEC*PNL849*) .... ☐
- Request Unit 1 to start 100-556, NMP2 Fire Pump, located at NMP1 Screenhouse .... ☐
- Utilize Unit 1 Cross Tie:

a. Request Unit 1 Fire Pump to be started .... ☐

b. Request Unit 1 to Open either of the following:

  - 100-54, CROSSTIE VLV TO NMP-2, MOV-128 .... ☐
  - 100-972, 2FPW-V149 BV-FIRE WTR U1/U2 SOUTH CROSSTIE (East fence U1 Switchyard) .... ☐

6.1.2 Verify RHS A is NOT in operation .... ☐

6.1.3 Place RHS*P1A, PMP 1A control switch in Pull-To-Lock. *(2CEC*PNL601)* ... ☐

6.1.4 Verify closed the following valves: *(2CEC*PNL601)*

- RHS*MOV15A, OUTLET TO DRYWELL SPRAY .... ☐
- RHS*MOV25A, OUTLET TO DRYWELL SPRAY .... ☐
- RHS*MOV33A, OUTLET TO SUPPR POOL SPRAY .... ☐
- RHS*FV38A, RETURN TO SUPPR POOL COOLING .... ☐
- RHS*MOV24A, LPCI A Injection VLV .... ☐
- (T) RHS*MOV40A, SDC A Return .... ☐
- (T) RHS*MOV12A, HEAT EXCHANGER 1A OUTLET VLV .... ☐

> **NOTE**
>
> RHS*MOV8A is interlocked in the open position for 10 minutes following a Division 1 ECCS initiation.

6.1.5 If possible, verify closed RHS*MOV8A, HEAT EXCHANGER 1A INLET BYPASS VLV .... ☐

6.1.6 Verify closed 2RHS*V70, CONDENSATE FLUSH TO A CONTMT SPRAY HDR. *(Rx Bldg EL 289)* .... ☐

6.1.7 Close 2CNS-V621, CNS TO RHR SUPPLY ISOL. *(Rx Bldg, Northside EL289 above 2RHS*MOV24A, LPCI Injection Valve)* .... ☐

CAUTION

Residual pressure may exist when removing the test connection blind flange between valves 2CNS-V621 and 2RHS*V70. (Figure 1)

(T) 6.1.8 Remove test connection blind flange from between valves 2CNS-V621 AND 2RHS*V70 (Figure 1). *(Rx Bldg EL 289)* .... ☐

(T) 6.1.9 Install 2½" firehose adapter to test connection flange (Figure 1). *(Rx Bldg EL 289)* .... ☐

(T) 6.1.10 Connect male end of 2½" firehose from EOP gangbox, to test connection flange adapter (Figure 1). *(Rx Bldg EL 289)* .... ☐

6.1.11 Align firewater supply to RHR A via test connection flange adapter as follows (Figure 1): *(Rx Bldg, EL 289, near North stairwell entrance)*

(T) a. Disconnect firehose at FHR 93 .... ☐

(T) b. Connect 2½" EOP firehose from test connection flange adapter, to FHR 93 .... ☐

c. Open 2FPW-V391, FHR 93 ANGLE VALVE .... ☐

(T) d. Unlock AND open 2RHS*V70. *(Rx Bldg EL 289)* .... ☐

6.1.12 RHS A Firewater Injection To The RPV

N/A, FPW injection to RPV is NOT required .... ☐

a. Verify RPV pressure is less than FPW pressure. *(2CEC-PNL849, 2FPW-PI215)* .... ☐

b. IF while performing this section, FPW Header pressure lowers to below RPV pressure, perform Subsection 6.3 .... ☐

NOTE

- Step 6.1.12.c OR 6.1.12.d will inject firewater into the RPV. Level should rise based on differential pressure.
- Steps 6.1.12.c, and 6.1.12.d may be performed separately, concurrently, or in any order.

c. IF available, verify open RHS*MOV24A, LPCI A INJECTION VLV to commence injection. *(2CEC*PNL601)* .... ☐

N/A, RHS*MOV24A IS NOT available .... ☐

6.1.12 (Continued)

d. IF RHS*MOV24A is NOT available OR additional injection is desired, commence injection through RHS*MOV40A, SDC A Return Valve as follows:

N/A, RHS*MOV40A injection NOT required .... ☐

> **NOTE**
>
> - The following substeps will defeat Group 5 Isolation for RHS*MOV40A.
> - (T) A L660 Key may be required to gain entry to 2CEC*PNL623. *(Control Room)*

(T) 1. Install EOP Jumper #24 between terminal points BB-49 AND AA-72 at 2CEC*PNL623 (Figure 2) .... ☐

(T) 2. Lift AND tape the lead on terminal point BB-58 at 2CEC*PNL623 (Figure 2) .... ☐

(T) 3. Throttle open RHS*MOV40A, SDC A RETURN to desired flow. *(2CEC*PNL601)* .... ☐

> **NOTE**
>
> Steps 6.1.13, 6.1.14 and 6.1.15 may be performed separately, concurrently, or in any order.

6.1.13 RHS A Firewater Injection To Suppression Chamber Sprays

N/A, This section will NOT be used. .... ☐

a. IF while performing this section, FPW Header pressure lowers to below suppression chamber pressure, perform Subsection 6.3 .... ☐

b. Verify closed the following valves. (*2CEC*PNL601*)

- RHS*MOV24A, LPCI A INJECTION VLV .... ☐
- RHS*MOV40A, SDC A Return .... ☐

6.1.13 (Continued)

c. IF a LOCA signal is present AND suppression chamber spray operation is directed WITH drywell pressure less that 1.68 psig, perform the following to bypass the high drywell pressure interlock for RHS*MOV33A:

(T) N/A, high drywell pressure interlock will NOT be bypassed .... ☐

NOTE

A L660 key may be needed to gain entry to 2CEC*PNL629.

1. Remove relay E12A-K108A in 2CEC*PNL629, Bay B (Figure 8).. ☐

(T) 2. Install EOP Jumper #42 on terminal points BBB-49 AND AA-119 in 2CEC*PNL629, Bay B (Figure 8) .... ☐

(T) 3. Deliver relay E12A-K108A to SM.. ☐

d. Verify open RHS*MOV33A, OUTLET TO SUPPR POOL SPRAY. (*2CEC*PNL601*) .... ☐

e. WHEN directed, close RHS*MOV33A to terminate suppression chamber sprays .... ☐

f. Repeat steps 6.1.13.d AND 6.1.13.e as directed .... ☐

g. IF firewater injection is to be swapped to RPV injection, close RHS*MOV33A AND go to step 6.1.12.. ☐

N/A, Injection will NOT be swapped .... ☐

6.1.14 RHS A Firewater Injection To Drywell Sprays

N/A, This section will NOT be used .... ☐

a. IF while performing this section, FPW Header pressure lowers to below drywell pressure, perform Subsection 6.3 .... ☐

b. Verify closed AND IF possible overridden, RHS*MOV24A, LPCI A INJECTION VLV. (*2CEC*PNL601*) .... ☐

c. Verify closed RHS*MOV40A, SDC A Return *(2CEC*PNL601)* .... ☐

6.1.14 (Continued)

d. IF Drywell spray valve interlocks are not met, defeat the RHS*MOV15A/25A interlock by performing the following:

N/A, Drywell spray valve interlocks do <u>NOT</u> need to be defeated .... ☐

NOTE

Ⓣ A L660 key may be needed to gain entry to 2CEC*PNL705B.

Ⓣ
- At 2CEC*PNL705B, install EOP Jumper #35 from terminal strip TC201, TB2 terminal 6 to terminal strip TC201, TB2 terminal 8 (Figure 3) .... ☐

Ⓣ
- At 2CEC*PNL705B, install EOP Jumper #36 from terminal strip TC201, TB1 terminal 10 to terminal strip TC201, TB1 terminal 14 (Figure 3) .... ☐

e. Initiate drywell sprays by opening the following valves: (*2CEC*PNL601*)

- RHS*MOV15A, OUTLET TO DRYWELL SPRAY .... ☐
- RHS*MOV25A, OUTLET TO DRYWELL SPRAY. .... ☐

f. WHEN directed, close the following valves to terminate drywell sprays: (*2CEC*PNL601*)

- RHS*MOV15A, OUTLET TO DRYWELL SPRAY .... ☐
- RHS*MOV25A, OUTLET TO DRYWELL SPRAY. .... ☐

g. Repeat steps 6.1.14.e AND 6.1.14.f as directed .... ☐

h. IF firewater injection is to be swapped to RPV injection, close the following valves AND go to step 6.1.12: (*2CEC*PNL601*)

N/A, Injection will <u>NOT</u> be swapped .... ☐

- RHS*MOV15A, OUTLET TO DRYWELL SPRAY .... ☐
- RHS*MOV25A, OUTLET TO DRYWELL SPRAY .... ☐

6.1.15 RHS A Firewater Injection To The Suppression Pool

N/A, This section will <u>NOT</u> be used .... ☐

a. IF while performing this section, FPW Header pressure lowers to below suppression chamber pressure, perform Subsection 6.3 .... ☐

b. Verify closed RHS*MOV24A, LPCI A INJECTION VLV. (*2CEC*PNL601*) .... ☐

Ⓣ c. Verify closed RHS*MOV40A, SDC A Return *(2CEC*PNL601)* .... ☐

d. Throttle open RHS*FV38A, RETURN TO SUPPR POOL COOLING to desired flow. (*2CEC*PNL601*) .... ☐

6.1.15 (Continued)

e. WHEN directed, close RHS*MOV38A. ☐

f. Repeat steps 6.1.15.d AND 6.1.15.e as directed ☐

g. IF firewater injection is to be swapped to RPV injection, close RHS*MOV38A AND go to step 6.1.12 ☐

N/A, Injection will NOT be swapped ☐

6.2 Injection of FPW via RHS Train B

N/A, Subsection 6.2, FPW via RHR B will NOT be used ☐

6.2.1 Verify Firewater system is available by performing one of the following:

- Start FPW-P1 *(2CEC*PNL849)* ☐
- Start FPW-P2 *(2CEC*PNL849)* ☐
- Request Unit 1 to start 100-556, NMP2 Fire Pump, located at NMP1 Screenhouse ☐
- Utilize Unit 1 Cross Tie:

a. Request Unit 1 Fire Pump to be started ☐

b. Request Unit 1 to Open either of the following:

- 100-54, CROSSTIE VLV TO NMP-2, MOV-128 ☐
- 100-972, 2FPW-V149 BV-FIRE WTR U1/U2 SOUTH CROSSTIE (East fence U1 Switchyard) ☐

6.2.2 Verify RHS B is NOT in operation ☐

6.2.3 Place RHS*P1B, PMP 1B control switch in Pull-To-Lock *(2CEC*PNL601)* ☐

6.2.4 Verify closed the following valves *(2CEC*PNL601)*:

- RHS*MOV15B, OUTLET TO DRYWELL SPRAY ☐
- RHS*MOV33B, OUTLET TO SUPPR POOL SPRAY ☐
- RHS*FV38B, RETURN TO SUPPR POOL COOLING ☐
- RHS*MOV24B, LPCI B INJECTION VLV ☐
- (T) RHS*MOV40B, SDC B RETURN ☐
- (T) RHS*MOV12B, HEAT EXCHANGER 1B OUTLET VLV ☐

NOTE

RHS*MOV8B is interlocked in the open position for 10 minutes following a Division 2 ECCS initiation.

6.2.5 If possible, verify closed RHS*MOV8B, HEAT EXCHANGER 1B INLET BYPASS VLV *(2CEC*PNL601)* ☐

6.2.6 Verify closed 2CNS-V622, CNS TO RHR SUPPLY ISOL (*Rx Bldg, EL289 Southside across from CRD maintenance room*) .... ☐

6.2.7 Verify closed 2RHS*V79, CONDENSATE FLUSH TO HEAD SPRAY HDR ISOL. (*Rx Bldg EL 289*) .... ☐

CAUTION

Residual pressure may exist when removing the test connection blind flange between valves 2CNS-V622 and 2RHS*V79 (Figure 4).

Ⓣ 6.2.8 Remove test connection blind flange from between valves 2CNS-V622 AND 2RHS*V79 (Figure 4). (*Rx Bldg EL 289*)

Ⓣ 6.2.9 Install 2½" firehose adapter to test connection flange (Figure 4). (*Rx Bldg EL 289*) .... ☐

Ⓣ 6.2.10 Connect male end of 2½" firehose from EOP gangbox, to test connection flange adapter(Figure 4). (*Rx Bldg EL 289*) .... ☐

NOTE

FHR 78 (Rx Bldg EL 289 near South stairwell entrance) OR FHR 86 (Rx Bldg EL 289 Across from SLS Tank) may be used to supply firewater to RHS B.

6.2.11 Align firewater supply to RHR B via test connection flange adapter as follows: (*Rx Bldg, EL 289, near South stairwell entrance)*

Ⓣ a. Disconnect firehose at FHR 78 OR FHR 86 .... ☐

Ⓣ b. Connect 2½" EOP firehose from test connection flange adapter, to FHR 78 OR FHR 86 .... ☐

c. Open 2FPW-V375, FHR 78 ANGLE VALVE OR 2FPW-V383, FHR 86 ANGLE VALVE .... ☐

Ⓣ d. Unlock AND open 2RHS*V79. (*Rx Bldg EL 289)* .... ☐

NOTE

- Steps 6.2.12.c, 6.2.12.d, 6.2.12.e inject FPW to the RPV. Level should rise based on differential pressure.
- Steps 6.2.12.c, 6.2.12.d and 6.2.12.e may be performed separately, concurrently, or in any order.

6.2.12 RHS B Firewater Injection To The RPV

N/A, FPW injection to RPV is NOT required .... ☐

a. Verify RPV pressure is less than FPW pressure. (*2CEC-PNL849, 2FPW-PI215*) .... ☐

b. IF while performing this section, FPW Header pressure lowers to below RPV pressure, perform Subsection 6.3 .... ☐

c. IF available, verify open RHS*MOV24B, LPCI B INJECTION VLV to commence injection. (*2CEC*PNL601*) .... ☐

N/A, RHS*MOV24B IS NOT available .... ☐

d. IF RHS*MOV24B is NOT available OR additional injection is desired, commence injection through RHS*MOV40B, SDC B Return Valve as follows:

N/A, RHS*MOV40B injection NOT required .... ☐

NOTE

- The following substeps will defeat Group 5 Isolation for RHS*MOV40B.
- (T) A L660 Key may be required to gain entry to 2CEC*PNL622.

(T) 1. Install EOP Jumper #9 between terminal points BB-41 AND BB-60 at 2CEC*PNL622 (Figure 5) .... ☐

(T) 2. Lift AND tape the lead on terminal point BB-62 at 2CEC*PNL622 (Figure 5) .... ☐

(T) 3. Throttle open RHS*MOV40B, SDC B RETURN, to desired flow. (*2CEC*PNL601*) .... ☐

6.2.12 (Continued)

e. IF neither RHS*MOV24B NOR RHS*MOV40B is available OR additional injection is desired, commence injection through RHS*MOV104, RHR TO REACTOR HEAD SPRAY as follows:

N/A, RHS*MOV104 injection NOT required .... ☐

> **NOTE**
>
> - The following substeps will defeat Group 5 Isolation for RHS*MOV104.
> - A L660 Key may be required to gain entry to 2CEC*PNL623. *(Control Room)*

Ⓣ 1. Install EOP Jumper #22 between terminal points AA-8 AND BB-20 at 2CEC*PNL623 (Figure 2) .... ☐

Ⓣ 2. Lift AND tape the lead on terminal point BB-22 at 2CEC*PNL623 (Figure 2) .... ☐

3. Place 2EHS*MCC103-20D, RHR HEAD SPRAY ISLN MOV 2RHS*MOV104, in ON (*CB EL261 DIV 1 SWGR RM*) .... ☐

Ⓣ 4. Verify open RHS*MOV104, RHR TO REACTOR HEAD SPRAY (*2CEC*PNL601*) .... ☐

> **NOTE**
>
> Steps 6.2.13, 6.2.14 and 6.2.15 may be performed separately, concurrently, or in any order.

6.2.13 RHS B Firewater Injection To Suppression Chamber Sprays

N/A, This section will NOT be used .... ☐

a. IF while performing this section, FPW Header pressure lowers to below suppression chamber pressure, perform Subsection 6.3 .... ☐

b. Verify closed the following valves: *(2CEC*PNL601)*

- RHS*MOV24B, LPCI B INJECTION VLV .... ☐
- Ⓣ RHS*MOV40B, SDC B RETURN .... ☐

6.2.13 (Continued)

c. IF a LOCA signal is present AND suppression chamber spray operation is directed WITH drywell pressure less that 1.68 psig, perform the following to bypass the high drywell pressure interlock for RHS*MOV33B:

N/A, high drywell pressure interlock will NOT be bypassed .... ☐

NOTE

Ⓣ A L660 key may be needed to gain entry to 2CEC*PNL618.

1. Remove relay E12A-K108B in 2CEC*PNL618, Bay B (Figure 9) .... ☐

Ⓣ 2. Install EOP Jumper #43 on terminal points BB-50 AND CC-32 in 2CEC*PNL618, Bay C (Figure 10) .... ☐

3. Deliver relay E12A-K108B to SM .... ☐

d. Verify open RHS*MOV33B, OUTLET TO SUPPR POOL SPRAY. (*2CEC*PNL601*) .... ☐

e. WHEN directed, close RHS*MOV33B to terminate suppression chamber sprays .... ☐

f. Repeat steps 6.2.13.d AND 6.2.13.e as directed .... ☐

g. IF firewater injection is to be swapped to RPV injection, close RHS*MOV33B AND go to step 6.2.12 .... ☐

N/A, Injection will NOT be swapped .... ☐

6.2.14 RHS B Firewater Injection To Drywell Sprays

N/A, This section will NOT be used .... ☐

a. IF while performing this section, FPW Header pressure lowers to below drywell pressure, perform Subsection 6.3 .... ☐

b. Verify closed AND IF possible overridden, RHS*MOV24B, LPCI B INJECTION VLV. (*2CEC*PNL601*) .... ☐

c. Verify closed RHS*MOV40B, SDC B RETURN (*2CEC*PNL601*) .... ☐

6.2.14 (Continued)

d. IF Drywell spray valve interlocks are not met, defeat the RHS*MOV15B/25B interlock by performing the following:

N/A, Drywell spray valve interlocks do <u>NOT</u> need to be defeated .... ☐

NOTE

A L660 key may be needed to gain entry to 2CEC*PNL704A.

- At 2CEC*PNL704A, install EOP Jumper #33 from terminal strip TC110, TB2 terminal 7 to terminal strip TC112, TB2 terminal 19 (Figure 6) .... ☐
- At 2CEC*PNL704A, install EOP Jumper #34 from terminal strip TC108, TB1 terminal 2 to terminal strip TC108, TB1 terminal 4 (Figure 7) .... ☐

e. Initiate drywell sprays by opening the following valves: (*2CEC*PNL601*)

- RHS*MOV15B, OUTLET TO DRYWELL SPRAY .... ☐
- RHS*MOV25B, OUTLET TO DRYWELL SPRAY. .... ☐

f. WHEN directed, close the following valves to terminate drywell sprays: (*2CEC*PNL601*)

- RHS*MOV15B, OUTLET TO DRYWELL SPRAY .... ☐
- RHS*MOV25B, OUTLET TO DRYWELL SPRAY. .... ☐

g. Repeat steps 6.2.14.e AND 6.2.14.f as directed .... ☐

h. IF firewater injection is to be swapped to RPV injection, close the following valves AND go to step 6.2.12: (*2CEC*PNL601*)

N/A, Injection will <u>NOT</u> be swapped .... ☐

- RHS*MOV15A, OUTLET TO DRYWELL SPRAY .... ☐
- RHS*MOV25A, OUTLET TO DRYWELL SPRAY. .... ☐

6.2.15 RHS B Firewater Injection To The Suppression Pool

N/A, This section will NOT be used. ☐

a. IF while performing this section, FPW Header pressure lowers to below suppression chamber pressure, perform Subsection 6.3 ☐

b. Verify closed the following valves: *(2CEC*PNL601)*

- RHS*MOV24B, LPCI B INJECTION VLV ☐
- (T) RHS*MOV40B, SDC B RETURN ☐

c. Throttle open RHS*FV38B, RETURN TO SUPPR POOL COOLING to desired flow. *(2CEC*PNL601)* ☐

d. WHEN directed, close RHS*MOV38B ☐

e. Repeat steps 6.2.15.c AND 6.2.15.d as directed ☐

f. IF firewater injection is to be swapped to RPV injection, close RHS*MOV38B AND go to step 6.2.12 ☐

N/A, Injection will NOT be swapped ☐

6.3 Loss of FPW Header Pressure

NOTE
All hoses and piping should be treated as contaminated.

6.3.1 For RHS A:

a. Verify closed the following valves: *(2CEC*PNL601)*

- RHS*MOV15A, OUTLET TO DRYWELL SPRAY ☐
- RHS*MOV25A, OUTLET TO DRYWELL SPRAY ☐
- RHS*MOV33A, OUTLET TO SUPPR POOL SPRAY ☐
- RHS*FV38A, RETURN TO SUPPR POOL COOLING ☐
- RHS*MOV24A, LPCI A Injection VLV ☐
- (T) RHS*MOV40A, SDC A RETURN ☐

b. Verify closed the following local valves:

- 2FPW-V391, FHR 93 ANGLE VALVE (Rx Bldg, EL 289, near North stairwell entrance) ☐
- 2RHS*V70, CONDENSATE FLUSH TO A CONTMT SPRAY HDR (*Rx Bldg EL 289, between 2RHS*MOV24A and 2HVR*UC413B*) ☐

FIREWATER TO RHS A

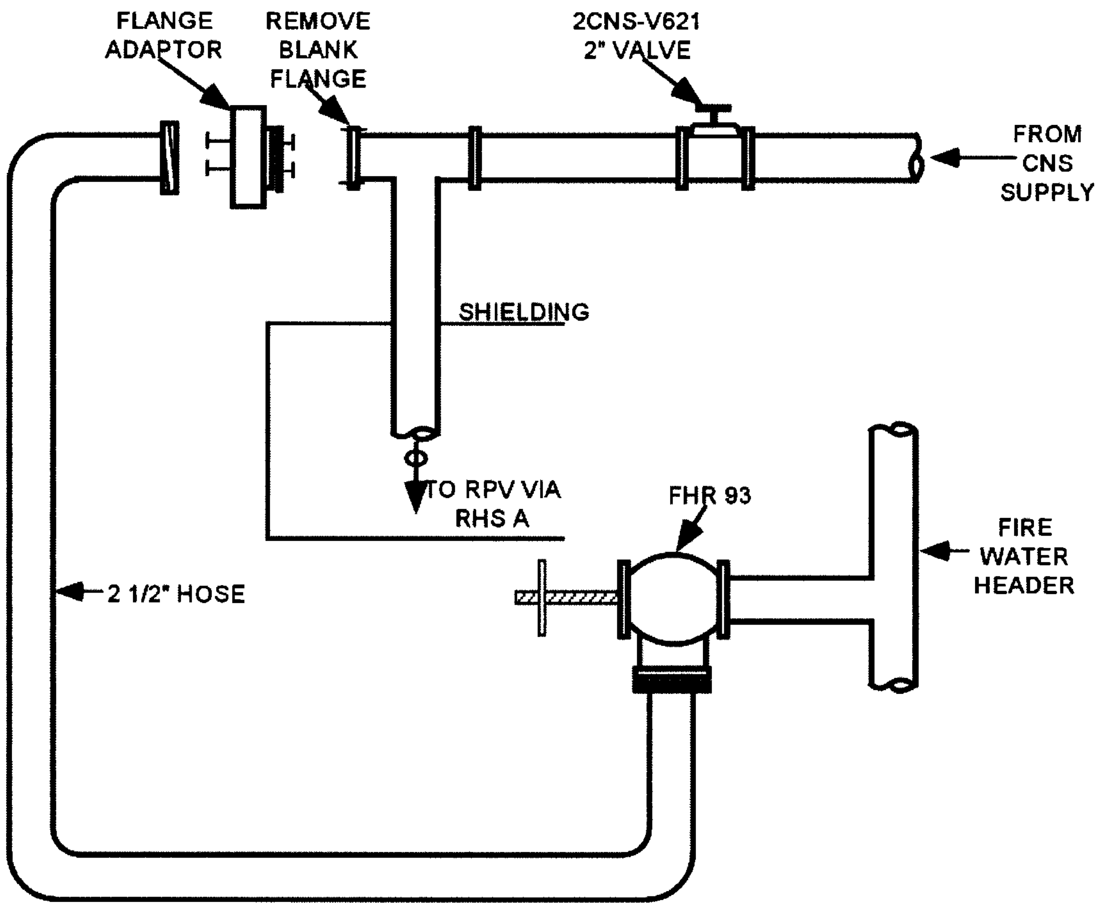


FIGURE 1

2CEC*PNL623

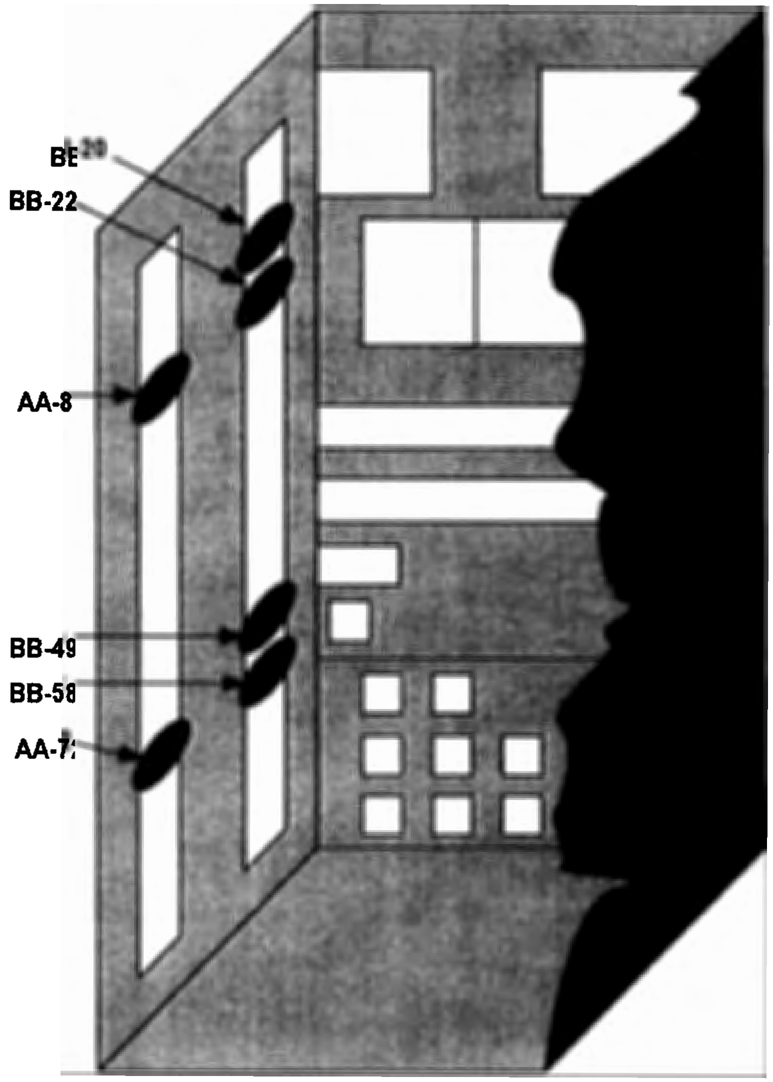


FIGURE 2

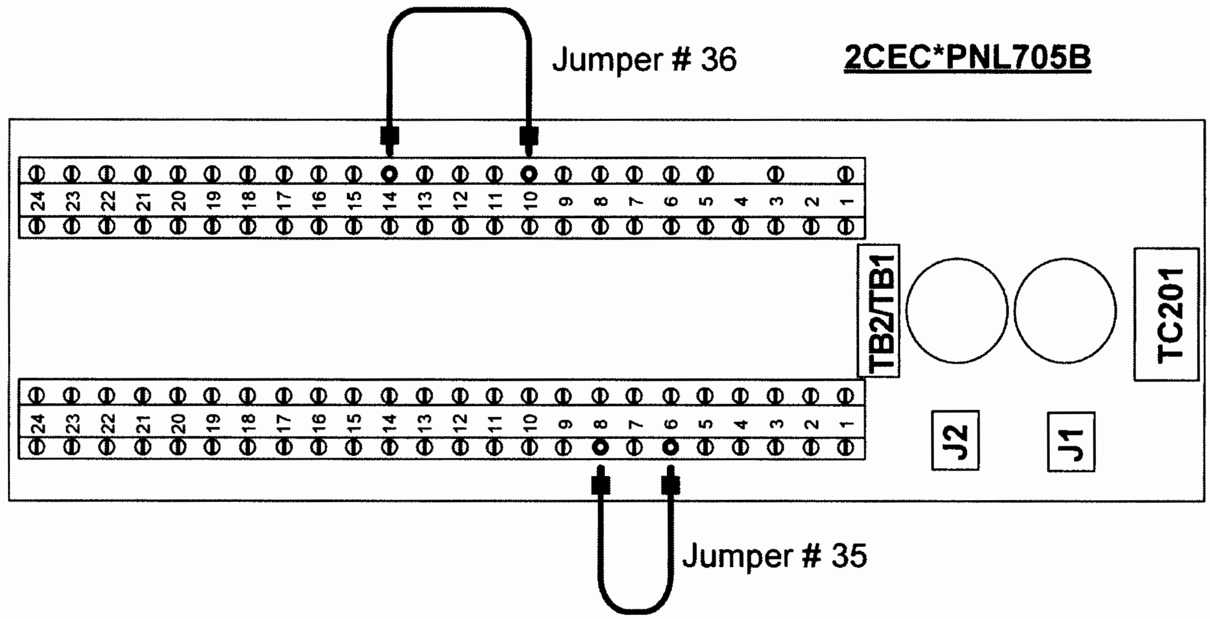

Jumper # 36
2CEC*PNL705B
24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
TB2/TB1
TC201
24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
J2
J1
Jumper # 35

