

Facility: <u>Arkansas Nuclear One Unit 2</u>		Date of Examination: <u>02/13/2017</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: <u>2017-1</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A1. Conduct of Operations 2.1.43 RO (4.1)	D/R	Perform a dilution calculation A2JPM-NRC-ADMIN-CVCS6
A2. Conduct of Operations 2.1.20 RO (4.6)	N/R	Perform Azimuthal Power Tilt calculation using the CPC System A2JPM-NRC-ADMIN-AZTILT
A3. Equipment Control 2.2.15 RO (3.9)	N/R	Perform identification of boundary isolations and electrical power to tagout a Boric Acid Makeup Pump A2JPM-NRC-ADMIN-HCRD2
A4. Radiation Control 2.3.15 RO (2.9)	P/R	Determine Condenser off gas radiation monitor setting. A2JPM-NRC-ADMIN-CRADMON
Emergency Plan		
<p>NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).</p>		
<p>* Type Codes &amp; Criteria:</p> <p>(C)ontrol room, (S)imulator, or Class(R)oom  (D)irect from bank (<math>\leq 3</math> for ROs; <math>\leq 4</math> for SROs &amp; RO retakes)  (N)ew or (M)odified from bank (<math>\geq 1</math>)  (P)revious 2 exams (<math>\leq 1</math>; randomly selected)</p>		

Facility: <u>Arkansas Nuclear One Unit 2</u>		Date of Examination: <u>02/13/2017</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>2017-1</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A5. Conduct of Operations 2.1.43 SRO (4.3)	D/R	Review dilution calculation A2JPM-NRC-ADMIN-CVCS7
A6. Conduct of Operations 2.1.20 SRO (4.6)	N/R	Perform Azimuthal Power Tilt calculation using the CPC System A2JPM-NRC-ADMIN-AZTILTSRO
A7. Equipment Control 2.2.37 SRO (4.6)	D/R	Determine CREVS TS/TRM applicability and any required actions. A2JPM-NRC-ADMIN-CREVSTS
A8. Radiation Control 2.3.14 SRO (3.8)	P/R	Approve administration of Potassium Iodide A2JPM-NRC-ADMIN-KI2
A9. Emergency Plan 2.4.44 SRO (4.4)	M/R	Determine protective action recommendations A2JPM-NRC-ADMIN-PAR3
NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).		
* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank ( $\leq 3$ for ROs; $\leq 4$ for SROs & RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected)		

ADMINISTRATIVE JOB PERFORMANCE MEASUREUNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Conduct of OperationsTASK: Perform a dilution calculationJTA#: ANO2-RO-CHADD-NORM-3KA VALUE RO: 4.1 SRO: 4.3 KA REFERENCE: 2.1.43APPROVED FOR ADMINISTRATION TO: RO: X SRO: \_\_\_\_\_TASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: \_\_\_\_\_ BOTH: X

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: Perform CLASSROOM: Perform

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ CLASSROOM: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 10 minutesREFERENCE(S): OP 2103.004 Soluble Poison Concentration Control Rev. 11

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EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- OP 2102.016 Reactor Startup Step 7.19 requires that RCS boron concentration is adjusted to the ECB value.
- Mode 3
- PZR level = 42%
- RCS pressure = 2200 psia
- Tave = 545°F
- VCT level = 60%
- Present boron concentration = 750 ppm
- ECB is calculated to be 350 ppm

**TASK STANDARD:**

Applicant determines that the amount of dilution water required to reach ECB is between 44233-44245.3 gallons.

**TASK PERFORMANCE AIDS:**

OP 2103.004 Soluble Poison Concentration Control REV. 11  
Attachment 'A.3' and Attachment C.

**SIMULATOR INITIAL CONDITIONS:**

Plant is in hot standby condition if performed in the Simulator.

**EXAMINER NOTES:**

Perform a dilution calculation (Manual Method). This admin JPM has the applicant determine the amount of water needed to dilute the RCS from its actual boron concentration to the Estimated Critical Boron Concentration using a manual calculation sheet in the Chemical Addition Procedure.

**Rev. 1:** Changed the approximate completion time to 10 minutes based on validation times.

JOB PERFORMANCE MEASURE**INITIATING CUE:**

The CRS directs, "Using OP 2103.004 Attachment A.3 and Attachment C, determine the amount of dilution water required to bring RCS boron concentration to the given ECB concentration."

Start Time: \_\_\_\_\_

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	1.	Record the following data from initial conditions attachment.	Recorded the following: - 545°F (Tave)  - 42% (PZR Level)  - 60% (VCT Level)  - (Cr <sub>i</sub> ) = 750 PPM (initial)  - (Cr <sub>f</sub> ) = 350 PPM (final)	N/A SAT UNSAT
(C)	2.	Determine the RC Mass from Attachment C.	Determined RC mass from Attachment C for a PZR level of 42%, 545°F, and 2200 psia.  <u>(Mr) = 481980 lb (C)</u>	N/A SAT UNSAT
(C)	3.	Calculate the DI Water Feed Mass.	Calculated the DI Water Feed Mass:  $M_f = 481980 \ln (750/350)$  <u><math>M_f = 367336.3 \text{ lb (C)}</math></u>  Acceptable range: (367300 – 367400 lb)	N/A SAT UNSAT
(C)	4.	Calculate DI water feed volume	Calculate DI water feed volume: $F = (M_f) (V_f) (7.48 \text{ gal/ft}^3)$ $V_f = sv @ 80^\circ\text{F} = 0.0161 \text{ ft}^3/\text{lb}$ $F = (367336.3 \text{ lb}) (0.0161) (7.48)$ <u><math>F = 44237.6 \text{ gallons (C)}</math></u>  Acceptable range: (44233-44245.3 gallons)	N/A SAT UNSAT
END				

Stop Time: \_\_\_\_\_

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**KEY**

ATTACHMENT A.3

PAGE 1 OF 1

WORK SHEET FOR MAKEUP IN DILUTE MODE

**NOTE**

- Changes made affecting the calculation should be coordinated with Computer Support prior to implementation.
- The BORON2 program located on the plant computer is the preferred method for performing the calculations in this procedure. Manual calculations include assumptions for simplicity that result in slightly different calculated volumes than those calculated using BORON2 (see Limit and Precaution 5.2)

1.0 Record the following:

- RCS Temp. = 545 °F
- Pressurizer Level = 42 %
- VCT Level = 60 %
- Initial RCS Boron Conc. ( $Cr_i$ ) = 750 ppm
- Final Desired RCS Boron Conc. ( $Cr_F$ ) = 350 ppm

2.0 Determine the RC Mass from Attachment C:

Mass of Reactor Coolant ( $M_r$ ) = 481980 lb.

3.0 Calculate the DI Water Feed Mass ( $M_f$ ):

$$M_f = M_r \ln \left[ \frac{Cr_i}{Cr_F} \right]$$

$$M_f = ((481980 - 482000)) \ln \left( \frac{750}{350} \right)$$

$$M_f = \underline{(367300 - 367400)} \text{ lb.} \leftarrow \text{Acceptable range}$$

4.0 Calculate the DI Water Feed Volume (F) that must be fed to change the boron concentration from  $Cr_i$  to  $Cr_F$ :

$$F = M_f V_F (7.48)$$

$$V_F = \text{Specific Volume of Feed @80°F (ft}^3/\text{lb.)} = 0.0161 \text{ ft}^3/\text{lb.}$$

$$F = (M_f) (0.0161 \text{ ft}^3/\text{lb.}) (7.48 \text{ gal/ft}^3)$$

$$F = ((367300 - 367400) \text{ lb.}) (0.0161 \text{ ft}^3/\text{lb.}) (7.48 \text{ gal/ft}^3)$$

$$F = \underline{(44233 - 44245.3)} \text{ gal. DI water} \leftarrow \text{Acceptable range}$$

Performed By: \_\_\_\_\_ Time: \_\_\_\_\_ Date: \_\_\_\_\_

Supervisor Review: \_\_\_\_\_ Date: \_\_\_\_\_

**KEY**

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**KEY**

ATTACHMENT C

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REACTOR COOLANT MASS TABLE

ANO - UNIT 2

MR (MASS OF REACTOR COOLANT AT GIVEN TEMP., LBS.)

PZR PRESSURE	250 psia	250 psia	250 psia	250 psia	1000 psia	2200 psia
PZR LEVEL (%)	100°F	140°F	200°F	240°F	300°F	545°F
0	632,303	626,598	614,668	604,785	556,500	462,894
2	633,589	627,885	615,957	606,075	557,617	463,803
4	634,874	629,172	617,246	607,365	558,733	464,711
6	636,160	630,459	618,535	608,656	559,850	465,620
8	637,446	631,746	619,824	609,946	560,966	466,529
10	638,731	633,033	621,113	611,237	562,083	467,438
12	640,017	634,320	622,402	612,527	563,199	468,347
14	641,303	635,607	623,691	613,817	564,315	469,256
16	642,588	636,894	624,980	615,108	565,432	470,165
18	643,874	638,181	626,269	616,398	566,548	471,074
20	645,160	639,468	627,558	617,689	567,665	471,982
22	646,445	640,755	628,847	618,979	568,781	472,891
24	647,731	642,042	630,137	620,270	569,898	473,800
26	649,017	643,329	631,426	621,560	571,014	474,709
28	650,302	644,616	632,715	622,850	572,131	475,618
30	651,588	645,903	634,004	624,141	573,247	476,527
32	652,874	647,190	635,293	625,431	574,364	477,436
34	654,159	648,477	636,582	626,722	575,480	478,345
36	655,445	649,764	637,871	628,012	576,596	479,253
38	656,731	651,051	639,160	629,302	577,713	480,162
40	658,016	652,338	640,449	630,593	578,829	481,071
42	659,302	653,626	641,738	631,883	579,946	481,980
44	660,588	654,913	643,027	633,174	581,062	482,889
46	661,873	656,200	644,316	634,464	582,179	483,798
48	663,159	657,487	645,605	635,754	583,295	484,707

**KEY**

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ATTACHMENT C

PAGE 2 OF 2

ANO - UNIT 2

MR (MASS OF REACTOR COOLANT AT GIVEN TEMP., LBS.)

PZR PRESSURE	250 psia	250 psia	250 psia	250 psia	1000 psia	2200 psia
PZR LEVEL (%)	100°F	140°F	200°F	240°F	300°F	545°F
50	664,445	658,774	646,894	637,045	584,412	485,616
52	665,730	660,061	648,183	638,335	585,528	486,524
54	667,016	661,348	649,472	639,626	586,644	487,433
56	668,302	662,635	650,761	640,916	587,761	488,342
58	669,587	663,922	652,050	642,206	588,877	489,251
60	670,873	665,209	653,339	643,497	589,994	490,160
62	672,159	666,496	654,629	644,787	591,110	491,069
64	673,444	667,783	655,918	646,078	592,227	491,978
66	674,730	669,070	657,207	647,368	593,343	492,887
68	676,016	670,357	658,496	648,658	594,460	493,796
70	677,301	671,644	659,785	649,949	595,576	494,704
72	678,587	672,931	661,074	651,239	596,692	495,613
74	679,873	674,218	662,363	652,530	597,809	496,522
76	681,158	675,505	663,652	653,820	598,925	497,431
78	682,444	676,792	664,941	655,111	600,042	498,340
80	683,730	678,079	666,230	656,401	601,158	499,249
82	685,015	679,366	667,519	657,691	602,275	500,158
84	686,301	680,653	668,808	658,982	603,391	501,067
86	687,587	681,940	670,097	660,272	604,508	501,975
88	688,872	683,227	671,386	661,563	605,624	502,884
90	690,158	684,514	672,675	662,853	606,741	503,793
92	691,444	685,801	673,964	664,143	607,857	504,702
94	692,729	687,088	675,253	665,434	608,973	505,611
96	694,015	688,375	676,542	666,724	610,090	506,520
98	695,301	689,662	677,831	668,015	611,206	507,429
100	696,586	690,949	679,120	669,305	612,323	508,338

KEY



JOB PERFORMANCE MEASURE

**EXAMINER'S COPY**

**INITIAL CONDITIONS:**

- OP 2102.016 Reactor Startup Step 7.19 requires that RCS boron concentration is adjusted to the ECB value.
- Mode 3
- PZR level = 42%
- RCS pressure = 2200 psia
- Tave = 545°F
- VCT level = 60%
- Present boron concentration = 750 ppm
- ECB is calculated to be 350 ppm

**INITIATING CUE:**

The CRS directs, "Using OP 2103.004 Attachment A.3 and Attachment C, determine the amount of dilution water required to bring RCS boron concentration to the given ECB concentration."

JOB PERFORMANCE MEASURE

**EXAMINEE'S COPY**

**INITIAL CONDITIONS:**

- OP 2102.016 Reactor Startup Step 7.19 requires that RCS boron concentration is adjusted to the ECB value.
- Mode 3
- PZR level = 42%
- RCS pressure = 2200 psia
- Tave = 545°F
- VCT level = 60%
- Present boron concentration = 750 ppm
- ECB is calculated to be 350 ppm

**INITIATING CUE:**

The CRS directs, "Using OP 2103.004 Attachment A.3 and Attachment C, determine the amount of dilution water required to bring RCS boron concentration to the given ECB concentration."

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ATTACHMENT A.3

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WORK SHEET FOR MAKEUP IN DILUTE MODE

**NOTE**

- Changes made affecting the calculation should be coordinated with Computer Support prior to implementation.
- The BORON2 program located on the plant computer is the preferred method for performing the calculations in this procedure. Manual calculations include assumptions for simplicity that result in slightly different calculated volumes than those calculated using BORON2 (see Limit and Precaution 5.2)

1.0 Record the following:

- RCS Temp. = \_\_\_\_\_ °F
- Pressurizer Level = \_\_\_\_\_ %
- VCT Level = \_\_\_\_\_ %
- Initial RCS Boron Conc. ( $Cr_i$ ) = \_\_\_\_\_ ppm
- Final Desired RCS Boron Conc. ( $Cr_F$ ) = \_\_\_\_\_ ppm

2.0 Determine the RC Mass from Attachment C:

Mass of Reactor Coolant ( $M_r$ ) = \_\_\_\_\_ lb.

