

Facility: Indian Point Unit 2Task No: 2000020202Task Title: **Review a Manual ECP Calculation**K/A Reference: 1940012137 -  
RO-4.6Job Performance Measure  
No: \_\_\_\_\_SRO  
Admin-1

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	<u>        </u>	X	Actual Performance	<u>        </u>
Classroom	<u>  X  </u>	Simulator	Plant	<u>        </u>

READ TO THE EXAMINEE

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

Initial Conditions:

- The unit had been operating for 300 Days at 100% power.
- A Unit trip occurred due to a Main Transformer Fire
- The unit has been shutdown for 15 days to effect repairs
- Prior to the trip:
  - Control Bank D at 223
  - Boron Concentrations 975 ppm
- Current Plant Conditions:
  - Tavg 547°F
  - Boron Concentrations 1472
- The Plant Computer is Out of Service
- Estimated time of Criticality 20:00 tonight
- The spare RO prepared a manual ECP

Task Standard: ECP Calculation reviewed and errors found.

Required Materials: Calculator

General References: 2-SOP-15.4, Estimated Critical Rod Position and Boron Concentration Calculation  
2-Graph-RV-1  
2-Graph-RV-2  
2-Graph-RV-3  
2-Graph-RV-4  
2-Graph-RV-5  
2-Graph-RV-6  
2-Graph-RV-7

Initiating Cue: You are the CRS and the SM has directed you to review the ECP.

Time Critical Task: No

Validation Time: 45 minutes

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Performance Information

(Denote critical steps with a check mark ✓)

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1. Performance Step: Obtain Correct Procedure and Graphs

Standard: Obtains 2-SOP-15.4 and Graphs RV-1 through 7

Comment:

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2. Performance Step: Review data for equilibrium operating conditions prior to shutdown in Section 1.0 of data sheet

Standard: Data given in initial conditions.  
Determines data entered correctly

Comment:

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3. Performance Step: Review estimated date, time , RCS Temperature, boron concentration and length of shutdownfor forthcoming criticality recorded in Section 2.0 of data sheet

Standard: Data given in initial conditions  
Determine data entered correctly

Comment:

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## Performance Information

(Denote critical steps with a check mark ✓)

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4. Performance Step: Perform required data entries AND Calculations using referenced graphs.

Standard: Actions listed in Steps below 5 -

Comment:

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5. Performance Step: Determine Remaining Rod Worth from Graph RV-1

Standard: Determines Remaining Rod Worth is 0  
Determines data entered correctly at step 3.1

Comment:

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✓ 6. Performance Step: **Determines Power Defect at Boron**

**Standard: Interpolate between 950 and 1000 ppm to achieve 1633.9 ± 0.5 and enter at step 4.1  
Determine data NOT entered correctly.**

**Comment: NOTE 1623.9 pcm is incorrect.**

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7. Performance Step: Determine Boron Concentration Differential

Standard: Calculate  $975 - .1472 = -497$   
Determines data entered correctly at step 5.1

Comment:

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## Performance Information

(Denote critical steps with a check mark ✓)

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8. Performance Step: Determine Boron Worth at Average Boron Concentration

Standard: Calculate  $(975 + 1472)/2 = 1223.5$   
Determines data entered correctly at Step 5.2

Comment:

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9. Performance Step: Determine boron worth for 1223.5 ppm

Standard: Determines boron worth  $7.14 \pm 0.01$   
Determines data entered correctly at Step 5.2

Comment:

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✓ 10. Performance Step: Determine Reactivity from boron change

Standard: Calculate Reactivity from Boron Change  $(-497) \times 7.14 = 3548.6$  pcm  
Determines data NOT entered correctly at Step 5.3

Comment: NOTE: 3584.6 is NOT correct.

---

11. Performance Step: Determine reactivity due to  $T_{avg}$  at Boron 975 and  $T_{avg}$  at 547°F

Standard: Determines Reactivity is 0 pcm from Graph RV-4  
Determines data entered correctly at step 6.1

Comment:

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## Performance Information

(Denote critical steps with a check mark ✓)

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12. Performance Step: Determine Xe Defect at 100% power

Standard: Identifies 2833 pcm from Graph RV-5  
Determines data entered correctly at step 7.1

Comment:

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13. Performance Step: Determine Sm Defect at 100% power

Standard: Identifies 1009 pcm from Graph RV-6  
Determines data entered correctly at step 7.2

Comment:

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14. Performance Step: Sum of step 7.1 and 7.2

Standard: Determines 3842 pcm  
Determines data entered correctly at step 7.3

Comment:

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15. Performance Step: Determine Xe/Sm Correction Factor

Standard: Determines 0.905 from Graph RV-7  
Determines data entered correctly at step 7.4

Comment:

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## Performance Information

(Denote critical steps with a check mark ✓)

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16. Performance Step: Determine Corrected Xe/Sm prior to shutdown

Standard: Calculate  $3842 \times 0.905 = 3477$   
Determines data entered correctly at step 7.5

Comment:

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17. Performance Step: Determine Xe Power for Startup

Standard: Determines Xe power is 100% (essentially constant for last 36 hours)  
Determines data entered correctly at step 8.2

Comment:

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18. Performance Step: Determine Sm Power for Startup

Standard: Determine Sm power is 100% (essentially constant for last 10 days)  
Determines data entered correctly at step 9.2

Comment:

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19. Performance Step: Determine Xe defect at startup

Standard: Determines -11 pcm from graph RV-5  
Determines data entered correctly at step 10.1

Comment:

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## Performance Information

(Denote critical steps with a check mark ✓)

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20. Performance Step:	Determine Sm Defect at startup
Standard:	Determines -1202 pcm from graph RV-6 Determined data entered correctly at step 10.2
Comment:	

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21. Performance Step:	Sum 10.1 and 10.2
Standard:	Calculate $-11 + -1202 = -1213$ pcm Determines data entered correctly at step 10.3
Comment:	

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22. Performance Step:	Determine Xe/Sm Correction Factor at startup boron concentration
Standard:	Interpolate to determine Correction Factor 0.861 ( $\pm 0.002$ ) Determines data entered correctly at step 10.4
Comment:	

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23. Performance Step:	Determine Corrected Xe/Sm at startup
Standard:	Calculate $1213 \times 0.861 = 1044.39$ ( $\pm 1.5$ ) Determines data entered correctly at step 10.5
Comment:	

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## Performance Information

(Denote critical steps with a check mark ✓)

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24. Performance Step: Determine Corrected Xenon/Samarium Differential

Standard: Calculate  $1044.39 - (-) 3477 = 2432.6 (\pm 2.0)$   
Determines data entered correctly at step 11.1

Comment:

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✓ 25. Performance Step: Calculate Total Reactivity Effect

Standard: Sum  $0 + 1633.9 + (-) 3548.6 + 0 + 2432.6 = (+) 517$   
**(CORRECT VALUE)**  
Sum  $0 + 1623.9 + (-) 3584.6 + 0 + 2432.6 = (+) 472$   
**(INCORRECT VALUE)**  
Determines data NOT entered correctly at step 12.1

Comment: NOTE: The calculation is correct; however the input numbers are incorrect causing this number to be wrong.

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✓ 26. Performance Step: Estimate Critical Rod Position

Standard: Determine Control Bank D at 99 steps ( $\pm 5$ ) **(CORRECT VALUE)**  
Determine Control Bank D at 110 Steps **(INCORRECT VALUE)**  
Determines data NOT entered correctly at step 13.1

Comment:

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Performance Information

(Denote critical steps with a check mark √)

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√ **27. Performance Step: Sign and Date the Calculations**

**Standard: Determines RO did NOT sign and date the calculation**

**Comment:**

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Terminating Cue: JPM Complete

ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION

2-SOP-15.4  
Rev. 10

ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION

(Page 1 of 8)

1.0 EQUILIBRIUM CONDITIONS PRIOR TO SHUTDOWN	
1.1 DATE	24 January 2012
TIME	10:00
1.2 CONTROL BANK	D
STEPS	223
1.3 BORON CONCENTRATION (PPM)	975
1.4 POWER LEVEL (%)	100%

2.0 ESTIMATED CRITICAL CONDITION FOR STARTUP	
2.1 DATE	TODAY
TIME	20:00
2.2 TAVG	547
2.3 BORON CONCENTRATION (PPM)	1472
2.4 LENGTH OF SHUTDOWN (HRS)	> 625
FROM DATE/TIME	24 January 2012

3.0 ROD DIFFERENTIAL	
3.1 REMAINING ROD WORTH AT POSITION (1.2) GRAPH RV-1	0

4.0 POWER DEFECT	
4.1 POWER DEFECT AT BORON (1.3) AND POWER (1.4) GRAPH RV-2	1623.9

ANSWER KEY

Answer  
Key

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION  
(Page 2 of 8)**

**NOTE**

The sign of reactivity in section 5.0 will be negative (-) if boron at estimated critical condition is greater than boron at prior to shutdown condition (and vice versa).

**5.0 EFFECT FROM BORON CONCENTRATION CHANGE**

5.1 BORON CONCENTRATION DIFFERENTIAL = (1.3) - (2.3) = (±)PPM	
BORON CONCENTRATION DIFFERENTIAL = (975) - (1472) = -497	PPM
5.2 BORON WORTH AT AVERAGE OF BORON (1.3) AND (2.3) GRAPH RV-3	
BORON WORTH AT AVERAGE OF BORON = [(975)+(1472)]/2 = 1223.5	PPM
GRAPH RV-3 BORON WORTH = (+) 7.14	PCM/PPM
5.3 REACTIVITY FROM BORON CONCENTRATION CHANGE = [(5.1) × (5.2)] = (±)PCM	
REACTIVITY FROM BORON CONCENTRATION CHANGE = [(-497) × (7.14)]	
	<b>3584.6</b>

**6.0 TEMPERATURE EFFECT**

6.1 REACTIVITY DUE TO TAVG AT BORON CONCENTRATION (1.3) AND TAVG (2.2) GRAPH RV-4	0
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Answer  
Key

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION  
(Page 3 of 8)**

<b>7.0 XENON/SAMARIUM PRIOR TO SHUTDOWN</b>			
7.1 Xe DEFECT AT POWER (1.4) AND TIME ZERO GRAPH RV-5	(-)	2833	PCM
7.2 Sm DEFECT AT POWER (1.4) AND TIME ZERO GRAPH RV-6	(-)	1009	PCM
7.3 SUM OF ITEMS (7.1) AND (7.2)	(-)	3842	PCM
7.4 Xe/Sm CORRECTION FACTOR AT BORON(1.3) GRAPH RV-7		0.905	
7.5 CORRECTED Xe/Sm PRIOR TO SHUTDOWN = [(7.3)×(7.4)] = (-) PCM			
CORRECTED Xe/Sm PRIOR TO SHUTDOWN = [((-)3842)×(.905)]			
CORRECTED Xe/Sm PRIOR TO SHUTDOWN = (-) 3477 PCM			

<b>8.0 XENON POWER FOR STATION</b>			
8.1-HRS PRIOR TO SHUTDOWN	AVERAGE PERCENT POWER	MULTIPLIER	PRODUCT
0-1		0.07	
1-4		0.23	
4-9		0.22	
9-16		0.20	
16-25		0.22	
25-36		0.06	
			<b>SUM TOTAL %</b>
8.2 XENON POWER = SUM TOTAL (8.1) OR = PERCENT POWER IF POWER ESSENTIALLY CONSTANT FOR LAST 36 HOURS. XENON % =			160%

Answer  
Key

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION  
(Page 4 of 8)**

<b>9.0 SAMARIUM POWER FOR STARTUP</b>	
<b>9.1-DAYS PRIOR TO SHUTDOWN</b>	<b>AVERAGE POWER</b>
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
<b>SUM TOTAL</b>	
<b>9.2 SAMARIUM POWER = SUM TOTAL/10</b> <b>SAMARIUM POWER/10 = PERCENT</b> <b>QR = PERCENT IF POWER ESSENTIALLY CONSTANT FOR LAST 10 DAYS</b> <b>SAMARIUM % =</b>	

*100%*

Answer  
Key

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION  
(Page 5 of 8)**

10.0 XENON/SAMARIUM AT STARTUP		
10.1 Xe DEFECT AT POWER (8.2) AND TIME (2.4) GRAPH RV-5	(-) 11	PCM
10.2 Sm DEFECT AT POWER (9.2) AND TIME (2.4) GRAPH RV-6	(-) 1202	PCM
10.3 SUM OF (10.1) + (10.2)	(-) 1213	PCM
10.4 Xe/Sm CORRECTION FACTOR AT BORON (2.3) GRAPH RV-7	0.861	
10.5 CORRECTED Xe/Sm AT STARTUP = (10.3) × (10.4) = (-) PCM		
CORRECTED Xe/Sm AT STARTUP = (1213) × (0.861) = (-)		1044.39 PCM

CORRECTED XENON/SAMARIUM DIFFERENTIAL	
11.1 CORRECTED XENON/SAMARIUM DIFFERENTIAL = (10.5) - (7.5)	(±)PCM
CORRECTED XENON/SAMARIUM DIFFERENTIAL = [(-) 1044.39] - [(-) 3477] =	2432.6

Answer  
Key

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

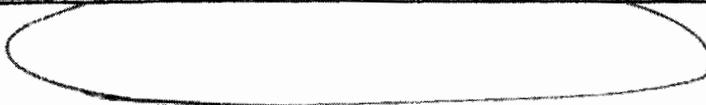
**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION  
(Page 6 of 8)**

**NOTE**

IF Total Reactivity Effect in step 12.1 is negative OR IF estimated Critical Rod Position step 13.1 differs from desired startup position, THEN a Boron Concentration Adjustment is required per Section 14.0

12.0 TOTAL REACTIVITY EFFECT	
12.1 TOTAL REACTIVITY EFFECT = (3.1) + (4.1) + (5.3) + (6.1) + (11.1)	(±)PCM
TOTAL REACTIVITY EFFECT = ( ) + ( ) + ( ) + ( ) + ( ) 0 + 1623.9 + (-7) + 3584.1 + 6 = 2432.6	(+) <b>472</b> PCM

13.0 ESTIMATED CRITICAL ROD POSITION		
13.1 POSITION AT REACTIVITY (12.1) GRAPH RV-1	BANK	STEPS
	0	<b>110</b>

ESTIMATE PERFORMED BY (RO/CRS/REACTOR ENGINEER)	DATE
	

ESTIMATE REVIEWED BY (SM/REACTOR ENGINEER)	DATE

Answer  
Key

**INDIAN POINT ENERGY CENTER  
UNIT NO. 2 - CYCLE 20**

Bank Overlap Remaining Rod Worth

D - Bank Steps	Worth PCM
223	0 (3.1)
213	12
203	40
193	83
183	134
173	186
163	236
153	284
143	330
133	374
123	417
113	459
100	515
93	547
83	599
73	659
63	727
53	801
43	878
33	955
23	1028
13	1094
3	1149
0	1164
C - Bank Steps	
113	1203
100	1253

Answer Key

*[Signature]*  
 RE APPROVED  
 5/24/11  
 EFFECTIVE DATE

Ref. Cycle 20 NuPOP HZP (MOL - 12000 MWD/MTU)  
Rev. 60

Z-GRAPH-RV-1

Indian Point Unit 2 Cycle 20  
 TOTAL POWER DEFECT (pcm) AS A FUNCTION OF POWER AND BORON CONCENTRATION AT MOL (12000 MWD/MTU)

Boron Conc. (ppm)	POWER LEVEL (%)																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
600	0.0	102.8	202.6	299.6	394.4	487.0	577.9	667.2	755.2	842.0	927.9	1013.0	1097.4	1181.2	1264.4	1347.2	1429.5	1511.3	1592.6	1673.4	1753.5
650	0.0	102.0	201.1	297.4	391.5	483.4	573.6	662.2	749.5	835.6	920.7	1004.9	1088.5	1171.4	1253.7	1335.5	1416.8	1497.6	1577.9	1657.6	1736.6
700	0.0	101.3	199.6	295.3	388.6	479.9	569.4	657.3	743.9	829.2	913.6	997.0	1079.7	1161.7	1243.1	1324.0	1404.3	1484.1	1563.4	1642.0	1720.0
750	0.0	100.5	198.2	293.2	385.9	476.5	565.3	652.5	738.4	823.0	906.6	989.2	1071.1	1152.2	1232.8	1312.7	1392.1	1470.9	1549.1	1626.7	1703.7
800	0.0	99.8	196.8	291.1	383.1	473.1	561.3	647.8	733.0	816.9	899.7	981.6	1062.6	1142.9	1222.6	1301.6	1380.0	1457.9	1535.1	1611.8	1687.7
850	0.0	99.1	195.4	289.1	380.4	469.8	557.3	643.2	727.7	810.9	893.0	974.1	1054.3	1133.8	1212.6	1290.7	1368.2	1445.1	1521.4	1597.0	1672.0
900	0.0	98.4	194.0	287.1	377.8	466.5	553.4	638.6	722.4	805.0	886.3	966.7	1046.2	1124.9	1202.8	1280.0	1356.6	1432.6	1507.9	1582.6	1656.5
950	0.0	97.7	192.7	285.1	375.2	463.3	549.6	634.2	717.3	799.2	879.8	959.5	1038.2	1116.1	1193.2	1269.5	1345.2	1420.3	1494.7	1568.4	1641.4
1000	0.0	97.1	191.4	283.2	372.7	460.2	545.8	629.8	712.3	793.5	873.5	952.4	1030.3	1107.4	1183.7	1259.2	1334.1	1408.2	1481.7	1554.4	1626.5
1050	0.0	96.4	190.1	281.3	370.2	457.1	542.1	625.5	707.4	787.9	867.2	945.4	1022.6	1098.9	1174.4	1249.1	1323.1	1396.3	1468.9	1540.7	1611.8
1100	0.0	95.8	188.9	279.5	367.8	454.1	538.5	621.3	702.5	782.4	861.0	938.5	1015.0	1090.6	1165.3	1239.2	1312.3	1384.7	1456.3	1527.3	1597.4
1150	0.0	95.2	187.6	277.7	365.4	451.1	535.0	617.1	697.7	777.0	855.0	931.8	1007.6	1082.4	1156.3	1229.4	1301.7	1373.2	1444.0	1514.0	1583.3
1200	0.0	94.6	186.4	275.9	363.1	448.2	531.5	613.0	693.1	771.7	849.0	925.2	1000.2	1074.3	1147.5	1219.8	1291.3	1362.0	1431.9	1501.0	1569.4
1250	0.0	94.0	185.3	274.1	360.8	445.3	528.0	609.0	688.5	766.5	843.1	918.6	993.0	1066.4	1138.8	1210.4	1281.1	1350.9	1420.0	1488.3	1555.8
1300	0.0	93.4	184.1	272.4	358.5	442.5	524.7	605.1	683.9	761.3	837.4	912.2	986.0	1058.6	1130.3	1201.1	1271.0	1340.1	1408.3	1475.7	1542.3
1350	0.0	92.8	183.0	270.7	356.3	439.8	521.4	601.2	679.5	756.3	831.7	905.9	979.0	1051.0	1122.0	1192.0	1261.1	1329.4	1396.8	1463.4	1529.2
1400	0.0	92.2	181.8	269.1	354.1	437.0	518.1	597.4	675.1	751.3	826.2	899.8	972.2	1043.5	1113.7	1183.0	1251.4	1318.9	1385.5	1451.3	1516.2
1475	0.0	91.4	180.2	266.6	350.9	433.0	513.3	591.8	668.7	744.0	818.0	890.7	962.1	1032.4	1101.6	1169.9	1237.1	1303.5	1368.9	1433.5	1497.2
1550	0.0	90.6	178.6	264.3	347.7	429.1	508.6	586.4	662.4	736.9	810.0	881.8	952.3	1021.6	1089.8	1157.0	1223.2	1288.4	1352.7	1416.1	1478.6
1625	0.0	89.8	177.1	262.0	344.7	425.3	504.1	581.0	656.3	730.0	802.2	873.1	942.7	1011.1	1078.3	1144.5	1209.6	1273.7	1336.9	1399.2	1460.5
1700	0.0	89.0	175.5	259.7	341.7	421.6	499.6	575.8	650.3	723.2	794.6	864.6	933.3	1000.8	1067.0	1132.2	1196.3	1259.4	1321.5	1382.6	1442.9

Answer  
Key

  
 RE - Approved  
5/24/11  
 Effective Date

1633.9  
 (4.1)

Ref. Cycle 20 NuPOP (MOL - 12000 MWD/MTU)  
 Rev. 50

INDIAN POINT STATION  
UNIT NO. 2 - CYCLE 20  
Differential Boron Worth (MOL)

<u>Boron Concentration (PPM)</u>	<u>Differential Boron Worth (PCM/PPM)</u>
0	8.10
75	8.08
150	8.00
225	7.93
300	7.86
375	7.80
450	7.74
525	7.68
600	7.62
675	7.56
750	7.50
825	7.44
900	7.38
975	7.33
1050	7.27
1125	7.22
1200	7.16
1275	7.11
1350	7.06
1425	7.01
1500	6.96
1575	6.91
1650	6.86
1725	6.81
1800	6.76

1423.5

7.14 (5.3)

Answer  
Key



RE- Approved

5/24/11

Effective Date

Indian Point Unit 2 Cycle 20

Total Temperature Defect (PCM) as a Function of Temperature and Boron Concentration MOL/EOL (18000 MWD/MTU)

Boron Conc. (ppm)	Core Average Temperature (F)											
	350	360	380	400	420	440	460	480	500	520	540	547
600	2242	2201	2096	1960	1793	1594	1364	1103	810	487	132	0
650	2152	2114	2017	1888	1729	1539	1319	1067	785	472	128	0
700	2062	2028	1938	1818	1667	1485	1274	1032	759	457	124	0
750	1974	1944	1860	1747	1605	1432	1229	997	734	442	120	0
800	1887	1860	1784	1678	1543	1379	1185	962	709	427	116	0
850	1800	1777	1708	1610	1483	1327	1142	928	685	413	112	0
900	1715	1694	1632	1542	1422	1275	1099	894	661	399	108	0
950	1630	1613	1558	1474	1363	1223	1056	860	636	385	105	0
1000	1546	1532	1484	1408	1304	1173	1014	827	612	371	101	0
1050	1463	1453	1411	1342	1246	1122	972	794	589	357	97	0
1100	1381	1374	1338	1276	1188	1072	930	761	565	343	94	0
1150	1300	1295	1267	1212	1130	1023	889	728	542	329	90	0
1200	1219	1218	1195	1147	1073	973	848	696	519	315	86	0
1250	1139	1141	1125	1084	1017	925	807	664	496	302	83	0
1300	1060	1064	1055	1020	961	876	767	632	473	288	79	0
1350	981	989	985	957	905	828	726	600	450	275	76	0
1400	903	914	916	895	849	780	686	569	427	262	72	0
1450	826	839	848	833	794	732	647	538	405	248	69	0
1500	749	765	780	771	740	685	607	506	382	235	65	0
1550	673	692	712	710	685	638	568	475	360	222	62	0
1600	597	619	645	650	632	592	529	445	338	209	58	0
1650	522	547	579	589	578	545	491	414	316	196	55	0
1700	448	475	513	530	525	499	452	384	294	183	51	0
1750	375	404	448	471	473	454	414	354	273	171	48	0
1800	302	334	383	412	421	409	377	324	251	158	45	0
1850	230	265	320	354	369	364	340	295	230	146	41	0
1900	159	197	257	298	319	321	303	266	209	133	38	0
1950	89	129	195	241	269	278	267	238	189	121	35	0

0 (6.1)

**Answer  
Key**

  
 RE APPROVED  
10/25/2011  
 EFFECTIVE DATE

Ref. Cycle 20 NuPOP MOL/EOL (18000 MWD/MTU)  
Rev. 54

2-GRAPH-RV-4

**Indian Point Unit 2 Cycle 20 Xenon Worth (PCM) versus Time Following Plant Trip  
After Steady State Operation at MOL (12000 MWD/MTU)  
(Page 1 of 2)**

Power (%)	Time After Trip (Hours)													
	0	2	4	6	8	10	12	14	16	18	20	25	30	35
100	-2833	-3471	-3822	-3963	-3955	-3843	-3662	-3438	-3190	-2931	-2673	-2067	-1554	-1146
95	-2791	-3395	-3725	-3854	-3840	-3727	-3549	-3330	-3087	-2836	-2585	-1996	-1501	-1106
90	-2749	-3319	-3627	-3744	-3725	-3612	-3436	-3221	-2985	-2741	-2498	-1929	-1449	-1067
85	-2706	-3244	-3530	-3635	-3610	-3496	-3322	-3113	-2883	-2646	-2410	-1860	-1396	-1028
80	-2664	-3168	-3433	-3525	-3495	-3380	-3209	-3004	-2781	-2551	-2323	-1791	-1344	-989
75	-2602	-3066	-3307	-3385	-3349	-3234	-3067	-2869	-2653	-2433	-2214	-1705	-1279	-941
70	-2539	-2964	-3180	-3245	-3203	-3088	-2925	-2733	-2526	-2314	-2105	-1620	-1214	-882
65	-2477	-2862	-3054	-3105	-3057	-2942	-2782	-2597	-2398	-2196	-1996	-1534	-1149	-844
60	-2414	-2760	-2927	-2965	-2911	-2796	-2640	-2461	-2271	-2077	-1887	-1448	-1084	-796
55	-2319	-2625	-2768	-2793	-2735	-2621	-2472	-2302	-2122	-1939	-1760	-1350	-1009	-740
50	-2223	-2490	-2608	-2621	-2559	-2447	-2304	-2142	-1972	-1801	-1634	-1251	-934	-685
45	-2128	-2354	-2449	-2449	-2383	-2273	-2136	-1983	-1823	-1663	-1507	-1152	-859	-630
40	-2032	-2219	-2289	-2277	-2207	-2099	-1968	-1824	-1674	-1526	-1381	-1053	-784	-574
35	-1870	-2023	-2076	-2056	-1987	-1886	-1765	-1634	-1498	-1364	-1234	-940	-699	-511
30	-1708	-1828	-1862	-1836	-1768	-1674	-1563	-1444	-1322	-1202	-1087	-826	-614	-448
25	-1546	-1632	-1648	-1615	-1548	-1461	-1360	-1254	-1147	-1041	-940	-712	-528	-386
20	-1384	-1436	-1434	-1394	-1329	-1248	-1158	-1064	-971	-879	-792	-599	-443	-323
15	-1121	-1151	-1142	-1104	-1049	-982	-909	-834	-759	-687	-618	-466	-344	-250
10	-858	-866	-849	-814	-768	-715	-659	-603	-547	-494	-444	-333	-245	-178
5	-429	-433	-425	-407	-384	-358	-330	-301	-274	-247	-222	-167	-123	-89
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ref. Cycle 20 NuPOP MOL (12000 MWD/MTU)  
Rev. 46

**Answer  
Key**

*[Signature]*  
RE APPROVED  
5/24/11  
EFFECTIVE DATE  
2-GRAPH-RV-5

**Indian Point Unit 2 Cycle 20 Xenon Worth (PCM) versus Time Following Plant Trip  
After Steady State Operation at MOL (12000 MWD/MTU)  
(Page 2 of 2)**

Power (%)	Time After Trip (Hours)												
	40	45	50	55	60	65	70	75	80	85	90	95	100 (10.1)
100	-832	-598	-426	-301	-212	-148	-103	-72	-50	-34	-24	-16	-11
95	-804	-577	-411	-290	-204	-143	-100	-69	-48	-33	-23	-16	-11
90	-775	-556	-396	-280	-197	-138	-96	-67	-46	-32	-22	-15	-10
85	-746	-536	-381	-269	-189	-133	-92	-64	-45	-31	-21	-15	-10
80	-718	-515	-367	-259	-182	-127	-89	-62	-43	-30	-20	-14	-10
75	-682	-490	-348	-246	-173	-121	-84	-59	-41	-28	-19	-13	-9
70	-647	-464	-330	-233	-164	-115	-80	-55	-38	-27	-18	-13	-9
65	-612	-439	-312	-220	-155	-108	-75	-52	-36	-25	-17	-12	-8
60	-576	-413	-294	-207	-146	-102	-71	-49	-34	-24	-16	-11	-8
55	-536	-384	-273	-193	-135	-95	-66	-46	-32	-22	-15	-10	-7
50	-496	-355	-252	-178	-125	-87	-61	-42	-29	-20	-14	-10	-7
45	-455	-326	-231	-163	-115	-80	-56	-39	-27	-19	-13	-9	-6
40	-415	-297	-211	-149	-104	-73	-51	-35	-24	-17	-12	-8	-6
35	-369	-264	-187	-132	-93	-65	-45	-31	-22	-15	-10	-7	-5
30	-324	-231	-164	-116	-81	-57	-39	-27	-19	-13	-9	-6	-4
25	-278	-198	-141	-99	-69	-48	-34	-23	-16	-11	-8	-5	-4
20	-232	-166	-117	-83	-58	-40	-28	-19	-13	-9	-6	-4	-3
15	-180	-128	-91	-64	-45	-31	-22	-15	-10	-7	-5	-3	-2
10	-128	-91	-64	-45	-32	-22	-15	-11	-7	-5	-3	-2	-2
5	-64	-45	-32	-23	-16	-11	-8	-5	-4	-3	-2	-1	-1
0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ref. Cycle 20 NuPOP MOL (12000 MWD/MTU)  
Rev. 46

**Answer  
Key**

*[Signature]*  
RE APPROVED  
5/24/11  
EFFECTIVE DATE

2-GRAPH-RV-5



**INDIAN POINT STATION  
UNIT NO. 2 - CYCLE 20**

Xenon/Samarium (Xe/Sm) Correction Factors

<u>Boron Concentration (PPM)</u>	<u>Xe/Sm Correction Factor</u>
0	1.000
75	0.992
150	0.985
225	0.977
300	0.970
375	0.962
450	0.955
525	0.948
600	0.941
675	0.934
750	0.926
825	0.919
900	0.912
975	0.905 (7.4)
1050	0.899
1125	0.892
1200	0.885
1275	0.878
1350	0.872
1425	0.865
1475	0.861 (10.4)
1500	0.858
1575	0.852
1650	0.845
1725	0.839
1800	0.832

Answer  
Key

*[Signature]*  
\_\_\_\_\_  
RE - Approved  
5/24/11  
\_\_\_\_\_  
Effective Date

Ref. Cycle 20 NuPOP - MOL (12000 MWD/MTU)  
Rev. 50

2-GRAPH-RV-7

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

## Initial Conditions:

- The unit had been operating for 300 Days at 100% power.
- A Unit trip occurred due to a Main Transformer Fire
- The unit has been shutdown for 15 days to effect repairs
- Prior to the trip:
  - Control Bank D at 223
  - Boron Concentrations 975 ppm
- Current Plant Conditions:
  - Tavg 547°F
  - Boron Concentrations 1469
- The Plant Computer is Out of Service
- Estimated time of Criticality 20:00 tonight
- 
- 

## Initiating Cue:

You are the Spare RO and the CRS has directed you to perform an ECP by hand.

ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION

2-SOP-15.4  
Rev. 10

ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION

(Page 1 of 8)

1.0 EQUILIBRIUM CONDITIONS PRIOR TO SHUTDOWN	
1.1 DATE	24 January 2012
TIME	10:00
1.2 CONTROL BANK	D
STEPS	223
1.3 BORON CONCENTRATION (PPM)	975
1.4 POWER LEVEL (%)	100%

2.0 ESTIMATED CRITICAL CONDITION FOR START	
2.1 DATE	TODAY
TIME	20:00
2.2 TAVG	547
2.3 BORON CONCENTRATION (PPM)	1472
2.4 LENGTH OF SHUTDOWN (HRS)	5625
FROM DATE/TIME	24 January 2012

3.0 ROD DIFFERENTIAL	
3.1 REMAINING ROD WORTH AT POSITION (1.2) GRAPH RV-1	0

4.0 POWER DEFECT	
4.1 POWER DEFECT AT BORON (1.3) AND POWER (1.4) GRAPH RV-2	1623.9

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION  
(Page 2 of 8)**

**NOTE**

The sign of reactivity in section 5.0 will be negative (-) IF boron at estimated critical condition is greater than boron at prior to shutdown condition (and vice versa).

**5.0 EFFECT FROM BORON CONCENTRATION CHANGE**

5.1 BORON CONCENTRATION DIFFERENTIAL = (1.3) - (2.3) = (±)PPM

BORON CONCENTRATION DIFFERENTIAL = (975) - (1472) = (-)497 PPM

5.2 BORON WORTH AT AVERAGE OF BORON (1.3) AND (2.3) GRAPH RV-3

BORON WORTH AT AVERAGE OF BORON = [(975)+(1472)]/2 = 1223.5 PPM

GRAPH RV-3 BORON WORTH = (+) 7.14 PCM/PPM

5.3 REACTIVITY FROM BORON CONCENTRATION CHANGE = [(5.1) × (5.2)] = (±)PCM

REACTIVITY FROM BORON CONCENTRATION CHANGE = [(-)497 × (+)7.14]

REACTIVITY FROM BORON CONCENTRATION CHANGE = -3584.6

**6.0 TEMPERATURE EFFECT**

6.1 REACTIVITY DUE TO TAVG AT  
BORON CONCENTRATION (1.3)  
AND TAVG (2.2) GRAPH RV-4

0

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION**  
(Page 3 of 8)

7.0 XENON/SAMARIUM PRIOR TO SHUTDOWN			
7.1 Xe DEFECT AT POWER (1.4) AND TIME ZERO GRAPH RV-5	(-)	2833	PCM
7.2 Sm DEFECT AT POWER (1.4) AND TIME ZERO GRAPH RV-6	(-)	1009	PCM
7.3 SUM OF ITEMS (7.1) AND (7.2)	(-)	3842	PCM
7.4 Xe/Sm CORRECTION FACTOR AT BORON(1.3) GRAPH RV-7		0.905	
7.5 CORRECTED Xe/Sm PRIOR TO SHUTDOWN = [(7.3)×(7.4)] = (-) PCM			
CORRECTED Xe/Sm PRIOR TO SHUTDOWN = [((-)3842)×(.905)]			
CORRECTED Xe/Sm PRIOR TO SHUTDOWN = (-) 3477 PCM			

8.0 XENON POWER FOR STARTUP			
8.1-HRS PRIOR TO SHUTDOWN	AVERAGE PERCENT POWER	MULTIPLIER	PRODUCT
0-1		0.07	
1-4		0.23	
4-9		0.22	
9-16		0.20	
16-25		0.22	
25-36		0.06	
			<b>SUM TOTAL %</b>
8.2 XENON POWER = SUM TOTAL (8.1) OR = PERCENT POWER IE POWER ESSENTIALLY CONSTANT FOR LAST 36 HOURS. XENON % =			160%

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION**

(Page 4 of 8)

<b>9.0 SAMARIUM POWER FOR STARTUP</b>	
<b>9.1-DAYS PRIOR TO SHUTDOWN</b>	<b>AVERAGE POWER</b>
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
<b>SUM TOTAL</b>	
<b>9.2 SAMARIUM POWER = SUM TOTAL/10</b> <b>SAMARIUM POWER/10 = PERCENT</b> <b>QR = PERCENT [E POWER ESSENTIALLY CONSTANT FOR LAST 10 DAYS</b> <b>SAMARIUM % =</b>	

*160%*

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION**

(Page 5 of 8)

10.0 XENON/SAMARIUM AT STARTUP		
10.1 Xe DEFECT AT POWER (8.2) AND TIME (2.4) GRAPH RV-5	(-) 11	PCM
10.2 Sm DEFECT AT POWER (9.2) AND TIME (2.4) GRAPH RV-6	(-) 1202	PCM
10.3 SUM OF (10.1) + (10.2)	(-) 1213	PCM
10.4 Xe/Sm CORRECTION FACTOR AT BORON (2.3) GRAPH RV-7	0.861	
10.5 CORRECTED Xe/Sm AT STARTUP = (10.3) × (10.4) = (-) PCM		
CORRECTED Xe/Sm AT STARTUP = (1213) × (0.861) = (-) 1044.39 PCM		

11.0 CORRECTED XENON/SAMARIUM DIFFERENTIAL	
11.1 CORRECTED XENON/SAMARIUM DIFFERENTIAL = (10.5) - (7.5)	(±) PCM
CORRECTED XENON/SAMARIUM DIFFERENTIAL =	
$[(-) 1044.39] - [(-) 3477] =$	2432.6

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION  
(Page 6 of 8)**

**NOTE**

IF Total Reactivity Effect in step 12.1 is negative OR IF estimated Critical Rod Position step 13.1 differs from desired startup position, THEN a Boron Concentration Adjustment is required per Section 14.0

12.0 TOTAL REACTIVITY EFFECT	
<b>12.1 TOTAL REACTIVITY EFFECT =</b> (3.1) + (4.1) + (5.3) + (6.1) + (11.1)	(±)PCM
<b>TOTAL REACTIVITY EFFECT =</b> ( ) + ( ) + ( ) + ( ) + ( ) 0 + 1623.9 + (-)6359.4 + 6 + 2432.6	(+) 472 PCM

13.0 ESTIMATED CRITICAL ROD POSITION		
13.1 POSITION AT REACTIVITY (12.1) GRAPH RV-1	BANK	STEPS
	D	110

ESTIMATE PERFORMED BY (RO/CRS/REACTOR ENGINEER)	DATE

ESTIMATE REVIEWED BY (SM/REACTOR ENGINEER)	DATE

Facility: Indian Point Unit 2Task No: 0080030402Task Title: **Determine Isolation Boundaries for CCW Leak Using Plant Print**K/A Reference: 1940012125  
SRO 4.2Job Performance Measure  
No: \_\_\_\_\_SRO  
Admin-2

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	X	Actual Performance	_____
Classroom	X	Simulator	_____
		Plant	_____

**READ TO THE EXAMINEE**

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

Initial Conditions:

- The plant is in cold shutdown on RHR
- CCW Surge Tank level is lowering at approximately 0.5% per minute
- The NPO in Containment reports a significant leak downstream of Check Valve 770.

Task Standard: Isolation boundary valves identified and NPOs notified to close valves.

Required Materials:

General References: 227781 Auxiliary Coolant System sheet 1  
9321-2720 Auxiliary Coolant System sheet 2  
9321-2746 Isolation Valve Seal Water System

Initiating Cue: You are the FSS and the CRS has directed you to identify all valves that must be shut to isolate the leak on Check Valve 770.

Time Critical Task: No

Validation Time: 25 minutes

---

Performance Information

(Denote critical steps with a check mark √)

---

1. Performance Step: Obtain Prints

Standard: Obtains Prints:  
227781 Auxiliary Coolant System sheet 1  
9321-2720 Auxiliary Coolant System sheet 2  
9321-2746 Isolation Valve Seal Water System

Comment:

---

√ 2. Performance Step: Determine MOV-769/797 must be shut

Standard: Identifies MOV-769/797 must be shut

Comment: Both valves are operated from the same switch in the control room.

---

√ 3. Performance Step: Determine 734C must be shut

Standard: Identifies 734C, Supply Stop must be shut

Comment: Print 9321-2720

---

---

Performance Information

(Denote critical steps with a check mark √)

---

**√ 4. Performance Step: Determine 771A – D must be shut**

**Standard: Identifies 771A – D**

**Comment: Print 9321-2720**

---

**√ 5. Performance Step: Determine Isolation Valve Seal Water System valve 1421, RCPs Cooling Water Inlet Stop must be closed**

**Standard: Identify 1421 must be closed**

**Comment: Print 9321-2746**

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

**Initial Conditions:**

- The plant is in cold shutdown on RHR
- CCW Surge Tank level is lowering at approximately 0.5% per minute
- The NPO in Containment reports a significant leak downstream of Check Valve 770.

**Initiating Cue:**

You are the FSS and the CRS has directed you to identify all valves that must be shut to isolate the leak on Check Valve 770.

Facility: Indian Point Unit 2Task No: 2000700102Task Title: **Review a Completed Surveillance Test**K/A Reference: 1940012212  
SRO – 4.2Job Performance Measure  
No: \_\_\_\_\_SRO  
Admin - 3

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	X	Actual Performance	
Classroom	<u>X</u>	Simulator	_____
		Plant	_____

**READ TO THE EXAMINEE**

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

Initial Conditions:

- 2-PT-M110 was completed 5 hours ago
- A Peer Review was completed

Task Standard: Surveillance Test Reviewed and errors found.

Required Materials: Completed 2-PT-M110

General References: IP-SMM-DC-904

Initiating Cue: You are the FSS and the SM has directed you to review the completed 2-PT-M110 in accordance with IP-SMM-DC-904

Time Critical Task: No

Validation Time: 30 Minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain copy of IP-SMM-DC-904

Standard: Obtains copy of procedure, Reviews P&Ls and goes to Step 6.5.3

Comment: CUE: Hand out copy of IP-SMM-DC-904 with completed surveillance test procedure

---

2. Performance Step: Spot Check Review completed Surveillance Test

Standard: Identify missing initials at step 4.2.1

Comment: This is not critical for SROs.  
Step 6.5.3.1  
"The primary focus of this review is to ensure that all OPERABILITY criteria and test criteria are satisfied – other sections of the ST may be spot-checked at the reviewer's discretion."

---

✓ 3. Performance Step: Determine Jacket Water Temperature is less than minimum

Standard: Identify 163° is below the limit of 165°

Comment:

---

## Performance Information

(Denote critical steps with a check mark √)

---

**√ 4. Performance Step: Identify that Jacket Water Temp is NOT Acceptable**

**Standard: Identify that YES is incorrectly circled**

**Comment:**

---

**√ 5. Performance Step: Identify that TRM Acceptance Criteria is NOT correct**

**Standard: Identify that YES is incorrectly circled**

**Comment:**

---

**√ 6. Performance Step: Determines PT is NOT Satisfactory and does not sign**

**Standard: Does Not Sign for Review**

**Comment:**

---

**7. Performance Step: Candidate may determine that Tim Jenkins is NOT qualified to perform Procedural Steps or Peer Review**

**Standard: Not Critical**

**Comment:**

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_



**Entergy**

Nuclear Northeast



Procedure Use Is:

Control Copy: \_\_\_\_\_

Continuous

Effective Date: 12/2/2010

Reference

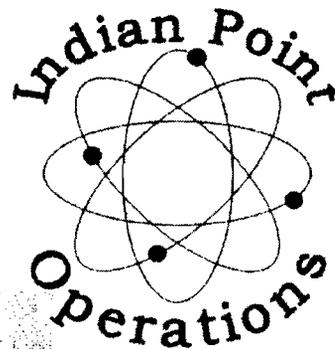
Page 1 of 14

Information

**2-PT-M110, Revision 6** <sup>DS</sup> TODAY  
**APPENDIX R DG FUNCTIONAL TEST**

Approved By:

John Bullette  11/15/10  
RPO or Designee: Print Name / Sign / Date



Team 2A  
Procedure Owner

**ANSWER  
KEY**

**EDITORIAL REVISION**

**APPENDIX R DG FUNCTIONAL TEST**

No: 2-PT-M110

Rev: 6

Page 2 of 14

**REVISION SUMMARY**

(Page 1 of 1)

**1.0 REASON FOR REVISION**

1.1 Incorporate feedback IP2-10135.

**2.0 SUMMARY OF CHANGES**

- 2.1 **Editorial change** [per step 4.6.13 of IP-SMM-AD-102] revised wording in Prerequisite 3.3: from "NOTIFY Watch Chemist prior to start of the diesel in order to obtain a glycol sample approximately 1 hour after diesel operations are secured" to "NOTIFY Watch Chemist prior to start of the diesel in order to obtain a coolant sample within 1 hour after diesel operations are secured".
- 2.2 **Editorial change** [per step 4.6.13 of IP-SMM-AD-102] added CR-IP2-2010-00036, CA#9 to Development Docs step 9.2.7.

**ANSWER  
KEY**

**APPENDIX R DG FUNCTIONAL TEST**

No: 2-PT-M110

Rev: 6

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<b>ANSWER KEY</b>
-----------------------

**APPENDIX R DG FUNCTIONAL TEST**

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**1.0 PURPOSE**

1.1 This procedure establishes requirements for the following:

- 1.1.1 Starting and running the SBO / Appendix R diesel generator for a period of time sufficient to reach stable operating temperatures in accordance with TRS 3.8.B.5.
- 1.1.2 Demonstrating proper operation of Appendix R DG output breaker SBO/ASS in accordance with TRS 3.8.B.5.
- 1.1.3 Demonstrating proper city water line up to the Appendix R DG heat exchangers in accordance with TRS 3.7.E.2.
- 1.1.4 Verifying exhaust area fan runs in accordance with Vendor Recommendations.

1.2 This procedure applies to the following:

- Appendix R DG
- Breaker SBO/ASS

<b>ANSWER KEY</b>
-----------------------

**2.0 PRECAUTIONS AND LIMITATIONS****2.1 Precautions And Limitations**

- 2.1.1 This test may be performed in any plant mode.
- 2.1.2 It is preferable to perform this test during daylight hours to facilitate the observation of Appendix R DG exhaust.
- 2.1.3 Momentary excursions outside the desired loading of 2005 to 2045 KW do NOT invalidate the test results.

**2.2 General Information**

- 2.2.1 Test personnel SHALL complete Sections 3.0, 4.0, 5.0, 6.0, and 7.0, as applicable.
- 2.2.2 Personnel directing this test SHALL read it in its entirety prior to performance. Personnel otherwise involved SHALL read applicable sections.
- 2.2.3 Any discrepancies found SHALL be identified in Section 5.0, Comments.
- 2.2.4 Attachment 1, Appendix R DG Data Sheet, captures all of the data required by Attachment 1, in SOP-27.6, Appendix R Diesel Generator Operation. Therefore completion of Attachment 1 in 2-SOP-27.6, Appendix R Diesel Generator Operation, is NOT required during performance of this test.

<b>APPENDIX R DG FUNCTIONAL TEST</b>	No: 2-PT-M110	Rev: 6
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2.25

Appendix R DG will be operated for a minimum of 1 hour at 2005 to 2045 KW to establish operability criteria. The test period may be extended as necessary to obtain data after temperature stability is reached.

**ANSWER  
KEY**

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Initials

**3.0 PREREQUISITES**

3.1 Equipment required for test:

EQUIPMENT	M&TE No.	CAL DUE DATE
Sample Bottle (minimum capacity 4 ounces)	N/A	N/A

JS

3.2 OBTAIN a current copy of 2-SOP-27.6, Appendix R Diesel Generator Operation, AND REVIEW Precautions and Limitations.

JS

3.3 NOTIFY Watch Chemist prior to start of the diesel in order to obtain a coolant sample within 1 hour after diesel operations are secured (Reference 9.2.7).

JS

3.4 Reason for Test – CHECK applicable listing:

- Normal Surveillance WO # 52297257-01
- Post Maintenance Test WO # \_\_\_\_\_  
WO # \_\_\_\_\_  
WO # \_\_\_\_\_
- Increased Test Frequency WO # \_\_\_\_\_
- Other Oil Sample 52297420-01

JS

**ANSWER  
KEY**

## APPENDIX R DG FUNCTIONAL TEST

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Initials4.0 PROCEDURE4.1 Initial Conditions

- 4.1.1
- OBTAIN permission from SM or Designated Alternate to perform Test:

Shift Manager TODAY  
SM or Des. Alt. Signature / Date

4.2 Test of Appendix R Diesel Generator

- 4.2.1
- START (Parallel Mode)
- AND
- LOAD Appendix R DG to between 2005 and 2045 KW per 2-SOP-27.6, Appendix R Diesel Generator Operation.
- ( )

- 4.2.2
- IF Appendix R DG does
- NOT
- start
- OR
- load,
- THEN
- :

4.2.2.1 NOTIFY the SM. NA4.2.2.2 DOCUMENT in detail any problems and/or specific components that may have caused the failure in Section 5.0. NA

- 4.2.3
- WHEN
- Appendix R DG reaches load window of 2005-2045 KW,
- THEN
- RECORD time and load:

Time 5 hours 30Load 2030 KW JS

- 4.2.4
- VERIFY the DG Area fan is running.
- JS

- 4.2.5
- WHEN
- lube oil and jacket water temperatures stabilize,
- THEN
- INITIATE data collection every 30 minutes in accordance with Attachment 1, Appendix R DG Data Sheet.
- JS

- 4.2.6
- WHEN
- lube oil and jacket water temperatures have stabilized during load run,
- THEN
- OBSERVE exhaust from Appendix R DG.
- JS

**ANSWER  
KEY**

<b>APPENDIX R DG FUNCTIONAL TEST</b>	No: 2-PT-M110	Rev: 6
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**Initials**

4.2.7 CHECK appropriate box indicating color of Appendix R DG exhaust observed.

APPENDIX R DG EXHAUST COLOR				
CLEAR	✓	LT. GRAY	BLACK	
WHITE		DK. GRAY	BLUE	JF

**NOTE**

Momentary excursions outside the desired loading of 2005 to 2045 KW do **NOT** invalidate the test results.

4.2.8 MAINTAIN Appendix R DG load at 2005 to 2045 KW for a minimum of 1 hour. JF

4.2.9 RECORD present time and run time at target load (2005 - 2045 KW):

Present time 1045

Time loaded ≥ 2005 KW 77 min (≥ 1 hour) JF

4.2.10 WHEN time and load conditions have been met, THEN UNLOAD AND SECURE Appendix R DG (Parallel Mode) per 2-SOP-27.6, Appendix R Diesel Generator Operation. JF

**ANSWER KEY**

**4.3 Restoration**

4.3.1 OBTAIN a lube oil sample of approximately 4 ounces from the Appendix R DG dipstick. JF

4.3.2 LABEL lube oil sample with the following information:

- Unit 2 Appendix R DG
- 2-PT-M110
- Date JF

4.3.3 VERIFY GT1 North and South combined Fuel Oil Storage Tank level is greater than or equal to 12,500 gallons. JF

**APPENDIX R DG FUNCTIONAL TEST**

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		<u>Initials</u>
<del>4.3.4</del>	VERIFY Fuel Oil Day Tank level is between 7/8 - FULL.	<u>JS</u>
<del>4.3.5</del>	VERIFY UW-831, City Water Supply Valve For Appendix 'R' Diesel Gen. Heat Exchangers, is open.	<u>JS</u>
<del>4.3.6</del>	VERIFY UW-833, City Water Supply Line Valve For Appendix 'R' Diesel Gen. J/W Heat Exchanger, is open.	<u>JS</u>
<del>4.3.7</del>	VERIFY UW-837, City Water Supply Line Valve For Appendix 'R' Diesel Gen. A/C Heat Exchanger, is open.	<u>JS</u>
<del>4.3.8</del>	NOTIFY CRS or SM the Appendix R DG has been returned to standby service.	<u>JS</u>
<del>4.3.9</del>	DELIVER lube oil sample to Maintenance.	<u>JS</u>

**ANSWER  
KEY**

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**5.0 COMMENTS**

① There is no TE to read

**ANSWER  
KEY**

**Test Performers:**

<b>Print Name:</b>	<b>Initials:</b>	<b>Signature/Date:</b>
Tim Jenkins	TJ	Tim Jenkins 1/24/12
Tom Feenan	TF	Tom Feenan 1/24/12
Greg Womell	GW	Greg Womell 1/24/12

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**6.0 ACCEPTANCE CRITERIA**

**6.1 TRM Requirements**

Equipment/Parameter/Instrument	Step/Att.	Surveillance Requirement	Acceptance Criteria	Actual	Acceptable	Initials
Generator Output Breaker / SBO/ASS	4.2.1	TRS 3.8.B.5	Breaker Closes	N/A	<input checked="" type="checkbox"/> YES / NO	CW
AC Wattmeter -- Generator / WM	4.2.9		Load >2005 KW Maintained For ≥ 1 Hour	<input checked="" type="checkbox"/> YES / NO	<input checked="" type="checkbox"/> YES / NO	CW
Jacket Water Temp	Att. 1		165-198 °F (60 Min Data)	163 °F	<input checked="" type="checkbox"/> YES / NO	CW
Lube Oil Temp	Att. 1		≤ 250°F (60 Min Data)	212 °F	<input checked="" type="checkbox"/> YES / NO	CW
UW-831	4.3.5	TRS 3.7.E.2	OPEN	OPEN	YES / NO	CW
UW-833	4.3.6		OPEN	OPEN	YES / NO	CW
UW-837	4.3.7		OPEN	OPEN	YES / NO	CW

**6.2 Other Program Requirements**

Equipment	Step	Surveillance Requirement	Acceptance Criteria	Actual	Acceptable	Initials
DG Area Fan	4.2.4	Vendor Recommendation	Fans Starts	<input checked="" type="checkbox"/> YES / NO	<input checked="" type="checkbox"/> YES / NO	CW

**7.0 TEST ACCEPTANCE**

**7.1 TRM Acceptance Criteria**

7.1.1 Based on recorded data, are all Acceptance Criteria of Section 6.1 satisfied?

YES      NO      N/A

**ANSWER KEY**

7.1.2 IF all Acceptance Criteria of Section 6.1 are NOT satisfied, THEN:

- NOTIFY CRS/SM to declare Appendix R Diesel Generator inoperable.
- INITIATE a WR and a CR.
- TAKE applicable action in accordance with TRO 3.8.B.

N/A

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7.2 **Other Programs Acceptance Criteria**

7.2.1 Based on the recorded data, are all Acceptance Criteria of Section 6.2 satisfied?

YES      NO      N/A

7.2.2 IF component(s) failed to meet the Acceptance Criteria of Section 6.2, THEN:

- NA
- NOTIFY CRS/SM.
  - INITIATE a WR and a CR.

7.3 IF NO is circled in Step 7.1.1 OR Step 7.2.1, THEN LIST corrective action(s) taken, with any comments:

Comments: None

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Reviewed By: \_\_\_\_\_  
SM or Des. Alt: **Print Name / Sign / Date**

**8.0 EVALUATION**

**8.1 SURVEILLANCE COORDINATOR REVIEW**

**ANSWER  
KEY**

Comments: \_\_\_\_\_

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Reviewed By: \_\_\_\_\_  
Surveillance Coordinator Review: **Print Name / Sign / Date**

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## 9.0 REFERENCES

### 9.1 Commitment Documents

None

### 9.2 Development Documents

- 9.2.1 250907, Electrical Distribution and Transmission System
- 9.2.2 400882, Station Blackout and Appendix R Diesel Generator Set P&ID Diesel Cooling Water System Mechanical
- 9.2.3 EC-5000033794, IP2 Station Blackout and Appendix R Diesel Generator Set
- 9.2.4 NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors
- 9.2.5 NSAC-108, Reliability of Diesel Generators at U.S. Power Plants
- 9.2.6 Cummins Operation and Maintenance Manual QSK78 Series Engines
- 9.2.7 CR-IP2-2010-00036, CA#9

### 9.3 Interface Documents

- 9.3.1 2-SOP-27.6, Appendix R Diesel Generator Operation
- 9.3.2 TRO 3.8.B
- 9.3.3 TRS 3.7.E.2

## 10.0 RECORDS AND DOCUMENTATION

### 10.1 Records

The following required records resulting from this procedure are controlled and maintained in accordance with the IPEC Records Retention Schedule.

- 10.1.1 This Performance Procedure becomes a Quality Record when completed.

### 10.2 Documentation

None

**ANSWER  
KEY**

	IPEC SITE MANAGEMENT MANUAL	QUALITY RELATED ADMINISTRATIVE PROCEDURE	IP-SMM DC-904	Revision 3
		INFORMATIONAL USE	Page	20 of 20

ATTACHMENT 10.2

PEER REVIEW SHEET

PEER REVIEW SHEET

PROCEDURE NUMBER: 2-PT-MIID

DATE PERFORMED: TODAY

	YES	NO*	N/A
1. Calibration due dates recorded?			✓
2. Instrument(s) within calibration?			✓
3. Changes documented by TPC?			✓
4. All required procedural steps completed?	✓		
5. All steps <u>NOT</u> completed noted & explained in Comments Section?			
6. All corrections lined out, dated and initialed?			✓
7. All calculations correct?	✓		
8. All data properly transcribed?			
9. Required CRs, WOs, PFs or CTs, etc. initiated?			✓
10. Operability conclusions correct?	✓		
11. Overall acceptance conclusions correct?	✓		

\* Explain all NOs

COMMENTS:

**ANSWER  
KEY**

PEER REVIEWER: Steve Davis TODAY  
Signature/Date

**Initial Conditions:**

- 2-PT-M110 was completed 5 hours ago
- A Peer Review was completed

**Initiating Cue:**

You are the FSS and the SM has directed you to review the completed 2-PT-M110 in accordance with IP-SMM-DC-904.



**Entergy**

Nuclear Northeast



Procedure Use Is:

- Continuous
- Reference
- Information

Control Copy: \_\_\_\_\_

Effective Date: 12/2/2010

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**2-PT-M110, Revision 6** <sup>BY TODAY</sup>  
**APPENDIX R DG FUNCTIONAL TEST**

Approved By:

John Bullette *[Signature]* 11/5/10  
 RPO or Designee: **Print Name / Sign / Date**



Team 2A  
 Procedure Owner

**EDITORIAL REVISION**

**APPENDIX R DG FUNCTIONAL TEST**

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**REVISION SUMMARY**

(Page 1 of 1)

**1.0 REASON FOR REVISION**

1.1 Incorporate feedback IP2-10135.

**2.0 SUMMARY OF CHANGES**

2.1 **Editorial change** [per step 4.6.13 of IP-SMM-AD-102] revised wording in Prerequisite 3.3: from "NOTIFY Watch Chemist prior to start of the diesel in order to obtain a glycol sample approximately 1 hour after diesel operations are secured" to "NOTIFY Watch Chemist prior to start of the diesel in order to obtain a coolant sample within 1 hour after diesel operations are secured".

2.2 **Editorial change** [per step 4.6.13 of IP-SMM-AD-102] added CR-IP2-2010-00036, CA#9 to Development Docs step 9.2.7.