FIGURE 3

FIREWATER TO RHS B

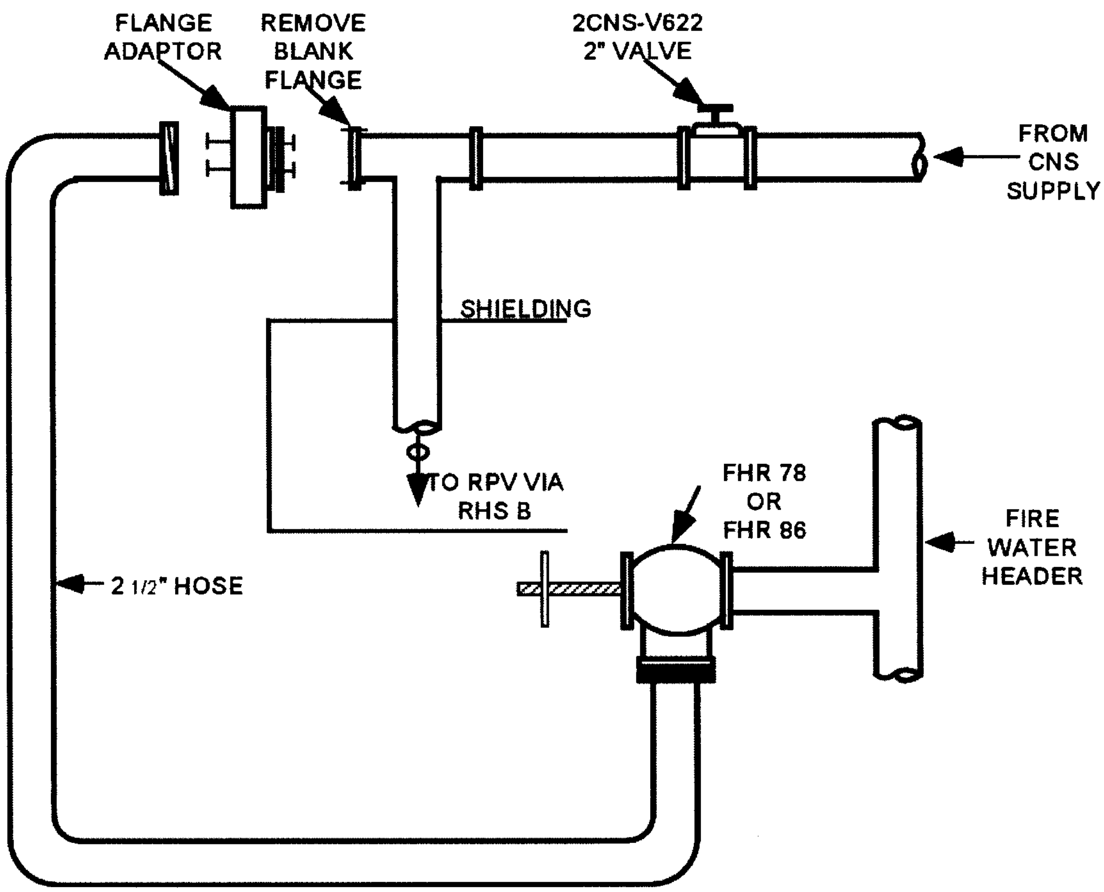


FIGURE 4

2CEC*PNL622

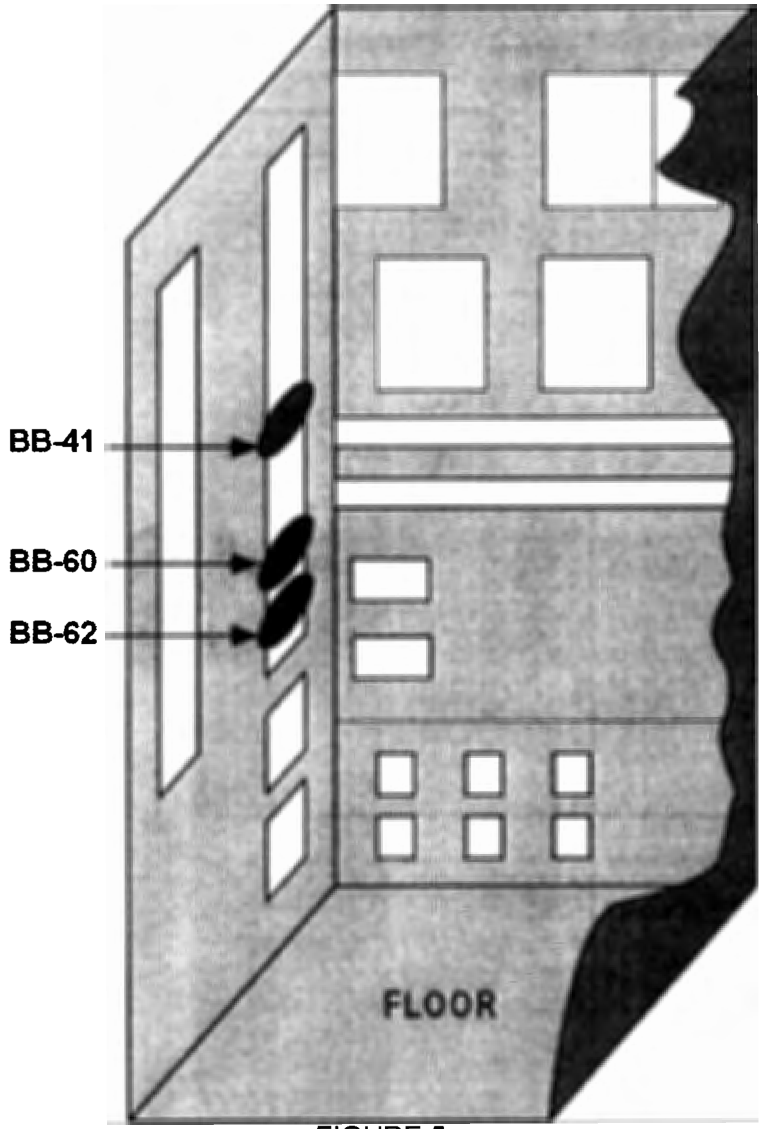


FIGURE 5

2CEC*PNL704A

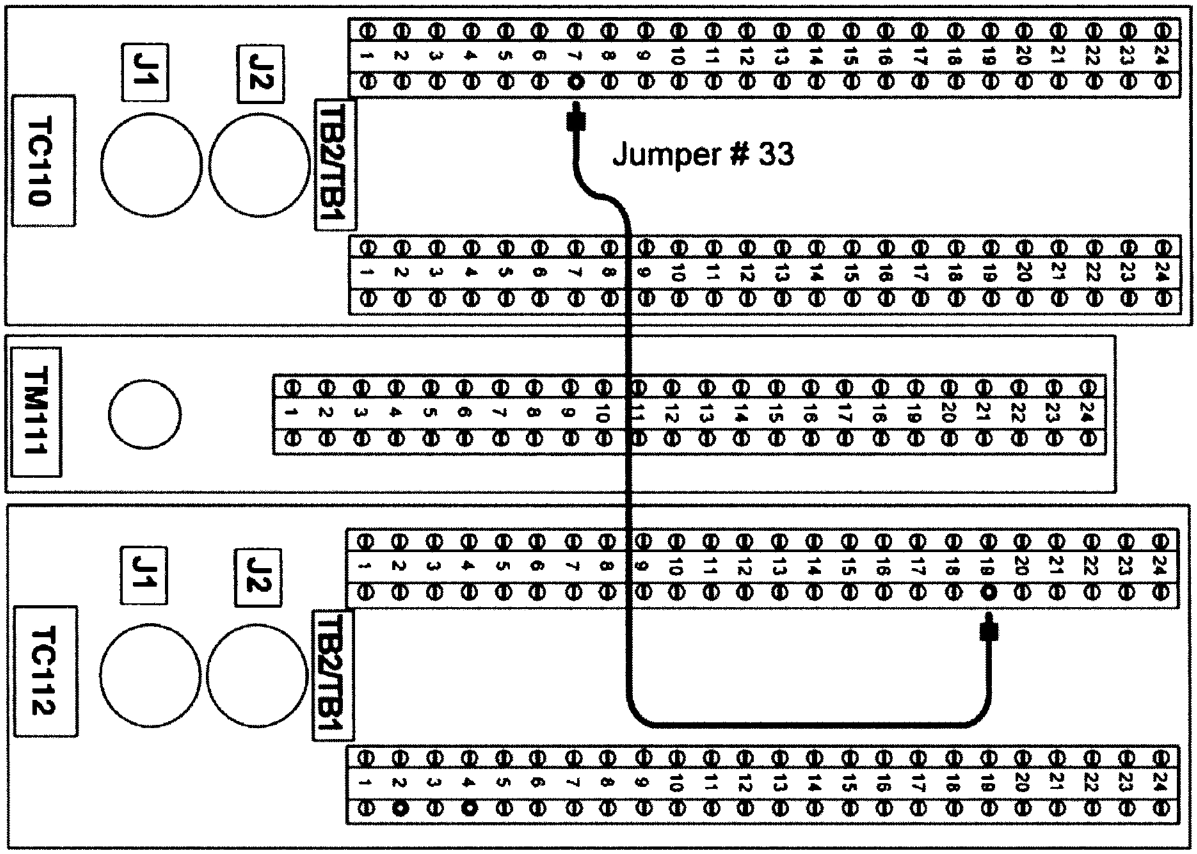


FIGURE 6

2CEC*PNL704A

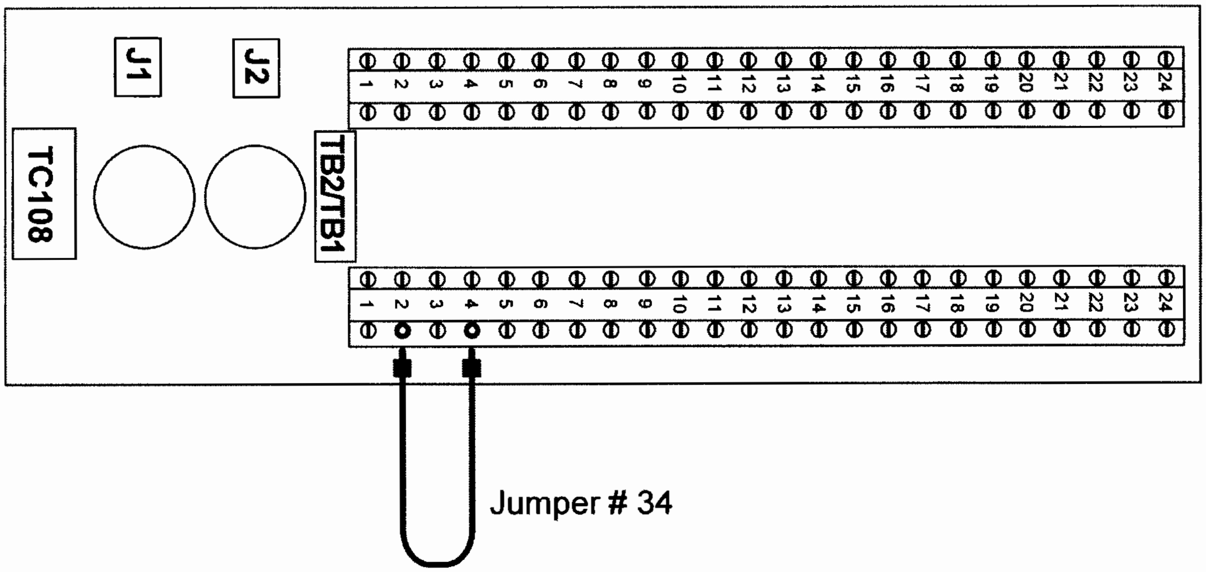


FIGURE 7

2CEC*PNL629 Bay B

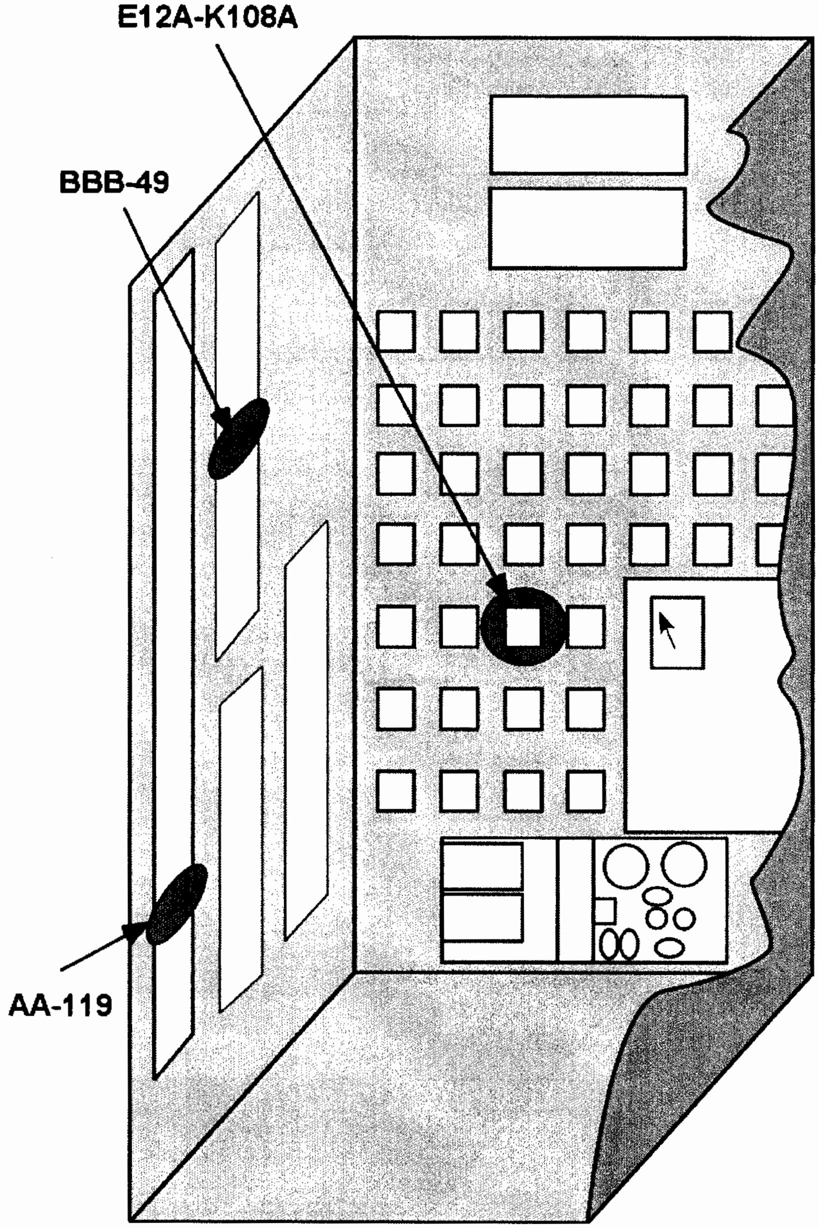


FIGURE 8

2CEC*PNL618, Bay B

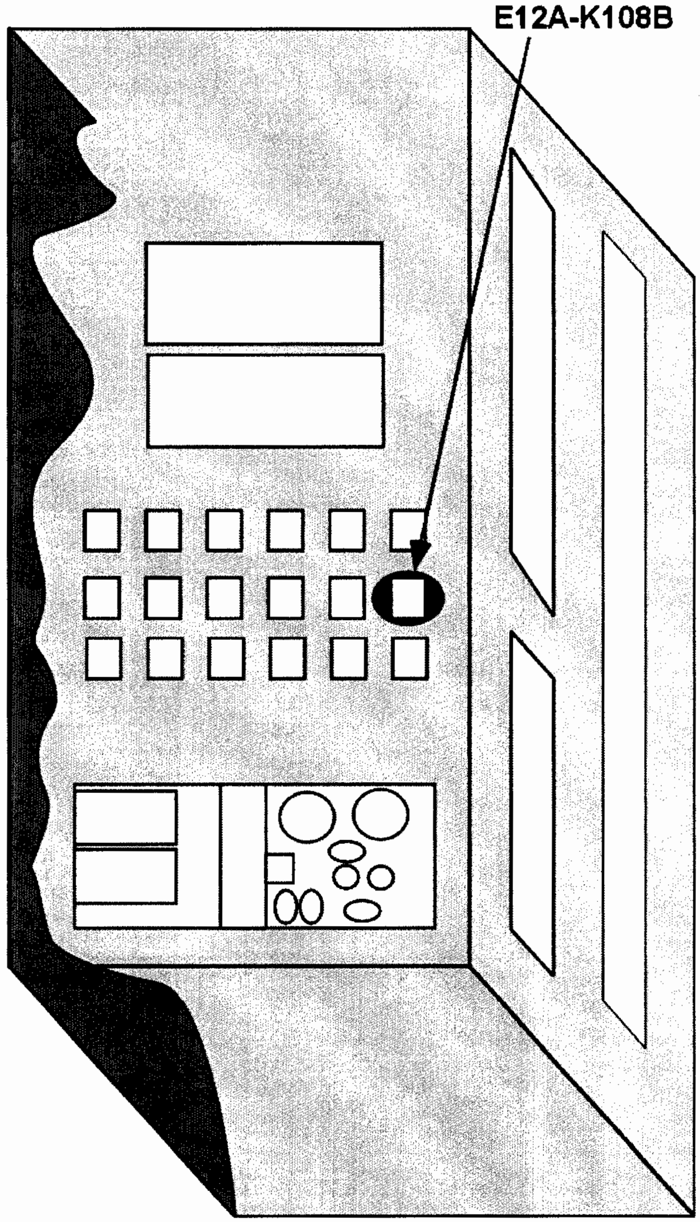


FIGURE 9

2CEC*PNL618 Bay C

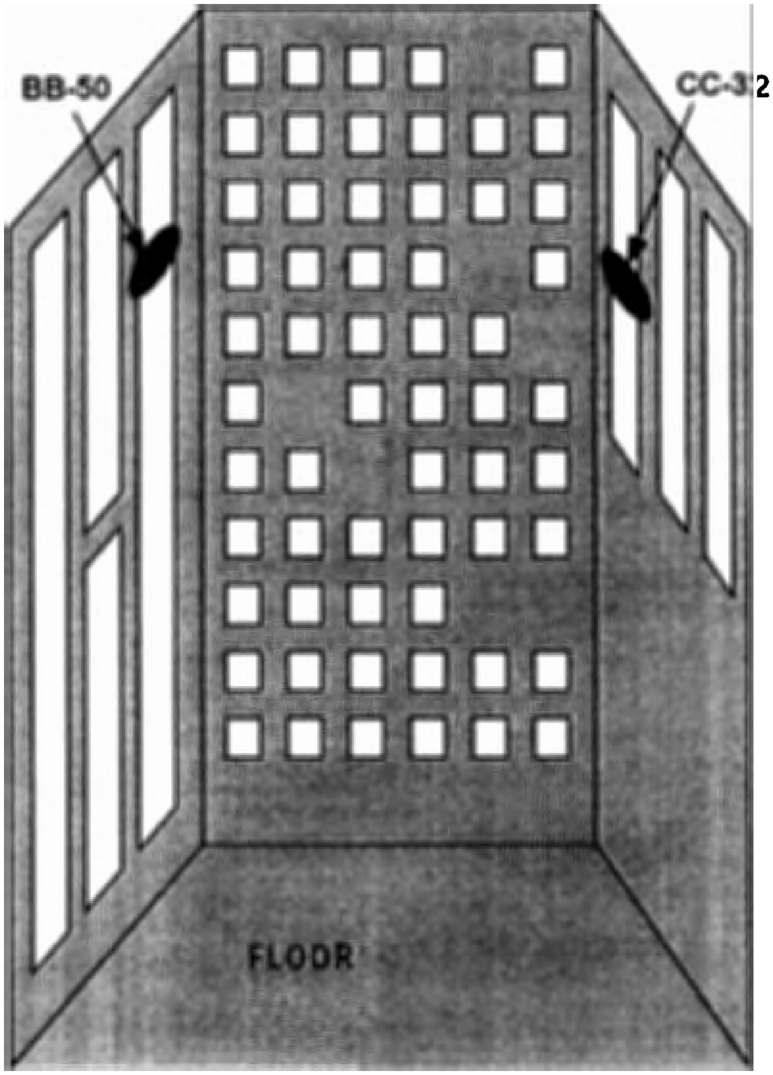


FIGURE 10

Exelon Generation.

Training Id: **2015 NRC JPM P-2** Revision: **0.0**

Title: **Transfer to 2VBA UPS2A Maintenance and Shutdown**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	06/08/15
Validated By	Brian Hilliker	9/29/15
Facility Reviewer	Mark Crean	10/1/15

Approximate Duration: 15 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: ________

References

1. N2-OP-71D, UPS
2. NUREG 1123 K/A 262002 A3.01 (2.8/3.1)

Instructor Information

A. JPM Information

1. Description

   a. This JPM tests the operator's ability to operate station UPS systems. The operator will simulate transferring 2VBA*UPS2A loads to the maintenance source and shutting down the UPS.

   b. This JPM is NOT considered alternate path.

   c. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

   a. N2-262002-01032, Remove UPS System from service and de-energize UPS Loads

   b. K/A 262002 A3.01 (2.8/3.1)

3. Evaluation / Task Criteria

Evaluation Method	Perform / Simulate
Evaluation Location	Plant
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

   a. Unit 2 WEC

5. JPM Setup (if required)

   a. Prepare a copy of N2-OP-71D, Section G.4.0. Include a copy of the precautions and limitations.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is in Mode 4. • 2VBA*UPS2A is supplying the critical load. • The maintenance source is available and energized. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, Perform a Load Transfer to maintenance supply and shutdown of 2VBA*UPS2A in accordance with N2-OP-71D, Section G.4.0. **Note:** Tagging will not be required

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary	P	SAT / UNSAT **STD:** Proper communications used
2.	Obtain a copy of the reference procedure and review/utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** N2-OP-71D obtained and Section G.4.0 referenced
3.	Refer to Technical Specification 3.8.7 for Modes 1, 2 AND 3.	NA (step 4.1)	SAT / UNSAT **STD:** Determines NA per initial conditions.
4.	Ensure the following conditions: • UPS module supplying critical load. • The maintenance Regulator/Transformer is energized.	P (step 4.2)	SAT / UNSAT **STD:** Determines requirements are met per initial conditions.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
5.	Check "SYNCH LOSS" light out. **Cue:** The Synch Loss light is out.	S (step 4.3.1)	SAT / UNSAT **STD:** At UPS2A, observe that the Red LED for SYNCH LOSS is not lit.
6.	Push REVERSE STATIC SWITCH pushbutton AND verify REVERSE TRANSFER lamp lit. **Cue:** Pushbutton depressed. **Cue:** Reverse light lit and forward light out.	S (step 4.3.2)	**PASS / FAIL** **STD:** At UPS2A, depress the "Reverse" transfer pushbutton fully and release. SAT / UNSAT **STD:** At UPS2A, observe that the Red LED "REVERSE TRANSFER LAMP" is lit.
7.	Verify left VOLTMETER SEL SW in OUTPUT position. **Cue:** Switch in output.	S (step 4.3.3)	SAT / UNSAT **STD:** At UPS2A, position/verify the "AC" voltmeter select switch to the "Output" position.
8.	Verify AC OUTPUT VOLTAGE meter to be nominally 120 A.C. VOLTS AND OUTPUT FREQUENCY meter to be about 60 HERTZ. **Cue**: Meter indicates 120 volts and frequency 60 Hz.	S (step 4.3.4)	SAT / UNSAT **STD:** At UPS2A, observe output voltage to be nominally 120 volts and frequency to be 60 Hz. (Voltage read on "AC output voltage" meter and frequency read on "output frequency" meter.)
9.	Place CB-52, BATTERY INPUT in OFF. Cue: Breaker in OFF position.	S (step 4.3.5)	**PASS / FAIL** **STD:** At UPS2A, place breaker CB-52 in the OFF position.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
10.	Place CB-51, NORMAL AC INPUT in OFF. **Cue:** Breaker in OFF position.	S (step 4.3.6)	**PASS / FAIL** **STD:** At UPS2A, place breaker CB-51 in the OFF position.
11.	Verify right VOLTMETER SEL SW in RECTIFIER. **Cue:** Switch in Rectifier.	S (step 4.3.7)	SAT / UNSAT **STD:** At UPS2A, position/verify the "DC" voltmeter select switch to the "Rectifier" position. (Right side switch)
12.	Verify DC VOLTAGE meter at zero D.C. VOLTS. **Cue:** DC volts at zero.	S (step 4.3.8)	SAT / UNSAT **STD:** At UPS2A, observe zero volts as read on "DC voltage" meter.
13.	Place left VOLTMETER SEL SW to INVERTER. **Cue:** Switch in inverter.	S (step 4.3.9)	SAT / UNSAT **STD:** At UPS2A, place the "AC" voltmeter select switch to the "Inverter" position.
14.	Verify AC OUTPUT VOLTAGE meter at zero A.C. VOLTS. **Cue:** Meter indicates AC volts at zero.	S (step 4.3.10)	SAT / UNSAT **STD:** At UPS2A, visually observe zero volts as read on "AC output voltage" meter.
15.	Turn S-5, MANUAL SWITCH to MAINTENANCE position. **Cue:** S-5 switch in maintenance.	S (step 4.3.11)	**PASS / FAIL** **STD:** At UPS2A, rotate switch S-5 counter clockwise to the maintenance position.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
16.	Turn CB-2, STATIC SWITCH INPUT to OFF. **Cue:** CB-2 is in the OFF position.	S (step 4.3.12)	**PASS / FAIL** **STD:** At UPS2A, place breaker CB-2 in the OFF position.
17.	Turn CB-53, STATIC SWITCH OUTPUT to OFF. **Cue:** CB-53 is in the OFF position.	S (step 4.3.13)	**PASS / FAIL** **STD:** At UPS2A, place breaker CB-53 in the OFF position.
18.	As required, open AND tag out normal AC AND DC Input Power Circuit Breakers at their respective switchgear. **Cue:** Not Required.	S (step 4.3.14)	SAT / UNSAT **STD:** Not required
19.	IF NOT tagged out in step G.4.3.14, THEN open breaker 2BYS*SWG002A(2B) - 3C. **Cue:** 2BYS*SWG002A-3C in open position.	S (step 4.3.15)	**PASS / FAIL** **STD:** At 2BYS*SWG002A place breaker 3C in open position.
Evaluator Note:	**Cue:** Your task is complete.		

TASK STANDARD	2VBA*UPS2A loads have been transferred to the maintenance supply and the UPS is shutdown.

STOP TIME	

Exelon Generation

JPM Handout

INITIAL CONDITIONS	Given: • The plant is in Mode 4. • 2VBA*UPS2A is supplying the critical load. • The maintenance source is available and energized.