3.0 Calculate the DI Water Feed Mass ( $M_f$ ):

$$M_f = M_r \ln \left[ \frac{Cr_i}{Cr_F} \right]$$

$$M_f = ( \text{_____} ) \ln ( \text{_____} )$$

$$M_f = \text{_____ lb.}$$

4.0 Calculate the DI Water Feed Volume (F) that must be fed to change the boron concentration from  $Cr_i$  to  $Cr_F$ :

$$F = M_F V_F (7.48)$$

$$V_F = \text{Specific Volume of Feed @80°F (ft}^3\text{/lb.)} = 0.0161 \text{ ft}^3\text{/lb.}$$

$$F = (M_F) (0.0161 \text{ ft}^3\text{/lb.}) (7.48 \text{ gal/ft}^3)$$

$$F = ( \text{_____ lb.} ) (0.0161 \text{ ft}^3\text{/lb.}) (7.48 \text{ gal/ft}^3)$$

$$F = \text{_____ gal. DI water}$$

Performed By: \_\_\_\_\_ Time: \_\_\_\_\_ Date: \_\_\_\_\_

Supervisor Review: \_\_\_\_\_ Date: \_\_\_\_\_

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ATTACHMENT C

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REACTOR COOLANT MASS TABLE

ANO - UNIT 2

MR (MASS OF REACTOR COOLANT AT GIVEN TEMP., LBS.)

<b>PZR PRESSURE</b>	<b>250 psia</b>	<b>250 psia</b>	<b>250 psia</b>	<b>250 psia</b>	<b>1000 psia</b>	<b>2200 psia</b>
<b>PZR LEVEL (%)</b>	<b>100°F</b>	<b>140°F</b>	<b>200°F</b>	<b>240°F</b>	<b>300°F</b>	<b>545°F</b>
<b>0</b>	632,303	626,598	614,668	604,785	556,500	462,894
<b>2</b>	633,589	627,885	615,957	606,075	557,617	463,803
<b>4</b>	634,874	629,172	617,246	607,365	558,733	464,711
<b>6</b>	636,160	630,459	618,535	608,656	559,850	465,620
<b>8</b>	637,446	631,746	619,824	609,946	560,966	466,529
<b>10</b>	638,731	633,033	621,113	611,237	562,083	467,438
<b>12</b>	640,017	634,320	622,402	612,527	563,199	468,347
<b>14</b>	641,303	635,607	623,691	613,817	564,315	469,256
<b>16</b>	642,588	636,894	624,980	615,108	565,432	470,165
<b>18</b>	643,874	638,181	626,269	616,398	566,548	471,074
<b>20</b>	645,160	639,468	627,558	617,689	567,665	471,982
<b>22</b>	646,445	640,755	628,847	618,979	568,781	472,891
<b>24</b>	647,731	642,042	630,137	620,270	569,898	473,800
<b>26</b>	649,017	643,329	631,426	621,560	571,014	474,709
<b>28</b>	650,302	644,616	632,715	622,850	572,131	475,618
<b>30</b>	651,588	645,903	634,004	624,141	573,247	476,527
<b>32</b>	652,874	647,190	635,293	625,431	574,364	477,436
<b>34</b>	654,159	648,477	636,582	626,722	575,480	478,345
<b>36</b>	655,445	649,764	637,871	628,012	576,596	479,253
<b>38</b>	656,731	651,051	639,160	629,302	577,713	480,162
<b>40</b>	658,016	652,338	640,449	630,593	578,829	481,071
<b>42</b>	659,302	653,626	641,738	631,883	579,946	481,980
<b>44</b>	660,588	654,913	643,027	633,174	581,062	482,889
<b>46</b>	661,873	656,200	644,316	634,464	582,179	483,798
<b>48</b>	663,159	657,487	645,605	635,754	583,295	484,707

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ATTACHMENT C

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ANO - UNIT 2

MR (MASS OF REACTOR COOLANT AT GIVEN TEMP., LBS.)

PZR PRESSURE	250 psia	250 psia	250 psia	250 psia	1000 psia	2200 psia
PZR LEVEL (%)	100°F	140°F	200°F	240°F	300°F	545°F
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54	667,016	661,348	649,472	639,626	586,644	487,433
56	668,302	662,635	650,761	640,916	587,761	488,342
58	669,587	663,922	652,050	642,206	588,877	489,251
60	670,873	665,209	653,339	643,497	589,994	490,160
62	672,159	666,496	654,629	644,787	591,110	491,069
64	673,444	667,783	655,918	646,078	592,227	491,978
66	674,730	669,070	657,207	647,368	593,343	492,887
68	676,016	670,357	658,496	648,658	594,460	493,796
70	677,301	671,644	659,785	649,949	595,576	494,704
72	678,587	672,931	661,074	651,239	596,692	495,613
74	679,873	674,218	662,363	652,530	597,809	496,522
76	681,158	675,505	663,652	653,820	598,925	497,431
78	682,444	676,792	664,941	655,111	600,042	498,340
80	683,730	678,079	666,230	656,401	601,158	499,249
82	685,015	679,366	667,519	657,691	602,275	500,158
84	686,301	680,653	668,808	658,982	603,391	501,067
86	687,587	681,940	670,097	660,272	604,508	501,975
88	688,872	683,227	671,386	661,563	605,624	502,884
90	690,158	684,514	672,675	662,853	606,741	503,793
92	691,444	685,801	673,964	664,143	607,857	504,702
94	692,729	687,088	675,253	665,434	608,973	505,611
96	694,015	688,375	676,542	666,724	610,090	506,520
98	695,301	689,662	677,831	668,015	611,206	507,429
100	696,586	690,949	679,120	669,305	612,323	508,338

ADMINISTRATIVE JOB PERFORMANCE MEASUREUNIT: 2 REV #: 2 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: CONDUCT OF OPERATIONSTASK: Perform Azimuthal Power Tilt calculation using the CPC SystemJTA#: ANO2-RO-CPC-NORM-4KA VALUE RO: 4.6 SRO: 4.6 KA REFERENCE: 2.1.20APPROVED FOR ADMINISTRATION TO: RO: X SRO: \_\_\_\_\_TASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: \_\_\_\_\_ BOTH: X

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: \_\_\_\_\_ CLASSROOM: Perform

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ CLASSROOM: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 15 minutesREFERENCE(S): OP 2103.017 Azimuthal Power Tilt Calculation using the CPC System Rev. 05

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time

JOB PERFORMANCE MEASURE**THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- The Unit is at 100% Power
- Core Operating Limit Supervisory System (COLSS) is inoperable
- All four (4) CPC Channels are operable
- The last known good value of PMS Point CV9008 ( $T_{COLSS}$ ) is 0.0052
- CPC PID 063 Azimuthal Tilt Allowance is reading 1.015 on all 4 CPC channels
- CPC PID 171 Neutron Flux Power is reading as follows:
  - Channel A 99.89%
  - Channel B 99.85%
  - Channel C 100.10%
  - Channel D 100.12%

**TASK STANDARD:**

Applicant determines that the Azimuthal Power Tilt ( $T_q$ ) is between 0.006 to 0.0072, and that Calculated CPC Azimuthal Tilt Allowance is 1.006 to 1.0072.

**TASK PERFORMANCE AIDS:**

OP 2103.017 Azimuthal Power Tilt Calculation using the CPC System Rev. 05 Supplement 1

**EXAMINER NOTES:**

Perform an Azimuthal Power Tilt calculation using CPC System. This admin JPM has the applicant perform a required 12 hour surveillance to calculate the CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with all CPCs operable, the Azimuthal Power Tilt ( $T_q$ ) =  $T_{CPC} + T_{COLSS}$ , and the Calculated CPC Azimuthal Tilt Allowance =  $T_q + 1$  using CPC values for core flux since the normal calculating computer program COLSS is out of service.

**Rev. 2:** In step 4 of the JPM Standards, removed the requirement to "Record  $T_{CPC}$  in Table 1 of Section 3.0"

JOB PERFORMANCE MEASURE**INITIATING CUE:**

The CRS directs, perform an Azimuthal Power Tilt Calculation using the CPC System using OP 2103.017 Supplement 1 starting at step 2.0 through step 3.1.

Start Time: \_\_\_\_\_

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	1. (Step 2.1)	Record in Section 3.0 and step 2.5, the last valid COLSS calculated Azimuthal Tilt ( $T_{COLSS}$ ), obtained from PMS/PDS point CV9008 or from Power Distribution logs.	In step 2.5 and Section 3.0, recorded the last valid COLSS calculated Azimuthal Tilt ( $T_{COLSS}$ ), obtained from the initial JPM conditions  $T_{COLSS} = 0.0052$	N/A SAT UNSAT
	2. (Step 2.2)	Record in Table 1 of Section 3.0, the value of Neutron Flux Power, point I.D. 171, obtained from all operable CPCs.	In Table 1 of Section 3.0, recorded the value of Neutron Flux Power CPC PID 171 obtained from the initial JPM conditions for all operable CPCs.  <ul style="list-style-type: none"> <li>Channel A <math>99.89\% = D_1</math></li> <li>Channel B <math>99.85\% = D_2</math></li> <li>Channel C <math>100.10\% = D_3</math></li> <li>Channel D <math>100.12\% = D_4</math></li> </ul>	N/A SAT UNSAT
	3. (Step 2.3)	Record in Table 1 of Section 3.0, the value of Azimuthal Tilt Allowance, point I.D. 063, obtained from all operable CPCs.	In Table 1 of Section 3.0, recorded the value of Azimuthal Tilt Allowance, point I.D. 063, obtained from initial JPM conditions for all operable CPCs.  CPC PID 063 = $1.015$ for all 4 CPC Channels	N/A SAT UNSAT



JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	4. (Step 2.4)  (Step 2.4.1)	Calculate $T_{CPC}$ and record in Table 1 Section 3.0, N/A formulas not used.  CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with all CPCs operable.	Used the correct formula and calculated Azimuthal Power Tilt ( $T_{CPC}$ ) for all CPCs operable.  $T_{CPC} = \sqrt{\left[\frac{D_2 - D_3}{D_2 + D_3}\right]^2 + \left[\frac{D_4 - D_1}{D_4 + D_1}\right]^2}$ $= \sqrt{\left[\frac{99.85 - 100.10}{99.85 + 100.10}\right]^2 + \left[\frac{100.12 - 99.89}{100.12 + 99.89}\right]^2}$ $= \sqrt{\left[\frac{-0.25}{199.95}\right]^2 + \left[\frac{0.23}{200.01}\right]^2} = 0.0017$ Acceptable range = 0.001 to 0.002.	N/A SAT UNSAT
<b>EXAMINER'S NOTE:</b> Steps 2.4.2 through 2.4.5 will be NA due to all CPC channels operable.				
(C)	5. (Step 2.5)	Determine Calculated Azimuthal Power Tilt $T_q$ and record in Table 1 of Section 3.0. $T_q = T_{CPC} + T_{COLSS}$	Calculated Azimuthal Power Tilt $T_q$ using $T_q = T_{CPC} + T_{COLSS}$  $0.0017 + 0.0052 = 0.0069$  Recorded $T_q$ value of <u>0.0069</u> in Table 1 of Section 3.0  Acceptable range = 0.006 to 0.0072.	N/A SAT UNSAT
(C)	6. (Step 2.6)	Determine and record in Table 1 Section 3.0 the Calculated CPC Azimuthal Tilt Allowance.  Calculated CPC Azimuthal Tilt Allowance = $T_q + 1$	Calculated CPC Azimuthal Tilt Allowance = $T_q + 1$  $0.0069 + 1 = 1.0069$  Recorded $T_q + 1$ value of <u>1.0069</u> in Table 1 of Section 3.0  Acceptable range = 1.006 to 1.0072.	N/A SAT UNSAT
END of JPM				

Stop Time: \_\_\_\_\_

**SEE KEY ON NEXT 5 PAGES**

PROC./WORK PLAN NO. <b>2103.017</b>	PROCEDURE/WORK PLAN TITLE: <b>AZIMUTHAL POWER TILT CALCULATION USING THE CPC SYSTEM</b>	PAGE: <b>4 of 10</b>  CHANGE: <b>005</b>
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# KEY

SUPPLEMENT 1

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## AZIMUTHAL POWER TILT CALCULATION USING THE CPC SYSTEM

This attachment is used to document the manual calculation of Azimuthal Tilt required by Technical Specification Surveillance Requirement listed below:

4.2.3 The AZIMUTHAL POWER TILT shall be determined to be within the limit above 20 % of RATED THERMAL POWER by:

b. Calculating the tilt at least once per 12 hours when the COLSS is inoperable.

WHEN COLSS is inoperable, THEN perform this calculation once each shift. A minimum of 3 operable CPCs are required for this calculation.

### 1.0 INITIAL CONDITIONS

1.1 COLSS is inoperable and RATED THERMAL POWER is greater than 20%.

1.2 At least 3 CPCs are operable.

### 2.0 INSTRUCTIONS

2.1 Record in Section 3.0 and step 2.5, the last valid COLSS calculated Azimuthal Tilt ( $T_{COLSS}$ ), obtained from PMS/PDS point CV9008 or from Power Distribution logs.

2.2 Record in Table 1 of Section 3.0, the value of Neutron Flux Power, point I.D. 171, obtained from all operable CPCs.

2.3 Record in Table 1 of Section 3.0, the value of Azimuthal Tilt Allowance, point I.D. 063, obtained from all operable CPCs.

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~~2.4~~

Calculate  $T_{CPC}$  and record in Table 1 Section 3.0, N/A formulas not used.