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**1.0 PURPOSE**

- 1.1 This procedure establishes requirements for the following:
- 1.1.1 Starting and running the SBO / Appendix R diesel generator for a period of time sufficient to reach stable operating temperatures in accordance with TRS 3.8.B.5.
  - 1.1.2 Demonstrating proper operation of Appendix R DG output breaker SBO/ASS in accordance with TRS 3.8.B.5.
  - 1.1.3 Demonstrating proper city water line up to the Appendix R DG heat exchangers in accordance with TRS 3.7.E.2.
  - 1.1.4 Verifying exhaust area fan runs in accordance with Vendor Recommendations.
- 1.2 This procedure applies to the following:
- 1.2.1 Appendix R DG
  - 1.2.2 Breaker SBO/ASS

**2.0 PRECAUTIONS AND LIMITATIONS****2.1 Precautions And Limitations**

- 2.1.1 This test may be performed in any plant mode.
- 2.1.2 It is preferable to perform this test during daylight hours to facilitate the observation of Appendix R DG exhaust.
- 2.1.3 Momentary excursions outside the desired loading of 2005 to 2045 KW do NOT invalidate the test results.

**2.2 General Information**

- 2.2.1 Test personnel SHALL complete Sections 3.0, 4.0, 5.0, 6.0, and 7.0, as applicable.
- 2.2.2 Personnel directing this test SHALL read it in its entirety prior to performance. Personnel otherwise involved SHALL read applicable sections.
- 2.2.3 Any discrepancies found SHALL be identified in Section 5.0, Comments.
- 2.2.4 Attachment 1, Appendix R DG Data Sheet, captures all of the data required by Attachment 1, in SOP-27.6, Appendix R Diesel Generator Operation. Therefore completion of Attachment 1 in SOP-27.6, Appendix R Diesel Generator Operation, is NOT required during performance of this test.

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2.25

Appendix R DG will be operated for a minimum of 1 hour at 2005 to 2045 KW to establish operability criteria. The test period may be extended as necessary to obtain data after temperature stability is reached.

## APPENDIX R DG FUNCTIONAL TEST

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Initials3.0 PREREQUISITES3.1 Equipment required for test:

EQUIPMENT	M&TE No.	CAL DUE DATE
Sample Bottle (minimum capacity 4 ounces)	N/A	N/A

SS3.2 OBTAIN a current copy of 2-SOP-27.6, Appendix R Diesel Generator Operation, AND REVIEW Precautions and Limitations.SS3.3 NOTIFY Watch Chemist prior to start of the diesel in order to obtain a coolant sample within 1 hour after diesel operations are secured (Reference 9.2.7).SS3.4 Reason for Test – CHECK applicable listing:

- Normal Surveillance WO # 52297057-01
- Post Maintenance Test WO # \_\_\_\_\_
- WO # \_\_\_\_\_
- WO # \_\_\_\_\_
- Increased Test Frequency WO # \_\_\_\_\_
- Other Oil Sample 52297420-01

SS

## APPENDIX R DG FUNCTIONAL TEST

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Initials4.0 PROCEDURE4.1 Initial Conditions

- 4.1.1 OBTAIN permission from SM or Designated Alternate to perform Test:

Shift Manager TODAY  
SM or Des. Alt. Signature / Date

4.2 Test of Appendix R Diesel Generator

- 4.2.1 START (Parallel Mode) AND LOAD Appendix R DG to between 2005 and 2045 KW per 2-SOP-27.6, Appendix R Diesel Generator Operation.

- 4.2.2 IF Appendix R DG does NOT start OR load, THEN:

4.2.2.1 NOTIFY the SM. NA

4.2.2.2 DOCUMENT in detail any problems and/or specific components that may have caused the failure in Section 5.0. NA

- 4.2.3 WHEN Appendix R DG reaches load window of 2005-2045 KW, THEN RECORD time and load:

Time 5 hours 390

Load 2070 KW RF

- 4.2.4 VERIFY the DG Area fan is running. RF

- 4.2.5 WHEN lube oil and jacket water temperatures stabilize, THEN INITIATE data collection every 30 minutes in accordance with Attachment 1, Appendix R DG Data Sheet. RF

- 4.2.6 WHEN lube oil and jacket water temperatures have stabilized during load run, THEN OBSERVE exhaust from Appendix R DG. RF

## APPENDIX R DG FUNCTIONAL TEST

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Initials

4.2.7

CHECK appropriate box indicating color of Appendix R DG exhaust observed.

## APPENDIX R DG EXHAUST COLOR

CLEAR	<input checked="" type="checkbox"/>	LT. GRAY	<input type="checkbox"/>	BLACK	<input type="checkbox"/>
WHITE	<input type="checkbox"/>	DK. GRAY	<input type="checkbox"/>	BLUE	<input type="checkbox"/>

JF

**NOTE**

Momentary excursions outside the desired loading of 2005 to 2045 KW do **NOT** invalidate the test results.

4.2.8

MAINTAIN Appendix R DG load at 2005 to 2045 KW for a minimum of 1 hour.

JF

4.2.9

RECORD present time and run time at target load (2005 - 2045 KW):

Present time 10:15

Time loaded  $\geq$  2005 KW 77 min ( $\geq$  1 hour)

JF

4.2.10

WHEN time and load conditions have been met, THEN UNLOAD AND SECURE Appendix R DG (Parallel Mode) per 2-SOP-27.6, Appendix R Diesel Generator Operation.

JF

4.3

**Restoration**

4.3.1

OBTAIN a lube oil sample of approximately 4 ounces from the Appendix R DG dipstick.

JF

4.3.2

LABEL lube oil sample with the following information:

Unit 2 Appendix R DG

2-PT-M110

Date

JF

4.3.3

VERIFY GT1 North and South combined Fuel Oil Storage Tank level is greater than or equal to 12,500 gallons.

JF

**APPENDIX R DG FUNCTIONAL TEST**

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		<u>Initials</u>
<del>4.3.4</del>	VERIFY Fuel Oil Day Tank level is between 7/8 - FULL.	<u>JS</u>
<del>4.3.5</del>	VERIFY UW-831, City Water Supply Valve For Appendix 'R' Diesel Gen. Heat Exchangers, is open.	<u>JS</u>
<del>4.3.6</del>	VERIFY UW-833, City Water Supply Line Valve For Appendix 'R' Diesel Gen. J/W Heat Exchanger, is open.	<u>JS</u>
<del>4.3.7</del>	VERIFY UW-837, City Water Supply Line Valve For Appendix 'R' Diesel Gen. A/C Heat Exchanger, is open.	<u>JS</u>
<del>4.3.8</del>	NOTIFY CRS or SM the Appendix R DG has been returned to standby service.	<u>JS</u>
<del>4.3.9</del>	DELIVER lube oil sample to Maintenance.	<u>JS</u>



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**6.0 ACCEPTANCE CRITERIA****6.1 TRM Requirements**

Equipment/ Parameter/ Instrument	Step/Att.	Surveillance Requirement	Acceptance Criteria	Actual	Acceptable	Initials
Generator Output Breaker / SBO/ASS	4.2.1	TRS 3.8.B.5	Breaker Closes	N/A	<input checked="" type="radio"/> YES / NO	cm
AC Wattmeter – Generator / WM	4.2.9		Load >2005 KW Maintained For ≥ 1 Hour	<input checked="" type="radio"/> YES / NO	<input checked="" type="radio"/> YES / NO	cm
Jacket Water Temp	Att. 1		185-198 °F (60 Min Data)	163 °F	<input checked="" type="radio"/> YES / NO	cm
Lube Oil Temp	Att. 1		≤ 250°F (60 Min Data)	212 °F	<input checked="" type="radio"/> YES / NO	cm
UW-831	4.3.5	TRS 3.7.E.2	OPEN	OPEN	<input checked="" type="radio"/> YES / NO	cm
UW-833	4.3.6		OPEN	OPEN	<input checked="" type="radio"/> YES / NO	cm
UW-837	4.3.7		OPEN	OPEN	<input checked="" type="radio"/> YES / NO	cm

**6.2 Other Program Requirements**

Equipment	Step	Surveillance Requirement	Acceptance Criteria	Actual	Acceptable	Initials
DG Area Fan	4.2.4	Vendor Recommendation	Fans Starts	<input checked="" type="radio"/> YES / NO	<input checked="" type="radio"/> YES / NO	cm

**7.0 TEST ACCEPTANCE****7.1 TRM Acceptance Criteria**

**7.1.1** Based on recorded data, are all Acceptance Criteria of Section 6.1 satisfied?

 YES

NO

N/A

**7.1.2** IF all Acceptance Criteria of Section 6.1 are NOT satisfied, THEN:

N/A

- NOTIFY CRS/SM to declare Appendix R Diesel Generator inoperable.
- INITIATE a WR and a CR.
- TAKE applicable action in accordance with TRO 3.8.B.

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7.2 **Other Programs Acceptance Criteria**

7.2.1 Based on the recorded data, are all Acceptance Criteria of Section 6.2 satisfied?

7.2.2 YES      NO      N/A  
IF component(s) failed to meet the Acceptance Criteria of Section 6.2,  
THEN:

- NA*
- NOTIFY CRS/SM.
  - INITIATE a WR and a CR.

7.3 IF NO is circled in Step 7.1.1 OR Step 7.2.1, THEN LIST corrective action(s) taken, with any comments:

Comments: None

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Reviewed By: \_\_\_\_\_  
 SM or Des. Alt: **Print Name / Sign / Date**

**8.0 EVALUATION**

**8.1 SURVEILLANCE COORDINATOR REVIEW**

Comments: \_\_\_\_\_

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Reviewed By: \_\_\_\_\_  
 Surveillance Coordinator Review: **Print Name / Sign / Date**

**APPENDIX R DG FUNCTIONAL TEST**

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**9.0 REFERENCES****9.1 Commitment Documents**

None

**9.2 Development Documents**

- 9.2.1 250907, Electrical Distribution and Transmission System
- 9.2.2 400882, Station Blackout and Appendix R Diesel Generator Set P&ID Diesel Cooling Water System Mechanical
- 9.2.3 EC-5000033794, IP2 Station Blackout and Appendix R Diesel Generator Set
- 9.2.4 NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors
- 9.2.5 NSAC-108, Reliability of Diesel Generators at U.S. Power Plants
- 9.2.6 Cummins Operation and Maintenance Manual QSK78 Series Engines
- 9.2.7 CR-IP2-2010-00036, CA#9

**9.3 Interface Documents**

- 9.3.1 2-SOP-27.6, Appendix R Diesel Generator Operation
- 9.3.2 TRO 3.8.B
- 9.3.3 TRS 3.7.E.2

**10.0 RECORDS AND DOCUMENTATION****10.1 Records**

The following required records resulting from this procedure are controlled and maintained in accordance with the IPEC Records Retention Schedule.

- 10.1.1 This Performance Procedure becomes a Quality Record when completed.

**10.2 Documentation**

None

## APPENDIX R DG FUNCTIONAL TEST

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**ATTACHMENT 1,  
APPENDIX R DG DATA SHEET**  
(Page 1 of 1)

Date: TODAY

PARAMETER	FULL LOAD	TIME/ READINGS			
		0	30	60	90
<b>Appendix R DG Engine Data</b>					
Coolant Temperature	≥ 40 - ≤ 215 °F	178	179	179	
Lube Oil Pressure	≥ 45 psig	75	76	77	
Engine Speed	1800 RPM	1801	1801	1801	
Fuel Pump Pressure	200 - 400 psig @ 1800 RPM	378	371	382	
Fuel Inlet Temperature	≤ 150 °F	73	77	84	
Coolant Pressure	≥ 11 psig	25	25	24	
Lube Oil Temperature	≤ 250 °F	181	210	212	
Lube Oil Level (Between Run High / Run Low)	Midpoint	1/2	1/2	1/2	
Air Intake Temperature	≤ 180 °F	135	136	136	
After Cooler Temperature	≤ 160 °F	107	107	107	
<b>Appendix R D/G Generator Data</b>					
L1 Amps	≤ 141.0 Amps	94	94	94	
L2 Amps	≤ 141.0 Amps	88	87	88	
L3 Amps	≤ 141.0 Amps	87	87	88	
Frequency	59.7 - 60.3 Hz	60.0	60.0	60.0	
Total kW	≤ 2700 kW	2093	2011	2007	
Total kVA	≤ 3375 kVA	2220	2220	2201	
Total PF (nominal 0.9)	(≥ 0.8 - ≤ 0.95)	.9	.9	.9	
<b>Appendix R DG Other Data</b>					
Day Tank Level	7/8 - Full	7/8	7/8	7/8	
PI-8030, Day Tank Fill Pump Pressure	psig	55	55	55	
TE-8027, Day Tank Oil Cooler Temperature	°F	110	110	110	
Lube Oil Reservoir Sight Glass Level	3/4 - Full	3/4	3/4	3/4	
LG-8032, Jacket Water Surge Tank Sight Glass Level	2/3 - 3/4	3/4	3/4	3/4	
LG-8031, After Cooler Surge Tank Sight Glass Level	2/3 - 3/4	3/4	2/3	2/3	
TI-908, Jacket Water Heat Exchanger Outlet Temperature	°F	115	121	121	
TI-909 After Cooler Heat Exchanger Outlet Temperature	°F	73	72	72	
FI-7979, Appendix R DG Jacket Water Flow (City Water)	≤ 118 gpm	160	160	140	
FI-7979, Appendix R DG Jacket Water Flow (Service Water)	≤ 160 gpm				
FI-7980, Appendix R DG Aftercooler Water Flow (City Water)	≤ 87 gpm	135	135	135	
FI-7980, Appendix R DG Aftercooler Water Flow (Service Water)	≤ 137 gpm				
Battery Voltage	≥ 24 VDC	24.6	26.3	26.7	

	IPEC SITE MANAGEMENT MANUAL	QUALITY RELATED ADMINISTRATIVE PROCEDURE	IP-SMM DC-904	Revision 3
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ATTACHMENT 10.2

PEER REVIEW SHEET

PEER REVIEW SHEET

PROCEDURE NUMBER: 2-PT-M110

DATE PERFORMED: TODAY

	YES	NO*	N/A
1. Calibration due dates recorded?			✓
2. Instrument(s) within calibration?			✓
3. Changes documented by TPC?			✓
4. All required procedural steps completed?	✓		
5. All steps <u>NOT</u> completed noted & explained in Comments Section?			
6. All corrections lined out, dated and initialed?			✓
7. All calculations correct?	✓		
8. All data properly transcribed?			
9. Required CRs, WOs, PFs or CTSs, etc. Initiated?			✓
10. Operability conclusions correct?	✓		
11. Overall acceptance conclusions correct?	✓		

\* Explain all NOs

COMMENTS:

PEER REVIEWER: Steve Davis TODAY  
Signature/Date

Facility: Indian Point Unit 2Task No: 2000180102Task Title: Review a Manual VC Pressure Relief Release PermitK/A Reference: 1940012306  
SRO-3.8Job Performance Measure  
No: \_\_\_\_\_SRO Admin  
4

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	X	Actual Performance	
Classroom	<u>X</u>	Simulator	_____
		Plant	_____

**READ TO THE EXAMINEE**

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

Initial Conditions:

- VC pressure has increased to approximately 0.4 psig.
- The Computer Release Permit Program has been corrupted.
- The Spare RO prepared a manual Release Permit
- Given:
  - Condenser Air In leakage is 5.25 scfm
  - Plant vent flow is  $7.06 \times 10^4$  scfm
  - Current reading R-45 is  $7.15 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current reading R-42 is  $1.82 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current reading R-44 is  $1.14 \times 10^{-6}$   $\mu\text{Ci/cc}$
  - Current High Alarm R-42 is  $8.54 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current High Alarm R-44 is  $1.5 \times 10^{-4}$   $\mu\text{Ci/cc}$
  - Current Warn R-44 is  $1.0 \times 10^{-4}$   $\mu\text{Ci/cc}$
  - Instantaneous Release Rate 70,000  $\mu\text{Ci/sec}$

Task Standard: Release Permit Reviewed and errors identified.

Required Materials: Calculator

General References: 2-SOP-5.4.1, VC Pressure Relief

Initiating Cue: You are the CRS and the SM has directed you to review the Manual VC Pressure Relief Gaseous Release Permit and authorize discharge if acceptable.

Time Critical Task: No

Validation Time: 30 minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain a current copy of 2-SOP-5.4.1 and review P&Ls

Standard: Obtains procedure and reviews P&Ls

Comment:

---

2. Performance Step: Review given data entered on Attachment 1

Standard: Reviews given data on attachment 1 and determines all is correct.

Comment:

---

3. Performance Step: Review Pressure Release Rate Calculation

Standard: Determines calculation is correct  
 $0.8 \times 1.82 \times 10^{-7} \mu\text{Ci/cc} = 1.46 \times 10^{-7} \mu\text{Ci/cc}$

Comment: Step 4.2.4.1

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 4. Performance Step: Review Plant Vent Release Rate Calculation

**Standard:** Determines  $C_{pv}$  was incorrectly entered resulting in an incorrect calculation  
 $4.72 \times 10^{-4} \times 1.14 \times 10^{-5} \mu\text{Ci/cc} \times 7.06 \times 10^4 \text{ scfm} =$   
 $3.80 \times 10^{-4} \text{ Ci/sec}$   
Should be  $3.80 \times 10^{-5} \text{ Ci/sec}$

**Comment:** Step 4.2.4.2

---

✓ 5. Performance Step: Review Plant Vent Release Rate Equivalent of CAE Release Rate Calculation

**Standard:** Determines result is incorrectly entered  
 $4.72 \times 10^{-4} \times 7.15 \times 10^{-7} \mu\text{Ci/cc} \times 5.25 =$   
 $7.11 \times 10^{-9} \text{ Ci/sec}$   
Should be  $1.77 \times 10^{-9} \text{ Ci/sec}$

**Comment:** Step 4.2.4.3  
This step does not impact the final calculation as the result is still so small; however, it is an error on the form

---

✓ 6. Performance Step: Review Total Calculated Release Rate Calculation

**Standard:** Determines Total Calculated Release Rate is incorrect. This is due to the incorrect calculation in calculating  $RR_{pv}$ .  
 $1.46 \times 10^{-7} \mu\text{Ci/cc} + 3.80 \times 10^{-4} \text{ Ci/sec} + 0 =$   
 $3.80 \times 10^{-4} \text{ Ci/sec}$   
Should be  $3.80 \times 10^{-5} \text{ Ci/sec}$

**Comment:** Step 4.2.4.4. This is the result of a previous error.

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 7. Performance Step: Review R-44 Alarm Setpoint Calculation

**Standard:** Determine R-44 Alarm Setpoint calculation is incorrect. This is due to the incorrect calculation in calculating  $RR_{pv}$   
 $[(.0072 \mu\text{Ci/sec} - 3.80 \times 10^{-4} \text{ Ci/sec}) \times 2119] / (7.06 \times 10^4 \text{ scfm} + 1700)$   
 $1.99 \times 10^{-4} \mu\text{Ci/cc}$   
Should be  $2.09 \times 10^{-4} \mu\text{Ci/cc}$

**Comment:** Step 4.2.6.1. This is the result of a previous error.

---

8. Performance Step: Review R42 Alarm Setpoint Calculations

**Standard:** Determines Calculations are correct.  
 $70,000 \times 1.25 \times 10^{-6} \text{ sec/cc} =$   
 $8.75 \times 10^{-2} \mu\text{Ci/cc}$

**Comment:** Step 4.2.7

---

✓ 9. Performance Step: Review R-44 Warn Calculation

**Standard:** Determines wrong value used ( $1.99 \times 10^{-4} \mu\text{Ci/cc}$ ) thus the calculation is wrong.

**Comment:**

---

Performance Information

(Denote critical steps with a check mark √)

---

**√ 10. Performance Step:** **Determines calculation not correct. Does not sign for Discharge Authorization**

**Standard:** **Does not sign for Discharge Authorization**

**Comment:**

---

Terminating Cue: JPM Complete

<b>VC PRESSURE RELIEFS</b>	No: 2-SOP-5.4.1	Rev: 17
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**ATTACHMENT 1**  
**VC PRESSURE RELIEF GASEOUS RELEASE PERMIT**

(Page 1 of 1)

Date: TODAY Time: NOR Permit No. 120005

VC Sample # 1	Date: _____	Time: _____	Activity (A)	_____ $\mu\text{Ci/cc}$
VC Sample # 2	Date: _____	Time: _____	Activity	_____ $\mu\text{Ci/cc}$
Plant Vent Sample #	Date: _____	Time: _____	Activity	_____ $\mu\text{Ci/cc}$
CAE Concentration <sup>2</sup>	Date: _____	Time: _____	Activity (E)	<u><math>7.15 \times 10^{-7}</math></u> $\mu\text{Ci/cc}$
CAE In Leakage (F <sub>c</sub> )	<u>5.25</u> scfm			
Plant Vent Flow (F)	<u><math>7.06 \times 10^4</math></u> scfm			
			R-44 Current Warn	<u><math>1.0 \times 10^{-4}</math></u> $\mu\text{Ci/cc}$
			R-44 Current High Alarm	<u><math>1.5 \times 10^{-4}</math></u> $\mu\text{Ci/cc}$
			R-44 Current Reading (C <sub>pv</sub> )	<u><math>1.14 \times 10^{-6}</math></u> $\mu\text{Ci/cc}$
			R-42 Reading (A)	<u><math>1.82 \times 10^{-7}</math></u> $\mu\text{Ci/cc}$

1 Per P&L 2.11, R-42 may be used to obtain containment Noble gas concentration in lieu of sampling and analysis.  
2 R-45 OR noble gas activity grab sample.

**Pressure Relief Release Rate: [Step 4.2.4.1]**

$$RR_{pr} = 0.8 \cdot \left( \frac{1.8 \times 10^{-7}}{(A)} \right) = \frac{1.46 \times 10^{-7}}{(RR_{pr})} \text{ Ci/sec}$$

**Plant Vent Release Rate: [Step 4.2.4.2]**

$$RR_{pv} = 4.72 \text{ E-4} \cdot \left( \frac{1.14 \times 10^{-5}}{(C_{pv})} \right) \cdot \left( \frac{7.06 \times 10^4}{(F)} \right) = \frac{3.80 \times 10^{-4}}{(RR_{pv})} \text{ Ci/sec}$$

**Plant Vent Release Rate Equivalent of CAE Release Rate: [Step 4.2.4.3]**

$$RR_{cae} = 4.72 \text{ E-4} \cdot \left( \frac{7.15 \times 10^{-7}}{(E)} \right) \cdot \left( \frac{5.25}{(F_c)} \right) = \frac{7.11 \times 10^{-9}}{(RR_{cae})} \text{ Ci/sec}^3$$

**Total Calculated Release Rate: [Step 4.2.4.4]**

$$RR = \frac{1.46 \times 10^{-7}}{(RR_{pr})} + \frac{3.80 \times 10^{-4}}{(RR_{pv})} + \frac{0}{(RR_{cae})} = \frac{3.80 \times 10^{-4}}{(RR)} \text{ Ci/sec}$$

Note 3. If  $RR_{cae}$  is LESS THAN  $2.0 \text{ E-4}$  then no further consideration of CAE is required.

**R-44 Alarm Setpoints: [Step 4.2.6.1]**

$$\text{R-44 reading in } \mu\text{Ci/cc} = \left[ \left( \frac{0.072}{(ARR)} \right) \cdot \left( \frac{3.80 \times 10^{-4}}{(RR)} \right) \cdot 2119 \right] / \left( \frac{7.06 \times 10^4}{(F)} + 1700 \right) = \frac{1.99 \times 10^{-4}}{(F)}$$

**R-42 Alarm Setpoint (Step 4.2.7)**

$$\text{R-42 Maximum Setpoint } (\mu\text{Ci/cc}) = \frac{70,000}{(IP)} \cdot (1.25 \text{ E-6 sec/cc}) \quad \text{Actual R-42 Setpoint } \frac{8.54 \times 10^{-7}}{\mu\text{Ci/cc}}$$

$$\text{Warn} = 0.75 \cdot \left( \frac{1.99 \times 10^{-4}}{(S)} \right) = \frac{1.49 \times 10^{-4}}{\text{Warn}} \mu\text{Ci/cc}$$

Prepared By: Reactor Operator Verified By: \_\_\_\_\_

Discharge Authorization: \_\_\_\_\_ Date: \_\_\_\_\_  
(Authorization Level must be greater than or equal to RR to permit release)

Start → Date: \_\_\_\_\_ Time: \_\_\_\_\_ Initial VC Pressure: \_\_\_\_\_

Terminate → Date: \_\_\_\_\_ Time: \_\_\_\_\_ Final VC Pressure: \_\_\_\_\_

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

## Initial Conditions:

- VC pressure has increased to approximately 0.4 psig.
- The Computer Release Permit Program has been corrupted.
- The Spare RO prepared a manual Release Permit
- Given:
  - Condenser Air In leakage is 5.25 scfm
  - Plant vent flow is  $7.06 \times 10^4$  scfm
  - Current reading R-45 is  $7.15 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current reading R-42 is  $1.82 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current reading R-44 is  $1.14 \times 10^{-6}$   $\mu\text{Ci/cc}$
  - Current High Alarm R-42 is  $8.54 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current High Alarm R-44 is  $1.5 \times 10^{-4}$   $\mu\text{Ci/cc}$
  - Current Warn R-44 is  $1.0 \times 10^{-4}$   $\mu\text{Ci/cc}$
  - Instantaneous Release Rate 70,000  $\mu\text{Ci/sec}$

## Initiating Cue:

You are the CRS and the SM has directed you to review the Manual VC Pressure Relief Gaseous Release Permit and authorize discharge if acceptable.

<b>VC PRESSURE RELIEFS</b>	No: 2-SOP-5.4.1    Rev: 17
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**ATTACHMENT 1**  
**VC PRESSURE RELIEF GASEOUS RELEASE PERMIT**

(Page 1 of 1)

Date: TODAY    Time: N/A    Permit No. 10005

VC Sample # 1 <sup>1</sup>	Date: _____	Time: _____	Activity (A)	_____ μCi/cc
VC Sample # 2	Date: _____	Time: _____	Activity	_____ μCi/cc
Plant Vent Sample #	Date: _____	Time: _____	Activity	_____ μCi/cc
CAE Concentration <sup>2</sup>	Date: _____	Time: _____	Activity (E <sub>j</sub> )	<u>7.15x10<sup>-7</sup></u> μCi/cc
CAE In Leakage (F <sub>c</sub> )	<u>5.25</u> scfm			
Plant Vent Flow (F)	<u>7.06x10<sup>4</sup></u> scfm			
			R-44 Current Warn	<u>1.0x10<sup>-4</sup></u> μCi/cc
			R-44 Current High Alarm	<u>1.5x10<sup>-4</sup></u> μCi/cc
			R-44 Current Reading (C <sub>pv</sub> )	<u>1.14x10<sup>-6</sup></u> μCi/cc
			R-42 Reading (A)	<u>1.82x10<sup>-7</sup></u> μCi/cc

- 1 Per P&L 2.11, R-42 may be used to obtain containment Noble gas concentration in lieu of sampling and analysis.
- 2 R-45 QR noble gas activity grab sample.

**Pressure Relief Release Rate: [Step 4.2.4.1]**

$$RR_{pr} = 0.8 \cdot \left( \frac{1.82 \times 10^{-7}}{(A)} \right) = \frac{1.46 \times 10^{-7}}{(RR_{pr})} \text{ Ci/sec}$$

**Plant Vent Release Rate: [Step 4.2.4.2]**

$$RR_{pv} = 4.72 \text{ E-4} \cdot \left( \frac{1.14 \times 10^{-6}}{(C_{pv})} \right) \cdot \left( \frac{7.06 \times 10^4}{(F)} \right) = \frac{3.80 \times 10^{-4}}{(RR_{pv})} \text{ Ci/sec}$$

**Plant Vent Release Rate Equivalent of CAE Release Rate: [Step 4.2.4.3]**

$$RR_{cae} = 4.72 \text{ E-4} \cdot \left( \frac{7.15 \times 10^{-7}}{(E_j)} \right) \cdot \left( \frac{5.25}{(F_c)} \right) = \frac{7.11 \times 10^{-9}}{(RR_{cae})} \text{ Ci/sec}^3$$

**Total Calculated Release Rate: [Step 4.2.4.4]**

$$RR = \frac{1.46 \times 10^{-7}}{(RR_{pr})} + \frac{3.80 \times 10^{-4}}{(RR_{pv})} + \frac{0}{(RR_{cae})} = \frac{3.80 \times 10^{-4}}{(RR)} \text{ Ci/sec}$$

Note 3: If RR<sub>cae</sub> is LESS THAN 2.0 E-4, then no further consideration of CAE is required.

**R-44 Alarm Setpoints: [Step 4.2.6.1]**

$$R-44 \text{ reading in } \mu\text{Ci/cc} = \left[ \left( \frac{0.001}{(ARR)} - \frac{3.80 \times 10^{-4}}{(RR)} \right) \cdot 2119 \right] / \left( \frac{7.06 \times 10^4}{(F)} + 1700 \right) = 1.99 \times 10^{-4}$$

**R-42 Alarm Setpoint (Step 4.2.7)**

$$R-42 \text{ Maximum Setpoint } (\mu\text{Ci/cc}) = \frac{70,000}{(IR)} \cdot (1.25 \text{ E-6 sec/cc}) \quad \text{Actual R-42 Setpoint } \frac{8.54 \times 10^7}{(S)} \mu\text{Ci/cc}$$

$$\text{Warn} = 0.75 \cdot \left( \frac{1.99 \times 10^{-4}}{(S)} \right) = \frac{1.49 \times 10^{-4}}{\text{Warn}} \mu\text{Ci/cc}$$

Prepared By: Reactor Operator    Verified By: \_\_\_\_\_  
 Discharge Authorization: \_\_\_\_\_    Date: \_\_\_\_\_  
(Authorization Level must be greater than or equal to RR to permit release)

Start →    Date: \_\_\_\_\_    Time: \_\_\_\_\_    Initial VC Pressure: \_\_\_\_\_  
 Terminate →    Date: \_\_\_\_\_    Time: \_\_\_\_\_    Final VC Pressure: \_\_\_\_\_



Facility: Indian Point Unit 2Task No: 1500010503Task Title: **Classify Emergency Plan Events Requiring Emergency Plan Implementation**K/A Reference: 1940012438  
SRO-4.4Job Performance Measure  
No: \_\_\_\_\_SRO  
Admin-5

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	X	Actual Performance	
Classroom	<u>X</u>	Simulator	Plant

**READ TO THE EXAMINEE**

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

Initial Conditions:

- The unit was operating at 100% power.
- RCS Pressure rapidly decreased to approximately 40 psig
- The unit tripped
- All safety equipment started as designed
- Approximately 5 minutes after the event the following conditions exist:
  - RCS Temperature           265°F
  - RCS Pressure               25 psig
  - Containment Pressure      5 psig and lowering
  - Containment Radiation     19 R/hr
  - Wind Speed                 7 meters per second
  - Wind Direction             270 degrees @ 10 meters
  - Stability Class              C

Task Standard: Event properly classified and Part 1 form correctly completed.

Required Materials:

General References: IP-EP-120, Emergency Classification  
IP-EP-210, Central control Room  
IP-EP-410, Protective Action Recommendation  
EAL Wall Chart  
EAL Technical Basis Document

Initiating Cue: This is a Time Critical Job Performance Measure  
You have 15 minutes from the time you are told to start to classify the event.  
You have 15 minutes from the time you classify the event to complete the  
Radiological Emergency Data Form (Part 1)

The Shift Manager has become ill. You are the CRS and you must perform  
the duties of the Emergency Director until a replacement SM can arrive on  
site.

You must Classify the event and Complete the NYS Part 1 form.

Time Critical Task: **YES**

Validation Time: 25 Minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

Inform the operator to BEGIN after completion of review of the Initial Conditions

---

1. Performance Step: Obtain Correct Procedure

Standard: Obtains IP-EP-120

Comment: CUE: Candidate will be given all necessary procedure before the JPM is started.

Record the time the JPM is started: \_\_\_\_\_

---

✓ 2. Performance Step: Evaluate Plant Status to determine if GE, SAE, Alert, or NUE applies. Determine the highest classification and make declaration.

Standard: Determines Event is GE per EAL 4.1.5 (see attached)

Comment: Record the Time Declaration Made: \_\_\_\_\_

**Containment Pressure rapidly rises on a LBLOCA. With Spray Actuation and Fan Cooler Units operating, Containment pressure should be approximately 15 psig after 5 minutes. Pressure of 5 psig is not consistent with LOCA conditions and indicates a breach in containment.**

---

---

Performance Information

(Denote critical steps with a check mark ✓)

---

**✓ 3. Performance Step:** Complete and approve “New York State Radiological Emergency Data Form”, IP-EP-115 EP-1

**Standard:** Completes all necessary information on the form and signs the form

**Comment:** Record the Time Form is complete: \_\_\_\_\_

---

4. Performance Step: Refer to procedure IP-EP-210, Attachment 9.1.

Standard: Refers to Attachment 9.1

Comment:

---

5. Performance Step: Initiate County, State and NRC Notification per IP-EP-115, Form EP-6.

Standard: Request a communicator

Comment: CUE: Acknowledge the communicator is prepared to make notifications

---

Terminating Cue: JPM Complete

New York State Indian Point Energy Center RADIOLOGICAL EMERGENCY DATA FORM - PART 1		Notification # <u>01</u>
This is the Indian Point Energy Center with a Part 1 Notification on: <u>TODAY</u>		
1.	<p>Reactor Status: <u>EXERCISE</u> *                      This is an: <u>EXERCISE</u> ACTUAL EMERGENCY at: <u>UNIT 2</u> UNIT 3 BOTH UNITS                      Unit 2 Operational (Date) <u>TODAY</u> (Time) <u>CURRENT TIME</u> (24 hr clock)                      Shutdown                      Unit 3 Operational (Date) _____ (Time) _____ (24 hr clock)                      Shutdown</p>	
2.	<p>The Emergency Classification is: A. Unusual Event B. Alert C. Site Area Emergency  <u>D</u> * <u>D. General Emergency</u> E. Emergency Terminated                      This Emergency Classification declared on: <u>TODAY</u> at <u>Time of Declaration</u>                      (Date) (Time 24 hr clock)</p>	
3.	<p>EAL#: <u>4.1.5</u> Loss of primary coolant inside containment with containment pressure or sump level response not consistent with LOCA conditions                      AND                      Any Indication of fuel clad damage, Table 4.2</p>	
4.	<p>Release of Radioactive Materials due to the Classified Event:                      A. No Release B. Release BELOW Federal limits To Atmosphere To Water                      * <u>C. Release ABOVE Federal limits</u> <u>To Atmosphere</u> To Water D. Unmonitored release requiring evaluation</p>	
5.	<p>Wind Speed: <u>7</u> Meters/Sec at elevation 10 meters</p>	
6.	<p>Wind Direction: (From) <u>370</u> Degrees at elevation 10 meters</p>	
7.	<p>Stability Class: A B <u>C</u> D E F G</p>	
8.	<p>The following Protective Actions are recommended to be implemented as soon as practicable:                      A. NO NEED for PROTECTIVE ACTIONS outside the site boundary                      * <u>B. EVACUATE</u> and IMPLEMENT the KI PLAN for the following Sectors                      C. SHELTER-IN-PLACE and IMPLEMENT the KI PLAN for the following Sectors                      All remaining Areas MONITOR the EMERGENCY ALERT SYSTEM  <u>2 miles around 5-miles downwind</u> * 5 miles around 10-miles downwind Entire EPZ                      In the following Sectors: 1 2 3 <u>4</u> <u>5</u> <u>6</u> 7 8 9 10 11 12 13 14 15 16                      NOTE: OFFSITE AUTHORITIES SHOULD CONSIDER SHELTER-IN-PLACE + TAKE KI IF EVACUATION IS NOT FEASIBLE</p>	
9.	<p>Reported by - Communicator: _____ Telephone # _____                      (Communicator's Name)</p>	
10.	<p>Emergency Director Approval: <u>Signature</u> * _____ Date/Time: _____                      (Director's Name)</p>	

ANSWER KEY

\* Indicates Critical Items

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

## Initial Conditions:

- The unit was operating at 100% power.
- RCS Pressure rapidly decreased to approximately 40 psig
- The unit tripped
- All safety equipment started as designed
- Approximately 5 minutes after the event the following conditions exist:
  - RCS Temperature 265°F
  - RCS Pressure 25 psig
  - Containment Pressure 5 psig and lowering
  - Containment Radiation 19 R/hr
  - Wind Speed 7 meters per second
  - Wind Direction 270 degrees @ 10 meters
  - Stability Class C

## Initiating Cue:

This is a **Time Critical** Job Performance Measure

You have 15 minutes from the time you are told to start to classify the event.

You have 15 minutes from the time you classify the event to complete the Radiological Emergency Data Form (Part 1)

The Shift Manager has become ill. You are the CRS and you must perform the duties of the Emergency Director until a replacement SM can arrive on site.

You must Classify the event and Complete the NYS Part 1 form.



Facility: Indian Point Unit 2Task No: 2000010201Task Title: **Perform a Manual ECP Calculation**K/A Reference: 1940012137 -  
RO-4.3Job Performance Measure  
No: RO Admin-1

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	X	Actual Performance	
Classroom	X	Simulator	Plant

**READ TO THE EXAMINEE**

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

Initial Conditions:

- The unit had been operating for 300 Days at 100% power.
- A Unit trip occurred due to a Main Transformer Fire
- The unit has been shutdown for 20 days to effect repairs
- Prior to the trip:
  - Control Bank D at 223
  - Boron Concentrations 975 ppm
- Current Plant Conditions:
  - Tavg 547°F
  - Boron Concentrations 1472
- The Plant Computer is Out of Service
- Estimated time of Criticality 20:00 tonight

Task Standard: ECP Calculation complete and accurate.

Required Materials: Calculator

General References: 2-SOP-15.4, Estimated Critical Rod Position and Boron  
Concentration Calculation  
2-Graph-RV-1  
2-Graph-RV-2  
2-Graph-RV-3  
2-Graph-RV-4  
2-Graph-RV-5  
2-Graph-RV-6  
2-Graph-RV-7

Initiating Cue: You are the Spare RO and the CRS has directed you to perform an ECP by  
hand.

Time Critical Task: No

Validation Time: 45 minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain Correct Procedure and Graphs

Standard: Obtains 2-SOP-15.4 and Graphs RV-1 through 7

Comment:

---

2. Performance Step: Obtain data for equilibrium operating conditions prior to shutdown and record data in Section 1.0 of data sheet

Standard: Data given in initial conditions.  
Records data in Section 1.0

Comment:

---

3. Performance Step: Estimate the date, time, RCS Temperature, boron concentration and length of shutdown for forthcoming criticality. Record data in Section 2.0 of data sheet

Standard: Data given in initial conditions  
Record data in Section 2.0

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

4. Performance Step: Perform required data entries AND Calculations using referenced graphs.

Standard: Actions listed in Steps below 5 -

Comment:

---

✓ 5. Performance Step: Determine Remaining Rod Worth from Graph RV-1

Standard: Determines Remaining Rod Worth is 0 and enters at step 3.1

Comment:

---

✓ 6. Performance Step: Determines Power Defect at Boron

Standard: Interpolate between 950 and 1000 ppm to achieve  $1633.9 \pm 0.5$  and enter at step 4.1

Comment:

---

✓ 7. Performance Step: Determine Boron Concentration Differential

Standard: Calculate  $975 - .1472 = -497$  and enters at step 5.1

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 8. Performance Step: Determine Boron Worth at Average Boron Concentration

Standard: Calculate  $(975 + 1472)/2 = 1223.5$  and enters at Step 5.2

Comment:

---

✓ 9. Performance Step: Determine boron worth for 1223.5 ppm

Standard: Determines boron worth  $7.14 \pm 0.01$  and enters at Step 5.2

Comment:

---

✓ 10. Performance Step: Determine Reactivity from boron change

Standard: Calculate Reactivity from Boron Change  $(-497) \times 7.14 = 3548.6$  pcm and enters at Step 5.3

Comment:

---

✓ 11. Performance Step: Determine reactivity due to  $T_{avg}$  at Boron 975 and  $T_{avg}$  at 547°F

Standard: Determines Reactivity is 0 pcm from Graph RV-4 and enters at step 6.1

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 12. Performance Step: Determine Xe Defect at 100% power

Standard: Identifies 2833 pcm from Graph RV-5 and enters at step 7.1

Comment:

---

✓ 13. Performance Step: Determine Sm Defect at 100% power

Standard: Identifies 1009 pcm from Graph RV-6 and enters at step 7.2

Comment:

---

✓ 14. Performance Step: Sum of step 7.1 and 7.2

Standard: Determines 3842 pcm and enters at step 7.3

Comment:

---

✓ 15. Performance Step: Determine Xe/Sm Correction Factor

Standard: Determines 0.905 from Graph RV-7 and enters at step 7.4

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 16. Performance Step: Determine Corrected Xe/Sm prior to shutdown

Standard: Calculate  $3842 \times 0.905 = 3477$  and enters at step 7.5

Comment:

---

✓ 17. Performance Step: Determine Xe Power for Startup

Standard: Determines Xe power is 100% (essentially constant for last 36 hours) and enters at step 8.2

Comment:

---

✓ 18. Performance Step: Determine Sm Power for Startup

Standard: Determine Sm power is 100% (essentially constant for last 10 days) and enters at step 9.2

Comment:

---

✓ 19. Performance Step: Determine Xe defect at startup

Standard: Determines -11 pcm from graph RV-5 and enters at step 10.1

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 20. Performance Step: Determine Sm Defect at startup

Standard: Determines -1202 pcm from graph RV-6 and enters at step 10.2

Comment:

---

✓ 21. Performance Step: Sum 10.1 and 10.2

Standard: Calculate  $-11 + -1202 = -1213$  pcm and enters at step 10.3

Comment:

---

✓ 22. Performance Step: Determine Xe/Sm Correction Factor at startup boron concentration

Standard: Interpolate to determine Correction Factor 0.861 ( $\pm 0.002$ ) and enters at step 10.4

Comment:

---

✓ 23. Performance Step: Determine Corrected Xe/Sm at startup

Standard: Calculate  $1213 \times 0.861 = 1044.39$  ( $\pm 1.5$ ) and enters at step 10.5

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ **24. Performance Step:**    **Determine Corrected Xenon/Samarium Differential**

**Standard:**                      **Calculate  $1044.39 - (-) 3477 = 2432.6 (\pm 2.0)$  and enters at step 11.1**

**Comment:**

---

✓ **25. Performance Step:**    **Calculate Total Reactivity Effect**

**Standard:**                      **Sum  $0 + 1633.9 + (-) 3548.6 + 0 + 2432.6 = (+) 517$  and enter at step 12.1**

**Comment:**

---

✓ **26. Performance Step:**    **Estimate Critical Rod Position**

**Standard:**                      **Determine Control Bank D at 99 steps ( $\pm 5$ ) and enter at step 13.1**

**Comment:**

---

✓ **27. Performance Step:**    **Sign and Date the Calculations**

**Standard:**                      **Enters Signature and date**

**Comment:**

---

Terminating Cue: JPM Complete

ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION

2-SOP-15.4  
Rev. 10

ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION  
(Page 1 of 8)

1.0 EQUILIBRIUM CONDITIONS PRIOR TO SHUTDOWN	
1.1 DATE	24 January 2012
TIME	10:00
1.2 CONTROL BANK	D
STEPS	203
1.3 BORON CONCENTRATION (PPM)	975 ppm
1.4 POWER LEVEL (%)	100%

2.0 ESTIMATED CRITICAL CONDITION FOR STARTUP	
2.1 DATE	TODAY
TIME	20:00
2.2 TAVG	547°F
2.3 BORON CONCENTRATION (PPM)	1472 ppm
2.4 LENGTH OF SHUTDOWN (HRS)	> 625 hrs
FROM DATE/TIME	24 January 2012

3.0 ROD DIFFERENTIAL	
3.1 REMAINING ROD WORTH AT POSITION (1.2) GRAPH RV-1	(R) 0 (RG)

4.0 POWER DEFECT	
4.1 POWER DEFECT AT BORON (1.3) AND POWER (1.4) GRAPH RV-2	(R) 1633.9 (RG)

Answer  
Key

ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION**  
(Page 2 of 8)

**NOTE**

The sign of reactivity in section 5.0 will be negative (-) IF boron at estimated critical condition is greater than boron at prior to shutdown condition (and vice versa).

5.0 EFFECT FROM BORON CONCENTRATION CHANGE	
5.1 BORON CONCENTRATION DIFFERENTIAL = (1.3) - (2.3) = (±)PPM	
BORON CONCENTRATION DIFFERENTIAL = (915) - (1412) = (-) 497	PPM
5.2 BORON WORTH AT AVERAGE OF BORON (1.3) AND (2.3) GRAPH RV-3	
BORON WORTH AT AVERAGE OF BORON = [(915)+(1412)]/2 = 1223.5	PPM
GRAPH RV-3 BORON WORTH = (+) 7.14 (±0.01) PCM/PPM	
5.3 REACTIVITY FROM BORON CONCENTRATION CHANGE = [(5.1)×(5.2)]=(±)PCM	
REACTIVITY FROM BORON CONCENTRATION CHANGE = [(497) × ((+) 7.14 )]	
REACTIVITY FROM BORON CONCENTRATION CHANGE = (-) 3548.6	PCM

6.0 TEMPERATURE DEFECT	
6.1 REACTIVITY DUE TO TAVG AT BORON CONCENTRATION (1.3) AND TAVG (2.2) GRAPH RV-4	(+) 0

Answer  
Key

ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION

2-SOP-15.4  
Rev. 10

ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION  
(Page 3 of 8)

7.0 XENON/SAMARIUM PRIOR TO SHUTDOWN			
7.1 Xe DEFECT AT POWER (1.4) AND TIME ZERO GRAPH RV-5	(-)	2833	PCM
7.2 Sm DEFECT AT POWER (1.4) AND TIME ZERO GRAPH RV-6	(-)	1009	PCM
7.3 SUM OF ITEMS (7.1) AND (7.2)	(-)	3842	PCM
7.4 Xe/Sm CORRECTION FACTOR AT BORON(1.3) GRAPH RV-7		0.905	
7.5 CORRECTED Xe/Sm PRIOR TO SHUTDOWN = [(7.3)×(7.4)] = (-) PCM			
CORRECTED Xe/Sm PRIOR TO SHUTDOWN = [((-)3842) × (.905)]			
CORRECTED Xe/Sm PRIOR TO SHUTDOWN = (-) 3477 PCM			

8.0 XENON POWER FOR STARTUP			
8.1-HRS PRIOR TO SHUTDOWN	AVERAGE PERCENT POWER	MULTIPLIER	PRODUCT
0-1		0.07	
1-4		0.23	
4-9		0.22	
9-16		0.20	
16-25		0.22	
25-36		0.06	
			SUM TOTAL %
8.2 XENON POWER = SUM TOTAL (8.1) OR = PERCENT POWER IF POWER ESSENTIALLY CONSTANT FOR LAST 36 HOURS. XENON % =			100%

Answer  
Key

ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION

2-SOP-15.4  
Rev. 10

ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION

(Page 4 of 8)

9.0 SAMARIUM POWER FOR STARTUP	
9.1-DAYS PRIOR TO SHUTDOWN	AVERAGE POWER
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
SUM TOTAL	
9.2 SAMARIUM POWER = SUM TOTAL/10 SAMARIUM POWER/10 = PERCENT <u>OR</u> = PERCENT IF POWER ESSENTIALLY CONSTANT FOR LAST 10 DAYS SAMARIUM % =	

100%

Answer  
Key

ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION

2-SOP-15.4  
Rev. 10

ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION  
(Page 5 of 8)

10.0 XENON/SAMARIUM AT STARTUP		
10.1 Xe DEFECT AT POWER (8.2) AND TIME (2.4) GRAPH RV-5	(-) 11	PCM
10.2 Sm DEFECT AT POWER (9.2) AND TIME (2.4) GRAPH RV-6	(-) 1202	PCM
10.3 SUM OF (10.1) + (10.2)	(-) 1213	PCM
10.4 Xe/Sm CORRECTION FACTOR AT BORON (2.3) GRAPH RV-7	0.861 ± (0.002)	
10.5 CORRECTED Xe/Sm AT STARTUP = (10.3) × (10.4) = (-) PCM		
CORRECTED Xe/Sm AT STARTUP = (1213) × (0.861) = (-) 1044.39 (±1.5) PCM		

11.0 CORRECTED XENON/SAMARIUM DIFFERENTIAL		
11.1 CORRECTED XENON/SAMARIUM DIFFERENTIAL = (10.5) - (7.5)		(±)PCM
CORRECTED XENON/SAMARIUM DIFFERENTIAL = [(-) 1044.39] - [(-) 3477] =	+ 2432.6 (±2.0) PCM	

Answer  
Key

**ESTIMATED CRITICAL ROD POSITION  
AND BORON CONCENTRATION CALCULATION**

2-SOP-15.4  
Rev. 10

**ATTACHMENT 1 DATA SHEET ESTIMATED CRITICAL POSITION**  
(Page 6 of 8)

**NOTE**

IF Total Reactivity Effect in step 12.1 is negative OR IF estimated Critical Rod Position step 13.1 differs from desired startup position, THEN a Boron Concentration Adjustment is required per Section 14.0

12.0 TOTAL REACTIVITY EFFECT	
12.1 TOTAL REACTIVITY EFFECT = (3.1) + (4.1) + (5.3) + (6.1) + (11.1)	(±)PCM
TOTAL REACTIVITY EFFECT = ( ) + ( ) + ( ) + ( ) + ( ) 0    1633.9 + (-)3548.6 + 0 + 3432.6	(H) 517    PCM

13.0 ESTIMATED CRITICAL ROD POSITION		
13.1 POSITION AT REACTIVITY (12.1) GRAPH RV-1	BANK	STEPS
	D	99

ESTIMATE PERFORMED BY (RO/CRS/REACTOR ENGINEER)	DATE

ESTIMATE REVIEWED BY (SM/REACTOR ENGINEER)	DATE

Answer  
Key

**INDIAN POINT ENERGY CENTER  
UNIT NO. 2 - CYCLE 20**

Bank Overlap Remaining Rod Worth

D - Bank Steps	Worth PCM
223	0 (8.1)
213	12
203	40
193	83
183	134
173	186
163	236
153	284
143	330
133	374
123	417
113	459
100	515
93	547
83	599
73	659
63	727
53	801
43	878
33	955
23	1028
13	1094
3	1149
0	1164
C - Bank Steps	
113	1203
100	1253

Answer  
Key

*[Signature]*  
RE APPROVED  
5/24/11  
EFFECTIVE DATE

Ref. Cycle 20 NuPOP HZP (MOL - 12000 MWD/MTU)  
Rev. 60

Z-GRAPH-RV-1

Indian Point Unit 2 Cycle 20  
 TOTAL POWER DEFECT (pcm) AS A FUNCTION OF POWER AND BORON CONCENTRATION AT MOL (12000 MWD/MTU)

Boron Conc. (ppm)	POWER LEVEL (%)																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
600	0.0	102.8	202.6	299.6	394.4	487.0	577.9	667.2	755.2	842.0	927.9	1013.0	1097.4	1181.2	1264.4	1347.2	1429.5	1511.3	1592.6	1673.4	1753.5
650	0.0	102.0	201.1	297.4	391.5	483.4	573.6	662.2	749.5	835.6	920.7	1004.9	1088.5	1171.4	1253.7	1335.5	1416.8	1497.6	1577.9	1657.6	1736.6
700	0.0	101.3	199.6	295.3	388.6	479.9	569.4	657.3	743.9	829.2	913.6	997.0	1079.7	1161.7	1243.1	1324.0	1404.3	1484.1	1563.4	1642.0	1720.0
750	0.0	100.5	198.2	293.2	385.9	476.5	565.3	652.5	738.4	823.0	906.6	989.2	1071.1	1152.2	1232.8	1312.7	1392.1	1470.9	1549.1	1626.7	1703.7
800	0.0	99.8	196.8	291.1	383.1	473.1	561.3	647.8	733.0	816.9	899.7	981.6	1062.6	1142.9	1222.6	1301.6	1380.0	1457.9	1535.1	1611.8	1687.7
850	0.0	99.1	195.4	289.1	380.4	469.8	557.3	643.2	727.7	810.9	893.0	974.1	1054.3	1133.8	1212.6	1290.7	1368.2	1445.1	1521.4	1597.0	1672.0
900	0.0	98.4	194.0	287.1	377.8	466.5	553.4	638.6	722.4	805.0	886.3	966.7	1046.2	1124.9	1202.8	1280.0	1356.6	1432.8	1507.9	1582.6	1656.5
950	0.0	97.7	192.7	285.1	375.2	463.3	549.6	634.2	717.3	799.2	879.8	959.5	1038.2	1116.1	1193.2	1269.5	1345.2	1420.3	1494.7	1568.4	1641.4
1000	0.0	97.1	191.4	283.2	372.7	460.2	545.8	629.8	712.3	793.5	873.5	952.4	1030.3	1107.4	1183.7	1259.2	1334.1	1408.2	1481.7	1554.4	1626.5
1050	0.0	96.4	190.1	281.3	370.2	457.1	542.1	625.5	707.4	787.9	867.2	945.4	1022.6	1098.9	1174.4	1249.1	1323.1	1396.3	1468.9	1540.7	1611.8
1100	0.0	95.8	188.9	279.5	367.8	454.1	538.5	621.3	702.5	782.4	861.0	938.5	1015.0	1090.6	1165.3	1239.2	1312.3	1384.7	1456.3	1527.3	1597.4
1150	0.0	95.2	187.6	277.7	365.4	451.1	535.0	617.1	697.7	777.0	855.0	931.8	1007.6	1082.4	1156.3	1229.4	1301.7	1373.2	1444.0	1514.0	1583.3
1200	0.0	94.6	186.4	275.9	363.1	448.2	531.5	613.0	693.1	771.7	849.0	925.2	1000.2	1074.3	1147.5	1219.8	1291.3	1362.0	1431.9	1501.0	1569.4
1250	0.0	94.0	185.3	274.1	360.8	445.3	528.0	609.0	688.5	766.5	843.1	918.6	993.0	1066.4	1138.8	1210.4	1281.1	1350.9	1420.0	1488.3	1555.8
1300	0.0	93.4	184.1	272.4	358.5	442.5	524.7	605.1	683.9	761.3	837.4	912.2	986.0	1058.6	1130.3	1201.1	1271.0	1340.1	1408.3	1475.7	1542.3
1350	0.0	92.8	183.0	270.7	356.3	439.8	521.4	601.2	679.5	756.3	831.7	905.9	979.0	1051.0	1122.0	1192.0	1261.1	1329.4	1396.8	1463.4	1529.2
1400	0.0	92.2	181.8	269.1	354.1	437.0	518.1	597.4	675.1	751.3	826.2	899.8	972.2	1043.5	1113.7	1183.0	1251.4	1318.9	1385.5	1451.3	1516.2
1475	0.0	91.4	180.2	266.6	350.9	433.0	513.3	591.8	668.7	744.0	818.0	890.7	962.1	1032.4	1101.6	1169.9	1237.1	1303.5	1368.9	1433.5	1497.2
1550	0.0	90.6	178.6	264.3	347.7	429.1	508.6	586.4	662.4	736.9	810.0	881.8	952.3	1021.6	1089.8	1157.0	1223.2	1288.4	1352.7	1416.1	1478.6
1625	0.0	89.8	177.1	262.0	344.7	425.3	504.1	581.0	656.3	730.0	802.2	873.1	942.7	1011.1	1078.3	1144.5	1209.6	1273.7	1336.9	1399.2	1460.5
1700	0.0	89.0	175.5	259.7	341.7	421.6	499.6	575.8	650.3	723.2	794.6	864.6	933.3	1000.8	1067.0	1132.2	1196.3	1259.4	1321.5	1382.6	1442.9

Answer  
Key

*Ah [Signature]*  
 RE - Approved  
 5/24/11  
 Effective Date

1633.9  
(4.1)

Ref. Cycle 20 NuPOP (MOL - 12000 MWD/MTU)  
 Rev. 50

INDIAN POINT STATION  
 UNIT NO. 2 - CYCLE 20  
 Differential Boron Worth (MOL)

Boron Concentration (PPM)	Differential Boron Worth (PCM/PPM)
0	8.10
75	8.06
150	8.00
225	7.93
300	7.86
375	7.80
450	7.74
525	7.68
600	7.62
675	7.56
750	7.50
825	7.44
900	7.38
975	7.33
1050	7.27
1125	7.22
1200	7.16
1203.5	7.14 (5.3)
1275	7.11
1350	7.06
1425	7.01
1500	6.96
1575	6.91
1650	6.86
1725	6.81
1800	6.76

Answer  
Key



RE- Approved

5/24/11

Effective Date

Indian Point Unit 2 Cycle 20

Total Temperature Defect (PCM) as a Function of Temperature and Boron Concentration MOL/EOL (18000 MWD/MTU)

Boron Conc. (ppm)	Core Average Temperature (F)											
	350	360	380	400	420	440	460	480	500	520	540	547
600	2242	2201	2096	1960	1793	1594	1364	1103	810	487	132	0
650	2152	2114	2017	1888	1729	1539	1319	1067	785	472	128	0
700	2062	2028	1938	1818	1667	1485	1274	1032	759	457	124	0
750	1974	1944	1860	1747	1605	1432	1229	997	734	442	120	0
800	1887	1860	1784	1678	1543	1379	1185	962	709	427	116	0
850	1800	1777	1708	1610	1483	1327	1142	928	685	413	112	0
900	1715	1694	1632	1542	1422	1275	1099	894	661	399	108	0
950	1630	1613	1558	1474	1363	1223	1056	860	636	385	105	0
1000	1546	1532	1484	1408	1304	1173	1014	827	612	371	101	0
1050	1463	1453	1411	1342	1246	1122	972	794	589	357	97	0
1100	1381	1374	1338	1276	1188	1072	930	761	565	343	94	0
1150	1300	1295	1267	1212	1130	1023	889	728	542	329	90	0
1200	1219	1218	1195	1147	1073	973	848	696	519	315	86	0
1250	1139	1141	1125	1084	1017	925	807	664	496	302	83	0
1300	1060	1064	1055	1020	961	876	767	632	473	288	79	0
1350	981	989	985	957	905	828	726	600	450	275	76	0
1400	903	914	916	895	849	780	686	569	427	262	72	0
1450	826	839	848	833	794	732	647	538	405	248	69	0
1500	749	765	780	771	740	685	607	506	382	235	65	0
1550	673	692	712	710	685	638	568	475	360	222	62	0
1600	597	619	645	650	632	592	529	445	338	209	58	0
1650	522	547	579	589	578	545	491	414	316	196	55	0
1700	448	475	513	530	525	499	452	384	294	183	51	0
1750	375	404	448	471	473	454	414	354	273	171	48	0
1800	302	334	383	412	421	409	377	324	251	158	45	0
1850	230	265	320	354	369	364	340	295	230	146	41	0
1900	159	197	257	298	319	321	303	266	209	133	38	0
1950	89	129	195	241	269	278	267	238	189	121	35	0