INITIATING CUE	**(Operators Name)**, Perform a Load Transfer to maintenance supply and shutdown of 2VBA*UPS2A in accordance with N2-OP-71D, Section G.4.0. **Note:** Tagging will not be required

NINE MILE POINT NUCLEAR STATION UNIT 2
OPERATING PROCEDURE

N2-OP-71D
REVISION 01001

UNINTERRUPTIBLE POWER SUPPLIES (UPS)

TECHNICAL SPECIFICATION REQUIRED

Approval Authority: Manager Operations

SUMMARY OF ALTERATIONS

Revision	Change	Summary of Revision or Change
010	00	This procedure revision does not follow format and content requirements due to an exemption granted per Procedure CNG-PR-1.01-1005, Section 1.2.C.2.d, by the PDU Work Leaders. Minor revision to incorporate: PCR-13-02659 — How to reset front panel display if display is locked up. 2VBB-UPS1G display was blank and would not activate when front panel key was pressed, also the control room did not receive any alarms with the display locked during forced transfer to battery power during maintenance. (CR-2013-003293) PCR-13-02659: • H.2.0 Note through H.2.2, Add new Steps for resetting front panel display if locked up. Reviewer Comments: • H.2.1.1 & H.2.2.1, Change 2VBB-UPS1B(G) to 2VBB-UPS1A (B,G).
010	01	Editorial Change to incorporate: PCR-14-02313 — Section H.49 step reference correction in Step H.49.2 PCR-14-02313: • H.49.2, Corrected Step reference from H.17.0 to E.12.0.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

A. REFERENCES AND COMMITMENTS

1.0 Technical Specifications

- 3.3.6.1, Primary Containment Isolation Instrumentation
- 3.8.7, Inverters – Operating
- 3.8.8, Distribution Systems – Operating
- 3.8.9, Distribution Systems - Shutdown

2.0 Licensee Documentation

- USAR Chapter 8.0, Electric Power, Section 8.3.1 A.C. Power Systems

3.0 Policies, Programs, and Procedures

- N2-OP-53A, Control Building Ventilation System
- N2-OP-54A, Normal Switchgear Building Ventilation
- N2-OP-70, Station Electrical Feed and 115KV Switchyard
- N2-OP-71A, 13.8KV AC Power Distribution
- N2-OP-71B, 4.16KV AC Power Distribution
- N2-OP-71C, 600V AC Power Distribution
- N2-OP-71D-LINEUPS, Uninterruptible Power Supplies (UPS) - Lineups
- N2-OP-72, Standby and Emergency AC Distribution System
- N2-OP-73A, Normal DC Distribution
- N2-OP-74A, Emergency DC Distribution
- N2-ELU-01, Walkdown Order Electrical Lineup and Breaker Operations

4.0 Technical Information

4.1 Flow Diagrams

None

4.2 Electrical Diagrams

- AE-100A, Panel Load List 120VAC VBS*PANEL (2VBB-UPS3A,B)
- AE-100B, DC Load List 125VDC SWGR/PNL
- AE-100C, VBS* Panel Load List (2VBA*UPS2A,B)
- AE-100D, Load List Uninterruptible Power Supply 2VBB-UPS1A
- AE-100E, Load List Uninterruptible Power Supply 2VBB-UPS1B
- AE-100F, Load List Uninterruptible Power Supply 2VBB-UPS1C
- AE-100G, Load List Uninterruptible Power Supply 2VBB-UPS1D
- AE-100H, Load List Uninterruptible Power Supply 2VBB-UPS1G
- EE-1BH, Low Voltage Power Distribution

A. REFERENCES & COMMITMENTS (Continued)

4.2 (Continued)

- EE-1CA, Emergency and Vital Bus Power Distribution
- EE-MO01C and MO01D, Normal 600V & 120VAC
- EE-MO01E, Emergency 600V & 120VAC
- EE-MO01F, Emer & Norm 125V & 24/48 VDC
- EE-MO01G, Normal 125 VDC

4.3 Vendor Manuals

- N20349, Instruction Manual for ELGAR UPS Model 253-1-106, ELGAR Corp (2VBA*UPS2A,B)
- N20456, Instruction Manual, ELGAR Corp (2VBB-UPS3A,B)
- N20253, Automatic Transfer Switch Operator's Manual, Automatic Switch Co (2VBB-TRS1)
- VTM-10-000025. Eaton Powerware Series FERRUPS FE/QFE UPS Installation and User's Guide (2VBB-UPS1H)
- N21097, Three Phase Inverter/Rectifier Technical Instruction Manual, HDR Power Systems Inc (2VBB-UPS1C,D)
- N21305, Instruction Manual For Electrical Protection Assemblies
- N2S25000IPWSUP002 ,Instruction and Operating Manual, Ametek Model 3DPP080, 80KVA, (2VBB-UPS1A,B,G)
- N2S25000TRANSF003, Instruction and Operating Manual, Controlled Power Company Model Series 700F, power processors, 75KVA, (2VBB-XD500, 2VBB-XD601, 2VBB-XD602)

5.0 Supplemental References

- NMP2-EO35A, Uninterruptible Power Supplies, Rev. 1 including Addendums 1 through 5
- NMP2-E0902, Transfer Switch 2VBB-TRS1

6.0 Commitments

Sequence Number	Commitment Number	Description
1	NCTS 502810-01	Clarify Response to Local Trouble Alarms for UPS2A and 2B
2	LER 96-04	ESF Actuations Caused by Failure of Electrical Protection Assembly

B. SYSTEM DESCRIPTION

Uninterruptible Power Supplies have three power sources. On a loss of the Normal power supply (AC), UPS loads will be fed by the Battery supply (DC). This will occur with no interruption of power to UPS loads. A third power source, the Maintenance supply (AC) is also available to provide power to UPS loads if Normal and Battery supplies are unavailable, or if the UPS will be shut down.

Basically, AC power enters the UPS and is converted to DC by the rectifier section. The DC voltage produced by the rectifier is then supplied to the DC Bus, which is a junction point between the rectifier's output, the battery source input, and the supply connection to the Inverter.

The DC power source to the UPS is an external DC bus. In the DC Distribution System, a battery charger normally supplies power to its associated bus and battery. If the charger is out of service, the battery will provide power to the bus and all connected system loads.

A blocking diode is located between the DC Bus and the external DC source. The blocking diode will only allow current flow in one direction; from the external DC bus to the UPS. This is necessary to prevent the UPS rectifier section from attempting to supply power to external DC loads. When current passes through the blocking diode, UPS System Trouble and UPS On Battery Power annunciators will be received, alerting operators that the UPS Blocking Diode is conducting and probably is receiving power from the battery source.

Power is supplied to the inverter section from the DC Bus. The inverter is used to convert DC into a regulated and filtered AC waveform for use by UPS system loads. The inverter also maintains its generated waveform in sync with the Maintenance supply's AC waveform to enable a transfer of UPS loads to occur, if necessary.

The Static Switch receives power from the Inverter and from the Maintenance supply. The Static Switch is a solid state device which is used to electronically transfer UPS loads from one supply to the other with no interruption of power to the loads.

The Maintenance power supply provides a regulated AC source to UPS loads when the UPS is not in operation. UPS loads will also be transferred to the Maintenance supply by the Static Switch if a large overload condition is detected. This is done to prevent damage to UPS components. Although the Maintenance supply is regulated, it is not as controlled as the UPS-generated AC.

AMETEK units for 2VBB-UPS1A, B and G have a display panel with indicator lamps, touch screen display and controls. There are 3 stand alone LEDs. Under normal operation 2 green LEDs should be lit, one for IN SYNC and one for UPS NORMAL. The third LED is red, for UPS TROUBLE that should only be lit if there is a problem. There are 4 other LEDs that are part of the buttons for controls. Under normal operation the green LED for INVERTER TO LOAD should be lit. The amber LED for BYPASS TO LOAD will be only on when the static switch has transferred the load to the alternate supply. The two remaining LEDs, green FLOAT and amber EQUALIZE are for battery charger functions that are disabled and should be off. A blocking diode is installed to prevent the UPS from charging the battery used as a DC source.

Controls functions on the display panel include:

- ALARM SILENCE pushbutton- to silence local horn
- ALARM RESET pushbutton - to clear locked in alarms
- RETRANSFER RESET pushbutton - for allowing transfers after a lockout condition is corrected

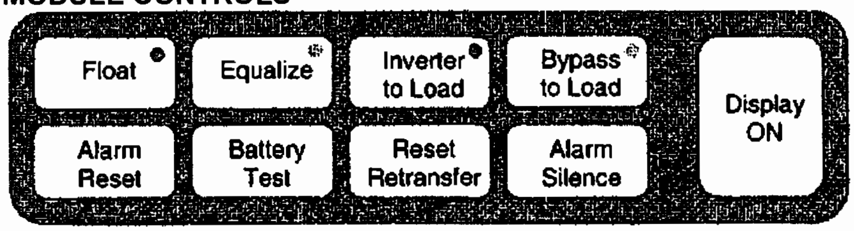
B. SYSTEM DESCRIPTION (Continued)

- INVERTER TO LOAD pushbutton - to connect load to UPS via static switch
- BYPASS TO LOAD pushbutton - to connect load to alternate supply via static switch
- DISPLAY ON pushbutton - to turn on the touch screen, auto off after 30 minutes.
- SW 2, INVERTER ENABLE switch- to start inverter after a DC source is available

NOTE

The units are configured to disable the Float and Equalize functions. A blocking diode will physically prevent the battery charging function. In this configuration, the indicators in the Float and Equalize keypad will be turned Off. The Battery Test has also been disabled.

DISPLAY MODULE CONTROLS



On the touch screen the **menu** screen will allow navigation to six other screens. The **setup** screen is password protected and will not normally be used by operations. It is used by vendors and technicians to enable and disable elective features in the units. The **mimic** screen provides main amperage and voltage parameters, system status and SYNC status in a block diagram form. The **alarm** screen displays current alarm status and should automatically come up if an alarm occurs. The **metering** screen has voltage and current readings. The **system info** screen provides current system display make and model numbers along with rating of unit. The **diagnostic** screen allows retrieval of historical information concerning temperature of unit, time a load has been on UPS or BYPASS. It also is used to perform a light test of unit indicator lights. The touch screen will turn off after 30 minutes of inactivity. It will automatically turn on if an alarm is sensed.

Soft Keys

- A touch screen is used to create soft keys (buttons) in conjunction with the display. Each button that is created with the display shall reverse its color to indicate that it has been pressed.
- The touch screen function will be deactivated while the LCD back light is OFF. The first touch will turn on the back light and any touches with the back light on will activate any commands.

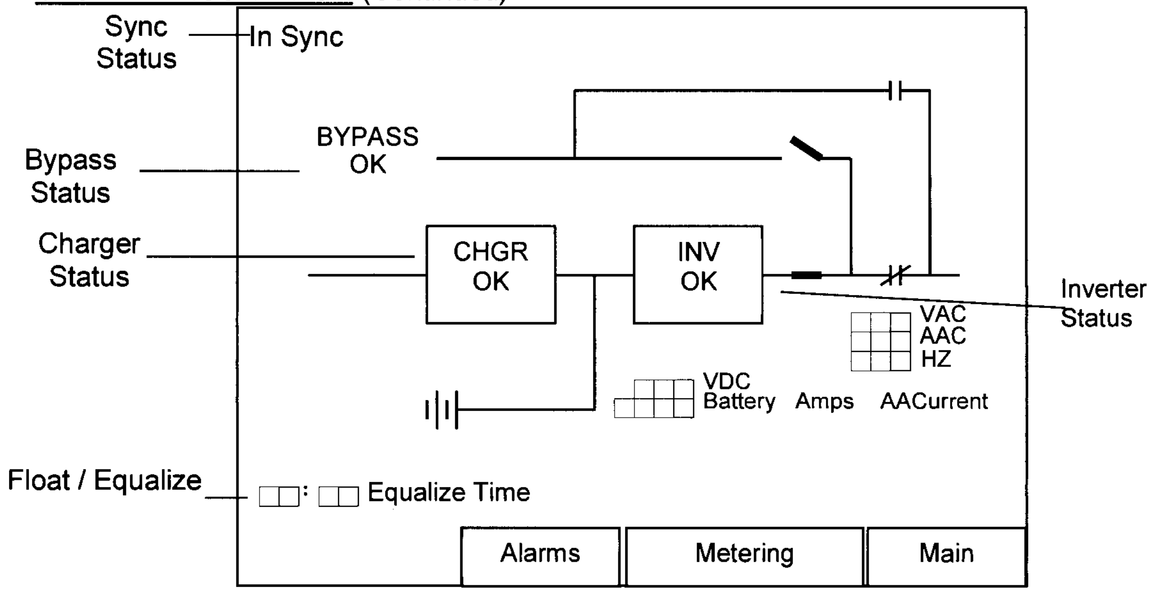
Operation

- The graphics display is used to communicate voltages, alarms and system statuses. All UPS operation control is accomplished through the membrane switch keypad. This ensures that controls are available in the event the display fails.
- The serial communication set-up will initialize memory, configure system information, select options and set up the battery information.

Mimic screen - The messages displayed on the mimic screen represent the following:

- The Rectifier status is represented by **OK** or **FAIL**. When **OK** is displayed the Rectifier is operating normally; when **FAIL** is displayed the Rectifier has failed or there is no AC input power.
- The Inverter status is represented by **OK** or **FAIL**. When **OK** is displayed the Inverter is operating normally; when **FAIL** is displayed, an Inverter failure has occurred. A failure will be immediately indicated because the display will show the Alarm Panel screen with the corresponding alarm.
- **Bypass** represents the Bypass source. If there is a Bypass failure the screen will change from BYPASS OK to BYPASS FAIL. A failure will be immediately indicated because the display will show the Alarm Panel screen with the corresponding alarm.
- **In Sync** indicates synchronization between the Bypass line and Inverter.
- The Mimic block diagram below shows two switches representing the Static Switch. The upper switch closes when the Static Switch transfers the load to the Bypass Line and the lower switch closes when the load is powered by the inverter.

B. SYSTEM DESCRIPTION (Continued)



Alarm Screen – (Alarms listed on Attachment 2, UPS Alarms)

The *ALARM* screen(s) provide a central location for alarm conditions to be evaluated. The designation "System Normal" is displayed when there are no active alarms. Pressing the Alarms button will display any active alarms. In the event of an alarm, the display immediately will reveal the *ALARM* screen, regardless of display status. . If the display has timed out and turned off the back light, an alarm will turn on the back light and change to the Alarm screen. If the display is in any other screen other than the two mentioned above, only the Alarm button will flash. The screen will remain in that state until manually changed or will change automatically to the mimic screen in approximately 30 minutes. The *ALARM* screen also provides access to the *ALARM DATA LOG* screen. The *ALARM DATA LOG* screen(s) stores the last 100 alarm events along with the date and time the event occurred. Alarms are displayed in the order in which they occurred.

The *METERING* screen(s) provide system measurements. Pressing the Metering button will display the unit parameter values. Pressing next will then display additional values.

The following lists the measurements that are provided as part of the UPS system(s).

- Battery Voltage and Amps
- Rectifier Voltage and Amps
- AC Output Volts, Amps and Freq
- AC Input Volts, Amps and Freq
- Bypass Voltage
- Inverter Voltage
- DC Output Voltage and Amps

If the communications has failed to any of the control boards an asterisk (*) will be displayed in the value location. The *DIAGNOSTIC* screen provides access to the *UPS OPERATION TIME* and the *LAMP TEST* Feature. The *UPS OPERATION TIME* screen identifies the amount of time the UPS has been on and providing power to the load, the amount of time the Bypass has been supplying power to the load and the amount of time the Inverter has been supplying power to the load. Additionally, this screen provides an indication of cabinet temperature. The time is displayed in tenths of hours and updated every 6 minutes.

B. SYSTEM DESCRIPTION (Continued)

The Ametek unit static switch logic is designed to fail to the bypass (alternate) supply. The static switch will transfer to the alternate supply upon any of the following conditions:

- Inverter failure
- Over current
- Overload, 125% for 10 minutes, 150% for 1 minute
- Inverter low voltage
- Inverter high voltage

For Ametek units 2VBB-UPS1A, B, G transfers from the alternate supply to the inverter supply will automatically happen after conditions clear and a 30 second time delay has past. This feature can be defeated if the "Auto Retransfer Enable" function is disabled in the software. The transfer needs all the following conditions to exist to occur automatically:

- All transfer to alternate conditions (above) cleared
- Auto-retransfer in enabled
- Auto-retransfer time delay expired
- Bypass and inverter supplies are in sync
- AC output current less than 100%

Transfers via the static switch should occur in less than ¼ cycle.

2VBB-XD500, 2VBB-XD601, and 2VBB-XD602, the maintenance supplies have three green light indicators are utilized to display POWER ON (output line to neutral for each phase) and one red light indicator to display ALERT. The POWER ON display is connected directly to the output and indicates the Series 700F is operating properly with just a quick glance. The ALERT display represents an over-temperature problem or output voltage loss when illuminated, and will shut down the output. Over-temperature thermal sensors are strategically located at critical points on the regulator assemblies and transformer. The main AC input circuit breaker must be turned off in order to reset the ALERT light. The digital "Shark" indicator can display Voltage, Current, kVA, kVAh, kW, kWh, kVARs, kVARh by depressing the down arrow key on the meter.

The normal feed for UPS1A (B, G) is fed through transfer switch 2VBB-TRS1. Upon loss of normal feed (2NJS-US3) to 2VBB-TRS1, the transfer switch will automatically transfer to 2NJS-US4. The load will automatically transfer back upon re-energization of 2NJS-US3 (After a 10-30 second time delay).

UPS1A and B feed selected non-safety related instrumentation and control loads UPS1A feeds the Radwaste computer, UPS1B feeds the leaky-wire radio system. UPS1G feeds PMS computer loads. AE-100D and AE-100E provide a detailed list of loads.

UPS1C and UPS1D are 75KVA models manufactured by HDR Power Systems, Inc. and provide 120VAC, 3 phase power to their loads. They differ from UPS1A, B, and G in the operation of the Static Switch, and have an additional component, a two position Manual Maintenance Switch.

Under normal conditions, the UPS is in operation supplying power from the UPS inverter output through the Static Switch with the manual transfer switch in the LOAD TO STATIC SWITCH position. If a UPS failure were to occur, the Static Switch would transfer the loads onto the Maintenance source of power.

B. SYSTEM DESCRIPTION (Continued)

The Manual Transfer Switch can be selected to the LOAD TO STATIC SWITCH or LOAD TO MAINTENANCE positions. If manually selected to the LOAD TO STATIC SWITCH position, power to the critical loads will normally be through the Static Switch. The Static Switch will control whether power is supplied from the Maintenance Source or from the UPS-generated source. If the manual transfer switch is selected to the LOAD TO MAINTENANCE position, the Static Switch is bypassed and only the Maintenance source of power is available to feed the UPS loads.

UPS1C and D feed essential lighting loads and the Gaitronics System.

*UPS2A and *UPS2B are 25KVA models manufactured by Elgar Corporation. They operate similarly to UPS1C and 1D in that they use a full time Static Switch and have a Manual Transfer Switch.

The manual transfer switch can be selected to the UPS or MAINTENANCE positions. If selected to the UPS position, power to critical plant loads will be through the Static Switch. The Static Switch will control if power will be supplied from the Maintenance supply or from the UPS-generated supply.

If the manual transfer switch is selected to the MAINTENANCE position, the Static Switch is bypassed, and only the Maintenance supply will be lined up to UPS loads. Under normal conditions, the UPS is in operation supplying power from the UPS inverter output through the Static Switch with the manual transfer switch in the UPS position. If a UPS failure were to occur, the Static Switch would transfer loads onto the Maintenance supply. The Static Switch is always powered whenever there is power to the loads.

*UPS2C and *UPS2D are 25KVA models manufactured by SCI/Ametek Corporation. These models operate similarly to UPS*2A and 2B in that they use a full time Static Switch and have a Manual Transfer Switch. These UPS's are redundant safety related assemblies used to back up (*UPS2A and *UPS2B) the Division 1 and Division 2 UPS's. This allows maintenance to be performed and added flexibility in case of equipment failures.

UPS 3A and B are 10KVA models manufactured by Elgar Corporation. They operate essentially the same as the UPS 2 series, but the manual transfer switch has three operations, instead of two.

With the manual transfer switch selected to the STATIC SWITCH position, the Static Switch will control if UPS loads will receive power from the UPS inverter or from the Maintenance supply with automatic transfer to Maint. supply if necessary. If the manual transfer switch is selected to the INVERTER position, only the UPS-generated source will supply the critical plant loads. If the UPS failed, the critical plant loads would be de-energized. Similarly, if the manual transfer switch is selected to the MAINTENANCE position, only the Maintenance supply will power the UPS loads, and if lost, the UPS loads would be de-energized.

The 10 KVA UPS (UPS 3A and B) supply loads through electrical protection assemblies (EPAs). These are molded case circuit breakers that will trip on an over voltage, under voltage, or under-frequency condition. After a trip, these must be manually reset.

B. SYSTEM DESCRIPTION (Continued)

UPS 1H is a 7KVA model manufactured by Eaton, and is unlike any of the other Uninterruptible Power Supplies. Power is supplied to UPS1H at 120VAC from 2VBB-DS1H or at 48 VDC from the external battery cabinet. This is the only external power supply to the UPS. Under normal conditions, the UPS external battery is floating on charge, and power is sent out through the energized electro-mechanical bypass switch 2VBB-DS1H with the UPS providing voltage conditioning. If the power supply to the UPS is lost, the external battery will immediately begin to supply power into 2VBB-UPS1H, and then the UPS to the electro-mechanical bypass switch (2VBB-DS1H) to the plant loads. If it is desired to shut down the UPS, 2VBB-DS1H should be manually aligned to UPS AC input. Power will then be fed directly from the UPS AC input through the electro-mechanical bypass switch to the loads.

C. <u>OPERATING REQUIREMENTS</u>

Systems

The following systems must be in operation per their respective operating procedures to support the Uninterruptible Power Supplies:

- N2-OP-53A, Control Building Ventilation System
- N2-OP-54A, Normal Switchgear Building Ventilation
- N2-OP-71A, 13.8KV AC Power Distribution
- N2-OP-71B, 4.16KV AC Power Distribution
- N2-OP-71C, 600V AC Power Distribution
- N2-OP-72, Standby and Emergency AC Distribution System
- N2-OP-73A, Normal DC Distribution
- N2-OP-74A, Emergency DC Distribution

D. PRECAUTIONS AND LIMITATIONS

1.0 Prior to energization of any UPS, the associated loads should be individually investigated to assure that they are in a condition to prevent damage to equipment and personnel.

2.0 Loss of power output from 2VBB-UPS1A will result in Technical Specification inoperability of both channels (Division 1 and Division 2) of the automatic primary containment isolation function associated with Group 9 isolation valves (2VBB-PNLA101 supply to high radiation isolation logic). TS 3.3.6.1, Condition B is applicable.

3.0 There must be one Safety Related UPS within Division 1 - 2VBA*UPS2A or 2VBA*UPS2C (Division 2 - 2VBA*UPS2B or 2VBA*UPS2D) with the output power from the inverter; otherwise TS 3.8.7, Condition A, would apply for one Divisional UPS being inoperable.

4.0 The Safety Related UPSs are not to be transferred between 2VBA*UPS2A and 2VBA*UPS2C (2VBA*UPS2B and 2VBA*UPS2D) using 2VBA*TRS2A (2VBA*TRS2B) while the CRITICAL LOADS are being supplied by their respective inverter. Damage can occur to both UPSs if their loads are not transferred to their maintenance supply first.

5.0 When Safety Related UPSs are transferred between 2VBA*UPS2A and 2VBA*UPS2C (2VBA*UPS2B and 2VBA*UPS2D), required surveillances for TS SR 3.8.7.1 (N2-ESP-BYS-W675, Attachments 1 & 2, Sections 7.5 and N2-OSP-LOG-W001, Attachment 4 - for the associated UPS) must be verified current to ensure the UPS is operable.

6.0 When it is required to remove UPS inverters from service the applicable sections of this procedure should be used in conjunction with the Clearance and Safety Tagging CNG-OP-1.01-1007.

G. SHUTDOWN (Continued) Initials

3.3.2 Perform the following at 2VBB-TRS3A(B):

a. Open door to 2VBB-TRS3A (B) .... ☐

b. Rotate manual operation handle counterclockwise (180°), in a continuous motion, UNTIL BOTH breakers are heard to operate. .... ☐

c. Verify mechanical pointer is in BYPASS position (approximately 6 o'clock). .... ☐ ________

3.3.3 Place 2VBB-DS3A(3B), Maintenance Supply Disconnect switch to OFF. ________

4.0 Load Transfer to Maintenance Supply and Shutdown of 2VBA*UPS2A(B)

4.1 Refer to Technical Specification 3.8.7 for Modes 1, 2 AND 3. ________

4.2 Ensure the following conditions:

4.2.1 UPS module supplying critical load. ________

4.2.2 The maintenance Regulator/Transformer is energized. ________

4.3 Transfer AND Shutdown UPS as follows:

4.3.1 Check SYNC LOSS lamp is out. ________

4.3.2 Push REVERSE STATIC SWITCH pushbutton AND verify REVERSE TRANSFER lamp lit. ________

4.3.3 Verify left VOLTMETER SEL SW in OUTPUT position. ________

4.3.4 Verify AC OUTPUT VOLTAGE meter to be nominally 120 A.C. VOLTS AND OUTPUT FREQUENCY meter to be about 60 HERTZ. ________

4.3.5 Place CB-52, BATTERY INPUT in OFF. ________

4.3.6 Place CB-51, NORMAL AC INPUT in OFF. ________

4.3.7 Verify right VOLTMETER SEL SW in RECTIFIER. ________

4.3.8 Verify DC VOLTAGE meter at zero D.C. VOLTS. ________

4.3.9 Place left VOLTMETER SEL SW to INVERTER. ________

4.3.10 Verify AC OUTPUT VOLTAGE meter at zero A.C. VOLTS. ________

4.3.11 Turn S-5, MANUAL SWITCH to MAINTENANCE position. ________

4.3.12 Turn CB-2, STATIC SWITCH INPUT to OFF. ________

4.3.13 Turn CB-53, STATIC SWITCH OUTPUT to OFF. ________

4.3.14 As required, open AND tag out normal AC AND DC Input Power Circuit Breakers at their respective switchgear. ________

4.3.15 IF NOT tagged out in step G.4.3.14,
THEN open breaker 2BYS*SWG002A(2B) - 3C. ________

Exelon Generation

Training Id: **2015 NRC JPM P-3** Revision: **0.0**

Title: **Recover Offgas After Automatic Shutdown**

Approvals:

	Signature / Printed Name	Date
Developed By	Paul Isham	06/08/15
Validated By	Brian Hilliker	9/29/15
Facility Reviewer	Alan Gan	10/1/15

Approximate Duration: 25 minutes

Documentation of Performance:

Performer: ____________________

Evaluator: ____________________

Start Time: ________ Stop Time: ________ Completion Time ________

Grade: **Pass / Fail**

Comments: ____________________

Evaluators Signature: ____________________ Date: ________

References

1. N2-OP-42, Offgas System
2. NUREG 1123 K/A 271000 A.2.10 (3.1/3.3)

Instructor Information

A. JPM Information

1. Description

    a. This JPM tests the operator's ability to restore the Offgas system after an automatic shutdown.

    b. This JPM is NOT considered alternate path.

    c. Critical steps are annotated in the Evaluator standard column with a bolded **Pass/Fail**.

2. Task Information:

    a. N2-217100-01013, Recover Offgas System Following Automatic Shutdown.

    b. K/A 271000 A.2.10 (3.1/3.3)

3. Evaluation / Task Criteria

Evaluation Method	Perform / Simulate
Evaluation Location	Plant
Time Critical Task	No
Alternate Path	No
LOD >1.0	Yes

4. Recommended Start Location

    a. Unit 2 WEC

5. JPM Setup (if required)

    a. Prepare a copy of N2-OP-42, Section H.1.0. Include a copy of the precautions and limitations.

B. Read Before Every JPM Performance

1. For the performance of this JPM, I will act as all those you need to talk to. Prior to providing direction to perform this task, I will provide you with the initial conditions and answer any questions. During task performance, I will identify the steps to be simulated, or discuss and provide cues as necessary. (Note, read the next only if conducting a plant JPM). With the exception of accessing panels, no plant equipment will be physically manipulated. Repositioning of devices will be simulated by discussion and acknowledged by my cues.

C. Read Before Each Evaluated JPM

1. This evaluated JPM is a measure of your ability to perform this task independently. The CRS has determined that a verifier is not available and that additional verification will not be provided.

INITIAL CONDITIONS	Given: • The plant is starting up. • Both Offgas Train A and B were operating when a spurious condition caused the Offgas Condensers to isolate. • Reactor Power has been reduced to 30%. • The cause of the trip has been determined and fixed. • The crew is executing the ARPs associated with this event. • You are the operator in the field supporting the actions of the loss of Offgas system. • The CRS has determined that the Off Gas System High Radiation Trips do not need to be defeated. • Recombiner A temperature elements are all indicating 390°F. **Evaluator:** *Ask trainee if he/she has any questions after presenting initial conditions*

INITIATING CUE	**(Operators Name)**, Recover Offgas Train 'A' after an automatic shutdown per N2-OP-42, Section H.1.0, starting at H.1.5.