~~2.4.1~~

CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with all CPCs operable.

$$T_{CPC} = \sqrt{\left[ \frac{D_2 - D_3}{D_2 + D_3} \right]^2 + \left[ \frac{D_4 - D_1}{D_4 + D_1} \right]^2}$$

$$\sqrt{\left[ \frac{99.85 - 100.10}{99.85 + 100.10} \right]^2 + \left[ \frac{100.12 - 99.89}{100.12 + 99.89} \right]^2}$$

$$\sqrt{\left[ \frac{-0.25}{199.95} \right]^2 + \left[ \frac{0.23}{200.01} \right]^2} = 0.0017 \quad \text{Acceptable Range } 0.001 \text{ to } 0.002$$

NA

~~2.4.2~~

CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with D CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_3 - D_2}{D_3 + D_2} \right]^2 + \left[ \frac{D_3 + D_2 - 2D_1}{D_3 + D_2} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{+ - 2( )}{+} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2} = \frac{-}{+}$$

KEY

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NA

2.4.3

CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with B CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_4 - D_1}{D_4 + D_1} \right]^2 + \left[ \frac{2D_3 - D_4 - D_1}{D_4 + D_1} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{2( ) - -}{+} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2} = \frac{-}{+}$$

NA

2.4.4

CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with A CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_3 - D_2}{D_3 + D_2} \right]^2 + \left[ \frac{2D_4 - D_3 - D_2}{D_3 + D_2} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{2( ) - -}{+} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2} = \frac{-}{+}$$

KEY

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NA

2.4.5

CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with C CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_4 - D_1}{D_4 + D_1} \right]^2 + \left[ \frac{D_4 + D_1 - 2D_2}{D_4 + D_1} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{+ - 2( )}{+} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{+ - 2( )}{+} \right]^2} = \underline{\hspace{2cm}}$$

2.5

Determine Calculated Azimuthal Power Tilt  $T_q$  and record in Table 1 of Section 3.0.

$$T_q = T_{CPC} + T_{COLSS}$$

$$= \underline{0.0017} + \underline{0.0052}$$

$$= \underline{0.0069}$$

Acceptable Range  
0.006 to 0.0072

2.6

Determine and record in Table 1 Section 3.0 the Calculated CPC Azimuthal Tilt Allowance.

$$\text{Calculated CPC Azimuthal Tilt Allowance} = T_q + 1$$

$$= \underline{1.0069}$$

Acceptable Range  
1.006 to 1.0072

KEY

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**KEY**

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~~3.0~~ ACCEPTANCE CRITERIA

3.1 Data

COLSS Tilt  $T_{COLSS}$  0.0052

Table 1

	CPC A	CPC B	CPC C	CPC D
	(D <sub>1</sub> )	(D <sub>2</sub> )	(D <sub>3</sub> )	(D <sub>4</sub> )
Neutron Flux Power (Pt. ID 171)	99.89	99.85	100.10	100.12
Azimuthal Tilt Allowance (Pt. ID 063)	1.015	1.015	1.015	1.015
Calculated Azimuthal Power Tilt (from step 2.5)	(T <sub>q</sub> ) 0.0069	N/A	N/A	N/A
Calculated CPC Azimuthal Tilt Allowance (from step 2.6)	(T <sub>q</sub> + 1) 1.0069	N/A	N/A	N/A

3.2 Is Calculated  
the TS 3.

**END OF JPM**

NO

3.3 Is Calculated CPC Azimuthal Tilt Allowance less than the  
Azimuthal Tilt Allowance (Pt. ID 063) installed in each  
CPC?

(circle one) YES NO

3.4 IF No is circled in either question above,

THEN perform following:

3.4.1 Immediately notify Shift Manager.

3.4.2 Refer to Tech Spec 3.2.3 for required actions.

3.4.3 Refer to 2105.001 for steps to change Pt. ID 063  
in all operable CPCs as required.

3.4.4 Initiate Condition Report.

PERFORMED BY \_\_\_\_\_ DATE \_\_\_\_\_

INDEPENDENT REVIEW BY \_\_\_\_\_ DATE \_\_\_\_\_

**KEY**

JOB PERFORMANCE MEASURE**EXAMINER'S COPY****INITIAL CONDITIONS:**

- The Unit is at 100% Power
- Core Operating Limit Supervisory System (COLSS) is inoperable
- All four (4) CPC Channels are operable
- The last known good value of PMS Point CV9008 ( $T_{COLSS}$ ) is 0.0052
- CPC PID 063 Azimuthal Tilt Allowance is reading 1.015 on all 4 CPC channels
- CPC PID 171 Neutron Flux Power is reading as follows:
  - Channel A 99.89%
  - Channel B 99.85%
  - Channel C 100.10%
  - Channel D 100.12%

**INITIATING CUE:**

The CRS directs, perform an Azimuthal Power Tilt Calculation using the CPC System using OP 2103.017 Supplement 1 starting at step 2.0 through step 3.1.

JOB PERFORMANCE MEASURE**EXAMINEE'S COPY****INITIAL CONDITIONS:**

- The Unit is at 100% Power
- Core Operating Limit Supervisory System (COLSS) is inoperable
- All four (4) CPC Channels are operable
- The last known good value of PMS Point CV9008 ( $T_{COLSS}$ ) is 0.0052
- CPC PID 063 Azimuthal Tilt Allowance is reading 1.015 on all 4 CPC channels
- CPC PID 171 Neutron Flux Power is reading as follows:
  - Channel A 99.89%
  - Channel B 99.85%
  - Channel C 100.10%
  - Channel D 100.12%

**INITIATING CUE:**

The CRS directs, perform an Azimuthal Power Tilt Calculation using the CPC System using OP 2103.017 Supplement 1 starting at step 2.0 through step 3.1.



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AZIMUTHAL POWER TILT CALCULATION USING THE CPC SYSTEM

This attachment is used to document the manual calculation of Azimuthal Tilt required by Technical Specification Surveillance Requirement listed below:

4.2.3 The AZIMUTHAL POWER TILT shall be determined to be within the limit above 20 % of RATED THERMAL POWER by:

- b. Calculating the tilt at least once per 12 hours when the COLSS is inoperable.

WHEN COLSS is inoperable, THEN perform this calculation once each shift. A minimum of 3 operable CPCs are required for this calculation.

~~1.0~~ INITIAL CONDITIONS

~~1.1~~ COLSS is inoperable and RATED THERMAL POWER is greater than 20%.

~~1.2~~ At least 3 CPCs are operable.

2.0 INSTRUCTIONS

2.1 Record in Section 3.0 and step 2.5, the last valid COLSS calculated Azimuthal Tilt ( $T_{COLSS}$ ), obtained from PMS/PDS point CV9008 or from Power Distribution logs.

2.2 Record in Table 1 of Section 3.0, the value of Neutron Flux Power, point I.D. 171, obtained from all operable CPCs.

2.3 Record in Table 1 of Section 3.0, the value of Azimuthal Tilt Allowance, point I.D. 063, obtained from all operable CPCs.

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- 2.4 Calculate  $T_{CPC}$  and record in Table 1 Section 3.0, N/A formulas not used.
- 2.4.1 CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with all CPCs operable.

$$T_{CPC} = \sqrt{\left[ \frac{D_2 - D_3}{D_2 + D_3} \right]^2 + \left[ \frac{D_4 - D_1}{D_4 + D_1} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2} = \frac{-}{+}$$

- 2.4.2 CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with D CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_3 - D_2}{D_3 + D_2} \right]^2 + \left[ \frac{D_3 + D_2 - 2D_1}{D_3 + D_2} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{+ - 2( )}{+} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2} = \frac{-}{+}$$

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2.4.3 CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with B CPC inoperable.

$$T_{CPC} = \sqrt{\left[\frac{D_4 - D_1}{D_4 + D_1}\right]^2 + \left[\frac{2D_3 - D_4 - D_1}{D_4 + D_1}\right]^2}$$

$$\sqrt{\left[\frac{-}{+}\right]^2 + \left[\frac{2( ) - -}{+}\right]^2}$$

$$\sqrt{\left[\frac{-}{+}\right]^2 + \left[\frac{-}{+}\right]^2} = \frac{-}{+}$$

2.4.4 CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with A CPC inoperable.

$$T_{CPC} = \sqrt{\left[\frac{D_3 - D_2}{D_3 + D_2}\right]^2 + \left[\frac{2D_4 - D_3 - D_2}{D_3 + D_2}\right]^2}$$

$$\sqrt{\left[\frac{-}{+}\right]^2 + \left[\frac{2( ) - -}{+}\right]^2}$$

$$\sqrt{\left[\frac{-}{+}\right]^2 + \left[\frac{-}{+}\right]^2} = \frac{-}{+}$$

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- 2.4.5 CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with C CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_4 - D_1}{D_4 + D_1} \right]^2 + \left[ \frac{D_4 + D_1 - 2D_2}{D_4 + D_1} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{+ - 2( )}{+} \right]^2}$$

$$\sqrt{\left[ \frac{ }{ } \right]^2 + \left[ \frac{ }{ } \right]^2} = \frac{ }{ }$$

- 2.5 Determine Calculated Azimuthal Power Tilt  $T_q$  and record in Table 1 of Section 3.0.

$$T_q = T_{CPC} + T_{COLSS}$$

$$\frac{ }{ } + \frac{ }{ }$$

$$= \frac{ }{ }$$

- 2.6 Determine and record in Table 1 Section 3.0 the Calculated CPC Azimuthal Tilt Allowance.

$$\text{Calculated CPC Azimuthal Tilt Allowance} = T_q + 1$$

$$= \frac{ }{ }$$

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3.0 ACCEPTANCE CRITERIA

3.1 Data

COLSS Tilt  $T_{COLSS}$ \_\_\_\_\_

Table 1

	CPC A	CPC B	CPC C	CPC D
Neutron Flux Power (Pt. ID 171)	( $D_1$ )	( $D_2$ )	( $D_3$ )	( $D_4$ )
Azimuthal Tilt Allowance (Pt. ID 063)				
Calculated Azimuthal Power Tilt (from step 2.5)	( $T_q$ )	N/A	N/A	N/A
Calculated CPC Azimuthal Tilt Allowance (from step 2.6)	( $T_q + 1$ )	N/A	N/A	N/A

3.2 Is Calculated Azimuthal Power Tilt  $T_q$  in compliance with  
the TS 3.2.3 limit?  
(circle one) YES NO

3.3 Is Calculated CPC Azimuthal Tilt Allowance less than the  
Azimuthal Tilt Allowance (Pt. ID 063) installed in each  
CPC?  
(circle one) YES NO

3.4 IF No is circled in either question above,

THEN perform following:

3.4.1 Immediately notify Shift Manager.

3.4.2 Refer to Tech Spec 3.2.3 for required actions.

3.4.3 Refer to 2105.001 for steps to change Pt. ID 063  
in all operable CPCs as required.

3.4.4 Initiate Condition Report.

PERFORMED BY \_\_\_\_\_ DATE \_\_\_\_\_

INDEPENDENT REVIEW BY \_\_\_\_\_ DATE \_\_\_\_\_

**ADMINISTRATIVE JOB PERFORMANCE MEASURE**UNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: EQUIPMENT CONTROLTASK: Perform Identification of boundary isolations and electrical power to tagout a Boric Acid Makeup PumpJTA#: ANO-RO-ADMIN-NORM-078KA VALUE RO: 3.9 SRO: 4.3 KA REFERENCE: 2.2.15APPROVED FOR ADMINISTRATION TO: RO: X SRO: \_\_\_\_\_TASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: \_\_\_\_\_ BOTH: X

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: \_\_\_\_\_ CLASSROOM: Perform

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ CLASSROOM: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 15 minutesREFERENCE(S): OP-2107.002 ESF Electrical System OPS Rev. 37 Attachment 2B62; PID Drawing M-2231 Sheet 2; E-Print E-2241 Sheet1A

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- The Unit is at 100% Power
- An excessive pump seal leak is present on Boric Acid Makeup Pump 2P-39B.
- A Danger Tag will need to be generated to isolate this pump seal leak.
- No pump drains or vents are required to be tagged at this time.

**TASK STANDARD:**

The examinee has correctly identified the fluid boundary isolations and electrical power needed to isolate the pump seal leak on Boric Acid Makeup Pump 2P-39B along with the required component positions.

**TASK PERFORMANCE AIDS:**

OP-2107.002 ESF Electrical System OPS Rev. 37 Attachment 2B62; Electrical E-Prints E-2241 Sheets 1, 1A, and 2 and Mechanical P&ID Drawings M-2231 Sheet 1, 2, 3, and 4 will be provided to the applicants.

**EXAMINER NOTES:**

Perform Identification of components that need to be used to prepare a tagout on Boric Acid Makeup Pump 2P-39B pump to repair a seal leak. This admin JPM has the applicant review controlled electrical E-prints, procedures and mechanical P&ID drawings to determine what the isolations boundaries will be to tag out the 2P-39B Boric Acid Makeup Pump to repair a pump seal leak.

**Rev. 1:** Changed the Task Performance Aids to state: "OP-2107.002 ESF Electrical System OPS Rev. 37 Attachment 2B62; Electrical E-Prints E-2241 Sheets 1, 1A, and 2 and Mechanical P&ID Drawings M-2231 Sheet 1, 2, 3, and 4 will be provided to the applicants."

JOB PERFORMANCE MEASURE**INITIATING CUE:**

The SM/CRS has directed you to identify the components that need to be danger tagged to electrically and mechanically isolate Boric Acid Makeup Pump 2P-39B to isolate the pump seal leak. Also provide the component danger tag position required.

Start Time: \_\_\_\_\_

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
<b>EXAMINERS NOTE: Applicant may add the pump control switch as a component to be placed in “Pull to Lock” but this will not be a Danger Tag and is not a critical boundary for isolating the BAM Pump.</b>				
(C)	1.	Review controlled documentation to determine the source of power to BAM Pump 2P-39B to add to the tagout (E-Print E-2241 Sheet 1A or OP-2107.002 ESF Electrical System OPS Attachment 2B62)	Reviewed E-Print E-2241 Sheet 1A and/or OP-2107.002 ESF Electrical System OPS Attachment 2B62.  Determined that Electrical Circuit Breaker <b>2B62-B6</b> will need to be <b>“OPENED”</b> to electrically isolate BAM Pump 2P-39B	N/A SAT UNSAT
(C)	2.	Review controlled documentation to determine the required isolation valves needed for BAM Pump 2P-39B pump seal leak. (Mechanical P&ID M-2231 Sheet 2)	Reviewed Mechanical P&ID M-2231 Sheet 2.  Determined that BAM Pump 2P-39B Discharge Isolation <b>2CVC-40B</b> will need to be <b>CLOSED</b> to isolate the seal leak	N/A SAT UNSAT
(C)	3.	Review controlled documentation to determine the required isolation valves needed for BAM Pump 2P-39B pump seal leak. (Mechanical P&ID M-2231 Sheet 2)	Reviewed Mechanical P&ID M-2231 Sheet 2.  Determined that BAM Pump 2P-39B Minimum Recirc Isolation Valve <b>2CVC-53B</b> will need to be <b>CLOSED</b> to isolate the seal leak	N/A SAT UNSAT
(C)	4.	Review controlled documentation to determine the required isolation valves needed for BAM Pump 2P-39B pump seal leak. (Mechanical P&ID M-2231 Sheet 2)	Reviewed Mechanical P&ID M-2231 Sheet 2.  Determined that BAM Pump 2P-39B Recirc Isolation Valve <b>2CVC-54B</b> will need to be <b>CLOSED</b> to isolate the seal leak	N/A SAT UNSAT



JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	53.	Review controlled documentation to determine the required isolation valves needed for BAM Pump 2P-39B pump seal leak. (Mechanical P&ID M-2231 Sheet 2)	Reviewed Mechanical P&ID M-2231 Sheet 2.  Determined that BAM Pump 2P-39B Suction Isolation <b>2CVC-39B</b> will need to be <b>CLOSED</b> to isolate the seal leak	N/A SAT UNSAT
END				

Stop Time: \_\_\_\_\_

**JOB PERFORMANCE MEASURE****EXAMINER'S COPY****INITIAL CONDITIONS:**

- The Unit is at 100% Power
- An excessive pump seal leak is present on Boric Acid Makeup Pump 2P-39B.
- A Danger Tagout will need to be generated to isolate this pump seal leak.
- No pump drains or vents are required to be tagged at this time.