0 (6.1)

Answer  
Key

*C. T. ...*  
RE APPROVED  
*10/25/2008*  
EFFECTIVE DATE

Ref. Cycle 20 NuPOP MOL/EOL (18000 MWD/MTU)  
Rev. 54

2-GRAPH-RV-4

**Indian Point Unit 2 Cycle 20 Xenon Worth (PCM) versus Time Following Plant Trip  
After Steady State Operation at MOL (12000 MWD/MTU)  
(Page 1 of 2)**

Power (%)	Time After Trip (Hours)													
	0	2	4	6	8	10	12	14	16	18	20	25	30	35
100	-2833	(T.I.)-3471	-3822	-3963	-3955	-3843	-3662	-3438	-3190	-2931	-2673	-2067	-1554	-1146
95	-2791	-3395	-3725	-3854	-3840	-3727	-3549	-3330	-3087	-2836	-2585	-1996	-1501	-1106
90	-2749	-3319	-3627	-3744	-3725	-3612	-3436	-3221	-2985	-2741	-2498	-1929	-1449	-1067
85	-2706	-3244	-3530	-3635	-3610	-3496	-3322	-3113	-2883	-2646	-2410	-1860	-1396	-1028
80	-2664	-3168	-3433	-3525	-3495	-3380	-3209	-3004	-2781	-2551	-2323	-1791	-1344	-989
75	-2602	-3066	-3307	-3385	-3349	-3234	-3067	-2869	-2653	-2433	-2214	-1705	-1279	-941
70	-2539	-2964	-3180	-3245	-3203	-3088	-2925	-2733	-2526	-2314	-2105	-1620	-1214	-892
65	-2477	-2862	-3054	-3105	-3057	-2942	-2782	-2597	-2398	-2196	-1996	-1534	-1149	-844
60	-2414	-2760	-2927	-2965	-2911	-2796	-2640	-2461	-2271	-2077	-1887	-1448	-1084	-796
55	-2319	-2625	-2768	-2793	-2735	-2621	-2472	-2302	-2122	-1939	-1760	-1350	-1009	-740
50	-2223	-2490	-2608	-2621	-2559	-2447	-2304	-2142	-1972	-1801	-1634	-1251	-934	-685
45	-2128	-2354	-2449	-2449	-2383	-2273	-2136	-1983	-1823	-1663	-1507	-1152	-859	-630
40	-2032	-2219	-2289	-2277	-2207	-2099	-1968	-1824	-1674	-1526	-1381	-1053	-784	-574
35	-1870	-2023	-2076	-2056	-1987	-1886	-1765	-1634	-1498	-1364	-1234	-940	-699	-511
30	-1708	-1828	-1862	-1836	-1768	-1674	-1563	-1444	-1322	-1202	-1087	-826	-614	-448
25	-1546	-1632	-1648	-1615	-1548	-1461	-1360	-1254	-1147	-1041	-940	-712	-528	-386
20	-1384	-1436	-1434	-1394	-1329	-1248	-1158	-1064	-971	-879	-792	-599	-443	-323
15	-1121	-1151	-1142	-1104	-1049	-982	-909	-834	-759	-687	-618	-466	-344	-250
10	-858	-866	-849	-814	-768	-715	-659	-603	-547	-494	-444	-333	-245	-178
5	-429	-433	-425	-407	-384	-358	-330	-301	-274	-247	-222	-167	-123	-89
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Answer  
Key**

*[Signature]*  
RE APPROVED  
5/24/11  
EFFECTIVE DATE  
2-GRAPH-RV-5

Ref. Cycle 20 NuPOP MOL (12000 MWD/MTU)  
Rev. 46

**Indian Point Unit 2 Cycle 20 Xenon Worth (PCM) versus Time Following Plant Trip  
After Steady State Operation at MOL (12000 MWD/MTU)  
(Page 2 of 2)**

Power (%)	Time After Trip (Hours)												
	40	45	50	55	60	65	70	75	80	85	90	95	100 (10.1)
100	-832	-598	-426	-301	-212	-148	-103	-72	-50	-34	-24	-16	-11
95	-804	-577	-411	-290	-204	-143	-100	-69	-48	-33	-23	-16	-11
90	-775	-556	-396	-280	-197	-138	-96	-67	-46	-32	-22	-15	-10
85	-746	-536	-381	-269	-189	-133	-92	-64	-45	-31	-21	-15	-10
80	-718	-515	-367	-259	-182	-127	-89	-62	-43	-30	-20	-14	-10
75	-682	-490	-348	-246	-173	-121	-84	-59	-41	-28	-19	-13	-9
70	-647	-464	-330	-233	-164	-115	-80	-55	-38	-27	-18	-13	-9
65	-612	-439	-312	-220	-155	-108	-75	-52	-36	-25	-17	-12	-8
60	-576	-413	-294	-207	-146	-102	-71	-49	-34	-24	-16	-11	-8
55	-536	-384	-273	-193	-135	-95	-66	-46	-32	-22	-15	-10	-7
50	-496	-355	-252	-178	-125	-87	-61	-42	-29	-20	-14	-10	-7
45	-455	-326	-231	-163	-115	-80	-56	-39	-27	-19	-13	-9	-6
40	-415	-297	-211	-149	-104	-73	-51	-35	-24	-17	-12	-8	-6
35	-369	-264	-187	-132	-93	-65	-45	-31	-22	-15	-10	-7	-5
30	-324	-231	-164	-116	-81	-57	-39	-27	-19	-13	-9	-6	-4
25	-278	-198	-141	-99	-69	-48	-34	-23	-16	-11	-8	-5	-4
20	-232	-166	-117	-83	-58	-40	-28	-19	-13	-9	-6	-4	-3
15	-180	-128	-91	-64	-45	-31	-22	-15	-10	-7	-5	-3	-2
10	-128	-91	-64	-45	-32	-22	-15	-11	-7	-5	-3	-2	-2
5	-64	-45	-32	-23	-16	-11	-8	-5	-4	-3	-2	-1	-1
0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ref. Cycle 20 NuPOP MOL (12000 MWD/MTU)  
Rev. 46

**Answer  
Key**

*[Signature]*  
RE APPROVED  
*5/24/11*  
EFFECTIVE DATE

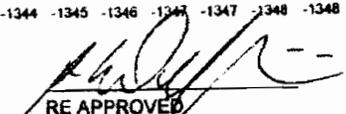
2-GRAPH-RV-5

**Indian Point Unit 2 Cycle 20**  
**Effective Samarium Worth (PCM) vs Time Following Plant Trip**  
**After Steady State Operation at MOL (12000 MWD/MTU)**

Power (%)	Time After Trip (Hours)																																							
	0	5	10	15	20	25	30	35	40	50	60	70	80	90	100	120	140	160	180	200	220	240	260	280	300	350	400													
100	-1009	-1021	-1033	-1043	-1054	-1063	-1072	-1080	-1088	-1102	-1114	-1125	-1135	-1143	-1150	-1162	-1172	-1179	-1184	-1189	-1192	-1195	-1196	-1198	-1199	-1201	-1202	(10.2)												
95	-1016	-1028	-1039	-1049	-1059	-1068	-1077	-1085	-1092	-1106	-1118	-1129	-1138	-1146	-1153	-1165	-1174	-1181	-1186	-1190	-1193	-1196	-1198	-1199	-1200	-1202	-1204	-1205												
90	-1023	-1035	-1045	-1056	-1065	-1074	-1082	-1090	-1097	-1111	-1122	-1133	-1142	-1149	-1156	-1166	-1177	-1183	-1189	-1193	-1196	-1198	-1200	-1201	-1202	-1204	-1205													
85	-1029	-1040	-1051	-1060	-1070	-1078	-1086	-1094	-1101	-1114	-1125	-1135	-1144	-1151	-1158	-1169	-1178	-1184	-1189	-1193	-1196	-1198	-1200	-1201	-1202	-1204	-1205													
80	-1036	-1047	-1057	-1066	-1075	-1084	-1091	-1099	-1106	-1118	-1129	-1138	-1147	-1154	-1161	-1171	-1180	-1186	-1191	-1194	-1197	-1200	-1201	-1203	-1204	-1205	-1206													
75	-1048	-1058	-1068	-1077	-1085	-1093	-1101	-1108	-1114	-1126	-1137	-1146	-1154	-1161	-1167	-1177	-1185	-1191	-1195	-1199	-1202	-1204	-1206	-1207	-1208	-1209	-1210													
70	-1060	-1070	-1079	-1088	-1096	-1103	-1111	-1117	-1123	-1135	-1145	-1153	-1161	-1168	-1174	-1183	-1191	-1197	-1201	-1205	-1207	-1209	-1211	-1212	-1213	-1214	-1215													
65	-1072	-1081	-1090	-1098	-1106	-1113	-1120	-1126	-1132	-1143	-1152	-1161	-1168	-1174	-1180	-1189	-1196	-1202	-1206	-1209	-1212	-1214	-1215	-1216	-1217	-1218	-1219													
60	-1084	-1093	-1101	-1109	-1116	-1123	-1129	-1135	-1141	-1151	-1160	-1168	-1175	-1181	-1188	-1195	-1201	-1207	-1211	-1214	-1216	-1218	-1219	-1220	-1221	-1223	-1223													
55	-1103	-1111	-1119	-1126	-1133	-1140	-1146	-1151	-1157	-1166	-1175	-1182	-1189	-1194	-1199	-1207	-1214	-1219	-1222	-1225	-1228	-1229	-1231	-1232	-1232	-1234	-1234													
50	-1123	-1131	-1138	-1145	-1151	-1157	-1163	-1166	-1173	-1182	-1190	-1197	-1203	-1208	-1213	-1220	-1226	-1231	-1234	-1237	-1239	-1241	-1242	-1243	-1244	-1245	-1245													
45	-1142	-1149	-1156	-1162	-1168	-1174	-1179	-1184	-1188	-1197	-1204	-1210	-1216	-1221	-1225	-1232	-1238	-1242	-1245	-1248	-1250	-1251	-1252	-1253	-1254	-1255	-1255													
40	-1161	-1168	-1174	-1180	-1185	-1190	-1195	-1200	-1204	-1211	-1218	-1224	-1229	-1234	-1238	-1244	-1249	-1253	-1256	-1258	-1260	-1261	-1262	-1263	-1264	-1265	-1265													
35	-1191	-1197	-1203	-1208	-1213	-1218	-1222	-1226	-1230	-1237	-1243	-1249	-1253	-1257	-1261	-1267	-1272	-1275	-1278	-1280	-1282	-1283	-1284	-1285	-1285	-1286	-1286													
30	-1221	-1226	-1232	-1236	-1241	-1245	-1249	-1253	-1256	-1263	-1268	-1273	-1277	-1281	-1284	-1290	-1294	-1297	-1300	-1302	-1303	-1304	-1305	-1306	-1306	-1307	-1308													
25	-1250	-1255	-1260	-1264	-1268	-1272	-1275	-1279	-1282	-1287	-1292	-1297	-1301	-1304	-1307	-1312	-1315	-1318	-1321	-1322	-1324	-1325	-1325	-1326	-1326	-1327	-1328													
20	-1280	-1284	-1288	-1292	-1296	-1299	-1302	-1305	-1308	-1313	-1317	-1321	-1325	-1328	-1330	-1335	-1338	-1340	-1342	-1344	-1345	-1346	-1347	-1347	-1348	-1348	-1349													

**Answer  
Key**

Ref. Cycle 20 NuPOP  
Rev. 47

  
 RE APPROVED  
 5/24/11  
 EFFECTIVE DATE

2-GRAPH-RV-6

**INDIAN POINT STATION  
UNIT NO. 2 - CYCLE 20**

Xenon/Samarium (Xe/Sm) Correction Factors

<u>Boron Concentration (PPM)</u>	<u>Xe/Sm Correction Factor</u>
0	1.000
75	0.992
150	0.985
225	0.977
300	0.970
375	0.962
450	0.955
525	0.948
600	0.941
675	0.934
750	0.926
825	0.919
900	0.912
975	0.905 (7.4)
1050	0.899
1125	0.892
1200	0.885
1275	0.878
1350	0.872
1425	0.865
1475	0.861 (10.4)
1500	0.858
1575	0.852
1650	0.845
1725	0.839
1800	0.832

**Answer  
Key**

*[Signature]*  
RE - Approved

5/24/11

Effective Date

Ref. Cycle 20 NuPOP - MOL (12000 MWD/MTU)  
Rev. 50

2-GRAPH-RV-7

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

**Initial Conditions:**

- The unit had been operating for 300 Days at 100% power.
- A Unit trip occurred due to a Main Transformer Fire
- The unit has been shutdown for 20 days to effect repairs
- Prior to the trip:
  - Control Bank D at 223
  - Boron Concentrations 975 ppm
- Current Plant Conditions:
  - Tavg 547°F
  - Boron Concentrations 1472
- The Plant Computer is Out of Service
- Estimated time of Criticality 20:00 tonight

**Initiating Cue:**

You are the Spare RO and the CRS has directed you to perform an ECP by hand.

Facility: Indian Point Unit 2Task No: 2000700102Task Title: **Review a Completed Surveillance Test**K/A Reference: 1940012212  
RO – 3.7Job Performance Measure  
No: \_\_\_\_\_RO  
Admin - 3

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	<u>X</u>	Actual Performance	_____
Classroom	<u>X</u>	Simulator	_____
		Plant	_____

READ TO THE EXAMINEE

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

Initial Conditions:

- 2-PT-M110 was completed 5 hours ago

Task Standard: Surveillance Test Reviewed and errors found.

Required Materials: Completed 2-PT-M110

General References: IP-SMM-DC-904

Initiating Cue: You are the Spare RO and the CRS has directed you to perform a Peer Review of the completed Surveillance 2-PT-M110

Time Critical Task: No

Validation Time: 30 Minutes

---

Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain copy of IP-SMM-DC-904

Standard: Obtains copy of procedure, Reviews P&Ls and goes to Step 6.5.2

Comment: CUE: Hand out copy of IP-SMM-DC-904 with completed surveillance test procedure

---

2. Performance Step: Check Calibration due dates recorded

Standard: Determine Calibration Due Dates is Not Applicable and Checks Box N/A

Comment: From Peer Review Sheet

---

3. Performance Step: Check Instruments within calibration

Standard: Determines Instrument Calibration is Not Applicable and Checks Box N/A

Comment: From Peer Review Sheet

---

4. Performance Step: Changes documented by TPC

Standard: Determines no TPC are applicable  
Checks Box N/A

Comment: From Peer Review Sheet

---

## Performance Information

(Denote critical steps with a check mark ✓)

✓ 5. Performance Step: Check all procedural steps completed

Standard: Determine step 4.2.1 NOT initialed Checks Box YES

Comment: This step was completed; just the initials are missing. This should also be noted in the comments section

6. Performance Step: Check all steps NOT completed noted and explained in Comments Section

Standard: Determine all steps completed (Step 4.2.1 just not signed off)  
Checks Box N/A

Comment:

7. Performance Step: Check all corrections lined out, dated and initialed

Standard: Determines no corrections with lineouts.  
Checks Box N/A

Comment:

8. Performance Step: Check all calculations correct

Standard: Determines calculations are correct.  
Checks Box YES

Comment:

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 9. Performance Step: Check data properly transcribed

**Standard:** Determines Jacket Water Temperature NOT properly Transcribed from Attachment 1  
Checks Box NO  
Adds Comment in Comment Section for Jacket Water Temp

**Comment:** The Jacket Water Temperature on Attachment 1 DOES is satisfactory. The value entered in the Table at step 6.1 in not correct.

---

10. Performance Step: Check Required CRs, WOs, PFs, or CTSs etc initiated

**Standard:** Determines no CRs, WOs, PFs, or CTSs are required.  
Checks Box N/A

**Comment:**

---

✓ 11. Performance Step: Check Operability conclusions correct

**Standard:** Determine Operability Conclusion NOT correct for Jacket Water Temp based on data entered in the Table.  
Checks Box NO  
Enters comment in comment section for Jacket Water Temperature

**Comment:**

---

## Performance Information

(Denote critical steps with a check mark √)

---

√ 12. **Performance Step:** **Check Overall Acceptance Criteria conclusions correct.**

**Standard:** **Determine Overall Acceptance Criteria NOT correct for Jacket Water Temp based on data entered in the Table. Checks Box NO Enters comment in comment section for Jacket Water Temperature**

**Comment:**

---

13. **Performance Step:** **Contact on watch SM, CRS or FSS if operability criteria NOT satisfied**

**Standard:** **Contacts CRS or SM and describes the errors in the surveillance test documentation**

**Comment:**

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_



Procedure Use Is:

- Continuous
- Reference
- Information

Control Copy: \_\_\_\_\_

Effective Date: 12/2/2010

Page 1 of 14

**2-PT-M110, Revision 6** <sup>By TODAY</sup>  
**APPENDIX R DG FUNCTIONAL TEST**

Approved By:

John B. Lette *[Signature]* 11/15/10  
 RPO or Designee: Print Name / Sign / Date



Team 2A  
 Procedure Owner

**ANSWER  
 KEY**

**EDITORIAL REVISION**

<b>APPENDIX R DG FUNCTIONAL TEST</b>	No: 2-PT-M110	Rev: 6
	Page 2 of 14	

## REVISION SUMMARY

(Page 1 of 1)

### 1.0 REASON FOR REVISION

1.1 Incorporate feedback IP2-10135.

### 2.0 SUMMARY OF CHANGES

- 2.1 **Editorial change** [per step 4.6.13 of IP-SMM-AD-102] revised wording in Prerequisite 3.3: from "NOTIFY Watch Chemist prior to start of the diesel in order to obtain a glycol sample approximately 1 hour after diesel operations are secured" to "NOTIFY Watch Chemist prior to start of the diesel in order to obtain a coolant sample within 1 hour after diesel operations are secured".
- 2.2 **Editorial change** [per step 4.6.13 of IP-SMM-AD-102] added CR-IP2-2010-00036, CA#9 to Development Docs step 9.2.7.

<b>ANSWER KEY</b>
-----------------------

<b>APPENDIX R DG FUNCTIONAL TEST</b>	No: 2-PT-M110	Rev: 6
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**ANSWER  
KEY**

<b>APPENDIX R DG FUNCTIONAL TEST</b>	No: 2-PT-M110	Rev: 6
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## 1.0 PURPOSE

- 1.1 This procedure establishes requirements for the following:
- 1.1.1 Starting and running the SBO / Appendix R diesel generator for a period of time sufficient to reach stable operating temperatures in accordance with TRS 3.8.B.5.
  - 1.1.2 Demonstrating proper operation of Appendix R DG output breaker SBO/ASS in accordance with TRS 3.8.B.5.
  - 1.1.3 Demonstrating proper city water line up to the Appendix R DG heat exchangers in accordance with TRS 3.7.E.2.
  - 1.1.4 Verifying exhaust area fan runs in accordance with Vendor Recommendations.
- 1.2 This procedure applies to the following:
- Appendix R DG
  - Breaker SBO/ASS

**ANSWER  
KEY**

## 2.0 PRECAUTIONS AND LIMITATIONS

### 2.1 Precautions And Limitations

- 2.1.1 This test may be performed in any plant mode.
- 2.1.2 It is preferable to perform this test during daylight hours to facilitate the observation of Appendix R DG exhaust.
- 2.1.3 Momentary excursions outside the desired loading of 2005 to 2045 KW do NOT invalidate the test results.

### 2.2 General Information

- 2.2.1 Test personnel SHALL complete Sections 3.0, 4.0, 5.0, 6.0, and 7.0, as applicable.
- 2.2.2 Personnel directing this test SHALL read it in its entirety prior to performance. Personnel otherwise involved SHALL read applicable sections.
- 2.2.3 Any discrepancies found SHALL be identified in Section 5.0, Comments.
- 2.2.4 Attachment 1, Appendix R DG Data Sheet, captures all of the data required by Attachment 1, in SOP-27.6, Appendix R Diesel Generator Operation. Therefore completion of Attachment 1 in 2-SOP-27.6, Appendix R Diesel Generator Operation, is NOT required during performance of this test.

**APPENDIX R DG FUNCTIONAL TEST**

No: 2-PT-M110

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2.25

Appendix R DG will be operated for a minimum of 1 hour at 2005 to 2045 KW to establish operability criteria. The test period may be extended as necessary to obtain data after temperature stability is reached.

**ANSWER  
KEY**

<b>APPENDIX R DG FUNCTIONAL TEST</b>	No: 2-PT-M110	Rev: 6
	Page 6 of 14	

**Initials**

**3.0 PREREQUISITES**

3.1 Equipment required for test:

EQUIPMENT	M&TE No.	CAL DUE DATE
Sample Bottle (minimum capacity 4 ounces)	N/A	N/A

JS

3.2 OBTAIN a current copy of 2-SOP-27.6, Appendix R Diesel Generator Operation, AND REVIEW Precautions and Limitations.

JS

3.3 NOTIFY Watch Chemist prior to start of the diesel in order to obtain a coolant sample within 1 hour after diesel operations are secured (Reference 9.2.7).

JS

3.4 Reason for Test – CHECK applicable listing:

- Normal Surveillance WO # 52297257-01
- Post Maintenance Test WO # \_\_\_\_\_
- WO # \_\_\_\_\_
- WO # \_\_\_\_\_
- Increased Test Frequency WO # \_\_\_\_\_
- Other Oil Sample 52297420-01

JS

**ANSWER  
KEY**

## APPENDIX R DG FUNCTIONAL TEST

No: 2-PT-M110

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Initials4.0 PROCEDURE4.1 Initial Conditions

- 4.1.1 OBTAIN permission from SM or Designated Alternate to perform Test:

Shift Manager. TODAY  
SM or Des. Alt. Signature / Date

4.2 Test of Appendix R Diesel Generator

- 4.2.1 START (Parallel Mode) AND LOAD Appendix R DG to between 2005 and 2045 KW per 2-SOP-27.6, Appendix R Diesel Generator Operation.

- 4.2.2 IF Appendix R DG does NOT start OR load, THEN:

4.2.2.1 NOTIFY the SM. NA

4.2.2.2 DOCUMENT in detail any problems and/or specific components that may have caused the failure in Section 5.0. NA

- 4.2.3 WHEN Appendix R DG reaches load window of 2005-2045 KW, THEN RECORD time and load:

Time 5 hours 30

Load 2030 KW

- 4.2.4 VERIFY the DG Area fan is running. JF

- 4.2.5 WHEN lube oil and jacket water temperatures stabilize, THEN INITIATE data collection every 30 minutes in accordance with Attachment 1, Appendix R DG Data Sheet. JF

- 4.2.6 WHEN lube oil and jacket water temperatures have stabilized during load run, THEN OBSERVE exhaust from Appendix R DG. JF

**ANSWER  
KEY**

<b>APPENDIX R DG FUNCTIONAL TEST</b>	No: 2-PT-M110	Rev: 6
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**Initials**

4.2.7 CHECK appropriate box indicating color of Appendix R DG exhaust observed.

APPENDIX R DG EXHAUST COLOR					
CLEAR	<input checked="" type="checkbox"/>	LT. GRAY	<input type="checkbox"/>	BLACK	<input type="checkbox"/>
WHITE	<input type="checkbox"/>	DK. GRAY	<input type="checkbox"/>	BLUE	<input type="checkbox"/>

DS

**NOTE**

Momentary excursions outside the desired loading of 2005 to 2045 KW do **NOT** invalidate the test results.

**ANSWER KEY**

4.2.8 MAINTAIN Appendix R DG load at 2005 to 2045 KW for a minimum of 1 hour.

DS

4.2.9 RECORD present time and run time at target load (2005 - 2045 KW):

Present time 10:15

Time loaded ≥ 2005 KW 77 min (≥ 1 hour)

DS

4.2.10 **WHEN** time and load conditions have been met, **THEN UNLOAD AND SECURE** Appendix R DG (Parallel Mode) per 2-SOP-27.6, Appendix R Diesel Generator Operation.

DS

4.3 **Restoration**

4.3.1 OBTAIN a lube oil sample of approximately 4 ounces from the Appendix R DG dipstick.

DS

4.3.2 LABEL lube oil sample with the following information:

Unit 2 Appendix R DG

2-PT-M110

Date

DS

4.3.3 VERIFY GT1 North and South combined Fuel Oil Storage Tank level is greater than or equal to 12,500 gallons.

DS

## APPENDIX R DG FUNCTIONAL TEST

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Initials

- |                  |   |           |
|------------------|---|-----------|
| <del>4.3.4</del> | VERIFY Fuel Oil Day Tank level is between 7/8 - FULL.   | <u>JS</u> |
| <del>4.3.5</del> | VERIFY UW-831, City Water Supply Valve For Appendix 'R' Diesel Gen. Heat Exchangers, is open.         | <u>JS</u> |
| <del>4.3.6</del> | VERIFY UW-833, City Water Supply Line Valve For Appendix 'R' Diesel Gen. JW Heat Exchanger, is open.  | <u>JS</u> |
| <del>4.3.7</del> | VERIFY UW-837, City Water Supply Line Valve For Appendix 'R' Diesel Gen. A/C Heat Exchanger, is open. | <u>JS</u> |
| <del>4.3.8</del> | NOTIFY CRS or SM the Appendix R DG has been returned to standby service.                              | <u>JS</u> |
| <del>4.3.9</del> | DELIVER lube oil sample to Maintenance.   | <u>JS</u> |



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**6.0 ACCEPTANCE CRITERIA**

**6.1 TRM Requirements**

Equipment/Parameter/Instrument	Step/Att.	Surveillance Requirement	Acceptance Criteria	Actual	Acceptable	Initials
Generator Output Breaker / SBO/ASS	4.2.1	TRS 3.8.B.5	Breaker Closes	N/A	<input checked="" type="radio"/> YES / NO	cu
AC Wattmeter – Generator / WM	4.2.9		Load >2005 KW Maintained For ≥ 1 Hour	<input checked="" type="radio"/> YES / NO	<input checked="" type="radio"/> YES / NO	cu
Jacket Water Temp	Att. 1		165-198 °F (60 Min Data)	<input checked="" type="radio"/> 163 °F	<input checked="" type="radio"/> YES / NO	cu
Lube Oil Temp	Att. 1		≤ 250°F (60 Min Data)	212 °F	<input checked="" type="radio"/> YES / NO	cu
UW-831	4.3.5	TRS 3.7.E.2	OPEN	OPEN	<input checked="" type="radio"/> YES / NO	cu
UW-833	4.3.6		OPEN	OPEN	<input checked="" type="radio"/> YES / NO	cu
UW-837	4.3.7		OPEN	OPEN	<input checked="" type="radio"/> YES / NO	cu

**6.2 Other Program Requirements**

Equipment	Step	Surveillance Requirement	Acceptance Criteria	Actual	Acceptable	Initials
DG Area Fan	4.2.4	Vendor Recommendation	Fans Starts	<input checked="" type="radio"/> YES / NO	<input checked="" type="radio"/> YES / NO	cu

**7.0 TEST ACCEPTANCE**

**7.1 TRM Acceptance Criteria**

**7.1.1** Based on recorded data, are all Acceptance Criteria of Section 6.1 satisfied?

YES                      NO                      N/A

**7.1.2** IF all Acceptance Criteria of Section 6.1 are NOT satisfied, THEN:

N/A

- NOTIFY CRS/SM to declare Appendix R Diesel Generator inoperable.
- INITIATE a WR and a CR.
- TAKE applicable action in accordance with TRO 3.8.B.

**ANSWER KEY**

<b>APPENDIX R DG FUNCTIONAL TEST</b>	No: 2-PT-M110	Rev: 6
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**7.2 Other Programs Acceptance Criteria**

**7.2.1** Based on the recorded data, are all Acceptance Criteria of Section 6.2 satisfied?

**7.2.2** YES NO N/A  
IF component(s) failed to meet the Acceptance Criteria of Section 6.2, THEN:

- NOTIFY CRS/SM.
- INITIATE a WR and a CR.

**7.3** IF NO is circled in Step 7.1.1 OR Step 7.2.1, THEN LIST corrective action(s) taken, with any comments:

Comments: None  
Note: Based on "YES" being circled in step 7.1.1 this step is correct. Because "YES" is NOT correct in 7.1.1 the candidate may identify 7.3 as incorrect also. This is not critical for the JPM.

Reviewed By: \_\_\_\_\_  
SM or Des. Alt: **Print Name / Sign / Date**

**8.0 EVALUATION**

**8.1 SURVEILLANCE COORDINATOR REVIEW**

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Reviewed By: \_\_\_\_\_  
Surveillance Coordinator Review: **Print Name / Sign / Date**

**ANSWER  
KEY**

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**9.0 REFERENCES****9.1 Commitment Documents**

None

**9.2 Development Documents**

- 9.2.1 250907, Electrical Distribution and Transmission System
- 9.2.2 400882, Station Blackout and Appendix R Diesel Generator Set P&ID Diesel Cooling Water System Mechanical
- 9.2.3 EC-5000033794, IP2 Station Blackout and Appendix R Diesel Generator Set
- 9.2.4 NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors
- 9.2.5 NSAC-108, Reliability of Diesel Generators at U.S. Power Plants
- 9.2.6 Cummins Operation and Maintenance Manual QSK78 Series Engines
- 9.2.7 CR-IP2-2010-00036, CA#9

**9.3 Interface Documents**

- 9.3.1 2-SOP-27.6, Appendix R Diesel Generator Operation
- 9.3.2 TRO 3.8.B
- 9.3.3 TRS 3.7.E.2

**10.0 RECORDS AND DOCUMENTATION****10.1 Records**

The following required records resulting from this procedure are controlled and maintained in accordance with the IPEC Records Retention Schedule.

- 10.1.1 This Performance Procedure becomes a Quality Record when completed.

**10.2 Documentation**

None

**ANSWER  
KEY**

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**ATTACHMENT 1,  
APPENDIX R DG DATA SHEET**  
(Page 1 of 1)

Date: TODAY

PARAMETER	FULL LOAD	TIME/ READINGS			
		0	30	60	90
<b>Appendix R DG Engine Data</b>					
Coolant Temperature	≥ 40 - ≤ 215 °F	178	179	179	
Lube Oil Pressure	≥ 45 psig	74	76	77	
Engine Speed	1800 RPM	1801	1801	1801	
Fuel Pump Pressure	200 - 400 psig @ 1800 RPM	375	371	382	
Fuel Inlet Temperature	≤ 150 °F	73	77	84	
Coolant Pressure	≥ 11 psig	25	25	24	
Lube Oil Temperature	≤ 250 °F	191	210	212	
Lube Oil Level (Between Run High / Run Low)	Midpoint	1/2	1/2	1/2	
Air Intake Temperature	≤ 180 °F	135	136	136	
After Cooler Temperature	≤ 160 °F	107	107	107	
<b>Appendix R D/G Generator Data</b>					
L1 Amps	≤ 141.0 Amps	91	84	94	
L2 Amps	≤ 141.0 Amps	88	87	85	
L3 Amps	≤ 141.0 Amps	87	87	88	
Frequency	59.7 - 60.3 Hz	60.0	60.0	60.0	
Total kW	≤ 2700 kW	2013	2011	2007	
Total kVA	≤ 3375 kVA	2220	2220	2201	
Total PF (nominal 0.9)	(≥ 0.8 - ≤ 0.95)	.9	.9	.9	
<b>R DG Other Data</b>					
Day Tank Level	7/8 - Full	7/8	7/8	7/8	
PI-8030, Day Tank Fill Pump Pressure	psig	55	55	55	
TE-8027, Day Tank Oil Cooler Temperature	°F	110	110	110	
Lube Oil Reservoir Sight Glass Level	3/4 - Full	3/4	3/4	3/4	
LG-8032, Jacket Water Surge Tank Sight Glass Level	2/3 - 3/4	3/4	3/4	3/4	
LG-8031, After Cooler Surge Tank Sight Glass Level	2/3 - 3/4	3/4	2/3	2/3	
TI-908, Jacket Water Heat Exchanger Outlet Temperature	°F	115	121	121	
TI-909 After Cooler Heat Exchanger Outlet Temperature	°F	73	72	72	
FI-7979, Appendix R DG Jacket Water Flow (City Water)	≤ 118 gpm	140	140	140	
FI-7979, Appendix R DG Jacket Water Flow (Service Water)	≤ 160 gpm	140	140	140	
FI-7980, Appendix R DG Aftercooler Water Flow (City Water)	≤ 87 gpm	135	135	135	
FI-7980, Appendix R DG Aftercooler Water Flow (Service Water)	≤ 137 gpm	135	135	135	
Battery Voltage	≥ 24 VDC	26.6	26.8	26.7	

**ANSWER  
KEY**

**Initial Conditions:**

- 2-PT-M110 was completed 5 hours ago

**Initiating Cue:**

You are the Spare RO and the CRS has directed you to perform a Peer Review of the completed Surveillance 2-PT-M110



**Entergy**

Nuclear Northeast



Procedure Use Is:

Control Copy: \_\_\_\_\_

Continuous

Effective Date: 12/2/2010

Reference

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Information

**2-PT-M110, Revision 6** <sup>ES</sup> <sub>TODAY</sub>  
**APPENDIX R DG FUNCTIONAL TEST**

Approved By:

John Bullette *[Signature]* 11/5/10  
RPO or Designee: **Print Name / Sign / Date**



Team 2A  
Procedure Owner

**EDITORIAL REVISION**

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## REVISION SUMMARY

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### 1.0 REASON FOR REVISION

1.1 Incorporate feedback IP2-10135.

### 2.0 SUMMARY OF CHANGES

- 2.1 **Editorial change** [per step 4.6.13 of IP-SMM-AD-102] revised wording in Prerequisite 3.3: from "NOTIFY Watch Chemist prior to start of the diesel in order to obtain a glycol sample approximately 1 hour after diesel operations are secured" to "NOTIFY Watch Chemist prior to start of the diesel in order to obtain a coolant sample within 1 hour after diesel operations are secured".
- 2.2 **Editorial change** [per step 4.6.13 of IP-SMM-AD-102] added CR-IP2-2010-00036, CA#9 to Development Docs step 9.2.7.

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**1.0 PURPOSE**

- 1.1 This procedure establishes requirements for the following:
- 1.1.1 Starting and running the SBO / Appendix R diesel generator for a period of time sufficient to reach stable operating temperatures in accordance with TRS 3.8.B.5.
  - 1.1.2 Demonstrating proper operation of Appendix R DG output breaker SBO/ASS in accordance with TRS 3.8.B.5.
  - 1.1.3 Demonstrating proper city water line up to the Appendix R DG heat exchangers in accordance with TRS 3.7.E.2.
  - 1.1.4 Verifying exhaust area fan runs in accordance with Vendor Recommendations.
- 1.2 This procedure applies to the following:
- Appendix R DG
  - Breaker SBO/ASS

**2.0 PRECAUTIONS AND LIMITATIONS****2.1 Precautions And Limitations**

- 2.1.1 This test may be performed in any plant mode.
- 2.1.2 It is preferable to perform this test during daylight hours to facilitate the observation of Appendix R DG exhaust.
- 2.1.3 Momentary excursions outside the desired loading of 2005 to 2045 KW do NOT invalidate the test results.

**2.2 General Information**

- 2.2.1 Test personnel SHALL complete Sections 3.0, 4.0, 5.0, 6.0, and 7.0, as applicable.
- 2.2.2 Personnel directing this test SHALL read it in its entirety prior to performance. Personnel otherwise involved SHALL read applicable sections.
- 2.2.3 Any discrepancies found SHALL be identified in Section 5.0, Comments.
- 2.2.4 Attachment 1, Appendix R DG Data Sheet, captures all of the data required by Attachment 1, in SOP-27.6, Appendix R Diesel Generator Operation. Therefore completion of Attachment 1 in 2-SOP-27.6, Appendix R Diesel Generator Operation, is NOT required during performance of this test.

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2.25

Appendix R DG will be operated for a minimum of 1 hour at 2005 to 2045 KW to establish operability criteria. The test period may be extended as necessary to obtain data after temperature stability is reached.

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Initials

**3.0** PREREQUISITES**3.1** Equipment required for test:

EQUIPMENT	M&TE No.	CAL DUE DATE
Sample Bottle (minimum capacity 4 ounces)	N/A	N/A

**3.2** OBTAIN a current copy of 2-SOP-27.6, Appendix R Diesel Generator Operation, AND REVIEW Precautions and Limitations.**3.3** NOTIFY Watch Chemist prior to start of the diesel in order to obtain a coolant sample within 1 hour after diesel operations are secured (Reference 9.2.7).**3.4** Reason for Test – CHECK applicable listing:

- Normal Surveillance WO # 52297257-01
- Post Maintenance Test WO # \_\_\_\_\_
- WO # \_\_\_\_\_
- WO # \_\_\_\_\_
- Increased Test Frequency WO # \_\_\_\_\_
- Other Oil Sample 52297420-01

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Initials4.0 PROCEDURE4.1 Initial Conditions

- 4.1.1 OBTAIN permission from SM or Designated Alternate to perform Test:

Shift Manager TODAY  
SM or Des. Alt. Signature / Date

4.2 Test of Appendix R Diesel Generator

- 4.2.1 START (Parallel Mode) AND LOAD Appendix R DG to between 2005 and 2045 KW per 2-SOP-27.6, Appendix R Diesel Generator Operation.

- 4.2.2 IF Appendix R DG does NOT start OR load, THEN:

4.2.2.1 NOTIFY the SM. NA

4.2.2.2 DOCUMENT in detail any problems and/or specific components that may have caused the failure in Section 5.0. NA

- 4.2.3 WHEN Appendix R DG reaches load window of 2005-2045 KW, THEN RECORD time and load:

Time 5 hours ago

Load 2030 KW

- 4.2.4 VERIFY the DG Area fan is running. JS

- 4.2.5 WHEN lube oil and jacket water temperatures stabilize, THEN INITIATE data collection every 30 minutes in accordance with Attachment 1, Appendix R DG Data Sheet. JS

- 4.2.6 WHEN lube oil and jacket water temperatures have stabilized during load run, THEN OBSERVE exhaust from Appendix R DG. JS

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Initials

- 4.2.7 CHECK appropriate box indicating color of Appendix R DG exhaust observed.

APPENDIX R DG EXHAUST COLOR					
CLEAR	✓	LT. GRAY		BLACK	
WHITE		DK. GRAY		BLUE	JS

**NOTE**

Momentary excursions outside the desired loading of 2005 to 2045 KW do NOT invalidate the test results.

- 4.2.8 MAINTAIN Appendix R DG load at 2005 to 2045 KW for a minimum of 1 hour. JS

- 4.2.9 RECORD present time and run time at target load (2005 - 2045 KW):

Present time 1015

Time loaded  $\geq$  2005 KW 77 min ( $\geq$  1 hour) JS

- 4.2.10 WHEN time and load conditions have been met, THEN UNLOAD AND SECURE Appendix R DG (Parallel Mode) per 2-SOP-27.6, Appendix R Diesel Generator Operation. JS

**4.3 Restoration**

- 4.3.1 OBTAIN a lube oil sample of approximately 4 ounces from the Appendix R DG dipstick. JS

- 4.3.2 LABEL lube oil sample with the following information:

- Unit 2 Appendix R DG
- 2-PT-M110
- Date JS

- 4.3.3 VERIFY GT1 North and South combined Fuel Oil Storage Tank level is greater than or equal to 12,500 gallons. JS

**APPENDIX R DG FUNCTIONAL TEST**

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		<u>Initials</u>
<del>4.3.4</del>	VERIFY Fuel Oil Day Tank level is between 7/8 - FULL.	<u>JF</u>
<del>4.3.5</del>	VERIFY UW-831, City Water Supply Valve For Appendix 'R' Diesel Gen. Heat Exchangers, is open.	<u>JF</u>
<del>4.3.6</del>	VERIFY UW-833, City Water Supply Line Valve For Appendix 'R' Diesel Gen. J/W Heat Exchanger, is open.	<u>JF</u>
<del>4.3.7</del>	VERIFY UW-837, City Water Supply Line Valve For Appendix 'R' Diesel Gen. A/C Heat Exchanger, is open.	<u>JF</u>
<del>4.3.8</del>	NOTIFY CRS or SM the Appendix R DG has been returned to standby service.	<u>JF</u>
<del>4.3.9</del>	DELIVER lube oil sample to Maintenance.	<u>JF</u>



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6.0 **ACCEPTANCE CRITERIA**

6.1 **TRM Requirements**

Equipment/ Parameter/ Instrument	Step/Att.	Surveillance Requirement	Acceptance Criteria	Actual	Acceptable	Initials
Generator Output Breaker / SBO/ASS	4.2.1	TRS 3.8.B.5	Breaker Closes	N/A	<u>YES</u> / NO	cu
AC Wattmeter – Generator / WM	4.2.9		Load >2005 KW Maintained For ≥ 1 Hour	<u>YES</u> / NO	<u>YES</u> / NO	cu
Jacket Water Temp	Att. 1		165-198 °F (60 Min Data)	163 °F	<u>YES</u> / NO	cu
Lube Oil Temp	Att. 1		≤ 250°F (60 Min Data)	212 °F	<u>YES</u> / NO	cu
UW-831	4.3.5	TRS 3.7.E.2	OPEN	OPEN	<u>YES</u> / NO	cu
UW-833	4.3.6		OPEN	OPEN	<u>YES</u> / NO	cu
UW-837	4.3.7		OPEN	OPEN	<u>YES</u> / NO	cu

6.2 **Other Program Requirements**

Equipment	Step	Surveillance Requirement	Acceptance Criteria	Actual	Acceptable	Initials
DG Area Fan	4.2.4	Vendor Recommendation	Fans Starts	<u>YES</u> / NO	<u>YES</u> / NO	cu

7.0 **TEST ACCEPTANCE**

7.1 **TRM Acceptance Criteria**

7.1.1 Based on recorded data, are all Acceptance Criteria of Section 6.1 satisfied?

YES                      NO                      N/A

7.1.2 IF all Acceptance Criteria of Section 6.1 are NOT satisfied, THEN:

- N/A
- NOTIFY CRS/SM to declare Appendix R Diesel Generator inoperable.
  - INITIATE a WR and a CR.
  - TAKE applicable action in accordance with TRO 3.8.B.

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7.2 **Other Programs Acceptance Criteria**

7.2.1 Based on the recorded data, are all Acceptance Criteria of Section 6.2 satisfied?

YES      NO      N/A

7.2.2 IF component(s) failed to meet the Acceptance Criteria of Section 6.2, THEN:

- NA
- NOTIFY CRS/SM.
  - INITIATE a WR and a CR.

7.3 IF NO is circled in Step 7.1.1 OR Step 7.2.1, THEN LIST corrective action(s) taken, with any comments:

Comments: None

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Reviewed By: \_\_\_\_\_  
SM or Des. Alt: **Print Name / Sign / Date**

**8.0 EVALUATION**

**8.1 SURVEILLANCE COORDINATOR REVIEW**

Comments: \_\_\_\_\_

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Reviewed By: \_\_\_\_\_  
Surveillance Coordinator Review: **Print Name / Sign / Date**

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**9.0 REFERENCES****9.1 Commitment Documents**

None

**9.2 Development Documents**

- 9.2.1 250907, Electrical Distribution and Transmission System
- 9.2.2 400882, Station Blackout and Appendix R Diesel Generator Set P&ID Diesel Cooling Water System Mechanical
- 9.2.3 EC-5000033794, IP2 Station Blackout and Appendix R Diesel Generator Set
- 9.2.4 NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors
- 9.2.5 NSAC-108, Reliability of Diesel Generators at U.S. Power Plants
- 9.2.6 Cummins Operation and Maintenance Manual QSK78 Series Engines
- 9.2.7 CR-IP2-2010-00036, CA#9

**9.3 Interface Documents**

- 9.3.1 2-SOP-27.6, Appendix R Diesel Generator Operation
- 9.3.2 TRO 3.8.B
- 9.3.3 TRS 3.7.E.2

**10.0 RECORDS AND DOCUMENTATION****10.1 Records**

The following required records resulting from this procedure are controlled and maintained in accordance with the IPEC Records Retention Schedule.

- 10.1.1 This Performance Procedure becomes a Quality Record when completed.

**10.2 Documentation**

None

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**ATTACHMENT 1,  
APPENDIX R DG DATA SHEET**  
(Page 1 of 1)

Date: TODAY

PARAMETER	FULL LOAD	TIME/ READINGS			
		0	30	60	90
<b>Appendix R DG Engine Data</b>					
Coolant Temperature	≥ 40 - ≤ 215 °F	178	179	179	
Lube Oil Pressure	≥ 45 psig	75	76	77	
Engine Speed	1800 RPM	1801	1801	1801	
Fuel Pump Pressure	200 - 400 psig @ 1800 RPM	378	371	382	
Fuel Inlet Temperature	≤ 150 °F	73	77	84	
Coolant Pressure	≥ 11 psig	25	25	24	
Lube Oil Temperature	≤ 250 °F	181	210	212	
Lube Oil Level (Between Run High / Run Low)	Midpoint	1/2	1/2	1/2	
Air Intake Temperature	≤ 180 °F	135	136	136	
After Cooler Temperature	≤ 160 °F	107	107	107	
<b>Appendix R D/G Generator Data</b>					
L1 Amps	≤ 141.0 Amps	94	94	94	
L2 Amps	≤ 141.0 Amps	88	87	88	
L3 Amps	≤ 141.0 Amps	87	87	88	
Frequency	59.7 - 60.3 Hz	60.0	60.0	60.0	
Total kW	≤ 2700 kW	2093	2011	2007	
Total kVA	≤ 3375 kVA	2226	2226	2201	
Total PF (nominal 0.9)	(≥ 0.8 - ≤ 0.95)	.9	.9	.9	
<b>Appendix R DG Other Data</b>					
Day Tank Level	7/8 - Full	7/8	7/8	7/8	
PI-8030, Day Tank Fill Pump Pressure	psig	55	55	55	
TE-8027, Day Tank Oil Cooler Temperature	°F	81	81	81	
Lube Oil Reservoir Sight Glass Level	3/4 - Full	3/4	3/4	3/4	
LG-8032, Jacket Water Surge Tank Sight Glass Level	2/3 - 3/4	3/4	3/4	3/4	
LG-8031, After Cooler Surge Tank Sight Glass Level	2/3 - 3/4	3/4	2/3	2/3	
TI-903, Jacket Water Heat Exchanger Outlet Temperature	°F	115	121	121	
TI-909 After Cooler Heat Exchanger Outlet Temperature	°F	73	72	72	
FI-7979, Appendix R DG Jacket Water Flow (City Water)	≤ 118 gpm	160	160	160	
FI-7979, Appendix R DG Jacket Water Flow (Service Water)	≤ 160 gpm	160	160	160	
FI-7980, Appendix R DG Aftercooler Water Flow (City Water)	≤ 87 gpm	135	135	135	
FI-7980, Appendix R DG Aftercooler Water Flow (Service Water)	≤ 137 gpm	135	135	135	
Battery Voltage	≥ 24 VDC	26.6	26.8	26.7	

Facility: Indian Point Unit 2Task No: 2000130101Task Title: **Prepare a VC Pressure Relief Release Permit**K/A Reference: 1940012311  
RO-3.8Job Performance Measure  
No: \_\_\_\_\_RO Admin 4

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	X	Actual Performance	
Classroom	X	Simulator	Plant

**READ TO THE EXAMINEE**

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

Initial Conditions:

- VC pressure has increased to approximately 0.4 psig.
- The Computer Release Permit Program has been corrupted.
- Given:
  - Condenser Air In leakage is 5.25 scfm
  - Plant vent flow is  $7.06 \times 10^4$  scfm
  - Current reading R-45 is  $7.15 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current reading R-42 is  $1.82 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current reading R-44 is  $1.14 \times 10^{-6}$   $\mu\text{Ci/cc}$
  - Current High Alarm R-42 is  $8.54 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current High Alarm R-44 is  $1.5 \times 10^{-4}$   $\mu\text{Ci/cc}$
  - Current Warn R-44 is  $1.0 \times 10^{-4}$   $\mu\text{Ci/cc}$
  - Instantaneous Release Rate 70,000  $\mu\text{Ci/sec}$
  - Most recent grab sample is  $8.3 \times 10^{-7}$   $\mu\text{Ci/cc}$

Task Standard: Release Permit complete and accurate.

Required Materials: Calculator

General References: 2-SOP-5.4.1, VC Pressure Relief

Initiating Cue: You are the spare RO and the CRS has directed you to prepare a Manual VC Pressure Relief Gaseous Release Permit in accordance with 2-SOP-5.4.1, VC Pressure Reliefs

Time Critical Task: No

Validation Time: 30 Minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain a current copy of 2-SOP-5.4.1 and review P&Ls

Standard: Obtains procedure and reviews P&Ls

Comment:

---

2. Performance Step: Enter given data on Attachment 1

Standard: Enters data on attachment 1

Comment:

---

✓ 3. Performance Step: Calculate Pressure Release Rate

Standard:  $0.8 \times 1.82 \times 10^{-7} \mu\text{Ci/cc} =$   
 $1.46 \times 10^{-7} \mu\text{Ci/cc}$

Comment: Step 4.2.4.1

---

✓ 4. Performance Step: Calculate Plant Vent Release Rate

Standard:  $4.72 \times 10^{-4} \times 1.14 \times 10^{-6} \mu\text{Ci/cc} \times 7.06 \times 10^4 \text{ scfm} =$   
 $3.80 \times 10^{-5} \text{ Ci/sec}$

Comment: Sep 4.2.4.2

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 5. Performance Step: Calculate Plant Vent Release Rate Equivalent of CAE Release Rate

Standard:  $4.72 \times 10^{-4} \times 7.15 \times 10^{-7} \mu\text{Ci/cc} \times 5.25 =$   
 $1.77 \times 10^{-9} \text{ Ci/sec}$

Comment: Step 4.2.4.3

---

✓ 6. Performance Step: Calculate Total Calculated Release Rate

Standard:  $1.46 \times 10^{-7} \mu\text{Ci/cc} + 3.80 \times 10^{-5} \text{ Ci/sec} + 0 =$   
 $3.81 \times 10^{-5} \text{ Ci/sec}$

Comment: Step 4.2.4.4

---

✓ 7. Performance Step: Calculate R-44 Alarm Setpoint

Standard:  $[(.0072 \mu\text{Ci/sec} - 3.81 \times 10^{-5} \text{ Ci/sec}) \times 2119] / (7.06$   
 $\times 10^4 \text{ scfm} + 1700)$   
 $2.09 \times 10^{-4} \mu\text{Ci/cc}$

Comment: Step 4.2.6.1

---

✓ 8. Performance Step: Calculate R42 Alarm Setpoint

Standard:  $70,000 \times 1.25 \times 10^{-6} \text{ sec/cc} =$   
 $8.75 \times 10^{-2} \mu\text{Ci/cc}$

Comment: Step 4.2.7

---

Performance Information

(Denote critical steps with a check mark √)

---

9. Performance Step: Sign Attachment 1 as Preparer.

Standard: Signs Attachment 1

Comment:

---

Terminating Cue: JPM Complete

<b>VC PRESSURE RELIEFS</b>	No: 2-SOP-5.4.1    Rev: 17
Page 25 of 25	

**ATTACHMENT 1**  
**VC PRESSURE RELIEF GASEOUS RELEASE PERMIT**

(Page 1 of 1)

Date: TODAY    Time: NOW    Permit No. 120005

VC Sample # 1	Date: _____	Time: _____	Activity (A)	_____ $\mu\text{Ci/cc}$
VC Sample # 2	Date: _____	Time: _____	Activity	_____ $\mu\text{Ci/cc}$
Plant Vent Sample #	Date: _____	Time: _____	Activity	_____ $\mu\text{Ci/cc}$
CAE Concentration <sup>2</sup>	Date: _____	Time: _____	Activity (E)	<u>7.15E-7</u> $\mu\text{Ci/cc}$
CAE In Leakage (F <sub>c</sub> )	<u>5.25</u> scfm			
Plant Vent Flow (F)	<u>7.06E4</u> scfm			
		R-44 Current Warn	<u>1.0E-4</u>	$\mu\text{Ci/cc}$
		R-44 Current High Alarm	<u>1.5E-4</u>	$\mu\text{Ci/cc}$
		R-44 Current Reading (C <sub>pv</sub> )	<u>1.14E-6</u>	$\mu\text{Ci/cc}$
		R-42 Reading (A)	<u>1.82E-7</u>	$\mu\text{Ci/cc}$

- 1 Per P&L 2.11, R-42 may be used to obtain containment Noble gas concentration in lieu of sampling and analysis.
- 2 R-45 OR noble gas activity grab sample.

**Pressure Relief Release Rate: [Step 4.2.4.1]**

$$RR_{pr} = 0.8 \cdot \left( \frac{1.82 \times 10^{-7}}{(A)} \right) = \frac{1.46 \times 10^{-7}}{(RR_{pr})} \text{ Ci/sec}$$

**Plant Vent Release Rate: [Step 4.2.4.2]**

$$RR_{pv} = 4.72 \text{ E-4} \cdot \left( \frac{1.14 \times 10^{-6}}{(C_{pv})} \right) \cdot \left( \frac{7.06 \times 10^4}{(F)} \right) = \frac{3.80 \times 10^{-5}}{(RR_{pv})} \text{ Ci/sec}$$

**Plant Vent Release Rate Equivalent of CAE Release Rate: [Step 4.2.4.3]**

$$RR_{cae} = 4.72 \text{ E-4} \cdot \left( \frac{7.15 \times 10^{-7}}{(E)} \right) \cdot \left( \frac{5.25}{(F_c)} \right) = \frac{1.77 \times 10^{-9}}{(RR_{cae})} \text{ Ci/sec}^3$$

**Total Calculated Release Rate: [Step 4.2.4.4]**

$$RR = \frac{1.46 \times 10^{-7}}{(RR_{pr})} + \frac{3.80 \times 10^{-5}}{(RR_{pv})} + \frac{0}{(RR_{cae})} = \frac{3.81 \times 10^{-5}}{(RR)} \text{ Ci/sec}$$

Note 3: If RR<sub>cae</sub> is LESS THAN 2.0 E-4, then no further consideration of CAE is required.

**R-44 Alarm Setpoints: [Step 4.2.6.1]**

$$R-44 \text{ reading in } \mu\text{Ci/cc} = \left[ \left( \frac{0.0072}{(ARR)} - \frac{3.81 \times 10^{-5}}{(RR)} \right) \cdot 2119 \right] / \left( \frac{7.06 \times 10^4}{(F)} + 1700 \right) = 2.09 \times 10^{-4}$$

**R-42 Alarm Setpoint (Step 4.2.7)**

$$R-42 \text{ Maximum Setpoint } (\mu\text{Ci/cc}) = \frac{10,000}{(IR)} \cdot (1.25 \text{ E-6 sec/cc}) \quad \text{Actual R-42 Setpoint } \underline{8.54 \times 10^{-7}} \mu\text{Ci/cc}$$

$$\text{Warn} = 0.75 \cdot \left( \frac{8.54 \times 10^{-7}}{(S)} \right) = \frac{6.56 \times 10^{-2}}{\text{Warn}} \mu\text{Ci/cc}$$

**ANSWER  
KEY**

Prepared By: \_\_\_\_\_    Verified By: \_\_\_\_\_

Discharge Authorization: \_\_\_\_\_    Date: \_\_\_\_\_  
(Authorization Level must be greater than or equal to RR to permit release)

Start →    Date: \_\_\_\_\_    Time: \_\_\_\_\_    Initial VC Pressure: \_\_\_\_\_

Terminate →    Date: \_\_\_\_\_    Time: \_\_\_\_\_    Final VC Pressure: \_\_\_\_\_

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

**Initial Conditions:**

- VC pressure has increased to approximately 0.4 psig.
- The Computer Release Permit Program has been corrupted.
- Given:
  - Condenser Air In leakage is 5.25 scfm
  - Plant vent flow is  $7.06 \times 10^4$  scfm
  - Current reading R-45 is  $7.15 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current reading R-42 is  $1.82 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current reading R-44 is  $1.14 \times 10^{-6}$   $\mu\text{Ci/cc}$
  - Current High Alarm R-42 is  $8.54 \times 10^{-7}$   $\mu\text{Ci/cc}$
  - Current High Alarm R-44 is  $1.5 \times 10^{-4}$   $\mu\text{Ci/cc}$
  - Current Warn R-44 is  $1.0 \times 10^{-4}$   $\mu\text{Ci/cc}$
  - Instantaneous Release Rate 70,000  $\mu\text{Ci/sec}$
  - Most recent grab sample is  $8.3 \times 10^{-7}$   $\mu\text{Ci/cc}$

**Initiating Cue:**

You are the spare RO and the CRS has directed you to prepare a Manual VC Pressure Relief Gaseous Release Permit in accordance with 2-SOP-5.4.1, VC Pressure Reliefs

Facility: Indian Point Unit 2Task No: 1500040502Task Title: **Perform Initial Unusual Event Notification**K/A Reference: 1940012439  
RO-3.9Job Performance Measure  
No: \_\_\_\_\_RO Admin-5

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	<u>X</u>	Actual Performance	_____
Classroom	_____	Simulator	<u>X</u>
		Plant	_____

**READ TO THE EXAMINEE**

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

Initial Conditions:

- A small plane crash in the Buchanan Switchyard has caused all Buchanan Ring Bus Breakers to Trip
- Rescue efforts have prevented restoration of power to the Ring Bus
- The Shift Manager Declared an Unusual Event based on EAL-6.1.1

Task Standard: Notification of event in progress complete to State, Counties and NRC.

Required Materials: Simulator RECS phone  
Completed NYS Radiological Data Form Part 1

General References: IP-EP-115 Form EP-3, NUE Notification Checklist

Initiating Cue: You are the Spare RO, and the Shift Manager has directed you to perform the duties of the Control Room Offsite Communicator.

Time Critical Task: YES

Validation Time: 15 minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain the Offsite Communicator Binder  
Standard: Obtains Binder from Shift Manager Office  
Comment:

---

2. Performance Step: Inform the Shift Manager that you have assumed the duties of the Control Room Offsite Communicator  
Standard: Same as above  
Comment: CUE: Acknowledge communication.