START TIME	

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
1.	Provide repeat back of initiating cue **Cue:** Acknowledge repeat back providing correction if necessary	P	SAT / UNSAT **STD:** Proper communications used
2.	Obtain a copy of the reference procedure and review/utilize the correct section of the procedure.	P	SAT / UNSAT **STD:** N2-OP-42 obtained and Section H.1.0 referenced

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
Procedure Note:	All actions in Step H.1.5 are performed at 2OFG-IPNL122 unless otherwise noted.		
Procedure Note:	If OFG Recombiner temperatures are < 290°F, recovery of the OFG System will not be possible in a timely manner and the system shall be considered non-recoverable.		
3.	Verify 2OFG-RBNR1A (B) are ready to resume H2/O2 recombination by observing temperature greater than or equal to 290°F on TEMPERATURE TI-30A (B) RECOMBINER 1A (B) using selector switch TEMPERATURE RBNR-1A (B), TE31A (B), TE32A (B), TE33A (B). **Cue:** Recombiner 1A temperatures indicate 390°F	P (step 1.5.1)	SAT / UNSAT **STD:** On 2OFG-IPNL122, rotates the RECOMBINER 1A TEMPERATURE selector switch to TI-30A and observes that Recombiner Temperature is 390°F
Procedure Caution:	If H2 concentrations downstream of the operating Recombiner Train are > 4%, no valves are to be operated until H2 concentrations are < 4% due to the potential for hydrogen ignition and detonation. This may be overridden in an emergency by SM direction.		
4.	Verify H2 concentration downstream of Recombiner Train is less than 4% by observing OFF GAS SYSTEM 1A (B), HYD SYS 1A (B) % LFL is reading less than 4%. **Cue:** H2 concentration is 1%	P (step 1.5.2)	SAT / UNSAT **STD:** On 2OFG-IPNL122, observes H2 concentration on OFF GAS SYSTEM 1A, HYD SYS 1A % LFL (Electronic Yokagowa Recorder). Determines H2 concentration is <4%.
5.	IF required, Offgas System High Radiation Trip may be defeated per Attachment 6, Removal and Restoration of Offgas System High Radiation Monitor Trips	N/A (step 1.5.3)	SAT / UNSAT **STD:** Determines per the turnover that this step is not required to be performed.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
6.	Reset the Offgas circuits by depressing AND releasing the following RESET pushbuttons:		
6a	RESET RE13A&B red pushbutton **Cue:** RE13A & B RED PUSHBUTTON has been depressed and released.	S (step 1.5.4)	SAT / UNSAT **STD:** On 2OFG-IPNL122, depresses the RE13A & B RED PUSHBUTTON.
6b	RESET SYSTEM A black pushbutton **Cue:** RESET SYSTEM A black pushbutton has been depressed and released.	S (step 1.5.4)	**PASS / FAIL** **STD:** On 2OFG-IPNL122, depresses the RESET A BLACK PUSHBUTTON.
6c	RESET SYSTEM B black pushbutton **Cue:** RESET SYSTEM B black pushbutton has been depressed and released	S (step 1.5.4)	SAT / UNSAT **STD:** On 2OFG-IPNL122, depresses the RESET B BLACK PUSHBUTTON.
6d	RESET VAC PUMP VP-1A black pushbutton **Cue:** RESET VAC PUMP VP-1A black pushbutton has been depressed and released.	S (step 1.5.4)	SAT / UNSAT **STD:** On 2OFG-IPNL122, depresses the RESET VAC PUMP VP-1A BLACK PUSHBUTTON.
6e	RESET VAC PUMP VP-1B black pushbutton **Cue:** RESET VAC PUMP VP-1B black pushbutton has been depressed and released.	S (step 1.5.4)	SAT / UNSAT **STD:** On 2OFG-IPNL122, depresses the RESET VAC PUMP VP-1B BLACK PUSHBUTTON.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
7.	Open 2OFG-LV20A (B), CONDENSER 1A (B) LEVEL CONTROLLER, to allow process flow to recycle back to Main Condenser. **Cue:** 2OFG-LV20A is open.	S (step 1.5.5)	**PASS / FAIL** **STD:** On 2OFG-IPNL122, adjusts the 2OFG-LV20A control switch to OPEN 2OFG-LV20A. Observes that LV20A fully opens.
8.	Open 2OFG-AOV1A (B), PREHTR E1A (B) INLET ISOL, by placing control switch to STARTUP. **Cue:** The 2OFG-A0V1A control switch is in STARTUP. AOV1A indicates open.	S (step 1.5.6)	SAT / UNSAT **STD:** Determines on 2OFG-IPNL122, the 2OFG-AOV1A PREHTR E1A INLET ISOL CONTROL SWITCH is in STARTUP. Determines AOV1A is open by observing on the status panel
9.	Verify 2OFG-AOV103, OFFGAS EXHAUST TO MAIN STACK open. **Cue:** 2OFG-AOV103 indicates OPEN	S (step 1.5.7)	SAT / UNSAT **STD:** On 2OFG-IPNL122, determines AOV103 is OPEN by observing the position on the status panel.
Procedure Note:	When both 2OFG-AOV1A and AOV1B are open, 2CCS-MOV45A and MOV45B will each automatically open to mid position. If only 2OFG-AOV1A (B) is open, the associated 2CCS-MOV45A (B) will automatically open fully. The valves are located in the OFG Bldg El 261' Hallway.		
Evaluator's Note	It is not necessary for the operator to locally verify the position of 2CCS-MOV45A. When the operator attempts to go to locally verify the valve is in the proper position, inform the operator that 2CCS-MOV45A is in the proper position.		
10.	Locally, verify 2CCS-MOV45A (B), OFFGAS CONDENSER 1A (B) OUTLET ISOLATION, is in proper position. **Cue:** When the operator determines 2CCS-MOV45A should be open cue the valve is in the proper position.	S (step 1.5.8)	SAT / UNSAT **STD:** Per the provided cue determines 2CCS-MOV45A is in the proper position.

	PERFORMANCE	ACT. CODE P / S / NA	EVALUATOR
11.	Verify one Dryer is in service with its associated valve control switch in OPEN (2OFG-AOV4A/5A, 4B/5B, AND 4C/5C). **Cue:** 2OFG-AOV4C/5C is already in service.	S (step 1.5.9)	SAT / UNSAT **STD:** On 2OFG-IPNL122, determines one dryer is in service by observing the CONTROL SWITCH for 2OFG-AOV4C/5C is in OPEN.
12.	IF required, start 2OFG-P1A AND P1B, VACUUM PUMP VP-1A (B). **Cue:** 2OFG-P1A is running.	S (step 1.5.10)	SAT / UNSAT **STD:** On 2OFG-IPNL122, determines 2OFG-P1A is already running by observing the status panel.
13.	WHEN recombination is occurring, as indicated by OFG Recombiner temperature rising, place 2OFG-LV20A (B) control switch in AUTO. **Cue:** OFG Recombiner temperature is RISING **Cue:** The Control Switch for 2OFG-LV20A is in AUTO.	S (step 1.5.11)	**PASS / FAIL** **STD:** On 2OFG-IPNL122, determines OFG RECOMBINER TEMPERATURES are rising by observing temperatures. Places the 2OFG-LV20A control switch to AUTO.
14.	Open 2OFG-AOV11A (B), CONDENSER 1A (B) OUTLET ISOLATION, by placing the control switch to STARTUP. **Cue:** The Control Switch for 2OFG-AOV11A is already in STARTUP.	S	SAT / UNSAT **STD:** On 2OFG-IPNL122, observes 2OFG-AOV11A control switch is already in STARTUP.

Evaluator Note:	Once 2OFG-AOV11A is observed to be in STARTUP, provide the following cue: **Cue:** Your task is complete, another operator will complete remaining actions.

TASK STANDARD	After an automatic shutdown of Offgas, Offgas Train A has been recovered.

STOP TIME	

JPM Handout

INITIAL CONDITIONS	Given: • The plant is starting up. • Both Offgas Train A and B were operating when a spurious condition caused the Offgas Condensers to isolate. • Reactor Power has been reduced to 30%. • The cause of the trip has been determined and fixed. • The crew is executing the ARPs associated with this event. • You are the operator in the field supporting the actions of the loss of Offgas system. • The CRS has determined that the Off Gas System High Radiation Trips do not need to be defeated. • Recombiner A temperature elements are all indicating 390°F.

INITIATING CUE	**(Operators Name)**, Recover Offgas Train 'A' after an automatic shutdown per N2-OP-42, Section H.1.0, starting at H.1.5.

NINE MILE POINT NUCLEAR STATION UNIT 2
OPERATING PROCEDURE

N2-OP-42

REVISION 01302

OFFGAS SYSTEM

TECHNICAL SPECIFICATION REQUIRED

Approval Authority: Manager Operations

<u>SUMMARY OF ALTERATIONS</u>

Revision	Change	Summary of Revision or Change
013	00	This procedure revision does not follow format and content requirements due to an exemption granted per Procedure CNG-PR-1.01-1005, Section 1.2.C.2.d, by the PDU Work Leaders.

Updated format to latest revision of PWM-PRO-0102 including replacement of Approval Authority signature with Approval Authority title on the Cover Page, addition of Summary of Alterations, deletion of List of Effective Pages, and changing page numbering to a Page x of y format starting with the Cover Page as page number one (page number is not shown on the Cover Page).

Minor Revision to incorporate:

PCR-12-06264 Modified valve positions due to flow balance test N2-TTP-CCS-@001.

<u>PCR-12-06264</u>:

- D.25.0, 1st bullet, changed "32" to "23"
- D.25.0, 2nd bullet, changed "16" to "13".
- E.4.21.4, 2nd bullet, changed "between 14-18" to "12.5"
- E.4.21.5, changed "between 14-18" to "12.5"
- E.4.21.5.b, changed "16" to "12.5"
- F.2.16.3, changed "14-18" to "12.5 open"
- Note prior to F.5.8, changed "32" to "23"
- F.5.8, changed "32" to "23"
- Note prior to F.10.3.5, changed "32" to "23"
- F.10.3.5, changed "32" to "23"
- Note prior to F.11.3.5, changed "32" to "23"
- F.11.3.5, changed "32" to "23"

<u>Writer Changes</u>:

- D.28.0, Deleted EPU related P&L.
- E.4.30, 7th bullet, incorporated EPU change, removed bold text.
- F.1.1, 4th bullet, incorporated EPU change, removed bold text.
- F.27, Changed incorrect section reference number to section title.
- F.2.13, 2nd bullet, incorporated EPU change, removed bold text.
- F.11.2, Changed incorrect section reference number to section title.

LIST OF EFFECTIVE PAGES

Revision	Change	Summary of Revision or Change
013	01	Editorial Changes to incorporate:

PCR-13-02719 Revise Attachment 6 branching step from Section E to Section H.

PCR-13-02719:

- Attachment 6, Step 1.5, Changed from Section 5 to Section H., OFG System Recovery After Automatic Shutdown.

Writer Review:

- Coversheet, Deleted "Effective Date: ________" per latest revision of PWM-PRO-0102.
- Step E.2.3, Changed from N2-VLU-01 Attachment 14 to N2-OP-14-LINEUPS, Attachment 1, N2-OP-14 Walkdown Valve Lineup.

Revision	Change	Summary of Revision or Change
013	02	Editorial Changes to incorporate:

PCR-13-03737 Revise N2-OP-42 to indicate channel numbers in lieu of pen colors per ECP-12-000748.

PCR-14-01730 Adding location of pressure indicator.

PCR-13-03737:

- A.4.0, 5th bullet, added, "ECP-12-000748, Bailey 771 Replacement to Yokogawa DX364 (2OFG-TR2A (B), 2OFG-MR116)"
- E.4.30, 10th bullet, Changed "blue pen" to "Ch. #2"
- H.3.13, Changed "Green Pen" to "Ch. #3"
- H.5.7, Changed "blue pen" to "Ch. #2"
- H.9.7.3, Changed "blue pen" to "Ch. #2"

PCR-14-01730:

- F.7.10, Added location of pressure indicator 2ASS-PI124.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

A. REFERENCES AND COMMITMENTS

1.0 Technical Specifications

- 3.4.8, RCS Specific Activity
- 3.7.4, Main Condenser Offgas
- 5.5.8, Explosive Gas and Storage Tank Radioactivity Monitoring System

2.0 Licensee Documentation

2.1 Unit 2 Updated Safety Analysis Report (USAR)

- Section 11.3, Gaseous Waste Management Systems
- Section 12.2.1.4.3, Offgas System Sources
- Table 14.2-60, Offgas System

2.2 Off-site Dose Calculation Manual (ODCM)

- D 3.2.4, Gaseous Radwaste Treatment System
- D 3.3.2, Radioactive Gaseous Effluent Monitoring Instrumentation

2.3 Technical Requirements Manual (TRM)

- TRM 3.3.11, Offgas System Explosive Gas Monitoring
- TRM 3.7.8, Explosive Gas Mixture

3.0 Technical Information

3.1 Drawings

- 12177-PID-42A to 42C, Piping and Instrumentation Diagram, Offgas System
- 12177- PID -9A, Piping and Instrumentation Drawing, Condenser Air Removal System
- 12177- PID -25A, Piping and Instrumentation Diagram, Clean Steam Reboiler and Auxiliary Cond.
- File Number 016.530-078-126, P&ID for OFG Refrigerator Skid 2OFG-REF1A, REF2A
- File Number 016.530-078-127, P&ID for OFG Refrigerator Skid 2OFG-REF1B, REF2B
- File Number 016.530-078-128, P&ID for OFG Refrigerator Skid 2OFG-REF1B, REF2C
- CTI Nuclear Dwg 7002013 sheets 1 through 6 (File Number 016.530-078-020 through 025) Offgas System Electric Schematic
- Dwg. 7.510-414-146C (Instrument Rack 2CES-RAK240)

A. REFERENCES AND COMMITMENTS (Continued)

3.2 General Electric (GE) Service Information Letters (SILs)

- SIL No. 150 Revision 2, Prevention of Hydrogen Ignitions related to the Offgas System
- SIL No. 150 Revision 2, Supplement 1, Ignition Prevention for Recombiner/Charcoal Adsorber Offgas Systems
- SIL No. 150 Revision 2, Supplement 2, Prevention of Hydrogen Ignitions Related to the Offgas System
- SIL No. 246, Control of Sustained Combustion in Offgas Systems
- SIL No. 497, Hydrogen Ignition in Offgas System

3.3 Vendor Manuals

- Instruction Manual, Installation - Operation - Maintenance Instructions for Gaseous Waste Processing System, N2K18750MISP001 (File Code N20837)

4.0 Supplemental References

- Simple Design Change SC2-0085-93
- EDC 2F00788, Bypassing Offgas Charcoal Filters on High Temperature
- EDC 2F00789C, Nitrogen Insertion into the Offgas Charcoal Filters
- ECP-10-000814, Form 7B, input M1, OFG System EPU Instrumentation Changes
- ECP-12-000748, Bailey 771 Replacement to Yokogawa DX364 (2OFG-TR2A (B), 2OFG-MR116)

5.0 Commitments

Sequence Number	Commitment Number	Description
1	DER 2-92-Q-1235	Revise N2-OP-42 to include recommendations contained in GE SIL No. 150
2	NCTS-503788	Corrective Actions from 1993 Charcoal Fire
3	DER 2-95-1633	Unmonitored Release Via Div II SWP LER 95-04
4	SE 2000-075	MSLRM Trip Removal
	SE 1999-082	Offgas Rad Monitor Delay Pipe Installation
5	DER 2005-0869	HWC Isolation as a result of Mode Select Switch being placed in wrong position

B. SYSTEM DESCRIPTION

The function of the Offgas (OFG) System is to reduce the radioactivity of the Main Condenser Steam Jet Air Ejectors (SJAEs) discharge gases to acceptable levels prior to their discharge to the atmosphere. In addition, the OFG System functions to reduce the H_2 concentration in the SJAE discharge stream to lower the possibility of hydrogen detonation within the plant.

During plant operation, noncondensible process gases (Offgas) are continuously removed from the Main Condensers by the SJAEs. The Offgases, which are composed of hydrogen, oxygen, steam vapor, air in-leakage, and radioactive noble gases, are mixed with driving steam in the SJAE and delivered to the OFG Preheaters. The Preheaters are shell and tube type heat exchangers that heat the Offgas stream using auxiliary steam. Heating the Offgas stream ensures that the steam is superheated prior to entering the OFG Recombiners to prevent wetting of the catalyst, and a subsequent reduction in its activity. This ensures optimum chemical activity within the Recombiner. Once the system is in normal operation, Auxiliary Steam supply to the Preheaters may be secured.

Offgas from the Preheaters goes to the Recombiners where it passes over a catalyst which causes the free hydrogen and oxygen in the Offgas stream to chemically react to form steam. The Offgas mixture then goes to the condensers which condense the majority of the steam present and returns that condensate to the Main Condenser. The condensers are shell and tube type heat exchangers which cool the Offgas stream with Turbine Building Closed Loop Cooling (CCS) water. The Offgas stream passes from the condenser to a 75-second delay pipe to facilitate the decay of short-lived radioactive isotopes. An approximate three minute delay pipe in the Offgas Radiation Monitors (2OFG-RE13A/B) sample stream provides sufficient delay time to allow for the decay of most of the short-lived activation products. Then it goes into a common header which is connected to three parallel Dryers.

The Dryers are shell and tube type heat exchangers whose tubes are comprised of three refrigerated coils cooled by Freon refrigeration machines. The first two coils are condensing coils which lower the Offgas stream temperature to approximately 40°F. The third coil is a freeze-out coil which is retired. The dryers dry the Offgas stream to prevent water "poisoning" of the activated charcoal beds in the Charcoal Adsorbers. A selector switch determines which Dryer is in service. The non-selected dryers are standby dryers. The standby dryer Condensing Coil Compressor (REF2A, B, C) will normally be on.

Under normal flow conditions (about 6-30 scfm) a single dryer will adequately maintain its outlet temp as indicated by 2OFG-T161A (B, C) less than 50°F. Under high flow conditions it is expected that a single dryer can handle flows of about 50 scfm. Flows greater than 50 scfm may result in dryer outlet temperature degradation. In this case, additional dryers may be put in service to split the flow and load on the dryers to maintain outlet temperature ≤ 50°F.

The Dryers are provided with downstream dewpoint instrumentation (2OFG-ME116). It has been determined that this element is susceptible to becoming wetted during system startup which artificially increases its reading which resulted in nuisance annunciation. The system has been modified to use Dryer Outlet Temperature, 2OFG-TI61A (B, C), as indication of dewpoint (reference PCR #PC2-0241-96).

The dry Offgas stream from the dryers enters the two Charcoal Adsorber trains. Each train is comprised of four adsorber columns. The trains are operated in series, parallel or lined up for single train operation dependant upon Offgas flow rate. The activated charcoal delays the radioactive isotopes in the Offgas stream thereby reducing their radioactivity to acceptable levels.

B. <u>SYSTEM DESCRIPTION</u> (Continued)

From the Charcoal Adsorbers, the Offgas stream enters one of two HEPA filters. The two filters are arranged in parallel with one in operation while the other is in standby. The filters remove particulate matter from the Offgas stream, such as solid by-products of radioactive decay. Finally, suction is taken by the vacuum pumps which provide the motive force to the Offgas stream. The two vacuum pumps are arranged in parallel with one operating and the other in standby during normal operations. The operating vacuum pump discharges the effluent to the atmosphere via the Main Stack.

C. OPERATING REQUIREMENTS

1.0 The following systems must be in operation to support the OFG System:

- N2-OP-9, Condenser Air Removal
- N2-OP-14, Turbine Closed Loop Cooling System
- N2-OP-19, Instrument and Service Air System
- N2-OP-25, Auxiliary Steam, Auxiliary Condensate and Gland Seal
- N2-OP-71C, 600V AC Power Distribution
- N2-OP-73A, Normal DC Distribution
- N2-OP-79, Radiation Monitoring
- N2-OP-91A, Process Computer

2.0 OFG Flow Rate Measuring Devices

- The primary indicator for measuring OFG System flow rate as referred to in ODCM D 3.3.2 is 2OFG-FI120.
- The OFG System Sampler flow rate measuring device is 2OFG-FT1113A or 2OFG-FT1113B. These devices measure the flow through the OFG System Noble Gas Activity Monitors (2OFG-CAB13A and CAB13B) and provide a local and remote readout.

3.0 The Offgas System Explosive Gas Monitoring system consists of a hydrogen monitor for Recombiner Train A (2OFG -AT16A) and a hydrogen monitor for Recombiner Train B (2OFG-AT16B). If either hydrogen monitor is inoperable with the associated Recombiner Train in service, TRM 3.3.11 requires alternate hydrogen monitoring on an increased frequency. This is due to the degraded ability to monitor hydrogen concentrations throughout the entire Offgas system during dual train operation and lack of Control Room annunciation.

In single train operation, the more frequent readings provided by TRM 3.3.11, Required Actions A.1 and A.2, provide direct indication of hydrogen concentration throughout the Offgas system.

In dual train operation, TRM 3.3.11 Required Actions B.1 and B.2 include additional actions because direct readings may not be representative of the actual hydrogen concentration throughout the Offgas system. In the event one channel is not operable, the hydrogen concentration for that train can be calculated by using the operable channel reading, system flows and the common hydrogen concentration. In the event that both required channels are inoperable, the hydrogen concentration can be determined to be ≤4% by calculating the maximum hydrogen concentration possible using the system flows and common hydrogen concentration.

D. PRECAUTIONS AND LIMITATIONS

1.0 To prevent cross connecting the Auxiliary Steam System (ASS) with the Auxiliary Boiler System (ABM), 2ASS-SOV138, AUX BOILER TO OFFGAS STEAM SUPPL ISOL, and 2ASS-SOV142, OFFGAS STM SUPPLY ISOL, shall not be open at the same time.

2.0 2ABM-V89, STEAM ISOL TO AUX STEAM HDR, must be closed when Main Steam is supplying the OFG Preheaters. This will prevent contaminated steam from entering the Aux Boiler System due to leakby of 2ASS-SOV138, AUX BOILER TO OFFGAS STEAM SUPPL ISOL.

3.0 2ASS-HCV150, PV125 BYPASS, and 2ASS-V37, PV125 ISOL, shall be closed when the Aux Boilers are supplying the OFG Preheaters. This will prevent cross connecting the ASS System with the ABM System through 2ASS-V290, bypass valve around 2ASS-SOV142.

4.0 No open flame, welding or cutting should be performed in the OFG Recombiner Rooms or on Charcoal Adsorber Tanks. These areas are potentially explosive due to possible detonable or flammable hydrogen concentrations or contain extremely flammable material. The need for purging of the applicable system sections should be evaluated prior to performing any maintenance activity. **[C1]**

5.0 It will require approximately three to four days to preheat the OFG inlet piping and the OFG Recombiners to 290°F. Subsection E.1.0 should be performed at least three days prior to planned startup of the OFG System.

6.0 It will require approximately 30 minutes for the Dryer Refrigeration Units to cool down to their normal operating range. Subsection E.2.0 must be performed at least 30 minutes prior to planned startup of the OFG System.

7.0 OFG Hydrogen Analyzers require at least 2 hours to stabilize following startup. OFG System flow to the H_2 Analyzers is controlled by the H_2 Analyzer's eductor and is required for proper H_2 Analyzer operation. Chemistry Department shall perform required hydrogen analysis until H_2 Analyzers are operational.

8.0 Due to SDC SC2-0085-93 installation, an operator needs to check the operating H_2 Analyzers at least once every shift. This is done to ensure proper sample flow through the H_2 sample rotometer to prevent analyzer cell damage from high temperature if sample flow is lost. If sample flow is lost and can not be resumed within two hours, the H_2 Analyzer(s) must be shutdown in accordance with the applicable actions in Subsection G.2.0. Refer to TRM 3.3.11 for additional monitoring requirements.

9.0 Plant operation must not continue for greater than one week without an operable H_2 Analyzer in service. **[C1]**

10.0 Due to the non-linear characteristic of H_2 Analyzers, the normal operating reading of H_2 indication may be approximately 0.3 to 0.7%. This is conservative compared to the grab sample result of zero from Chemistry Department. There will be a permanent modification on this non-linear characteristic problem.

11.0 When the H_2 Analyzers are secured during a system outage, Subsection G.2.0 must be performed within 2 hours of closing 2OFG-AOV1A and 2OFG-AOV1B, PREHTR E1A and E1B INLET ISOL. This is done to prevent H_2 Analyzer cell damage due to overheating.

12.0 On initial system startup, the Charcoal Adsorbers should be bypassed to prevent wetting of the charcoal beds. In addition, the sample line delay pipe should be bypassed so that the Offgas Radiation Monitors (2OFG-RE13A/B) Alert/Trip setpoints remain consistent with the process effluent stream.

D. PRECAUTIONS AND LIMITATIONS (Continued)

13.0 No Recombiner Train isolation valve shall be operated if H_2 concentration is ≥ 4% due to the potential for hydrogen ignition and detonation.

14.0 Loss of the OFG System during power operation will result in a loss of condenser vacuum. Depending on initial plant conditions, this will result in any or all of the following:

- Turbine Trip (and possible Reactor Scram) at 22.1" Hg Vacuum
- MSIV Isolation at 8.5" Hg Vacuum
- Bypass Valve Closure at 7" Hg Vacuum

15.0 The amount of time available to restore the OFG System to service is dependent upon several factors: 1) Reactor power level, 2) Amount of air in-leakage, 3) CWS water temperature, etc. Following a loss of the OFG System, it is recommended that Reactor power be reduced as rapidly as possible in accordance with N2-SOP-101D, Rapid Power Reduction.

16.0 If an Offgas leak has been detected, additional monitoring for H_2 leakage should be performed. When monitoring for H_2 leakage, ensure that the H_2 detector is not a possible ignition source.

17.0 If Computer Point 2OFGFA01 alarms (2OFG-FT120), Chemistry must be notified to sample Offgas to determine the effect on release rate.

18.0 Prior to placing the Offgas System in service, radiation monitors 2OFG-RE13A, 2OFG-RE13B and Stack Gems (2RMS-CAB170) shall be operable and in service or compensatory actions are being taken. **[C3]**

19.0 Under normal flow conditions (about 6-30 scfm) a single dryer will adequately maintain its outlet temp as indicated by 2OFG-TI61A (B, C) less than 50°F. Under high flow conditions it is expected that a single dryer can handle flows of about 50 scfm. Flows greater than 50 scfm may result in dryer outlet temperature degradation. In this case, additional dryers may be put in service to split the flow and load on the dryers to maintain outlet temperature ≤ 50°F.

20.0 The Dryers are provided with downstream dewpoint instrumentation (2OFG-ME116). It has been determined that this element is susceptible to becoming wetted during system startup which artificially increases its reading which resulted in nuisance annunciation. The system has been modified to use Dryer Outlet Temperature, 2OFG-TI61A (B, C), as alarm/indication of dewpoint (reference PCR #PC2-0241-96).

21.0 When the control switches for Offgas Recombiner train inlet and outlet valves (2OFG-AOV1A, 2OFG-AOV1B, 2OFG-AOV11A, and 2OFG-AOV11B) are in "STARTUP", the automatic isolation signal for low preheater outlet temperature is bypassed. If conditions require operation for longer than 5 days with these switches in "STARTUP", an assessment should be made to determine required corrective actions.

22.0 When 2OFG-RE13A/13B sample hold up pipe(s) are desired to be bypassed with Reactor at power take actions as described in Section H.11.0.

23.0 The HWC System will trip from an Offgas Isolation on any automatic or manual closure of the Recombiner inlet valve for the Train selected by the HWC/Offgas System Selector Switch.

24.0 The Charcoal Adsorbers must be in service prior to placing the Offgas Radiation Monitor Delay pipe in service.

D. PRECAUTIONS AND LIMITATIONS (Continued)

25.0 2CCS-MOV45A/B, OFFGAS COND 1A/1B OUTLET ISOLATION, with both control switches in green flagged position will automatically operate as follows:

- One Recombiner train placed in service - the in service valve opens fully (about 23% open position)
- Both Recombiner trains in service - both valves open to mid position (about 13% open position)
- Placing a standby Recombiner train in service - the on line valve travels closed from full open to mid position prior to the standby valve opening to mid position
- One Recombiner train trips or is placed in standby - the tripped/standby train's valve closes prior to the inservice train's valve opening fully.

26.0 When the Auxiliary Steam supply to the Preheaters is isolated during normal operations, the following conditions would require restoring Auxiliary Steam to the Preheaters:

- Changes in system configurations, such as dual train to single or swapping SJAE trains, would require restoration before performing manipulations.
- During normal plant shutdown, Auxiliary Steam supply would need to be reestablished prior to reaching a Recombiner differential temperature of less than 100°F as indicated between 2OFG-TI15A/B and 2OFG-TI30A/B at 2OFG-IPNL122.

27.0 High Offgas flows can affect the operability of the Offgas Radiation Monitors, 2OFG-RE13A (B). The setpoints for Offgas flow for 2OFG-RE13A (B) are based on a maximum flow rate of 40 SCFM. If Offgas flow exceeds 40 SCFM, check with RP Calibrations for operability of 2OFG-RE13A (B).