**INITIATING CUE:**

The SM/CRS has directed you to identify the components that need to be danger tagged to electrically and mechanically isolate Boric Acid Makeup Pump 2P-39B to isolate the pump seal leak. Also provide the component danger tag position required.

**EXAMINER ANSWER KEY**

Critical	Component #	Component Name	Component Position
(C)	2B62-B6	BAM Pump 2P-39B Electrical Circuit Breaker	OPENED
(C)	2CVC-40B	BAM Pump 2P-39B Discharge Isolation Valve	CLOSED
(C)	2CVC-53B	BAM Pump 2P-39B Minimum Recirculation Isolation Valve	CLOSED
(C)	2CVC-54B	BAM Pump 2P-39B Recirculation Isolation Valve	CLOSED
(C)	2CVC-39B	BAM Pump 2P-39B Suction Isolation Valve	CLOSED

## JOB PERFORMANCE MEASURE

**EXAMINEE'S COPY**

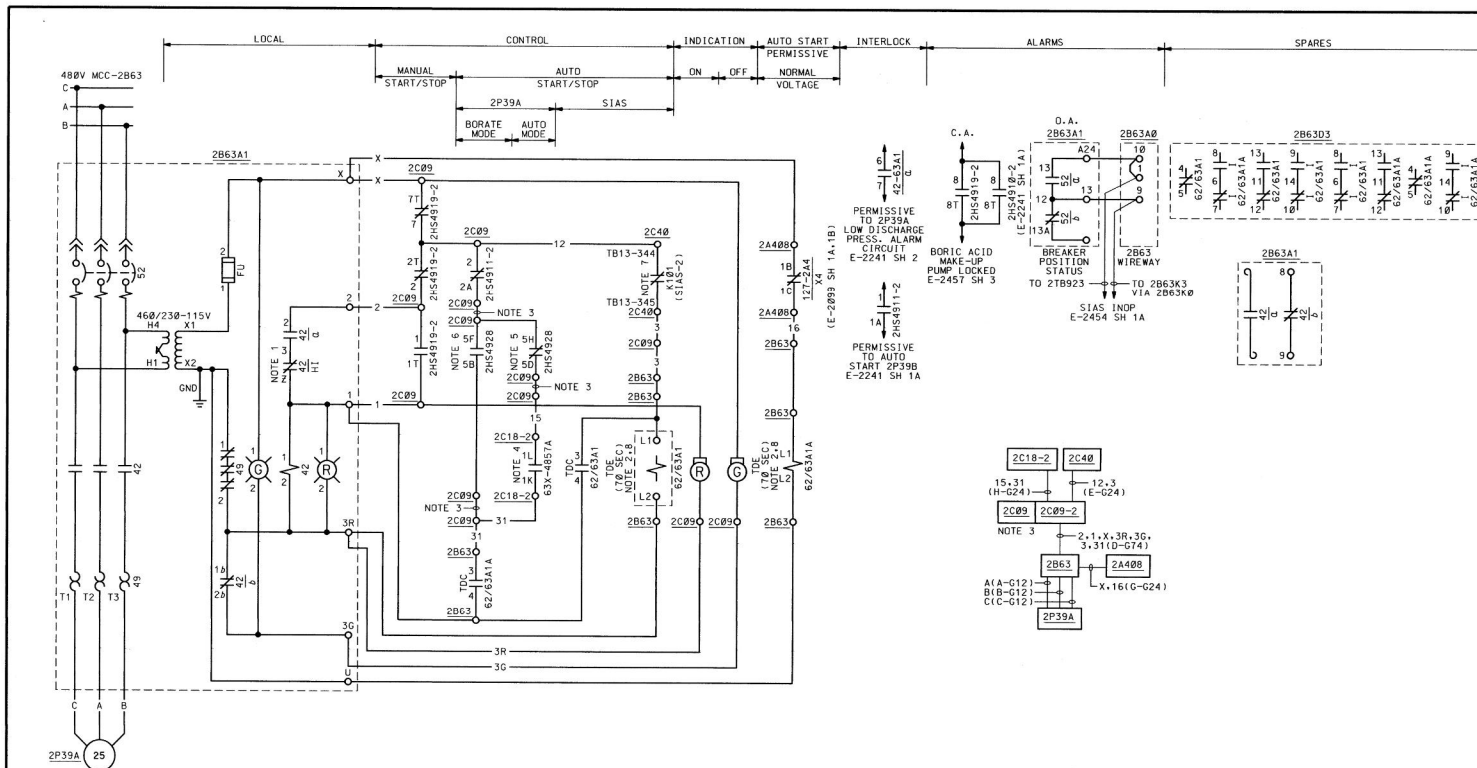
**INITIAL CONDITIONS:**

- The Unit is at 100% Power
- An excessive pump seal leak is present on Boric Acid Makeup Pump 2P-39B.
- A Danger Tagout will need to be generated to isolate this pump seal leak.
- No pump drains or vents are required to be tagged at this time.

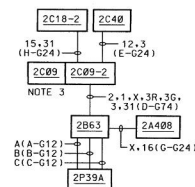
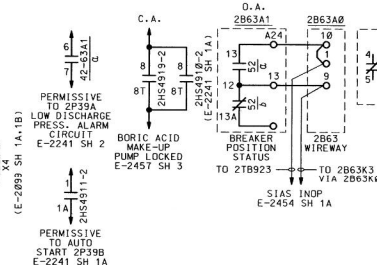
**INITIATING CUE:**

The SM/CRS has directed you to identify the components that need to be danger tagged to electrically and mechanically isolate Boric Acid Makeup Pump 2P-39B to isolate the pump seal leak. Also provide the component danger tag position required.

[illegible]



**BORIC ACID MAKE-UP PUMP 2P39A - GREEN**  
**SCHEME 2B63A1**  
 ST #640



**REF DWGS:**

1. E-2644 SH 1, 10, 4 (2B63) CONNECTION DIAGRAM
2. E-2614 SH 8B, 8C (2A408) CONNECTION DIAGRAM
3. E-2683 SH 2 (2C09) CONNECTION DIAGRAM
4. E-2700 SH 1 (2C40) CONNECTION DIAGRAM
5. E-2969 SH 10, 11 (2C18-2) CONNECTION DIAGRAM
6. M-2231 SH 2 P&ID
7. M-2417 SH 5 CONTROL LOGIC DIAGRAM
8. V/P 6600-M2001-B6-30 (414-304)
9. V/P 6600-M2001-325 SH 2, 6, 8 (2C09) WIRING DIAGRAM

**NOTES:**

1. HOLDING INTERLOCK CONTACT (42/H1) IS INSTALLED FOR MECHANICAL PUSHBUTTON.
2. TIMER SETTING IS NOMINAL. SIMS CONTROLS EXACT SETTING.
3. THESE WIRES INSTALLED IN SEPARATE WIREWAYS/SLEEVES FROM THE GREEN SECTION IN 2C09-2 DIRECTLY TO 2B63A0 TERMINALS 3B, 5D, 5H IN PANEL 2C09.
4. CONTACT CLOSING ON LOW VOLUME LEVEL IN TANK 214. SEE E-2715 SH 2.
5. CONTACT CLOSING IN AUTO MODE ONLY. SHOWN IN AUTO MODE. SEE E-2186 SH 1.
6. CONTACT CLOSING IN BORATE MODE ONLY. SEE E-2186 SH 1.
7. SIAS RELAY CONTACTS ARE SHOWN IN DE-ENERGIZED OR ACCIDENT CONDITION.
8. RELAYS 62/63A1 AND 62/63A1A ARE PHYSICALLY LOCATED IN CUBICLE 2B63D3.

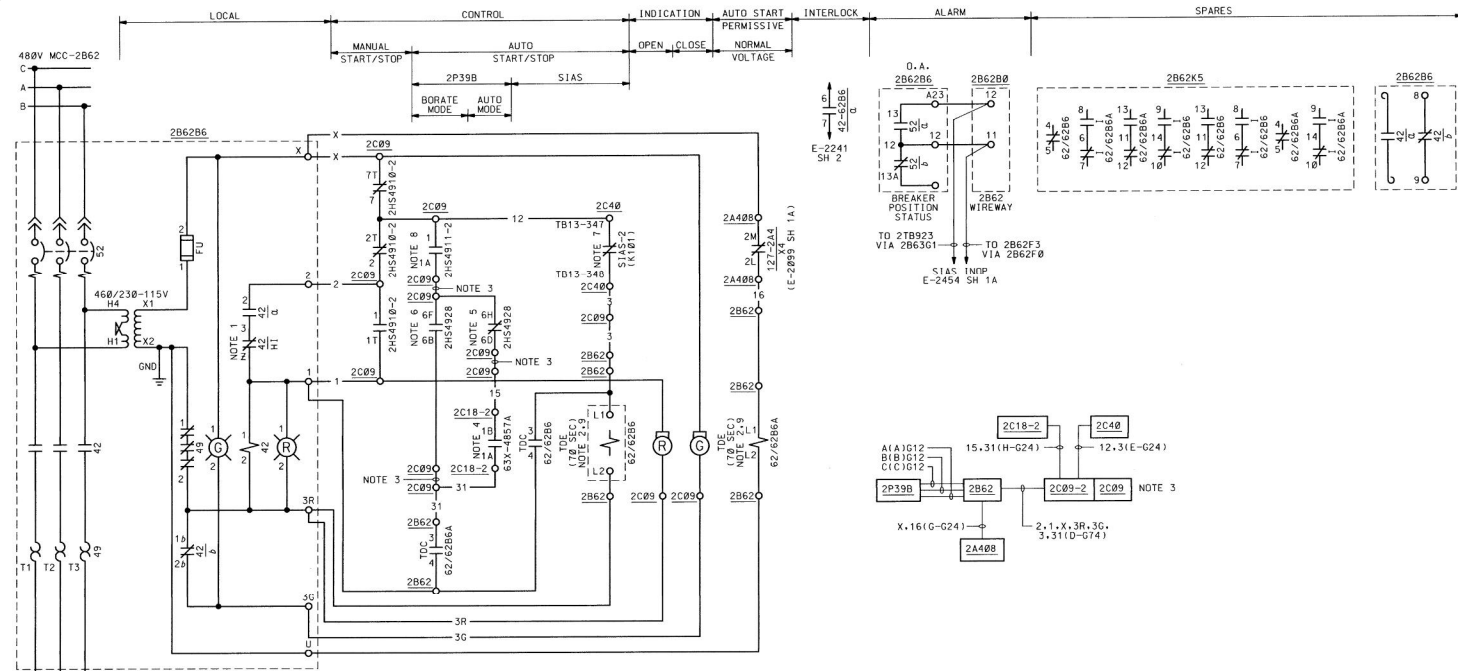
CONTROL SWITCH: 2H54919-2									
STOP	START	STOP	START	STOP	START	STOP	START	STOP	START
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

SELECTOR SWITCH: 2H54911-2									
STOP	START	STOP	START	STOP	START	STOP	START	STOP	START
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

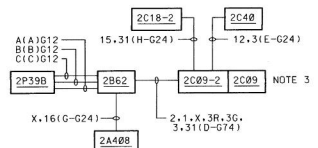
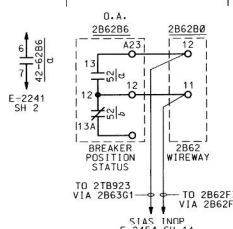
REV	DATE	REVISION	DESCRIPTION	BY	CHKD	ENGR	APVD
24	FEB 05	AS-BUILT: EC 47703					
23	NOV 12 2002	AS-BUILT: DRN 01-00901					
22	JUL 16 1996	AS-BUILT: DRN 95-02633 (PC 95-0229)					

SCALE: NONE	DESIGN: BECHTEL CORP.	DRAWN: B.J. JACKSON	CAD NO: .
<b>ARKANSAS NUCLEAR ONE</b> UNIT 2 RUSSELLVILLE, ARKANSAS <b>SCHEMATIC DIAGRAM</b> <b>BORIC ACID MAKE-UP PUMP</b> <b>2P39A</b>			
DRAWING NO	SHEET	REVISION	
E-2241	1	24	





**BORIC ACID MAKE-UP PUMP 2P39B - GREEN**  
**SCHEME 2B62B6**  
 ST #640



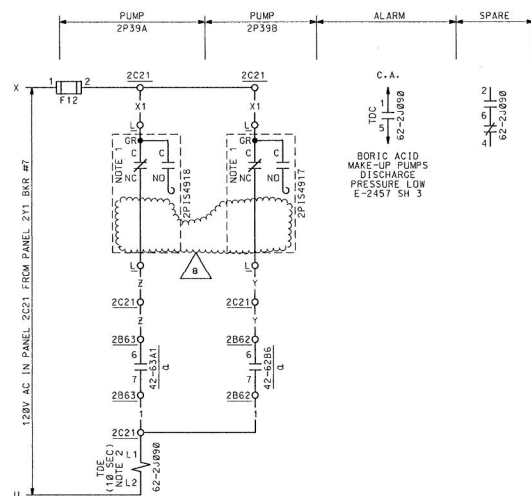
CONTROL SWITCH: 2H54910-2									
NORM	STOP	START	STOP	START	STOP	START	STOP	START	STOP
TO	TO	TO	TO	TO	TO	TO	TO	TO	TO
LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK
FUNCTION	FUNCTION	FUNCTION	FUNCTION	FUNCTION	FUNCTION	FUNCTION	FUNCTION	FUNCTION	FUNCTION
OR	OR	OR	OR	OR	OR	OR	OR	OR	OR
REFERENCE	REFERENCE	REFERENCE	REFERENCE	REFERENCE	REFERENCE	REFERENCE	REFERENCE	REFERENCE	REFERENCE
DRAWING	DRAWING	DRAWING	DRAWING	DRAWING	DRAWING	DRAWING	DRAWING	DRAWING	DRAWING
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10

- REF DWGS:**
1. E-2643 SH 1C, 3C, 4 (2B62) CONNECTION DIAGRAM
  2. E-2614 SH 00, 0C (2A400) CONNECTION DIAGRAM
  3. E-2683 SH 2 (2C09) CONNECTION DIAGRAM
  4. E-2969 SH 10, 11 (2C18-2) CONNECTION DIAGRAM
  5. E-2700 SH 1 (2C40) CONNECTION DIAGRAM
  6. M-2231 SH 2 PAID
  7. M-2417 SH 5, 6 CONTROL LOGIC DIAGRAM
  8. V/P 6600-M2001-06-30 (414-304)
  9. V/P 6600-M2201-325 SH 2, 6, 8 (2C09) WIRING DIAGRAM

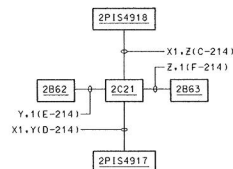
- NOTES:**
1. HOLDING INTERLOCK CONTACT (42/H1) IS INSTALLED FOR MECHANICAL PUSHBUTTON.
  2. TIMER SETTING IS NOMINAL. SWS CONTROLS EXACT SETTING.
  3. THESE WIRES INSTALLED IN SEPARATE WIREWAYS/SLEEVES FROM THE GREEN SECTION IN 2C09-2 DIRECTLY TO 2H54928-2 TERMINALS 68, 6D, 6H IN PANEL 2C09.
  4. CONTACT CLOSURES ON LOW VOLUME LEVEL IN TANK 2T4. SEE E-2715 SH 2.
  5. CONTACT CLOSURES IN AUTO MODE ONLY. SHOWN IN AUTO MODE. SEE E-2186 SH 1.
  6. CONTACT CLOSURES IN BORATE MODE ONLY. SEE E-2186 SH 1.
  7. SWS CONTACTS ARE SHOWN IN THE ACCIDENT CONDITION.
  8. SELECTOR SWITCH 2H54911-2 CONTACT DEVELOPMENT TABLE SHOWN ON THIS DRAWING SH 1.
  9. RELAYS 62/62B6 AND 62/62B6A ARE PHYSICALLY LOCATED IN CUBICLE 2B62K5.