---

✓ 3. Performance Step: **Obtain the completed and signed NYS Radiological Emergency Data Form Part 1 (IP-EP-115 Form EP-1) from the Shift Manager**  
Standard: **Request Form from the Shift Manager.**  
Comment: **CUE: Give the candidate the completed form.**

---

---

Performance Information

(Denote critical steps with a check mark √)

---

4. Performance Step: Review the form to ensure all required information is entered including the Shift Manager (Emergency Director) Signature

Standard: Determines all necessary data is correctly entered.

Comment:

---

√ 5. Performance Step: Pick up RECS Handset

Standard: Picks up RECS Handset

Comment:

---

√ 6. Performance Step: When you hear the message "Welcome to Wave Please enter session ID" depress the "7" button

Standard: Depresses the "7" button

Comment:

---

---

Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 7. **Performance Step:** You will hear two tones wait 5 seconds and state “This is to report an event at Indian Point Energy Center. Standby for roll call”.

**Standard:** After 5 seconds states “This is to report an event at Indian Point Energy Center. Standby for roll call”.

**Comment:**

---

✓ 8. **Performance Step:** Enter Time you are starting the initial roll call

**Standard:** Enters time on NUE Notification Checklist

**Comment:**

---

## Performance Information

(Denote critical steps with a check mark √)

---

**√ 9. Performance Step:** Initiate roll call by asking “(location title) are you on the line for each of the stations, stopping after each name is read to allow station to identify itself. Check off each location as they answer the roll call

**Standard:** Reads each station name, when station acknowledges, checks it on NUE Notification Checklist

**Comment:** If using the booth operator to acknowledge message, no CUE is needed. If acknowledging yourself then CUE candidate”  
New York State  
Westchester County  
Putnam County  
Rockland County  
Orange County  
Peekskill City  
West Point

---

**√ 10. Performance Step:** State, “This is the Unit 2 Central Control Room. An Unusual Event has been declared at the Indian Point Energy Center based on EAL# 6.1.1. A Part 1 Notification # 1 has been sent to you vial Email and FAX”.

**Standard:** Reads statement

**Comment:**

## Performance Information

(Denote critical steps with a check mark √)

---

**√ 11. Performance Step: Confirm the receipt of email or FAX by asking “(location Title) do you acknowledge receipt of an Email of FAX from IPEC”?**

**Standard: Reads roll call list and asks for acknowledgment. Checks off each station when acknowledgment is received.**

**Comment: If using the booth operator to acknowledge message, no CUE is needed. If acknowledging yourself then CUE candidate”  
New York State has received the email.  
Westchester County has received the email.  
Putnam County has received the email.  
Rockland County has received the email.  
Orange County has received the email.  
Peekskill City has received the email.  
West Point has received the email.**

---

**12. Performance Step: If any of the above did not receive either an email of FAX, THEN FAX part 1 to location and verbally read the entire Part 1 form. IF all locations received (or you completed reading) proceed**

**Standard: All locations received email**

**Comment:**

---

---

Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 13. Performance Step: End notifications by saying "Indian Point out at \_\_\_\_\_". Enters time

**Standard:** Makes statement and enters current time

**Comment:** The time entered at checklist step 9 must be within 15 minutes of the time of declaration used for the Part 1 form.

---

13. Performance Step: Signs Reported by and Enters RECS on Part 1 Form

**Standard:** Signs form and enters RECS

**Comment:**

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

**Initial Conditions:**

- A small plane crash in eh Buchanan Switchyard has caused all Buchanan Ring Bus Breakers to Trip
- Rescue efforts have prevented restoration of power to the Ring Bus
- The Shift Manager Declared an Unusual Event based on EAL-6.1.1

**Initiating Cue:** You are the Spare RO, and the Shift Manager has directed you to perform the duties of the Control Room Offsite Communicator.



### Control Room NUE Notification Checklist

**NOTE**

**PERFORM ONLY CIRCLED ITEMS FOR NUE PERIODIC UPDATE NOTIFICATIONS**

Notify Protected Area Personnel: To be completed by Shift Manager or Designee	Time
<p>1. Contact opposite unit's Control Room and inform them of classification, time, EAL# and brief description.              Unit 2: 734-5294 (5295)    Unit 3: 736-8277 (8282)</p> <p>2. Coordinate the following with the opposite unit Control Room:</p> <p style="margin-left: 20px;">a. Announce the following message over both Unit's P.A. systems three (3) times:              <b>"Attention all personnel an NUE has been declared. Staffing of facilities (is/is not) required"</b></p> <p style="margin-left: 20px;">b. If staffing of facilities (EOF/OSC/TSC/JIC/AEOF) is required, state the following:              <b>"The following facilities are required to be staffed: _____ (fill in with appropriate facilities.)"</b></p>	

Notify State and Counties: (within 15 minutes of classification) - to be completed by Offsite Communicator or Designee
--

- 3 Pick up the RECS handset
- 4 When you hear the message "Welcome to Wave. Please enter session ID", Depress the "7" button on the key pad.
- 5 IF you did not hear the above message after picking up handset THEN hang up, wait 5 seconds and repeat steps 3 and 4. AFTER 3 unsuccessful attempts, advise the Emergency Director and PROCEED to step 7.
- 6 You will hear two tones, wait 5 seconds and State **"This is to report an event at Indian Point Energy Center. Standby for roll call."**
- 7 IF RECS is unavailable, THEN use Local Government Radio (LGR) (instructions step 23). IF LGR is unavailable, THEN use the audio conference bridge (instructions step 24) to contact the Counties and State. IF audio conference bridge is unavailable, THEN contact Counties and State via the numbers on Form EP-5 Page 3 of 3 using a commercial telephone.
- 8 Enter time you are starting the initial roll call in the space provided below.
- 9 Initiate roll call by asking **"(location title) are you on the line?"** for each of the following stations, stopping after each name is read to allow station to identify itself. Check off "Initial Roll Call" for each location as they answer the roll call:

	Location	Initial Roll Call	Acknowledged receipt of Email or FAX	
			YES	NO
<b>Time Initial Roll Call Started</b>  <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px auto;"></div>	1. New York State	1. <input type="checkbox"/>	1. <input type="checkbox"/>	<input type="checkbox"/>
	2. Westchester County	2. <input type="checkbox"/>	2. <input type="checkbox"/>	<input type="checkbox"/>
	3. Peekskill City	3. <input type="checkbox"/>	3. <input type="checkbox"/>	<input type="checkbox"/>
<b>Time Call Completed</b>  <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px auto;"></div>	4. Rockland County	4. <input type="checkbox"/>	4. <input type="checkbox"/>	<input type="checkbox"/>
	5. Orange County	5. <input type="checkbox"/>	5. <input type="checkbox"/>	<input type="checkbox"/>
	6. Putnam County	6. <input type="checkbox"/>	6. <input type="checkbox"/>	<input type="checkbox"/>
	7. West Point	7. <input type="checkbox"/>	7. <input type="checkbox"/>	<input type="checkbox"/>
		If any location does not respond, please notify via Phone after Step 14.	ALL YES go to step 14	<b>ANY NO go to step 12</b>  <b>ALL NO Go to step 13.</b>

- 10 State, **"This is the (Unit 2/3) Central Control Room. An Unusual Event has been declared at the Indian Point Energy Center based on EAL\_\_\_\_\_. A Part I Notification # \_\_\_\_\_ has been sent to you via Email and FAX."**
- 11 Confirm the receipt of email or fax by asking **"(location title), do you acknowledge receipt of an Email or FAX from IPEC."** For each location, mark Yes/No box above
- 12 Verbally read the Part I Notification to all parties. When completed, proceed to step 14.
- 13 In the event that the electronic Email or FAX of the Part I Notification Form fails:
  - FAX a hard copy of the form via conventional FAX machine to all locations. (FAX #s are preprogrammed in FAX or see page 3 of 3 of Form EP-5)
  - Verbally read the Part I Notification to all parties. When completed, proceed to step 14.
- 14 End notification by saying **"Indian Point out at (time)"**. Enter time in the space labeled as "Time Call completed". (Call any locations that did not respond to roll call and provide Part I information. See page 3 of 3 of Form EP-5)

**Control Room NUE Notification Checklist**

**NOTE**  
**PERFORM ONLY CIRCLED ITEMS FOR NUE PERIODIC UPDATE NOTIFICATIONS**

Notify Emergency Response Organization.  
 Time

- 15 The Shift Manger (Emergency Director) determines if Emergency Response Organization mobilization is needed or if Emergency Response Organization should receive Event Notification only. Perform or direct notification by one of the following as appropriate:  
**IF ALL** Emergency Response Organization mobilization is needed, **THEN** use Envelope A "IPEC ALL ERO Mobilization" envelope to mobilize the ERO.  
  
**IF** event notification only, **THEN** use Envelope B "IPEC ALL ERO Event Notification" envelope to contact **ALL** ERO members to notify them of the event.  
  
**IF ALL** Emergency Response Organization mobilization is needed for a Security Event, **THEN** use Envelope C "IPEC ALL ERO Mobilization to Backup Locations" envelope to mobilize the ERO.  
  
**IF Partial** Emergency Response Organization mobilization is needed for TSC/OSC activation only, **THEN** use Envelope D "IPEC TSC/OSC Mobilization" envelope to mobilize specific ERO members.  
  
**IF Partial** Emergency Response Organization mobilization is needed for TSC/OSC/EOF activation only, **THEN** use Envelope E "IPEC TSC/OSC/EOF Mobilization" envelope to mobilize specific ERO members
- 16 Notify Security Shift Supervisor of the affected unit and date/time of NUE classification. Call CAS at 736-8067 or 271-5330 and request to speak to SSS or leave a message.
- 17 Call Indian Point Communications Representative at 271-7031  
 a. Read the following statement to individual answering or into answering machine:  
 "This is the Unit \_\_\_ Control Room, an Unusual Event was declared at \_\_\_\_\_ (time) on Emergency Action Level number \_\_\_\_\_" (EAL)  
 b. If individual answers **THEN** obtain and enter name of individual contacted: \_\_\_\_\_

Notify NRC (to be initiated within 1 hour of classification) (within 15 minutes if required by 0-XOP-SEC-1)

Time

18. **IF** it is during normal working hours **THEN** notify the affected unit(s) NRC Resident Inspector  
 x5347, 739-9360, 739-8565 or 739-9361  
  
**IF** during off-hours **THEN** call the NRC Senior Resident Inspector using phone numbers provided in the Emergency Telephone Directory  
  
 Provide the Inspector with Date/Time of NUE classification, EAL # and brief description of event.
19. Contact NRC by calling main number listed on ENS phone. (IF main number does not work **THEN** use 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup> backup number, or region 4 alternate number listed.)  
  
 Inform them that this is a 50.72 notification and provide them with Date/Time of emergency classification, EAL # and brief description of event. Complete NRC Form 361, if requested.
20. Record any Comments:

21. Date and sign this form

Date:

Signature:

22. Inform the Shift Manager that you have completed NUE notifications

Use of Alternate Notification Methods

- 23 **Use of Local Government Radio (LGR)**  
 A. Depress "LGR" select call button on Zetron panel and depress the transmit button. Transmit the following: "This is to report an event at Indian Point Energy Center. Stand by for roll call". Return to Step 8 and notify Westchester County of the event via phone at 914-864-7890 or 914-864-5200.
- 24 **Use of Conference Bridge:**  
 The following will notify State and County Warning Points and EOC's to call into the Backup Conference Bridge.  
 A. Call 866-205-9839  
 NOTE: for steps B, C, and D you will be asked for a confirmation of the numbers you entered.  
 B. You will hear: "This is the remote activation module. Please enter your company ID number followed by the pound sign." Enter 4732#  
 C. You will hear: "Please enter your scenario activation password followed by the pound sign" Enter 54321#  
 D. You will hear "To start a scenario, enter ID followed by the pound sign, or press pound alone for more options." Enter 12345#  
 E. You will hear "To listen to the current scenario message press 1, to re-record the scenario message press 2, start the scenario press 3, to return to the main menu press pound: Press 3  
 F. AFTER you hear: "The scenario is building" HANG UP THE PHONE  
 G. Using a regular telephone call into the conference bridge number by dialing the following: 888-232-0362, you will be asked to enter an access code, enter 254479. You will be the host of this conference.  
 H. AFTER the tones: State the following: "This is to report an event at the Indian Point Energy Center. Stand by for roll call."  
 I. Return to step 8

## CCR Initial Notification Checklist – Alert/SAE/GE

### Note

If the Shift Manager does not feel it is safe to relocate personnel at this time, **DO NOT** sound the Site Assembly Alarm or call for personnel to report to the Assembly Areas.

Notify Protected Area Personnel: - To be completed by Shift Manager or designee Time

1. Contact opposite unit's Control Room and inform them of classification, time, EAL# and brief description.  
**Unit 2: 734-5294 (5295)      Unit 3: 736-8277 (8282)**
2. Coordinate the following with the opposite unit Control Room:
  - a. Sounding of the Site Assembly Alarm for 10 seconds and;
  - b. Announce the following message over both Unit's P.A. systems three (3) times:  
**"Attention all personnel a (Alert/Site Area Emergency/General Emergency) has been declared. All Essential Personnel report to your assigned emergency response facility. All other personnel report to the Energy Education Center or Generation Support Building."**
3. The Shift Manger (Emergency Director) determines what type of Emergency Response Organization mobilization is needed utilizing the appropriate envelope:
  - a. **IF a Security Event, THEN use Envelope C "IPEC ALL ERO Mobilization to Backup Locations"**
  - b. **Otherwise, use Envelope A "IPEC ALL ERO Mobilization"**

Notify State and Counties: (within 15 minutes of classification) - To be completed by Offsite Communicator or designee.

4. Pick up the RECS handset
5. When you hear the message "Welcome to Wave. Please enter session ID", Depress the "7" button on the key pad.
6. **IF** you did not hear the above message after picking up handset **THEN** hang up, wait 5 seconds and repeat steps 4 and 5. **AFTER 3** unsuccessful attempts, advise the Emergency Director and **PROCEED** to step 8.
7. You will hear two tones, wait 5 seconds and State **"This is to report an event at Indian Point Energy Center. Standby for roll call."**
8. **IF** RECS is unavailable, **THEN** use Local Government Radio (LGR) (instructions step 24). **IF** LGR is unavailable, **THEN** use the audio conference bridge (instructions step 25) to contact the Counties and State. **IF** audio conference bridge is unavailable, **THEN** contact Counties and State via the numbers on Form EP-5 Page 3 of 3 using a commercial telephone.
9. Enter time you are starting the initial roll call in the space provided below.
10. Initiate roll call by asking **"(location title) are you on the line?"** for each of the following stations, stopping after each name is read to allow station to identify itself. Check off "Initial Roll Call" for each location as they answer the roll call:

Time Initial Roll Call Started	Location	Initial Roll Call	Acknowledged receipt of Email or FAX	
			YES	NO
	1. New York State	1. <input type="checkbox"/>	1. <input type="checkbox"/>	<input type="checkbox"/>
	2. Westchester County	2. <input type="checkbox"/>	2. <input type="checkbox"/>	<input type="checkbox"/>
	3. Peekskill City	3. <input type="checkbox"/>	3. <input type="checkbox"/>	<input type="checkbox"/>
	4. Rockland County	4. <input type="checkbox"/>	4. <input type="checkbox"/>	<input type="checkbox"/>
	5. Orange County	5. <input type="checkbox"/>	5. <input type="checkbox"/>	<input type="checkbox"/>
	6. Putnam County	6. <input type="checkbox"/>	6. <input type="checkbox"/>	<input type="checkbox"/>
	7. West Point	7. <input type="checkbox"/>	7. <input type="checkbox"/>	<input type="checkbox"/>

If any location does not respond, please notify via Phone after Step 15.

<b>ALL YES go to step 15</b>	<b>ANY NO Go to step 13</b>
	<b>ALL NO go to step 14</b>

11. State, "This is the (Unit 2/3) Central Control Room/EOF. A(n) (Alert/Site Area Emergency/General Emergency) has been declared at the Indian Point Energy Center based on EAL\_\_\_\_\_. A Part I Notification # \_\_\_\_\_ has been sent to you via Email and FAX."
12. Confirm the receipt of email or fax by asking **"(location title), do you acknowledge receipt of an Email or FAX from IPEC"** for each location, mark Yes/No box above.
13. Verbally read the Part I Notification to all parties. When completed proceed to step 15.

 <b>IPEC EMERGENCY PLAN IMPLEMENTING PROCEDURE</b>	<b>NON-QUALITY RELATED PROCEDURE</b>	<b>IP-EP-210</b> <b>Revision 8</b>
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Attachment 9.3  
**CCR Offsite Communicator Checklist**  
Sheet 1 of 8

**1.0 Initial Responsibility/Activity**

**Notes**

**1.1 Assume the Duties of CR Offsite Communicator**

**NOTE:**

1. Notification of State and local authorities SHALL be initiated within 15 minutes of emergency declaration.

2. Notification to NRC SHALL be initiated within 1 hour of the emergency declaration.

- A. Upon being notified to fulfill the CCR Offsite Communicator role, **IMMEDIATELY** report to the effected Unit's Control Room.
- B. **IF** site accountability has been directed, **THEN** swipe your security badge through the CCR accountability card reader.
- C. Inform the Shift Manager (Emergency Director) and the Control Room staff that you have assumed the duties of CCR Offsite Communicator.
- D. **IF** making the initial notification for a Notification of Unusual Event classification, **THEN**, proceed to step 1.2.
- E. **IF** making the initial notification for an Alert or higher classification, **THEN**, proceed to step 1.4.
- F. **IF** making a periodic update of the NUE, **THEN** proceed to step 2.1
- G. **IF** making a periodic update of the Alert/SAE/GE, **THEN** proceed to step 2.2
- H. **IF** making an upgrade classification, **THEN** proceed to step 2.3

**1.2 Perform Confirmation of Receipt of Initial UNUSUAL EVENT Notifications (Use Form EP-3)**

- A. Obtain the completed and signed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review form to ensure all required information is completed, including Shift Manager (Emergency Director) signature.
- B. Verify SM has sent electronic Fax and email of the NYS Radiological Data Form Part I to State/Counties/EOF.
- C. Using, "Control Room NUE Notification Checklist" (Form EP-3) start the initial roll call to State and counties within 15 minutes of the declaration of the Unusual Event.

 <b>IPEC EMERGENCY PLAN IMPLEMENTING PROCEDURE</b>	<b>NON-QUALITY RELATED PROCEDURE</b>	<b>IP-EP-210</b> <b>Revision 8</b>
	<b>REFERENCE USE</b>	<b>Page 23</b> <b>of 38</b>

Attachment 9.3  
**CCR Offsite Communicator Checklist**  
 Sheet 2 of 6

**Initial Responsibility/Activity (cont)**

**Notes**

- C. Using, "Control Room NUE Notification Checklist" (Form EP-3) start the initial roll call to State and counties within 15 minutes of the declaration of the Unusual Event.
  - D. IF plant condition/emergency classification change prior to initiating notification:
    - a. Disregard previous classification and continue notification with highest current classification.
    - a. Follow-up notification shall include details of all conditions/emergency classifications.
  - E. IF plant condition/emergency classification changes while performing notification, THEN continue notification and state at the end the following "Changes in plant conditions indicate a potential for escalating the Emergency Classification. A completed Part I will be transmitted within 15 minutes."
- 1.3 Support Shift Manager (Emergency Director) with other notifications.**
- A. Determine if notification of ERO has been completed.
  - B. If ERO notification has not been completed request direction from Shift Manager (Emergency Director) if Emergency Response Organization mobilization is needed or if Emergency Response Organization should receive event notification only.
  - C. Complete the remaining notifications as specified on the Control Room NUE Notification Checklist (Form EP-3)
- 1.4 Perform confirmation of receipt of Initial ALERT/SAE/GE Notifications (Use Form EP-4)**

**NOTE:**

Control Room Alert/SAE/GE Initial Notification Checklist (Form EP-4) is used only once. After notifications are complete using this form, all subsequent upgrade and update notifications shall be made using an Upgrade/Update Notification Alert/SAE/GE Checklist (Form EP-5)

 <b>IPEC EMERGENCY PLAN IMPLEMENTING PROCEDURE</b>	<b>NON-QUALITY RELATED PROCEDURE</b>	<b>IP-EP-210    Revision 8</b>
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**Attachment 9.3  
CCR Offsite Communicator Checklist  
Sheet 3 of 6**

**Initial Responsibility/Activity (cont)**

**Notes**

- A. Obtain the completed and signed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review form to ensure all required information is completed, including Shift Manager (Emergency Director) signature.
- B. Verify that SM has sent Fax and email of the NYS Radiological Data Form Part I to State/Counties/EOF.
- C. Using "Control Room Initial Notification Checklist Alert/SAE/GE (Form EP-4), start the initial roll call to State and Counties within 15 minutes of the declaration of the Alert, SAE or GE
- D. Complete the remaining notifications as specified on the (Form EP-4 Checklist).
- E. IF plant condition/emergency classification change prior to initiating notification:
  - a. Disregard previous classification and continue notification with highest current classification.
  - b. Follow-up notification shall include details of all conditions/emergency classifications.
- F. IF plant condition/emergency classification changes while performing notification, THEN continue notification and state at the end the following "Changes in plant conditions indicate a potential for escalating the Emergency Classification. A completed Part I will be transmitted within 15 minutes."

**1.5 Support Shift Manager (Emergency Director) with other notifications**

- A. Determine if notification of ERO has been completed.
- B. Determine if personnel assembly is being suspended from the Emergency Director.
- C. IF ERO notification has not been completed, request direction from Shift Manager (Emergency Director) and initiate notification of personnel located in the Protected Area, and the Emergency Response Organization.
- D. Complete the remaining notifications as specified on the (Form EP-4 Checklist).

 <b>IPEC EMERGENCY PLAN IMPLEMENTING PROCEDURE</b>	<b>NON-QUALITY RELATED PROCEDURE</b>	<b>IP-EP-210    Revision 8</b>
	<b>REFERENCE USE</b>	<b>Page 25    of    38</b>

**Attachment 9.3**

**CCR Offsite Communicator Checklist  
Sheet 4 of 6**

**2.0    Continuous Responsibility/Activity**

**2.1    Perform Periodic Update Notifications – UNUSUAL EVENT  
(Use Form EP-3)**

**NOTE:**  
Periodic Update Notifications to offsite authorities shall be made approximately every 30 minutes or whenever conditions change. Time interval may be lengthened with concurrence of offsite agencies.

- A. Obtain the completed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review the form to ensure all required information is completed, including Emergency Director's signature.
- B. Verify Fax and email of the NYS Radiological Data Form Part I to State/Counties/EOF.
- C. Using Control Room NUE Notification Checklist (Form EP-3) perform ONLY the circled items, to make the periodic update notifications.
- D. Fax, or have CCR Admin Support Fax, copies of the NYS Radiological Data Form Part 1 to State/Counties/EOF

 <b>IPEC EMERGENCY PLAN IMPLEMENTING PROCEDURE</b>	<b>NON-QUALITY RELATED PROCEDURE</b>	<b>IP-EP-210</b> <b>Revision 8</b>
	<b>REFERENCE USE</b>	<b>Page 26 of 38</b>

**Attachment 9.3  
CCR Offsite Communicator Checklist  
Sheet 5 of 6**

**Continuous Responsibility/Activity (cont)**

**Notes**

**2.2 Perform Periodic Update Notifications – Alert/SAE/GE  
(Use Form EP-5)**

**NOTE:**  
 Periodic Update Notifications to offsite authorities shall be made approximately every 30 minutes or whenever conditions change. Time interval may be lengthened with concurrence of offsite agencies.

- A. Obtain the completed NYS Radiological Emergency Data Form Part I (Form EP-1) (Part II if a radiological release has occurred or is in progress) from the Emergency Director. Review form to ensure all required information is completed, including Emergency Director's signature.
- B. Verify that SM has sent Fax and email of the NYS Radiological Data Form Part I to State/Counties/EOF.
- C. Using an Upgrade/Update Alert/SAE/GE Checklist (Form EP-5) start the roll call to State and Counties.
- D. Complete the remaining notifications as specified on the (Form EP-5 Checklist).

**2.3 IF the Emergency Classification is Upgraded, THEN Perform Upgrade Notifications (Use Form EP-5)**

- A. Obtain the completed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Emergency Director. Review form to ensure all required information is completed, including Emergency Director's signature.
- B. Verify that SM has sent Fax and email of the NYS Radiological Data Form Part I to State/Counties/EOF.

 <b>IPEC EMERGENCY PLAN IMPLEMENTING PROCEDURE</b>	<b>NON-QUALITY RELATED PROCEDURE</b>	<b>IP-EP-210    Revision 8</b>
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**Attachment 9.3  
CCR Offsite Communicator Checklist**

Sheet 6 of 6

- C. Using an Upgrade/Update Alert/SAE/GE Checklist (Form EP-5) start the roll call to State and Counties within 15 minutes of upgrade of the emergency classification.
- D. Fax, or have CCR Admin Support fax, copies of the NYS Radiological Data Form Part 1 to the State/Counties/EOF, if required.
- E. Support Shift Manager, as needed, with the remaining notifications as specified on the Checklist.

**3.0 Closeout Responsibility/Activity**

- 3.1 When directed by the Shift Manager, return all equipment utilized in the response to proper storage locations**
- 3.2 Review all documentation the CR Offsite Communicators generated during the emergency:**
  - A. Ensure all logs, forms and other documentation is complete.
  - B. Collect all forms, logs and other documentation.
- 3.3 Provide all logs and records to the Shift Manager upon termination of the emergency and entry into the Recovery Phase.**

Facility: Indian Point Unit 2Task No: 0840220422Task Title: Align 23 Charging Pump to 12FD3K/A Reference: 000068AA1.06  
RO-4.1 SRO-4.2Job Performance Measure  
No: \_\_\_\_\_In Plant - 1

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	<u>X</u>	Actual Performance	_____
Classroom	_____	Simulator	_____
		Plant	<u>X</u>

**READ TO THE EXAMINEE**

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

Initial Conditions:

- The CCR has been evacuated due to a fire and 2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control, has been implemented.
- Radio communications have been established and operators are standing by in the PAB.
- Sub-Station 12FD3 is energized.
- 480V Switchgear Room is accessible

Task Standard: 23 Charging Pump is aligned to 12FD3 .

Required Materials: None

General References: 2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown

Initiating Cue: You are the BOP assisting the Conventional NPO and the SM has directed you to perform the required actions to Align 23 Charging Pump to its safe shutdown power supply per 2-AOP-SSD-1, Attachment 8.

Time Critical Task: No

Validation Time: 20 minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain Correct Procedure

Standard: Obtain 2-AOP-SSD-1

Comment: Cue: hand candidate Attachment 8 of 2-AOP-SSD-1.

During a control room evacuation the procedure is obtained from the App R locker in the CCR Foyer.

---

2. Performance Step: Is 480V Switchgear Room Accessible

Standard: Given in Initial Conditions that 480V Switchgear Room is accessible.

Comment:

---

3. Performance Step: If At Any Time 21 Charging Pump available to start from the 480V Switchgear Room and the SM desires THEN Go To Step 8.20.

Standard:

Comment: *CUE: The SM desires 23 Charging Pump placed in service on ASSD feed.*

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 4. Performance Step: Open breaker on bus 6A using trip button and Remove DC Control Power Fuse Block

Standard: Locate Breaker for 23 Charging Pump and depress TRIP button located on front of breaker. Simulate Opening the breaker door and describe removal of control power fuse block and re-install in OFF position.

Comment: *CUE: Breaker is open and control power fuses pulled and reinstalled in OFF*

---

5. Performance Step: Observe NOTES before step 8.4

Standard: Reviews the NOTES

Comment:

---

6. Performance Step: Is 12FD3 Sub-Station energized

Standard: Given in Initial Conditions 12FD3 is energized

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 7. Performance Step: Place "LOCAL-REMOTE Control Switch Device 69" for substation 12FD3 in LOCAL.

Standard: Locate Switch and simulate rotating switch to LOCAL

Comment: **CUE: The switch is in LOCAL.**

**The switch is located in a control panel/box directly above CHARGING PUMP 23 Breaker Control Switch**

---

8. Performance Step: Is Substation 12FD3 Breaker 1M Open

Standard: Determines Breaker is OPEN

Comment:

---

✓ 9. Performance Step: Place Transfer Switch EDC4 to EMERGENCY FEED position

Standard: Locate switch and rotate to EMERGENCY FEED position

Comment: **CUE: The switch is in EMERGENCY FEED.**

**The Switch is located inside the cabinet**

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

**Initial Conditions:**

- The CCR has been evacuated due to a fire and 2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control, has been implemented.
- Radio communications have been established and operators are standing by in the PAB.
- Sub-Station 12FD3 is energized.
- 480V Switchgear Room is accessible

**Initiating Cue:**

You are the BOP assisting the Conventional NPO and the SM has directed you to perform the required actions to Align 23 Charging Pump to its safe shutdown power supply per 2-AOP-SSD-1, Attachment 8.

Control Room Inaccessibility  
 Safe Shutdown Control  
 Attachment 8  
 Placing 21 OR 23 Charging Pump in  
 Service  
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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>8.1 <input type="checkbox"/> Is 480V Switchgear Room accessible?</p>	<p>1. <input type="checkbox"/> <b>IF</b> <u>all three</u> diesel generator control switches are <b>NOT</b> in OFF, <b>THEN</b> place <u>all three</u> diesel generator control switches in OFF.</p> <p>2. <input type="checkbox"/> <b>IF</b> breaker SS6 (6.9KV Breaker for Station Service Transformer No. 6) is <b>NOT</b> open, <b>THEN</b> perform the following for breaker SS6.</p> <p>A. <input type="checkbox"/> Remove 51/50 Phase A relay cover.</p> <p>B. <input type="checkbox"/> Gently rotate relay disc clockwise until breaker opens.</p> <p>C. <input type="checkbox"/> Replace relay cover.</p> <p>D. <input type="checkbox"/> Reset targets.</p> <p>E. <input type="checkbox"/> <b>IF</b> breaker did <b>NOT</b> open, <b>THEN</b> lift trip coil plunger mechanism.</p> <p>3. <input type="checkbox"/> <b>GO TO</b> Step 8.4.</p>
<p>8.2 <input type="checkbox"/> <b>IAAT</b> 21 Charging Pump available to start from the 480V Switchgear Room <u>and</u> the SM desires, <b>THEN GO TO</b> Step 8.20.</p>	<p><input type="checkbox"/> <b>GO TO</b> Step 8.3</p>
<p>8.3 Perform the following for 23 Charging Pump breaker:</p> <p>A. <input type="checkbox"/> Open breaker on Bus 6A using trip button, compartment 11B.</p> <p>B. <input type="checkbox"/> Remove DC control power fuse block and reinstall in the OFF position (upper right corner, inside breaker).</p>	

**Control Room Inaccessibility  
Safe Shutdown Control  
Attachment 8  
Placing 21 OR 23 Charging Pump in  
Service  
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**IF AT ANY TIME:**

(8.2) 21 Charging Pump available to start from the 480V Switchgear Room and the SM desires...

**Control Room Inaccessibility  
Safe Shutdown Control  
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Placing 21 OR 23 Charging Pump in  
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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
--------------------------	-----------------------

<u>NOTE</u>	
<ul style="list-style-type: none"> <li>● Substation 12FD3 is located at 33 ft el. Superheater Building next to Cold Water Deaerating Tank.</li> <li>● Figure 1 (PAB Transfer Switch Locations) (Page 11 of this attachment) shows location of EDC4.</li> <li>● Attachment 28 (Safe Shutdown Power Distribution) (Page 319) provides a simplified diagram fo Safe Shutdown Power Supplies</li> </ul>	

<p>8.4 <input type="checkbox"/> Is 12FD3 Sub-Station energized?</p>	<p><input type="checkbox"/> <b>WHEN</b> 12FD3 Sub-Station is energized, <b>THEN</b> continue with Step 8.5.</p>
<p>8.5 <input type="checkbox"/> Place "LOCAL-REMOTE Control Switch Device 69" for Substation 12FD3 Breaker 1M in LOCAL (in control panel/box directly above CHARGING PUMP 23 Breaker Control Switch).</p>	
<p>8.6 <input type="checkbox"/> Is Substation 12FD3 Breaker 1M open?</p>	<p><input type="checkbox"/> Operate CLOSE/TRIP switch to open breaker.</p>
<p>8.7 <input type="checkbox"/> Place transfer switch EDC4 (inside cabinet) to EMERGENCY FEED position.</p>	
<p>8.8 <input type="checkbox"/> Is instrument air available?</p>	<p>1. <input type="checkbox"/> Uncouple air speed controller from scoop tube linkage (above pump). 2. <input type="checkbox"/> Place scoop tube in position "A".</p>
<p>8.9 <input type="checkbox"/> Open 288 (RWST MANUAL INLET STOP) (22 Charging Pump cell).</p>	
<p>8.10 <input type="checkbox"/> Close 297 (BORIC ACID BLENDER OUTLET STOP) (Concentrates Holding Tank Cell – PAB 98' near FCV-110B).</p>	

**Control Room Inaccessibility  
Safe Shutdown Control  
Attachment 8  
Placing 21 OR 23 Charging Pump in  
Service  
Page 4 of 11**

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**IF AT ANY TIME:**

(8.2) 21 Charging Pump available to start from the 480V Switchgear Room and the SM desires...

Control Room Inaccessibility  
 Safe Shutdown Control  
 Attachment 8  
 Placing 21 OR 23 Charging Pump in  
 Service

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.11 ___ Unlock and place Substation 12FD3 Breaker 1M in the vertical position.	
8.12 ___ Close Substation 12FD3 Breaker 1M by operating CLOSE/TRIP switch.	
8.13 ___ Raise 23 CHP speed to maximum.	
8.14 ___ Open disconnect switch 1HR on MCC-26A (LCV-112C).	
8.15 ___ Manually close LCV-112C (VCT OUTLET STOP) (VCT alleyway).	
8.16 ___ Note time LCV-112C was closed (charging pump placed on RWST suction). _____	
8.17 ___ <b>IAAT CCW to Charging Pumps CAN NOT</b> be established within 45 minutes, <b>THEN Initiate</b> Attachment 10 (Backup Cooling Water Supply to Charging Pumps)	
8.18 ___ <b>IAAT PAB</b> ventilation is <b>NOT</b> available, <b>THEN</b> establish alternate PAB ventilation per 2-SOP-ESP-001, Local Equipment Operation and Compensatory Actions.	
8.19 ___ <b>WHEN</b> actions specified by IAAT Steps 8.17 <u>and</u> 8.18 are complete, <b>OR 23</b> Charging Pump operation is no longer necessary, <b>THEN EXIT</b> this attachment.	

••• END •••

**Control Room Inaccessibility  
Safe Shutdown Control  
Attachment 8  
Placing 21 OR 23 Charging Pump in  
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Page 6 of 11**

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**IF AT ANY TIME:**

(8.17) CCW to Charging Pumps **CAN NOT** be established within 45 minutes...

Control Room Inaccessibility  
 Safe Shutdown Control  
 Attachment 8  
 Placing 21 OR 23 Charging Pump in  
 Service  
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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.20 ___ Is instrument air available?	1. ___ Uncouple air speed controller from scoop tube linkage (above pump).
8.21 ___ Open 288 (RWST MANUAL INLET STOP) (22 Charging Pump cell).	2. ___ Place scoop tube in position "A".
8.22 ___ Close 297 (BORIC ACID BLENDER OUTLET STOP) (Concentrates Holding Tank Cell – PAB 98' near FCV-110B).	

<b>CAUTION</b>
Local operation of 21 Charging Pump removes both the low bearing oil trip and the under-voltage trip from the control circuit.

8.23 ___ Insert key into Control Switch for 21 Charging Pump at Panel EDA56 (480V south wall behind switchgear).	
8.24 ___ Place 21 Charging Pump Control Switch to Start.	
8.25 ___ Is 21 Charging Pump Running?	___ <b>GO TO</b> Step 8.3.
8.26 ___ Manually close LCV-112C (VCT OUTLET STOP) (VCT alleyway).	
8.27 ___ Note time LCV-112C was closed (charging pump placed on RWST suction). _____	
8.28 ___ <b>IAAT</b> CCW to Charging Pumps <b>CAN NOT</b> be established within 45 minutes, <b>THEN Initiate</b> Attachment 10 (Backup Cooling Water Supply to Charging Pumps)	

**Control Room Inaccessibility  
Safe Shutdown Control  
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Placing 21 OR 23 Charging Pump in  
Service  
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**IF AT ANY TIME:**

- (8.17) CCW to Charging Pumps **CAN NOT** be established within 45 minutes...
- (8.28) CCW to Charging Pumps **CAN NOT** be established within 45 minutes...

**Control Room Inaccessibility**  
**Safe Shutdown Control**  
**Attachment 8**  
**Placing 21 OR 23 Charging Pump in**  
**Service**  
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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.29 __ <b>IAAT</b> PAB ventilation is <b>NOT</b> available, <b>THEN</b> establish alternate PAB ventilation per 2-SOP-ESP-001, Local Equipment Operation and Compensatory Actions.	
8.30 __ <b>IAAT</b> 21 Charging Pump is not needed, <b>THEN</b> place control switch to STOP.	
8.31 __ <b>WHEN</b> actions specified by IAAT Steps 8.28 <u>and</u> 8.29 are complete, <b>OR</b> 21 Charging Pump operation is no longer necessary, <b>THEN EXIT</b> this attachment.	

••• END •••

**Control Room Inaccessibility  
Safe Shutdown Control  
Attachment 8  
Placing 21 OR 23 Charging Pump in  
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Page 10 of 11**

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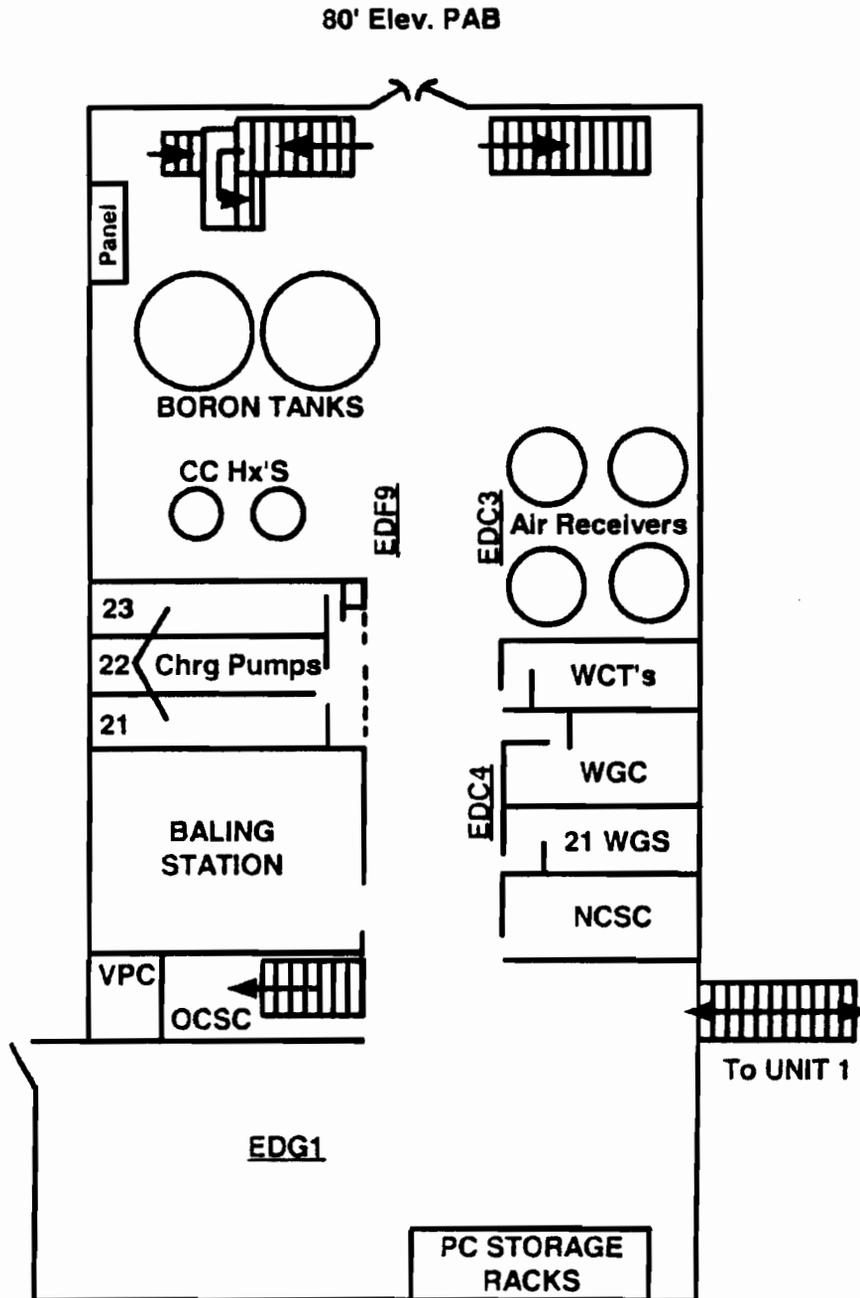
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**Figure 1 - PAB Transfer Switch Locations**



**Control Room Inaccessibility  
Safe Shutdown Control**

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Facility: Indian Point Unit 2Task No: 0840390422Task Title: **Lineup Alternate Cooling to SIS and RHR Pumps**K/A Reference: 005000 2.4.34  
RO-4.2 SRO-4.1Job Performance Measure  
No: \_\_\_\_\_In Plant – 2

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	X	Actual Performance	
Classroom	_____	Simulator	_____
		Plant	X

READ TO THE EXAMINEE

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

Initial Conditions:

- The CCR has been evacuated due to a fire and 2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control.
- CCW cooling is not available to the SI and RHR Pumps

Task Standard: Backup Cooling has been established to the SI and RHR Pumps.

Required Materials: None

General References: 2-AOP-SSD-1 Attachment 14 Steps 14.4 – 14.13

Initiating Cue: You are the ATC assisting the Nuclear NPO and the SM has directed you to establish backup cooling to the SI and RHR Pumps in accordance with 2-AOP-SSD-1 Attachment 14 steps 14.4 – 14.13.

Time Critical Task: No

Validation Time: 20 Minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain Correct Procedure

Standard: Obtain 2-AOP-SSD-1

Comment: Cue: hand candidate Attachment 14 of 2-AOP-SSD-1.

During a control room evacuation the procedure is obtained from the App R locker in the CCR Foyer.

---

✓ 2. Performance Step: Close 734A SI/RHR Supply Header Stop

Standard: Locate valve and simulate rotating clockwise to close

Comment: *CUE: The Valve is CLOSED*

---

✓ 3. Performance Step: Close 734B SI/RHR Normal Outlet Stop

Standard: Locate valve and simulate rotating clockwise to close

Comment: *CUE: The Valve is CLOSED*

---

✓ 4. Performance Step: Connect a hose between PW-115, PW to CCW Supply Telltale Drain Stop and MW-746 City Water Header Outlet Stop

Standard: Locate hose and valves and simulate connecting hose between the 2 valves.

Comment: *CUE: Hose is connected.*

---

## Performance Information

(Denote critical steps with a check mark √)

---

√ 5. Performance Step: **Connect a hose at 734F SI/RHR Pumps Emergency Cooling Outlet Stop and direct to a drain**

Standard: **Locate hose and valve. Connect hose and direct to a drain**

Comment: ***CUE: Hose is connected***

---

√ 6. Performance Step: **OPEN 734F SI/RHR Pumps Emergency Cooling Outlet Stop**

Standard: **Locate valve and simulate rotating counterclockwise to OPEN valve**

Comment: ***CUE: Valve is OPEN***

---

√ 7. Performance Step: **OPEN 734E SI/RHR Pumps Emergency Cooling Outlet Stop**

Standard: **Locate Valve and simulate rotating counterclockwise to OPEN valve**

Comment: ***CUE: Valve is OPEN***

---

8. Performance Step: **Is PW-114 PW and CCW Supply Isolation closed?**

Standard: **Locate valve and check valve closed**

Comment: ***CUE: The valve is closed.***

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 9. Performance Step: Open PW-115 PW to CCW Supply Telltale Drain Stop

Standard: Locate valve and simulate rotating counterclockwise to OPEN valve

Comment: *CUE Valve is OPEN*

---

✓ 10. Performance Step: OPEN MW 746 City Water Header Outlet Stop

Standard: Locate Valve and simulate rotating counterclockwise to OPEN valve

Comment: *CUE Valve is OPEN*

---

✓ 11. Performance Step: OPEN 733C SI/RHR Pump Primary Water Emergency Supply Stop

Standard: Locate Valve and simulate rotating counterclockwise to OPEN valve

Comment: *CUE Valve is OPEN*

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

**Initial Conditions:**

- The CCR has been evacuated due to a fire and 2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control.
- CCW cooling is not available to the SI and RHR Pumps

**Initiating Cue:**

You are the ATC assisting the Nuclear NPO and the SM has directed you to establish backup cooling to the SI and RHR Pumps in accordance with 2-AOP-SSD-1 Attachment 14 steps 14.4 – 14.13.

**Control Room Inaccessibility**  
**Safe Shutdown Control**  
**Attachment 14**  
**Placing 21 SI Pump in Service with Safe**  
**Shutdown Power**  
**Page 3 of 11**

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>14.2 Perform the following for 21 SI Pump breaker:</p> <p>A. <input type="checkbox"/> Open breaker on Bus 5A using trip button, compartment 15A.</p> <p>B. <input type="checkbox"/> Remove DC control power fuse block and reinstall in the OFF position (upper right corner, inside breaker).</p> <p>C. <input type="checkbox"/> Engage breaker racking lever.</p> <p>D. <input type="checkbox"/> Press and hold interlock lever (left side of breaker frame).</p> <p>E. <input type="checkbox"/> Press breaker racking lever to move breaker from CONNECT to TEST position.</p> <p>F. <input type="checkbox"/> Release interlock lever.</p> <p>G. <input type="checkbox"/> Remove breaker racking lever.</p> <p>H. <input type="checkbox"/> Press and hold interlock lever (left side of breaker frame).</p> <p>I. <input type="checkbox"/> Pull breaker forward until locking pin is in front notch.</p> <p>J. <input type="checkbox"/> Release interlock lever.</p>	
<p>14.3 <input type="checkbox"/> IAAT CCW cooling to 21 SI Pump does <b>NOT</b> exist, <b>THEN</b> perform Steps 14.4 - 14.13.</p>	<p><input type="checkbox"/> <b>GO TO Step 14.15.</b></p>
<p>14.4 <input type="checkbox"/> Close 734A (SI/RHR SUPPLY HEADER STOP).</p>	
<p>14.5 <input type="checkbox"/> Close 734B (SI/RHR NORMAL OUTLET STOP).</p>	

**Control Room Inaccessibility  
Safe Shutdown Control  
Attachment 14  
Placing 21 SI Pump in Service with Safe  
Shutdown Power  
Page 4 of 11**

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**IF AT ANY TIME:**

(14.3) CCW cooling to 21 SI Pump does **NOT** exist...

Control Room Inaccessibility  
 Safe Shutdown Control  
 Attachment 14  
 Placing 21 SI Pump in Service with Safe  
 Shutdown Power  
 Page 5 of 11

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.6 Connect a hose between the following: ___ PW-115 (PW TO CCW SUPPLY TELLTALE DRAIN STOP) ___ MW-746 (CITY WATER HEADER OUTLET STOP)	
14.7 ___ Connect a hose at 734F (SI/RHR PUMPS EMERGENCY COOLING OUTLET STOP) and direct to a drain.	
14.8 ___ Open 734F.	
14.9 ___ Open 734E (SI/RHR PUMPS EMERGENCY COOLING OUTLET STOP).	
14.10 ___ Is PW-114 (PW AND CCW SUPPLY ISOLATION) closed?	___ Close PW-114.
14.11 ___ Open PW-115 (PW TO CCW SUPPLY TELLTALE DRAIN STOP).	
14.12 ___ Open MW-746 (CITY WATER HEADER OUTLET STOP).	
14.13 ___ Open 733C (SI/RHR PUMPS PRIMARY WATER EMERGENCY SUPPLY STOP).	
14.14 ___ Is 12FD3 Sub-Station energized?	___ <b>WHEN</b> 12FD3 Sub-Station is energized, <b>THEN</b> continue with Step 14.15.
14.15 ___ Place "LOCAL-REMOTE Control Switch Device 69" for Substation 12FD3 Breaker 1T in LOCAL (in control panel/box directly above 21RHR 21SIS Breaker Control Switch).	

**Control Room Inaccessibility  
Safe Shutdown Control  
Attachment 14  
Placing 21 SI Pump in Service with Safe  
Shutdown Power  
Page 6 of 11**

2-AOP-SSD-1 Rev. 18

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**IF AT ANY TIME:**

(14.3) CCW cooling to 21 SI Pump does **NOT** exist...

Facility: Indian Point 2 Task No: 0720060122Task Title: Align 24 Large Gas Decay Tank for start of dischargeK/A Reference: 071000A4.05 Job Performance Measure  
(2.6/2.6) No: In Plant – 3

Examinee: \_\_\_\_\_ NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_ Date: \_\_\_\_\_

## Method of testing:

Simulated Performance	<u>X</u>	Actual Performance	_____
Classroom	_____	Simulator	_____
		Plant	<u>X</u>

## READ TO THE EXAMINEE

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

## Initial Conditions:

- The system is aligned in accordance with COL 5.2.1.
- The SM has directed 24 Large Gas Decay Tank is to be released.
- 24 Large Gas Decay Tank had been isolated, sampled, and the sample has been analyzed.
- A PAB Exhaust Fan is Running
- Iodine and Particulate Composite Collection Device IS in place
- Release Permit has been completed and approved to release 24 LGDT in accordance with SOP-5.2.1.
- Radiation Monitor R-44 is in service  $R_{TA}$  for the release permit is  $3.525 \text{ E-06 } \mu\text{Ci/cc}$

Task Standard: 24 LGDT Release has been started.

Required Materials: None

General References: SOP-5.2.1 Gaseous Waste Disposal System Operation

Initiating Cue: You have been directed to **SIMULATE** lining up and starting a release on 24 Large Gas Decay Tank in accordance with SOP-5.2.1.

Time Critical Task: No

Validation Time: 30 minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain correct procedure

CUE: Give candidate 2-SOP-5.2.1

Standard: 2-SOP-5.2.1 section 4.4 and Attachment 4

Comment:

---

✓ 2. Performance Step: **Verify RCV-014 Plant Stack Discharge Valve Closed**

CUE: After candidate locates valve on the Waste Disposal Panel, state the valve is CLOSED

Standard: Locate Valve on the Waste Disposal Panel, position checked closed

Comment:

---

✓ 3. Performance Step: **CLOSE 1644D, PCV-1039A inlet stop**

CUE: After candidate locates valve and checks position CUE ***the valve is closed***

Standard: Locate Valve and position checked

Comment: Attachment 4 should be used for the next sequence of steps.

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 4. Performance Step: Close 1632, 24 LGDT Reuse Outlet

CUE: After candidate locates valve and checks position CUE **the valve is closed**

Standard: Valve located on Waste Disposal Panel

Comment:

---

✓ 5. Performance Step: CLOSE PCV-1039B, Gas Analyzer Sample Inlet

CUE: After candidate locates valve, question candidate on the method used to determine its position. If candidate states that he would use the print, allow candidate to use the print 9321-2730. After appropriate discussion CUE **the valve is closed**

NOTE: Drawing indicates the valve fails closed. Air supply is from under the diaphragm. Therefore, air to open, spring to close. Closed would be stem in the down position.

Standard: Valve located and methods for determining position verification discussed.

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ **6. Performance Step:      CLOSE 1617, 21 LGDT Outlet Stop**

CUE:            After candidate locates valve and proper motion simulated, CUE ***the valve is closed***

Standard:      Valve is located and hand wheel turned clockwise (**simulated**) until closed

Comment:

---

✓ **7. Performance Step:      CLOSE 1618, 22 LGDT Outlet Stop**

CUE:            After candidate locates valve and proper motion simulated, CUE ***the valve is closed***

Standard:      Valve is located and hand wheel turned clockwise (**simulated**) until closed

Comment:

---

✓ **8. Performance Step:      CLOSE 1619, 23 LGDT Outlet Stop**

CUE:            After candidate locates valve and proper motion simulated, CUE ***the valve is closed***

Standard:      Valve is located and hand wheel turned clockwise (**simulated**) until closed

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

**✓ 9. Performance Step: CLOSE 1652F, 21 SGDT Outlet Stop**

CUE: After candidate locates valve and proper motion simulated, CUE ***the valve is closed***

Standard: Valve is located and hand wheel turned clockwise (**simulated**) until closed

Comment:

---

**10. Performance Step: CLOSE 1652E, 22 SGDT Outlet Stop**

CUE: After candidate locates valve and proper motion simulated, CUE ***the valve is closed***

Standard: Valve is located and hand wheel turned clockwise (**simulated**) until closed

Comment:

---

**✓ 11. Performance Step: CLOSE 1652D, 23 SGDT Outlet Stop**

CUE: After candidate locates valve and proper motion simulated, CUE ***the valve is closed***

Standard: Valve is located and hand wheel turned clockwise (**simulated**) until closed

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 12. Performance Step: **CLOSE 1652C, 24 SGDT Outlet Stop**

CUE: After candidate locates valve and proper motion simulated, CUE ***the valve is closed***

Standard: Valve is located and hand wheel turned clockwise (**simulated**) until closed

Comment:

---

✓ 13. Performance Step: **CLOSE 1652B, 25 SGDT Outlet Stop**

CUE: After candidate locates valve and proper motion simulated, CUE ***the valve is closed***

Standard: Valve is located and hand wheel turned clockwise (**simulated**) until closed

Comment:

---

✓ 14. Performance Step: **CLOSE 1652A, 26 SGDT Outlet Stop**

CUE: After candidate locates valve and proper motion simulated, CUE ***the valve is closed***

Standard: Valve is located and hand wheel turned clockwise (**simulated**) until closed

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

**✓ 15. Performance Step: OPEN 1620, 24 LGDT Outlet Stop**

CUE: After candidate locates valve and proper motion simulated, CUE ***the valve is opened***

Standard: Valve is located and hand wheel turned counter clockwise (**simulated**) until opened.

Comment:

---

**✓ 16. Performance Step: OPEN 1643D, 24 LGDT Stop (Inlet and PT)**

CUE: After candidate locates valve and proper motion simulated, CUE ***the valve is opened***

Standard: Valve is located and hand wheel turned counter clockwise (**simulated**) until opened.

Comment:

---

17. Performance Step: Manually Select Waste Gas Release Line (WG RELEASE) on Gas Analyzer.

Standard: Steps listed below in 18 -

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

18. Performance Step:	If Sample is to be drawn for greater than 3 ½ minutes
Standard:	Determines sample will be drawn for greater than 3 ½ minutes
Comment:	

---

19. Performance Step:	Verify all Sample-Bypass switches are BYPASSED
Standard:	Locates switches
Comment:	<i>CUE: All switches are in BYPASS</i>

---

20. Performance Step:	If Switch is NOT in manual THEN notify CCR that an expected alarm "WASTE DISPOSAL BORON RECYCLE PANEL" may annunciate.
Standard:	Simulate contacting CCR and communicate alarm
Comment:	<i>CUE: CCR Acknowledges</i>

---

21. Performance Step:	Place MODE switch in MAN
Standard:	Locates switch and simulates placing in MAN
Comment:	<i>CUE: Switch is in MAN</i>

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

22. Performance Step: Place Sample-Bypass Switch for the desired sample point in SAMPLE

Standard: Locate WG RELEASE switch and place in SAMPLE

Comment: *CUE: Switch is in SAMPLE*

---

23. Performance Step: Record the following on the appropriate Discharge/Sample Checkoff Attachment 4

Standard: All data was previously recorded on form

Comment:

---

24. Performance Step: Verify a PAB Exhaust Fan is running

Standard: Given in Initial Conditions, a PAB Exhaust fan is running

Comment: *CUE: If asked, cue a PAB Exhaust Fan is running*

---

25. Performance Step: Determine if Iodine and Particulate Composite Collection Device is in place

Standard: Given in Initial Conditions, Iodine and Particulate Composite Collection Device is in place

Comment: *CUE: If asked, cue Iodine and Particulate Composite Collection Device is in place*

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

<b>✓ 26. Performance Step:</b>	<b>Commence Discharge by:</b>
<b>Standard:</b>	Given in Initial Conditions R-44 is in service (Not Critical) <b>Slowly open RCV-014 until R-44 indication approaches</b> <b>R<sub>TA</sub></b>
<b>Comment:</b>	<b>CUE: R-44 indication is approaching R<sub>TA</sub></b>

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

**Initial Conditions:**

- The system is aligned in accordance with COL 5.2.1.
- The SM has directed 24 Large Gas Decay Tank is to be released.
- 24 Large Gas Decay Tank had been isolated, sampled, and the sample has been analyzed.
- A PAB Exhaust Fan is Running
- Iodine and Particulate Composite Collection Device IS in place
- Release Permit has been completed and approved to release 24 LGDT in accordance with SOP-5.2.1.
- Radiation Monitor R-44 is in service  $R_{TA}$  for the release permit is  $3.525 \text{ E-06 } \mu\text{Ci/cc}$

**Initiating Cue:**

You have been directed to **SIMULATE** lining up and starting a release on 24 Large Gas Decay Tank in accordance with SOP-5.2.1.