Initials/Date

H. OFF-NORMAL PROCEDURES

1.0 OFG System Recovery After Automatic Shutdown **[SOP] [EOP]**

> **NOTE**
>
> - Loss of the OFG System will result in a rapid loss of condenser vacuum. Depending upon plant operating conditions, this may result in a Turbine Trip, MSIV Closure and Reactor Scram. The time available to correct the situation is dependent on several variables including Reactor power, condenser air in-leakage and CWS temperature.
> - Performance of this subsection may be required by the EOPs. Changes to this subsection (including renumbering) are required to be reviewed by the EOP coordinator.

1.1 Dispatch an operator to 2OFG-IPNL122 to determine cause of loss of OFG System.

1.2 Commence reducing Reactor power per N2-SOP-101D, Rapid Power Reduction.

1.3 Enter N2-SOP-09, Loss of Condenser Vacuum, AND execute concurrently with this procedure.

1.4 At 2OFG-IPNL122, perform appropriate Annunciator Response Procedures.

> **NOTE**
>
> All actions in Step H.1.5 are performed at 2OFG-IPNL122 unless otherwise noted.

1.5 WHEN cause of OFG System automatic shutdown has been identified AND corrected, recover system as follows:

> **NOTE**
>
> If OFG Recombiner temperatures are < 290°F, recovery of the OFG System will not be possible in a timely manner and the system shall be considered non-recoverable.

1.5.1 Verify 2OFG-RBNR1A (B) are ready to resume H2/O2 recombination by observing temperature greater than or equal to 290°F on TEMPERATURE TI-30A (B) RECOMBINER 1A (B) using selector switch TEMPERATURE RBNR-1A (B), TE31A (B), TE32A (B), TE33A (B).

CAUTION

If H_2 concentrations downstream of the operating Recombiner Train are > 4%, no valves are to be operated until H_2 concentrations are < 4% due to the potential for hydrogen ignition and detonation. This may be overridden in an emergency by SM direction.

1.5.2 Verify H_2 concentration downstream of Recombiner Train is less than 4% by observing OFF GAS SYSTEM 1A (B), HYD SYS 1A (B) % LFL is reading less than 4%.

1.5.3 IF required, Offgas System High Radiation Trip may be defeated per Attachment 6, Removal and Restoration of Offgas System High Radiation Monitor Trips.

1.5.4 Reset the Offgas circuits by depressing AND releasing the following RESET pushbuttons:

- RESET RE13A&B red pushbutton
- RESET SYSTEM A black pushbutton
- RESET SYSTEM B black pushbutton
- RESET VAC PUMP VP-1A black pushbutton
- RESET VAC PUMP VP-1B black pushbutton

1.5.5 Open 2OFG-LV20A (B), CONDENSER 1A (B) LEVEL CONTROLLER, to allow process flow to recycle back to Main Condenser.

1.5.6 Open 2OFG-AOV1A (B), PREHTR E1A (B) INLET ISOL, by placing control switch to STARTUP.

1.5.7 Verify 2OFG-AOV103, OFFGAS EXHAUST TO MAIN STACK open.

NOTE

When both 2OFG-AOV1A and AOV1B are open, 2CCS-MOV45A and MOV45B will each automatically open to mid position. If only 2OFG-AOV1A (B) is open, the associated 2CCS-MOV45A (B) will automatically open fully. The valves are located in the OFG Bldg El 261' Hallway.

1.5.8 Locally, verify 2CCS-MOV45A (B), OFFGAS CONDENSER 1A (B) OUTLET ISOLATION, is in proper position.

1.5.9 Verify one Dryer is in service with its associated valve control switch in OPEN (2OFG-AOV4A/5A, 4B/5B, AND 4C/5C).

1.5.10 IF required, start 2OFG-P1A AND P1B, VACUUM PUMP VP-1A (B).

1.5.11 WHEN recombination is occurring, as indicated by OFG Recombiner temperature rising, place 2OFG-LV20A (B) control switch in AUTO.

1.5.12 Open 2OFG-AOV11A (B), CONDENSER 1A (B) OUTLET ISOLATION, by placing the control switch to STARTUP.

1.5.13 WHEN OFG System stabilizes, perform the following:

a. Push RESET SYSTEM A (B) pushbutton.

b. Return Recombiner Train Isolation AOV control switches to AUTO.

1.5.14 IF required, reperform Steps H.1.5.4 through H.1.5.12 to return second OFG Recombiner Train to service.

1.5.15 IF Offgas System High Radiation Trip was defeated, restore Offgas System High Radiation Trip per Attachment 6, Removal and Restoration of Offgas System High Radiation Monitor Trips.

1.6 IF OFG System can NOT be returned to service in a timely manner, THEN continue to lower Reactor power per N2-SOP-101D.

1.7 IF a Turbine trip occurs, refer to N2-SOP-21, Turbine Trip.

1.8 IF a Scram occurs, refer to N2-SOP-101C, Reactor Scram.

2.0 <u>Offgas Vacuum Pump High Suction Pressure Trip</u>

NOTE

- All actions in this Subsection are performed at 2OFG-IPNL122 unless otherwise noted.
- When a high suction pressure occurs, the operating vacuum pump trips and the standby pump auto starts. The high pressure signal to the tripped pump seals in and must be reset in order to place the pump in standby or in service.

2.1 Verify cause of high suction pressure trip has been determined AND corrected.

2.2 IF tripped pump is to be placed in standby, THEN perform the following:

2.2.1 Position VACUUM PUMP SELECT TRAIN 1A/1B switch to in-service vacuum pump VP-1A <u>OR</u> VP-1B.

2.2.2 For tripped pump, place VACUUM PUMP VP-1A (B) control switch in AUTO.

2.2.3 For tripped pump, depress AND release RESET VAC PUMP VP-1A (B) pushbutton.

2.3 IF tripped pump is to be placed in service, THEN perform the following:

2.3.1 For tripped pump, depress AND release RESET VAC PUMP VP-1A (B) pushbutton.

Facility: Nine Mile Point Unit 2 Scenario No.: NRC-2 Op-Test No.: LC2 14-1

Examiners: ______________ Operators: ______________

Initial Conditions: The plant is operating at approximately 65% power with a plant shutdown in progress. IRM 'D' is out of service and bypassed. EHC pump 'B' is out of service.

Turnover: Place the "C" heater drain pump in recirculation mode IAW N2-OP-8, Section G.1. Lower power using recirculation flow to 58%.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP, SRO	Place heater drain pumps in recirculation mode. **N2-OP-101D, N2-OP-8 G.1.0**
2	N/A	R-ATC, SRO	Continue shutdown using Recirc flow **N2-OP-101C**
3	RD05	C-ATC, SRO TS-SRO	Control Rod drift. **ARPs, N2-SOP-8, T.S. 3.1.3**
4	CS01B	C-BOP, SRO TS-SRO	Inadvertent initiation of HPCS due to high drywell pressure. **N2-OP-33, T.S. 3.5.1**
5	CW09 CW26	C-BOP, SRO	Lowering intake level due to clogged strainer **N2-SOP-11**
6	FW03A FW03B	M-All	Loss of all high pressure feedwater pumps requiring scram **N2-SOP-06, N2-EOP-RPV**
7	RD12	C-ATC, SRO	Loss of RDS for injection. **N2-EOP-RPV, N2-SOP-101C**
8	RR20 RH14A	M-All	A LOCA occurs. The Division 1 ECCS system fails to automatically initiate. **N2-EOP-PC, N2-EOP-6**
9	RH10B	C-All	2RHS*MOV25B will stick shut, preventing drywell sprays. **N2-EOP-PC, N2-EOP-6, N2-EOP-C2**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: **Nine Mile Point Unit 2** Scenario No.: **NRC-2**		Op-Test No.: **LC2 14-1**
1. Total malfunctions (5-8) **Events 3, 4, 5, 6, 7, 8, 9**	7	
2. Malfunctions after EOP entry (1-2) **Event 7, 8, 9**	3	
3. Abnormal events (2-4) **Events 3, 5, 6, 7**	4	
4. Major transients (1-2) **Event 6, and 8**	2	
5. EOPs entered/requiring substantive actions (1-2) **N2-EOP-RPV, N2-EOP-PC**	2	
6. EOP contingencies requiring substantive actions (0-2) **N2-EOP-C2**	1	
7. EOP Based Critical tasks (2-3)	2	

CRITICAL TASK DESCRIPTIONS:	**CRITICAL TASK JUSTIFICATION:**
CT-1.0: Given service water intake bay level less than 234 ft and a failure of 2SWP*MOV77A & 77B to automatically open, the crew will take action to manually open 2SWP*MOV77A & 77B per N2-SOP-11.	*This task is identified as critical because without operator action, the plant will lose its ultimate heat sink.*
CT- 2.0: Given a LOCA in the Drywell with a failure of Feedwater and CRD pumps, the crew will inject with preferred and alternate injection systems to restore and maintain RPV water level above -14 inches, in accordance with N2-EOP-RPV.	*This task is identified as critical because without operator action, adequate core cooling, through submergence, would be lost, which would result in damage to fuel cladding.*
CT- 3.0: Given Suppression Chamber Pressure unable to be restored and maintained within the Pressure Suppression Limit, the crew will open 7 SRV's IAW N2-EOP-C2.	*This task is identified as critical because without operator action, the primary containment pressure suppression function would continue to degrade and would not be able to accept a full blowdown of the reactor.*

Exelon Generation

Copy ___ of ___

Training Id: **NRC 2015 Scenario 2** Revision: **0.0**

Title: **PC 4, High containment pressure approaching PCPL, exceeds PSP, RPV Blowdown required**

	Signature / Printed Name	Date
Developed By	Paul Isham	7/1/15
Validated By	Carl Jones	11/3/15
	Dan Delaney	
	Brian Moore	
Facility Reviewer	Mark Greer	11/13/15

References

1. N2-OP-101D, Reactor Shutdown
2. N2-OP-8, Feedwater Heaters and Extraction Steam System
3. N2-OP-33, High Pressure Core Spray System
4. N2-SOP-08, Unplanned Power Changes
5. N2-SOP-11, Loss or Degraded Service Water System
6. N2-SOP-101C, Reactor Scram
7. N2-EOP-RPV
8. N2-EOP-PC
9. N2-EOP-C2, RPV Blowdown
10. N2-EOP-6, NMP2 EOP Support Procedure
11. Unit 2 Technical Specifications

Instructor Information

A. Scenario Description

Sequence of Events / Expected Crew Response:

The scenario begins at approximately 65% power in the process of shutting down for a refueling outage. IRM 'D' is out of service and bypassed. EHC Pump B is out of service for maintenance.

The crew will place the "C" heater drain pump in recirculation mode. The crew will then continue the shutdown by lowering recirculation flow. After a significant power reduction a control rod will drift out of the core. The SRO will direct the control rod be inserted and disarmed then enter Technical Specification 3.1.3.

Once the control rod drift is addressed the crew must respond to an inadvertent HPCS initiation that will require securing HPCS and placing it in pull-to lock. The SRO reviews T.S. 3.5.1 for HPCS being inoperable. After these Technical Specifications are determined, Service Water intake clogging will occur causing Service Water intake bay level to lower. The crew will take action per N2-SOP-11 and attempt to clean the traveling screens. Intake bay will continue to lower to 234 feet. The intake bay bypass valves 2SWP*MOV77A/B will fail to automatically open requiring the crew to take manual action to open the valves **(CRITICAL TASK)**. Once MOV77A and B are open, intake bay level will recover.

Once Service Water intake bay level is restored, a loss of all feed pumps will occur. The loss will require the crew to place the Mode Switch in shutdown. A LOCA will occur. RPV level will be controlled using alternate level control systems in accordance with N2-EOP-RPV **(CRITICAL TASK)**. The LOCA will also cause Primary Containment (PC) parameters to degrade and the crew will enter N2-EOP-PC to stabilize PC parameters. Malfunctions in the Division 1 RHS systems will prevent RHS A from being used for primary containment control and the crew will be required to use RHS B to spray the suppression chamber. As PC conditions continue to degrade, the crew will attempt to spray the drywell using RHS B. While the crew is attempting to align drywell sprays, 2RHS*MOV25B (Drywell Spray Valve) will stick shut. Plant Operators will be dispatched in an attempt to manually open MOV25B. While the POs are attempting to manually open MOV25B, primary containment parameters will continue to degrade. The SRO will determine that Suppression Chamber Pressure cannot be restored and maintained within the Pressure Suppression Limit and will enter N2-EOP-C2 and direct 7 ADS valve be opened. The crew will open 7 SRV's and blowdown the reactor **(CRITICAL TASK)**. The scenario may be terminated once 7 SRV's are opened.

1. Termination Criteria

   a. 7 SRVs are open and reactor pressure is lowering.

2. Critical Tasks

CT-1.0, Given service water intake bay level less than 234 ft and a failure of 2SWP*MOV77A & 77B to automatically open, the crew will take action to manually open 2SWP*MOV77A & 77B per N2-SOP-11.

Justification:

Safety Significance: *The intake is shared with pumps from safety significant systems such as Service Water. In the event of lowering intake water level with the plant at power, action must be taken in order to preserve water in the intake for other systems to maintain use of the lake as a heat sink.*

Cueing: *Multiple annunciators will provide indication of low intake level. Field reports will provide additional information about lowering intake level. N2-SOP-11 provides direction of appropriate actions.*

Measurable Performance Indicators: *Manipulation of control room switches will provide observable actions for the evaluation team.*

Performance Feedback: *Valve indications and indications of rising intake water level will provide performance feedback regarding the success of opening 2SWP*MOV77A/B*

CT-2.0, Given a LOCA in the Drywell with a failure of Feedwater and CRD pumps, the crew will inject with preferred and alternate injection systems to restore and maintain RPV water level above -14 inches, in accordance with N2-EOP-RPV.

Justification:

Safety Significance: *Maintaining Reactor water level above -84 inches ensures adequate core cooling through the preferred method of core submergence. This protects the integrity of the fuel cladding.*

Cueing: *Multiple Reactor water level indicators and annunciators will provide indications of lowering Reactor water level. N2-EOP-RPV provides multiple procedure steps directing injection with preferred and alternate injection systems.*

Measurable Performance Indicators: *Manipulation of pumps and/or valves in the preferred or alternate injection system(s) will provide observable actions for the evaluation team.*

Performance Feedback: *Multiple Reactor water level indicators and annunciators will provide performance feedback regarding the success of injection with preferred and alternate injection systems.*

CT-3.0, Given Suppression Chamber Pressure unable to be restored and maintained within the Pressure Suppression Limit, the crew will open 7 SRV's IAW N2-EOP-C2.

Justification:

Safety Significance: *A Blowdown is required to limit further release of energy into the Primary Containment and to ensure that the RPV is depressurized while pressure suppression capability is still available. This protects the integrity of the Primary Containment.*

Cueing: *Multiple Primary Containment pressure indicators and annunciators will provide indications. N1-EOP-4 provides direction to monitor the Pressure Suppression Pressure limit and blowdown if required.*

Measurable Performance Indicators: *Manual operation of SRVs will provide observable actions for the evaluation team.*

Performance Feedback: *SRV instrumentation will provide indication that these systems are functioning properly once placed in service. Multiple Reactor pressure indicators and annunciators will provide performance feedback regarding the success of the blowdown.*

3. Length
    a. ~60 minutes
4. Mitigation Strategy Code
    a. PC 4, High containment pressure approaching PCPL, exceeds PSP, RPV Blowdown required
5. Technical Specifications
    a. TS 3.1.3
    b. 3.5.1
6. EAL Classification
    a. Alert, FA-1.1, ANY loss or ANY potential loss of EITHER Fuel Clad barrier OR RCS barrier.
    b. Table F-1, RCS Barrier B.2, C.4
2. Special Orders
    a. None

B. Initial Conditions

1. IC Number

   a. IC-152

2. Presets / With Triggers

a. Malfunctions

1)	**NM07D,** IRM Channel Failure - Downscale	**Inserted**
2)	**TC15B,** EHC Pump Trip B	**Inserted**
3)	**RD05-30-55,** CONTROL ROD DRIFT, FV=TRUE	**TRG2**
4)	**CS01B,** HPCS INITIATION ON LOW LEVEL, FV=TRUE	**TRG4**
5)	**CW09,** SW INTAKE CLOGGING, FV=50, RT=4:00	**TRG6**
6)	**RR20,** DBA LOCA, FV=1.8, RT=12:00	**TRG8**
7)	**FW03A,** FEED PUMP TRIP (P1A) FV=TRUE	**TRG8**
8)	**FW03B,** FEED PUMP TRIP (P1B) FV=TRUE, DT=3	**TRG8**
9)	**FW03C,** FEED PUMP TRIP (P1C) FV=TRUE, DT=15	**TRG7**
10)	**RD12A,** CRD FEED PUMP TRIP (P1A) FV=TRUE	**TRG10**
11)	**RD12B,** CRD FEED PUMP TRIP (P1B) FV=TRUE, DT=3	**TRG10**
12)	**RH10B,** RHS*MOV25B Jammed FV=True	**Inserted**

b. Remotes

1)	**FW13C**, 2HDL-LIC24C REMOTE SETPOINT, FV=35, RT=:45	**TRG1**
2)	**RD08-30-55**, HCU ISOLATION, FV=CLOSE	**TRG3**
3)	**CW26**, 2SWP*MOV77A/B FAIL TO AUTO OPEN, FV=TRUE	**Inserted**
4)	**RM02-041**, SWP 23B RAD MONITOR ONLINE, FV=ON	**TRG12**
5)	**RM03-041**, SWP 23B RAD MONITOR SAMPLE PUMP POWER, FV=ON	**TRG12**

c. Overrides

1) **DI03514**, RHS A SWITCH IN STOP, FV=OFF **Inserted**

2) **DI03515**, RHS A SWITCH IN NORMAL AFTER STOP, FV=OFF **Inserted**

3) **DI0360**, RHS A SWITCH IN NORMAL AFTER START, FV=OFF **Inserted**

4) **DI0361**, RHS A SWITCH IN START, FV=OFF **Inserted**

d. Annunciators

5) None

e. Event Triggers

Event #	Event Action	Command
8	**zdrps1d==1** (mode switch to shutdown)	**Blank**
7	**zdrps1d==1 .and. zdfwsc11(2)==1** (mode switch to shutdown and Feed Pump C control switch to start)	**Blank**
10	**zdrps1d==1 .and. zdrd001b(2)==1** (mode switch to shutdown and RDS Pump B control switch to start)	**Blank**

f. Equipment Out of Service

1) IRM D Bypassed

2) EHC Pump B

g. Support Documentation

1) Turnover sheet and ReMA

2) N2-OP-101D, Marked up to step G.1.20

3) N2-OP-8, Section G.1.0. Steps G.1.1 through G.1.4 are marked as complete.

h. Miscellaneous

1) Protect the following equipment:

   a) EHC Pump 'A'

   b) Place info tag on EHC pump 'B'

   c) Off normal flag on IRM 'D'

2) >100% Rodline Sign NOT Posted

Exelon Generation

SHIFT TURNOVER INFORMATION

ON COMING SHIFT: ☐ N ■ D DATE: Today

PART I: **To be performed by the oncoming Operator before assuming the shift.**

- Control Panel Walkdown (all panels) (SRO, ROs)

PART II: **To be reviewed by the oncoming Operator before assuming the shift.**

- LCO Status (SRO)
- Shift Turnover Information Sheet

Evolutions/General Information/Equipment Status:

- Reactor power is approximately 63% with a reactor shutdown in progress, currently on step G.1.20.
- EHC Pump B is out of service for maintenance
- IRM D is out of service and bypassed due to a failure.
- Rodline <100%
- Heater Drain Pumps A and B are in Recirculation Mode
- 8 Condensate Demineralizers are in service

PART III: **Remarks/Planned Evolutions:**

- Place Heater Drain Pump C in recirculation mode per N2-OP-8, Section G.1.0. Steps G.1.1 through G.1.4 are complete. An operator is standing by at 2CES-IPNL204
- Once heater drain pumps are in recirc mode, lower reactor power to 60% using Recirc flow per the provided REMA. RE and STA are available in the control room.

Shift Turnover

Instructor Actions / Plant Response	Operator Actions
Take the Simulator out of freeze before the crew enters for the pre-shift walkdown. • Verify annunciator sound turned on • If recording scenario, start the recording device during the pre-shift walkdown	
Allow no more than 5 minutes to walkdown the panels.	**Crew** • Walkdown panels • Conduct shift turnover brief • Assume the shift

Event #1: Place heater drain pump in recirculation mode.

Event Information	• Place heater drain pump in recirculation mode.

Note The booth operator should have up the following screen displayed on the simulator computer: FW06, Extraction Steam II	**SRO** • Directs the BOP to place Heater Drain Pump C in recirculation mode.
	BOP • Acknowledges direction to place Heater Drain Pump in recirculation mode. • At 2CEC*PNL851, slowly raise HDL-LV4C, FD WTR HTR CNM-E4C WTR LEVEL CONTROL setpoint to 47%
Role Play As PO directed to lower tape setting (N2-OP-8, G.1.6), immediately **insert** the following **remote function**: **TRG1** **FW13C**, 2HDL-LIC24C REMOTE SETPOINT, FV=35, RT=:45 Once the remote setpoint reaches 35, contact the control room and inform them that the tape setting is at 35 and 2HDL-LV24C is closed.	• Contacts PO at 2CES-IPNL204 and directs them to slowly lower HDL-LV24C, 4TH PT HTR E4C HIGH DR tape setting in Auto UNTIL 2HDL-LV24C begins to open OR tape setting is at 35%. • Places 2HDL-LV4C in MAN AND slowly closes the valve WHILE verifying the following:
Role Play As PO, observe the position of LV24C on the FW06, Extraction Steam II display and inform the control room when it begins to open and control level.	o At 2CES-IPNL204, HDL-LV24C, 4TH PT HTR E4C HIGH DR, opens to control heater level. o 2HDL-FV35C, HTR DRAIN P1C RECIRC FV POSN opens AND maintains a minimum system flow of approximately 1400 gpm.

Role Play	BOP, (cont.)
As PO directed to lower tape setting (N2-OP-8, G.1.8), immediately **modify** the following **remote function** as follows: **FW13C**, 2HDL-LIC24C REMOTE SETPOINT, FV=10, RT=1:00	• Contacts the PO and directs them to slowly lower tape setting for HDL-LV24C,4th PT HTR E4C controller set to 10% • Reports to the SRO that Heater Drain Pump C is in recirculation mode.

Event Termination Criteria	• Heater Drain Pump C is in recirculation mode.

Event #2: Continue the shutdown by lowering recirculation flow

Event Information	• Reactor power is approximately 65% • The crew will lower power to ~60% with recirc flow then wait for RE to evaluate Thermal Limits.

	SRO • Directs RO to lower power to 60% in accordance with the ReMA.
	RO • Lowers power to 60 % by reducing core flow • Uses manual FCV closure signals at one of the Recirc FCV controllers, RCS*HYV17A&B, one FCV at a time. • Moves RCS*HYV17A&B individually in the close direction, maintaining loop flow differential at a minimal. • Monitors NIs and rate of power change.
	BOP • Monitors plant parameters to verify proper operations. • Determines feedwater control maintains RPV water level. • Provides peer checks as requested

Event Termination Criteria	• Sufficient plant power manipulation has been observed.

Event #3: Control Rod 30-55 drifts out of the core.

Event Information	• Control Rod 30-55 drifts out of the core. • The crew will respond per N2-SOP-08 and isolate the associated HCU

When directed by the Lead Evaluator, insert the following malfunction: **TRG2** **RD05-30-55**, CONTROL ROD DRIFT, FV=TRUE • *Rod 30-55 begins to drift out* • *Reactor Power Rises* • *MWe Rises* • *603443, CONTROL ROD DRIFT*	
	CREW • Recognizes and reports rod 30-55 drifting out
	SRO • Acknowledges report of rod 30-55 drifting out • Directs RO to enter N2-SOP-08
	RO • Acknowledges direction to enter N2-SOP-08 • Determines power change is due to a drifting control rod
Note When the RO attempts to insert the control rod, the rod will insert	• Selects rod 30-55 and depresses the insert pushbutton

Note Once the rod is fully inserted, the SRO/RO may direct the BOP to take over actions for N2-SOP-08	• Determines the control rod did insert and maintains the insert pushbutton depressed • Determines power was rising • Determines reactor power is already lowered below 85% • Directs BOP to monitor off gas and main steam line radiation levels • Refers to Flowchart A and determines the initial flowchart actions have been completed • Determines the control rod can be fully inserted • Determines power is already less than 85%
Note When the RO releases the pushbutton, rod 30-55 will begin to drift out again.	• Releases the insert pushbutton • Determines the rod did not remain fully inserted • Re-depresses the insert pushbutton and fully inserts rod 30-55
Role Play As PO directed to isolate HCU 30-55 (shut RDS*V103/105), wait one minute and **insert** the following **remote function**: **TRG3** **RD08-30-55**, HCU ISOLATION, FV=CLOSE -AND- **Delete malfunction RD05-30-55** Report back to the control room that valves V103 and V105 for Accumulator 30-55 have been shut.	• Contacts PO and directs them to isolate the HCU for rod 30-55 • Releases the insert pushbutton and determines rod 30-55 remains fully inserted
Role Play As PO directed to disarm rod 30-55, wait 2 minutes and inform the control room that rod 30-55 has been disarmed.	• May contact a PO and direct disarming rod 30-55 per N2-OP-30

	SRO • Declares rod 30-55 inoperable and refers to T.S. 3.1.3 and determines entry into condition C is applicable. • Determines rod 30-55 must be fully inserted within 3 hours and disarmed within 4 hours.

Event Termination Criteria	• Control Rod 30-55 HCU is isolated.

Event #4: Spurious initiation of HPCS

Event Information	• Inadvertent HPCS initiation • The crew will respond securing HPCS and placing in PTL • SRO will address tech specs.

When directed by the Lead Evaluator, insert the following malfunction: **TRG4** **CS01B**, HPCS INITIATION ON LOW LEVEL, FV=TRUE *HPCS will auto start and begin injecting into the core* *RPV water level will rise and FWLC will respond to lower level* *MWth lowers* *The following annunciators alarm:* • *852311 EDG 2 TROUBLE* • *852317 EDG 2 RUNNING* • 603139 REACTOR WATER LEVEL HIGH/LOW	
	<u>CREW</u> • Recognizes and reports HPCS initiation and injection into the RPV
	<u>RO</u> • Monitors RPV water level and FWLC response. • Reports to the SRO that FWLC is responding
	<u>SRO</u> • Acknowledges report of HPCS initiation and injection into the core and FWLC responding • Directs BOP to determine if the HPCS initiation signal is valid

	BOP • Determines drywell pressure is <1.68 psig • Determines RPV water level is >108.8 inches
Role Play If contacted as booth to provide indication of the HPCS trip units all read normal and are not tripped.	• Goes to back panels and calls the booth for indication on the HPCS trip units • Informs the SRO that HPCS did not initiate on a valid signal
	SRO • Acknowledges report from BOP that HPCS did not initiate on a valid signal • Directs BOP to shutdown HPCS per N2-OP-33, Section G.3.0 or place HPCS in Pull-To-Lock
Role Play As PO dispatched to perform running checks on HPCS diesel, acknowledge report	**BOP** • Acknowledges direction to shutdown HPCS • May depresses HPCS MANUALLY OUT OF SERVICE pushbutton • Places HPCS control switch in PTL • Informs SRO that HPCS is shutdown • May contact PO and direct them to perform running checks on HPCS DG
Role Play As WWM, acknowledge report of HPCS inadvertent initiation and inform the control room that you will put together a troubleshooting plan	**SRO** • Acknowledges report that HPCS is shutdown • Declares HPCS inoperable and enters T.S. 3.5.1 Condition B • May contact WWM and inform them of HPCS initiation

Event Termination Criteria	• HPCS pump is secured.

Event #5: Clogging of Service Water Traveling Screens

Event Information	• A clogging of service water traveling screens will cause Service Water Intake Bay level to lower. • Operators will take action to monitor and ultimately open the traveling screen bypass valves to restore intake bay level.