NAME: 62/62B6	NAME: 62/62B6A
TYPE: TIMER, ATC TYPE 363	TYPE: TIMER, ATC TYPE 363
CONTACT	CONTACT
THIS SHEET	THIS SHEET
SPARE INSTANTANEOUS	SPARE INSTANTANEOUS
SPARE INSTANTANEOUS	SPARE INSTANTANEOUS
SPARE	SPARE
THIS SH NOTE: 15 JUMPED TO 1	THIS SH NOTE: 15 JUMPED TO 1
15-CLOCK	15-CLOCK
16 UNUSED	16 UNUSED

6	FEB 04 2014	AS-BUILT: EC 47703	KDR	APPROVED	28
5	SEP 01 2002	AS-BUILT: DRN 01-00902	APPROVED	REVISION	
4	JUL 10 1996	AS-BUILT: DRN 95-02634 (PC 95-8025)	APPROVED	REVISION	
REV	DATE	REVISION DESCRIPTION	BY	CHKD	APVD
SCALE: NONE	DESIGN: BECHTEL CORP.	DRAWN: BJ. JACKSON	CAD NO: 1		
<b>ARKANSAS NUCLEAR ONE</b> UNIT 2 RUSSELLVILLE, ARKANSAS <b>SCHEMATIC DIAGRAM</b> <b>BORIC ACID MAKE-UP PUMP</b> <b>2P39B</b>					
DRAWING NO		SHEET	REVISION		
E-2241		1A	6		



C.A.  
TDC  
62-2J090  
41



BORIC ACID MAKE-UP PUMPS 2P-39A AND 2P-39B  
LOW DISCHARGE PRESSURE ALARM CIRCUIT  
SCHEME 2J090  
ST #64D

# REF DWGS:

1. E-2643 SH 1 (2B62) CONNECTION DIAGRAM
2. E-2644 SH 1 (2B63) CONNECTION DIAGRAM
3. E-2691 SH 6 (2C21) CONNECTION DIAGRAM
4. E-2978 SH 10 (2PIS4917, 2PIS4918) CONNECTION DIAGRAM
5. M-2417 SH 8 CONTROL LOGIC DIAGRAM
6. V/P 6600-M2001-30 SH 3.15 (2C21) WIRING DIAGRAM
7. V/P 6600-M2001-06-30 (414-304)
8. V/P 6600-M2001-03-37 (416-046)

# NOTES:

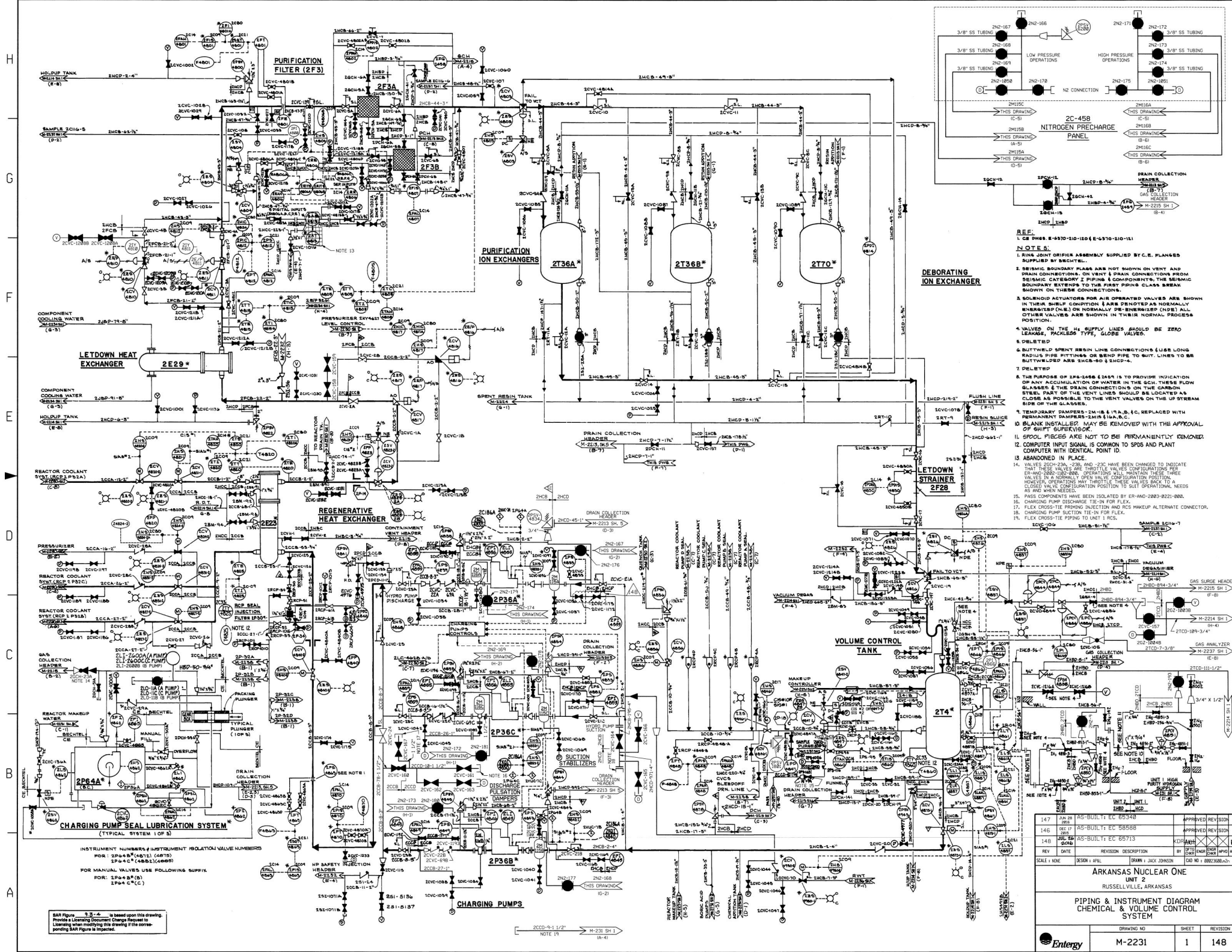
1. PRESSURE INDICATING SWITCHES 2PIS4917 AND 2PIS4918  
CLOSE ON LOW PRESSURE.
2. TIMER SETTING IS NOMINAL. SIMS CONTROLS EXACT SETTING.

REVISION 8 NOTE:  
THIS DRAWING HAS BEEN CONVERTED FROM A PRE-EXISTING  
SIZE OR FORMAT TO CONFORM TO THE CURRENT APPROVED  
SIZE OR FORMAT FOR THIS DRAWING SERIES. ONLY THE  
BUBBLED AREAS ARE AS-BUILT FOR THIS REVISION. THIS  
NOTE TO BE REMOVED AT THE NEXT AS-BUILT REVISION.

REV	DATE	REVISION DESCRIPTION	BY	CHKD	ENGR	APVD	APVD
8	JUN 10 2008	AS-BUILT: EC 4644	MW	ALL			BB
7	JAN 27 1993	REDRAWN AS BUILT: EAR 91-429					
SCALE: NONE	DESIGN: BECHTEL CORP.	DRAWN: B.L. JACKSON	CAD NO:				
ARKANSAS NUCLEAR ONE UNIT 2 RUSSELLVILLE, ARKANSAS							
SCHEMATIC DIAGRAM BORIC ACID MAKE-UP PUMPS 2P-39A AND 2P-39B LOW DISCHARGE PRESSURE ALARM							
DRAWING NO		SHEET		REVISION			
E-2241		2		8			

NAME: 62-2J090	TYPE: TIMER, AGASTAT 7012AC
CONTACT	REF DWG
1-3-4	E-2457 SH 3
2-6-4	SPARE
L1-L2	THIS SH





**DEBORATING  
ION EXCHANGER**

- REF.**  
1. CE DWG. E-4570-10-100 (E-4570-10-101)
- NOTES:**
1. RING JOINT ORIFICE ASSEMBLY SUPPLIED BY C.E. FLANGES SUPPLIED BY SPECTRA.
  2. SEISMIC BOUNDARY PLATES ARE NOT SHOWN ON VENT AND DRAIN CONNECTIONS. ONLY 4 COMPONENTS FROM SEISMIC CATEGORY 2 PIPING & COMPONENTS, THE SEISMIC BOUNDARY EXTENDS TO THE FIRST PIPE CLASS BREAK SHOWN ON THESE CONNECTIONS.
  3. SOLENOID ACTUATORS FOR AIR OPERATED VALVES ARE SHOWN IN THEIR BUILT POSITION. (AIR OPERATED VALVES ARE NORMALLY ENERGIZED (CLOSE) ON NORMALLY PRE-ENERGIZED (DISE) ALL OTHER VALVES ARE SHOWN IN THEIR NORMAL PROCESS POSITION.
  4. VALVES ON THE H<sub>2</sub> SUPPLY LINES SHOULD BE ZERO LEAKAGE, YACKESS TYPE, GLOBE VALVES.
  5. DELETED.
  6. BUTTWELDED SPENT RESIN LINE CONNECTIONS (USE LONG RADIUS PIPE FITTINGS OR BEND PIPE TO SUIT. LINES TO BE BUTTWELDED ARE 2HCB-80 & 2HCB-4.
  7. DELETED.
  8. THE PURPOSE OF 2HCB-2458 & 2HCB-15 IS TO PROVIDE INDICATION OF ANY ACCUMULATION OF WATER IN THE SCH. THESE FLOW GLASSES & THE DRAIN CONNECTIONS ON THE CANNISTER. THE STEEL PART OF THE VENT LINES SHOULD BE LOCATED AS CLOSE AS POSSIBLE TO THE VENT VALVES ON THE UPSTREAM SIDE OF THE GLASSES.
  9. TEMPORARY DAMPERS: 2M-1 & 2M-2, 60, REPLACED WITH PERMANENT DAMPERS: 2M-1 & 2M-2.
  10. BLANK INSTALLED. MAY BE REMOVED WITH THE APPROVAL OF SHIP SUPERVISOR.
  11. SPOOL PIECES ARE NOT TO BE PERMANENTLY REMOVED.
  12. COMPUTER INPUT SIGNAL IS COMMON TO SPDS AND PLANT COMPUTER WITH IDENTICAL POINT ID.
  13. ABANDONED IN PLACE.
  14. VALVES 2HCB-234, 2HCB-235 AND 2HCB-236 HAVE BEEN CHANGED TO INDICATE THAT THESE VALVES ARE THROTTLE VALVES. CONFIGURATIONS FOR 2HCB-234, 2HCB-235 AND 2HCB-236 WILL REMAIN THE SAME. HOWEVER, OPERATIONS MAY THROTTLE THESE VALVES BACK TO CLOSED POSITION FOR FLEXING OF THE THERMAL NEEDS AS AND WHEN NEEDED.
  15. PASS COMPONENTS HAVE BEEN ISOLATED BY ER-HND-2003-0221-000.
  16. CHARGING PUMP DISCHARGE TIE-IN FOR FLEX.
  17. FLEX CROSS-TIE PRIMING INJECTION AND RCS MAKEUP ALTERNATE CONNECTOR.
  18. CHARGING PUMP SUCTION TIE-IN FOR FLEX.
  19. FLEX CROSS-TIE PIPING TO UNIT 1 RCS.