**4.4 GASEOUS WASTE DISCHARGE**

- \_\_\_ 4.4.1 VERIFY RCV-014, Plant Stack Discharge Valve, is Closed.
- \_\_\_ 4.4.2 DETERMINE appropriate Discharge/Sample Checkoff Attachment(s) (1 through 5) to be used for discharge and ALIGN selected GDT(s) for release by completing Section 1 of appropriate attachment.
- \_\_\_ 4.4.3 Manually SELECT Waste Gas Release Line (WG RELEASE) on Gas Analyzer per 2-SOP-5.2.3, Waste Gas Analyzer Operation.
- \_\_\_ 4.4.4 PREPARE an Airborne Radioactive Waste Release Permit per 2-SOP-5.4.2, Gas Decay Tank Gaseous Releases.
- \_\_\_ 4.4.5 RECORD the following on the appropriate Discharge/Sample Checkoff(s), Attachments 1 through 5 (obtained from the CRS):
  - \_\_\_ • Release permit number
  - \_\_\_ •  $R_{TA}$  **OR** Release Time
  - \_\_\_ • Minimum and Planned Release times
- \_\_\_ 4.4.6 VERIFY PAB exhaust fan running.
- \_\_\_ 4.4.7 IF Iodine and Particulate Composite Collection Device is NOT in place, THEN DO NOT start release.
- \_\_\_ 4.4.8 COMMENCE Discharge by performing ONE of the following:
  - \_\_\_ 4.4.8.1 IF R-44, Plant Vent Noble Gas Monitor, is in service, THEN:

**NOTE**

R-44, Plant Vent Noble Gas Monitor, values are one minute averages. Readings should be allowed to stabilize following flow adjustments prior to use.

- \_\_\_ a) IF directed by CCR, THEN slowly OPEN RCV-014, Plant Stack Discharge Valve, until R-44 indication (WDP right side) approaches calculated  $R_{TA}$  (Reference 5.3.1).
- \_\_\_ b) IF R-44 Warn alarm actuates, THEN CLOSE RCV-014.

- \_\_\_\_\_ 4.4.8.2 IF R-44, Plant Vent Noble Gas Monitor, is NOT in service, THEN SLOWLY CRACK OPEN RCV-014, Plant Stack Discharge Valve using the release time determined from the permitting process and the rate of tank pressure decrease to gauge required RCV-014 position.
- \_\_\_\_\_ a) Making very small adjustments, REPOSITION RCV-014 as needed over the duration of the release interval approximates the planned release time.
- \_\_\_\_\_ 4.4.9 IF a N<sub>2</sub> purge will NOT be performed at end of release, THEN RETURN Gas Analyzer to AUTO (sampling the in-service LGDT) per 2-SOP-5.2.3, Waste Gas Analyzer Operation.
- \_\_\_\_\_ 4.4.10 ENTER permit number and start time in CCR Unit Log.
- \_\_\_\_\_ 4.4.11 Periodically MONITOR the following during the release:
- \_\_\_\_\_ • RCV-014, Plant Stack Discharge Valve, position
  - \_\_\_\_\_ • GDT(s) pressure
  - \_\_\_\_\_ • R-44, Plant Vent Noble Gas Monitor, activity (If in service)
  - \_\_\_\_\_ • PAB exhaust fan RUNNING
- \_\_\_\_\_ 4.4.12 Periodically ADJUST release rate as follows:
- \_\_\_\_\_ 4.4.12.1 IF R-44, Plant Vent Noble Gas Monitor, is in service, THEN ADJUST RCV-014, Plant Stack Discharge Valve, as GDT pressure decreases to maintain recorded R<sub>TA</sub>.
- \_\_\_\_\_ 4.4.12.2 IF R-44, Plant Vent Noble Gas Monitor, is out of service, THEN MONITOR rate of GDT pressure decrease and ADJUST RCV-014, Plant Stack Discharge Valve, to comply with calculated release.
- \_\_\_\_\_ 4.4.13 WHEN release has been completed OR pre-maturely terminated, THEN:
- \_\_\_\_\_ 4.4.13.1 IF a N<sub>2</sub> purge will NOT be performed, THEN CLOSE RCV-014, Plant Stack Discharge Valve, AND GO TO step 4.4.14.

**CAUTION**

Do **NOT** start purging a GDT with N<sub>2</sub> **unless** its pressure is 10 psig or less. Release Time (T) as determined by CCR, SHALL have been reached or exceeded prior to commencing a purge.

- \_\_\_ 4.4.13.2 VERIFY Release Time requirements are met.
- \_\_\_ 4.4.13.3 VERIFY GDT pressure is less than or equal to 10 psig.
- \_\_\_ 4.4.13.4 VERIFY N<sub>2</sub> inlet stop(s) for GDT(s) being purged is OPEN:
  - \_\_\_ • 1637 21 LGDT N<sub>2</sub> Purge Inlet Stop
  - \_\_\_ • 1638 22 LGDT N<sub>2</sub> Purge Inlet Stop
  - \_\_\_ • 1639 23 LGDT N<sub>2</sub> Purge Inlet Stop
  - \_\_\_ • 1640 24 LGDT N<sub>2</sub> Purge Inlet Stop
  - \_\_\_ • 1641F 21 SGDT N<sub>2</sub> Purge Inlet Stop
  - \_\_\_ • 1641E 22 SGDT N<sub>2</sub> Purge Inlet Stop
  - \_\_\_ • 1641D 23 SGDT N<sub>2</sub> Purge Inlet Stop
  - \_\_\_ • 1641C 24 SGDT N<sub>2</sub> Purge Inlet Stop
  - \_\_\_ • 1641B 25 SGDT N<sub>2</sub> Purge Inlet Stop
  - \_\_\_ • 1641A 26 SGDT N<sub>2</sub> Purge Inlet Stop
- \_\_\_ 4.4.13.5 OPEN 1685, N<sub>2</sub> Purge Supply Stop.
- \_\_\_ 4.4.13.6 VERIFY N<sub>2</sub> purge flow by observing a pressure increase on GDT(s) being purged or increased flow on outlet of PCV-1046, 15 psig N<sub>2</sub> Header Regulator.

**NOTE**

To provide a back pressure for PCV-1069B, MSA Sample Supply Line, do NOT fully open RCV-014, Plant Stack Discharge Valve.

**CAUTION**

Do NOT allow R-44, Plant Vent Noble Gas Monitor, Activity to exceed recorded  $R_{TA}$ .

- \_\_\_\_\_ 4.4.13.7 Slowly ADJUST RCV-014, Plant Stack Discharge Valve, to maintain between 5 and 15 psig on GDT(s) being purged.
- \_\_\_\_\_ 4.4.13.8 WHEN Purge has gone for 90 minutes OR Gas Analyzer indicates that the GDT(s) being purged meet the Radiological, Chemistry or Inerted Tank specifications, THEN:
  - \_\_\_\_\_ a) CLOSE  $N_2$  purge stop(s) opened in step 4.4.13.4.
  - \_\_\_\_\_ b) CLOSE 1685,  $N_2$  Purge Supply Stop.
- \_\_\_\_\_ 4.4.13.9 PERFORM **one** of the following:
  - \_\_\_\_\_ • IF GDT(s) is to be ready for service, THEN CLOSE RCV-014, Plant Stack Discharge Valve.
  - \_\_\_\_\_ • IF GDT(s) is to be removed from service, THEN ALLOW GDT(s) to reach atmospheric pressure and CLOSE RCV-014, Plant Stack Discharge Valve.
- \_\_\_\_\_ 4.4.14 ENTER finish time in Unit Narrative Log.
- \_\_\_\_\_ 4.4.15 VERIFY Gas Analyzer is returned to AUTO (sampling the in-service LGDT) per 2-SOP-5.2.3, Waste Gas Analyzer Operation.
- \_\_\_\_\_ 4.4.16 COMPLETE Section 2 of Discharge/Sample Checkoff(s) to restore normal system lineup.
  - \_\_\_\_\_ • RETURN completed applicable attachment to CCR.
- \_\_\_\_\_ 4.4.17 IF R-44, Plant Vent Noble Gas Monitor, High Alarm setpoint had been raised for discharge, THEN RETURN it to previous value.

GASEOUS WASTE DISPOSAL SYSTEM  
OPERATION

No:2-SOP-5.2.1

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ATTACHMENT 4  
24 LGDT Discharge / Sample Checkoff  
(Page 1 of 1)

Release Permit Number \_\_\_\_\_

R<sub>TA</sub> = \_\_\_\_\_ μCi/cc

T<sub>MIN</sub> = \_\_\_\_\_ min. {SEE Attachment 8} Planned Release Time (T) = \_\_\_\_\_ min

**NOTE**

- WHEN multiple LGDTs are to be sampled and released,  
THEN additional associated discharge stops are NOT closed as called for below.
- Chemistry Manager permission is required, when a 24 LGDT is >1E-2 uCi/cc

1.0	24 Large Gas Decay Tank Start of Discharge	Position	Init.	Date
•	1644D PCV-1039A Inlet Stop	CLOSED	___	___
•	1632 24 LGDT Reuse Outlet	CLOSED	___	___
•	PCV-1039B Gas Analyzer Sample Inlet	CLOSED	___	___
•	1617 21 LGDT Outlet Stop	CLOSED	___	___
•	1618 22 LGDT Outlet Stop	CLOSED	___	___
•	1619 23 LGDT Outlet Stop	CLOSED	___	___
•	1652F 21 SGDT Outlet Stop	CLOSED	___	___
•	1652E 22 SGDT Outlet Stop	CLOSED	___	___
•	1652D 23 SGDT Outlet Stop	CLOSED	___	___
•	1652C 24 SGDT Outlet Stop	CLOSED	___	___
•	1652B 25 SGDT Outlet Stop	CLOSED	___	___
•	1652A 26 SGDT Outlet Stop	CLOSED	___	___
•	1620 24 LGDT Outlet Stop	OPEN	___	___
•	1643D 24 LGDT Stop (Inlet and PT)	OPEN	___	___
2.0	<b>Termination of Discharge</b>			
•	1620 24 LGDT Outlet Stop	CLOSED	___	___
•	1644D PCV-1039A Inlet Stop	OPEN	___	___
•	1643D 24 LGDT Stop (Inlet and PT)	OPEN	___	___

Completed by: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Facility: Indian Point Unit 2Task No: 0040170101Task Title: **Align CVCS Makeup after Chemistry Sample**K/A Reference: 004000A4.07Job Performance Measure  
No: \_\_\_\_\_

Sim 1

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	<u>X</u>	Actual Performance	_____
Classroom	_____	Simulator	<u>X</u>
		Plant	_____

**READ TO THE EXAMINEE**

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

Initial Conditions:

- The plant is operating near Middle of Life.
- A power reduction was required.
- Following the power reduction the watch Chemist reports that current RCS Boron concentration is 430 ppm

Task Standard: Proper boric acid flow rate is determined for 120 gpm makeup; the controllers are properly set for current boron concentration and 120 gpm makeup capability.

Required Materials: None

General References: Graphs Book (CVCS section) CVCS-1A  
2-SOP-3.2, RCS Boron Concentration Control

Initiating Cue: You are the ATC and the CRS has directed you to adjust automatic makeup controls for a 120 gpm blend and to match the current chemistry sample boron concentration.

Time Critical Task: NO

Validation Time:

---

Performance Information

(Denote critical steps with a check mark √)

---

1. Performance Step: Obtain Correct Procedure and Review Precautions and Limitation

Standard: Obtains 2-SOP-3.2 Reactor Coolant System Boron Concentration Control

Comment: Procedure Section Automatic Makeup Section 4.0

---

2. Performance Step: Determine RCS Boron Concentration

Standard: Current Boron Concentration is 430 ppm Given in Initial Conditions

Comment:

---

3. Performance Step: Verify both Boric Acid Transfer Pump speed selector switches are in SLOW

Standard: Observes pump speed switches selected to SLOW

Comment:

---

4. Performance Step: Verify in-service Boric Acid Transfer Pump in AUTO

Standard: Observes pump switches selected to AUTO

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

5 Performance Step: Verify on Primary Water (PW) pumps is running

Standard: Observes 21 PW pump running

Comment:

---

6. Performance Step: Verify FIC-110 Boric Acid Flow Control in AUTO

Standard: Observes controller selected to AUTO

Comment:

---

✓ 7. Performance Step: **Adjust FIC-110, Boric Acid Flow Control, auto setpoint to match blender output Boron concentration to that existing in Reactor Coolant. (refer to CVCS section in Graphs Book)**

**Standard: Using Graph CVCS-1A determine the automatic setpoint for FIC is  $2.46 \pm 0.02$  gallons per minute flow. Adjust potentiometer to 24.6**

**Comment: The automatic controller for Boric Acid flow is a 0 to 10 gpm controller. A setting of 24.6 on the controller will yield approximately 2.46 gpm boric acid flow**

---

✓ 8. Performance Step: **Verify remote primary water controller HFC-111 (Foxboro Rack A-6) is set to desired flow rate (0-100% = 0 - 120 gpm)**

**Standard: In Rack A-6 rotate potentiometer for HFC-111 to 100**

**Comment:**

---

## Performance Information

(Denote critical steps with a check mark √)

---

**√ 9. Performance Step:** Place RCS Makeup Mode Selector switch in Auto  
**Standard:** Rotate RCS Makeup Mode Selector switch to AUTO

**Comment:**

---

**√ 10. Performance Step:** Place RCS Makeup Control Switch to START  
**Standard:** Rotate Makeup Control Switch to START

**Comment:**

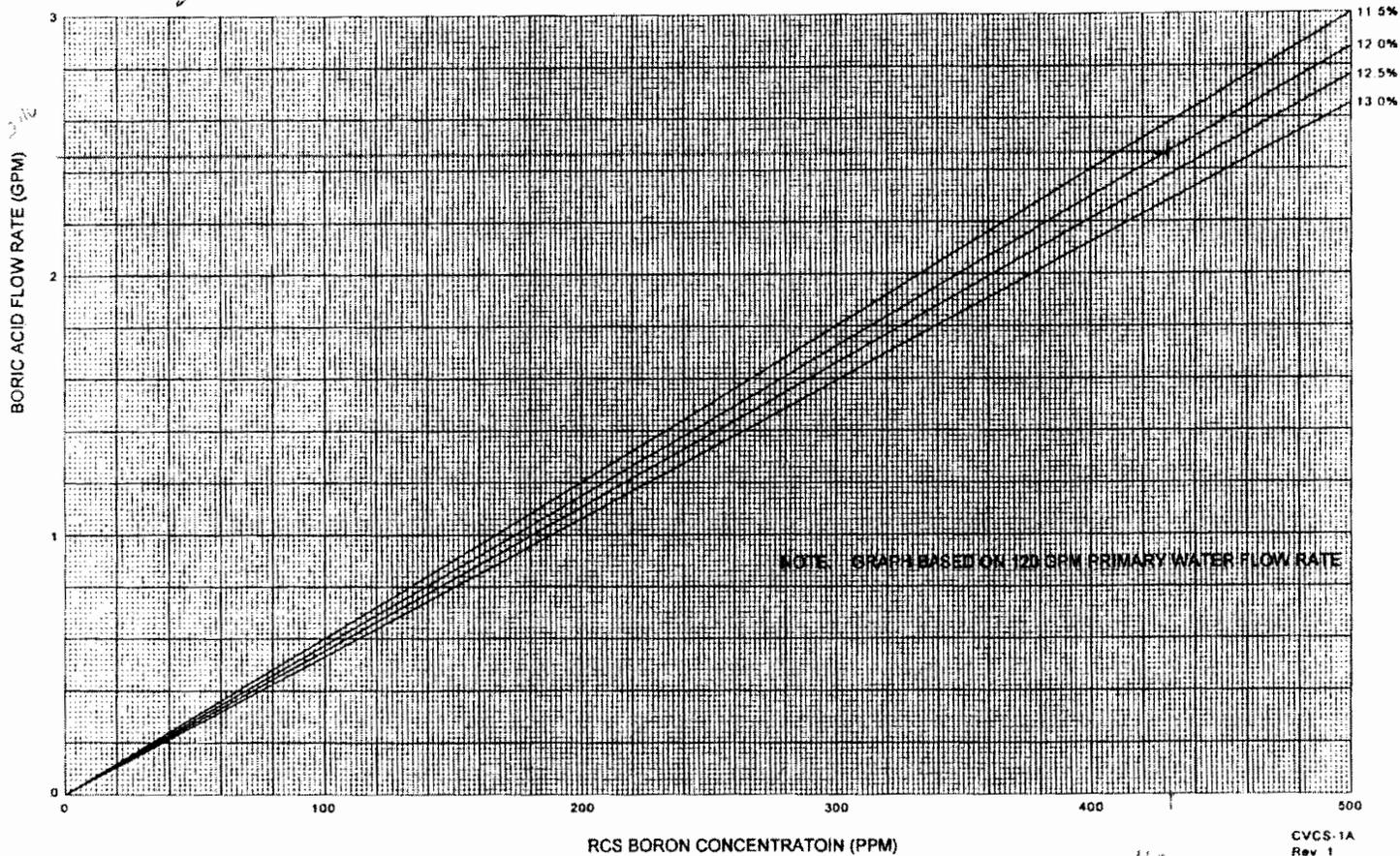
---

Terminating Cue: JPM Complete

not required  
SWSRIS 4791 1/22/93  
SWSR REVIEW DATE  
Mandy M... 10/13/98  
APPROVED DATE

INDIA INT STATION  
UNIT NO. 2  
REACTOR COOLANT SYSTEM  
BLENDED MAKE-UP

BORIC ACID CONCENTRATION  
IN STORAGE TANK



NOTE: GRAPH BASED ON 120 GPM PRIMARY WATER FLOW RATE

CVCS-1A  
Rev 1

430 ppm

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

This JPM can be performed from any plant condition.

Ensure the Automatic setpoint for controller HFC-111 is set to approximately 79%.

Ensure the Automatic setpoint for controller FCV-110 is set for < 10 (1 gpm).

Initial Conditions:

- The plant is operating near Middle of Life.
- A power reduction was required.
- Following the power reduction the watch Chemist reports that current RCS Boron concentration is 430 ppm

Initiating Cue:

You are the ATC and the CRS has directed you to adjust automatic makeup controls for a 120 gpm blend and to match the current chemistry sample boron concentration.

**4.0 PROCEDURE**

**4.1 Automatic Makeup**

- 4.1.1 DETERMINE RCS Boron concentration.
- 4.1.2 VERIFY both boric acid transfer pump speed selector switches are in SLOW.
- 4.1.3 VERIFY in-service boric acid transfer pump in AUTO.
- 4.1.4 VERIFY one PW pump is running.
- 4.1.5 VERIFY FIC-110, Boric Acid Flow Control, is in AUTO.

**NOTE**

- GRAPH CVCS-1C, Blended Makeup With Various PW Flows, is based on a PW flow rate of 60 to 120 gpm.
- GRAPH CVCS-1A, Blended Makeup - (0-500) with 120 gpm PW, and GRAPH CVCS-1B, Blended Makeup - (0-2000) with 120 gpm PW, are based on a PW flow rate of 120 gpm.

- 4.1.6 ADJUST FIC-110, Boric Acid Flow Control, auto setpoint to match blender output Boron concentration to that existing in Reactor Coolant (or to desired boron concentration if borating). (Refer to CVCS section in Graphs Book.)
  - 4.1.6.1 IF boron flow becomes erratic at low flows, THEN ADJUST HCV-104, CVCS/Boric Acid Tank 22 BA Inlet, OR HCV-105, CVCS/Boric Acid Tank 21 BA Inlet, as required to stabilize at a lower boron flow.
- 4.1.7 IF required blended makeup Boron concentration is greater than 1700 ppm, THEN PERFORM the following, as appropriate:
  - ADJUST FIC-111, Demin Water Flow Control, in MANUAL to obtain a primary water flow rate to achieve required makeup Boron concentration
  - ADJUST FIC-110, Boric Acid Flow Control, to greater than 10 gpm
- 4.1.8 IF desired to maximize Boron flow, THEN CLOSE the appropriate BATP recirculation valve.
  - HCV-104, CVCS/Boric Acid Tank 22 BA Inlet
  - HCV-105, CVCS/Boric Acid Tank 21 BA Inlet

**REACTOR COOLANT SYSTEM BORON  
CONCENTRATION CONTROL**

No: 2-SOP-3.2

Rev: 37

Page 8 of 49

- 4.1.9 VERIFY remote primary water controller HFC-111 (Foxboro Rack A-6) is set to desired flow rate (0-100% = 0-120 gpm).
- 4.1.10 PLACE the RCS Makeup Mode Selector switch in AUTO.
- 4.1.11 PLACE the RCS Makeup Control switch to START.
- 4.1.12 IF VCT level decreases to the automatic makeup point of 21 percent, THEN VERIFY makeup is initiated.
- 4.1.12.1 VERIFY BATPs shift to fast speed.
- 4.1.12.2 WHEN VCT level reaches the automatic makeup reset of 28.5 percent, THEN VERIFY makeup stops.
- 4.1.13 OBSERVE  $T_{AVE}$  and control rod bank position following addition of makeup.

**CAUTION**

The following will prevent further auto makeup until the RCS Makeup Control switch is again moved to START.

- 4.1.14 WHEN automatic makeup is no longer required OR is to be stopped, THEN PLACE RCS Makeup Control switch to STOP.
- 4.1.15 IF HCV-104, CVCS/Boric Acid Tank 22 BA Inlet, was adjusted, THEN return it to its original position.
- 4.1.16 IF HCV-105, CVCS/Boric Acid Tank 21 BA Inlet, was adjusted, THEN return it to its original position.

INDIAN POINT STATION

UNIT 2

GRAPH CVCS-1A Rev. 2

REACTOR COOLANT SYSTEM BLENDED MAKEUP

**CONTROLLED**



Drafted by

Reviewed by

Concurrence by  
Plant Manager / Section Head

*Not Required*  
*SNSC 1749 1791 4/20/93*

SNSC Review Mtg. No. / Date

*Marly Miller 10/13/98*

Approved by / Date

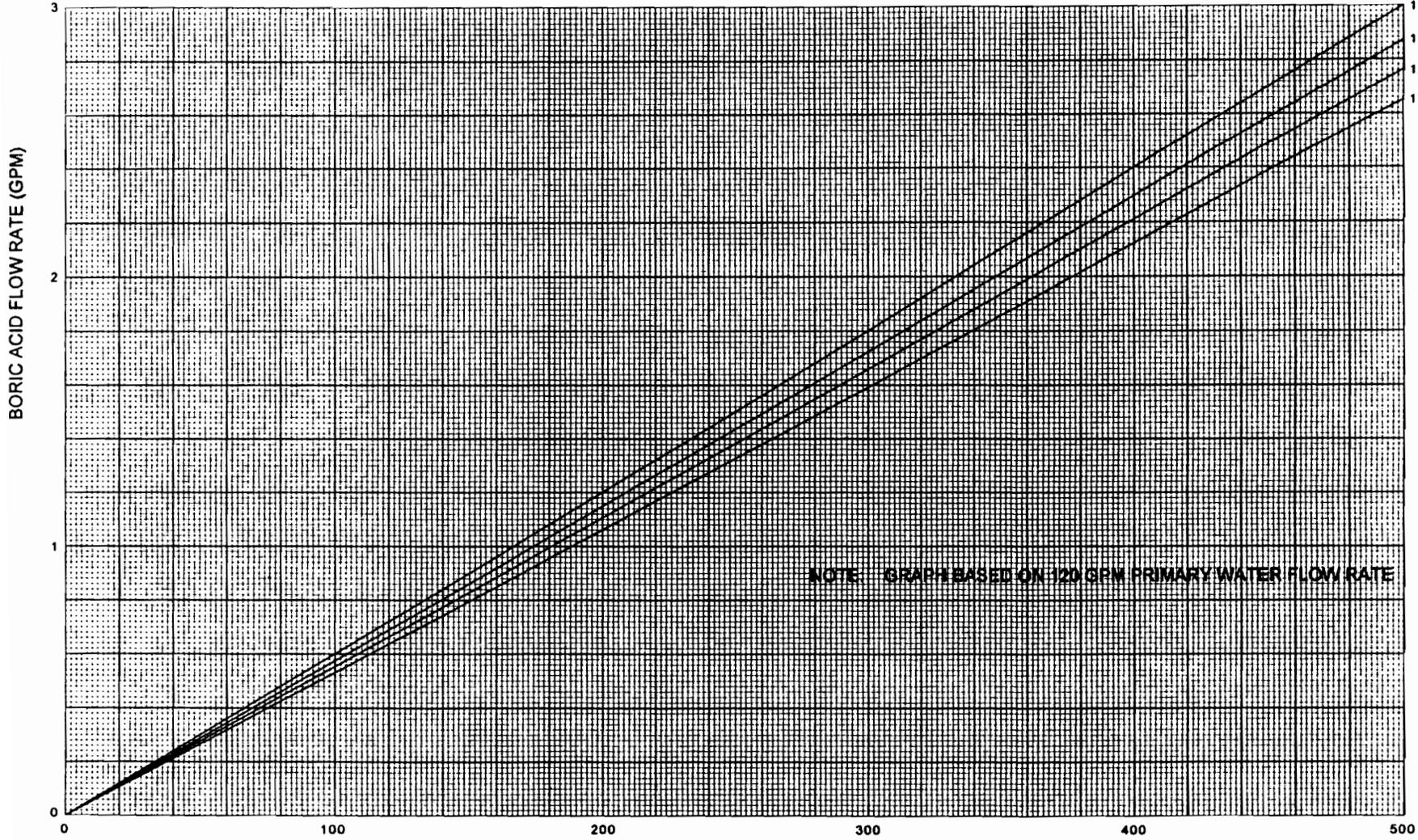
*10/20/98*

Effective Date

Not required  
EWS/SNSC/4791 1/22/93  
SNSC REVIEW DATE  
Mandy M. H. 10/13/98  
APPROVED DATE

INDIA INT STATION  
UNIT NO. 2  
REACTOR COOLANT SYSTEM  
BLENDED MAKE-UP

BORIC ACID CONCENTRATION  
IN STORAGE TANK



NOTE: GRAPH BASED ON 120 GPM PRIMARY WATER FLOW RATE

RCS BORON CONCENTRATOIN (PPM)

CVCS-1A  
Rev. 1

INDIAN POINT STATION

UNIT 2

GRAPH CVCS-1B Rev. 2

REACTOR COOLANT SYSTEM BLENDED MAKE-UP

**CONTROLLED**



\_\_\_\_\_  
Drafted by



A. Q. 10/9/98

\_\_\_\_\_  
Reviewed by

N/A

\_\_\_\_\_  
Concurrence by  
Plant Manager / Section Head

not required  
Rev. SNSC Mtg #1791 4/22/93

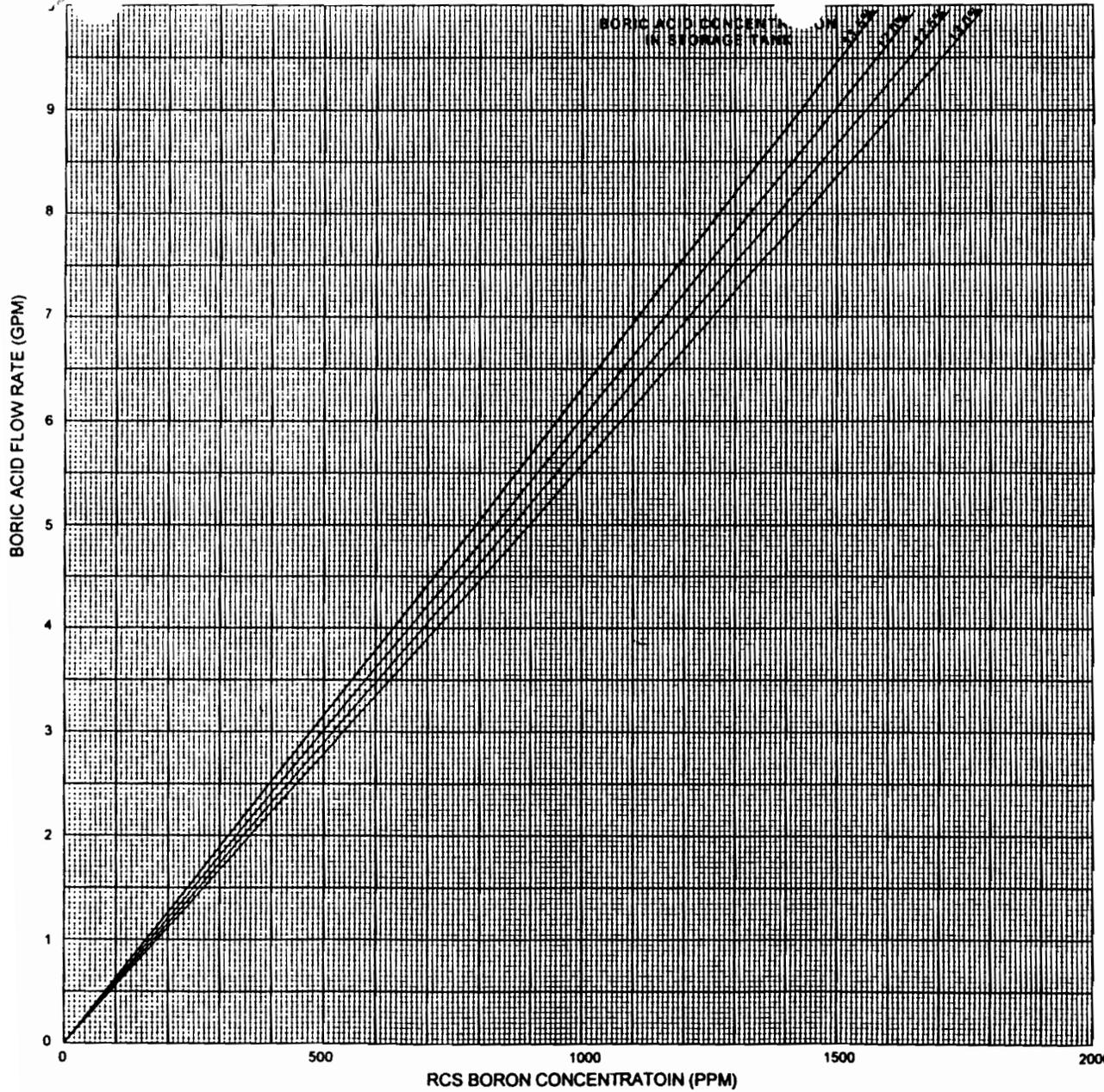
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SNSC Review Mtg. No. / Date

\_\_\_\_\_  
Marty Miller 10/13/98

\_\_\_\_\_  
Approved by / Date

10/20/98

\_\_\_\_\_  
Effective Date



INDIAN POINT STATION  
 UNIT NO. 2  
 REACTOR COOLANT SYSTEM  
 BLENDED MAKE-UP

*Not Required*  
*Chris S. S. C. A. 1791 4/22/93*  
 SNBC REVIEW DATE  
*Mark M. M. 10/13/98*  
 APPROVED DATE

NOTE: GRAPH BASED ON 120 GPM  
 PRIMARY WATER FLOW RATE

CVCS-1B  
 Rev 2

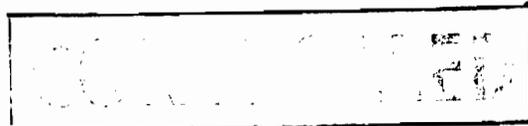
INDIAN POINT STATION

UNIT 2

CONTROL OF PAGES TO GRAPH BOOK

GRAPH Blended Makeup with Various PW Flows PAGE CVCS-1C REV. 2

Thomas Sorrentino  
Drafted by  
Anthony R. Reese  
Reviewed by  
Robert Allen  
Concurrence by  
General Manager/Section Head  
Michael D. Soomey  
1787 4/15/93  
SNSC Review Mtg. No. /Date  
Dun for McWay  
Approved by  
4-16-93  
Effective Date

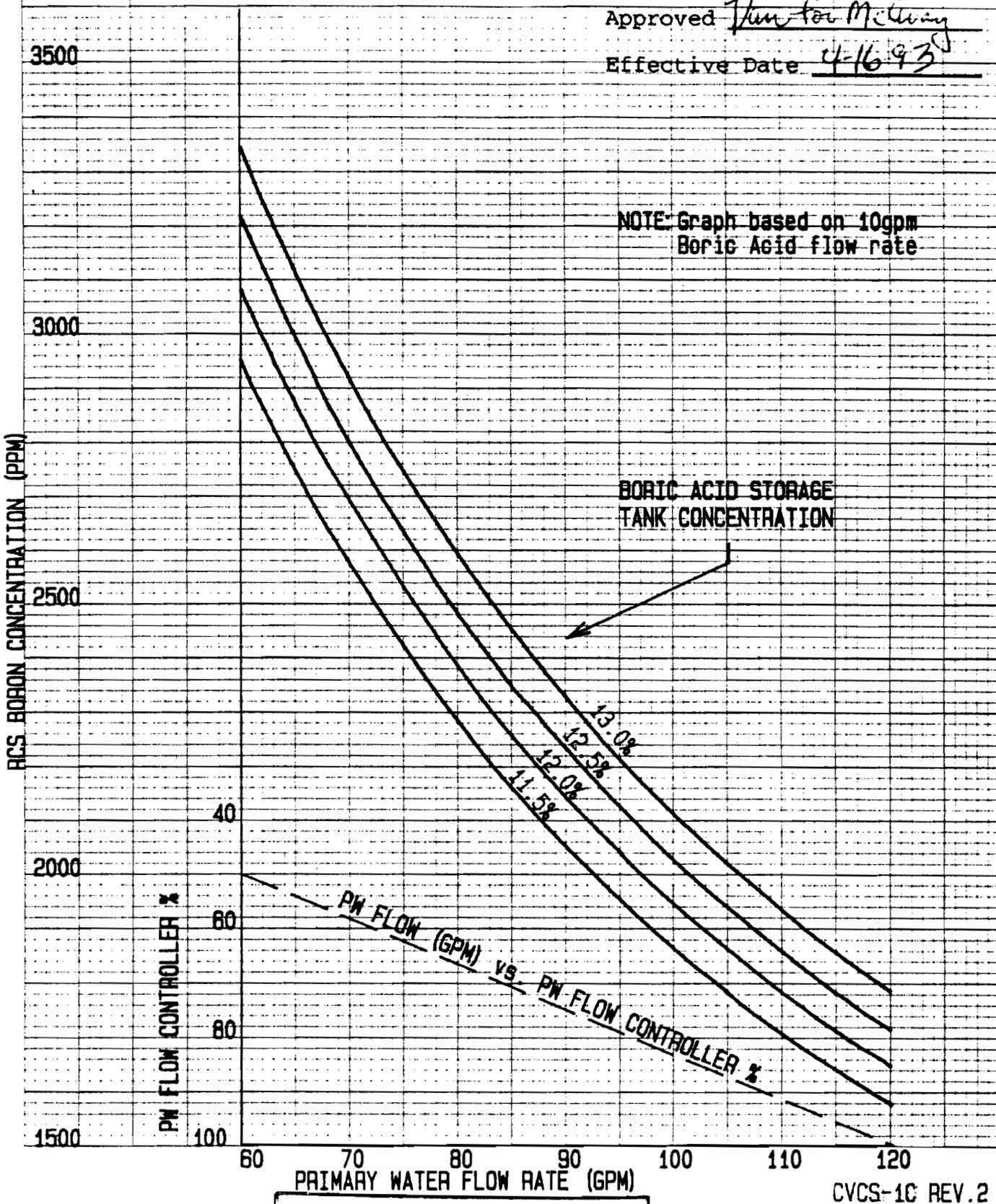


INDIAN POINT STATION  
 UNIT No. 2  
 BLENDED MAKEUP

*Donald D. Brown*  
 SNSC 1787 4/15/93  
 Approved *Dan for McGraw*  
 Effective Date 4-16-93

46 1610

K&E 5 X 5 TO THE CENTIMETER 18 X KEUFFEL & ESSER CO. MADE IN U.S.A.



NOTE: Graph based on 10gpm Boric Acid flow rate

BORIC ACID STORAGE TANK CONCENTRATION

PW FLOW CONTROLLER %  
 PW FLOW (GPM) vs PW FLOW CONTROLLER %

**CONTROLLED**

BLENDING MAKEUP - (0-500) WITH 90 GPM PW

Prepared by: MARK LEONE Reviewer: \_\_\_\_\_

Reviewer: H. Chesley Reviewer: \_\_\_\_\_

Reviewer: \_\_\_\_\_ Reviewer: \_\_\_\_\_

SNSC Review: Not Required Reviewer: \_\_\_\_\_  
prev SNSC mtg 1791 4/24/93

Approval: Alexander J. Horn Meeting No. / Date 1 6/24/00

Signature \_\_\_\_\_ Date \_\_\_\_\_  
6/30/00 7/3/00  
Effective Date

BIENNIAL REVIEW

Reviewer / Date

Reviewer / Date

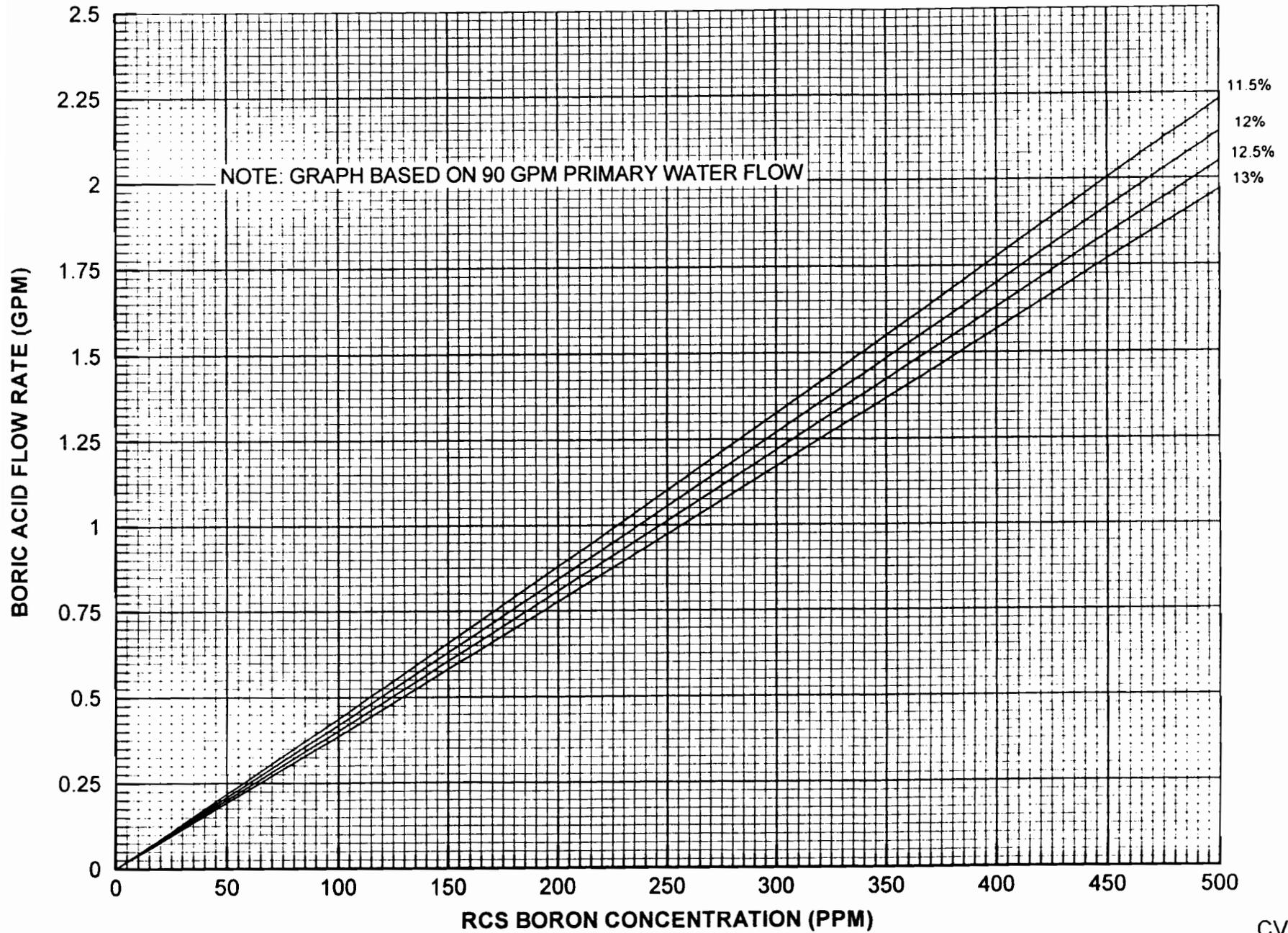
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Control Room Supervisor Date / Time

REFERENCE USE

CREW ""



INDIAN POINT STATION  
UNIT NO. 2  
REACTOR COOLANT SYSTEM BLENDED MAKEUP



BLENDING MAKEUP - (0-2000) WITH 90 GPM PW

Prepared by: MARK LEONE Reviewer: \_\_\_\_\_  
Reviewer: M. Cleesler Reviewer: \_\_\_\_\_  
Reviewer: \_\_\_\_\_ Reviewer: \_\_\_\_\_  
SNSC Review: Not Required Reviewer: \_\_\_\_\_

Approval: Meeting No. / Date \_\_\_\_\_  
Alexander J. Horn 1 6/29/00  
Signature Date  
6/30/00 7/3/00  
Effective Date

BIENNIAL REVIEW

Reviewer / Date

Reviewer / Date

For use as field copy. Valid for 24 hours:

Control Room Supervisor

Date / Time

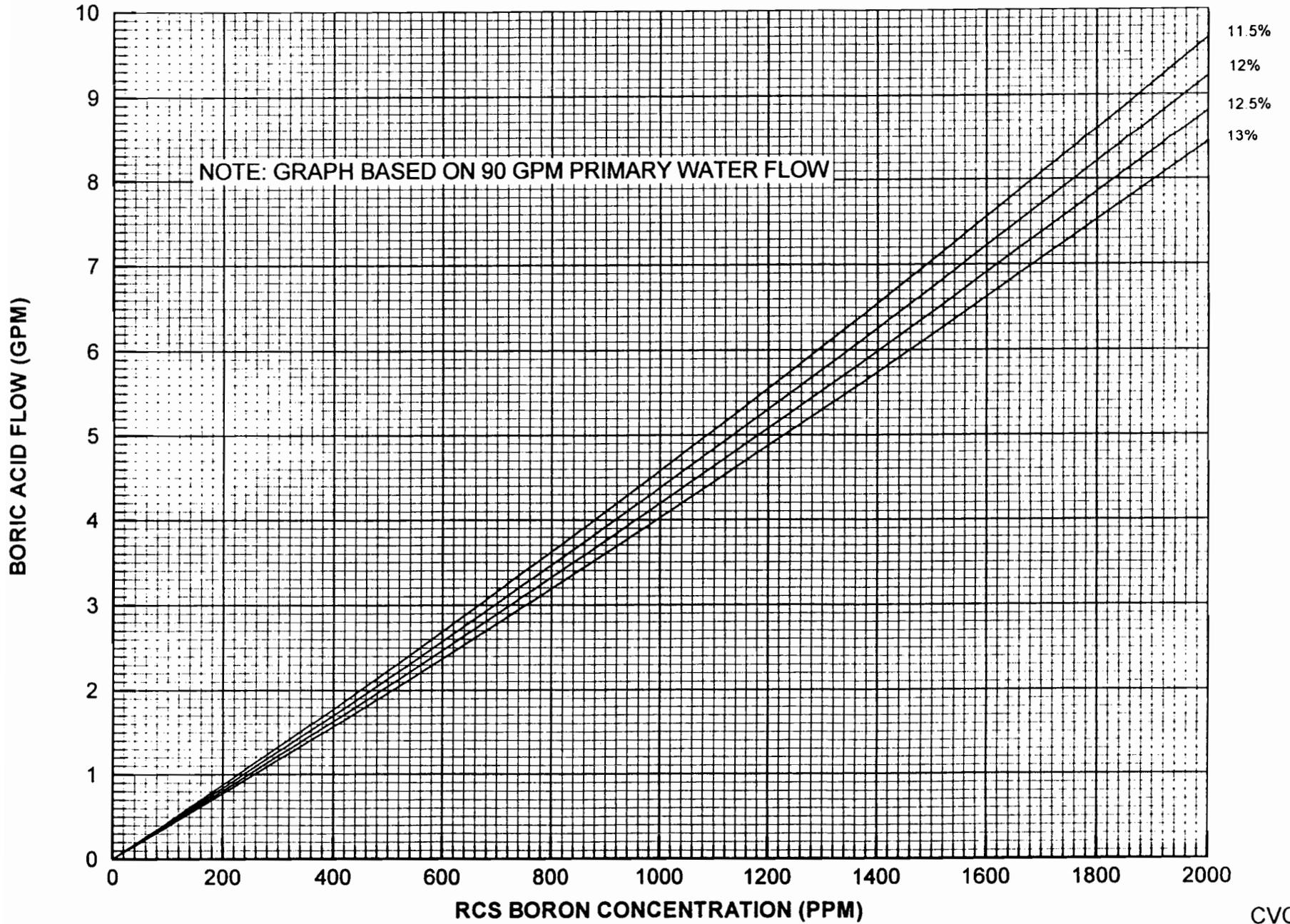
REFERENCE USE

CREW ""



CONTROLLED

INDIAN POINT STATION  
UNIT NO. 2  
REACTOR COOLANT SYSTEM BLENDED MAKEUP



BLENDING MAKEUP-(2000-12000) WITH REDUCED PW FLOWS

Prepared by: GE Walling *GE Walling* 8/23/02 Reviewer: \_\_\_\_\_

Reviewer: *James Peters* 3/26/02 Reviewer: \_\_\_\_\_

Reviewer: *[Signature]* 8-26-02 Reviewer: \_\_\_\_\_

SNSC Review: \_\_\_\_\_ Reviewer: \_\_\_\_\_

Meeting No. / Date

Approval: *[Signature]* *1 8/26/02*

Signature

Date

*26 August '02*

Effective Date

BIENNIAL REVIEW

Reviewer / Date

Reviewer / Date

For use as field copy. Valid for 24 hours:

24 Hr Extension:

24 Hr Extension:

\_\_\_\_\_  
Qualified Operator

\_\_\_\_\_  
Date / Time

\_\_\_\_\_  
Control Room Supervisor

\_\_\_\_\_  
Date / Time

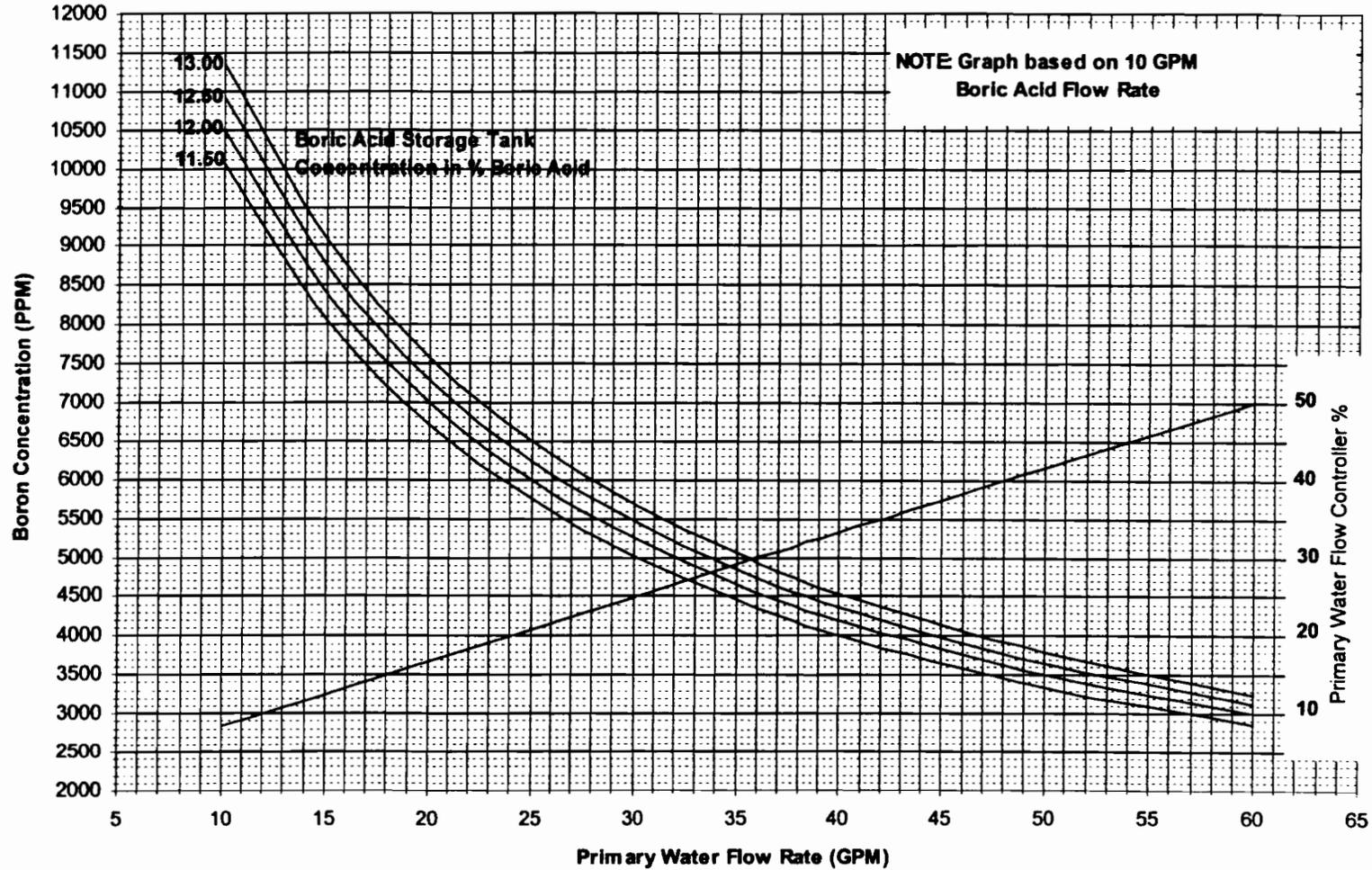
\_\_\_\_\_  
Control Room Supervisor

\_\_\_\_\_  
Date / Time

REFERENCE USE



## Indian Point Station Unit No. 2 Blended Makeup



BLENDING MAKEUP - (0-500) WITH 60 GPM PW

Prepared by:	<u>Don Dewey</u>	Reviewer:	_____
Reviewer:	<u><i>[Signature]</i></u>	Reviewer:	_____
Reviewer:	_____	Reviewer:	_____
SNSC Review:	<u>N/A</u>	Reviewer:	_____

Meeting No. / Date

Approval:	<u><i>[Signature]</i></u>	<u>1 9/6/12</u>
	Signature	Date

09/11/02

Effective Date

BIENNIAL REVIEW

Reviewer / Date

Reviewer / Date

For use as field copy. Valid for 24 hours:

24 Hr Extension:

24 Hr Extension:

\_\_\_\_\_  
Qualified Operator

\_\_\_\_\_  
Date / Time

\_\_\_\_\_  
Control Room Supervisor

\_\_\_\_\_  
Date / Time

\_\_\_\_\_  
Control Room Supervisor

\_\_\_\_\_  
Date / Time

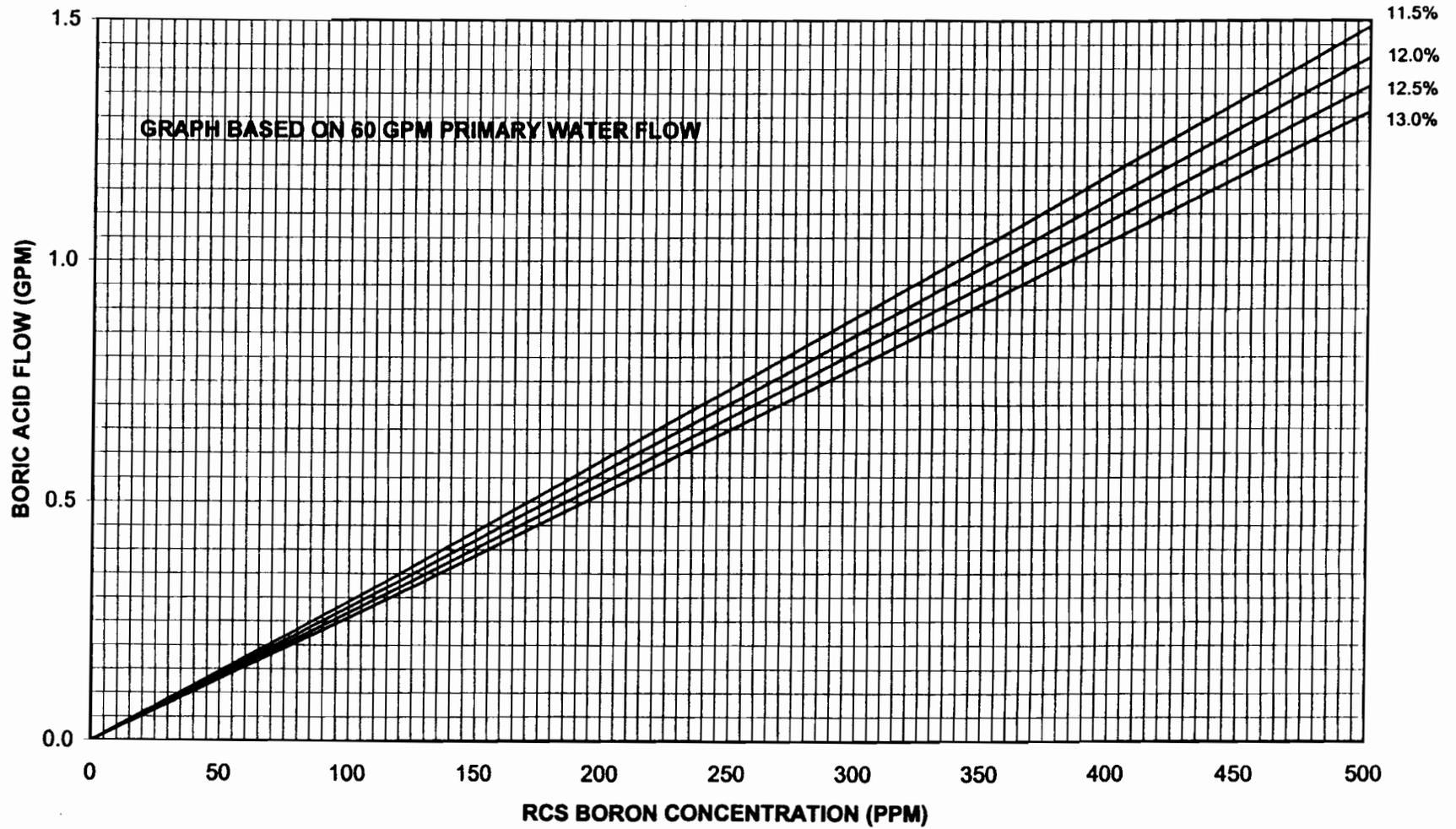


GO

CONTROLLED

### Indian Point Station Unit 2 Reactor Coolant System Blended Makeup

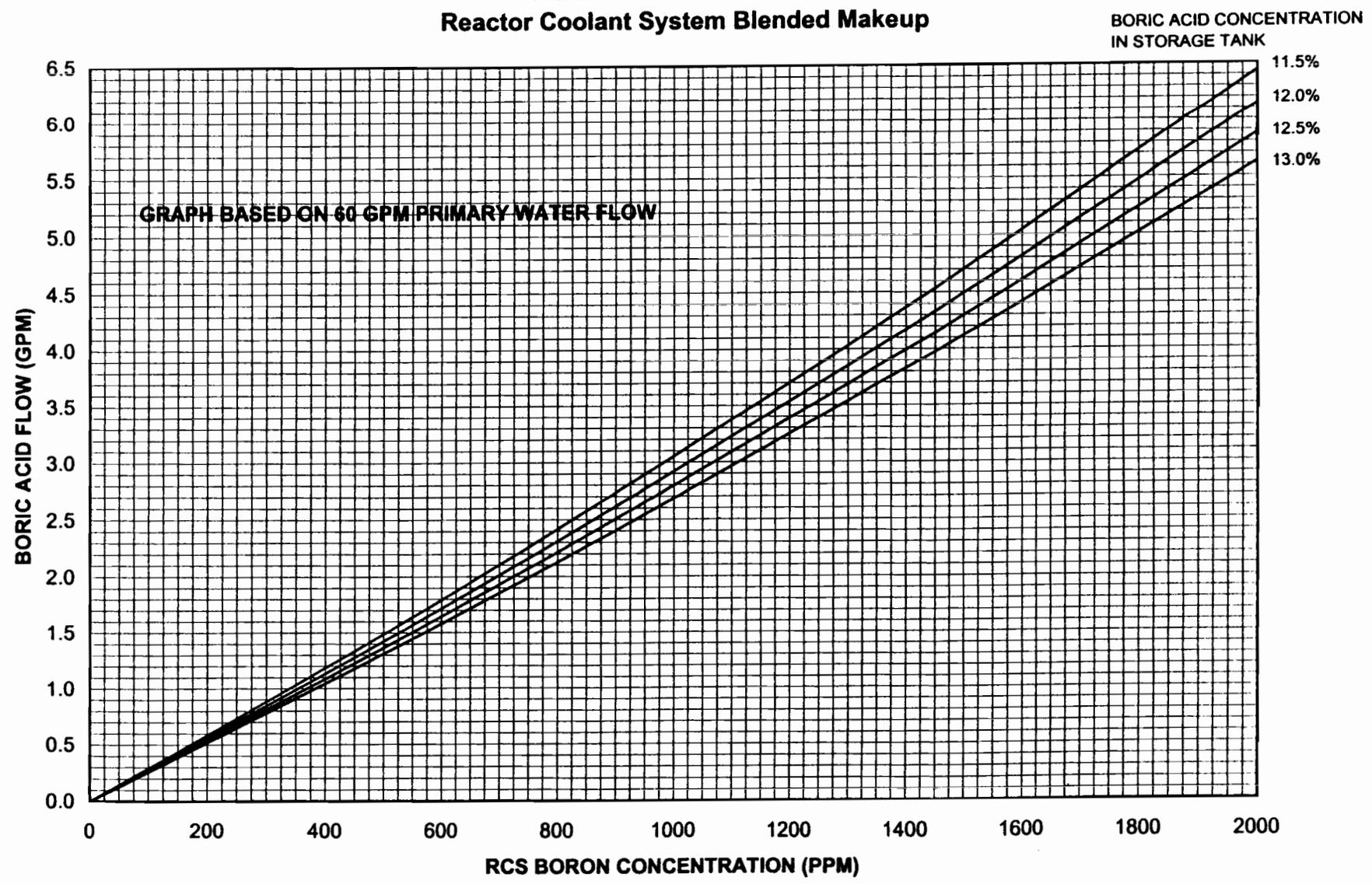
BORIC ACID CONCENTRATION  
IN STORAGE TANK





REACTOR COOLANT SYSTEM

### Indian Point Station Unit 2 Reactor Coolant System Blended Makeup



Facility: Indian Point Unit 2Task No: 0000420501Task Title: **Transfer to Hot Leg Recirculation**K/A Reference: 000011EA1.13Job Performance Measure  
No: SIM-2

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	X	Actual Performance
Classroom	Simulator	Plant

**READ TO THE EXAMINEE**

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

Initial Conditions:

- A Large Break LOCA occurred approximately 6.5 hours ago.
- The operating crew properly aligned Cold Leg Recirculation per 2-ES-1.3 Transfer to Cold Leg Recirculation using 21 Recirculation Pump.
- FSB Ventilation has been previously shutdown

Task Standard: The Safety Injection System is aligned for Hot Leg Recirculation .