Note: This event takes several minutes before an annunciator alerts the crew to a problem with the service water system. At the discretion of the lead evaluator, this malfunction may be inserted prior to completing the previous event. Verify **inserted** the following **remote function**: **CW26**, 2SWP*MOV77A/B FAIL TO AUTO OPEN, FV=TRUE When directed by lead evaluator, **insert** the following **malfunction**: **TRG6** **CW09**, SW INTAKE CLOGGING, FV=50, RT=4:00 *Expected Annunciators:* *601124 TRAVELING SCREEN WASH SYSTEM TROUBLE (first alarm)* *After a period of time:* *601115 SWP PUMP 1A/C/E SUCTION PRESSURE LOW* *601127 SWP INTAKE BAY WATER LEVEL LOW* *601218 SWP PUMP 1B/D/F SUCTION PRESSURE LOW*	**<u>CREW</u>** • May identify that SW intake bay level is lowering prior to any annunciator • Recognizes and reports Annunciator 601124
Note: When Service Water Intake Bay Level reaches 238 feet (~6 min.), **modify** the following **malfunction**: **CW09**, SW INTAKE CLOGGING, FV=30	**<u>SRO</u>** • Acknowledges report • Directs actions per appropriate ARPs

Role Play As PO dispatched to investigate the trash rakes and travelling screens, wait two minutes and report that the travelling screens are clogged with debris but no additional debris is coming in. As necessary, respond to the control room that you are attempting to clean the travelling screens	**BOP** • Contacts PO and dispatches them to inspect and report the status of the trash rakes and traveling screens • Recognizes and reports SW intake bay level lowering
	SRO • Acknowledges report of lowering intake bay level • Directs BOP to enter N2-SOP-11
Role Play As PO dispatched to verify proper operation of the traveling screens and trash rakes per N2-OP-12, acknowledge report.	**BOP** • Acknowledges direction to enter N2-SOP-11 • Contacts PO and dispatches them to verify proper operation of traveling screens and trash racks per N2-OP-12 • Trips the Jet Motive Pump (SWP-P3) • When intake bay level lowers to 238 feet, verifies 2SWP*MOV30A/B are open
CT-1.0 Given service water intake bay level less than 234 ft and a failure of 2SWP*MOV77A & 77B to automatically open, the crew will take action to manually open 2SWP*MOV77A & 77B per N2-SOP-11	• **When intake bay level lowers to 234 feet, determines 2SWP*MOV77A & 77B failed to open automatically and manually opens them.** • Determines intake bay level is rising and informs the SRO.
Note: The crew may choose to place the mode switch in shutdown during the course of the event based on operator judgment. This is an acceptable action and will not prevent evaluation of the critical task nor interfere with the remaining events in this scenario.	**SRO** • Acknowledges report of rising intake bay level.

Event Termination Criteria	• 2SWP*MOV77A and 77B open • Service Water Intake Bay level rising

Event #6 and #7: Loss of Feed Pumps and Level Control Issues

Event Information	• A Loss of feed pumps will occur. • The crew will use alternate level control systems to maintain RPV water level

Note: Events 6, 7, 8, and 9 will occur in rapid succession. If the crew placed the mode switch in shutdown in the previous event, the below **malfunctions** were **inserted**: **RR20**, DBA LOCA, FV=1.8, RT=12:00 **FW03A**, FEED PUMP TRIP (P1A) FV=TRUE **FW03B**, FEED PUMP TRIP (P1B) FV=TRUE, DT=3 When directed by lead evaluator, **insert** the following **malfunction**: **TRG8** **RR20**, DBA LOCA, FV=1.8, RT=12:00 **FW03A**, FEED PUMP TRIP (P1A) FV=TRUE **FW03B**, FEED PUMP TRIP (P1B) FV=TRUE, DT=3 *Feed Pumps A and B trip* *DW pressure starts to rise slowly* *RPV water level starts to lower*	
The following annunciators alarm: • *603139, REACTOR WATER LEVEL HIGH/LOW* • *851509, REACTOR FEED PUMP 1A/1B/1C AUTO TRIP* • *851519, REAC FEED PMP 1A/1B/1C MOTOR ELEC FAULT* • *851523, CNST BSTR PMP 2A/2B/2C SUCTION FLOW LOW* • *851546, CNST PUMP DISCH HEADER FLOW LOW* • *851254, PROCESS AIRBORNE RADN MON ACTIVATED*	**CREW** • Recognizes and reports loss of feed pumps and rising drywell pressure

	SRO • Acknowledges report of loss of feed pumps and rising drywell pressure. • Directs the RO to place the mode switch in shutdown.
	RO • Acknowledges direction to place the mode switch to shutdown. • Places mode switch to shutdown. • Provides scram report to SRO
	SRO • Acknowledges scram report • Enters N2-EOP-RPV on low RPV water level • Directs RO to perform actions of N2-SOP-101C • Directs RO to maintain RPV water level 160 to 200 inches using any one or a combination of the following injection sources: o Feed Pump by starting Feed Pump C o Maximize RDS Flow per N2-OP-30, H.3.0 o RCIC o HPCS o Condensate Booster Pumps (requires a pressure reduction) • Directs BOP to maintain RPV Pressure 800 to 1000 psig with the EHC system or to coordinate with RO to maintain 500 to 600 psig with EHC to facilitate booster pump injection.

	RO (N2-SOP-101C) • Acknowledges direction to take actions per N2-SOP-101C • Acknowledges direction to maintain RPV water level 160 to 200 inches using o Feed Pump by starting Feed Pump C o RDS Flow per N2-OP-30, H.3.0 o RCIC o HPCS o Condensate Booster Pumps • Performs initial actions of N2-SOP-101C: o Verifies turbine has tripped and TSV/TCVs are shut o Verifies generator has tripped and house loads have transferred o Verifies SDV vent and drain valves have closed o Verifies RCS pumps have downshifted o As necessary inserts SRMs and IRMs o Determines scram cannot be reset due to high drywell pressure o Places all FWLC Valves to MANUAL and verifies all FWLC Valves are fully shut
Role Play As PO directed to energize 2WCS-MOV107, acknowledge the report.	**RO cont.** o May direct energizing 2WCS-MOV107 o May shutdown HWC

Note: The starting of Feed Pump C may or may not be performed based on the level control strategy selected by the SRO.	**RO (N2-SOP-101C – Start Feed Pump C)** • Attempts to start Feed Pump C per N2-SOP-101C as follows: o Determines at least one condensate pump is available o Places Feed Pump A and B control switches in Pull To Lock o Determines at least two condensate pumps and two condensate booster pumps are already running. o Places the FWLC Master and individual controllers in MANUAL and shuts all FWLC valves. o Determines that it is not required to reset the Level 8 trips. o Confirms Feed Pump C suction is >500 psig o Verifies Feed Pump C Aux Oil Pump is running.
When the RO places the Feed Pump C switch to start, verify **inserted** the following **malfunction**: **TRG7** **FW03C**, FEED PUMP TRIP (P1C) FV=TRUE, DT=15 *After 15 seconds, Feed Pump C trips*	o Places Feed Pump C control switch to START o Confirms Feed Pump C starts when the minimum flow valve is ~19% open. o Opens Feed Pump C FWLC Valve and injects to maintain RPV Level 160 to 200 inches. o Recognizes and reports that Feed Pump C has tripped on motor electric fault and that Feed Pump C is not available.
Note: The maximizing of RDS Flow may or may not be performed based on the level control strategy selected by the SRO.	**RO (N2-OP-30 – Maximize RDS flow)** • Attempts to maximize RDS Flow as follows: o Determines that both RPS A and B are tripped. o Verifies RDS Pump 1A is already running.

When the RO places the RDS Pump 1B switch to start, verify **inserted** the following **malfunctions**: **TRG10** **RD12A**, CRD FEED PUMP TRIP (P1A) FV=TRUE **RD12B**, CRD FEED PUMP TRIP (P1B) FV=TRUE, DT=3 *RDS Pumps P1A and P1B trip.*	**<u>RO cont.</u>** o Places RDS Pump 1B control switch in START o Recognizes and reports that both RDS Pumps have tripped on motor electric fault and are not available
Note: Use of HPCS may or may not be performed based on the level control strategy selected by the SRO.	**<u>RO (Starting HPCS - N2-OP-33)</u>** • Starts HPCS as follows: o If not already initiated due to Level 2 or high drywell pressure, ARM's and DEPRESSES the HPCS MANUAL INITIATION PUSHBUTTON. o Verifies HPCS Pump starts o Verifies HPCS Injection Valve opens o Verifies HPCS Minimum Flow Valve closes on rising HPCS flow
<u>Role Play</u> If contacted as PO to perform running checks on the Division 3 EDG, wait two minutes and inform the control room that running checks have been completed satisfactorily	o Verifies Division 3 EDG starts. o At 2CEC*PNL851, verifies open 2CNS-AOV123, CONDENSATE STORAGE TKS MAKE UP VLV o OPENS and SHUTS HPCS Injection Valve as necessary to maintain RPV Water Level 160 to 200 inches.

	<u>RO (Starting RCIC – N2-EOP-HC)</u>
	• Initiates RCIC as follows:
	  o If RCIC is not already running, arms AND depresses RCIC MANUAL INITIATION pushbutton
	  o Verifies the following:
	    ▪ GLAND SEAL SYSTEM AIR COMPRESSOR starts
	    ▪ ICS*MOV116 opens
	    ▪ ICS*MOV120 opens
	    ▪ ICS*MOV126 opens
	    ▪ WHEN RCIC flow >220 gpm, ICS*MOV143 closes
	    ▪ WHEN RCIC discharge pressure > Reactor pressure, ICS*V156 AND ICS*V157 open
	    ▪ RCIC injection to Reactor controlled at 600 gpm
	    ▪ ICS*AOV109 closes
	    ▪ ICS*AOV110 closes
	    ▪ ICS*AOV130 closes
	    ▪ ICS*AOV131 closes
	  o Controls RCIC as follows:
	    ▪ If maintained in Automatic Control, maintains Turbine Speed >1500 rpm and Injection Flow between 400 to 600 gpm.
	    ▪ If maintained in manual Control, maintains Turbine Speed >1500 rpm and Injection Flow <600 gpm.
	  o If it is desired to reject RCIC to the CST (i.e. tank to tank mode), performs the following:
	    ▪ Opens 2ICS*MOV124, TEST BYPASS TO CON. STORAGE TANK
	    ▪ Throttles 2ICS*FV108 TEST BYPASS TO CON. STORAGE TANK as necessary to control RPV Level.

Note:
Use of Condensate Booster Pumps for injection may or may not be performed based on the level control strategy selected by the SRO. If this strategy is selected, then an RPV pressure reduction will be required to allow booster pumps to inject.
	<u>BOP (Lowering RPV Pressure for Inject.)</u>
	• Acknowledges direction to maintain RPV pressure 500 to 600 psig using EHC.
	• Coordinates with RO and lowers RPV pressure as follows:
	  o DEPRESSES the INCREASE pushbutton for the BYPASS OPENING JACK until 5 bypass valves indicate full open
	  o Adjusts the bypass valves as necessary to control RPV Pressure 500 to 600 psig.

	<u>RO (Injecting with Cond. Booster Pumps)</u>
	• Coordinates with BOP to lower RPV pressure and injects with Condensate Booster Pumps as follows:
	  o As RPV pressure lowers, opens LV10A, B, or C as required to maintain RPV level 160 to 200 inches.
	  o May place FWLC back into automatic.

	<u>BOP (N2-SOP-101C – Pressure Control)</u>
	• Acknowledges direction to maintain RPV pressure 800 to 1000 psig using EHC.
	• As necessary to control pressure, performs the following:
	  o Closes 2MSS-AOV87A/B/C/D and AOV88A/B
	  o Closes 2ASS-MOV152
	  o Starts 2ARC-P1A or B as follows:
	    ▪ Confirms there is no fuel damage
	    ▪ Closes 2ARC-AOV104
	    ▪ Places in AUTO 2ARC-AOV105
	    ▪ Opens SWP-HV98A(B)
	    ▪ Starts 2ARC-P1A(B)
	    ▪ Verifies proper operation
	  o Closes 2ASS-MOV148
	  o As necessary to prevent excessive cooldown, closes the MSIV's.

	SRO • As required, acknowledges report of trip of Feed Pump C and RDS Pumps. • Adjusts level control and pressure control strategies as appropriate based on equipment malfunctions.

Event Termination Criteria	• RPV Level Control has been established. • RPV Pressure Control has been established.

Event #8 and #9: LOCA with failure of PC Spray Systems

Event Information	• A LOCA will occur causing drywell pressure to rise. • The crew will respond and attempt to mitigate Primary Containment parameters, however due to failure of the spray systems, a blowdown will eventually be required due to PSP.

Note: The following **malfunction** was **inserted** in the previous event: **RR20**, DBA LOCA, FV=1.8, RT=12:00 Based on the level and pressure control strategies chosen by the crew, the rate of drywell pressure rise may rise or lower. As determined by the lead evaluator, the severity value on the above malfunction may be modified as necessary to raise or lower the rate of drywell pressure rise.	**Crew** • Recognizes and reports rising drywell pressure.
A few minutes after the initiation of the previous event, the following additional annunciators alarm: • *603140, DRYWELL PRESSURE HIGH/LOW* • *603101, RPS A DRYWELL PRESSURE HIGH TRIP* • *603401, RPS B DRYWELL PRESSURE HIGH TRIP* **Note:** A malfunction will prevent manually starting of RHS Pump 1A. **Role Play** If directed to investigate the cause of why RHS Pump 1A would not start and/or directed to locally shut the RHS Pump 1A breaker, wait two minutes and inform the control room that there is nothing visibly wrong with the pump and breaker but you were not able to get the breaker to shut locally.	**BOP** • Recognizes and reports that Division 1 ECCS Systems failed to automatically initiate • ARMs and DEPRESSES the Division 1 ECCS Manual Initiation Pushbutton. • Determines that the initiation pushbutton failed to operate. • Manually starts the LPCS pump by placing the control switch to START • Attempts to manually start RHS Pump 1A • Determines RHS Pump 1A will not start from the control room. • May dispatch an operator to investigate cause and/or locally shut the RHS Pump 1A breaker. • Reports to the SRO that RHS Pump 1A failed to start.

	SRO (N2-EOP-PC) • Acknowledges report of rising drywell pressure and that RHS Pump 1A failed to start. • Enters N2-EOP-PC and reenters N2-EOP-RPV when drywell pressure reaches 1.68 psig. • Determines drywell pressure cannot be maintained below 1.68 psig. • Determines Suppression Pool water level is below 217 feet. • Directs BOP to spray the suppression chamber using RHS B per N2-EOP-6.22 • As necessary, directs RO/BOP to start a 5th Service Water Pump • As necessary, directs RO/BOP to restore pneumatics to the Drywell.
	RO/BOP (N2-EOP-HC – 5th SW Pump) • Acknowledges direction to start a 5th Service Water Pump • Starts a Service Water Pump as follows: o Selects either SWP E or F to start o Verifies 2SWP*MOV74 shut for the associated pump. o Starts SWP Pump 1E or 1F by placing its associated control switch to START o Verifies the associated MOV47 opens. • Reports to the SRO that a 5th Service Water Pump has been started.
	RO/BOP (N2-EOP-HC Restore Pneum.) • Acknowledges direction to restore pneumatics to the Drywell • Restores pneumatics to the Drywell as follows: o At 2CEC*PNL851: ▪ Places LOCA OVERRIDE VLV IAS*SOV166 to OVERRIDE ▪ Opens IAS*SOV166 o At 2CEC*PNL851: ▪ Places LOCA OVERRIDE VLV IAS*SOV184 to OVERRIDE ▪ Opens IAS*SOV184 o At 2CEC*PNL601:

	▪ Places LOCA OVERRIDE VLV IAS*SOV164 to OVERRIDE ▪ Opens IAS*SOV164 o At 2CEC*PNL601: ▪ Places LOCA OVERRIDE VLV IAS*SOV165 to OVERRIDE ▪ Opens IAS*SOV165 • Informs the SRO that pneumatics have been restored to the drywell.
	BOP (N2-EOP-6.22) • Acknowledges direction to spray the suppression chamber using RHS B • Sprays the suppression chamber using RHS B as follows: o Determines a LOCA Signal is present and drywell pressure is >1.68 psig. o Opens 2SWP*MOV90B o Verifies closed and overridden 2RHS*MOV24B o Verifies running RHS*P1B o Sprays the suppression chamber by opening 2RHS*MOV33B o Verifies >450 gpm on the suppression chamber spray flow meter. o Throttles 2SWP*MOV33B as necessary to supply Service Water Flow of ~7400 gpm to the RHS B Heat Exchanger.
Role Play As RP contacted to place RE-23B in service, wait two minutes and **insert** the following **remote function** : **TRG12** **RM02-041**, SWP 23B RAD MONITOR ONLINE, FV=ON **RM03-041**, SWP 23B RAD MONITOR SAMPLE PUMP POWER, FV=ON Report back to control room that RE-23B is in service	o Contacts RP and directs them to start 2SWP*RE23B • Informs the SRO that RHS Pump 1B is spraying the suppression chamber

	SRO (N2-EOP-PC) • Acknowledges report of RHS Pump 1B spraying the suppression chamber • Waits until suppression chamber pressure reaches 10 psig •
Note: Depending on crew actions, leak rate may need to be adjusted to achieve PSP. The leak rate can be adjusted in .1 increments.	**SRO (cont.)** • Determines suppression pool water level is still below 217 feet • Determines parameters or within the Drywell Spray Initiation Limit • Directs the RO/BOP to trip both recirculation pumps • Directs the RO/BOP to trip all drywell unit coolers. • Directs BOP to spray the drywell with RHS Pump 1B.
	RO/BOP (Trip Recirculation Pumps) • Acknowledges direction to trip the Recirculation Pumps • If not already completed, trips the Recirculation Pumps as follows: o Places Control Switch(s) for Recirculation Pumps A and B to STOP • Informs the SRO that Recirculation Pumps A and B are tripped.
Note: Unless Drywell Unit Coolers have been restored per N2-EOP-6.24, the coolers should already be tripped.	**RO/BOP (Drywell Unit Coolers)** • Acknowledges direction to verify tripped all Drywell Unit Coolers • Verify tripped all Drywell Unit Coolers as follows: o At 2CEC*PNL873, observes that all red running lights for all drywell coolers are off. • Informs SRO that all drywell coolers are verified tripped.
	BOP (N2-EOP-6.22) • Acknowledges direction to spray the drywell using RHS B • Sprays the drywell using RHS B as follows:

	BOP (cont.) o Determines drywell spray interlocks are met o Verifies open 2SWP*MOV90B o Verifies closed 2RHS*FV38B o Verifies running RHS Pump 1B o Verifies 2RHS*MOV33B is open o Verifies >450 gpm on the suppression chamber spray flow meter.
Note: When attempting to spray the drywell, MOV25B will fail to open due to it being stuck shut.	o Attempts to spray the drywell by opening 2RHS*MOV15B and 2RHS*MOV25B o Recognizes that 2RHS*MOV25B will not open.
Role Play As PO directed to attempt to open 2RHS&MOV25B, wait 3 minutes and inform the control room that it is stuck shut and you are getting additional operators to help you open the valve.	o Dispatches a PO to attempt to manually open 2RHS*MOV25B o Informs the SRO that the he cannot spray the drywell using RHS Pump 1B.
	SRO (N2-EOP-PC) • Acknowledges report of the inability to spray the drywell using RHS Pump 1B • Directs the BOP to spray the drywell using Fire Water through RHS A per N2-EOP-6.6 • Analyzes the Pressure Suppression Pressure curve. • Determines he cannot restore and maintain suppression chamber pressure and suppression pool water level within the Pressure Suppression Pressure limits. • Enters N2-EOP-C2, RPV Blowdown

Role Play As PO directed to lineup Firewater to RHS A, acknowledge report. Note; this action will not be completed prior to the end of the scenario. If contacted for updates, acknowledge the request and inform the control room that you are still working on getting the lineup completed.	**BOP (N2-EOP-6.6)** • Acknowledges direction to spray the drywell using Firewater through RHS A • Sprays the drywell using Firewater through RHS A as follows: o Starts Firewater Pump 1 or 2 o Determines RHS A is not in operation o Places RHS Pump 1A in Pull To Lock o Verifies closed the following valves: ▪ RHS*MOV15A, OUTLET TO DRYWELL SPRAY ▪ RHS*MOV25A, OUTLET TO DRYWELL SPRAY ▪ RHS*MOV33A, OUTLET TO SUPPR POOL SPRAY ▪ RHS*FV38A, RETURN TO SUPPR POOL COOLING ▪ RHS*MOV24A, LPCI A Injection VLV ▪ RHS*MOV40A, SDC A Return ▪ RHS*MOV12A, HEAT EXCHANGER 1A OUTLET VLV o If possible, verifies closed RHS*MOV8A, HEAT EXCHANGER 1A INLET BYPASS VLV o Directs a PO to lineup Firewater to RHS A per N2-EOP-6.6, Starting on Step 6.1.6
Note: Based on the chosen level control strategy, the SRO may choose to prevent injection with some or all low pressure ECCS Pumps.	**SRO (N2-EOP-C2)** • Enters N2-EOP-C2, RPV Blowdown: o Determines Reactor will stay shutdown without boron o Determines drywell pressure is above 1.68 psig o As necessary based on Level Control strategy, directs RO/BOP to prevent LPCS and LPCI injection. o Determines suppression pool level is >192 feet

CT-3.0: Given Suppression Chamber Pressure unable to be restored and maintained within the Pressure Suppression Limit, the crew will open 7 SRV's IAW N2-EOP-C2	**SRO cont.** o **Directs BOP to open 7 ADS valves.**
	RO/BOP (Prevent LPCS/LPCI Injection) • Acknowledges direction to prevent LPCS and LPCI Injection • As required, prevents LPCS and LPCI Injection as follows: o If necessary, places LPCS in PTL. o Verifies shut and overridden the following valves: ▪ RHS*MOV24B, LPCI B Injection VLV ▪ RHS*MOV24C, LPCI C INJECTION VLV • Informs the SRO that LPCS and LPCI Injection has been prevented
CT-3.0: Given Suppression Chamber Pressure unable to be restored and maintained within the Pressure Suppression Limit, the crew will open 7 SRV's IAW N2-EOP-C2	**BOP (N2-EOP-HC - Blowdown)** • Acknowledges direction to open 7 ADS valves and performs the following: o Determines no SRVs are stuck open and an ECCS pump is running o **Arms and depresses both ADS pushbuttons for each division** o **Informs the SRO that 7 ADS valves are open**
	SRO (N2-EOP-RPV) • Acknowledges report from BOP that 7 ADS valves are open

Event Termination Criteria	• 7 SRVs are open • RPV Pressure is lowering

Facility: Nine Mile Point Unit 2 Scenario No.: NRC-3 Op-Test No.: LC2 14-1

Examiners: ______________ Operators: ______________

Initial Conditions: The plant is operating at approximately 90% power. IRM 'D' is out of service and bypassed. EHC pump 'B' is out of service.

Turnover: Perform a live Bus Transfer of 2NNS-SWG013 to 2NNS-SWG012 per N2-OP-71B, Sect H.6.0. Then, raise power to 95% using recirculation flow.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP, SRO	Perform a live Bus Transfer of 2NNS-SWG013 to 2NNS-SWG012 **N2-OP-71B, Sect. H.6.0**
2	N/A	R-ATC, SRO	The crew will raise reactor power to 95% using recirculation flow. **N2-OP-101D**
3	NM19A	I-BOP, SRO TS-SRO	RBM "A" Inop requires bypassing **ARPs, N2-OP-92, Tech Spec 3.3.2.1**
4	RR10A	C-ATC, SRO TS-SRO	Recirculation Pump "A" trips. **N2-SOP-29, Tech Specs 3.4.1**
5	MC01	C-All	Loss of condenser vacuum requires a reactor scram **N2-SOP-9, N2-SOP-101C**
6	RD17Z	M-All	Failure of Control Rods to Insert During the Scram **N2-EOP-RPV, N2-EOP-C5**
7	MS04	M-ATC, SRO	Steam Leak in the Drywell **N2-EOP-PC, N2-EOP-6**
8	RR27	C-All	Loss of Reactor Water Level Indication **N2-EOP-C4**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: **Nine Mile Point Unit 2** Scenario No.: **NRC-3**		Op-Test No.: **LC2 14-1**
1. Total malfunctions (5-8) **Events 3, 4, 5, 6, 7, 8**	6	
2. Malfunctions after EOP entry (1-2) **Event 7, 8,**	2	
3. Abnormal events (2-4) **Events 4, 5**	2	
4. Major transients (1-2) **Events 6, 7**	2	
5. EOPs entered/requiring substantive actions (1-2) **N2-EOP-RPV, N2-EOP-PC**	2	
6. EOP contingencies requiring substantive actions (0-2) **N2-EOP-C5**	1	
7. EOP Based Critical tasks (2-3)	2	

CRITICAL TASK DESCRIPTIONS:	**CRITICAL TASK JUSTIFICATION:**
CT-1.0: Given a failure of the reactor to scram with power <4%, the crew will ensure the reactor will remain shutdown without boron in accordance with N2-EOP-C5	*This task is identified as critical because without operator action, the plant continuing to produce power will present challenges to the plant during a failure to scram. Inserting control rods or injecting boron will lower power. Inserting control rods will ultimately provide stable, long-term core shutdown conditions.*
CT- 2.0: Given the plant with water level unknown, execute N2-EOP-C4, RPV Flooding, in accordance with N2-EOP-RPV	*This task is identified as critical because without operator action, adequate core cooling cannot be assured.*

Exelon Generation

Copy ___ of ___

Training Id: **NRC 2015 Scenario 3** Revision: **0.0**

Title: **AT5 – Low Power ATWS RPV Flooding Required**

	Signature / Printed Name	Date
Developed By	Paul Isham	7/1/15
Validated By	Carl Jones	11/3/15
	Dan Delaney	
	Brian Moore	
Facility Reviewer	Mark Greer	11/13/15

References

1. N2-OP-101D, Power Changes
2. N2-OP-71B, 4.16KV AC Power Distribution
3. N2-OP-92, Neutron Monitoring
4. N2-SOP-09, Loss of Condenser Vacuum
5. N2-SOP-29, Sudden Reduction in Core Flow
6. N2-SOP-101C, Reactor Scram
7. N2-EOP-RPV
8. N2-EOP-PC
9. N2-EOP-C4, RPV Flooding
10. N2-EOP-C5, Failure to Scram
11. N2-EOP-6, NMP2 EOP Support Procedure
12. Unit 2 Technical Specifications

Instructor Information

A. Scenario Description

Sequence of Events / Expected Crew Response:

The scenario begins at approximately 90% power. IRM 'D' is out of service and bypassed. EHC Pump B is out of service for maintenance. The crew will perform a live bus transfer of 2NNS-SWG013 to 2NNS-SWG012 per OP-71B, Sect H.6.0.

Once the bus transfer is completed the crew will take the shift and raise reactor power to 95% using recirculation flow. After the reactivity maneuver, the "A" RBM will fail inop requiring bypassing the RBM and entering Tech Spec 3.3.2.1.

After these T.S. are addressed, the A Recirculation Pump will trip the Crew will enter N2-SOP-29 and take actions including inserting 4 cram rods. The SRO will enter Technical Specifications 3.4.1 for single loop operation.

After the Tech Specs are addressed a condenser vacuum leak will occur and efforts made IAW N2-SOP-09 will not be successful. When the reactor is scrammed several groups of control rods will fail to fully insert and reactor power drops below 4%. The SRO will direct the RO to insert the control rods IAW N2-EOP-06, Attachment 14 (**CRITICAL TASK**). When the reactor scrams a steam leak will occur inside the drywell. The steam leak will result in rising Drywell temperature and pressure. When drywell temperature rises, all RPV water level indication will fail upscale. RPV Flooding is required and the RPV will have to be depressurized to flooding the RPV to the Main Steam Lines **(CRITICAL TASK)**.

When Suppression Chamber pressure exceeds 10 psig, the crew will spray the Drywell with RHR to stay below Pressure Suppression Pressure Limit.

1. Termination Criteria

   a. RPV Flooding in progress.

   b. Control Rods have been or are being inserted.

2. Critical Tasks

CT-1.0, Given a failure of the reactor to scram with power <4%, the crew ensure the reactor will remain shutdown without boron by inserting control rods in accordance with N2-EOP-C5

Justification:

Safety Significance:, *Inserting control rods ultimately provides a long-term, stable core shutdown. Boron injection alone may not provide a stable shutdown condition.*

Cueing: *Control rod position and Reactor power indications will indicate a failure to scram. N2-EOP-C5 provides direction to insert control rods and/or inject boron.*

Measurable Performance Indicators: *Manipulation of RPS, CRD, and RMCS controls will provide observable actions for the evaluation team.*

Performance Feedback: *Control rod position and Reactor power will provide performance feedback regarding success of crew actions to lower reactor power.*

CT-2.0, Given the plant with water level unknown, execute N2-EOP-C4, RPV Flooding, in accordance with N2-EOP-RPV

Justification:

Safety Significance: *With reactor water level unknown, the status of core cooling is unknown. RPV Flloding is required to establish conditions to cool the core. This protects the integrity of the fuel cladding.*

Cueing: *Multiple Reactor water level indications will indicate off-scale or invalid. N2-EOP-RPV provides direction to implement N2-EOP-C4, RPV Flooding.*

Measurable Performance Indicators: *Manipulation SRVs and injection systems will provide observable actions for the evaluation team.*

Performance Feedback: *SRV instrumentation will provide indication that these systems are functioning properly once placed in service. SRV acoustic monitors provide performance feedback regarding success of RPV Flooding actions.*

3. Length

    a. ~60 minutes

4. Mitigation Strategy Code

    a. AT5 – Low Power ATWS and RPV Flooding is required

1. Technical Specifications

    a. TS 3.3.2.1

    b. 3.4.1

2. EAL Classification

    a. FS1.1, Loss or potential loss of any two fission product barriers. RCS and Fuel Clad barriers, due to RPV water level cannot be determined.