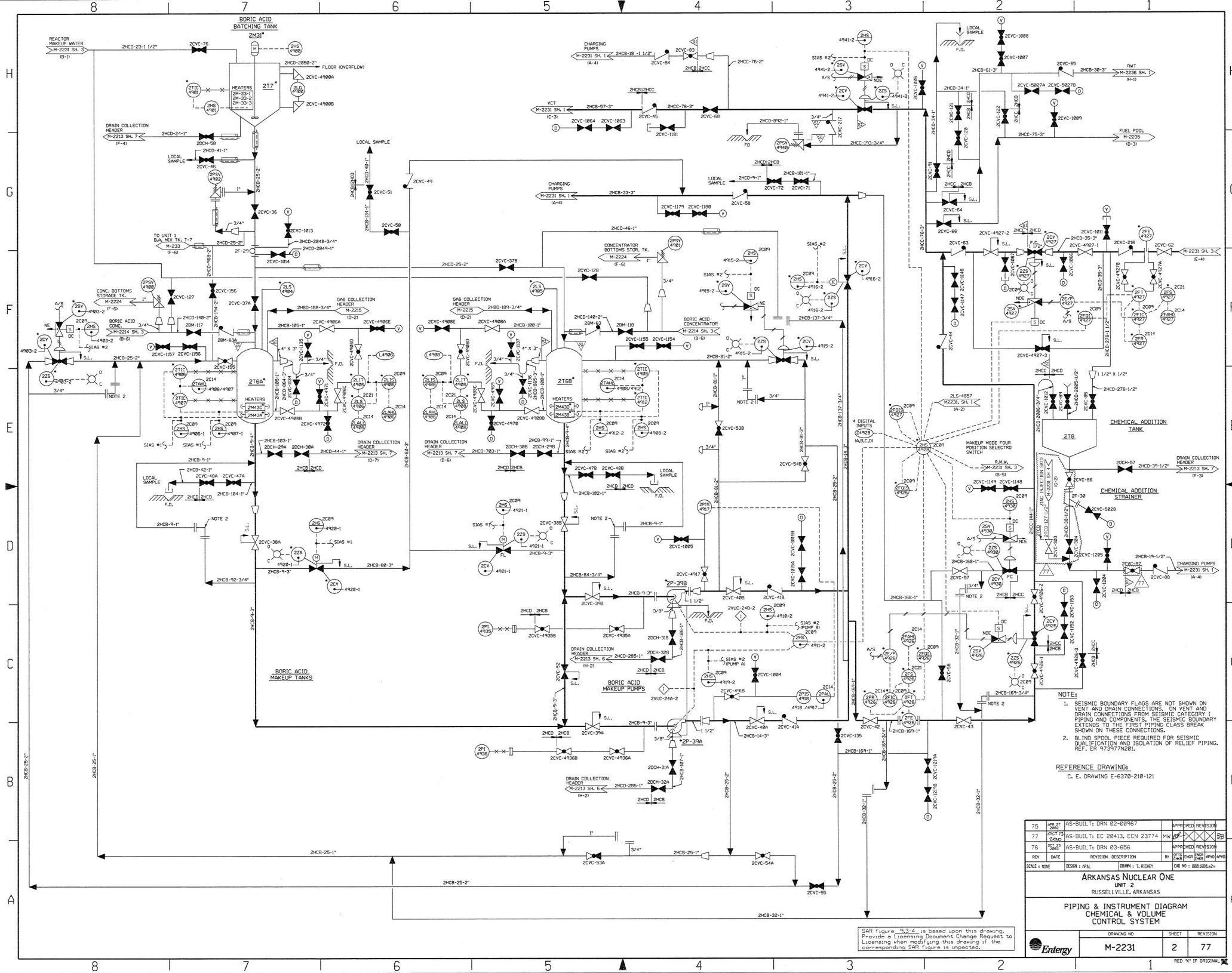
147	AS-BUILT: EC 85340	APPROVED REVISION
146	AS-BUILT: EC 85858	APPROVED REVISION
145	AS-BUILT: EC 85713	APPROVED REVISION
REV	DATE	REVISION DESCRIPTION
SCALE: NONE	DESIGN: RPL	DRAWN: JCK/DWJ

ARKANSAS NUCLEAR ONE  
RUSSELLVILLE, ARKANSAS

PIPING & INSTRUMENT DIAGRAM  
CHEMICAL & VOLUME CONTROL  
SYSTEM

DRAWING NO.	SHEET	REVISION
M-2231	1	148

RED "X" IF ORIGINAL



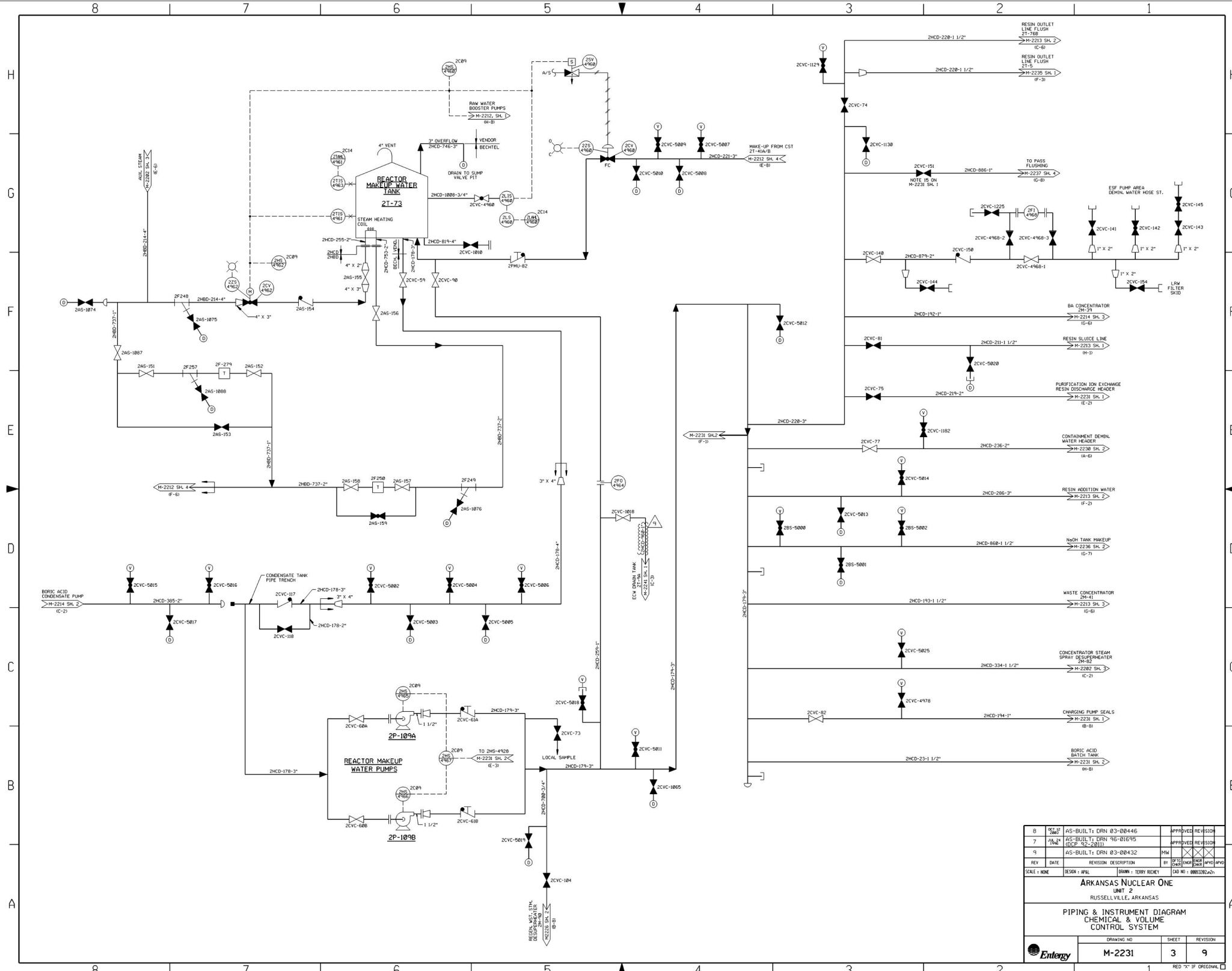
- NOTE:
1. SEISMIC BOUNDARY FLAGS ARE NOT SHOWN ON VENT AND DRAIN CONNECTIONS. ON VENT AND DRAIN CONNECTIONS FROM SEISMIC CATEGORY 1 PIPING AND COMPONENTS, THE SEISMIC BOUNDARY EXTENDS TO THE FIRST PIPING GLASS BREAK SHOWN ON THESE CONNECTIONS.
  2. BLIND SPOOL PIECE REQUIRED FOR SEISMIC QUALIFICATION AND ISOLATION OF RELIEF PIPING. REF. ER 97377N281.

REFERENCE DRAWING:  
C. E. DRAWING E-6370-210-121

75	10/27/75	AS-BUILT: DRN 02-08967	APPROVED	REVISION	
77	10/27/75	AS-BUILT: EC 28413, ECN 23774	APPROVED	REVISION	
76	10/27/75	AS-BUILT: DRN 03-656	APPROVED	REVISION	
REV	DATE	REVISION DESCRIPTION	BY	CHKD	APP'D
SCALE: NONE	DESIGN: JPHL	DRAWN: T. RIDLEY	CD NO: 0001586	2nd	
ARKANSAS NUCLEAR ONE					
UNIT 2					
RUSSELLVILLE, ARKANSAS					
PIPING & INSTRUMENT DIAGRAM					
CHEMICAL & VOLUME CONTROL SYSTEM					
DRAWING NO		SHEET		REVISION	
M-2231		2		77	

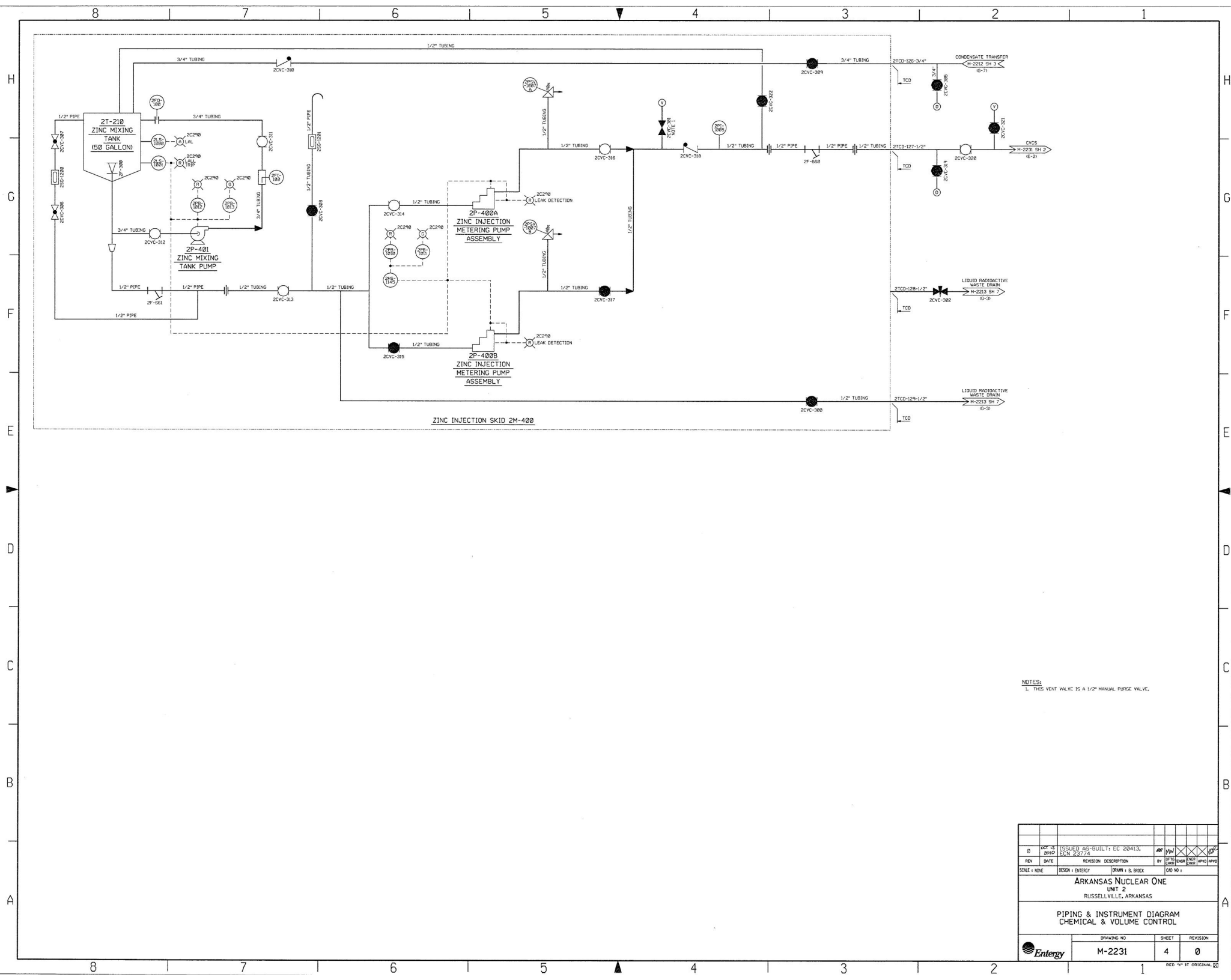
SAR figure 5.3.4 is based upon this drawing. Provide a Licensing Document Change Request to Licensing when modifying this drawing if the corresponding SAR figure is impacted.





8	REV. 17	AS-BUILT: DRN 03-00446	APPROVED	REVISION
7	REV. 16	AS-BUILT: DRN 96-00195 (O&P 95-0011)	APPROVED	REVISION
9	REV. 18	AS-BUILT: DRN 03-00432	APPROVED	REVISION
REV	DATE	REVISION DESCRIPTION	BY	CHKD
SCALE: NONE	DESIGN: SPIL	DRAWN: TERRY RICHY	LD NO: 00002020	
ARKANSAS NUCLEAR ONE				
UNIT 2				
RUSSELLVILLE, ARKANSAS				
PIPING & INSTRUMENT DIAGRAM				
CHEMICAL & VOLUME CONTROL SYSTEM				
DRAWING NO		SHEET	REVISION	
M-2231		3	9	

RED "X" IF ORIGINAL



NOTES:  
1. THIS VENT VALVE IS A 1/2" MANUAL PURGE VALVE.

0	DO NOT REWORK	ISSUED AS-BUILT: EC 20413, SEN 23774										BY	MIN	DATE	REVISION	DESCRIPTION
REV	DATE	REVISION DESCRIPTION										BY	DATE	REVISION	DESCRIPTION	
SCALE : NONE		DESIGN : ENTRY		DRWN : S. BROCK						CAO NO :						
ARKANSAS NUCLEAR ONE																
UNIT 2																
RUSSELLVILLE, ARKANSAS																
PIPING & INSTRUMENT DIAGRAM																
CHEMICAL & VOLUME CONTROL																
DRAWING NO										SHEET		REVISION				
M-2231										4		0				



ADMINISTRATIVE JOB PERFORMANCE MEASUREUNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Radiation ControlTASK: Determine Condenser off gas radiation monitor setting.JTA#: ANO2-RO-RMS-OFFNORM-13ALTERNATE PATH Yes: \_\_\_\_\_ No: X TIME CRITICAL Yes: \_\_\_\_\_ No: XKA VALUE RO: 2.9 SRO: 3.1 KA REFERENCE: 2.3.15APPROVED FOR ADMINISTRATION TO: RO: X SRO: \_\_\_\_\_TASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: \_\_\_\_\_ BOTH: X

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: \_\_\_\_\_ CLASSROOM: Perform

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ CLASSROOM: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 10 MinutesREFERENCE(S): 2105.016, Radiation Monitoring and Evacuation system. Unit 2 OPS B2 CBO Log.

EXAMINEE'S NAME: \_\_\_\_\_ Badge #: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time \_\_\_\_\_

**ADMINISTRATIVE JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- Unit 2 is in Mode 1.
- 2K11-A10 Secondary System radiation hi alarm is locked in due to 2RITS-0645 Condenser off gas radiation monitor.
- Crew has entered Primary to Secondary leakage AOP due to a small primary to secondary leak that does not require a shutdown.
- The 2RITS-0645 was logged reading 375 CPM on the OPS-B2 CBO log.
- SM has given permission to adjust the alarm setpoint for 2RITS-0645.

**TASK STANDARD:**

Determined the new potentiometer setting for the alarm setpoint of 2RITS-0645 (potentiometer setting: 3.45) and the new voltage setting for 2RR-1057 (1.778 to 1.835) Secondary Radiation Recorder.