Required Materials: None

General References: 2-ES-1.4, Transfer to Hot Leg Recirculation

Initiating Cue: You are the BOP and the CRS has directed you to align the Safety Injection System for Hot Leg Recirculation.

Time Critical Task: No

Validation Time: 20 Minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step:	Obtain Correct Procedure
Standard:	Obtains 2-ES-1.4 Transfer to Hot Leg Recirculation
Comment:	

---

2. Performance Step:	Check Low Head Recirculation Flow Indicated
Standard:	Observes Flow indicated on FI 946 A-D on Panel SBF-2
Comment:	

---

3. Performance Step:	Check if FSB Ventilation previously shutdown
Standard:	Given in Initial Conditions FSB Ventilation is Shutdown
Comment:	

---

✓ 4. Performance Step:	<b>Close Cold Leg Injection Valve</b>
Standard:	<b>Locate and rotate switch to close for either MOV 856A or 856E on Panel SBF-2</b>
Comment:	

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

<b>✓ 5. Performance Step:</b>	<b>Open Hot Leg Injection Valve to Loop 23</b>
<b>Standard:</b>	<b>Locate and rotate switch for MOV-856B on Panel SBF-2</b>
<b>Comment:</b>	

---

<b>✓ 6. Performance Step:</b>	<b>Close Cold Leg Injection Valve</b>
<b>Standard:</b>	<b>Locate and rotate switch to close for either MOV 856C or 856D on Panel SBF-2</b>
<b>Comment:</b>	

---

<b>✓ 7. Performance Step:</b>	<b>Open Hot Leg Injection Valve to Loop 21</b>
<b>Standard:</b>	<b>Locate and rotate switch for MOV-856F on Panel SBF-2</b>
<b>Comment:</b>	

---

<b>8. Performance Step:</b>	<b>Check Recirculation System Alignment</b>
<b>Standard:</b>	Locate indications for MOV 746 and 747 on Panel SBF-1 or SGF and observe one closed  Observe Safety Injection Recirc Switch 6 is OFF on Panel SBF-1
<b>Comment:</b>	

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

**✓ 9. Performance Step: Check System Alignment for Starting SI Pumps**

Standard:

Locates and Observes only 21 Recirculation Pump Running on SBF-1

Locates and Observes SI Pump Miniflow valves MOV-842 and 843 closed on SBF-1

**Locate and rotate switch for MOV-888A & 888B to OPEN**

Locate and place toggle switch for SI Pump Low Suction Pressure Alarm to ON on SBF-1

Locate and Observe Recirculation Switch 7 in OFF on SBF-1

**Comment: Only the step for opening MOV-888A/B is critical for this step.**

---

**10. Performance Step: Check SI Suction Pressure > 75 psig**

Standard:

Locate and observe SI Pump Suction Pressure Indicator PI-947 &gt; 75 psig on Panel SBF-2

Comment: Candidate may also observe SI Pump Suction Low Pressure Alarm CLEAR on Panel SBF-1

---

**11. Performance Step: Observe Caution before Step 10**

Standard:

Candidate should observe EDG Loading at this time

Comment:

## Performance Information

(Denote critical steps with a check mark ✓)

12. Performance Step: Start 23 SI Pump

Standard: Locate and Observe 23 EDG Load on Bus 6A is less than 1300 KW

Attempt start 23 Safety Injection Pump. The Pump will trip on overcurrent when start is attempted.

Comment: Alternate Path actions are listed in the next step.

✓ 13. Performance Step: **Alternate Path Actions for failure of 23 SIP to start**

Standard: **Place 21 Containment Spray Pump in Pullout (Not Critical)**

**Place 22 SI Pump in PULLOUT On Panel SBF-2**

**Place Recirc Switch 1 to OFF on Panel SBF-1**

**Open 22 SI Pump Suction Valves 887A and 887B on Panel SBF-2**

**Verify MOV-851B Open AND 851A closed on Panel SBF-2**

**Start 22 SI Pump on Panel SBF-2**

Comment:

✓ 14. Performance Step: **Verify 746 and 747 CLOSED**

Standard: **Locate indications for MOV 746 and 747 on Panel SBF-1 or SGF and observe one valve closed. Rotate switch for Opened valve to CLOSE on Panel SGF-1**

Comment:

## Performance Information

(Denote critical steps with a check mark ✓)

---

15. Performance Step: Check SI Pump Suction Pressure Greater than 75 psig

Standard: Locate and observe SI Pump Suction Pressure Indicator PI-947 > 75 psig on Panel SBF-2

Comment: Candidate may also observe SI Pump Suction Low Pressure Alarm CLEAR on Panel SBF-1

---

16. Performance Step: Observe Caution before Step 13

Standard: Candidate should observe EDG Loading at this time

Comment:

---

✓ 17. Performance Step: Start 21 SI Pump

Standard: Locate and Observe 21 EDG Load on Bus 5A is less than 1300 KW

Locate and rotate switch for 21 Safety Injection Pump to START on Panel SBF-2.

Comment:

---

18. Performance Step: Verify Adequate Recirculation Flow

Standard: Observe Core Exit Thermocouples Stable or Decreasing on QSPDS

Comment:

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

Initialize Simulator to any 100% Power IC

Insert Malfunction MAL-RCS001A Rupture 21 Loop Cold Leg

Perform Actions of E-0, E-1 and ES-1.3 when conditions require.

Initial Conditions:

- A Large Break LOCA occurred approximately 6.5 hours ago.
- The operating crew properly aligned Cold Leg Recirculation per 2-ES-1.3 Transfer to Cold Leg Recirculation using 21 Recirculation Pump.
- FSB Ventilation has been previously shutdown

Initiating Cue:

You are the BOP and the CRS has directed you to align the Safety Injection System for Hot Leg Recirculation.



**Entergy**

Nuclear Northeast



Procedure Use Is:

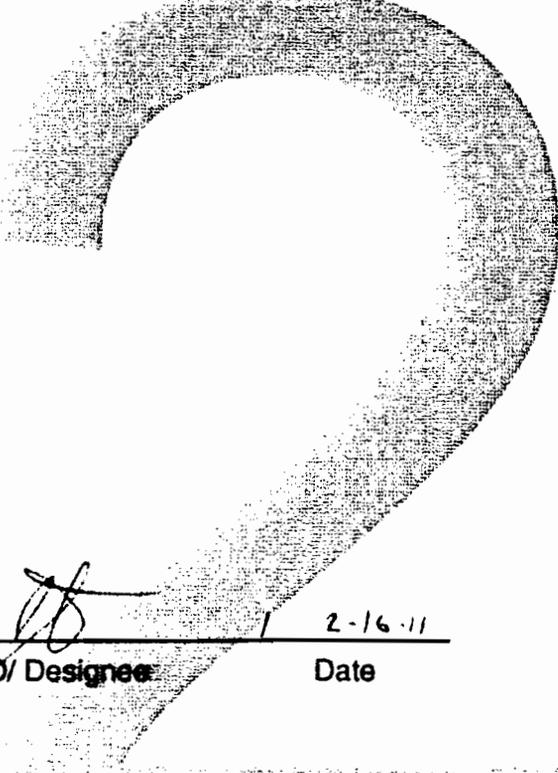
- Continuous
- Reference
- Information

CONTROLLED  
Control Copy: \_\_\_\_\_

Effective Date: 2/24/2011

### 2-ES-1.4, Revision: 3

## TRANSFER TO HOT LEG RECIRCULATION



**Approved By:**

John Belletts 

Procedure Sponsor, RPO/ Designer

2-16-11

Date

**Team P**

Procedure Owner



**PARTIAL REVISION**

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
---------------------	---	----------------------------

A. PURPOSE

This procedure provides the necessary instructions for transferring the safety injection system to hot leg recirculation.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered:

- 1) From 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 24, when the specified time interval has elapsed, or
- 2) When a decision is made, based upon the recommendation of the TSC, that transfer to hot leg recirculation is required. Transfer to hot leg recirculation might be required eventually, after transferring to cold leg recirculation during the implementation of:
  - o 2-ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION;
  - o 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED;
  - o 2-ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
---------------------	---	----------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	<u>Check Low-Head Recirculation - FLOW INDICATED</u>	<u>IF</u> any HHSI Pump is running, <u>THEN</u> go to step 15.
2.	<u>Check If FSB Ventilation - PREVIOUSLY SHUTDOWN</u>	Dispatch NPO to shut down FSB ventilation.  <u>IF</u> FSB ventilation can <u>NOT</u> be shut down, <u>THEN</u> notify TSC that FSB ventilation exhaust should be monitored for radioactive contamination.
3.	<u>Close Cold Leg Injection Valve:</u> o MOV-856A  - OR - o MOV-856E	
4.	<u>Open Hot Leg Injection Valve To Loop 23:</u> o MOV-856B	
5.	<u>Close Cold Leg Injection Valve:</u> o MOV-856C  - OR - o MOV-856D	
6.	<u>Open Hot Leg Injection Valve To Loop 21:</u> o MOV-856F	

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
---------------------	---	----------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	<u>Check Recirculation System Alignment:</u>	
	a. MOV-746 OR MOV-747 - CLOSED	a. Verify 746 <u>OR</u> 747 closed.  <u>IF</u> neither valve can be closed, <u>THEN</u> close HCV-638 <u>OR</u> 640.
	b. Safety injection recirc switch 6 - OFF	b. Place safety injection recirc switch 6 to OFF.
8.	<u>Check System Alignment For Starting SI Pumps:</u>	
	a. Check recirculation pumps - ONLY ONE running	a. Place ONE recirculation pump in trip pullout.
	b. SI pump miniflow valves - PREVIOUSLY CLOSED  o MOV-842  o MOV-843	b. Manually close valves.
	c. SI pump suction valves from RHR Hx - OPEN:  o MOV-888A o MOV-888B	c. Manually open valve(s).
	d. Arm SI pump suction low pressure alarm by placing toggle switch to ON:  o PT-947	
	e. Check recirculation switch No. 7 - OFF	e. Place switch in off.
9.	<u>Check SI Suction Pressure - GREATER THAN 75 PSIG</u>	Check SI valve alignment.  <u>IF</u> adequate suction pressure can <u>NOT</u> be established, <u>THEN</u> consult ISC prior to continuing.

Number:  2-ES-1.4	Title:  TRANSFER TO HOT LEG RECIRCULATION	Revision Number:  REV. 3
-------------------------	---	--------------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>.....</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>.....</p> <p>• EDG load should be maintained less than 1650 KW, but may be increased to</p> <p>• 2000 KW for a maximum of 2 hrs in any 24 hr period.</p> <p>.....</p>	
10.	<p><u>Start 23 SI Pump As Follows:</u></p> <p>a. Verify adequate power:</p> <ul style="list-style-type: none"> <li>o Bus 6A - ENERGIZED BY OFFSITE POWER</li> <li>- OR -</li> <li>o Load on 23 diesel generator - LESS THAN 1300 KW</li> </ul> <p>b. Start 23 SI pump</p>	<p>a. <u>IF</u> adequate power can <u>NOT</u> be established, <u>THEN</u> consult TSC prior to continuing.</p> <p>b. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Place 21 containment spray pump in PULLOUT.</li> <li>2) Place 22 SI pump in PULLOUT.</li> <li>3) Place Safety Injection Recirc Switch 1 to OFF.</li> <li>4) Open 22 SI pump suction valves: <ul style="list-style-type: none"> <li>o MOV-887A</li> <li>o MOV-887B</li> </ul> </li> <li>5) Verify: <ul style="list-style-type: none"> <li>o MOV-851B open</li> <li>- AND -</li> <li>o MOV-851A closed</li> </ul> </li> <li>6) Start 22 SI pump.</li> </ol>

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	<u>Verify 746 AND 747 - CLOSED</u>	<u>IF</u> either valve can <u>NOT</u> be closed, <u>THEN</u> close HCV-638 <u>AND</u> 640.
		<u>IF</u> either HCV-638 <u>OR</u> 640 can <u>NOT</u> be closed, <u>THEN</u> go to step 21.
12.	<u>Check SI Suction Pressure - GREATER THAN 75 PSIG</u>	Check SI valve alignment.
		<u>IF</u> adequate suction pressure can <u>NOT</u> be established, <u>THEN</u> consult TSC prior to continuing.

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>.....</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>.....</p> <p>EDG load should be maintained less than 1650 KW, but may be increased to 2000 KW for a maximum of 2 hrs in any 24 hr period.</p> <p>.....</p>	
13.	<p><u>Start 21 SI Pump As Follows:</u></p> <p>a. Verify adequate power:</p> <ul style="list-style-type: none"> <li>o Bus 5A - ENERGIZED BY OFFSITE POWER</li> <li style="text-align: center;">- OR -</li> <li>o Load on 21 diesel generator - LESS THAN 1300 KW</li> </ul> <p>b. Start 21 SI pump</p>	<p>a. <u>IF</u> adequate power can <u>NOT</u> be established, <u>THEN</u> consult TSC prior to continuing.</p> <p>b. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Place 21 containment spray pump in PULLOUT.</li> <li>2) Place 22 SI pump in PULLOUT.</li> <li>3) Place Safety Injection Recirc Switch 1 to OFF.</li> <li>4) Open 22 SI pump suction valves: <ul style="list-style-type: none"> <li>o MOV-887A</li> <li>o MOV-887B</li> </ul> </li> <li>5) Verify: <ul style="list-style-type: none"> <li>o MOV-851A open</li> <li style="text-align: center;">AND -</li> <li>o MOV-851B closed</li> </ul> </li> <li>6) Start 22 SI pump.</li> </ol>

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	<u>Go To Step 20</u>	
15.	<u>Close Cold Leg Injection Valve:</u>	
	o MOV-856A	
	- OR -	
	o MOV-856E	
16.	<u>Open Hot Leg Injection Valve To Loop 23:</u>	
	o MOV-856B	
17.	<u>Close Cold Leg Injection Valve:</u>	
	o MOV-856C	
	- OR -	
	o MOV-856D	
18.	<u>Open Hot Leg Injection Valve To Loop 21:</u>	
	o MOV-856F	

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19.	<u>Check High-Head Recirculation Status:</u>	
	a. Check SI pumps - ANY RUNNING	a. <u>IF</u> SI pumps 21 and 23 were shutdown, <u>THEN</u> CONSULT with TSC.
	b. Check SI pumps - 21 AND 23 RUNNING	b. <u>IF</u> 21 <u>OR</u> 23 SI pump can <u>NOT</u> be started, <u>THEN</u> perform the following:
		1) Place 21 containment spray pump control switch in PULLOUT.
		2) Place 22 SI pump control switch in PULLOUT.
		3) Place recirculation switch No. 1 to OFF.
		4) Manually open 22 SI pump suction valves:
		o MOV-887A
		o MOV-887B
		5) Start 22 SI pump.
		6) <u>IF</u> 21 <u>AND</u> 22 SI pumps running, <u>THEN</u> :
		a) Verify MOV-851B open.
		b) Verify MOV-851A closed.
		7) <u>IF</u> 22 <u>AND</u> 23 SI pumps running, <u>THEN</u> :
		a) Verify MOV-851A open.
		b) Verify MOV-851B closed.

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20.	<u>Verify Adequate Recirculation Flow:</u>	
	a. Core exit TCs - STABLE OR DECREASING	a. Return to Step 1.
21.	<u>Align Seal Gas System:</u>	
	a. Verify following valves are closed:	
	o PCV-1090 outlet stop 1443 o PCV-1090 bypass stop 1444	
	b. Verify nitrogen supply is available - PI-1075 GREATER THAN 250 PSIG	
	c. Slowly open PCV-1090 outlet stop valve 1443	
	d. Verify PCV-1090 set to maintain 250 psig on PI-1089	

Number: 2-FS-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

MOV-744 bonnet may pressure lock if closed due to system and penetration area temperature differences. Valve should remain open with MCC-26A breaker locked open unless required for Passive Failure isolation in 2-SOP-10.1.1. N2 seal gas should only be applied if valve has been closed and reopening is not expected.

22. Close Containment Manual Isolation Valves:
  - a. Consult SM to determine the necessary valves on ATTACHMENT 1 to be isolated
  - b. Consult TSC prior to isolation of MOV-744
  - c. Dispatch NPO to isolate the necessary valves with Health Physics assistance
23. Return To Procedure And Step In Effect

-END-

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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ATTACHMENT 1

(Attachment page 1 of 7)

Permission* Granted	Valve Operation	Location	Valving** Completed
A	Isolate Charging Line		
	a) Close MOV-205	4	_____
	b) Close MOV-226	4	_____
	c) Close MOV-227	4	_____
	d) Open SOV 3501 (IVSW)	2	_____
B	Isolate RCP 21 Seal Injection		
	a) Close MOV-4925	4	_____
	b) Close MOV-250A	4	_____
	c) Open SOV 3514 (IVSW)	2	_____
C	Isolate RCP 22 Seal Injection		
	a) Close MOV-4926	4	_____
	b) Close MOV-250B	4	_____
	c) Open SOV 3515 (IVSW)	2	_____
D	Isolate RCP 23 Seal Injection		
	a) Close MOV-4927	4	_____
	b) Close MOV-250C	4	_____
	c) Open SOV 3516 (IVSW)	2	_____

- Location:
- 1 Piping Penetration Area
  - 2 IVSW Control Panel - PAB 98 ft. El.
  - 3 Gallery above Piping Penetration Area
  - 4 MCC 26 AA and BB - PAB 98 ft. El.
  - 5 PACS/PACV Panels - PAB 98 ft. El.
  - 6 Spray Pump Area - PAB 68 ft. El.
  - 7 Personnel Air Lock - Fan House 80 ft. El.
  - 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

\* The SM should initial those lines which it is permissible to isolate.

\*\* The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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ATTACHMENT 1

(Attachment page 2 of 7)

(Continued)

Permission* Granted	Valve Operation	Location	Valving** Completed
E	Isolate RCP 24 Seal Injection		
	a) Close MOV-4928	4	_____
	b) Close MOV-250D	4	_____
	c) Open SOV 3517 (IVSW)	2	_____
F	Isolate RCP Seal Return		
	a) Close MOV-222	CCR	_____
G	Isolate RCP Component Cool. Wtr.		
	a) Close MOV-769 (Supply)	CCR	_____
	b) Close MOV-797 (Supply)	CCR	_____
	c) Close MOV-786 (Mtr Brg Return)	CCR	_____
	d) Close MOV-784 (Mtr Brg Return)	CCR	_____
	e) Close MOV-789 (Thermal Barrier)	CCR	_____
	f) Close FCV-625 (Thermal Barrier)	CCR	_____
H	Isolate Containment Spray Headers		
	a) Close MOV-869A	4	_____
	b) Close MOV-869B	4	_____
	c) Open SOV 3504 (IVSW-869B)	2	_____
	d) Open SOV 3511 (IVSW-869A)	2	_____
	e) Close 878A (Test Line Stop)	6	_____
I	Isolate Recirculation Sample Line		
	a) Close MOV-990A	4	_____
	b) Close MOV-990B	4	_____
	c) Open (N2 Gas) SOV 3505	2	_____

- Location:
- 1 Piping Penetration Area
  - 2 IVSW Control Panel - PAB 98 ft. El.
  - 3 Gallery above Piping Penetration Area
  - 4 MCC 26 AA and BB - PAB 98 ft. El.
  - 5 PACS/PACV Panels - PAB 98 ft. El.
  - 6 Spray Pump Area - PAB 68 ft. El.
  - 7 Personnel Air Lock - Fan House 80 ft. El.
  - 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

\* The SM should initial those lines which it is permissible to isolate.

\*\* The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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ATTACHMENT 1

(Attachment page 3 of 7)

(Continued)

Permission* Granted	Valve Operation***	Location	Valving** Completed
J	Isolate RHR System		
	a) Close MOV-882	CCR	_____
	b) Close MOV-744***	CCR	_____
	c) Close MOV-743	4	_____
	d) Close MOV-1870	4	_____
	e) Close MOV-958 (Sample Line)	4	_____
	f) Close MOV-959 (Sample Line)	4	_____
	g) Close 990D (Sample Line)	3	_____
	h) Open SOV 3500 (N2Gas 732)	2	_____
	i) Open SOV 3506 (N2Gas MOV-744)***	2	_____
	j) Open SOV 3509 (N2Gas Sample Line)	2	_____
	k) Open SOV 3510 (N2Gas - Between Mov-743/1870)	2	_____
	l) Close 732 (RHR Suction)	1	_____
	m) Close 859A (SIS Test Line Stop)	1	_____
	n) Close 859C (SIS Test Line Stop)	1	_____
	o) Close MOV-885A (VC Sump To RHR)	CCR	_____
	p) Close MOV-885B (VC Sump To RHR)	CCR	_____
K	Isolate N2 to PRT/RCDT/SIS ACCUM/PORV		
	a) Close SOV 3418 and 3419 (PRT)	2	_____
	b) Close SOV 3416 and 3417 (RCDT)	2	_____
	c) Close PCV-863 (VC N <sub>2</sub> Supply)	CCR	_____
	d) Close 5459 (RCDT N <sub>2</sub> Supply)	1	_____
	e) Close 4136 (PRT N <sub>2</sub> Supply)	1	_____

- Location:
- 1 Piping Penetration Area
  - 2 IVSW Control Panel - PAB 98 ft. El.
  - 3 Gallery above Piping Penetration Area
  - 4 MCC 26 AA and BB - PAB 98 ft. El.
  - 5 PACS/PACV Panels - PAB 98 ft. El.
  - 6 Spray Pump Area - PAB 68 ft. El.
  - 7 Personnel Air Lock - Fan House 80 ft. El.
  - 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

- \* The SM should initial those lines which it is permissible to isolate.
- \*\* The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.
- \*\*\* Prior to closure of MOV-744 (and opening of SOV-3506), TSC to evaluate potential bonnet pressurization and capability to reopen.

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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ATTACHMENT 1

(Attachment page 4 of 7)

(Continued)

Permission* Granted	Valve Operation	Location	Valving** Completed
L	Isolate Containment Pressure Instrumentation		
	a) Close 1814A	1	_____
	b) Close 1814B	1	_____
	c) Close 1814C	1	_____
M	Isolate PRZR Level Instrumentation DW Tester		
	a) Close 580A	1	_____
	b) Close 580B	1	_____
N	Isolate CCW To Recirc Pump Motors		
	a) Close 753G (Return)	1	_____
	b) Close 753H (Supply)	1	_____
O	Isolate Weld Channel to Racks in VC		
	a) Close PCV-1111-1 Rack 16 & 17	1	_____
	b) Close PCV-1111-2 Rack 14 & 18	1	_____
P	Isolate Station Air To VC		
	a) Close SA-24	1	_____
	b) Close SA-24-1	1	_____
Q	Isolate Service Water to FCU's		
	a) Close SWN-41-1A (21 Inlet Iso)	4	_____
	b) Close SWN-41-1B (21 Block)	4	_____
	c) Close SWN-41-2A (22 Inlet Iso)	4	_____
	d) Close SWN-41-2B (22 Block)	4	_____

Location:

- 1 Piping Penetration Area
- 2 IVSW Control Panel - PAB 98 ft. El.
- 3 Gallery above Piping Penetration Area
- 4 MCC 26 AA and BB - PAB 98 ft. El.
- 5 PACS/PACV Panels - PAB 98 ft. El.
- 6 Spray Pump Area - PAB 68 ft. El.
- 7 Personnel Air Lock - Fan House 80 ft. El.
- 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

\* The SM should initial those lines which it is permissible to isolate.

\*\* The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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ATTACHMENT 1

(Attachment page 5 of 7)

(Continued)

Permission* Granted	Valve Operation	Location	Valving** Completed
Q	Isolate Service Water to FCU's (continued)		
	e) Close SWN-41-3A (23 Inlet Iso)	4	_____
	f) Close SWN-41-3B (23 Block)	4	_____
	g) Close SWN-41-4A (24 Inlet Iso)	4	_____
	h) Close SWN-41-4B (24 Block)	4	_____
	i) Close SWN-41-5A (25 Inlet Iso)	4	_____
	j) Close SWN-41-5B (25 Block)	4	_____
	k) Close SWN-43-1 (21 Hdr Drain)	1	_____
	l) Close SWN-43-2 (22 Hdr Drain)	1	_____
	m) Close SWN-43-3 (23 Hdr Drain)	1	_____
	n) Close SWN-43-4 (24 Hdr Drain)	1	_____
	o) Close SWN-43-5 (25 Hdr Drain)	1	_____
	p) Close SWN-44-1A (21 Out Isol )	4	_____
	q) Close SWN-44-1B (21 Block)	4	_____
	r) Close SWN-44-2A (22 Out Isol )	4	_____
	s) Close SWN-44-2B (22 Block)	4	_____
	t) Close SWN-44-3A (23 Out Isol )	4	_____
	u) Close SWN-44-3B (23 Block)	4	_____
	v) Close SWN-44-4A (24 Out Isol )	4	_____
	w) Close SWN-44-4B (24 Block)	4	_____
	x) Close SWN-44-5A (25 Out Isol )	4	_____
	y) Close SWN-44-5B (25 Block)	4	_____
	z) Close SWN-51-1A (21 Out Sample)	4	_____
	aa) Close SWN-51-2A (22 Out Sample)	4	_____
	ab) Close SWN-51-3A (23 Out Sample)	4	_____
	ac) Close SWN-51-4A (24 Out Sample)	4	_____
	ad) Close SWN-51-5A (25 Out Sample)	4	_____

Location:

- 1 Piping Penetration Area
- 2 IVSW Control Panel - PAB 98 ft. El.
- 3 Gallery above Piping Penetration Area
- 4 MCC 26 AA and BB - PAB 98 ft. El.
- 5 PACS/PACV Panels - PAB 98 ft. El.
- 6 Spray Pump Area - PAB 68 ft. El.
- 7 Personnel Air Lock - Fan House 80 ft. El.
- 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

\* The SM should initial those lines which it is permissible to isolate.

\*\* The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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ATTACHMENT 1

(Attachment page 6 of 7)

(Continued)

Permission* Granted	Valve Operation	Location	Valving** Completed
Q	Isolate Service Water to FCU's (continued)		
	ae) Close SWN-71-1A (21 Mtr Isol)	4	_____
	af) Close SWN-71-1B (21 Mtr Block)	4	_____
	ag) Close SWN-71-2A (22 Mtr Isol)	4	_____
	ah) Close SWN-71-2B (22 Mtr Block)	4	_____
	ai) Close SWN-71-3A (23 Mtr Isol)	4	_____
	aj) Close SWN-71-3B (23 Mtr Block)	4	_____
	ak) Close SWN-71-4A (24 Mtr Isol)	4	_____
	al) Close SWN-71-4B (24 Mtr Block)	4	_____
	am) Close SWN-71-5A (25 Mtr Isol)	4	_____
	an) Close SWN-71-5B (25 Mtr Block)	4	_____
R	Isolate Auxiliary Steam to VC		
	a) Close UH-43 (Steam Supply)	1	_____
	b) Close UH-44 (Condensate Return)	1	_____
S	Isolate Alternate Safe Shutdown Instrumentation		
	a) Close IIP-504 (Przr LI-3101-1)	1	_____
	b) Close IIP-505 (Przr LI-3101-1)	1	_____
	c) Close IIP-506 (Przr PI-3105-1)	1	_____
	d) Close IIP-507 (Przr PI-3105-1)	1	_____
	e) Close IIP-500 (22 SG LI-5002-1)	1	_____
	f) Close IIP-501 (22 SG LI-5002-1)	1	_____
	g) Close IIP-502 (21 SG LI-5001-1)	1	_____
	h) Close IIP-503 (21 SG LI-5001-1)	1	_____

- Location:
- 1 Piping Penetration Area
  - 2 IVSW Control Panel - PAB 98 ft. El.
  - 3 Gallery above Piping Penetration Area
  - 4 MCC 26 AA and BB - PAB 98 ft. El.
  - 5 PACS/PACV Panels - PAB 98 ft. El.
  - 6 Spray Pump Area - PAB 68 ft. El.
  - 7 Personnel Air Lock - Fan House 80 ft. El.
  - 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

\* The SM should initial those lines which it is permissible to isolate.

\*\* The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 3
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ATTACHMENT 1

(Attachment page 1 of 7)

(Continued)

Permission* Granted	Valve Operation	Location	Valving** Completed
T	Isolate Post Accident Air Sampling		
	a) Move SOV 5018 (VC Samp Ch 1)	5	_____
	b) Move SOV 5019 (VC Samp Ch 1)	5	_____
	c) Move SOV 5020 (VC Samp Ch 2)	5	_____
	d) Move SOV 5021 (VC Samp Ch 2)	5	_____
	e) Move SOV 5022 (VC Return Ch 1)	5	_____
	f) Move SOV 5023 (VC Return Ch 1)	5	_____
	g) Move SOV 5024 (VC Return Ch 2)	5	_____
	h) Move SOV 5025 (VC Return Ch 2)	5	_____
U	Isolate City Water To VC		
	a) Close MW-17	1	_____
	b) Close MW-17-1	1	_____
V	Isolate Post Accident Venting (Ventilation)		
	a) Close E-1 (VC IA Supply Stop)	5	_____
	b) Close E-2 (VC Isolation Stop)	5	_____
	c) Close E-3 (Vent Exhaust Isol)	5	_____
	d) Close E-5 (Vent Exhaust Isol)	5	_____
W	<u>IF</u> Personnel And Equipment Hatch Air Lock Doors <u>NOT</u> Operating. Isolate Equalizing Valves		
	a) Close 85A (80 ft Air Lock)	7	_____
	b) Close 85B (80 ft Air Lock)	7	_____
	c) Close 95A (95 ft Air Lock)	8	_____
	d) Close 95B (95 ft Air Lock)	8	_____

- Location:
- 1 Piping Penetration Area
  - 2 IVSW Control Panel - PAB 98 ft. El.
  - 3 Gallery above Piping Penetration Area
  - 4 MCC 26 AA and BB - PAB 98 ft. El.
  - 5 PACS/PACV Panels - PAB 98 ft. El.
  - 6 Spray Pump Area - PAB 68 ft. El.
  - 7 Personnel Air Lock - Fan House 80 ft. El.
  - 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

\* The SM should initial those lines which it is permissible to isolate.

\*\* The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

-END-

Facility: Indian Point Unit 2Task No: 0000150501Task Title: **Depressurize RCS during Natural Circ to Block Low Pressure SI**K/A Reference: WE09EA1.1Job Performance Measure  
No: \_\_\_\_\_Sim-3

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	<u>    X    </u>	Actual Performance	_____
Classroom	<u>    </u>	Simulator	<u>    X    </u>
		Plant	<u>    </u>

READ TO THE EXAMINEE

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

Initial Conditions:

- A Unit Trip occurred coincident with a loss of off site power.
- All 480 V buses are energized from the Emergency Diesel Generators.
- All actions of E-0, Reactor Trip or Safety Injection and ES-0.1, Reactor Trip Response have been completed.
- The RCS has been borated to the Cold Shutdown Boron Concentration.
- An RCS Cooldown has been established at approximately 24°F/hr.
- RCS Temperature is approximately 540°F.
- The Shift Manager has determined that a Natural Circulation Cooldown will be performed.

Task Standard: RCS Pressure is stable at approximately 1890 psig.  
Low Pressure SI is blocked

Required Materials:

General References: 2-ES-0.2, Natural Circulation Cooldown  
2-SOP-1.4, Pressurizer Pressure Control

Initiating Cue: You are the ATC and the CRS has directed you to Depressurize the RCS and Block Low Pressure SI.

Time Critical Task: No

Validation Time: 20 Minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain a copy of ES-0.2

Standard: Obtains copy of ES-0.2 and reviews actions up to step 7

Comment:

---

2. Performance Step: Depressurize RCS to 1890 psig

Standard: The sub steps to accomplish this are listed below steps 3-5.

Comment: Charging flow cannot be established (Seal injection is in service) which will prevent establishing < 320°F differential temperature between aux spray and the PRZR.

---

3. Performance Step: Check Letdown in service

Standard: Observes Letdown valve alignment and indicated flow

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

4. Performance Step: Check differential temperature between PRZR and Aux Spray (TI-126) LESS THAN 320°F

Standard: Observes differential temperature is > 320°F

Comment: Candidate may attempt to adjust HCV-142 to establish < 320°F differential temperature. HCV-142 is failed closed and will not operate.

✓ 5. Performance Step: Use One PORV (to depressurize to 1890 psig)

Standard: Open One PORV Motor Operated Block Valve  
Open One PORV  
Observe PRZR Pressure decreasing

Comment: Alternate Path Actions

✓ 6. Performance Step: Block Low Pressure SI

Standard: Observe LO PRESS PERMISSIVE TO BLOCK S.I. light illuminated  
Rotate **BOTH SAFETY INJECTION BLOCK 1940 PSIG Switches to Block position**  
Observe CH. A and CH. B light illuminated

Comment:

## Performance Information

(Denote critical steps with a check mark ✓)

---

7. Performance Step:            Maintain Following RCS Conditions

Standard:                        RCS Pressure 1890  
                                      PRZR Level 37% to 71%  
                                      Cooldown Rate < 25°F/hr  
                                      RCS Temp and Press within limits of Figure 1 ES02-1

Comment:

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

Reset the simulator to any 100% power IC.  
Insert Malfunction MAL-EPS001

**Initial Conditions:**

- A Unit Trip occurred coincident with a loss of off site power.
- All 480 V buses are energized from the Emergency Diesel Generators.
- All actions of E-0, Reactor Trip or Safety Injection and ES-0.1, Reactor Trip Response have been completed.
- The RCS has been borated to the Cold Shutdown Boron Concentration.
- An RCS Cooldown has been established at approximately 24°F/hr.
- RCS Temperature is approximately 540°F.
- The Shift Manager has determined that a Natural Circulation Cooldown will be performed.

**Initiating Cue:**

You are the ATC and the CRS has directed you to Depressurize the RCS and Block Low Pressure SI.



**Entergy**

**Nuclear Northeast**



Procedure Use Is:

- Continuous
- Reference
- Information

Control Copy: \_\_\_\_\_

Effective Date: 1/25/2010

## 2-ES-0.2, Revision: 2

# NATURAL CIRCULATION COOLDOWN

**Approved By:**

Procedure Sponsor, RPO/ Designee

1/25/09

Date

**Team P**

Procedure Owner



**EDITORIAL REVISION**

Number:

2-ES-0.2

Title:

NATURAL CIRCULATION COOLDOWN

Revision Number:

REV. 2

A. PURPOSE

This procedure provides actions to perform a natural circulation RCS cooldown and depressurization to cold shutdown, with no accident in progress, under requirements that will preclude any upper head void formation.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

- 1) 2-ES-0.1, REACTOR TRIP RESPONSE, Step 14, when it has been determined that a natural circulation cooldown is required.
- 2) 2-ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, Step 19, after the plant conditions have been stabilized following the restoration of 480V bus power.

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E 0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2 FS 0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 2
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- CAUTION
- o If SI actuation occurs during this procedure, transition to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, step 1.
  - o If RCP seal cooling had previously been lost, the affected RCP should NOT be started prior to a status evaluation.

- NOTE
- o RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.
  - o If conditions can be established for starting an RCP during this procedure, Step 1 should be repeated.

\* 1. Try To Restart An RCP:

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>a. Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION</li> <li>b. Start one RCP</li> <li>c. Go to 2-POP-3.2, PLANT RECOVERY FROM TRIP, HOT STANDBY</li> </ul> | <ul style="list-style-type: none"> <li>a. Go to Step 2.</li> <li>b. Go to Step 2.</li> </ul> |
|--|--|

2. Borate RCS To Cold Shutdown Boron Concentration

3. Verify Cold Shutdown RCS Boron Concentration By Sampling:

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>a. Verify Boration Complete</li> <li>b. Verify RCS Boron Concentration exceeds cold shutdown requirement by sampling prior to continuing with next step</li> </ul> | <ul style="list-style-type: none"> <li>a. Return to Step 2.</li> <li>b. Return to Step 2.</li> </ul> |
|---|--|

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2 ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 2
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<u>Check VCT Makeup Control System:</u> a. Makeup set for cold shutdown boron concentration b. RCS makeup control switch placed to START	Adjust controls as necessary.
⊕ 5.	<u>Verify All CRDM Fans - RUNNING</u>	Start all fans.
6.	<u>Initiate RCS Cooldown To Cold Shutdown:</u> a. Maintain cooldown rate in RCS cold legs - LESS THAN 25°F/HR b. Dump steam to condenser: 1) Check condenser - AVAILABLE 2) Place steam dump controller switch to manual and adjust for zero output. 3) Transfer condenser steam dump to pressure control mode and adjust manual setpoint as necessary. c. Maintain SG narrow range level - BETWEEN 46% AND 52% d. RCS temperature and pressure - WITHIN LIMITS OF FIGURE ES02-1	b. Dump steam using SG atmospheric steam dumps.         c. Control feed flow as necessary.
7.	<u>Check RCS Hot Leg Temperatures - LESS THAN 550°F</u>	Return to Step 6.

**FOLDOUT PAGE FOR 2-ES-0.2**

**1. SI ACTUATION CRITERIA:**

IF EITHER condition listed below occurs, actuate SI AND go to 2-E 0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

**2. AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2 ES 0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 2
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8. Depressurize RCS To 1890 psig:

a. Check letdown - IN SERVICE

a. Try to establish letdown per 2-SOP-3.1, CHARGING, SEAL WATER AND LETDOWN CONTROL.

IF letdown can NOT be established, THEN use one PRZR PORV. Go to Step 9. OBSERVE CAUTION PRIOR TO STEP 9.

b. Check differential temperature between PRZR and auxiliary spray (TI-126) - LESS THAN 320°F

b. Use one PRZR PORV. Go to Step 9. OBSERVE CAUTION PRIOR TO STEP 9.

c. Use auxiliary spray:

- o Refer to 2-SOP-1.4, PRESSURIZER PRESSURE CONTROL

CAUTION

SI actuation circuits will automatically unblock if PRZR pressure increases to greater than 1940 psig.

9. Block Low PRZR Pressure SI

10. Maintain Following RCS Conditions:

- o RCS pressure - AT 1890 PSIG
- o PRZR level - BETWEEN 37% AND 71%
- o Cooldown rate in RCS cold legs - LESS THAN 25°F/HR
- o RCS temperature and pressure - WITHIN LIMITS OF FIGURE ES02-1

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2 ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 2
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

11. Monitor RCS Cooldown:

- o Core exit TCs - DECREASING
- o RCS hot leg temperatures -  
DECREASING
- o RCS subcooling based on core  
exit TCs - INCREASING

**FOLDOUT PAGE FOR 2-ES-0.2**

**1. SI ACTUATION CRITERIA:**

IF EITHER condition listed below occurs, actuate SI AND go to 2-E 0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

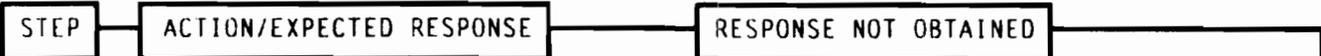
- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

**2. AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES 0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 2
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NOTE

- o If at any time it is determined that a natural circulation cooldown and depressurization must be performed at a rate that may form a steam void in the vessel, one of the following procedures should be used:
  - o 2-ES-0.3, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)
  - OR-
  - o 2-ES-0.4, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)
- o IF RVLIS changes status after entering these procedures, THEN TSC will need to be contacted to determine appropriate procedure response.

12. Initiate RCS Depressurization:

- a. Check CRDM fans - ALL RUNNING
- a. Maintain RCS temperature and pressure per ATTACHMENT 1 and FIGURE ES02 2. Go to Step 12c.
- b. Maintain RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	102
401 - 800	86
801 - 1200	73
1201 - 2500	69

- c. Check letdown - IN SERVICE
- c. Use one PRZR PORV. Go to Step 13. OBSERVE NOTE PRIOR TO STEP 13.
- d. Check differential temperature between PRZR and auxiliary spray (TI-126) - LESS THAN 320°F
- d. Use one PRZR PORV. Go to Step 13. OBSERVE NOTE PRIOR TO STEP 13.
- e. Use auxiliary spray:
  - o Refer to 2-SOP-1.4, PRESSURIZER PRESSURE CONTROL

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E 0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 2
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN, should be referred to for plant alignment during cooldown.

13. Continue RCS Cooldown And Depressurization:

- a. Maintain cooldown rate in RCS cold legs - LESS THAN 25°F/HR
- b. Maintain subcooling requirements of Step 12
- c. Maintain RCS temperature and pressure - WITHIN LIMITS OF FIGURE ES02-1

b. Stop depressurization and re-establish subcooling.

14. Verify Steam Void In Reactor Vessel Does Not Exist:

- o PRZR level - NO UNEXPECTED LARGE VARIATIONS
- o RVLIS natural circulation range indication - GREATER THAN 88%

Repressurize RCS within limits of FIGURE ES02-1 to collapse potential voids in system and continue cooldown. IF RCS depressurization must continue, THEN go to one of the following:

o 2-ES-0.3, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)

- OR -

o 2-ES-0.4, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2 FS 0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 2
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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.....  
 : CAUTION :  
 :  
 \* Radiation levels and harsh environment conditions should be evaluated \*  
 \* prior to performing local actions. \*  
 :  
 .....

15. Check If SI Accumulators Should Be Isolated:

- |  |   |
|--|---|
| a. RCS pressure - LESS THAN 1000 PSIG  | a. Continue with Step 16. <u>WHEN</u> RCS pressure less than 1000 psig, <u>THEN</u> do Steps 15b through 15d. |
| b. Locally restore power to isolation valves:  |   |
| <ul style="list-style-type: none"> <li>o 894A (MCC 26A)</li> <li>o 894C (MCC 26A)</li> <li>o 894B (MCC 26B)</li> <li>o 894D (MCC 26B)</li> </ul> |   |

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft. switch to city water supply.



**FOLDOUT PAGE FOR 2-ES-0.2**

**1. SI ACTUATION CRITERIA:**

IF EITHER condition listed below occurs, actuate SI AND go to 2-E 0, REACTOR TRIP OR SAFETY INJECTION. Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

**2. AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft. switch to city water supply.

Number: 2 ES 0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 2
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16.	<u>Check If SI Pumps Should Be Locked Out:</u>  a. RCS hot leg temperature - LESS THAN 350°F  b. Place SI pump control switches in PULLOUT	a. Continue with Step 17. <u>WHEN</u> RCS hot leg temperature less than 350°F. <u>THEN</u> do Step 16b.
17.	<u>Maintain Letdown Flow:</u>  a. Open letdown orifice isolation valves as necessary  b. Adjust low pressure letdown control valve PCV-135 setpoint as necessary	
18.	<u>Maintain Required RCP Seal Injection Flow:</u>  o 6 gpm to 12 gpm per pump	
19.	<u>Check If RHR System Can Be Placed In Service:</u>  a. RCS temperature - LESS THAN 350°F  b. RCS pressure - LESS THAN 370 PSIG  c. Place RHR System in service per 2-SOP-4.2.1, RESIDUAL HEAT REMOVAL SYSTEM	a. Return to Step 13. OBSERVE NOTE PRIOR TO STEP 13.  b. Return to Step 13. OBSERVE NOTE PRIOR TO STEP 13.
20.	<u>Continue RCS Cooldown To Cold Shutdown</u>	

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2 ES 0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: RFV. 2
---------------------	--	----------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
------	--------------------------	-----------------------

.....

CAUTION

Depressurizing the RCS before the entire RCS is less than 200°F may result in void formation in the RCS.

.....

21. Continue Cooldown Of Inactive Portion Of RCS:
- o Cool upper head region using CRDM fans
  - o Cool SG U-tubes by dumping steam from all SGs

NOTE

If CRDM fans are NOT running, a waiting period of 27 hours is necessary to allow the head to cool to less than 200°F.

22. Determine If RCS Depressurization Is Permitted:
- a. Entire RCS LESS THAN 200°F      a. Return to Step 20.
  - b. Go to 2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN

END

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft. switch to city water supply.

FIGURE ES02 1

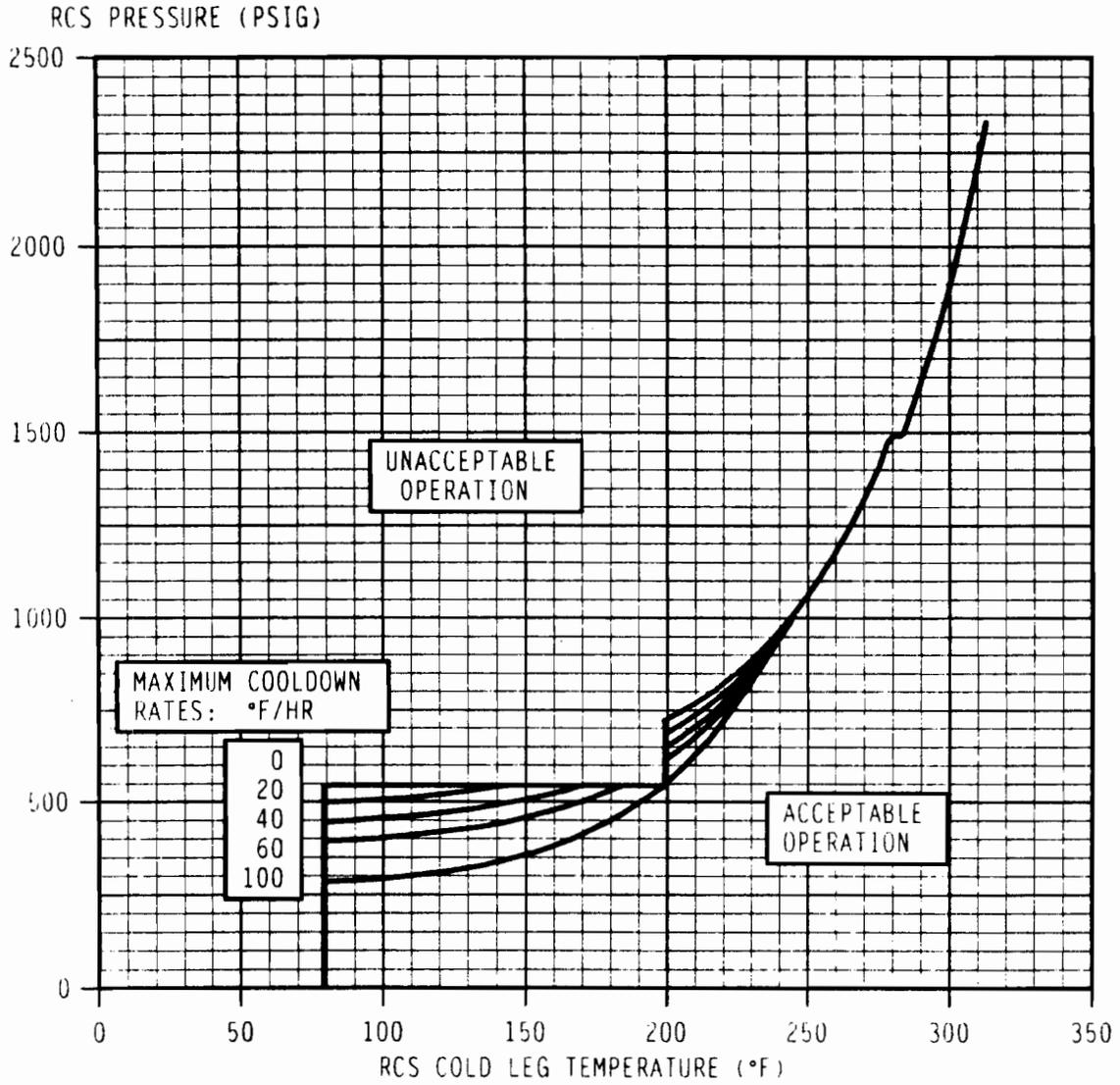


FIGURE ES02-1, REACTOR COOLANT SYSTEM COOLDOWN LIMITATIONS  
END

**FOLDOUT PAGE FOR 2-ES-0.2**

**1. SI ACTUATION CRITERIA:**

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

**2. AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

FIGURE ES02-2

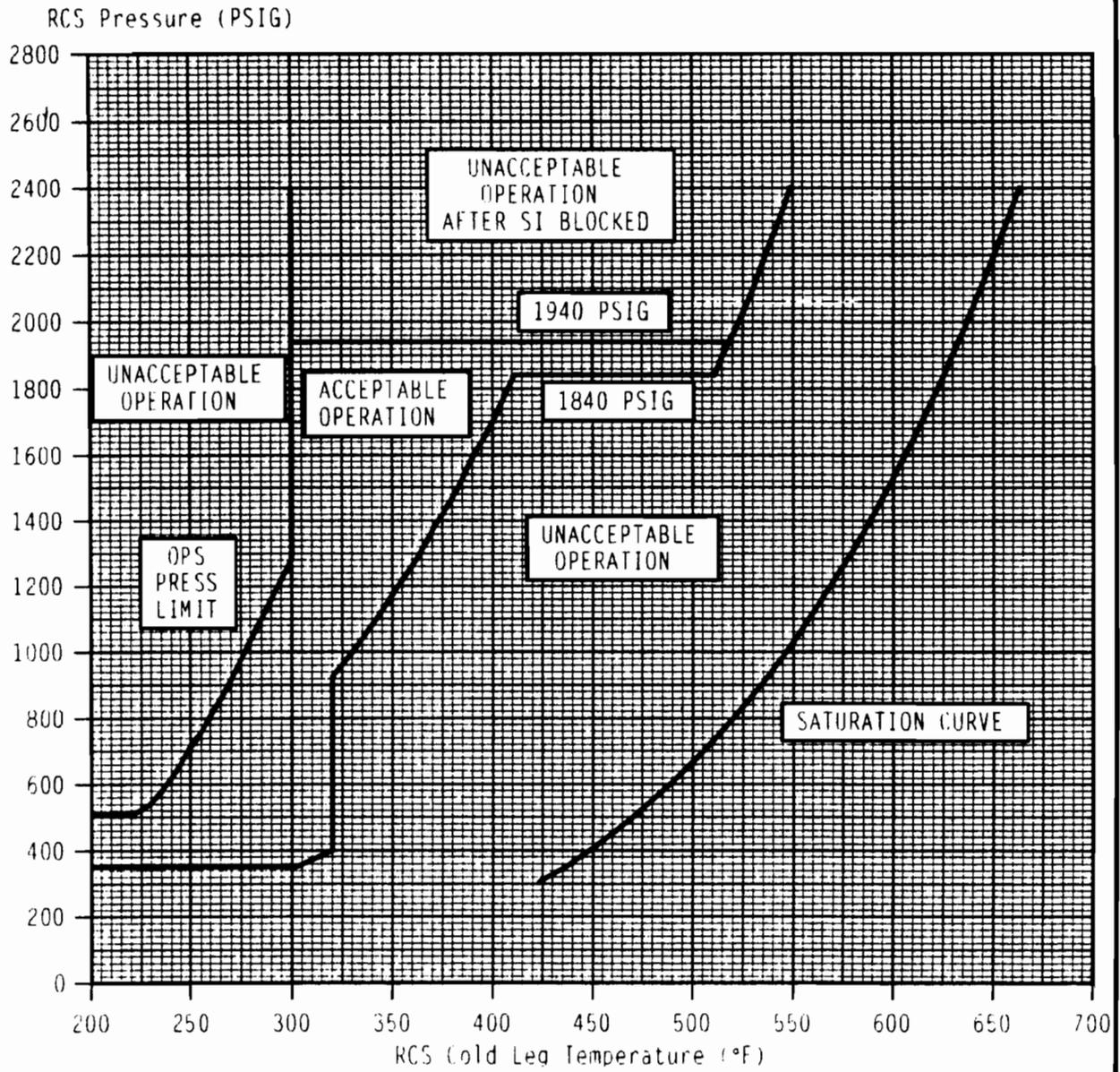


FIGURE ES02-2. NATURAL CIRCULATION COOLDOWN WITHOUT CRDM FANS  
END

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2 ES 0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 2
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ATTACHMENT 1 (Attachment page 1 of 1)  
RCS SUBCOOLING WITHOUT CROM FANS

1. Perform the following in conjunction with Procedure Steps.
  - a) Refer to FIGURE ES02-2 for the acceptable operating region.
  - b) Maintain RCS pressure approximately 1890 psig until RCS cold leg temperature is decreased to 400°F at a rate less than 25°F/hr.
  - c) Continue the cooldown at a rate less than 25°F/hr and initiate a depressurization of the RCS while maintaining a minimum of 150°F subcooling (or the Tech Spec limit) until RCS pressure is 1100 psig.
  - d) Maintain RCS pressure approximately 1100 psig until RCS cold leg temperature is decreased below 320°F at a rate less than 25°F/hr.
  - e) Wait 8 hours to allow the upper head to cool before continuing depressurization.
  - f) Continue the cooldown at a rate less than 25°F/hr and initiate a depressurization of the RCS while maintaining a minimum of 50°F subcooling (or the Tech Spec limit) until RCS pressure is between 350 psig and 370 psig.
  - g) With RHR in service for cooldown, maintain RCS pressure between 350 psig and 370 psig for 27 hours until the entire RCS is decreased below 200°F.

END

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Facility: Indian Point Unit 2Task No: 0070010101Task Title: **Fill the PRT**K/A Reference: 007000A4.01Job Performance Measure  
No: Sim-4

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	<u>        </u>	X	Actual Performance	<u>        </u>
Classroom	<u>        </u>	Simulator	<u>        </u>	Plant
			X	

READ TO THE EXAMINEE

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

Initial Conditions:

- PRT is currently 65%

Task Standard: PRT Level is restored to approximately 70%.

Required Materials:

General References: 2-SOP-1.6 Pressurizer Relief Tank Operations

Initiating Cue: You are the ATC and the CRS has directed you to Fill the PRT to 70% in accordance with 2-SOP-1.6

Time Critical Task: NO

Validation Time: 15 Minutes

## Performance Information

(Denote critical steps with a check mark √)

---

1. Performance Step: Obtain correct Procedure

Standard: Obtains 2-SOP-1.6, Pressurizer Relief Tank Operations and reviews the Precautions and Limitations.

Comment: Hand candidate a copy of 2-SOP-1.6

---

2. Performance Step: Verify 519 552 PRI WTR ISOL Valves RCP PRT switch is in REMOTE (Panel SNF)

Standard: Locates switch and verifies switch is in REMOTE position

Comment:

---

√ 3. Performance Step: OPEN PW Containment Isolation Valves (Panel SAF)

Standard: Rotate Switch for 519 to OPEN  
Rotate Switch for 552 to OPEN

Comment:

---

4. Performance Step: Observe Caution before Step 4.4.3

Standard: Reviews caution and locates PRT Pressure Indicator.

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 5. **Performance Step:**      **OPEN 560 PW Stop Vlv to PRT (Panel SAF)**

**Standard:**                      **Locates Switch and rotates to OPEN position.**  
Monitors PRT Level increasing.

**Comment:**

---

6. **Performance Step:**      Vent PRT using section 4.3 as necessary to maintain PRT pressure less than 25 psig.

**Standard:**

**Comment:**      PRT venting is not expected to be necessary for this JPM.

---

7. **Performance Step:**      Observe NOTE before step 4.4.5

**Standard:**                      Reviews NOTE

**Comment:**

---

8. **Performance Step:**      **WHEN approximately 70% is reached, stop filling PRT**

**Standard:**                      **Rotate Switch for 519 to CLOSE**  
**Rotate Switch for 552 to CLOSE**  
**Rotate Switch for 560 to CLOSE**

**Comment:**      **While it is not critical that 560 be closed last, it is important to follow the procedure and observe the guidance in the NOTE.**

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

This JPM can be run from any IC with normal PRT alignment.  
Drain the PRT level to approximately 65%.

Initial Conditions:

- PRT is currently 65%

Initiating Cue:

You are the ATC and the CRS has directed you to Fill the PRT to 70% in accordance with 2-SOP-1.6

**4.4 Filling PRT With Primary Water (PW)**

- 4.4.1 VERIFY 519 552 PRI WTR ISOL Valves RCP PRT switch is in REMOTE (Panel SNF).
- 4.4.2 OPEN PW Containment isolation valves (Panel SAF):
- 519, PW Isol M/U Valve
  - 552, PW Isol M/U Valve

**CAUTION**

PRT pressure SHALL be monitored during filling, do NOT exceed 25 psig.

- 4.4.3 OPEN 560, PW Stop Vlv To PRT (Panel SAF).
- 4.4.4 VENT PRT using Section 4.3 as necessary to maintain PRT pressure less than 25 psig.

**NOTE**

Valve 552 tends to re-open after it is closed due to trapped pressure and thermal expansion when filling the PRT; therefore Valve 560 needs to be the last valve closed. Step 4.4.6 allows operators to cycle 560 whenever 552 is closed and then re-opens due to thermal expansion of Primary Water in the pipe.

- 4.4.5 WHEN desired PRT level is reached (normal level 69 - 75%), THEN:
- 4.4.5.1 CLOSE 519, PW Isol M/U Valve.
- 4.4.5.2 CLOSE 552, PW Isol M/U Valve.
- 4.4.5.3 CLOSE 560, PW Stop Vlv To PRT.
- 4.4.6 IF valve 552 re-opens (dual indication) due to thermal expansion of isolated Primary Water, THEN CYCLE valve 560 at any time to relieve water pressure.

Facility: Indian Point Unit 2Task No: 0350010401Task Title: **Respond to 22 SG "B" Level Channel failure High**K/A Reference: 059000A4.08Job Performance Measure  
No: \_\_\_\_\_Sim-5

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	X	Actual Performance	
Classroom	_____	Simulator	X
		Plant	_____

**READ TO THE EXAMINEE**

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

Initial Conditions:

- Reactor at indicated power.
- Steady State, equilibrium Xenon.
- No equipment out of service.

Task Standard: Plant stabilized, failed channel removed from service.