2. Special Orders

    a. None

B. Initial Conditions

1. IC Number

   a. IC-153

2. Presets / With Triggers

   a. Malfunctions

1)	**NM07D,** IRM Channel Failure - Downscale	**Inserted**
2)	**TC15B,** EHC Pump Trip B	**Inserted**
3)	**RD17A,** Partial Insertion of One Bank of Rods Under Scram, FV = 48	**Inserted**
4)	**RD17E,** Partial Insertion of One Bank of Rods Under Scram, FV = 48	**Inserted**
5)	**RD17K,** Partial Insertion of One Bank of Rods Under Scram, FV = 48	**Inserted**
6)	**RD17I,** Partial Insertion of One Bank of Rods Under Scram, FV = 48	**Inserted**
7)	**NM19A,** RBM A INOP FAILURE, FV=TRUE	**TRG1**
8)	**RR10A,** RECIRC A PUMP BKR TRIP, FV=TRUE	**TRG2**
9)	**MC01,** CONDENSER AIR INLEAKGE, FV=50, RT=10:00	**TRG3**
10)	**MS04,** STEAM RUPTURE IN DRYWELL, FV=1.0, DT=6:00	**TRG4**
11)	**RP14A,** DIV I RRCS FAILURE/DEFEATED, FV=TRUE, DT=120	**TRG5**
12)	**RP14B,** DIV II RRCS FAILURE/DEFEATED, FV=TRUE, DT=120	**TRG5**
13)	**RP02,** RPS AUTOMATIC FAILURE, FV=TRUE, DT=120	**TRG5**
14)	**RR27,** RPV Level Instruments All Fail Upscale	**TRG6**

   b. Remotes

1)	**RM02-40**, RE23A RAD MONITOR ONLINE, FV=ON	**TRG12**
2)	**RM03-40**, RE23A SAMPLE PUMP POWER, FV=ON	**TRG12**
3)	**RM02-41**, RE23B RAD MONITOR ONLINE, FV=ON	**TRG17**
4)	**RM03-41**, RE23B SAMPLE PUMP POWER, FV=ON	**TRG17**

5) **MS06A,** DEFEAT LEVEL ONE ISOLATION OF MSIVS (JUMPER K148A), Defeated **TRG20**

6) **MS06B,** DEFEAT LEVEL ONE ISOLATION OF MSIVS (JUMPER K148B), Defeated **TRG20**

7) **MS06C,** DEFEAT LEVEL ONE ISOLATION OF MSIVS (JUMPER K148C), Defeated **TRG20**

8) **MS06D,** DEFEAT LEVEL ONE ISOLATION OF MSIVS (JUMPER K148D), Defeated **TRG20**

c. Overrides

1) None

d. Annunciators

2) None

e. Event Triggers

Event #	Event Action	Command
4	**zdrps1d==1** (Mode switch to shutdown)	**Blank**
6	**dwtgas>220** (Drywell Temperature above 220°F)	**Blank**

f. Equipment Out of Service

1) IRM D Bypassed
2) EHC Pump B

g. Support Documentation

1) Turnover sheet and ReMA
2) N2-OP-71B, Section H.6.0

h. Miscellaneous

1) Protect the following equipment:

a) EHC Pump ‘A’
b) Place info tag on EHC pump ‘B’
c) Off normal flag on IRM ‘D’

SHIFT TURNOVER INFORMATION

ON COMING SHIFT: ☐ N ■ D DATE: Today

PART I: **To be performed by the oncoming Operator before assuming the shift.**

- Control Panel Walkdown (all panels) (SRO, ROs)

PART II: **To be reviewed by the oncoming Operator before assuming the shift.**

- LCO Status (SRO)
- Shift Turnover Information Sheet

Evolutions/General Information/Equipment Status:

- Reactor power is approximately 90%
- EHC Pump B is out of service for maintenance
- IRM D is out of service and bypassed due to a failure.

PART III: **Remarks/Planned Evolutions:**

- Perform a live Bus Transfer of 2NNS-SWG013 to 2NNS-SWG012 per OP-71B, Sect H.6.0 in preparation for breaker maintenance.
- Once the switchgear transfer has been completed, raise power to 95% using Recirc flow per N2-OP-101D and provided REMA.

Shift Turnover

Instructor Actions / Plant Response	Operator Actions
Take the Simulator out of freeze before the crew enters for the pre-shift walkdown. • Verify annunciator sound turned on • If recording scenario, start the recording device during the pre-shift walkdown	
Allow no more than 5 minutes to walkdown the panels.	**Crew** • Walkdown panels • Conduct shift turnover brief • Assume the shift

Event #1: Perform a live Bus Transfer of 2NNS-SWG013 to 2NNS-SWG012

Event Information	• The crew will shift 2NNS-SWG013 to its alternate power supply in preparation for breaker maintenance, IAW N2-OP-71B.

	SRO • Directs the BOP to Perform a live Bus Transfer of 2NNS-SWG013 to 2NNS-SWG012 per OP-71B, Sect H.6.0
	BOP • Verifies that 2NPS-SWG001 AND 2NPS-SWG003 are being supplied from the same transformer (2STX-XNS1 OR 2RTX-XSR1A OR 1B). • Checks closed BREAKER 13-6, (Auxiliary Transformer to 2NNS-SWG013 Feeder) AND verifies 2NNS-SWG013 is energized. • Checks closed the following breakers AND verifies 2NNS-SWG011 AND 2NNS-SWG012 is energized: o BREAKER 11-3, (Auxiliary Transformer to 2NNS-SWG011 Feeder) o BREAKER 11-1, (2NNS-SWG011 to 2NNS-SWG012 Feeder) • Verifies voltages on 2NNS-SWG011 AND 2NNS-SWG013 are approximately equal.
Note: A time delay interlock exists which will allow the Normal Supply and Tie Breaker to be closed for up to 15 seconds when all supplies are from a common source. Paralleling of supplies in the following two steps should be performed in less than	• Closes BREAKER 13-10, (2NNS-SWG013 to 2NNS-SWG012 Feeder). • Opens BREAKER 13-6. • Verifies voltage on the following buses at approximately 4160 volts: o 2NNS-SWG011

15 seconds or the Tie Breaker (13-10) will trip open.	○ 2NNS-SWG012
Role Play If contacted as a PO to ensure proper breaker operation in the field, wait two minutes and inform them that proper breaker operation was observed.	**BOP, (cont.)** ○ 2NNS-SWG013 • Informs SRO that the live Bus Transfer of 2NNS-SWG013 to 2NNS-SWG012 has been completed

Event Termination Criteria	• Bus Transfer of 2NNS-SWG013 to 2NNS-SWG012 has been completed

Event #2: Raise Power to 95% using Recirculation Flow

Event Information	• Initial reactor power is ~90% • The crew will raise reactor power using Recirc to ~95% power

	SRO • Directs RO to raise power to 95% using Recirc flow per REMA and N2-OP-101D.
	RO • Acknowledges direction to raise reactor power to 95% using Recirc flow. • Raises power to 95% by raising core flow: o Moves RCS*HYV17A&B individually in the open direction, maintaining loop flow differential at a minimal value by alternating between the two valves. • Monitors APRMs and rate of power change.
	BOP • Monitors plant parameters to verify proper operations. • Provides peer checks as needed

Event Termination Criteria	• Reactor power has been raised sufficiently as determined by the Lead Evaluator.

Event #3: RBM "A" Failure High

Event Information	• RBM 'A' fails high • The crew will bypass the failed signal • The SRO will evaluate tech specs

When directed by Lead Evaluator, **insert** the following **malfunction**: **TRG1** **NM19A**, RBM A INOP FAILURE, FV=TRUE *Expected Annunciators* • *603204 RBM UPSCALE/ INOPERABLE* • *603442 CONTROL ROD OUT BLOCK*	
	<u>Crew</u> • Acknowledge/Report Annunciators • Diagnose failure of RBM A (INOP)
	<u>SRO</u> • Acknowledges report of failed RBM A • Direct response IAW ARPs as necessary
	<u>BOP</u> • Acknowledges SRO and enters ARP 603204 • Determines RBM A is INOP

Role Play As booth when contacted for indications on RBM A Interface Module Top, provide the following information: LED indications on A3 are as follows: • PWR 1-Lit • PWR 2-Not Lit • PWR A-Not Lit • PWR B-Not Lit LED indications on the cards: • A4-Not Lit • A5- Not Lit • A6- Not Lit • A7-Lit • A8- Not Lit • A9- Not Lit • A10- Not Lit	**BOP Cont…** • Completes N2-OP-92, Attachment 4 • Informs SRO of the results of Attachment 4 • Informs SRO that the RBM may be bypassed per N2-OP-92
	SRO • Acknowledges report from BOP
Role Play If contacted as the SM, acknowledge report. **Note** If the SRO decides to not bypass RBM A, at the Lead Evaluators discretion, call up the SRO as the SM and direct bypassing RBM A.	• May contact the SM for direction • Directs bypassing RBM A per N2-OP-92.
Role Play If contacted as WWM and/or I&C, acknowledge the report	• Contacts WWM and/or I&C

	BOP • Acknowledges direction to bypass RBM A • References N2-OP-92, Section H.2.0 • Determines no other RBMs are bypassed • Places the RBM bypass joystick to the 'A' position • Verifies RBM A BYPASS light is lit at P603
Role Play When contacted as booth to provide indications at P608, inform the operator that BYPASS MANUAL is displayed in inverse video header for RBM A	• Verifies BYPASS MANUAL is displayed in inverse video header at P608 • Informs SRO that RBM A is bypassed
Note Although RBM A is inoperable, it is only required to be operable when no peripheral, (edge) rod is selected. If an edge rod is not already selected, the SRO may direct the RO to select an edge rod to exit the applicability requirements of TS 3.3.2.1	**SRO** • Acknowledges report from BOP • References TS 3.3.2.1. Condition A and determines a 24 hour LCO applies • May direct selecting an edge rod to change the applicability

Event Termination Criteria	• RBM channel is bypassed • SRO has addressed tech specs

Event #4: Recirc Pump A trips

Event Information	• RCS Pump A will trip • Crew will respond per N2-SOP-29 • SRO will address tech specs

When directed by the Lead Evaluator, **insert** the following **malfunction**: **TRG2** **RR10A**, RECIRC A PUMP BKR TRIP, FV=TRUE • *Recirc pump "B" trips.* • *Flow and power lower.* *The following annunciators alarm:* • *602107, RECIRC PUMP 1A/1B MOTOR ELEC FAULT* • *602119, RECIRC PUMP 1A/1B MOTOR AUTO TRIP*	
	<u>CREW</u> • Diagnoses and reports trip of RCS-P1A
	<u>SRO</u> • Acknowledges report of trip of A Recirc Pump • Directs RO to enter N2-SOP-29
• *Reactor Power will be ~64%* • *Core Flow will be ~50 mlbm/hr*	**<u>RO</u>** • Acknowledges direction to enter N2-SOP-29 • Determines a Recirc pump is in service • Determines core flow and power are not within the Scram Region • Determines Core flow AND power are NOT within the OPRM Dependent Stability Region

	RO, (cont.) • Inserts the first four cram rods • Performs N2-SOP-29, Attachment 1: o Determines closure of one or both flow control valves did not cause the sudden reduction in core flow
Note Based on the initial power level and how the crew plots the power to flow, the plant may or may not be operating in the Exit region. If it is operating in the Exit region, then expect the crew to either raise core flow or insert additional cram rods to exit the Exit region. Either action is acceptable.	o Determines the plant is not operating within the EXIT region o Determines the plant is operating in the heightened awareness region and >3 OPRMs are operable o May determine plant conditions are stable and reference N2-OP-29 for operating in single loop o Determines one recirc pump tripped and the plant is not operating in natural circulation o Verifies closed flow control valve for A RCS loop o Verifies RCS loop B is operating <41,800 gpm
Role Play As I&C acknowledge the direction to adjust APRMs, Rod Blocks, and Rod Block Monitor setpoints	o Contacts I&C for adjustment to APRMs, Rod Blocks, and Rod Block Monitor o Refers to N2-OP-29, Section H.6.0 for single loop operations.
Note N2-RESP-07 may be referenced for Tech Specs.	**SRO** • Refers to TS 3.4.1 and determines the LCO is not met due to RPS flow instrumentation is not reset for single loop operation. Enters a four hour LCO, Condition C.

<u>Role Play</u> As RE contacted, acknowledge direction and inform the control room you will start working on it.	• Notifies RE to check thermal limits and to make adjustments to the rod pattern based on operation in the Heightened Awareness Region

Event Termination Criteria	• N2-SOP-29 is being executed. • SRO has addressed tech specs

Event #5: Loss of Condenser Vacuum and manual Scram required

Event Information	• Condenser air in leakage requires reactor scram due to loss of condenser vacuum. • The crew will attempt to stabilize vacuum using power manipulations, prior to scramming.

Note As the discretion of the Lead Evaluator, the next event may be initiated during the previous event. When directed by the Lead Evaluator, **insert** the following **malfunction**: **TRG3** **MC01**, CONDENSER AIR INLEAKGE, FV=50, RT=10:00 • *Offgas flows rise* • *Condenser vacuum begins to lower* • *MWe lowers* • *MWth lowers* • *AN851358, TURBINE CNSR A/B/C VACUUM LOW*	
Note Offgas flow rate will be high >65 scfm after 2 minutes. The Main Turbine will trip on low vacuum about 6 minutes after the start of the event	**CREW** • Diagnoses and reports degrading condenser vacuum

	SRO • Acknowledges report of degrading condenser vacuum • Directs BOP to enter N2-SOP-9 • Directs RO to lower power per N2-SOP-101D to stabilize vacuum
	BOP • Acknowledges direction to enter N2-SOP-9 • Determines RO is lowering power • Verifies proper operation of the following:
Role Play As a PO if contacted by the control room to verify proper operation of the SJAE, Offgas, and Circulating Water, acknowledge the direction.	o SJAE o Offgas o Circulating Water • Determines condenser vacuum cannot be maintained above 22.1"Hg • Informs the SRO that N2-SOP-9 directs tripping the turbine per N2-SOP-21
When RPS is tripped, about 50 control rods fail to fully insert. Power drops below 1%	**RO** • Reduces power with cram rods • When directed places the Mode Switch In Shutdown • Provides Scram report o RPV water level o RPV pressure o Feed pump status o MSIV status o APRMs downscale o All rods are not in

	SRO • Acknowledges report from BOP to enter N2-SOP-21 • Directs RO to place mode switch in shutdown • Directs BOP to trip the turbine per N2-SOP-21
	RO • Acknowledges direction to place the mode switch in shutdown
Note When the mode switch is placed in shutdown, **verify** the following **malfunction** is **inserted**: **TRG4** **MS04**, STEAM RUPTURE IN DRYWELL, FV=1.0, DT=6:00	

Event Termination Criteria	• Mode switch is in shutdown

Event #6: Failure of several Groups of Control Rods to Insert

Event Information	• Mode switch is in shutdown • A failure to scram occurs with power <4%

	SRO • Acknowledges scram report. • Enters N2-EOP-RPV and then exits N2-EOP-RPV and enters N2-EOP-C5 • Directs BOP to inhibit ADS • Directs HPCS be placed in Pull to Lock • Directs RO to initiate RRCS per N2-EOP-6, Attachment 13
	BOP • Acknowledges direction to inhibit ADS • Inhibits ADS by performing the following: o Places BOTH DIV I and Div II ADS AUTOMATIC INITIATION DISABLE keylock switches in ON o Verifies AN601521 and AN601522 are in • Places HPCS pump switch in pull to lock • Informs the SRO that ADS is inhibited and HPCS pump is in pull to lock

	RO • Acknowledges direction to initiate RRCS per N2-EOP-6, Attachment 14 • Manually initiates RRCS as follows: o At PNL603, arms and depresses the Division I and II A and B RRCS MANUAL INITAITION SWITCHES o Ensure the following (2CEC*PNL603): • Division I ARI INIT amber light on • Division II ARI INIT amber light on • Annunciator 603422, DIV I/II RRCS POTENTIAL ATWS, alarms • Annunciator 603306, CRD SCRAM VALVE PILOT AIR HEADER PRESS HIGH/LOW, alarms • Informs SRO that RRCS has been manually initiated
	SRO • Acknowledges the following reports: o ADS is inhibited o HPCS pump switch in pull to lock o RRCS has been manually initiated • Directs BOP to maintain RPV pressure 800-1000 psig using EHC until MSIVs shut on low vacuum and then transfer control to the SRVs. • Directs RO to maintain RPV water level 160 to 200 inches using feed and condensate.

CT-1.0: Given a failure of the reactor to scram with power <4%, the crew will ensure the reactor will remain shutdown without boron in accordance with N2-EOP-C5	• **Directs the RO to insert control rods per N2-EOP-6, Attachment 14**
	<u>**BOP**</u> • Acknowledges direction to maintain pressure 800-1000 psig using EHC and SRVs
<u>**Note**</u> The RO may insert controls by either; inserting additional manual scrams or manually driving control rods.	<u>**RO, (Additional Manual Scrams)**</u> • Acknowledges direction to insert control rods per N2-EOP-6, Attachment 14 • Determines the scram solenoid power lights are off and the scram valves are open • Resets ARI and defeats the RPS interlocks as follows:
If contacts as PO to defeat MSIV level 1 interlocks, **insert** the following **remotes:** **TRG20** **MS06A,** DEFEAT LEVEL ONE ISOLATION OF MSIVS (JUMPER K148A), Defeated **MS06B,** DEFEAT LEVEL ONE ISOLATION OF MSIVS (JUMPER K148B), Defeated **MS06C,** DEFEAT LEVEL ONE ISOLATION OF MSIVS (JUMPER K148C), Defeated **MS06D,** DEFEAT LEVEL ONE ISOLATION OF MSIVS (JUMPER K148D), Defeated Report completion to the control room.	o Contacts a PO and directs them to defeat the ARI and RPS interlocks per N2-EOP-6, Attachment 14

Role Play As PO directed to defeat the ARI and RPS interlocks, insert the following malfunctions: **TRG5** **RP14A**, DIVISION I ARI DEFEATED, FV=TRUE, DT=2:00 **RP14B**, DIVISION II ARI DEFEATED, FV=TRUE, DT=2:00 **TRG5** **RP02**, RPS FAILURE TO SCRAM, FV=TRUE, DT=2:00 When the malfunctions are fully inserted, report to the control room that ARI and RPS interlocks have been defeated	• Resets RPS A and B by placing the reset switches on PNL603 in RESET • Ensures all eight white RPS solenoid lights are lit • Ensures AN603306, CRD SCRAM VALVE PILOT AIR HDR PRESS HIGH/LOW is clear • Ensures SDV vent and drain valves are open • Waits for the scram dump volume to drain. • Initiates a manual scram when the SDV indicates sufficiently drained.
CT-1.0: Given a failure of the reactor to scram with power <4%, the crew will ensure the reactor will remain shutdown without boron in accordance with N2-EOP-C5	**RO, (Manual Insertion of Rods)** • Acknowledges direction to insert control rods

	<u>RO, (cont.)</u> • Verifies 2RDS-P1A and P1B are running • Places controller 2RDS-FC107, CRD FLOW CONTROL, in MANUAL at (2CEC*PNL603) • Depress the OPEN pushbutton on 2RDS-FC107 UNTIL the controller output meter shows 100% OR RDS pump motor current approaches 40 amps • Check that RDS System flow rises on C12-R606, CRD SYSTEM FLOW • Close 2RDS-PV101, DRIVE WTR PRESS CONTROL MOV, to maximize Drive Water ΔP • Ensure RDS Drive Water ΔP rises on C12-R602, DRIVE WTR DIFF PRESSURE • Using an SHH 5366 key, bypass the RWM by taking the RWM Operator Console BYPASS/OPERATE/TEST switch to the BYPASS position • Inserts control rods in a spiral pattern per N2-EOP-6, Attachment 14, Figures 14-2 and 14-3.

Event Termination Criteria	• Actions are in progress to lower reactor power.

Event #7 and #8: Steam Leak Inside Drywell with Loss of Reactor Level Indication.

Event Information	• Steam leak occurs when the scram is initiated. • The crew will need to take action to spray the drywell with degraded spray capability.

<u>Note</u> Six minutes after the mode switch is placed in shutdown, the steam rupture in the drywell is initiated **TRG4** **MS04**, STEAM RUPTURE IN DRYWELL, FV=1.0, DT=6:00 • *Annunciator 851254, PROCESS AIRBORNE RADN MON ACTIVATED* • *Drywell pressure rises to the ECCS initiation set-point* • *Drywell temperature rises* • *Division I and II*	
	<u>CREW</u> • Identifies and reports primary coolant leak in the drywell
	<u>SRO</u> • Acknowledges report of leak in the drywell • Enters N2-EOP-PC • Determines drywell pressure cannot be main-tained <1.68 psig • Directs BOP to place RHR A in suppression chamber sprays per N2-EOP-6, Attachment 22 • May direct BOP/RO to restore drywell pneumat-ics. • May direct BOP/RO to start another service water pump
	<u>BOP</u> • Acknowledges direction from SRO to spray the

	suppression chamber using RHS A: o Verifies open MOV90A o Verifies shut and overridden MOV24A o Verifies RHS A is running o Verifies open 2RHS*MOV33A o Throttles open 2SWP*MOV33A as necessary to establish service water flow to RHS heat exchanger
Role Play As RP contacted to place RE-23A in service, wait two minutes and **insert** the following **remote function**: **TRG12** **RM02-40**, SWP 23A RAD MONITOR ONLINE, FV=ON **RM03-40**,SWP 23A RAD MONITOR SAMPLE PUMP POWER, FV=ON Contact the control room and inform them that RE23A is in service	o Contacts RP to place RE-23A in service • Informs the SRO that RHS A is in suppression chamber sprays
	BOP/RO (Restore Pneumatics) • Restores pneumatics to the drywell as follows: o Places LOCA OVERRIDE VLV IAS*SOV166 to OVERRIDE and opens IAS*SOV166 o Places LOCA OVERRIDE VLV IAS*SOV184 to OVERRIDE and opens IAS*SOV184 o Places LOCA OVERRIDE VLV IAS*SOV164 to OVRD and opens IAS*SOV164 **BOP/RO (cont.)** o Places LOCA OVERRIDE VLV IAS*SOV165 to OVRD and opens IAS*SOV165

Note: If the crew has progressed in the scenario to the point where the last event is being waited on, it is ok to adjust MS04 in .1 increments, up to 1.5, to achieve 220F in the drywell.	**BOP/RO (Starting Service Water Pump)** • Starts a 5th service water pump as follows: o Selects a non running SWP o Checks shut the MOV74 associated with the pump o Starts the pump o Verifies all service water pumps are <10,000 gpm.
Drywell temperature rises and reaches 220°F WHEN Drywell temperature reaches 220°F, verify the following **malfunction** activates: **TRG6 RR27**, RPV Level Instruments All Fail Upscale, FV=True	**CREW** • Identifies and reports all RPV water level instruments are failed upscale
CT- 2.0: Given the plant with water level unknown, execute N2-EOP-C4, RPV Flooding, in accordance with N2-EOP-RPV	**SRO** • Acknowledges report of failed level instruments • **Determines RPV water level is unknown. Exit N2-EOP-C5 Level and Pressure Legs and enters N2-EOP-C4, RPV Flooding** • Will the reactor stay shutdown without boron ? **NO** (implements ATWS path) • Suppression Pool water level? **Above El 192 ft** • Terminate and prevent all RPV injection except: o Boron o CRD o RCIC
Detail Q2 ATWS Flooding Systems • Condensate/Feedwater • CRD (OP-30, Section H.3.0) • RCIC • RHS through shutdown cooling (EOP-6.30) • SLS, boron tank (OP-36A, Section H.1)	• Open all 7 ADS valves. o OK to exceed 100°F/hr cooldown. o Restore pneumatics • Are at least 2 SRVs open? **YES** • **WAIT** until RPV pressure is below the value in

Detail W Flooded RPV Indications
• Lowering SRV tailpipe temperatures.
• Rising RPV pressure.
• SRV acoustic monitor actuation.
• Actuation of MSL or RCIC high flow logic.
• Water leakage from RCIC turbine shaft seals.
• If MSIVs are open, two phase flow audible near main
• steam tunnel, main steam chest, main turbine stop valves, or main turbine bypass valves.
• If flooding with pumps drawing suction from the
• suppression pool, suppression pool water level lowers as the RPV and steam lines are flooded, then stabilizes when the steam lines are full.
	Table J (165 psig with 7 SRVs open)
	• Close the following valves:
	  o MSIVs
	  o MSL drain isolations
	  o RCIC steam isolations
	    ▪ Only if not needed for injection.
	• Using only ATWS Flooding Systems (Detail Q2), slowly raise injection. Control flow to establish and maintain the following conditions:
	  o At least 2 SRVs open,
	  o **AND**
	  o RPV pressure
	• **WAIT** until the RPV is flooded to the main steam lines (Detail W)

	<u>**RO**</u> (N2-EOP-HC Att 6)
	• Re-terminates and prevents injection at 2CEC*PNL603
	• Places 2FWS-HIC1600 in MANUAL and rapidly lowers output to zero
	• Verifies the following controllers are in MANUAL with zero output
	  • 2FWS-HIC1010A, B & C
	  • 2FWS-LIC1055A & B
	  • 2CNM-LIK1137
	• Informs SRO that injection terminated and prevented at 2CEC*PNL603

	<u>**RO**</u> (N2-EOP-HC Att 5)
	  • Verifies injection at 2CEC*PNL601 still terminated and prevented
	  • Informs SRO that injection terminated and prevented at 2CEC*PNL601

	<u>**RO**</u> (N2-EOP-HC Att 5) • Initiates ADS at 2CEC*PNL601 • Determines no SRVs are stuck open

After SRVs are open, RPV pressure lowers. When RPV pressure is below 165 psig, it's OK to begin injection for flooding.	• Arms and depresses the following manual pushbuttons: ADS Logic A ADS Logic E ADS Logic B ADS Logic F • Confirms seven ADS valves open • Verifies ADS SRV accumulators are ≥ 150 psig • Informs SRO that 7 ADS valves are open and RPV pressure is lowering
	RO • Raises injection to RPV using at least one of the following controllers to fill the RPV to the main steam lines: • 2FWS-HIC1010A, B, or C • As directed, maintain injection until flooded to Main Steam Lines is indicated by **Detail W Flooded RPV Indications**
	SRO • Acknowledges report that RHR A is in suppression chamber sprays • Determines suppression chamber pressure is at 10 psig • Determines he is in the good region of the DWSIL curve • Directs RO to trip Recirc Pumps • Directs BOP to verify tripped all drywell unit coolers • Directs BOP to spray the drywell using RHR A
	RO • Acknowledges direction to trip Recirc Pumps • Trips Recirc Pumps by placing their control switches in NORMAL AFTER STOP • Informs the SRO that Recirc Pumps are tripped

	BOP
	
	• Acknowledges direction to verify tripped all dry-well unit coolers
	• Verifies tripped all drywell unit coolers as follows:
	  o Goes to PNL873 and places all drywell unit cooler control switches to NORMAL AFTER STOP
	  o Informs the SRO that all drywell unit coolers are tripped
	• Sprays the drywell with RHR A as follows:
	  o Determines drywell spray interlocks are met
	  o Verifies open SWP*MOV90A, HEAT EX-CHANGER 1A SVCE WTR INLET VLV
	  o Verifies closed AND overridden, RHS*MOV24A, LPCI A INJECTION VLV
	  o Verifies running RHS*P1A, PMP 1A
	  o Verifies open RHS*MOV33A, OUTLET TO SUPPR POOL SPRAY
	  o Verifies ≥450 gpm on SUPPR SPRAY HEADER FLOW 2RHS*FI64A)
	  o Verifies closed, RHS*FV38A, RETURN TO SUPPR POOL COOLING
	  o Verifies open, RHS*MOV4A, PMP 1A MINI-MUM FLOW VLV

	o Initiates drywell sprays by opening 2RHS*MOV15A(B) and 2RHS*MOV25A(B) o Verifies closed RHS*MOV4A(B) o Verifies approximately 7450 gpm on DRY-WELL SPRAY HEADER FLOW (2RHS*FI63A[B]) o Throttles open 2SWP*MOV33A(B) not to ex-ceed 7400 gpm (E12-R602A[B]) o When possible, closes RHS*MOV8A(B)

	o Notifies Radiation Protection to start Radiation Monitor 2SWP*RE23A(B) o Informs SRO that suppress chamber and drywell sprays are in service
	BOP • Acknowledges direction to terminate and prevent LPCS and LPCI C and open 7 ADS valves • Terminates and prevents LPCS and LPCI C as follows: o Places CSL*P1, PMP 1, control switch in PULL-TO-LOCK o Arms and depresses LPCI A/LPCS MANUAL INITIATION pushbutton o Closes and overrides CSL*MOV104, PMP 1 INJECTION VLV o Places RHS*P1C, PMP 1C, control switch in PULL-TO-LOCK o Arms and depresses LPCI B & C MANUAL INITIATION pushbutton o Closes and overrides RHS*MOV24C, LPCI C INJECTION VLV • Informs SRO that LPCS and LPCI C have been terminated and prevented • Opens 7 ADS valves by performing the following: o Determines a low pressure ECCS pump is running and no SRVs are stuck open
	o **ARMs and DEPRESSES the 4 ADS LOGIC pushbuttons for both divisions.** o Determines and reports 7 SRVs are open

Event Termination Criteria	• RPV flooding is in progress. • Control Rods have been or are being inserted.