**TASK PERFORMANCE AIDS:**

2105.016, Radiation Monitoring and Evacuation System Rev. 31, and Unit 2 OPS-B2 CBO Log Rev. 9/1/2016

**EXAMINER NOTES:**

Determine Condenser off gas radiation monitor setting. This admin JPM has the applicant determine the new setpoint on the Condenser Off Gas Radiation Monitor 2RITS-0645 based on rising activity due the primary to Secondary leakage. The new setpoint must be calculated based on the guidance in the procedure and then a new potentiometer setting and voltage must be obtained from the tables in the procedure to allow the physical adjustment of the monitor controls.

**Rev. 1:** Changed the approximate completion time to 10 minutes based on validation times. Changed the Examiner Cue in Step 2 of the Performance Checklist to state "If asked for permission, state "Read the initial conditions". Deleted "Inform examiner when ready to adjust 2RITS-0645 alarm setpoint IAW step 11.3.2." for the initiating cue.

**ADMINISTRATIVE JOB PERFORMANCE MEASURE****INITIATING CUE:**

Determine the highest allowable new potentiometer setting of 2RITS-0645, Condenser Off Gas Radiation Monitor, and highest allowable new voltage setting for 2RR-1057, Secondary Radiation Recorder, IAW OP-2105.016, Radiation Monitoring and Evacuation System, and OPS-B2 CBO log.

**START TIME:** \_\_\_\_\_

<b>PERFORMANCE CHECKLIST</b>			<b>STANDARDS</b>	(Circle One)
(C)	1. (Step 11.1)	Determine new high alarm setpoint for 2RITS-0645 from Unit 2 CBOT Electrical log (OPS-B2). <ul style="list-style-type: none"> <li>Verify setpoint within the following limits: <ul style="list-style-type: none"> <li>Minimum high alarm setpoint of 250 cpm</li> <li>Smaller of 2 times background or 300 cpm above background</li> </ul> </li> </ul>	Examinee reviewed the Unit 2 OPS-B2 CBO Log and 2105.016 and determined that the new alarm set point should be 675 CPM.  Background = 375 CPM. $2 \times 375 = 750 \text{ CPM}$ $375 + 300 = 675 \text{ CPM}$ 675 is less than 750.  Thus new setpoint should be 675 CPM maximum	N/A SAT UNSAT
	2. (Step 11.2)	Obtain SM permission to adjust alarm setpoints for 2RITS-0645. <b><u>EXAMINER CUE:</u></b> <b>IF asked for permission, state "Read the initial conditions".</b>	Examinee determined SM permission was given from the initial conditions.	N/A SAT UNSAT
(C)	3. (Step 11.3 and 11.3.1)	Perform the following to change 2RITS-0645 high alarm setpoint on 2C25:  Determine potentiometer dial setting which corresponds to desired high alarm setpoint from Table 1 below.	Examinee determined the new potentiometer dial setting for 2RITS-0645 is 3.45 from Table 1.  <b>Examiner Note: 675 cpm is between the values listed in table 1 and the applicant should select the value for 600 cpm to comply with step 11.1</b>	N/A SAT UNSAT
	4. (Step 11.3.2)	Adjust 2RITS-0645 high alarm setpoint potentiometer to required setting.  <b><u>EXAMINER CUE:</u></b> <b>Report that the Potentiometer has been adjusted to the desired setting.</b>	Examinee told examiner they were ready to adjust the potentiometer per the initiating cue.	N/A SAT UNSAT

**ADMINISTRATIVE JOB PERFORMANCE MEASURE**

<b>PERFORMANCE CHECKLIST</b>			<b>STANDARDS</b>	(Circle One)
(C)	5. (Step 11.4 and 11.4.1)	<p>Perform the following to change 2RITS-0645 high alarm on Secondary Radiation Recorder (2RR-1057) on 2C14 and SEC SYS RADIATION HI (2K11-A10):</p> <p>Determine voltage setting which corresponds to desired high alarm setpoint from Table 2.</p>	<p>Examinee determined the new voltage setting for 2RR-1057 is 1.778 from Table 2.</p> <p><b>Examiner Note: The value for 675 cpm is not in Table 2 and the applicant should select the value for 600 cpm to comply with step 11.1</b></p> <p><b>Examiner note: Either step 5 or step 6 is critical based on the which method the examinee chooses to determine the new voltage setting but the voltage setting must in the following band. 1.778.</b></p>	N/A SAT UNSAT
(C)	6. (Step 11.4.2)	<p>IF desired setpoint NOT in Table 2, <u>THEN</u> perform the following to calculate corresponding voltage:</p> $y = \frac{[\ln(x) - \ln(10)]}{\ln(10)} \quad x = \text{desired counts}$ <p><math>y =</math> required voltage setting</p>	<p>Examinee determined the new voltage setting to be between 1.813 and 1.835 for 675 cpm.</p> <p><b>Examiner Note: Either step 5 or step 6 is critical based on the which method the examinee chooses to determine the new voltage setting but the voltage setting must in the following band. 1.813 to 1.835</b></p>	N/A SAT UNSAT
<b>END</b>				

STOP TIME: \_\_\_\_\_

ADMINISTRATIVE JOB PERFORMANCE MEASURE**EXAMINER'S COPY****INITIAL CONDITIONS:**

- Unit 2 is in Mode 1.
- 2K11-A10 Secondary System radiation hi alarm is locked in due to 2RITS-0645 Condenser off gas radiation monitor.
- Crew has entered Primary to Secondary leakage AOP due to a small primary to secondary leak that does not require a shutdown.
- The 2RITS-0645 was logged reading 375 CPM on the OPS-B2 CBO log.
- SM has given permission to adjust the alarm setpoint for 2RITS-0645.

**INITIATING CUE:**

Determine the highest allowable new potentiometer setting of 2RITS-0645, Condenser Off Gas Radiation Monitor, and highest allowable new voltage setting for 2RR-1057, Secondary Radiation Recorder, IAW OP-2105.016, Radiation Monitoring and Evacuation System, and OPS-B2 CBO log.

Key:

2RITS-0645 potentiometer setting: 3.45

2RR-1057 voltage setting: (1.778) or (1.813 to 1.835)

ADMINISTRATIVE JOB PERFORMANCE MEASURE**EXAMINEE'S COPY****INITIAL CONDITIONS:**

- Unit 2 is in Mode 1.
- 2K11-A10 Secondary System radiation hi alarm is locked in due to 2RITS-0645 Condenser off gas radiation monitor.
- Crew has entered Primary to Secondary leakage AOP due to a small primary to secondary leak that does not require a shutdown.
- The 2RITS-0645 was logged reading 375 CPM on the OPS-B2 CBO log.
- SM has given permission to adjust the alarm setpoint for 2RITS-0645.

**INITIATING CUE:**

Determine the highest allowable new potentiometer setting of 2RITS-0645, Condenser Off Gas Radiation Monitor, and highest allowable new voltage setting for 2RR-1057, Secondary Radiation Recorder, IAW OP-2105.016, Radiation Monitoring and Evacuation System, and OPS-B2 CBO log.

2RITS-0645 potentiometer setting: \_\_\_\_\_

2RR-1057 voltage setting: \_\_\_\_\_



## UNIT 2 CBOT ELECTRICAL

OPS-B2 1/9/2012

Unit Two OPS

9/1/2016

Unit Two Rounds

Page 13 of 44

2RITS-8233 READING

REQUIRED Seq: 51 Every Day 137

Equip. 2-RMS -SWITCH-2RITS-8233

Location: CR2-386-2C25

ID:

Short Instr: MAX=2X BACKGROUND TS 3.3.3.1 ODCM L2.2.1.

Units: CPM

Shift Time	Reading	Notes	Recorded By
Days	<b>105</b>		<b>Joe Reactor</b>
Nights			
Extra Set 1			
Extra Set 2			

SETPOINT FOR 2RITS-0645

REQUIRED Seq: 52 Every Day 136

Location: CR2-386-2C25

Short Instr: SEE LONG INSTRUCTION FOR MAX CRITERIA

Long Instr: IF COND VAC PUMP IS IN OPERATION, THEN THE HIGH ALARM SETPT SHALL BE THE SMALLER OF 2X BACKGROUND OR APP 300 CPM ABOVE BKGRD. MINIMUM SETPOINT IS 250 CPM.

Units: CPM Minimum: &gt;= 250

Shift Time	Reading	Notes	Recorded By
Days	<b>250</b>		<b>Joe Reactor</b>
Nights			
Extra Set 1			
Extra Set 2			

2RITS-0645 READING COND VAC

REQUIRED Seq: 53 Every Day 135

Equip. 2-RMS -SWITCH-2RITS-0645

Location: CR2-386-2C25

ID:

Short Instr: 2RITS-0645

Units: CPM Maximum: &lt;= &lt;EXPR&gt;

Shift Time	Reading	Notes	Recorded By
Days	<b>375</b>		<b>Joe Reactor</b>
Nights			
Extra Set 1			
Extra Set 2			

Order	Description	Expression	Text	Color
1	EXCEEDS HIGH ALARM SETPOINT	n(sta(135))>N(STA(136))	EXCEEDS HIGH ALARM SETPOINT	

Max. Expr.: N(STA(136))

WASTE GAS DISCHARGE

REQUIRED Seq: 54 Every Day 134

Equip. 2-RMS -SWITCH-2RITS-2429

Location: CR2-386-2C25

ID:

Short Instr: ODCM L2.2.1 and L2.4.1 SEE LONG INST.

Long Instr: ODCM L2.2.1. IF 2RITS-2429 &gt;= 8.9 E+5, THEN declare monitor inoperable and refer to ODCM L2.2.1 and L2.4.1 (ANO-91-05604)

If background reading drops significantly from previous readings, initiate actions to refill loop seals at 2FIT-2430 and 2RITS-2429. (CR-2-97-0037-03)

Units: CPM

Maximum: &lt;= 890000

Shift Time	Reading	Notes	Recorded By
Days	<b>210</b>		<b>Joe Reactor</b>
Nights			
Extra Set 1			
Extra Set 2			

Order	Description	Expression	Text	Color
1	OOS HIGH	N(STA(134))>890000	ODCM L 2.2.1. IF 2RITS-2429 >= 8.9 E+5, THEN declare monitor inoperable and refer to ODCM L 2.2.1 and L 2.4.1 (ANO-91-05604)	

PROC./WORK PLAN NO. <b>2105.016</b>	PROCEDURE/WORK PLAN TITLE: <b>RADIATION MONITORING AND EVACUATION SYSTEM</b>	PAGE: <b>14 of 35</b>  CHANGE: <b>031</b>
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11.0 HIGH ALARM SETPOINT ADJUSTMENT FOR MAIN CONDENSER OFFGAS MONITOR (2RITS-0645).

11.1 Determine new high alarm setpoint for 2RITS-0645 from Unit 2 CBOT Electrical log (OPS-B2).

- Verify setpoint within the following limits:
  - Minimum high alarm setpoint of 250 cpm
  - Smaller of 2 times background or 300 cpm above background

11.2 Obtain SM permission to adjust alarm setpoints for 2RITS-0645.

11.3 Perform the following to change 2RITS-0645 high alarm setpoint on 2C25:

11.3.1 Determine potentiometer dial setting which corresponds to desired high alarm setpoint from Table 1 below.

11.3.2 Adjust 2RITS-0645 high alarm setpoint potentiometer to required setting.

TABLE 1							
Alarm Setpoint CPM	Dial Setting	Alarm Setpoint CPM	Dial Setting	Alarm Setpoint CPM	Dial Setting	Alarm Setpoint CPM	Dial Setting
250	= 2.77	800	= 3.78	5000	= 5.24	10000	= 5.82
300	= 2.85	900	= 3.87	6000	= 5.42	20000	= 6.35
400	= 3.10	1000	= 4.00	7000	= 5.56	30000	= 6.66
500	= 3.30	2000	= 4.51	8000	= 5.68	40000	= 6.94
600	= 3.45	3000	= 4.82	9000	= 5.74	50000	= 7.09
700	= 3.62	4000	= 5.06				

11.4 Perform the following to change 2RITS-0645 high alarm on Secondary Radiation Recorder (2RR-1057) on 2C14 and SEC SYS RADIATION HI (2K11-A10):

11.4.1 Determine voltage setting which corresponds to desired high alarm setpoint from Table 2 below.

TABLE 2							
Alarm Setpoint CPM	Voltage Setting	Alarm Setpoint CPM	Voltage Setting	Alarm Setpoint CPM	Voltage Setting	Alarm Setpoint CPM	Voltage Setting
250	= 1.398	425	= 1.628	1000	= 2.000	8000	= 2.903
275	= 1.439	450	= 1.653	2000	= 2.301	9000	= 2.954
300	= 1.477	500	= 1.699	3000	= 2.477	10000	= 3.000
325	= 1.512	600	= 1.778	4000	= 2.602	20000	= 3.301
350	= 1.544	700	= 1.845	5000	= 2.699	30000	= 3.477
375	= 1.574	800	= 1.903	6000	= 2.778	40000	= 3.602
400	= 1.602	900	= 1.954	7000	= 2.845	50000	= 3.699

11.4.2 IF desired setpoint NOT in Table 2,  
THEN perform the following to calculate corresponding voltage:

$$y = \frac{[\ln(x) - \ln(10)]}{\ln(10)} \quad \begin{array}{l} x = \text{desired counts} \\ y = \text{required voltage setting} \end{array}$$

**ADMINISTRATIVE JOB PERFORMANCE MEASURE**UNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Conduct of OperationsTASK: Review dilution calculationJTA#: ANO2-RO-CHADD-NORM-3KA VALUE RO: 4.1 SRO: 4.3 KA REFERENCE: 2.1.43APPROVED FOR ADMINISTRATION TO: RO: \_\_\_\_\_ SRO: XTASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: \_\_\_\_\_ BOTH: X

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: Perform CLASSROOM: Perform

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ CLASSROOM: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 10 minutesREFERENCE(S): OP 2103.004 Soluble Poison Concentration Control REV. 11  
—

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- OP 2102.016 Reactor Startup Step 7.19 requires that RCS boron concentration is adjusted to the ECB value.
- Mode 3
- PZR level = 42%
- RCS pressure = 2200 psia
- Tave = 545°F
- VCT level = 60%
- Present boron concentration = 750 ppm
- ECB is calculated to be 350 ppm

**TASK STANDARD:**

Determined the given calculation was incorrect and determined the actual amount of water needed to dilute from actual to ECB boron concentration has been calculated using OP 2103.004 Attachment 'A.3'.