Required Materials:

General References: 2-AOP-INST-1, Instrument or Controller Failures

Initiating Cue: You are the ATC.

Time Critical Task: No

Validation Time: 25 Minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ 1. Performance Step: **Operator takes Immediate Actions from memory (steps 3.1-3.3)**

**Note: Immediate actions of 2-AOP-INST-1**

**Standard:**

1. Checks all parameters listed and determines that 22 S/G Level Channel (447B) is failed high.
2. Verify 22 S/G level control is affected
- 3. Place 22 FW Reg Valve in MANUAL.**
- 4. Take manual actions as necessary to control parameters and stabilize the plant.**
5. Assures all control systems listed in step 3.1 are checked.

**Comment: Note: Placing 22 Feedwater Reg Valve in Manual and stabilizing plant are critical**

---

2. Performance Step: Has an instrument failure occurred?

Standard: Operator determines that 22 SG Level 427B has failed high

Comment: The purpose of this step is to distinguish between an instrument failure and a controller failure

---

3. Performance Step: Go To the applicable step for the indicated failure

Standard: Candidate determines Step 4.22 is correct

Comment: This step is normally "peer checked" the candidate may request a peer check. If so, CUE: "I agree" with whatever step the candidate selects.

## Performance Information

(Denote critical steps with a check mark ✓)

---

4. Performance Step: Has Channel "B" failed

Standard: Candidate determines that Channel "B" has failed.

Comment:

---

✓ 5. Performance Step: **Manually control affected SG Feed Regulating Valve as necessary to maintain SG level**

**Standard: Make periodic adjustments on 22 SG Feed Reg Valve to maintain SG level.**

**Comment:**

---

6. Performance Step: Refer to the following Tech Specs for required actions

Standard: Candidate should verbalize Tech Spec reference.

Comment: *CUE: The STA will refer to Tech Specs.*

---

7. Performance Step: Review NOTES prior to step 4.25

Standard: Candidate reviews NOTES prior to step

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

8. Performance Step: If At Any Time (IAAT) SM/CRS determines and bistables listed on Attachment 1 should be tripped, THEN trip bistables as directed by SM/CRS

Standard:

Comment: *CUE: The SM has determined that all necessary bistables will be tripped.*

---

✓ 9. Performance Step: Trip Bistables

Standard: Place bistable trip switches for 427B in tripped (UP) position in Protection Rack B-2

- LC-427E Loop 2B High Level
- LC-427F Loop 2B Low Level
- LC-427A-2 Loop 2B AMSAC Low Level

Comment: The candidate should verify that no other bistables are tripped for 22 SG to ensure that tripping the bistables will not cause a reactor trip. The bistable status panel is on Panel SOF. The candidate should verify that the bistable status lights are lit on Panel SOF after the bistables are tripped.

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

This JPM can be run from any 100% power IC

Insert Malfunction XMT-SGN018A 100%, 0 delay, 0 ramp.

Initial Conditions:

- Reactor at indicated power.
- Steady State, equilibrium Xenon.
- No equipment out of service.

Initiating Cue:

You are the ATC.



**Entergy**

**Nuclear Northeast**



Procedure Use Is:

- Continuous
- Reference
- Information

Control Copy: \_\_\_\_\_

Effective Date: 1/25/2010

Page 1 of 129

## 2-AOP-INST-1, Revision: 06

# INSTRUMENT/CONTROLLER FAILURES



Approved By: \_\_\_\_\_

Procedure Sponsor, RPO/ Designee

Date

Team 2A

Procedure Owner

**EDITORIAL REVISION**

**REVISION SUMMARY**

(Page 1 of 1)

**1.0 REASON FOR REVISION**

1.1 Incorporate feedback

**2.0 SUMMARY OF CHANGES**

2.1 Step 4.47 - Add TS per IP2-9091. (Editorial 4.6.13)

## 1. PURPOSE

- 1.1 To maintain operator control of the plant and recover from failed instrumentation that provides input to control or protective systems.
- 1.2 To provide for rapid operator control of systems whose auto control function has failed.

## 2. ENTRY CONDITIONS

- 2.1 Any of the following instruments indicate abnormal behavior when compared to other instruments measuring the same parameter:

- PRZR pressure or level
- SG pressure or level
- Steam flow
- Feedwater flow
- RCS flow or NR temperature (Thot or Tcold)
- Turbine 1<sup>st</sup> stage pressure
- Containment Pressure
- NIS Power Range
- Feedwater pressure
- Main steam line pressure

- 2.2 Failure of any of the following to control in automatic:

- Rod control
- PRZR pressure control
- PRZR level control
- MBFP speed control
- SG level control
- SG pressure control



## 4. SUBSEQUENT ACTIONS

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED																																													
<p>4.1 <input type="checkbox"/> Has an instrument failure occurred?</p>	<p>1. <input type="checkbox"/> Initiate repairs of failed controller.</p> <p>2. <input type="checkbox"/> <b>WHEN</b> controller is repaired, <b>THEN</b> restore applicable controls to automatic as directed by CRS/SM.</p> <p>3. <input type="checkbox"/> <b>RETURN</b> to procedure and step in effect.</p>																																													
<p>4.2 <b>GO TO</b> the applicable step for the indicated failure:</p> <table border="1"> <thead> <tr> <th>√</th> <th>Failed Parameter</th> <th>Step</th> </tr> </thead> <tbody> <tr> <td></td> <td>NIS Power Range</td> <td>4.3</td> </tr> <tr> <td></td> <td>MBFP suction pressure</td> <td>4.4</td> </tr> <tr> <td></td> <td>MBFP discharge pressure</td> <td>4.11</td> </tr> <tr> <td></td> <td>Steam header pressure (PT-404)</td> <td>4.16</td> </tr> <tr> <td></td> <td>S/G level</td> <td>4.22</td> </tr> <tr> <td></td> <td>S/G pressure</td> <td>4.36</td> </tr> <tr> <td></td> <td>Feedwater flow</td> <td>4.56</td> </tr> <tr> <td></td> <td>Steam flow</td> <td>4.66</td> </tr> <tr> <td></td> <td>PRZR pressure</td> <td>4.76</td> </tr> <tr> <td></td> <td>PRZR level</td> <td>4.108</td> </tr> <tr> <td></td> <td>NR Thot or Tcold</td> <td>4.141</td> </tr> <tr> <td></td> <td>RCS flow</td> <td>4.162</td> </tr> <tr> <td></td> <td>Turbine 1<sup>st</sup> stage pressure</td> <td>4.168</td> </tr> <tr> <td></td> <td>Containment pressure</td> <td>4.198</td> </tr> </tbody> </table>	√	Failed Parameter	Step		NIS Power Range	4.3		MBFP suction pressure	4.4		MBFP discharge pressure	4.11		Steam header pressure (PT-404)	4.16		S/G level	4.22		S/G pressure	4.36		Feedwater flow	4.56		Steam flow	4.66		PRZR pressure	4.76		PRZR level	4.108		NR Thot or Tcold	4.141		RCS flow	4.162		Turbine 1 <sup>st</sup> stage pressure	4.168		Containment pressure	4.198	
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<p>4.3 <input type="checkbox"/> <b>GO TO</b> 2-AOP-NI-1 (Nuclear Instrument Malfunction).</p>																																														

••• END •••

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
--------------------------	-----------------------

<p><b><u>Unit Status</u></b></p> <p>A SG level channel failure has occurred.</p>	
--	--

- 4.22  Has a Channel B instrument failed?
- 4.23  Manually control affected SG FRV as necessary to maintain SG level on program.
- 4.24 Refer to the following Tech Spec Tables for required actions:
  - 3.3.1-1 (Functions 13 and 14)
  - 3.3.2-1 (Functions 5.b and 6.b)

GO TO Step 4.24.

**NOTE**

- Attachment 1 (Steam Generator Level Trip Bistable Switches) (Page 89) contains a list of bistables associated with each SG.
- Tripping 2/3 channels of low level bistables on the same SG will initiate a reactor trip.
- Tripping 1/2 low level mismatch bistables coincident with the associated steam flow/feedflow mismatch bistables will initiate a reactor trip.
- Tripping 2/3 channels of high level bistables on the same SG will trip the turbine (and reactor if > P-8).
- Tripping bistables in 3/4 loops causes AMSAC to trip the turbine (and reactor if > P-8).
- Tech Specs contain specific requirements for when bistables for a failed channel must be tripped. Only those bistables that will **NOT** cause a reactor trip should be tripped. The SM/CRS should base the decision of which, if any, bistables to trip on the effects of doing so.

- 4.25  **IAAT** SM/CRS determines any bistables listed on Attachment 1 (Steam Generator Level Trip Bistable Switches) (Page 89) associated with failed channel should be tripped, **THEN** trip bistables as directed by SM/CRS.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.26 Have <u>any</u> of the following AMSAC SG level channels failed? <input type="checkbox"/> 417A <input type="checkbox"/> 427B <input type="checkbox"/> 437C <input type="checkbox"/> 447C	<input type="checkbox"/> <b>GO TO</b> Step 4.29.

**NOTE**

An AMSAC train out of service is defined as 3/4 logic will **NOT** initiate AMSAC assuming failure of one channel to perform its function.

- 4.27  **IAAT** both trains of AMSAC are out of service, **THEN** perform one of the following:
- A.  Restore one train within 30 days.
- B.  Limit reactor power to less than 40%.
- 4.28  **IAAT** only one train of AMSAC is out of service, **THEN** restore train as soon as practical.
- 4.29  **WHEN** failed instrument has been restored to service is in service. **THEN** continue in this procedure.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.30 <input type="checkbox"/> Were bistables associated with failed channel listed in Attachment 1 (Steam Generator Level Trip Switches) (Page 89) manually tripped?	<input type="checkbox"/> <b>GO TO</b> Step 4.32.
4.31 <input type="checkbox"/> Un-trip affected bistables.	
4.32 <input type="checkbox"/> Was failure a Channel B failure?	<input type="checkbox"/> <b>GO TO</b> Step 4.35.
4.33 <input type="checkbox"/> Is automatic control of affected FRV desired?	<input type="checkbox"/> <b>GO TO</b> Step 4.35.
4.34 <input type="checkbox"/> Place FRV in automatic control.	
4.35 <input type="checkbox"/> <b>RETURN</b> to procedure and step in effect.	

••• END •••

**Attachment 1**  
**Steam Generator Level Trip**  
**Bistable Switches**  
**Page 1 of 3**

<b>Steam Generator 21</b>				
<b>FAILED CHANNEL</b>	<b>BISTABLE</b>	<b>SWITCH NAME</b>	<b>PROTECTION RACK</b>	<b>TRIP °</b>
417A	LC-417A	Loop 1A High Level	Yellow B-9	
	LC-417B	Loop 1A Low Level	Yellow B-9	
	LC-417G	Loop 1A Low Level Mismatch	Yellow B-9	
	LC-417A-1	Loop 1A AMSAC Low Level	Yellow B-9	
417B	LC-417E	Loop 1B High Level	Blue B-2	
	LC-417F	Loop 1B Low Level	Blue B-2	
417C	LC-417C	Loop 1C High Level	White A-9	
	LC-417D	Loop 1C Low Level	White A-9	
	LC-417K	Loop 1C Low Level Mismatch	White A-9	

<b>Steam Generator 22</b>				
<b>FAILED CHANNEL</b>	<b>BISTABLE</b>	<b>SWITCH NAME</b>	<b>PROTECTION RACK</b>	<b>TRIP °</b>
427A	LC-427A	Loop 2A High Level	Yellow B-9	
	LC-427B	Loop 2A Low Level	Yellow B-9	
	LC-427G	Loop 2A Low Level Mismatch	Yellow B-9	
427B	LC-427E	Loop 2B High Level	Blue B-2	
	LC-427F	Loop 2B Low Level	Blue B-2	
	LC-427A-2	Loop 2B AMSAC Low Level	Blue B-2	
427C	LC-427C	Loop 2C High Level	Red A-1	
	LC-427D	Loop 2C Low Level	Red A-1	
	LC-427K	Loop 2C Low Level Mismatch	Red A-1	

**Attachment 1**  
**Steam Generator Level Trip**  
**Bistable Switches**  
**Page 3 of 3**

<b>Steam Generator 23</b>				
<b>FAILED CHANNEL</b>	<b>BISTABLE</b>	<b>SWITCH NAME</b>	<b>PROTECTION RACK</b>	<b>TRIP °</b>
437A	LC-437A	Loop 3A High Level	Yellow B-9	
	LC-437B	Loop 3A Low Level	Yellow B-9	
	LC-437G	Loop 3A Low Level Mismatch	Yellow B-9	
437B	LC-437E	Loop 3B High Level	Blue B-2	
	LC-437F	Loop 3B Low Level	Blue B-2	
437C	LC-437C	Loop 3C High Level	Red A-1	
	LC-437D	Loop 3C Low Level	Red A-1	
	LC-437K	Loop 3C Low Level Mismatch	Red A-1	
	LC-437A-3	Loop 3C AMSAC Low Level	Red A-1	

<b>Steam Generator 24</b>				
<b>FAILED CHANNEL</b>	<b>BISTABLE</b>	<b>SWITCH NAME</b>	<b>PROTECTION RACK</b>	<b>TRIP °</b>
447A	LC-447A	Loop 4A High Level	Yellow B-9	
	LC-447B	Loop 4A Low Level	Yellow B-9	
	LC-447G	Loop 4A Low Level Mismatch	Yellow B-9	
447B	LC-447E	Loop 4B High Level	Blue B-2	
	LC-447F	Loop 4B Low Level	Blue B-2	
447C	LC-447C	Loop 4C High Level	White A-9	
	LC-447D	Loop 4C Low Level	White A-9	
	LC-447K	Loop 4C Low Level Mismatch	White A-9	
	LC-447A-4	Loop 4C AMSAC Low Level	White A-9	

Facility: Indian Point Unit 2Task No: 0000280501

Task Title: **Perform the Required Actions to Isolate the SI Accumulators during a Loss of Coolant Accident with failure of MOV-894B to Isolate**

K/A Reference:	<u>006000A3.01</u> <u>RO-4.0 SRO-3.9</u>	Job Performance Measure No:	<u>Sim-6</u>
----------------	---	-----------------------------	--------------

Examinee: \_\_\_\_\_ NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_ Date: \_\_\_\_\_

Method of testing:

Simulated Performance	<u>X</u>	Actual Performance	_____
Classroom	_____	Simulator	<u>X</u>
		Plant	_____

READ TO THE EXAMINEE

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

Initial Conditions:

- A small break LOCA has occurred.
- The Operating Crew has performed all required actions of E-0 and E-1 up to step 19.

Task Standard: Accumulator Isolation Valves for 3 Accumulators closed and one Accumulator vented.

Required Materials: None

General References: 2-E-1, Loss of Reactor or Secondary Coolant

Initiating Cue: You are the BOP and the CRS has directed you to Isolate the SI Accumulators in accordance with E-1 step 19

Time Critical Task: NO

Validation Time: 15 Minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain correct procedure

Standard: Obtains E-1

Comment: CUE: Give Candidate a copy of E-1

---

2. Performance Step: Check at least 2 hot leg temperatures < 400°F

Standard: Observes hot leg temperatures and determines all are < 400°F

Comment:

---

✓ 3. Performance Step: **Locally restore power to Isolation Valves**

Standard: **Contact Nuc NPO and direct him/her to re-energize 894A – D on MCCs 26A and 26B**

Comment: ***CUE: Nuc NPO reports that the Accumulator Isolation Valves are energized.***

---

✓ 4. Performance Step: **Close All SI Accumulator Isolation Valves**

Standard: **Rotate switches for 894A – D to CLOSE  
Observe 894B failed to close and go to Right hand column (RNO)**

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

- 
5. Performance Step: Close HCV – 863
- Standard: Candidate observes 863 is closed
- Comment: Located on Panel SMF

✓ 6. Performance Step: **Open the following valves as necessary for Accumulator 22**

Standard: **Rotate switch for 891B to OPEN  
Rotate Potentiometer for HCV-943 to 100%  
Observe Accumulator Pressure decreases to 0 psig**

Comment: **Located on Panel SMF  
Alternate Path Actions**

7. Performance Step: Open all SI Accumulator Isolation Valve Breakers
- Standard: Contact Nuc NPO and direct him/her to de-energize 894A – D on MCCs 26A and 26B
- Comment: *CUE: Nuc NPO reports that the Accumulator Isolation Valves are de-energized.*

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

Initialize the Simulator to any 100% power IC

Insert Malfunction MAL-RCS004A; FINAL VALUE 0.2; Small Break Loop 21

Crossover Leg.

Allow the simulator to run

Perform the actions of E-0 and E-1 up to Step 19.

**Initial Conditions:**

- A small break LOCA has occurred.
- The Operating Crew has performed all required actions of E-0 and E-1 up to step 19.

**Initiating Cue:**

You are the BOP and the CRS has directed you to Isolate the SI Accumulators in accordance with E-1 step 19.

Number: 211	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 2
----------------	--	----------------------------



17. Check If RCS Cooldown And  
Depressurization Is Required:

a. RCS pressure - GREATER THAN  
320 PSIG (350 PSIG FOR ADVERSE  
CONTAINMENT)

b. Go to 2-ES-1.2, POST LOCA  
COOLDOWN AND DEPRESSURIZATION,  
Step 1

a. IF RHR pump flow greater than  
240 gpm (400 gpm FOR ADVERSE  
CONTAINMENT), THEN go to  
Step 18.

18. Check If Transfer To Cold Leg  
Recirculation Is Required:

a. RWST level - LESS THAN 9.24 FT

b. Go to 2-ES-1.3, TRANSFER TO  
COLD LEG RECIRCULATION, Step 1  
unless previously performed

a. Return to Step 16.

19. Check If SI Accumulators Should  
Be Isolated:

a. At least two RCS hot leg  
temperatures - LESS THAN 400°F

b. Locally restore power to  
isolation valves:

- o 894A (MCC 26A)
- o 894C (MCC 26A)
- o 894B (MCC 26B)
- o 894D (MCC 26B)

a. Continue with Step 20. WHEN  
at least two RCS hot leg  
temperatures less than 400°F  
THEN do steps 19b through 19d.

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm  
-OR-  
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
  - STABLE OR INCREASING
  - GREATER THAN 1720 PSIG (1750 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary:

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

switch to city water supply.



FOLDOUT PAGE FOR 2-E-1

1) RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm  
-OR-  
Narrow range level in at least one intact SG - GREATER THAN 10% (2% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
  - STABLE OR INCREASING
  - GREATER THAN 1720 PSIG (1750 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary:

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF level less than 2 ft switch to city water supply.



## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain correct procedure

Standard: Obtains 2-FR-C.1

Comment: *CUE: Hand candidate 2-FR-C.1*

---

2. Performance Step: Check if RCPs Should be Started

Standard: Sub Steps Below Steps 3 - 4

Comment:

---

3. Performance Step: Check Core Exit Thermocouples GREATER THAN 1200°F

Standard: Observes CETs > 1200°F

Comment:

---

4. Performance Step: Check if an idle RCS cooling loop is available

Standard: Observe Narrow Range SG Level GREATER THAN 27%  
RCP in associated loop available and not running

Comment:

---

## Performance Information

(Denote critical steps with a check mark ✓)

---

✓ **5. Performance Step:**      **Place RCP BEARING LIFT PERMISSIVE BYPASS key switch in bypass located on the rear of SA Panel**

**Standard:**                      **Enter the Supervisory Panel and locate the key switches (near the floor) and place selected RCP switch in bypass**

**Comment:**

---

✓ **6. Performance Step:**      **Start one RCP**

**Standard:**                      **Rotate RCP Switch to Start Position**

**Comment:** *CUE: If requested direct candidate to start 24 RCP*

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

Reset Simulator to Snapshot for this JPM.

Initial Conditions:

- An event occurred a short time ago that resulted in a transition to FR-C.1, Response to Inadequate Core Cooling.
- The Steam Generators were unable to be depressurized.

Initiating Cue:

You are the BOP and the CRS has directed you to determine if one RCPs should be started and to start one RCP if conditions warrant in accordance with 2-FR-C.1 step 18.

Number: 2-FR-C.1	Title: RESPONSE TO INADEQUATE CORE COOLING	Revision Number: REV. 1
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

.....  
CAUTION  
 .....  
 Placing key switches to DEFEAT will prevent auto SI actuation.  
 .....

NOTE

Normal conditions are desired but NOT required for starting the RCPs.

18. Check If RCPs Should Be Started:

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>a. Core exit TCs - GREATER THAN 1200°F</li> <li>b. Check if an idle RCS cooling loop is available:           <ul style="list-style-type: none"> <li>o Narrow range SG level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</li> <li>o RCP in associated loop - AVAILABLE AND NOT OPERATING</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>a. Go to Step 19.</li> <li>b. Perform the following:           <ul style="list-style-type: none"> <li>1) Reset SI signal:               <ul style="list-style-type: none"> <li>a) Check all CCW pumps running.</li> <li><u>IF NOT, THEN</u> place non-running CCW pumps CCR control switches in PULLOUT.</li> <li>b) Place controls for main <u>AND</u> bypass feedwater regulating valves to CLOSE.</li> <li>c) Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position:                   <ul style="list-style-type: none"> <li>o Train A SIA-1</li> <li>o Train B SIA-2</li> </ul> </li> </ul> </li> </ul> </li> </ul> |
|--|---|

This Step continued on the next page.

Number: 2-FR C.1	Title: RESPONSE TO INADEQUATE CORE COOLING	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<ul style="list-style-type: none"> <li>d) One at a time, depress Safety Injection reset buttons (Panel SB-2): <ul style="list-style-type: none"> <li>o Train A</li> <li>o Train B</li> </ul> </li> <li>e) Verify Train A <u>AND</u> B reset. <ul style="list-style-type: none"> <li><u>IF NOT, THEN</u> verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1): <ul style="list-style-type: none"> <li>o SIA-1</li> <li>o SIM-1</li> <li>o SIA-2</li> <li>o SIM-2</li> </ul> </li> </ul> </li> <li>2) Reset containment isolation Phase A: <ul style="list-style-type: none"> <li>a) Place IVSW switches to OPEN on SN panel: <ul style="list-style-type: none"> <li>o 1410</li> <li>o 1413</li> <li>o SOV 3518</li> <li>o SOV 3519</li> </ul> </li> <li>b) Place CNTMT RAD MON WCPS VALVES control switch to OPEN on SN panel.</li> <li>c) Verify personnel and equipment hatch solenoid control switches to INCIDENT on SM panel.</li> <li>d) Place control switches for all Phase A isolation valves to CLOSE on SN panel.</li> </ul> </li> </ul>
	This Step continued on the next page.	

Number: 2-FR-C.1	Title: RESPONSE TO INADEQUATE CORE COOLING	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>e) One at a time, depress Phase A reset buttons:</p> <ul style="list-style-type: none"> <li>o CI Phase A Train A</li> <li>o CI Phase A Train B</li> </ul> <p>f) Verify Train A and B reset.</p> <p><u>IF</u> signal does <u>NOT</u> reset, <u>THEN</u>:</p> <ol style="list-style-type: none"> <li>1. Place key switches to BYPASS.</li> <li>2. One at a time, depress Phase A reset buttons: <ul style="list-style-type: none"> <li>o CI Phase A Train A</li> <li>o CI Phase A Train B</li> </ul> </li> </ol> <p><u>IF</u> signal can <u>NOT</u> be reset, <u>THEN</u> reset relays CA1 <u>AND</u> CA2 on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2.</p> <p>3) Establish instrument air to containment by opening isolation valve PCV-122B.</p> <p><u>IF</u> valve will <u>NOT</u> open, <u>THEN</u> verify relays on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2 are reset:</p> <ul style="list-style-type: none"> <li>o CA1</li> <li>o CA2</li> </ul> <p>4) Open all PRZR PORVs and block valves.</p>

This Step continued on the next page.

Number:  2-FR-C.1	Title:  RESPONSE TO INADEQUATE CORE COOLING	Revision Number:  REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>c. Start RCP in one idle RCS cooling loop:</p> <ul style="list-style-type: none"> <li>o If necessary, use RCP BEARING LIFT PERMISSIVE BYPASS key switch located on rear of SA panel</li> </ul> <p>d. Return to Step 18a</p>	<p>5) <u>IF</u> core exit TCs remain greater than 1200°F, <u>THEN</u> open all other vent paths to containment:</p> <ul style="list-style-type: none"> <li>a) Restore power to all reactor head vent valves by closing the following breakers: <ul style="list-style-type: none"> <li>o MCC 26A/7MR (HCV-3100)</li> <li>o MCC 26B/7MR (HCV-3101)</li> </ul> </li> <li>b) Open all reactor head vent valves: <ul style="list-style-type: none"> <li>o HCV-3100</li> <li>o HCV-3101</li> </ul> </li> </ul> <p>6) Go to Step 19.</p>

Facility: Indian Point Unit 2Task No: 0000020501Task Title: **Verify Phase A Isolation**K/A Reference: 103000A3.01  
RO-3.9 SRO-4.2Job Performance Measure  
No: \_\_\_\_\_Sim-8

Examinee: \_\_\_\_\_

NRC Examiner: \_\_\_\_\_

Facility Evaluator: \_\_\_\_\_

Date: \_\_\_\_\_

Method of testing:

Simulated Performance	<u>X</u>	Actual Performance	_____
Classroom	_____	Simulator	<u>X</u>
		Plant	_____

**READ TO THE EXAMINEE**

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

Initial Conditions:

- A Reactor Trip and Safety Injection have just occurred.
- The crew is performing the actions of E-0.

Task Standard: Phase A valves Manually closed.

Required Materials: None

General References: E-0 Attachments 1 and 2

Initiating Cue: You are the BOP. You are at the step to verify Phase A in Attachment 1.  
Continue with Attachment 1 actions.

Time Critical Task: No

Validation Time: 15 Minutes

## Performance Information

(Denote critical steps with a check mark ✓)

---

1. Performance Step: Obtain correct procedure

Standard: Obtains E-0 Attachments 1 and 2

Comment: CUE: Hand candidate a copy of Attachments 1 and 2

---

2. Performance Step: Verify Containment Isolation Phase A

Standard: Sub steps are listed below steps 3 - 7

Comment:

---

3. Performance Step: Verify Phase A Actuated

Standard: Observes Phase A did not fully actuate  
Attempts to manually actuate Phase A (Not Successful)

Comment:

---

**✓ 4. Performance Step: Verify Phase A Valves Closed**

**Standard: Manually Close Valves**

**Comment: See Attachment 2 for list of valves that need to be closed.  
Alternate Path Actions**

## Performance Information

(Denote critical steps with a check mark ✓)

✓ 5. Performance Step: Verify IVSW Valves OPEN:

Standard: Manually Open the following Valves  
1410  
1413  
SOV-3518  
SOV-3519

Comment: Alternate Path Actions

✓ 6. Performance Step: Verify WCP Valves OPEN

Standard: Manually Open the following Valves  
PCV- 1238  
PCV- 1239  
PCV- 1240  
PCV- 1241

Comment: Alternate Path Actions

✓ 7. Performance Step: Place Personnel and Equipment hatch solenoid control switches to INCIDENT on SM Panel

Standard: Rotate switches to INCIDENT

Comment:

Performance Information

(Denote critical steps with a check mark √)

---

8. Performance Step: Dispatch NOP to periodically check IVSW Tank Level and Pressure and WCP header pressure

Standard: Contact NPO and direct monitoring of IVSW and WCP

Comment:

---

Terminating Cue: JPM Complete

VERIFICATION OF COMPLETION

Job Performance Measure No.

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to complete:

Question Documentation:

Question:

Response:

Result: SAT or UNSAT

Examiner's signature and date: \_\_\_\_\_

Reset the simulator to any at power IC

Insert the following Malfunctions to prevent Phase A Isolation:

RLY-PPL086 DE-ENERGIZED  
RLY-PPL087 DE-ENERGIZED  
RLY-PPL088 DE-ENERGIZED  
RLY-PPL089 DE-ENERGIZED  
RLY-PPL091 DE-ENERGIZED  
RLY-PPL092 DE-ENERGIZED  
RLY-PPL093 DE-ENERGIZED  
RLY-PPL094 DE-ENERGIZED

Initial Conditions:

- A Reactor Trip and Safety Injection have just occurred.
- The crew is performing the actions of E-0.

Initiating Cue:

You are the BOP. You are at the step to verify Phase A in Attachment 1. Continue with Attachment 1 actions.

Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 4
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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ATTACHMENT 1 (Attachment page 8 of 10)  
AUTOMATIC ACTION VERIFICATION

NOTE

ATTACHMENT 2 provides a list of Phase A valves.

12. Verify Containment Isolation  
Phase A:

- |   |  |
|---|--|
| <p>a) Phase A - ACTUATED</p> <ul style="list-style-type: none"> <li>o Train A master relay CA1 (above rack E)</li> <li>o Train B master relay CA2 (above rack F)</li> </ul> <p>b) Phase A valves - CLOSED</p> <p>c) IVSW valves - OPEN:</p> <ul style="list-style-type: none"> <li>o 1410</li> <li>o 1413</li> <li>o SOV-3518</li> <li>o SOV-3519</li> </ul> <p>d) WCP valves - OPEN:</p> <ul style="list-style-type: none"> <li>o PCV 1238</li> <li>o PCV 1239</li> <li>o PCV 1240</li> <li>o PCV 1241</li> </ul> <p>e) Place personnel AND equipment hatch solenoid control switches to INCIDENT on SM panel</p> <p>f) Dispatch NPO to periodically check:</p> <p>1) IVSW tank:</p> <ul style="list-style-type: none"> <li>o Level - GREATER THAN 92%</li> <li>o Pressure - GREATER THAN 57 PSIG</li> </ul> <p>2) WCP header pressures - GREATER THAN 52 PSIG</p> | <p>a) Manually actuate phase A.</p> <p>b) Manually close valves.</p> <p>c) Manually open valves.</p> <p>d) Manually open valves.</p> <p>1) Direct NPO to fill or pressurize tank as necessary.</p> <p>2) Direct NPO to verify station air backup <u>OR</u> N2 backup are aligned as necessary.</p> |
|---|--|

Number: 2 E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 4
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ATTACHMENT 2  
CONTAINMENT ISOLATION VALVES

(Attachment page 1 of 1)

1. The following valves will close on Phase A isolation:

<u>VALVE NAME</u>	<u>VALVE NUMBER(S)</u>
CCW from excess letdown Hx	796, 793
CCW to excess letdown Hx	798, 791
Vent header from RCDT	1786, 1787
Gas analyzer PRT	548, 549
Gas analyzer RCDT	1788, 1789
Letdown from regenerative HX	201, 202
Letdown orifice control stop valves	200A, 200B, 200C
Make-up to PRT	519, 552
Containment sump pumps to WDS - hold-up tank	1723, 1728
Instrument air to containment	PCV-1228
RCDT to WDS - hold-up tank	1702, 1705
SG blowdown and sampling system	PCV-1214, 1214A PCV-1215, 1215A PCV-1216, 1216A PCV-1217, 1217A
Radiation monitor return to containment	PCV-1234, 1235 PCV-1236, 1237
Accumulator samples	956G, 956H
Sample - pressurizer steam	956A, 956B
Sample - pressurizer liquid	956C, 956D
Sample - RCS loops	21, 22, 23 MOV-956E, 956F
SJAE to containment	1229, 1230
Hi-Rad sample system return to containment sump	MOV-4399, 5132
Recirculation pump discharge sample line	MOV-990A, 990B
Accumulator N2 Supply Line Stop	863

2. The following valves will close on Phase B isolation:

<u>VALVE NAME</u>	<u>VALVE NUMBER(S)</u>
Component cooling to RCS pumps	MOV-769, 797
Component cooling from RCS thermal barrier return	MOV-789, FCV-625
Component cooling from RCS motor bearing return	MOV-786, 784
Seal water return containment isolation valve	MOV-222

END-

Facility: Indian Point 2 Scenario No.: 1

Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Initial Conditions:**

Reset simulator to IC-114 Load Simulator Schedule-Scenario1  
 The Plant is at 16% power. 23 EDG is OOS due to a malfunctioning governor.

**Turnover:**

Return plant to 100% power.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (ATC) N (CRS) N (BOP)	Power Escalation
2	XMT-SGN008A	I(ATC) I(BOP) TS(CRS)	23 SG Controlling Steam Flow Transmitter Fails High
3	MAL-EPS008L	C (BOP) C (CRS) TS (CRS)	MCC-28 will trip on overcurrent.
4	MAL-EPS001	C (ALL)	Loss of offsite power due to Loss of Station Aux Transformer. The running charging pump (21) will trip.
5	MAL-SWD003A	M(ALL)	Complete loss of off site power resulting in a Reactor Trip
6	MAL-DSG007A	M(ALL)	21 EDG will trip and team will enter ECA-0.0.
7	N/A	C(BOP)	22 EDG will be repaired and started. Team must start a service water pump to cool the EDG before it overheats and trips.
8	N/A	C(ATC) C(CRS)	Prior to starting a charging pump, RCP Seal Injection must be isolated.

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

## **Session Outline:**

The evaluation begins with the plant at 16% power steady state operation. 23 EDG is out of service due to a malfunctioning governor. Post maintenance testing will be performed this shift. After completion of testing, the diesel will be declared operable. The team is currently raising power.

After taking the watch, 23 SG Steam Flow Transmitter fails high. The team will take actions in accordance with 2-AOP-INST-1, Instrument and Controller Failures.

After failed channel is removed from service, MCC-28 will trip on overcurrent. The team will need to restart Control Rod Drive Cooling Fans on MCC-28A.

Following restart on the CRD cooling fans, a loss of offsite power will occur due to a widespread blackout. The running charging pump (21) will trip and EDG 22 will fail to start.

About three minutes after the loss of offsite power, a loss of grid will occur resulting in a unit trip. The team will perform actions of E-0, Reactor Trip or Safety Injection. Only Bus 5A will be energized. Because both motor driven AFW Pumps are de-energized, the team will take manual action to align AFW flow from the turbine driven AFW pump.

Soon after AFW flow is established, 21 EDG will trip. The team will recognize a loss of all AC and enter EOP ECA-0.0, Loss of All AC Power. After equipment is placed in pullout per ECA-0.0, 22 EDG will be repaired and started. However, 22 Service Water Pump will not auto start. The team will manually start the Service Water pump to provide cooling to the EDG before the diesel overheats and trips. The team will proceed through ECA-0.0 and transition to 1) ECA-0.1, Loss of All AC Recovery without SI Required, and then transition to ES-0.2, Natural Circulation Cool down OR 2) ECA-0.2, Loss of All AC Recovery with SI Required, and then to E-1, Loss of Reactor or Secondary Coolant. The scenario will be terminated after transition to ES-0.2, E-1, or at the lead evaluator's discretion.

Procedure flow path: AOP-INST-1, 2-AOP-138 KV-1, ECA-0.0, ECA-0.1 or ECA-0.2, ES-0.2  
E-1

## Scenario Critical Task and Malfunction Analyses

### Critical Tasks:

#### CT-1

Establish greater than 400 gpm AFW flow to the SGs before transition out of E-0 or tripping the RCPs in the FR-H.1.

#### Actions to complete task :

- Increase speed on 22 AFW Pump and establish >760 gpm feed to all SGs

#### CT-2

Manually start the ESW pump such that the EDG does not fail because of damage caused by engine overheating.

#### Actions to complete task :

- Team will ensure 22 ESW pump is running for 22 EDG

#### CT-3

Isolate RCP Seal Injection before starting a Charging Pump.

#### Actions to complete task :

- Team will isolate RCP Seal Injection

### Credited Events:

1. Power escalation. ATC will add positive reactivity via dilution and/or rods. BOP will increase MTG load. CRS will coordinate activities.
2. FT-439B fails high. The ATC should diagnose the event with help from the BOP and swap to the unaffected channel. The CRS will implement the AOP and have the BOP remove the affected channel from service. This malfunction also requires evaluation of Tech Specs by the CRS.
3. MCC-28 will trip on overcurrent. The team will diagnose the loss of MCC-28. BOP will restart tripped CRD fans in accordance with ARP. The CRS will coordinate and supervise activities. This malfunction also requires evaluation of Tech Specs by the CRS.
4. Loss of offsite power occurs due to the loss of the Station Aux Transformer.
5. A complete loss of power will occur. The unit will trip and the team will perform the immediate actions of E-0. BOP will align 22 AFWP to supply >760 gpm to the S/Gs.
6. 21 EDG will trip and the team will enter ECA-0.0. BOP will place equipment in Pullout. CRS will coordinate and supervise activities.
7. 22 EDG will be repaired and the team will be able to start and load the EDG. BOP should realize there is no ESW pump running and start an ESW pump to prevent the EDG from overheating and being damaged. BOP will start equipment on the running EDG. CRS will coordinate and supervise activities.
8. ATC will be requested to start a charging pump. RCP seal injection must be isolated prior to starting a charging pump.

Simulator Setup and Instructor Directions		
Setup/Event	INSTRUCTOR ACTIONS	EXPECTED RESPONSE/INSTRUCTOR CUES
IC Reset	114	RESET SIMULATOR TO 16% POWER IC
SES Setup Schedule	<b>Load schedule</b> and verify malfunctions and overrides have been entered	Removes 23 EDG from service Loads 22 EDG starting failure Loads 2A and 3A service water pump start failures Sets trigger 2 to fail FT-439B Sets trigger 3 to fail MCC 28 on a fault Sets trigger 4 for loss of the station aux transformer Sets trigger 5 for loss of grid Sets trigger 6 to restart 22 EDG Sets trigger to trip 21 EDG once AFW flow is established
Floor Setup	Perform setup checklist  Ensure 21 Charging Pump is In Service  Ensure 2 CRD fans are powered from MCC-28	Watch team walks the panels and assumes the watch. Place #23 EDG output breaker control switch in Pullout and apply a Danger tag. Place protected equipment placards on 21 and 22 EDGs. Update the protected equipment computer to show 21 and 22 EDGs and 13.8/138KV power supplies as protected equipment. Risk is yellow. Ensure 21 Charging Pump is In Service Ensure 2 CRD fans are powered from MCC-28
Event 1	Respond as requested by Crew	Crew performs power ascension
Event 2	Actuate Trigger 2 when directed	MAL-SGN008A, FT-439B Main Steam flow transmitter fails high
Role Play	Acknowledge requests for I&C to troubleshoot	I&C will develop a troubleshooting plan
Role Play	If called about tripping bistables	Inform team that bistables are to be tripped.
Event 3	Actuate Trigger 3 At lead evaluator direction	MAL-EPS008L, Fault on MCC-28

Role Play	When NPO contacted	NPO will report that investigation with FIN reveals that the breaker appears to have a mechanical issue that caused it to open. No flags were up on the breaker.  Alternate Path-If team does not use 28A, and team requests changing out the MCC breaker, report that time compression is being used and that a spare breaker has been inserted in the cubicle. Remove the malfunction and then mechanically close the breaker from the Rack in/ Rack out LOA.
Event 4	Actuate Trigger 4 At lead evaluator direction	MAL-EPS001, Loss of Station Aux Transformer
Role Play	When ConEd contacted	ConEd reports wide spread blackout across CT, Westchester, and NYC, and Long Island
Event 5	Occurs ~ 2 minutes after event 4	MAL-SWD003A, Main Generator trip 345KV EASTVIEW LINE FAULT
Event 6	60 seconds after AFW established	MAL-DSG007A, 21 EDG Trips. Loss of All AC Power – ECA-0.0.
Role Play	If asked, Unit 3 has tripped and is stable on the EDGs. The IP 3 SM should state that Unit 3 meets the emergency plan EAL 6.1.1 classification if only IP3 were affected	
Role Play	If dispatched to App R DG	After 1 minute. report that there is a lot of oil all around the diesel and it cannot be run.

<p>After equipment in pullout in ECA-0.0 step 6 Restore 22 EDG:</p>	<p>To Start 22 EDG Delete air start malfunction on Director ( MAL-DSG003B), Actuate trigger 6 to start the EDG</p> <p>After it starts, call again to ensure that they know it has been started.</p>	<p>Restore 22 EDG. Deletes failure, resets and starts 22EDG. AFTER all four of the following conditions are met, NPO call CCR and let them know that you are ready to start 22 EDG:</p> <ul style="list-style-type: none"> <li>• Equipment placed in pullout</li> <li>• NPO dispatched to start EDGs</li> <li>• All 480V buses have been de-energized for &gt;15 minutes</li> </ul> <p>CCR notified that 22 EDG is ready to start and CCR gave permission to start 22 EDG</p>
<p>Role Play</p>	<p>Perform requested NPO actions except any that restore power other than 22 EDG as directed above.</p>	

Event Description: Power Escalation

Time	Position	Applicant's Actions or Behavior
<p><b>Note:</b></p> <p><b>The reactivity plan for the power ascension should be developed by the team in the briefing room prior to taking the watch. The plan could call for dilution and/or rod withdrawal</b></p>		
	CRS	Assigns roles for power ascension
	ATC	Reviews reactivity plan
	ATC	If rods are withdrawn: <ul style="list-style-type: none"> <li>• Places/verifies rods are in Manual</li> <li>• Withdraws rods</li> <li>• Observes:               <ul style="list-style-type: none"> <li>○ Proper rod motion</li> <li>○ Tavg</li> <li>○ Power</li> </ul> </li> </ul>
	BOP	Peer checks rod withdrawal
	ATC	If dilution is performed: <ul style="list-style-type: none"> <li>• Places RCS Makeup control to Stop</li> <li>• Place RCS Makeup Mode selector to Dilute</li> <li>• Adjusts integrator to desired dilution amount</li> <li>• Places RCS Makeup control to Start</li> <li>• Observes:               <ul style="list-style-type: none"> <li>○ Proper makeup response</li> <li>○ Tavg</li> <li>○ Power</li> </ul> </li> </ul>
	BOP	Peer check dilution Adjust Low Flow Feed Reg Valves to maintain SG levels.
Lead Evaluator		When the following has been demonstrated/observed: <ul style="list-style-type: none"> <li>• Sufficient load ascension.</li> <li>• Sufficient normal plant operations by the BOP.</li> </ul> Then instruct Booth to insert Event 2.

Event Description: 23 SG Controlling Steam Flow Transmitter Fails High

Time	Position	Applicant's Actions or Behavior
	BOP/ATC	Diagnose failed instrument: High Steam Flow Channel Trip Alarm High Steam Flow indicated for 23 SG
	BOP	Refers to ARPs for alarms
	ATC	Places Channel A in service for 23 SG Steam Flow (may switch to the A Channel for Feed Flow as well)
	CRS	Directs team to perform immediate operator actions of 2-AOP-INST-1
	ATC	Checks all instruments listed in 2-AOP-INST-1
	CRS	Implements 2-AOP-INST-1 <ul style="list-style-type: none"> <li>• Verifies no other instrument failures</li> <li>• Ensures actions have been taken to stabilize the plant</li> <li>• Refers to Tech Spec Table 3.3.2-1 <ul style="list-style-type: none"> <li>○ 6 hour AOT to trip bistables</li> </ul> </li> <li>• Directs tripping of bistables (may ask SM for direction)</li> </ul>
Lead Evaluator		If the CRS asks the SM if bistables are to be tripped, a cue to trip bistables will be given.
	BOP	Trips the following bistable: In Rack A-11 Loop 3B SF > FWF
Lead Evaluator		When bistables have been tripped, direct the Booth Instructor to insert trigger for Event 3

Event Description: MCC-28 Trip on overcurrent.

Time	Position	Examinee's Actions or Behavior
	BOP/ATC	Diagnose loss of MCC-28
	BOP	Diagnose loss of power to two CRD Fans and review ARP-SLF Window 4-5, Common Control Rod Cooling Fan Tripped. <ul style="list-style-type: none"> <li>• Verify fans are available for restart</li> <li>• Restart tripped fans on MCC-28A</li> </ul>
	CRS	Direct implementation of ARP-SHF Window 3-8, MCC-28 Auto Trip.
	BOP	Restart CRD Fans
Lead Evaluator		NPO will report that investigation with FIN reveals that the breaker appears to have a mechanical issue that caused it to open. No flags were up on the breaker.  Alternate Path- if team requests changing out the MCC breaker report that time compression is being used and that a spare breaker has been inserted in the cubicle. Remove the malfunction and then mechanically close the breaker from the Rack in/ Rack out LOA.
	CRS	Review TRM for loss of power to VC Sump Pump <ul style="list-style-type: none"> <li>• TRM 3.4D Condition B- Start operable sump once per 24 hours and restore failed pump within 7 days.</li> </ul>
Lead Evaluator		Proceed to next event following crew brief, or at the discretion of the Lead Evaluator.

Op-Test No.: 1 Scenario No.: 1 Event No.: 4

Page 1 of 1

Event Description: Loss of offsite power due to Loss of Station Aux Transformer.

<b>Time</b>	<b>Position</b>	<b>Examinee's Actions or Behavior</b>
	BOP/CRS	Diagnose loss of offsite Power
	ATC	Diagnose loss of 21 Charging Pump
	ATC	Start 22 Charging Pump

Event Description: Complete loss of off site power resulting in a Reactor Trip

Time	Position	Examinee's Actions or Behavior
	CRS	When Unit trips, direct team to perform immediate actions of E-0 <ul style="list-style-type: none"> <li>• Verifies immediate actions using the procedure.</li> </ul>
	ATC	Verifies Reactor Trip: <ul style="list-style-type: none"> <li>• Reactor trip breakers open</li> <li>• Nuclear flux decreasing</li> <li>• Rod bottom lights lit</li> <li>• IRPIs &lt; 12.5 inches Verify Turbine is tripped</li> </ul>
	ATC	Verifies Turbine Trip by observing stop valves closed
	BOP	Check status of 480V buses Observe ONLY bus 5A is energized
	ATC	Check SI status Determine SI is not required
	BOP	Check AFW status Manually aligns 22 AFWP to supply >760 gpm to the S/Gs

**Critical Task**

**Establish at least 400 gpm AFW flow to the S/Gs before transition out of E-0 or tripping RCPs in FR-H.1**

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**Soon after AFW flow is established, 21 EDG will trip**

Event Description: 21 EDG will trip and team will enter ECA-0.0.

Time	Position	Examinee's Actions or Behavior
	CRS	Transitions to ECA-0.0, Loss of All AC Power and directs crew actions during implementation of ECA-0.0
	ATC	Verify Reactor trip <ul style="list-style-type: none"> <li>• Reactor trip breakers open</li> <li>• Nuclear flux decreasing</li> <li>• Rod bottom lights lit</li> <li>• IRPIs &lt; 12.5 inches Verify Turbine is tripped</li> </ul>
	ATC	Verifies Turbine Trip by observing stop valves closed
	BOP	Check if RCS is isolated <ul style="list-style-type: none"> <li>○ Isolates letdown</li> <li>○ Close LCV-459</li> <li>○ Close 200A, B, and D</li> </ul>
	BOP	Verifies AFW flow > 400 GPM
	CRS/BOP	Try to restore power <ul style="list-style-type: none"> <li>○ Manually actuate Safety Injection</li> </ul>
Lead Evaluator		<b>There is no 138KV from the Buchanan Switchyard. 138KV and 13.8KV are NOT available. IF asked, the team can attempt starting the Appendix R DG to restore 13.8KV supply. NPO will report major oil system failure and DG is not available. If asked, Unit 3 has tripped and is stable on the EDGs and meets Emergency Plan NUE classification if only IP3 were affected. ConEd reports widespread blackout across CT, Westchester, NYC and Long Island</b>

Event Description: 21 EDG will trip and team will enter ECA-0.0.

	BOP	<p>Place equipment to Pullout</p> <ul style="list-style-type: none"> <li>• Containment Spray Pumps</li> <li>• SI Pumps</li> <li>• FCUs</li> <li>• Motor Drive ABFPs</li> <li>• Turning Gear Oil pump</li> <li>• Bearing Oil pump</li> <li>• Turbine Auxiliary Oil pump</li> <li>• CCW Pumps</li> <li>• RHR Pumps</li> </ul> <p>Reset Safety Injection when directed by the CRS</p>
	CRS	<p>Direct RO/BOP to reset Safety Injection</p> <p>Dispatch Personnel to Locally Close Valves to Isolate RCP Seals and Place Valve Switches in CLOSED position</p> <ul style="list-style-type: none"> <li>• MOV-222, Seal Water Return Isolation</li> <li>• RCP Seal Injection valves 250A, B, C, and D</li> <li>• FCV-789, CCW return From RCP Thermal Barrier</li> </ul> <p>Isolate the CST</p> <p>Initiate depressurization of Steam Generators.</p>

**Critical Task**

**Isolate RCP Seal Injection before starting a Charging Pump**

Event Description: 22 EDG will be repaired and started

Lead Evaluator		<p>AFTER all of the following conditions are met, NPO call CCR and let them know that he is ready to start 22 EDG:</p> <ul style="list-style-type: none"> <li>○ NPO has been dispatched to isolate RCP seal injection per ECA-0.0 step 8</li> <li>○ All 480V buses have been de-energized for &gt;15 minutes (use time from RX trip on PICS)</li> <li>○ CCR has been notified by NPO that 22 EDG is ready to start and CCR has provided permission to NPO to start 22 EDG</li> </ul> <p>THEN clear the air start failure, reset 22 EDG, and start it:</p> <ul style="list-style-type: none"> <li>○ Delete air start malfunction: DMF MAL-DSG003B</li> <li>○ Initiate trigger 6</li> </ul>
	CRS	Provide permission to NPO to start 22 EDG
	BOP	<p>Diagnose 22 EDG is running and bus 2A/3A energized</p> <ul style="list-style-type: none"> <li>○ Observe no SW pump running</li> <li>○ Manually start 22 ESW Pump</li> </ul>
	CRS	Ensure SW Pump running for 22 EDG
<b>Critical Task</b>		
<b>Manually start the ESW pump such that the EDG does not fail because of damage caused by engine overheating</b>		
	CRS	<p>Continue recovery actions with ECA-0.0 step 24</p> <p>Refers to step 18b to reset SI</p> <p>Directs actions to load equipment onto 2A/3A</p>
	BOP	<p>Reset SI (if not previously reset)</p> <p>Verify EDG SW valves open</p> <p>Verify equipment loaded onto bus 2A/3A</p>
	CRS	Transition to ECA-0.1 OR ECA-0.2
Lead Evaluator		After review of the scenario set for the exam, this scenario may be terminated at this point provided a valid exam with the required attributes is given to all candidates.

## **Post Scenario Event Classification**

### **Event Classification - Site Area Emergency Alert**

**EAL 6.1.4** following determination of the inability to power required core cooling systems with alternate power sources for greater than 15 minutes and loss of all AC for greater than 15 minutes

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## Turnover Information

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<b>Date/Time:</b>	Today/Now
<b>Condition:</b>	Power Ops
<b>% Power:</b>	16%
<b>Xenon:</b>	Equilibrium
<b>RCS Boron:</b>	1621 ppm
<b>PZR Press Control:</b>	Channel 1
<b>PZR Level Control:</b>	Channel 2
<b>RCS Total Leakage:</b>	0.1 gpm
<b>RCS Unidentified Leakage:</b>	0.01 gpm
<b>Condenser Air leakage</b>	6 SCFM
<b>RCS Gas activity</b>	1.78E-2 $\mu\text{Ci/cc}$
<b>Risk Assessment:</b>	Yellow

### Plant Equipment Status:

1. 23 EDG is out of service due to a malfunctioning governor. Maintenance is complete and post maintenance testing will be performed this shift.
2. TS 3.8.1.B surveillance requirement last performed 3 hours ago.
3. 21 and 22 EDGs are protected equipment. 138KV and 13.8KV Offsite Power Supplies are protected.

### Instructions:

Return power to 100% at 200 MW/hr.

Facility: Indian Point 2 Scenario No.: 2

Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions:  
 The Plant is in a 100% normal full power lineup.

Turnover:  
 21 Charging Pump and 21 CCW pump are out of service.

Event No.	Malf. No.	Event Type*	Event Description
1	XMT RCS043A	I (ALL) TS (CRS)	RCS Loop 23 T-Hot fails high
2	N/A	R (ATC) N (CRS) N (BOP)	Rapid Load Shutdown
3	MAL CRF002AV	C (ATC) C (CRS) TS (CRS)	Control Rod P-6 "ratchets in" during rod motion.
4	MOT CVC004A	C (ATC) C (CRS) TS (CRS)	22 Charging Pump trips.
5	MAL SGN004A	M (ALL)	Steam Break down stream of 21 MSIV & Check Valve in Aux Boiler Feed Pump Building.
6	PLP RHR033  PLP RHR022  RLY PPL487  RLY PPL488  MOV RHR011	M (ALL)	LOCA outside Containment in Primary Auxiliary Building (PAB) Safety Injection fails to Auto Actuate requiring Manual Actuation. RHR valve 746 will fail to auto open requiring Manual Action

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

## **Session Outline:**

The evaluation begins with the plant at 100% power steady state operation.

21 Charging Pump and 21 CCW pump are out of service.

Shortly after the crew assumes the watch 23 Loop T-hot instrument fails high. The team will take actions in accordance with 2-AOP-INST-1, Instrument and Controller Failures.

The Shift Manager will call the control room and report that 24 SG Feed Regulating Valve air line has been damaged by a maintenance crew. The shift manager will direct the team to begin a rapid shutdown in accordance with 2-AOP-RSD-1.

After adequate power reduction has taken place, Control Rod P-6 will ratchet into the core due to a movable gripper failure, requiring the load reduction to be stopped and the condition evaluated per 2-AOP-ROD-1.

After the load reduction is resumed, 22 Charging pump will trip. The crew will respond using 2-AOP-CVCS-1 and isolate letdown. Charging and letdown then will be re-established.

Subsequently a Main Steam Rupture will occur downstream of 21 MSIV and check valve. The team may use 2-AOP-UC-1 to trip the reactor and close the MSIVs.

Simultaneously with the reactor trip, a rupture will occur on the RHR discharge header outside of containment. Automatic SI will fail to actuate when demanded, requiring manual actuation.

The team will progress through E-0 and may determine that RCP trip criteria is met. (This depends on the magnitude of the cooldown during the steam break.) The BOP will manually open MOV-746 while performing E-0 Attachment 1. The team will continue in E-0 until a transition to ECA-1.2 is directed. In ECA-1.2, the source of the LOCA outside containment will be identified and isolated. The scenario is terminated when the team has determined a transition to E-1 is required.

Procedural flow path: 2- AOP-INST-1, 2-AOP-RSD-1, 2-AOP-ROD-1, 2-AOP-CVCS-1, 2-AOP-UC-1, 2-E-0, 2-ECA-1.2, 2-E-1.

## Scenario Critical Task and Event Analyses

### Critical Tasks:

#### CT-1

Manually actuate at least one train of SIS-actuated safeguards before any of the following:

- Transition to any E-1 series, E-2 series, or E-3 series procedure or transition to any FRP.
- Completion of step 5.a of ES-0.1.

### Actions to complete task:

Automatic actuation of SI will not occur. Team must manually actuate SI via pushbuttons.

#### CT-2

When RCP trip criteria are met, trip all RCPs prior to completion of the first step in the EOP network that directs tripping RCPs.

### Actions to complete task:

BOP/ATC will secure RCPs once the RCP trip criteria is met

#### CT-3

Isolate the LOCA outside of containment before transition out of ECA-1.2.

### Actions to complete task:

BOP/ATC will Close RHR pump cold leg injection valves 746 and 747

### **Credited Events:**

1. RCS Loop 23 T-Hot fails high. The ATC should diagnose the event with help from the BOP. ATC should take Charging pump control and Rod control to manual control and perform the immediate actions of AOP-INST-1. CRS will implement the AOP. BOP will remove the affected channel from service.
2. Team will commence Rapid Shutdown. CRS will supervise activities of the crew. ATC will develop a reactivity plan for the shutdown and perform the shutdown. BOP will perform peer checks and load reductions.
3. Control Rod P-6 "ratchets in" during rod motion. CRS will evaluate Tech Specs. ATC will verify or place rod control in manual.
4. 22 Charging Pump trips. BOP will close 200A, B, C and LCV-459. ATC will start a charging pump. BOP will restore letdown.
5. Steam Break down stream of 21 MSIV & Check Valve in Aux Boiler Feed Pump Building. CRS will direct actions of AOP-UC-1. ATC will manually trip the reactor and verified it is tripped. BOP will close all MSIVs.
6. LOCA outside containment in the PAB. ATC will manually initiate SI when the auto actuation fails. BOP will be operating equipment on the panel in accordance with Attachment 1 including opening RHR 746 which will fail to auto open. ATC will secure RCPs when sub-cooling lowers and reset SI. CRS will diagnose LOCA outside containment and transition to ECA-1.2. CRS will coordinate and supervise activities. BOP will isolate the LOCA by closing RHR pump cold leg injection valves 746 and 747.