Facility: Nine Mile Point Unit 2 Scenario No.: NRC-4 Op-Test No.: LC2 14-1

Examiners: ______________________ Operators: ______________________

Initial Conditions: The plant is operating at approximately 95% power. IRM 'D' is out of service and bypassed. EHC pump 'B' is out of service.

Turnover: The crew will start RHR Loop C in full flow test mode. Then raise reactor power to 100% using recirc flow.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP, SRO	Start RHR in full flow test mode **N2-OP-31**
2	N/A	R-ATC, SRO	Increase power to 100%
3	RR07B	C-ATC, SRO	APRM Flow signal fails Hi **N2-SOP-97 Tech Spec 3.3.2**
4	NM11D	TS-SRO	APRM fails Hi – same RPS channel **Tech Spec 3.3.1**
5	CW01A CW10E	C-BOP, SRO TS-SRO	Service Water Pump 1A trips. While starting the standby pump, the associated discharge valve will fail to automatically open requiring the operator to manually open the valve. The SRO will declare the pump inoperable and evaluate TS 3.7.1. **ARP's, N2-OP-11, TS 3.7.1**
6	AD05B	C-BOP, SRO	One Non-ADS SRV fails open **N2-SOP-34**
7	PC12	M-All	Suppression Pool rupture results in loss of inventory in the suppression pool, requires scram and eventual blowdown. **N2-EOP-RPV N2-EOP-PC**
8	AD08A AD08C	C-ATC, SRO	Failure of the ADS pushbuttons to actuate all 7 ADS valves. **N2-EOP-C2**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: **Nine Mile Point Unit 2** Scenario No.: **NRC-4**		Op-Test No.: **LC2 14-1**
1. Total malfunctions (5-8) **Events 3, 4, 5, 6, 7, 8**	6	
2. Malfunctions after EOP entry (1-2) **Event 8**	1	
3. Abnormal events (2-4) **Events 3, 6**	2	
4. Major transients (1-2) **Event 7**	1	
5. EOPs entered/requiring substantive actions (1-2) **N2-EOP-RPV, N2-EOP-PC**	2	
6. EOP contingencies requiring substantive actions (0-2) **N2-EOP-C2**	1	
7. EOP Based Critical tasks (2-3)	2	
CRITICAL TASK DESCRIPTIONS:		**CRITICAL TASK JUSTIFICATION:**
CT-1.0: Given an un-isolable leak in the suppression pool, exceeding makeup capacity, the crew will scram the reactor in accordance with N2-EOP-PC.		*This task is identified as critical because lowering suppression pool water level challenges the pressure suppression function of the Primary Containment. Continued Reactor operation is not allowed with an inoperable Primary Containment. A Reactor scram also allows subsequent mitigating actions, such as Reactor cooldown and/or blowdown.*
CT- 2.0A: Given a lowering suppression pool level, the crew will depressurize the RPV by opening 5 main turbine bypass valves, IAW N2-EOP-RPV, prior to suppression pool level reaching 192 feet.		*This task is identified as critical because without operator action to depressurize the RPV prior level reaching 192 feet, the primary containment pressure limit could be exceeded due to a loss of pressure suppression capability concurrent with pressure control via SRVs.*
CT- 2.0B: Given a lowering suppression pool level, the crew will depressurize the RPV in accordance with N2-EOP-C2, RPV Blowdown, prior to suppression pool level reaching 192 feet.		*This task is identified as critical because without operator action to depressurize the RPV prior level reaching 192 feet, the primary containment pressure limit could be exceeded due to a loss of pressure suppression capability concurrent with pressure control via SRVs.*

Exelon Generation

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Training Id: **NRC 2015 Scenario 4** Revision: **0.0**

Title: **PC2, Loss of inventory in SP requiring an RPV blowdown**

	Signature / Printed Name	Date
Developed By	Paul Isham	7/1/15
Validated By	Carl Jones	11/3/15
	Dan Delaney	
	Brian Moore	
Facility Reviewer	Mark Greer	11/13/15

References

1. N2-OP-31, Residual Heat Removal System
2. N2-SOP-11, Loss or Degraded Service Water System
3. N2-SOP-97, Reactor Protection System Failures
4. N2-SOP-101C, Reactor Scram
5. N2-EOP-RPV
6. N2-EOP-SC
7. N2-EOP-C2, RPV Blowdown
8. N2-EOP-6, NMP2 EOP Support Procedure
9. Unit 2 Technical Specifications

Instructor Information

A. Scenario Description

Sequence of Events / Expected Crew Response:

The scenario begins at approximately 95% power. IRM 'D' is out of service and bypassed. EHC Pump B is out of service for maintenance. The crew will be required to start RHR Loop C in full flow test mode per N2-OP-31 Section H.12. After the evolution, power must be raised to 100%.

One APRM flow signal will fail high requiring actions to bypass the APRM and the SRO will address TS. Another APRM will then fail requiring an entry to a TS LCO. Once TS are addressed, Service Water Pump 1A will trip on motor electric fault. The crew will take action to start a standby service water pump per N2-OP-11. When starting the standby pump, the discharge valve will fail to automatically open requiring the crew to manually open the valve. The SRO will evaluate tech spec 3.7.1.

After these T.S. are addressed one Non-ADS SRV will fail open placing the plant in an uncontrolled cooldown situation. The crew will take the required actions per N2-SOP-34 and close the valve. The pressure transient caused by this stuck open SRV will have impacted the suppression pool causing a suppression pool leak. The crew will take action and attempt to refill the suppression pool (**CRITICAL TASK**). The leak will cause flooding alarms in the RB requiring entry into N2-EOP-SC. The lowering suppression pool level will require the crew to enter N2-EOP-C2 and blowdown the reactor, **(CRITICAL TASK)**. The blowdown will be complicated by a failure of the 7 ADS valves to open and the crew will be required to open 2 additional SRVs.

1. Termination Criteria
    a. RPV Blowdown in progress

2. Critical Tasks

CT-1.0, Given an un-isolable leak in the suppression pool, exceeding makeup capacity, the crew will scram the reactor in accordance with N2-EOP-PC.

Justification:

Safety Significance: *Lowering suppression pool water level challenges the pressure suppression function of the Primary Containment. Continued Reactor operation is not allowed with an inoperable Primary Containment. A Reactor scram also allows subsequent mitigating actions, such as Reactor cooldown and/or blowdown.*

Cueing: *Multiple indicators and annunciators will provide indications of low suppression pool water level. N2-EOP-PC provides direction to scram the Reactor.*

Measurable Performance Indicators: *Rotation of the Mode Switch to SHUTDOWN or depressing the manual scram pushbuttons will provide observable actions for the evaluation team.*

Performance Feedback: *Control rod position and Reactor power indications will provide performance feedback regarding the success of the scram.*

CT-2.0A, Given a lowering suppression pool level, the crew will depressurize the RPV by opening 5 main turbine bypass valves, IAW N2-EOP-RPV, prior to suppression pool level reaching 192 feet.

Justification:

Safety Significance: *If suppression pool water level lowers below the elevation of the SRV discharges, opening SRVs would discharge steam directly into the suppression pool airspace. The resulting pressure increase could exceed the maximum pressure capability of the Primary Containment. Since the RPV may not be kept at pressure under these conditions, a blowdown would be required. EOPs allow anticipating a blowdown, using TBVs in this situation*

Cueing: *Multiple indicators and annunciators will provide indications of low suppression pool water level. N2-EOP-PC provides direction to blowdown the Reactor.*

Measurable Performance Indicators: *Manipulation of TBV control switches will provide observable actions for the evaluation team.*

Performance Feedback: *TBV instrumentation will provide indication that the system is functioning properly once placed in service. Multiple Reactor pressure indicators and annunciators will provide performance feedback regarding the success of the depressurization.*

CT-2.0B, Given a lowering suppression pool level, the crew will depressurize the RPV in accordance with N2-EOP-C2, RPV Blowdown, prior to suppression pool level reaching 192 feet.

Justification:

Safety Significance: *If suppression pool water level lowers below the elevation of the SRV discharges, opening SRVs would discharge steam directly into the suppression pool airspace. The resulting pressure increase could exceed the maximum pressure capability of the Primary Containment. Since the RPV may not be kept at pressure under these conditions, a blowdown is required.*

Cueing: *Multiple indicators and annunciators will provide indications of low suppression pool water level. N2-EOP-PC provides direction to blowdown the Reactor.*

Measurable Performance Indicators: *Manipulation of SRV control switches will provide observable actions for the evaluation team.*

Performance Feedback: *SRV instrumentation will provide indication that the system is functioning properly once placed in service. Multiple Reactor pressure indicators and annunciators will provide performance feedback regarding the success of the blowdown.*

3. Length
   a. ~60 minutes
4. Mitigation Strategy Code
   a. PC2, Loss of inventory in SP requiring an RPV blowdown
5. Technical Specifications
   a. TS 3.3.2
   b. 3.3.1
   c. 3.7.1
6. EAL Classification
   a. FA 1.1 – RPV Blowdown
2. Special Orders
   a. None

B. Initial Conditions

1. IC Number

IC-154

Presets / With Triggers

Malfunctions

1)	**NM07D,** IRM Channel Failure - Downscale	**Inserted**
2)	**TC15B,** EHC Pump Trip B	**Inserted**
3)	**CW10E,** 2SWP*MOV74E FAILS TO AUTO-OPEN	**Inserted**
4)	**CW10F,** 2SWP*MOV74F FAILS TO AUTO-OPEN	**Inserted**
5)	**AD08A,** PSV121 ADS N2 SUPPLY SEVERED, FV=TRUE	**Inserted**
6)	**AD08C,** PSV126 ADS N2 SUPPLY SEVERED, FV=TRUE	**Inserted**
7)	**RR07B,** RR FLOW UNIT FAILURE - UPSCALE (B), ON	**TRG1**
8)	**NM11D,** APRM CHANNEL FAILURE - UPSCALE (4), ON	**TRG3**
9)	**CW01A,** SERVICE WATER PUMP TRIP (P1A), TRUE	**TRG5**
10)	**AD05B,** ADS/RELIEF VALVE(S) FAILURE - OPEN (PSV128), FV=TRUE	**TRG7**
11)	**PC12,** Suppression Pool Leak to RB, FV=100%, RT=2:00	**TRG7**

Remotes

1)	**RH05**, V71 CNS TO RHS A SUPPLY, FV=OPEN	**TRG9**

Overrides

1)	**01A2S165DI0493,** CLOSE TEST RETURN TO SUPPR POOL MOV 111FV=ON	**Inserted**
2)	**01A2S165DI0494,** OPEN TEST RETURN TO SUPPR POOL MOV 11FV=OFF	**Inserted**

Annunciators

1)

Event Triggers

Event #	Event Action	Command
15	**zdads09(1)==1** (PSV 128 control switch to off)	**dmf AD05B**

Equipment Out of Service

1) IRM D Bypassed

2) EHC Pump B

Support Documentation

1) Turnover Sheet

Miscellaneous

1) Protect the following equipment:

a) EHC Pump 'A'

b) Place info tag on EHC pump 'B'

c) Off normal flag on IRM 'D'

SHIFT TURNOVER INFORMATION

ON COMING SHIFT: ☐ N ■ D DATE: Today

PART I: **To be performed by the oncoming Operator before assuming the shift.**

- Control Panel Walkdown (all panels) (SRO, ROs)

PART II: **To be reviewed by the oncoming Operator before assuming the shift.**

- LCO Status (SRO)
- Shift Turnover Information Sheet

Evolutions/General Information/Equipment Status:

- Reactor power is approximately 95%.
- EHC Pump B is out of service for maintenance
- IRM D is out of service and bypassed due to a failure.

PART III: **Remarks/Planned Evolutions:**

- Start RHR Loop C in Full Flow Test Mode per N2-OP-31 H.12.0 and run for 5 minutes
- Raise power to 100% using recirc flow.

Shift Turnover

Instructor Actions / Plant Response	Operator Actions
Take the Simulator out of freeze before the crew enters for the pre-shift walkdown. • Verify annunciator sound turned on • If recording scenario, start the recording device during the pre-shift walkdown	
Allow no more than 5 minutes to walkdown the panels.	**Crew** • Walkdown panels • Conduct shift turnover brief • Assume the shift

Event #1: RHR C Full Flow Test Mode

Event Information	• The plant is operating at ~95% power. • The crew will place RHR "C" in full flow test mode in accordance with N2-OP-31.

	CREW • Crew conducts a pre-brief and walks down the panels.
	SRO • Directs Starting 2RHS*P1C in Full Flow Test per N2-OP-31 H.12. • Enters TS 3.5.1 Condition A.1. Restore to operable with 7 day Completion Time.

ROLE PLAY: If asked for condition of 2RHS*P1B rotation, report 2RHS*P1B is NOT rotating backwards.	**BOP**
	• Starts 2RHS*P1C in Full Flow Test per N2-OP-31 H.12.0:
	  • Start 2RHS*P1C, RHR Pump 1C.
	  • Using 2RHS*FV38C, RETURN TO SUPPR POOL COOLING THROTTLE, adjust RHR C TOTAL FLOW to 7450 gpm (7450 gpm to 7500 gpm).
	  • Observe 2RHS*MOV4C, PMP 1C MINIMUM FLOW VLV closes.
	  • Operate 2RHS*P1C until NO longer required.
	  • Close 2RHS*FV38C, TEST FLOW RETURN TO SUPPR POOL THROTTLE.
	  • Observe 2RHS*MOV4C, PMP 1C MINIMUM FLOW VLV opens.
	  • Stop 2RHS*P1C, RHR Pump 1C.
	  • Notify SM LPCI "C" may be declared operable.

Event Termination Criteria	RHR C secured from full flow test mode.

Events #2 and 3: Increase Power to 100%. APRM Flow signal fails high.

Event Information	• The plant is operating at ~95% power. • The crew will raise power to 100% using recirc flow. • During power ascension, an APRM flow unit fails high.

	SRO Directs power raised to 98% power per N2-OP-101D.
	RO Raises power to 98% using Recirc Flow.
	BOP Monitors balance of plant systems.
When directed by Lead Evaluator, **insert** the following **malfunction:** **TRG1** RR07B, RR FLOW UNIT FAILURE – UPSCALE (B), ON	**CREW** Responds to Annunciators: • 603217 – FLOW REFERENCE ABOVE NORMAL • 603442 – CONTROL ROD OUT BLOCK
	SRO • Directs action IAW the alarm response • Enters TS 3.3.1.1to place at least one inop channel in tripped condition with 12 hour Completion Time.

	RO
	• Responds to Annunciators
	• Checks front panel indications:
	  • Flow Unit #2 UPSCALE – Amber light lit
	  • Comparator – White light lit
	• Checks Back Panel Indications on APRM Panel
	  • APRM #2 indication Flow indicates 125%

	• IAW N2-OP-92 –Bypasses APRM #2 using the joystick • Rechecks back panel indications and confirms APRM #2 indicates BYPASS –Blue Light Lit.

Event Termination Criteria	• APRM 2 is bypassed

Event #4: APRM Fails High

Event Information	• Plant is operating near rated conditions. • An APRM fails high in the same channel as another bypassed APRM • SRO will address tech specs.

When directed by Lead Evaluator, **insert** the following **malfunction:** **TRG3 NM11D, APRM CHANNEL FAILURE – UPSCALE (4), ON**	CREW Responds to Annunciators: • 603208 – APRM TRIP SYTEM UPSCALE • 603442 – CONTROL ROD OUT BLOCK • 603202 – APRM TRIP SYTEMUPSCALE/INOP
EXAMINER NOTE: With one APRM already bypassed, this APRM cannot be bypassed and the trip will remain in. The TS action is already taken due to the failure. Crew may un-bypass APRM 2 then bypass APRM 4.	SRO • Directs actions IAW Alarm Response • Refers to TS LCO 3.3.1.1 Action A.1 – place in trip condition within 12 hours • Refers to TRM 3.3.2 Action A.1 - place in trip condition within 1 hour
	BOP • Checks back panel indications which confirm APRM #4 Upscale/Inop

Event Termination Criteria	• SRO has address tech specs

Event #5: Service Water Pump Trip

Event Information	• Service Water Pump P1A trips on motor electric fault. • Operators will respond per the ARPs and start an additional pump. • The discharge valve will not automatically open when starting the standby pump requiring operators to manually open the valve.

Verify inserted the following malfunctions: **CW10E**, 2SWP*MOV74E FAILS TO AUTO-OPEN **CW10F**, 2SWP*MOV74F FAILS TO AUTO-OPEN When directed by lead instructor/evaluator, **insert** the following **malfunction**: **TRG5** **CW01A**, SWP A TRIP, FV=TRUE *Service Water Pump P1A trips* *The following annunciators alarm:* • *601113, Service Water Pump 1A/1C/1E Auto Trip Fail to Start* • *601114, Service Water Pump 1A/1C/1E Motor/Feeder Elec Fault*	
	CREW • Recognizes and reports loss of SWP P1A
Note: The SRO may determine that a SWP must be started immediately and direct the BOP to start a pump without going through the in plant actions. This method is acceptable. If the SRO decides on this course of action, then throttling of the MOV74's will not be required.	**SRO** • Directs BOP to respond to trip of SWP P1A • References TS 3.7.1 and determines <4 operable service water pumps are in operation • Enters condition E of TS 3.7.1 and determines he has 72 hours to restore 4 service water pumps to operation.

	BOP • Acknowledges direction to respond to SWP P1A trip
Role Play As PO dispatched to inspect SWP P1A, wait two minutes and inform them that the pump motor is abnormally hot to the touch and the breaker overcurrent flag is tripped.	• May contact PO and direct them to inspect SWP A pump and breaker • References ARP 60113 and determines flows on the operating SWPs are >10,000 gpm • Throttles shut on 2SWP*MOV74B, C, D to maintain flows <10,0000 gpm
Note: The SRO may direct starting either SWP E or F	• Determines that time permits to start a SWP per N2-OP-11, Section E.2.0
Role Play As PO dispatched to perform prestart checks on SWP E or F, wait one minute and report that prestart checks have been completed satisfactorily.	• Contacts PO and directs him to perform prestart checks of SWP E(F)
Note: P&L 13. States the following: With three operable and running SWP pumps, the plant shall restore 4 operable pumps to service in an expedited fashion. In this condition the plant is in a degraded state, see Tech Spec 3.7.1 for required actions.	• Determines conditions in P&L 13.0 are met • Verifies 2SWP*MOV74E(F) IS SHUT
Role Play As PO directed to perform steps E.2.4 through E.2.6, wait one minute and inform the control room that those steps have been complete	• Contacts PO and directs them to perform N2-OP-11, Steps E.2.4 through E.2.6 for SWP E(F) • Determines sufficient flow is available for each SWP to have at least 2500 gpm • Starts SWP E(F) by placing control switch in NORMAL AFTER START
Note: When SWP P1E(F) is started, its associated discharge valve will fail to open.	• Verifies the following parameters: o Red running light lit. o Pump Current is ≤76 amps. o 2SWP*MOV74E(F)opens fully. o ALL running Service Water Pump Flows are ≥2500 gpm. • Determines that 2SWP*MOV74E(F) failed to open and manually opens MOV74E(F).

	BOP Cont… • Informs SRO that SWP E(F) has been started and its associated discharge valve failed to open automatically. • May place SWP P1A control switch in PTL
Role Play As Electrical Maintenance contacted for SWP A trip, inform them you will begin working on a troubleshooting plan.	• Contacts Electrical Maintenance • Fully opens 2SWP*MOV74B, C, and D
	SRO • Acknowledges BOP report of 2SWP*MOV74E(F) failing to automatically open. • If P1E was started, declares 2SWP*P1E inoperable and determines he is still in condition E of TS 3.7.1 and also TS 3.7.1, Condition C now applies (only one operable service water pump in one division). Determines he has 72 hours to restore the Division 1 SW Subsystem to operable status.
	SRO (cont.) • If P1F was started, declares 2SWP*P1F inoperable and determines he is still in TS 3.7.1, Condition E and has 72 hours to start a fourth operable SWP.
Role Play As the SM, acknowledge the report from the SRO and inform him to maintain SWP P1E(F) running until an evaluation can be made.	• Contacts SM and informs him that both SWP P1A and E(F) are inoperable.

Event Termination Criteria	• 2SWP*P1E(F) is running and its associated discharge valve is open.

Event #6: Inadvertent Opening of an SRV

Event Information	• SRV 128 fails open. • Crew actions per N2-SOP-34 will shut the valve.

When directed by lead instructor/evaluator, **insert** the following **malfunction**: **TRG7** **AD05B**, ADS/RELIEF VALVE(S) FAILURE - OPEN (PSV128), FV=TRUE **PC12**, Suppression Pool Leak to RB, FV=100%, RT=2:00	**BOP** • Identifies PSV128 stuck open and informs the SRO
	SRO • Acknowledges reports from BOP concerning PSV128 • Directs entry into N2-SOP-34
Note When the BOP places keylock switch for PSV128 in the off position, **verify TRG 15 inserted** and malfunction **AD05B** is **deleted**	**BOP** • Enters N2-SOP-34 • Places keylock switch for PSV128 in the off position. • Determines PSV128 is shut • Informs the SRO and exits N2-SOP-34

Event Termination Criteria	• PSV 128 is shut

Event #7 and #8: Suppression Pool Rupture. Two ADS Valves Fail to Open on a Blowdown.

Event Information	• Suppression Pool rupture results in loss of inventory in the suppression pool • A blowdown will be required • Several ADS valves fail to open on the blowdown

The suppression pool malfunction was initiated in the previous event. Approximately 1.5 minutes after TRG 5 went in, the following annunciators will alarm: • *851443 - RB GENERAL AREA 2A FLOODING* • *851444 - RB GENERAL AREA 2E FLOODING* • *851453 - RB FLOOR DR SYSTEM TROUBLE* • *If SPWL goes below 195 ft, 601458, RHS PUMP SUCTION PRESS ABNORMAL*	**CREW** • Recognizes and reports AN851443 and AN85144.
	SRO • Acknowledges report and enters N2-EOP-SC on area water level above 0 inches • Directs BOP to operate all available sump pumps • Directs ROs to dispatch PO to investigate flooding alarms
	BOP • Acknowledges SRO
Role Play If contacted as RW, report all RB Floor Drain Sump Pumps are running.	• Contacts Radwaste and directs them to operate all RB Floor Drain Pumps
Role Play When directed to investigate the RB flooding, wait two minutes and report that you are on RB 175' and there is water leaking from a crack in the suppression pool.	• Dispatches PO to investigate flooding in the RB • Reports PO investigation results to SRO

	SRO • Acknowledges report of a crack in the suppression pool • Determines all discharges into the affected area have been isolated • Determines a primary system is not discharging into the reactor building • Waits for two or more areas water levels to be above their maximum safe values • Directs BOP to monitor suppression pool level, (SPWL)
Note It will take approximately 2.5 minutes from when TRG 7 went in to get to 199.5 feet in the suppression pool	**BOP** • Acknowledges direction to monitor SPWL • Informs SRO that SPWL is 199.5 feet
	SRO • Acknowledges report from BOP that SPWL is 199.5 feet and enters N2-EOP-PC • Determines SPWL cannot be maintained above 199.5 feet
Note EOP-PC allows the suppression pool to be filled using either gravity drain through HPCS or using the actual HPCS pump. Either method is acceptable.	• Directs BOP to fill the suppression pool using HPCS per N2-OP-33, Section H.2.0 or H.3.0
CT-1.0: Given an un-isolable leak in the suppression pool, exceeding makeup capacity, the crew will scram the reactor in accordance with N2-EOP-PC.	• **Directs entry into N2-EOP-RPV before SPWL reaches 192 feet.**

	BOP • Acknowledges direction to fill the suppression pool using HPCS per N2-OP-33, Section H.2.0 or H.3.0 • Fills the suppression pool using gravity drain (H.2.0) as follows: o Verifies SRO has declared HPCS inoperable o Verifies open CSH*MOV101, PUMP SUCT FROM CNDS TK o Monitors AND maintains 2CSH*PI117, HPCS SYSTEM PRESS PMP, 65 psig
Note 2CSH*MOV111 will fail to open using control switch.	o Attempts to throttle open CSH*MOV111, TEST RETURN TO SUPPRESSION POOL o Determines 2CSH*MOV111 will not open • Fills the suppression pool using the HPCS pump (H.3.0) as follows: o Verifies SRO has declared HPCS inoperable o Performs prestart checks per section F.1.0 o Starts HPCS Pump by placing the control switch in start o Verifies open 2CSH*MOV105 o Monitors CST and SPWL
Note 2CSH*MOV111 will fail to open using control switch.	o Attempts to throttle open 2CSH*MOV111 o Determines 2CSH*MOV111 will not open
Role Play As PO dispatched to try to manually open 2CSH*MOV111, acknowledge direction, wait 3 minutes and report to the control room that 2CSH*MOV111 cannot be opened and you are calling additional PO's to help you get it open.	• Informs the SRO and dispatches a PO to manually open 2CSH*MOV111

Note: With a lowering suppression pool level, the crew may anticipate blowdown and begin depressurizing the reactor through the TBVs. Or they may opt to just lower the pressure band. Either option is acceptable.	**SRO** • Acknowledges report from BOP that 2CSH*MOV111 will not open • Directs BOP to fill the suppression pool using condensate through RHS A per N2-OP-31, Section H.6.0

	BOP
	• Acknowledges direction to fill the suppression pool using condensate through RHS A per N2-OP-31, Section H.6.0
	• Fills the suppression pool by performing the following:
	  o Notifies the SRO that LPCI A is inoperable
	  o Depresses RHR A manually out of service pushbutton
	  o Places RHR A control switch in PTL

Roll Play As PO dispatched to open 2RHS*V71, wait two minutes and **insert** the following **remote function**: **TRG9** **RH05**, V71 CNS TO RHS A SUPPLY, FV=OPEN Report to the control room that 2RHS*V71 is open.	o Contacts PO and directs them to open 2RHS*V71 o Throttles open 2RHS*FV38A while maintaining >70 psig on the RHR discharge pressure meter o Informs the SRO that filling of the suppression pool has begun.
Note It will take approximately 25 minutes from the time TRG 7 is activated before SPWL gets below 195 feet.	**SRO** • Determines suppression pool water level cannot be maintained >192 feet and (re)enters N2-EOP-RPV and blows down the RPV per N2-EOP-C2 • Determines the reactor will stay shutdown without boron • Determines drywell pressure is <1.68psig • Determines SPWL is >192 feet

CT- 2.0 Given a lowering suppression pool level, the crew will enter and execute N2-EOP-C2, RPV Blowdown, prior to suppression pool level reaching 192 feet.	• **Directs BOP to open 7 ADS valves**
CT-1.0: Given an un-isolable leak in the suppression pool, exceeding makeup capacity, the crew will scram the reactor in accordance with N2-EOP-PC.	**BOP** • **Places/verifies mode switch in shutdown.** • Determines no ECCS pump is running
CT- 2.0 Given a lowering suppression pool level, the crew will enter and execute N2-EOP-C2, RPV Blowdown, prior to suppression pool level reaching 192 feet.	• **Goes to PNL628 and P631 and attempts to open 7 ADS valves using the 14 keylock switches**
Note When the BOP attempts to open 7 ADS valves, PSV121 and PSV126 will fail to open due to severed N2 supply lines. This will be indicated on P601 N2 pressures for their associated accumulators reading 0 psig.	• Determines at P601 that only 5 ADS valves opened • Informs the SRO that only 5 ADS valves opened.
	SRO • Acknowledges report from the BOP that only 5 ADS valves are open • Directs BOP to open 2 additional SRVs until a total of 7 are open.
	BOP • Acknowledges direction to open 2 additional SRVs

CT- 2.0 Given a lowering suppression pool level, the crew will enter and execute N2-EOP-C2, RPV Blowdown, prior to suppression pool level reaching 192 feet.	• **Using keylock switches on P601, opens 2 additional SRVs** • Reports to the SRO that 7 SRVs are open.

Event Termination Criteria	• 7 SRVs are Open