<b>Simulator Setup and Instructor Directions</b>		
<b>Setup/Event</b>	<b>INSTRUCTOR ACTIONS</b>	<b>EXPECTED RESPONSE/INSTRUCTOR CUES</b>
IC Reset	118	Reset Simulator to 100% power IC.
SES Setup Schedule File	Load schedule and verify malfunctions and over-rides have been entered	<ul style="list-style-type: none"> <li>○ Racks out 21 Charging Pump 480V breaker.</li> <li>○ Racks out 21 CCW Pump 480V breaker.</li> <li>○ Loads movable gripper malfunction on control rod P-6.</li> <li>○ Loads failure of Auto SI master relays SIA-1&amp;2.</li> <li>○ Loads auto open failure MOV-746.</li> <li>○ Loads steam line break on trigger 1.</li> <li>○ Sets conditional trigger 30 which auto actuates when reactor trip occurs.</li> <li>○ Loads malfunctions to cause RHR piping LOCA outside containment on trigger 30.</li> <li>○ Loads failure of 23 MSIV Remote Closure</li> </ul>
Floor Setup	<p>Perform setup checklist.</p> <p>Place pump control switch for 21 Charging Pump in TPO and apply danger tag.</p> <p>Place pump control switch for 21 CCW Pump in TPO and apply danger tag.</p>	<p>Watch team walks the panels and informs Lead Evaluator when ready to take the watch.</p> <p>Place Protected equipment placards on the other Charging and CCW pumps.</p> <p>Update the Protected Equipment LCD screen.</p>
Event 1	Actuate Trigger 1 At lead evaluator direction	XMT-RCS043A RCS Loop 23 hot leg temperature fails high
Role Play	Acknowledge requests for I&C to troubleshoot	I&C will develop a troubleshooting plan
Event 2	As SM tell team to commence rapid shutdown	Team begins load reduction using AOP-RSD-1
Event 3	Occurs following rod motion:	Rod P-6 ratchets in during rod motion IMF MAL-CRF002AV

Simulator Setup and Instructor Directions		
Setup/Event	INSTRUCTOR ACTIONS	EXPECTED RESPONSE/INSTRUCTOR CUES
Role Play	<p>Acknowledge requests for I&amp;C to troubleshoot</p> <p>Acknowledge requests for Reactor Engineer assistance.</p>	<p>I&amp;C will develop a troubleshooting plan Using "time compression" report back that I&amp;C troubleshooting has discovered an open circuit on the movable gripper circuit for rod P-6.</p> <p>Reactor Engineer will report to CCR. Using "time compression" report back that RE has determined CCR should allow rod P-6 to ratchet the rest of the way into the core rather than attempting to retrieve it.</p>
Event 4	Actuate Trigger 4 At lead evaluator direction:	MOTCVC004A winding short in 22 Charging Pump
Event 5	Actuate Trigger 5 At lead Evaluator direction	Steam Line Rupture Downstream of MSIVs. RCS Leak Outside of VC. Failure of automatic actuation of Safety Injection. Manual initiation required.
Role Play	When NPO dispatched	Close 23 MSIV without delay.
Role Play	<p>When RO/CRS are checking SI flow in E-0 step 8.</p> <p>Nuclear NPO calls CCR to report:</p>	"A large leak of steam is billowing up from the mezzanine area. I cannot get close due to steam"
Role Play	When NPOs dispatched:	Perform field actions as requested.

Event Description: Loop 23 Hot leg temperature fails high

Time	Position	Applicant's Actions or Behavior
	BOP/ATC	Diagnose failed instrument: High T-AVE 568F T AVE Deviation OVERPOWER Delta-T Channel Trip or Rod Stop OVERTEMP Delta-T Channel Trip or Rod Stop Delta-T Deviation T AVE T REF Deviation 5F T AVE Loop 3 reading higher than normal Rod Step Speed indicating 72
	BOP	Refers to ARPs for alarms
	ATC	Place Rod control and Charging Pumps to manual
	CRS	Directs team to perform immediate operator actions of 2-AOP-INST-1
	ATC	Checks all instruments listed in 2-AOP-INST-1
	CRS	Implements 2-AOP-INST-1 <ul style="list-style-type: none"> <li>• Verifies no other instrument failures</li> <li>• Ensures actions have been taken to stabilize the plant</li> <li>• Refers to Tech Spec Table 3.3.2-1               <ul style="list-style-type: none"> <li>○ 72 hour AOT to trip bistables</li> </ul> </li> <li>• Directs tripping of bistables (may ask SM for direction)</li> </ul>
Lead Evaluator		If the CRS asks the SM if bistables are to be tripped, a cue to trip bistables will be given.
	BOP	Trips the following bistables: In Rack D-10 Switch T/412A to DEFEAT LOOP 3 In Rack B-8 Switch T/411B to DEFEAT LOOP 3
	CRS/ATC	Return Rod control and Charging Pumps to AUTO
Lead Evaluator		Inform team that a Rapid Shutdown is required due to 24 SG Feed Regulating Valve air line has been damaged by maintenance. Perform plant Shutdown in 2 hours.

Event Description: Perform Rapid Shutdown

<b>Time</b>	<b>Position</b>	<b>Examinee's Actions or Behavior</b>
	CRS ATC	Develop shutdown plan and reactivity plan.
	CRS	Supervise activities of the crew during rapid shutdown. <ul style="list-style-type: none"><li>○ Performs a crew brief on shutdown plan.</li><li>○ Directs the RO to perform the reactivity plan.</li><li>○ Directs load reduction.</li></ul>
	ATC	Develops reactivity plan. <ul style="list-style-type: none"><li>○ Borates the reactor.</li><li>○ Monitors critical parameters during load reduction.</li></ul>
	BOP	Performs actions as directed by the CRS during load reduction. <ul style="list-style-type: none"><li>○ Peer checks reactivity manipulations (when personnel available).</li><li>○ Performs load reduction when directed by CRS.</li></ul>
	ATC CRS	When rod motion occurs, diagnoses rod P-6 is misaligned. <ul style="list-style-type: none"><li>○ Discuss stopping the shutdown.</li><li>○ Stabilize the plant per AOP-RSD-1 Attachment 1.</li></ul>
	Lead Evaluator	Proceed to next event when the team diagnoses a misaligned control rod.

Event Description: Control Rod P-6 "ratchets in" during rod motion

Time	Position	Examinee's Actions or Behavior
Lead Evaluator		Rod P-6 has a failed moving gripper. <i>Alarm SF 2-7 Control Rod or Power Distribution Trouble.</i> <i>Alarm FC 2-4 NIS Power Range Channel Deviation 3%.</i> <i>Control Rod P-6 IRPI indicates lower than the rest of Control Bank D.</i> <i>PICS alarms for Rod to Bank deviation and Rod to Rod deviation.</i>
	CRS ATC	Diagnose Rod P-6 misaligned (dropped if rod motion not stopped).
	CRS	Implement AOP-ROD-1. Supervise the actions of the crew during AOP-ROD-1.
	CRS ATC	Perform AOP-ROD-1 actions: <ul style="list-style-type: none"> <li>○ Check if entry into the AOP was due to continuous unwarranted rod motion.</li> <li>○ Go to section for Misaligned Rod.</li> <li>○ Determine that the malfunction is clearly a misaligned rod.</li> <li>○ Verify Rod Control is in manual and operate rods in manual as directed by CRS.</li> <li>○ Direct I&amp;C to investigate.</li> </ul>
	CRS	Evaluate the following TS: <ul style="list-style-type: none"> <li>3.1.4 (Rod Group Alignment Limits).</li> <li>3.2.3 (Axial Flux Difference (AFD)).</li> <li>3.2.4 (Quadrant Power Tilt Ratio (QPTR)).</li> </ul> (Cue from Reactor Engineer)
	ALL	Continue with AOP-RSD-1 Shutdown.
Lead Evaluator		At the discretion of the Lead Evaluator, direct the Booth Instructor to actuate trigger 4.

Event Description: 22 Charging Pump trips

Time	Position	Examinee's Actions or Behavior
	ATC	Diagnose trip of 22 Charging pump
	BOP	Perform ARPs for associated alarms <ul style="list-style-type: none"> <li>○ SH 3-10 480V SWGR Motor Trip (Common)</li> <li>○ SF 3-5 RCP Thermal Barrier Low Delta-P <math>\theta</math></li> </ul> Dispatch NPO to 22 Charging pump, to 480V room breaker, and to standby pump selected for start.
	CRS	Direct actions of AOP-CVCS-1, "Loss of Charging or Letdown"
	CRS BOP	Perform AOP-CVCS-1 actions as directed by CRS <ul style="list-style-type: none"> <li>○ Close 200A, B, C and LCV-459</li> <li>○ Verify VCT level &gt; 9%</li> <li>○ Check 112C open</li> <li>○ Determine indications of gas buildup in charging pump suction did not exist prior to pump trip</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>○ Start selected Charging pump</li> <li>○ Adjust speed to control RCP seal injection</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>○ Restore letdown per Attachment 2</li> </ul>
Lead Evaluator		NOTE: Team may utilize ARP SFF, Window 3-5 "Low Thermal Barrier Delta-P to start a charging pump.
	CRS	Monitor PRZR Level. If $\geq 65.1\%$ , then evaluate ITS 3.4.9. Evaluate TRO 3.1.B.1.c) Boration Systems requirements.
Lead Evaluator		When charging and letdown have been reestablished, proceed to the next event. At the discretion of the lead evaluator, direct the Booth Instructor to actuate trigger 5

Event Description: Steam Break down stream of 21 MSIV and Check Valve in the AUX Boiler Feed Pump Building

Time	Position	Examinee's Actions or Behavior
	CRS ATC	Diagnose Steam Leak.
	CRS ATC	Implement AOP-UC-1 Direct operators to perform the following: <ul style="list-style-type: none"><li>○ Manually trip the reactor.</li><li>○ Verify the reactor is tripped.</li></ul>
	BOP	<ul style="list-style-type: none"><li>○ Close MSIVs.</li></ul>
	CRS	<ul style="list-style-type: none"><li>○ Go to E-0.</li></ul>
Lead Evaluator		When the reactor trip breakers open the LOCA commences on the RHR piping in the PAB piping penetration. SI will fail to actuate. The team will perform E-0 and successfully isolate the leak in ECA-1.2

Event Description: LOCA outside containment in the PAB. SI fails to Auto actuate and RHR valve 746 will fail to auto open

Time	Position	Examinee's Actions or Behavior
	CRS	When Unit trips, direct team to perform immediate actions of E-0 <ul style="list-style-type: none"> <li>• Verifies immediate actions using the procedure.</li> </ul>
	ATC	Verifies Reactor Trip: <ul style="list-style-type: none"> <li>• Reactor trip breakers open</li> <li>• Nuclear flux decreasing</li> <li>• Rod bottom lights lit</li> <li>• IRPIs &lt; 12.5 inches Verify Turbine is tripped</li> </ul>
	ATC	Verifies Turbine Trip by observing stop valves closed
	BOP	Check status of 480V buses
	ATC	Check SI status
	<b>Critical Task</b>	<p><b>Manually actuate at least one train of SIS-actuated safeguards before any of the following:</b></p> <ul style="list-style-type: none"> <li>○ <b>Transition to any E-1 series, E-2 series, or E-3 series procedure or transition to any FRP</b></li> <li>○ <b>Completion of step 5.a of ES-0.1</b></li> </ul>
	BOP	<p>Perform E-0 immediate actions.</p> <p>Perform E-0 Attachment 1.</p> <ul style="list-style-type: none"> <li>○ Start a charging pump.</li> <li>○ Dispatch NPO to reset lighting and MCCs 24A, 27A, 29A.</li> <li>○ Stop Condensate Pumps.</li> <li>○ Check automatic actions.</li> <li>○ OPEN MOV-746.</li> </ul>

Event Description: LOCA outside containment in the PAB. SI fails to Auto actuate and RHR valve 746 will fail to auto open

Time	Position	Examinee's Actions or Behavior
	ATC	Perform actions directed by CRS. <ul style="list-style-type: none"> <li>○ Dispatch NPO to align service water valves.</li> <li>○ Start 25 SWP.</li> <li>○ When RCS sub-cooling lowers, check RCP trip criteria and stop all RCPs.</li> <li>○ Reset SI.</li> <li>○ Diagnose abnormal PAB radiation due to LOCA outside containment.</li> </ul>
	<b>Critical Task</b>	<b>When RCP trip criteria are met, trip all RCPs prior to completion of the first step in the EOP network that directs tripping RCPs.</b>
	CRS	Evaluate plant conditions and diagnose LOCA outside containment.
	CRS	Transition to ECA-1.2 and supervise the actions of the crew to identify and isolate the leak.
	CRS ATC	Perform ECA-1.2 actions. <ul style="list-style-type: none"> <li>○ Verify SI reset.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>○ Close RHR pump cold leg injection valves 746 and 747.</li> <li>○ Observe rising RCS pressure.</li> </ul>
	ATC	Diagnose LOCA outside containment has been isolated.
	<b>Critical Task</b>	<b>Isolate the LOCA outside of containment before transition out of ECA-1.2. (Team will close 746 and 747)</b>
	CRS	Transition to E-1.
Lead Evaluator		Terminate scenario following transition to E-1, or at the discretion of the Lead Evaluator.

## **Post Scenario Event Classification**

Event Classification - Site Area Emergency Alert

**EAL 4.1.3** Inability to isolate any primary system discharging outside containment AND Radiological release to the environment exists as a result.

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## Turnover Information

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<b>Date/Time:</b>	Today/Now
<b>Condition:</b>	Power Ops
<b>% Power:</b>	100%
<b>Xenon:</b>	Equilibrium
<b>RCS Boron:</b>	1040 ppm
<b>PZR Press Control:</b>	Channel 1
<b>PZR Level Control:</b>	Channel 2
<b>RCS Total Leakage:</b>	0.1 gpm
<b>RCS Unidentified Leakage:</b>	0.01 gpm
<b>Condenser Air leakage</b>	6 SCFM
<b>RCS Gas activity</b>	1.78E-2 $\mu\text{Ci/cc}$
<b>Risk Assessment:</b>	Yellow

### Plant Equipment Status:

1. 21 Charging pump is out of service for troubleshooting. Scoop tube positioner erratic operation. 22 and 23 Charging pumps are protected.
2. 21 CCW pump is out of service to replace pump packing. 22 and 23 CCW Pumps are protected.

### Instructions:

Maintain current 100% Steady State operations.

Facility: Indian Point 2 Scenario No.: 3

Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Initial Conditions:**

Reset simulator to IC-115  
 The Plant is at 30% power. 21 EDG is OOS for major PM.

**Turnover:**

Return plant to 100% power.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (ATC) N (CRS) N (BOP)	Power Escalation
2	XMT-SGN037A	I (ALL) TS (CRS)	PT-419C (31 SG C Channel Pressure) fails high causing 21 ADV to fail open requiring manual closure.
3	MOC CCW003A MOC CCW001/2	C(CRS) C (BOP) TS (CRS)	23 CCW Pump trips and 21 and 22 CCW Pump fail to auto start
4	MAL-RCS002A	C (ALL) TS (CRS)	35 gpm RCS leak.
5	MAL-RCS001A	M (ALL)	Large Break RCS LOCA.
6	MOC-RHR003/4	C (CRS) C (BOP)	RHR pumps will not auto start and need to be started manually.
7	RLY-PPL085/090	C (BOP)	Failure of Containment Phase A requiring manual initiation.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

## **Session Outline:**

The evaluation begins with the plant at 30% power steady state operation. The team is instructed to raise power to return to full load. The following equipment is out of service:

- 21 EDG is out of service for 36 hours for malfunctioning governor. Maintenance is in progress with expected return to service this shift.

After starting the power ascension, a SG pressure channel (PT-419C) fails high. The team will take actions in accordance with 2-AOP-INST-1, Instrument/Controller Failures.

Prior to completion of the Subsequent Actions of 2-AOP-INST-1, 23 CCW Pump will trip. 21 and 22 CCW Pumps will fail to auto start requiring the BOP to manually start 21 or 22 CCW Pump before RCP trip is required.

After CCW is restored, a 35 gpm RCS leak will occur. The crew will diagnose RCS leakage, quantify the leak rate and take actions per 2-AOP-LEAK-1.

Large Break LOCA will occur. The team will perform actions of E-0, Reactor Trip or Safety Injection. Both RHR Pumps will fail to Auto start and must be started manually. Containment Isolation Phase A will fail to auto actuate requiring manual actuation by the operator. Fan Cooler Units 23 and 25 will trip due to bearing failures and will remain out of service for the remainder of the scenario. The team will subsequently transition to E-1, Loss of Reactor or Secondary Coolant.

When RWST level decreases to 9.24 feet, the team will transition to ES-1.3, Transfer to Cold Leg Recirculation. The team will take the appropriate action to place a train of recirculation in service. The scenario is terminated when recirculation is established to one train and SI pumps are secured.

Procedure flow path: 2-AOP-INST-1, 2-AOP-CCW-1, 2-AOP-LEAK-1, 2-E-0, 2-E-1, 2-ES-1.3

## Scenario Critical Task and Malfunction Analyses

### Critical Tasks:

#### CT-1

Manually start at least one low-head ECCS pump before completion of E-0 Attachment 1.

#### Actions to complete task :

21 and 22 RHR Pumps will be started. The team may notice that the pumps did not start and start them due to an automatic system not working properly. E-0 main body has a prompt to check RHR Pump status, and Attachment 1 checks RHR Pump Status.

#### CT-2

Close containment isolation valves such that at least one valve is closed on each critical penetration before the end of the scenario.

#### Actions to complete task :

Automatic Phase A will not work and manual use of pushbuttons is successful;

#### CT-3

Transfer to cold leg recirc and establish minimum ECCS requirements of ES-1.3 prior to core uncover based on CET temperature exceeding 700°F.

#### Actions to complete task :

Team will have to establish cold leg recirc per ES-1.3. Failure of the team to adequately progress through ES-1.3 could lead to having to secure all injection into the RCS (when RWST level reaches 3 ft.) prior to establishing internal recirc.

### Credited Events:

1. Power escalation. ATC will add positive reactivity via dilution and/or rods. BOP will increase MTG load. CRS will coordinate activities.
2. PT-419C fails high. The ATC should diagnose the event with help from the BOP. The ATC will place 21 SG ADV in manual and closed. The CRS will implement the AOP and have the BOP trip bistables. This malfunction also requires evaluation of Tech Specs by the CRS.
3. 23 CCW Pump will trip. 21 and 22 CCW Pumps will fail to auto start requiring the BOP to manually start 21 or 22 CCW Pump before RCP trip is required. The CRS will coordinate and supervise activities.
4. RCS leak and LOCA. Initially the leak rate will be 35 gpm. There are no specific actions required by the team, so no actions are credited, however, time will be allowed for them to calculate leak rate. This will be challenging because of changing plant load and putting Excess Letdown in service. The CRS will have time to evaluate Tech Specs for the leak.
5. When the leak rate is increased to a LOCA, this will be a major malfunction.
6. RHR pumps do not auto-start. This will require manual action to prevent challenging core cooling. Credit is given to the BOP since this addressed by E-0 Attachment 1, however, the CRS may direct the ATC to perform this action.
7. Phase A will not actuate automatically. This will require manual action by the BOP to isolate containment.

<b>Simulator Setup and Instructor Directions</b>		
<b>Setup/Event</b>	<b>INSTRUCTOR ACTIONS</b>	<b>EXPECTED RESPONSE/INSTRUCTOR CUES</b>
<b>IC Reset</b>	<b>Reset Simulator to IC-115</b>	Reset Simulator to 30% power IC.
<b>Schedule Setup</b>	<b>Run schedule for NRC Scenario 3.</b>	<ol style="list-style-type: none"> <li>1. Loads LOA-DSG055 to OFF</li> <li>2. Loads LOA-DSG032 to OUT</li> <li>3. Loads MOC-RHR003 to AUT_CLS</li> <li>4. Loads MOC-RHR004 to AUT_CLS</li> <li>5. Loads MOC-CCW001 to AUT_CLS</li> <li>6. Loads MOC-CCW002 to AUT_CLS</li> <li>7. Loads RLY-PPL085 to STUCK_CONTACTS</li> <li>8. Loads RLY-PPL090 to STUCK_CONTACTS</li> <li>9. Loads XMT-SGN037A to 1400.00000 on event 2</li> <li>10. Loads MOT-CCW003A to WINDING_SHORT on event 3</li> <li>11. Loads MAL-RCS002A to 0.00650 on event 4</li> <li>12. Loads MAL-RCS001A on event 5</li> <li>13. Loads MOT-CNM010A after 30 to WINDING_SHORT on event 30</li> <li>14. Loads MOT-CNM012B after 22 to 100.00000 on event 30</li> <li>15. Loads RLY-PPL085 to N/A on event 20</li> <li>16. Loads RLY-PPL090 to N/A on event 21</li> <li>17. Create Event 30 jbkrt==0 -desc RTA Open</li> <li>18. Create Event 20 xdoi047f==1 -desc Phase A Train A Push Button</li> <li>19. Create Event 21 xdoi048f==1 -desc Phase A Train B Push Button</li> </ol>
<b>Floor Setup</b>	<b>Perform setup checklist.</b>	<p>Hang protected equipment signs for 22 and 23 EDGs.</p> <p>Place 21 EDG 52/EG1 to pullout and apply danger tag.</p> <p>Update the protected equipment PC.</p> <p>Ensure Rod Control is in manual</p>
<b>Event 1</b>	<b>No Booth actions other than responding to requests and communications from the crew.</b>	<b>Crew performs power ascension.</b>
<b>Event 2</b>	<b>Actuate Trigger 2 (there is no trigger 1) At lead evaluator direction</b>	<p>21 SG Pressure Channel C Fails High</p> <p>XMT-SGN037A FIXED OUTPUT failed high with no ramp or delay.</p>

<b>Simulator Setup and Instructor Directions</b>		
<b>Setup/Event</b>	<b>INSTRUCTOR ACTIONS</b>	<b>EXPECTED RESPONSE/INSTRUCTOR CUES</b>
<b>Role Play</b>	Acknowledge requests for I&C to troubleshoot.  When CRS asks SM if B/S should be tripped:	I&C will develop a troubleshooting plan.  Provide cue that SM requests bistables be placed in trip.
<b>Event 3</b>	Actuate Trigger 3 <b>At lead evaluator direction</b>	23 CCW Pump trips MOT-CCW003A to short the windings on the CCW Pump.
<b>Event 4</b>	Actuate Trigger 4 <b>At lead evaluator direction.</b>	35 gpm RCS Leak  MAL-RCS002A failed to 0.003 no ramp or delay.
<b>Event 5</b>	Actuate Trigger 5 <b>At lead evaluator direction.</b>	LBLOCA 31 CL  MAL-RCS001A to TRUE with no ramp or delay
<b>Note:</b>		When SI is actuated, the following SI equipment will not auto-start (manual available): 21 RHR Pump 22 RHR Pump.  The following will fail and not be able to be started either in Auto or Manual: 23 FCU 25 FCU.
<b>Role Play</b>	If asked to investigate 23 and 25 FCU failures:	Overcurrent trip actuated on both breakers. No obvious problem (no visual damage and no smell of burning or over heat condition).
<b>Role Play</b>	At CCR Request:	Perform various LOAs per NPO Task List.

Op-Test No.: <u>1</u> Scenario No.: <u>3</u> Event No.: <u>1</u>		Page <u>1</u> of <u>1</u>
Event Description: Power Escalation		
Time	Position	Applicant's Actions or Behavior
	CRS	<p>Supervise the actions of the team during power reduction</p> <ul style="list-style-type: none"> <li>• Refers to POP-2.1 Attachment 2, Reactor Power Ascension Checklist and Attachment 1, Operation At Power.</li> <li>• Refers to Reactivity Summary Sheet</li> <li>• Develops and implements a reactivity plan (should be done prior to team taking watch)</li> <li>• Directs the ATC to make reactivity additions</li> <li>• Directs the BOP to make turbine load changes</li> </ul>
	ATC	<p>Commences dilution using 2-SOP-3.2, Reactor Coolant System Boron, and/or withdraws Control Rods to raise Tavg to support load increase.</p> <p>Observes: Tavg, NIs</p>
	BOP	Peers Checks dilution and/or rod withdrawal.
	BOP	<p>Initiate generator load increase at rate directed by CRS</p> <ul style="list-style-type: none"> <li>• Monitor Tave – Tref deviation</li> <li>• Coordinate load increase with ATC reactivity addition rate.</li> <li>• Maintain Feed Water Regulating Valve controllers manual setpoint nulled during power reduction.</li> </ul>
	ATC	Peers Checks MTG load increase

Op-Test No.: 1 Scenario No.: 3 Event No.: 2Page 1 of 1

Event Description: PT-419C (31 SG C Channel Pressure) fails high causing 21 ADV to fail open requiring manual closure.

Time	Position	Applicant's Actions or Behavior
	BOP	Observes Steam Line Delta-P 21 CHNL Trip 155 PSID alarm.
	ATC	Observes PI-419C is pegged high and increased steam flow on 21 SG
	ATC	Diagnoses PT-419C has failed high
	ATC	Places 21 SG ADV in manual and closes valve
	CRS	Instructs team to perform immediate operator actions of 2-AOP-INST-1
	ATC	Checks all instrumentation associated with instrument failures covered by 2-AOP-INST-1. No additional actions are necessary. Announces immediate actions complete.
	CRS	Instructs team that they are entering 2-AOP-INST-1
	CRS/ATC	Re-checks all instrumentation associated with instrument failures covered by 2-AOP-INST-1. Verifies that no additional actions are necessary.
	CRS	Evaluate TS 3.3.2. <ul style="list-style-type: none"> <li>• Function 1e and g.</li> <li>• Function 4e.</li> <li>• Determine Condition A requires review of table 3.3.2-1 and associate actions.</li> <li>• From table 3.3.2-1 determine Condition D requires bistables placed in trip within 72 hours.</li> </ul>
	CRS	Consults with SM to determine if bistables are to be tripped. <b><i>When called the Booth will inform team that bistables will be tripped. The CRS may just elect to trip bistables without consulting SM. This is allowed per 2-AOP-INST-1 step 4.39.</i></b>
	BOP	Trips bistables in Rack B-9: <ul style="list-style-type: none"> <li>• Loop 1C, Low Pressure SI</li> <li>• Loop 1C, P1&lt;P4-A</li> <li>• Loop 1C, P4&lt;P1-A</li> </ul>
Lead Evaluator		When bistables are tripped, have Booth initiate Event 3

Op-Test No.: 1 Scenario No.: 3 Event No.: 3Page 1 of 1

Event Description: Trip of 23 CCW pump.

Time	Position	Applicant's Actions or Behavior
	BOP	Diagnose that 23 CCW pump has tripped:
	CRS	Enters 2-AOP-CCW-1
	CRS/BOP	CRS coordinate with BOP to manually start 21 or 22 CCW Pump
Lead Evaluator		When CCW is restored initiate Event 4

Op-Test No.: <u>1</u> Scenario No.: <u>3</u> Event No.: <u>4</u>		Page <u>1</u> of <u>1</u>
Event Description: 35 gpm RCS leak.		
Time	Position	Applicant's Actions or Behavior
	CREW	Diagnose RCS Leakage: <ul style="list-style-type: none"> <li>• VCT level decrease</li> <li>• PZR level decrease</li> <li>• Containment humidity increase</li> <li>• Containment Sump level increase</li> </ul>
	CRS	Enters 2-AOP-LEAK-1
Lead Evaluator		Booth operator acting as SM or OM will ask CRS what implications leak rate has on continued operation. This will prompt determination of leak rate and evaluation of T.S.
	ATC or BOP	Team should quantify leak rate using: <ul style="list-style-type: none"> <li>• Seal injection flows</li> <li>• Seal return flows</li> <li>• VCT level trend</li> <li>• PZR level trend</li> </ul>
	CRS	Determine required shutdown due to leak rate. T.S. 3.4.13 requires leakage to be reduced within 4 hours. Be in Mode 3 in 6 hours after 4 hours exceeded.
	CREW	Team may: <ul style="list-style-type: none"> <li>• Adjust charging pump speed</li> <li>• Isolate Excess Letdown</li> </ul>
Lead Evaluator		When team has quantified leak rate and CRS has evaluated T.S., have Booth initiate Event 5.

Op-Test No.: 1 Scenario No.: 3 Event No.: 5Page 1 of 1

Event Description: Large Break RCS LOCA.

Time	Position	Applicant's Actions or Behavior
	CRS	Direct team to perform immediate operator actions of E-0
	ATC	Verifies Reactor Trip: <ul style="list-style-type: none"> <li>• Reactor trip breakers open</li> <li>• Nuclear flux decreasing</li> <li>• Rod bottom lights lit</li> <li>• IRPIs &lt; 12.5 inches</li> </ul>
	ATC	Verifies Turbine Trip by observing stop valves closed
	BOP	Verifies Power to 480V Busses - all powered from offsite power
	ATC	Verifies SI has actuated in both trains
	CRS	Enters E-0 and performs read-through of steps 1-4
	CRS	Recognizes foldout criteria are met for tripping RCPs
	ATC	Trips RCPs
	CRS	Directs BOP to perform E-0 Attachment 1
<p><b>Note:</b></p> <p><b>Actions will be continued on Event 6 and 7 D-2s</b></p>		

Op-Test No.: 1 Scenario No.: 3 Event No.: 6Page 1 of 1

Event Description: RHR pumps will not auto start and need to be started manually.

Time	Position	Applicant's Actions or Behavior
<b>Note:</b>		
<i>Depending on how the crew responds, Events 6 and 7 may be addressed in either order. Also, since the BOP is performing Attachment 1 in parallel, the actions may be addressed at different points in E-0.</i>		
	CRS/ATC	Verify AFW Pumps and Flow
<b>Critical Task 1</b> Manually start at least one RHR pump before completion of E-0 Attachment 1		
	CRS/ATC	Checks that RCS Press is < 1750 psig
	CRS/ATC	Checks that High Head SI flow is indicated
	CRS/ATC	Checks that RCS Press is < 350 psig
	CRS/ATC	Checks that RHR flow is indicated - it is not
	BOP	<b>Starts 21 and 22 RHR Pumps</b>
	CRS/ATC	Directs local closure of service water valves: FCV-1111/1112 SWN-4,5,6,7
	CRS	When service water valves are reported closed, directs start of one non-Essential Service Water Pump.
	CRS/ATC	Continue verification steps in E-0 May reduce AFW flow at RCS Temperature verification step
	CRS	Will transition to E-1 based on numerous indications of RCS leakage in containment

Op-Test No.: 1 Scenario No.: 3 Event No.: 7Page 1 of 1

Event Description: Failure of Containment Phase A requiring manual initiation.

Time	Position	Applicant's Actions or Behavior
	BOP	Will note that adverse containment conditions exist.
	BOP	Will start one Charging Pump and adjust to maximum speed.
	BOP	Will open LCV-112B and close LCV-112C
	BOP	Place RCS makeup control to STOP
	BOP	Opens 345 KV Switch F7-9
	BOP	Checks all 480V busses energized by offsite power
	BOP	Dispatches NPOs to reset: <ul style="list-style-type: none"> <li>• Lighting</li> <li>• MCC-24A, 27A, 29A</li> </ul>
	BOP	Stops all condensate pumps
	BOP	Verifies: <ul style="list-style-type: none"> <li>• FW isolation</li> <li>• MSIV closure</li> <li>• Service Water alignment</li> <li>• SI Pumps alignment</li> <li>• RHR Pump alignment</li> <li>• Containment Fan Cooler status - note 23 and 25 have tripped and will remain out of service</li> <li>• AFW flow</li> <li>• Containment Ventilation isolation</li> </ul>
<b>Critical Task 2</b>		
<b>Close containment isolation valves such that at least one valve is closed on each critical panel area before the end of the scenario.</b>		
	BOP	Notes Phase A valves not closed
	BOP	Presses both Phase A actuation pushbuttons

Time	Position	Applicant's Actions or Behavior
	BOP	Checks containment spray system
	BOP	Verifies CCR AC in incident mode
	CRS	Announces entry into E-1
	CRS/ATC	Verifies: <ul style="list-style-type: none"> <li>• RCPs are stopped</li> <li>• SGs not faulted</li> <li>• SGs not ruptured</li> <li>• Checks PORV/Block status</li> </ul>
	ATC/BOP	Resets SI: <ul style="list-style-type: none"> <li>• Close MFRV/Bypass FRVs</li> <li>• Place SI Defeat Keys in switches</li> <li>• Reset both trains SI</li> </ul>
	BOP	Reset Phase A: <ul style="list-style-type: none"> <li>• Put switches in Open for valves 1410, 1413, SOV-3518, 3519</li> <li>• Place CNTMT Rad Mon WCPS valves to Open</li> <li>• Verify both airlock solenoid switches are in Incident</li> <li>• Place remaining SN panel Phase A switches to Close</li> <li>• Press both Phase A reset buttons (will not work)</li> <li>• Place Key Defeat switches in bypass</li> <li>• Press both Phase A reset buttons</li> </ul>
	BOP	Reset Phase B: (If Containment Pressure <17 psig) Press both Containment Spray Reset buttons Press both Phase B Reset buttons
	BOP	Open PCV-1228 to establish Instrument Air to Containment
<b>Note:</b> <b><i>Around this point, RWST Level will reach 9.24 ft and the Crew will transition to ES-1.3</i></b>		
	BOP/ATC	Announce that both RWST Low Low 9.24 Ft. Alarms are up
	CRS	Announces entry in to ES-1.3

U2 NRC 2010 Scenario 3: Power Escalation from 30%, SG Pressure Failure causing ADV to open, CCW Pump trip with auto start failure, RCS leakage, LBLOCA with multiple actuation failures.

	CRS/ATC	Verify RWST alarms are up and VC Sump Level is increasing
	CRS/BOP	Reset SI if not already done
	CRS/BOP	Dispatch NPO to CCW HXs
	ATC	Stops Charging Pump and Secures PZR Heaters
	ATC	Reset Containment Spray
	ATC	Place Recirc Switches 1 and 3 to On Verifies: 22 SI Pump stopped 21 Containment Spray Pump stopped Both RHR Pumps stopped
	CRS	Verifies that Service Water Valves are closed (order sent out in E-0)
	ATC	Place Recirc Switch 2 to On Verifies: <ul style="list-style-type: none"> <li>• One NESW Pump running</li> <li>• 3 CCW Pumps running</li> <li>• Stops 23 CCW Pump</li> <li>• Function Complete Light Lit</li> </ul>
	CRS/BOP	Check 822A/B 746/747 Open Close 746
<b>Critical Task 3</b>		
Transfer to hold big recirc and establish minimum ECCB requirements of ES-1.3 prior to core uncovery based on CET temperature exceeding 700°F		
	ATC	<b>Place Recirc Switch 4 to On</b> Verify: <ul style="list-style-type: none"> <li>• 21 Recirc Pump Running</li> <li>• MOV-1802A/B are open</li> <li>• Function Complete Light Lit</li> </ul>
Lead Evaluator		The next steps verify adequate recirculation flow. Scenario can be terminated when flow is established.

## Post Scenario Event Classification

Event Classification - Alert

EAL 3.1.2 Primary system leakage exceeding the capacity (> 75 gpm) of a single charging pump.

*Candidate should understand that EAL 4.1.3 SAE was challenged without automatic Phase A actuation*

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## Turnover Information

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<b>Date/Time:</b>	Today/Now
<b>Condition:</b>	Power Ops
<b>% Power:</b>	30%
<b>Xenon:</b>	Equilibrium
<b>RCS Boron:</b>	1529 ppm
<b>Rods</b>	CB D - 174
<b>PZR Press Control:</b>	Channel 1
<b>PZR Level Control:</b>	Channel 2
<b>RCS Total Leakage:</b>	0.1 gpm
<b>RCS Unidentified Leakage:</b>	0.01 gpm
<b>Condenser Air leakage</b>	6 SCFM
<b>RCS Gas activity</b>	1.78E-2 $\mu\text{Ci/cc}$
<b>Risk Assessment:</b>	Green

### Plant Equipment Status:

Plant is at 30% power. Power was reduced a week ago for work on 22 MBFP. The work is complete and power is to be returned to 100%. 21 EDG has been out for 12 hours due to a major PM. It is expected back in 24 hours.

### Instructions:

Return power to 100% at 200 MW/hr.

Facility: Indian Point 2 Scenario No.: 4

Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions:  
 The Plant is in a 100% normal full power lineup.

Turnover: 21 AFW Pump out of service for scheduled maintenance and is expected back within 4 hours.

Maintain 100% Power

Event No.	Malf. No.	Event Type*	Event Description
1	XMT CVC019A	I (ALL)	VCT Level Transmitter LT-112 fails low
2	MAL RCS014D	C (ALL) TS (CRS)	6 gpm SG Tube Leak 24 SG
3	NA	R (ATC) N (CRS) N (BOP)	Rapid Load Reduction/Shutdown
4	MAL RCS014D	M (ALL)	Steam Generator Tube Rupture
5	MAL EPS007D	C (ALL)	Bus 6A fault after Safety Injection
6	MAL SIS001	C (BOP)	Safety Injection Pump 21 Fails to Auto Start
7	AOV RCS003A  SWI RCS006B  SWI RCS006C	C (CRS) C (ATC)	PORV 456 loss of control power when attempted to open
8	AOV CVC008A	C (CRS) C (BOP)	Auxiliary Spray Valve 212 fails to open resulting in a transition to ECA-3.3 SGTR With Loss of Pressure Control
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

## **Session Outline:**

The evaluation begins with the plant at 100% power steady state operation.

21 AFW Pump out of service for scheduled maintenance and is expected back within 4 hours.

Shortly after the crew takes the shift, VCT level transmitter 112 will fail low. The crew will take actions in accordance with 2-AOP-CVCS-1 to restore a normal charging lineup. VCT level will be maintained by maintaining VCT pressure above the pre-failed value.

A 6 gpm Steam Generator Tube leak will occur in 24 SG. The team will take actions in accordance with 2-AOP-SG-1 and determine that a shutdown must commence per TS 3.4.13. After the magnitude of the leak is determined, the crew will initiate a power reduction using either 2-AOP-RLR-1 or 2-AOP-RSD-1. (The crew may determine that the leakrate will not be adequately reduced at 50% power and perform 2-AOP-RSD-1 to shutdown the unit.)

During the power reduction the tube leak will increase to a Steam Generator Tube Rupture requiring a Reactor Trip and Safety Injection. When the Main Generator output breakers open, the Station Auxiliary Transformer will fault resulting in a loss of offsite power. Approximately 45 seconds after Safety Injection is actuated, bus 6A will fault. With 6A faulted and 21 AFW pump out of service, 22 Auxiliary Boiler Feed Pump will have to be manually aligned to supply water to the SGs. 21 Safety Injection Pump will fail to auto start and must be manually started.

The team will transition to E-3. Pressurizer Spray will not be available due to loss of RCPs. PORV 456 control power will fail when the valve is placed to open. Auxiliary Spray Valve AOV-212 will not open when the crew attempts to align Aux Spray. The crew will transition to ECA-3.3. The scenario is terminated when SI pumps are secured.

Procedure Flow Path: 2-AOP-CVCS-1, 2-AOP-SG-1, 2-AOP-RSD-1, E-0, E-3, ECA-3.3.

## Scenario Critical Task and Event Analyses

### **Critical Tasks:**

#### **CT-1**

Establish greater than 400 gpm AFW flow to the SGs before transition out of E-0 or tripping the RCPs in the FR-H.1.

#### **Actions to complete task :**

- Increase speed on 22 AFW Pump and establish >400 gpm feed to all SGs

#### **CT-2**

Isolate Feedwater flow to and steam flow from the ruptured SG before transition to ECA-3.1 occurs.

#### **Actions to complete task :**

Isolate feedflow and steam flow to 24 SG

#### **CT-3**

Establish/Maintain RCS temperature to ensure transition out of E-3 does not occur due to either of the following:

- RCS temperature too high to maintain required subcooling
- RCS temperature too low resulting in severe challenge to the subcriticality or integrity CSF (due to the fault of the team).

#### **Actions to complete task :**

In E-3, cooldown must be controlled

#### **CT-4**

When SI termination criteria are met, stop SI pumps before completion of ECA-3.3 step 9.

#### **Actions to complete task :**

Terminate SI

### **Credited Events:**

1. VCT level instrument failure low. The ATC and BOP both have control board indications that will be used to diagnose failure. The BOP will acknowledge alarms and take action to restore Charging Pump suction to the VCT. The ATC will have to monitor for reactivity effects when the Charging Pump is taking suction from RWST. Additionally, the ATC will secure makeup at the proper time. The CRS will coordinate and supervise activities.
2. 24 SG Tube Leak. The BOP and ATC will have to diagnose event. The BOP will take actions to isolate leakage. A load reduction will occur which will be a reactivity manipulation for the ATC and normal plant operation for the BOP and CRS. This malfunction also requires evaluation of Tech Specs by the CRS.
3. Rapid Load Reduction. CRS will direct the activities of a rapid load reduction. The ATC will control rods and boron while the BOP will lower MTG load.
4. 24 SG Tube Rupture. This is a major malfunction for all operators. Complicating the event is a loss of the Station Aux Transformer.
5. 480 Bus 6A fault. With 6A faulted and 21 AFW pump out of service, 22 Auxiliary Boiler Feed Pump will have to be manually aligned to supply water to the SGs.
6. 21 Safety Injection Pump will fail to auto start and must be manually started.
7. PORV 456 loss of control power when attempted to open. ATC will attempt to open PORV 456, but control power will fail
8. Auxiliary Spray Valve 212 fails to open resulting in a transition to ECA-3.3 SGTR With Loss of Pressure Control. Crew will perform actions of ECA-3.3 up to and including the securing of SI.

<b>Simulator Setup and Instructor Directions</b>		
<b>Setup/Event</b>	<b>INSTRUCTOR ACTIONS</b>	<b>EXPECTED RESPONSE/INSTRUCTOR CUES</b>
IC Reset	<b>118</b>	Reset Simulator to 100% power IC
SES Setup Batch File	<b>Run setup schedule</b> and verify malfunctions and over-rides have been entered.	<ol style="list-style-type: none"> <li>1. Loads LOA-EPS008 to OUT</li> <li>2. Loads AOV-CVC008A to CLOSE</li> <li>3. Loads MOC-SIS001 to AUT_CLS</li> <li>4. Loads XMT-CVC019A to 0 on event 1</li> <li>5. Loads MAL-RCS014D to 0.1200 on event 2</li> <li>6. Loads MAL-RCS014D from 0.25000 to 8.00000 on event 4</li> <li>7. Loads MAL-EPS001 on event 30</li> <li>8. Loads MAL-EPS007D on event 30</li> <li>9. Loads AOV-RCS003A to CLOSE on event 29</li> <li>10. Loads SWI-RCS006B to Off on event 29</li> <li>11. Loads SWI-RCS006C to Off on event 29</li> <li>12. Create Event 30 ji_p==1 -desc ji_p</li> <li>13. Create Event 29 xeo327o==1 -desc xeo327o</li> </ol>
Floor Setup	Perform setup checklist.  Update the Protected Equipment PC. <i>Risk is Yellow</i>	
Event 1	Actuate Trigger 1 button at lead evaluator direction	VCT Level Transmitter LT-112 Fails low
Role Play	If NPO sent to investigate VCT level instrumentation:	NPO reports no obvious problems.
Role Play	If I&C asked to investigate VCT level instrumentation:	Inform the crew that a troubleshooting plan will be developed.
Event 2	Actuate Trigger 2 button at lead evaluator direction.	6 gpm Steam Generator Tube Leak on 24 SG
Role Play	If NPO sent to N16 panel:	Acknowledge the local alarm and report reading on 24 main steam line.  Team will start a shutdown based on SGTL
Event 3	No Booth Operator Action	Rapid Shutdown due to SGTL
Event 4	Actuate Trigger 4 button at lead evaluator direction. No Booth Operator Action; event loaded at setup	Steam Generator Tube Rupture  Station Aux Transformer Fault – Loss of Offsite Power
Event 5	No Booth Operator Action; event loaded at setup	Bus 6A Fault

<b>Simulator Setup and Instructor Directions</b>		
<b>Setup/Event</b>	<b>INSTRUCTOR ACTIONS</b>	<b>EXPECTED RESPONSE/INSTRUCTOR CUES</b>
Event 6	No Booth Operator Action; event loaded at setup	21 Safety Injection Pump fails to auto start
Event 7	No Booth Operator Action; event loaded at setup	PORV 456 Loss of control power when attempted to open
Event 8	No Booth Operator Action; event loaded at setup	Auxiliary Spray Valve AOV-212 fails to open resulting in a transition to ECA-3.3

Event Description: VCT level instrument fails low causing automatic makeup and charging pump suction to swap to the RWST.

Time	Position	Applicant's Actions or Behavior
	CRS BOP	Diagnose VCT Level Instrument failing low by the following: <ul style="list-style-type: none"> <li>• Automatic Makeup to VCT initiating</li> <li>• VCT Level Low Alarm (FB-1)</li> <li>• Charging Pump Suction swaps to RWST (LCV-112B opens LCV-112C closes)</li> </ul>
	CRS	Enters 2-AOP-CVCS-1
	BOP	Place and hold LCV-112C in Open
	BOP	When LCV-112C indicates Full Open, place LCV-112B in Close
	BOP	When LCV-112B indicates Full Closed, place LCV-112C in Auto
	ATC	Place Makeup Control in Stop
	ATC	Place Makeup Mode Selector Switch in Manual
	CRS	Determine if RCS Temperature was affected by RWST makeup. <b><i>No action should be needed if Crew response was timely</i></b>
	ATC	Makeup or divert from VCT as necessary to maintain VCT Pressure 2-5 psi above pre-event value.
	CRS	Complete AOP actions: <ul style="list-style-type: none"> <li>• Have Chemistry determine RCS Boron concentration</li> <li>• Have NPO monitor running Charging Pump</li> <li>• Make notifications</li> </ul>
	Lead Evaluator	Request Booth Operator initiate Event 2

Event Description: 6 gpm tube leak on 24 SG

Time	Position	Applicant's Actions or Behavior
	CRS ATC	Diagnose SG Tube Leakage by the following Alarms: <ul style="list-style-type: none"> <li>• Steam Line N-16 Monitor</li> <li>• Air Ejector Exhaust R-45</li> </ul>
	BOP	Dispatch NPO to N-16 Monitor <b>Report back will be that 24 SG leakage is approximately 8600 gpd.</b>
	CRS	Enter 2-AOP-SG-1
	ATC	Determines that PZR Level is not affected
	CRS	Determine that leakage is greater than 75 gpd (report from N-16 panel and R-45 will confirm)
	CRS	Perform AOP actions: <ul style="list-style-type: none"> <li>• Make notifications</li> <li>• Direct operator to fill out leakrate attachment</li> <li>• Have Chemistry obtain samples</li> </ul>

Event Description: Rapid Load Reduction/Shutdown

	CRS	Initiate Shutdown to achieve <50% in one hour and Mode 3 in additional 2 hours using: 2-POP-2.1, 2-AOP-RSD-1, or 2-AOP-RLR-1 <ul style="list-style-type: none"> <li>• Perform notifications</li> <li>• Hold briefing for load reduction</li> </ul>
	ATC	Perform Boration for shutdown
	BOP	Reduce Turbine Load using Governor
	BOP	Perform Actions per 2-AOP-SG-1: <b><i>Actions performed depend on crew pace and when Event 4 is initiated.</i></b> <ul style="list-style-type: none"> <li>• Adjust 24 SG ADV to 1030 psig</li> <li>• Attempt to close 24 SG Blowdown valves <ul style="list-style-type: none"> <li>○ Valve 1216 will not close, can be failed closed in field</li> <li>○ 1216A will isolate Blowdown line</li> </ul> </li> </ul>
Lead Evaluator		When sufficient load reduction has been observed, request Booth Operator to proceed to Event 4.

Event Description: SG Tube Leak will turn into a rupture. This will lead to team performing a manual reactor trip and SI.

Time	Position	Applicant's Actions or Behavior
	ATC	Diagnose that SG Leakage has increased: <ul style="list-style-type: none"> <li>• Decreasing PZR level</li> <li>• RCS Low Pressure Alarm</li> <li>• Charging Pump speed increase in automatic</li> <li>• VCT lowering level</li> <li>• VCT Level Low Low Alarm</li> </ul> May start additional Charging Pump and/or Place 45 gpm orifice in service.
	CRS	Directs ATC to trip Reactor Directs BOP to Initiate SI
	ATC	Trip Reactor from Flight Panel
	BOP	Initiates Safety Injection
	CRS	Directs Operators to perform immediate operator actions of E0.
	ATC	Verifies Reactor Trip: <ul style="list-style-type: none"> <li>• Checks trip breakers open</li> <li>• Checks flux decreasing</li> <li>• Checks rod bottom lights lit (will have lost power)</li> <li>• Checks IRPIs &lt;12.5 inches (will have lost power)</li> </ul>
	ATC	Verifies Turbine Trip by observing all Turbine Stop Valves closed.
	BOP	Verifies Power to 480V Busses: <ul style="list-style-type: none"> <li>• Depending on the timing of this step the Station Aux Transformer and bus 6a may be faulted.</li> </ul>

Event Description: SG Tube Leak will turn into a rupture. This will lead to team performing a manual reactor trip and SI.

Time	Position	Applicant's Actions or Behavior
	ATC	Checks SI Status: <ul style="list-style-type: none"><li>• SI Annunciators are lit</li><li>• SI Pumps are running</li><li>• Both Trains of SI are actuated</li></ul>
	CRS	Directs BOP to perform Attachment 1 of E-0
	BOP	Performs Attachment 1 in parallel with the CRS/ATC progressing through E-0: <ul style="list-style-type: none"><li>• Start a charging pump and align suction to RWST by opening LCV-112B and closing LCV-112C.</li><li>• Dispatch NPO to reset lighting and MCCS 24A, 27A, and 29A.</li><li>• Stop condensate pumps.</li></ul>

Event Description: Fault on 480 V Bus 6A during the SI loading sequence. 22 Aux Boiler Feed Pump will have to be started and aligned to feed SGs.

Time	Position	Applicant's Actions or Behavior
	ATC	Reports that no AFW pumps are running.
<b>Critical Task</b> Establish greater than 400 gpm AFW flow to the SGs before transition out of E-0 or tripping the RCPs in the FR-H.1.		
	ATC	Establish greater than 400 gpm AFW flow: <ul style="list-style-type: none"> <li>• <b>Increase speed on 22 AFW Pump</b> which is idling.</li> <li>• <b>Adjust 22 AFW Pump Aux Feed Reg Valves</b> to establish greater than 400 gpm total AFW Flow. 24 SG should be fed if level is less than 10%</li> </ul>

Event Description: Safety Injection Pump 21 Fails to Auto Start. PORV 456 loss of control power when attempted to open. Auxiliary Spray Valve 212 fails to open resulting in a transition to ECA-3.3 SGTR With Loss of Pressure Control

Time	Position	Applicant's Actions or Behavior
	CRS/ATC	Verify SI System Flow: <ul style="list-style-type: none"> <li>• 21 SI pump Failed to Auto Start and must be manually started</li> </ul>
	CRS/ATC	Checks RCS Pressure Checks SI Flow indicated if RCS Pressure is below 1720 psig Verifies RHR flow established/required.
	CRS/ATC	Check RCP Seal Cooling: <ul style="list-style-type: none"> <li>• Notes no CCW flow</li> <li>• Secures RCPs if not already done</li> <li>• Direct Service Water Valves FCV-1111, FCV-1112, SWN-6, SWN-7, SWN-4, SWN-5 be closed locally</li> <li>• When valves are closed start 24 or 25 SWP</li> </ul>
	CRS/ATC	Check RCS Temperature: AFW Flow may be throttled back to just above 400 gpm at this point to maintain RCS Temperature.

Event Description: Safety Injection Pump 21 Fails to Auto Start. PORV 456 loss of control power when attempted to open. Auxiliary Spray Valve 212 fails to open resulting in a transition to ECA-3.3 SGTR With Loss of Pressure Control

Time	Position	Applicant's Actions or Behavior
	CRS/ATC	Will check that Spray, Aux Spray, and PORVs are all closed.
	CRS/ATC	Check if RCPs should be stopped: RCPs are already secured
	CRS/ATC	Check for Faulted SG
	CRS/ATC	Check for Ruptured SG: <ul style="list-style-type: none"> <li>• 24 SG Level will be increasing in an uncontrolled manner</li> <li>• Air Ejector, Steam Line and Blowdown Radiation Monitors for 24 SG will be abnormal.</li> </ul> Team will identify 24 SG is ruptured.
	CRS	Transition to E-3 Steam Generator Tube Rupture
	CRS/ATC	Check if RCPs should be stopped: RCPs are already secured
	CRS	Identifies 24 SG as ruptured
<b>Critical Task</b>		
<b>Isolate Feedwater flow to and steam flow from the ruptured SG before transition to ECA-3.1 occurs.</b>		
<b>Isolating AFW Flow to 24 SG may have occurred in E-0 when level reached 10% as a Prudent Operator Action.</b>		
<b>If AFW is secured immediately after 10% level is reached, the team may have to re-initiate feeding to maintain level &gt;10%</b>		
	CRS/ATC	Adjust 24 SG ADV to 1030 psig (74% on dial) and check that it is closed if pressure is below 1030 psig. ADV should have been adjusted in AOP-SG-1.
	CRS/ATC	Verify Blowdown Valves closed for 24 SG. This should have been done in AOP-SG-1
	CRS/ATC	<b>Direct closure of steam traps upstream of 24 MSIV.</b>
	CRS/ATC	Direct check that MS-55D (MSIV bypass) is closed.
	CRS/ATC	<b>Close 24 MSIV</b>

Event Description: Safety Injection Pump 21 Fails to Auto Start. PORV 456 loss of control power when attempted to open. Auxiliary Spray Valve 212 fails to open resulting in a transition to ECA-3.3 SGTR With Loss of Pressure Control

Time	Position	Applicant's Actions or Behavior
	CRS/ATC	Check 24 SG Pressure greater than 440 psig. If properly isolated, pressure will be approximately 1030 psig.
	CRS/ATC	Determine Core Exit Thermal Couple target temperature for cooldown:
<p style="text-align: center;"><b>CRS/ATC</b></p> <p><b>Estimate/Manual RCS temperature to ensure transition out of E-3.3.3.3 is not done due to action of the Safety Injection Pump.</b></p> <p><b>RCS temperature to be maintained during shutdown. (This could be done by ensuring that the CET temperature is maintained at 1000°F.)</b></p> <p><b>RCS temperature to be maintained during shutdown. (This could be done by ensuring that the CET temperature is maintained at 1000°F.)</b></p> <p><b>RCS temperature to be maintained during shutdown. (This could be done by ensuring that the CET temperature is maintained at 1000°F.)</b></p>		
	CRS/ATC	<p>Commence Cooldown to target CET temperature:</p> <p><i>Note: ADVs will be used if RCPs not proactively tripped earlier.</i></p> <ul style="list-style-type: none"> <li>• <b>Place HP Steam Dumps in Pressure Mode and Manual</b></li> <li>• <b>Initiate Cooldown</b></li> <li>• Do not exceed 0.5E6 lbs/hr on each of 21, 22, 23 SG</li> </ul> <p><i>Team will continue in procedure while CETs are lowering</i></p> <p>When CET temperatures are less than target:</p> <ul style="list-style-type: none"> <li>• <b>Stop cooldown by closing HP Steam Dumps or ADVs</b></li> <li>• <b>Maintain CET temperature below target temperature</b></li> </ul>
	CRS/ATC	Check SG Levels and maintain AFW flow
	CRS/ATC	Check PORVs and Block Valves. Will not be able to open any block valves.

Event Description: Safety Injection Pump 21 Fails to Auto Start. PORV 456 loss of control power when attempted to open. Auxiliary Spray Valve 212 fails to open resulting in a transition to ECA-3.3 SGTR With Loss of Pressure Control

Time	Position	Applicant's Actions or Behavior
	CRS/ATC	Reset SI: <ul style="list-style-type: none"> <li>• Place non-running CCW Pumps in Trip Pullout</li> <li>• Close MFRV and Bypass FRVs</li> <li>• Place SI Defeat Key Switches in Defeat</li> <li>• Press SI Reset Pushbuttons</li> </ul>
	CRS/BOP	Reset Phase A: <ul style="list-style-type: none"> <li>• Place switches in open for IVSW valves 141, 1413, SOV-3518, SOV-3519</li> <li>• Place Containment Rad Monitor WCPS Valve Switch to open</li> <li>• Place VC Hatch switches in incident</li> <li>• Place all remaining Phase A Valve switches to close</li> <li>• Depress Phase A reset pushbuttons</li> </ul>
	CRS/BOP	Establish Instrument Air to Containment by opening PCV-1228
	CRS/BOP	Secure remaining in service RHR Pump
	CRS/ATC	Start the remaining Charging Pump and establish maximum charging flow
	CRS/ATC	After cooldown stopped, check 24 SG Pressure stable or increasing. It will be stable
	CRS/ATC	Check that adequate RCS subcooling exists. Subcooling will be greater than the required 43 degrees
	CRS/ATC	Will realize that due to conditions (Loss of Aux Spray, loss of Bus 6A, and loss of power to PORV), depressurization is not possible
	CRS	Transition to ECA-3.3
	CRS/BOP	Check status of 480V Busses. Will start one Electrical Tunnel Exhaust Fan and direct restoring some auxiliary loads locally.

Event Description: Safety Injection Pump 21 Fails to Auto Start. PORV 456 loss of control power when attempted to open. Auxiliary Spray Valve 212 fails to open resulting in a transition to ECA-3.3 SGTR With Loss of Pressure Control

Time	Position	Applicant's Actions or Behavior
	CRS/ATC	Check 24 SG Level <73%: <ul style="list-style-type: none"> <li>• Depending on Crew timing, level may be above 73%</li> <li>• If Level is above 73%, Crew will proceed to termination step</li> <li>• If Level is below 73%, Crew will first perform following steps</li> </ul>
	CRS/ATC	Check 24 RCP not in service
	CREW	Try to establish pressure control: <ul style="list-style-type: none"> <li>• Check normal spray - is not available</li> <li>• Check PORV - is not available</li> <li>• Check Aux Spray - is not available</li> </ul>
	CRS/ATC	Check intact SG Levels
	CRS/ATC	Check PZR Level greater than 14% (PZR Level should be greater than 14%. If not, Crew will loop in procedure until 24 SG is 73% and/or PZR Level is above 14%)
<b>Critical Task</b> When SI termination criteria are met, stop SI pumps before completion of ECA-3.3 and SI		
	CRS/ATC	Terminate SI: Check Subcooling - will be above required 36 degrees Check Heat Sink - will have greater than 400 gpm available flow Check RVLIS - Indication will be available and level will be above required\ Check 24 SG Level - Increasing in an uncontrolled manner <b>Stop SI Pumps and place in auto</b>
Lead Evaluator		Terminate Scenario

## **Post Scenario Event Classification**

Event Classification - ALERT

EAL - 3.1.2 Primary system leakage exceeding the capacity (>75 gpm) of a single charging pump.

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## Turnover Information

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<b>Date/Time:</b>	Today/Now
<b>Condition:</b>	Power Ops
<b>% Power:</b>	100%
<b>Xenon:</b>	Equilibrium
<b>RCS Boron:</b>	1234 ppm
<b>PZR Press Control:</b>	Channel 1
<b>PZR Level Control:</b>	Channel 2
<b>RCS Total Leakage:</b>	0.1 gpm
<b>RCS Unidentified Leakage:</b>	0.01 gpm
<b>Condenser Air leakage</b>	6 SCFM
<b>RCS Gas activity</b>	1.78E-2 $\mu\text{Ci/cc}$
<b>Risk Assessment:</b>	Yellow

### Plant Equipment Status:

21 AFW Pump out of service for scheduled maintenance and is expected back within 4 hours.

### Instructions:

Maintain 100% power