**TASK PERFORMANCE AIDS:**

OP 2103.004 Soluble Poison Concentration Control REV. 11  
Attachment 'A.3' and Attachment C.

**EXAMINER NOTES:**

Review dilution calculation. This administrative JPM has the applicant has to review a completed calculation find the errors, and determine the amount of water needed to dilute the RCS from its actual boron concentration to the Estimated Critical Boron Concentration using a manual calculation sheet in the Chemical Addition Procedure.

**Rev. 1:** Removed the number 481 from the Examinee's Copy of the ICs and QUE on Page 6 of 6. Revised the Initiating Cue to clarify the task based on Facility Representative feedback and added lines on the Examiner's and Examinee's sheets to facilitate documentation of the errors.

**JOB PERFORMANCE MEASURE****INITIATING CUE:**

Review completed Dilution water calculation (OP 2103.004 Attachment A.3 and Attachment C); correct any errors that may be found, if any.

**AND**

If any errors are found, list them below AND determine the actual amount of dilution water required to bring RCS boron concentration to the given ECB concentration.

Start Time: \_\_\_\_\_

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	1.	Review 2103.004 Attachment A.3 for completeness and errors.	<p>Determined both of the following errors:</p> <p>Mass of Reactor Coolant (Mr) was determined incorrectly from Attachment C.</p> <p>And</p> <p>Initial and final Boron Concentrations were reversed in step 3.0 of the calculation.</p>	N/A SAT UNSAT
	2.	Record the following data from initial conditions attachment.	<p>Ensured the recorded data was accurate:</p> <ul style="list-style-type: none"> <li>- 545°F (Tave)</li> <li>- 42% (PZR Level)</li> <li>- 60% (VCT Level)</li> <li>- (Cri) = 750 PPM (initial)</li> <li>- (Crf) = 350 PPM (final)</li> </ul>	N/A SAT UNSAT
(C)	3.	Correct RC Mass from Attachment C.	<p>Determined the correct RC mass from Attachment C for a PZR level of 42%, 545°F, and 2200 psia.</p> <p><u>(Mr) = 481980 lb (C)</u></p>	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

(C)	4.	Calculate the DI Water Feed Mass.	Calculated the DI Water Feed Mass: $Mf = 481980 \ln (750/350)$ <u><math>Mf = 367336.3 \text{ lb (C)}</math></u> Acceptable range: (367300 – 367400 lb)	N/A SAT UNSAT
(C)	5.	Calculate DI water feed volume	Calculate DI water feed volume: $F = (Mf) (Vf) (7.48 \text{ gal/ft}^3)$ $Vf = sv@80^\circ\text{F} = 0.0161 \text{ ft}^3/\text{lb}$ $F = (367336.3 \text{ lb}) (0.0161)(7.48)$ <u><math>F = 44237.6 \text{ gallons (C)}</math></u> Acceptable range: (44233-44245.3 gallons)	N/A SAT UNSAT
END				

Stop Time: \_\_\_\_\_

**SEE KEY ON NEXT 2 PAGES**

PROC./WORK PLAN NO. <b>2103.004</b>	PROCEDURE/WORK PLAN TITLE: <b>SOLUBLE POISON CONCENTRATION CONTROL</b>	PAGE: <b>6 of 21</b> CHANGE: <b>011</b>
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# KEY

ATTACHMENT A.3

PAGE 1 OF 1

## WORK SHEET FOR MAKEUP IN DILUTE MODE

### NOTE

- Changes made affecting the calculation should be coordinated with Computer Support prior to implementation.
- The BORON2 program located on the plant computer is the preferred method for performing the calculations in this procedure. Manual calculations include assumptions for simplicity that result in slightly different calculated volumes than those calculated using BORON2 (see Limit and Precaution 5.2)

1.0 Record the following:

- RCS Temp. = 545 °F
- Pressurizer Level = 42 %
- VCT Level = 60 %
- Initial RCS Boron Conc. ( $Cr_i$ ) = 750 ppm
- Final Desired RCS Boron Conc. ( $Cr_F$ ) = 350 ppm

2.0 Determine the RC Mass from Attachment C:

1st error

Mass of Reactor Coolant ( $M_r$ ) = 490160 lb. Should be 481980 lb.

3.0 Calculate the DI Water Feed Mass ( $M_f$ ):

$$M_f = M_r \ln \left[ \frac{Cr_i}{Cr_F} \right]$$

2nd error

$$M_f = (\underline{490160}) \ln \left( \frac{\underline{350}}{\underline{750}} \right) \quad \text{Should be } \ln (750/350)$$

$$M_f = \underline{373570} \text{ lb.} \quad \text{Should be } 367336.3 \text{ lb}$$

4.0 Calculate the DI Water Feed Volume ( $F$ ) that must be fed to change the boron concentration from  $Cr_i$  to  $Cr_F$ :

$$F = M_f V_F (7.48)$$

$$V_F = \text{Specific Volume of Feed @80°F (ft}^3/\text{lb.)} = 0.0161 \text{ ft}^3/\text{lb.}$$

$$F = (M_f) (0.0161 \text{ ft}^3/\text{lb.}) (7.48 \text{ gal/ft}^3)$$

$$F = (\underline{373570} \text{ lb.}) (0.0161 \text{ ft}^3/\text{lb.}) (7.48 \text{ gal/ft}^3)$$

$$F = \underline{44988.3} \text{ gal. DI water} \quad \text{Should be } 44237.6 \text{ gallons}$$

Performed By: Jo RO Time: Now Date: Today

Supervisor Review: \_\_\_\_\_ Date: \_\_\_\_\_

Corrected form on the next page.

# KEY

PROC./WORK PLAN NO. <b>2103.004</b>	PROCEDURE/WORK PLAN TITLE: <b>SOLUBLE POISON CONCENTRATION CONTROL</b>	PAGE: <b>6 of 21</b> CHANGE: <b>011</b>
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**KEY**

ATTACHMENT A.3

PAGE 1 OF 1

WORK SHEET FOR MAKEUP IN DILUTE MODE

**NOTE**

- Changes made affecting the calculation should be coordinated with Computer Support prior to implementation.
- The BORON2 program located on the plant computer is the preferred method for performing the calculations in this procedure. Manual calculations include assumptions for simplicity that result in slightly different calculated volumes than those calculated using BORON2 (see Limit and Precaution 5.2)

1.0 Record the following:

- RCS Temp. = **545 °F**
- Pressurizer Level = **42%**
- VCT Level = **60%**
- Initial RCS Boron Conc. ( $Cr_i$ ) = **750 ppm**
- Final Desired RCS Boron Conc. ( $Cr_F$ ) = **350 ppm**

2.0 Determine the RC Mass from Attachment C:

Mass of Reactor Coolant ( $M_r$ ) = **481980 lb.**

3.0 Calculate the DI Water Feed Mass ( $M_f$ ):

$$M_f = M_r \ln \left[ \frac{Cr_i}{Cr_F} \right]$$

$$M_f = (.481980) \ln \left( \frac{750}{350} \right)$$

$$M_f = 367300 - 367400 \text{ lb.}$$

4.0 Calculate the DI Water Feed Volume (F) that must be fed to change the boron concentration from  $Cr_i$  to  $Cr_F$ :

$$F = M_F V_F (7.48)$$

$$V_F = \text{Specific Volume of Feed @80°F (ft}^3/\text{lb.)} = 0.0161 \text{ ft}^3/\text{lb.}$$

$$F = (M_F) (0.0161 \text{ ft}^3/\text{lb.}) (7.48 \text{ gal/ft}^3)$$

$$F = (367300 - 367400 \text{ lb.}) (0.0161 \text{ ft}^3/\text{lb.}) (7.48 \text{ gal/ft}^3)$$

$$F = 44233 - 44245.3 \text{ gal. DI water}$$

Performed By: \_\_\_\_\_ Time: \_\_\_\_\_ Date: \_\_\_\_\_

Supervisor Review: \_\_\_\_\_ Date: \_\_\_\_\_

**KEY**



**JOB PERFORMANCE MEASURE****EXAMINER'S COPY****INITIAL CONDITIONS:**

- OP 2102.016 Reactor Startup Step 7.19 requires that RCS boron concentration is adjusted to the ECB value.
- Mode 3
- PZR level = 42%
- RCS pressure = 2200 psia
- Tave = 545°F
- VCT level = 60%
- Present boron concentration = 750 ppm
- ECB is calculated to be 350 ppm

**INITIATING CUE:**

Review completed Dilution water calculation (OP 2103.004 Attachment A.3 and Attachment C); correct any errors that may be found, if any.

**AND**

If any errors are found, list them below AND determine the actual amount of dilution water required to bring RCS boron concentration to the given ECB concentration.

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**JOB PERFORMANCE MEASURE****EXAMINEE'S COPY****INITIAL CONDITIONS:**

- OP 2102.016 Reactor Startup Step 7.19 requires that RCS boron concentration is adjusted to the ECB value.
- Mode 3
- PZR level = 42%
- RCS pressure = 2200 psia
- Tave = 545°F
- VCT level = 60%
- Present boron concentration = 750 ppm
- ECB is calculated to be 350 ppm

**INITIATING CUE:**

Review completed Dilution water calculation (OP 2103.004 Attachment A.3 and Attachment C); correct any errors that may be found, if any.

**AND**

If any errors are found, list them below AND determine the actual amount of dilution water required to bring RCS boron concentration to the given ECB concentration.

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PROC./WORK PLAN NO. <b>2103.004</b>	PROCEDURE/WORK PLAN TITLE: <b>SOLUBLE POISON CONCENTRATION CONTROL</b>	PAGE: <b>6 of 21</b> CHANGE: <b>011</b>
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ATTACHMENT A.3

PAGE 1 OF 1

WORK SHEET FOR MAKEUP IN DILUTE MODE

**NOTE**

- Changes made affecting the calculation should be coordinated with Computer Support prior to implementation.
- The BORON2 program located on the plant computer is the preferred method for performing the calculations in this procedure. Manual calculations include assumptions for simplicity that result in slightly different calculated volumes than those calculated using BORON2 (see Limit and Precaution 5.2)

1.0 Record the following:

- RCS Temp. = 545 °F
- Pressurizer Level = 42 %
- VCT Level = 60 %
- Initial RCS Boron Conc. (Cr<sub>i</sub>) = 750 ppm
- Final Desired RCS Boron Conc. (Cr<sub>F</sub>) = 350 ppm

2.0 Determine the RC Mass from Attachment C:

Mass of Reactor Coolant (Mr) = 490160 lb.

3.0 Calculate the DI Water Feed Mass (M<sub>f</sub>):

$$M_f = M_r \ln \left[ \frac{Cr_i}{Cr_F} \right]$$

$$M_f = ( \underline{490160} ) \ln \left( \frac{\underline{350}}{\underline{750}} \right)$$

$$M_f = \underline{373570} \text{ lb.}$$

4.0 Calculate the DI Water Feed Volume (F) that must be fed to change the boron concentration from Cr<sub>i</sub> to Cr<sub>F</sub>:

$$F = M_F V_F (7.48)$$

$$V_F = \text{Specific Volume of Feed @80°F (ft}^3\text{/lb.)} = 0.0161 \text{ ft}^3\text{/lb.}$$

$$F = (M_F) (0.0161 \text{ ft}^3\text{/lb.}) (7.48 \text{ gal/ft}^3)$$

$$F = ( \underline{373570} \text{ lb.} ) (0.0161 \text{ ft}^3\text{/lb.}) (7.48 \text{ gal/ft}^3)$$

$$F = \underline{44988.3} \text{ gal. DI water}$$

Performed By: Jo RO Time: Now Date: Today

Supervisor Review: \_\_\_\_\_ Date: \_\_\_\_\_

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ATTACHMENT C

PAGE 1 OF 2

REACTOR COOLANT MASS TABLE

ANO - UNIT 2

MR (MASS OF REACTOR COOLANT AT GIVEN TEMP., LBS.)

<b>PZR PRESSURE</b>	<b>250 psia</b>	<b>250 psia</b>	<b>250 psia</b>	<b>250 psia</b>	<b>1000 psia</b>	<b>2200 psia</b>
<b>PZR LEVEL (%)</b>	<b>100°F</b>	<b>140°F</b>	<b>200°F</b>	<b>240°F</b>	<b>300°F</b>	<b>545°F</b>
<b>0</b>	632,303	626,598	614,668	604,785	556,500	462,894
<b>2</b>	633,589	627,885	615,957	606,075	557,617	463,803
<b>4</b>	634,874	629,172	617,246	607,365	558,733	464,711
<b>6</b>	636,160	630,459	618,535	608,656	559,850	465,620
<b>8</b>	637,446	631,746	619,824	609,946	560,966	466,529
<b>10</b>	638,731	633,033	621,113	611,237	562,083	467,438
<b>12</b>	640,017	634,320	622,402	612,527	563,199	468,347
<b>14</b>	641,303	635,607	623,691	613,817	564,315	469,256
<b>16</b>	642,588	636,894	624,980	615,108	565,432	470,165
<b>18</b>	643,874	638,181	626,269	616,398	566,548	471,074
<b>20</b>	645,160	639,468	627,558	617,689	567,665	471,982
<b>22</b>	646,445	640,755	628,847	618,979	568,781	472,891
<b>24</b>	647,731	642,042	630,137	620,270	569,898	473,800
<b>26</b>	649,017	643,329	631,426	621,560	571,014	474,709
<b>28</b>	650,302	644,616	632,715	622,850	572,131	475,618
<b>30</b>	651,588	645,903	634,004	624,141	573,247	476,527
<b>32</b>	652,874	647,190	635,293	625,431	574,364	477,436
<b>34</b>	654,159	648,477	636,582	626,722	575,480	478,345
<b>36</b>	655,445	649,764	637,871	628,012	576,596	479,253
<b>38</b>	656,731	651,051	639,160	629,302	577,713	480,162
<b>40</b>	658,016	652,338	640,449	630,593	578,829	481,071
<b>42</b>	659,302	653,626	641,738	631,883	579,946	481,980
<b>44</b>	660,588	654,913	643,027	633,174	581,062	482,889
<b>46</b>	661,873	656,200	644,316	634,464	582,179	483,798
<b>48</b>	663,159	657,487	645,605	635,754	583,295	484,707

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ATTACHMENT C

PAGE 2 OF 2

ANO - UNIT 2

MR (MASS OF REACTOR COOLANT AT GIVEN TEMP., LBS.)

PZR PRESSURE	250 psia	250 psia	250 psia	250 psia	1000 psia	2200 psia
PZR LEVEL (%)	100°F	140°F	200°F	240°F	300°F	545°F
50	664,445	658,774	646,894	637,045	584,412	485,616
52	665,730	660,061	648,183	638,335	585,528	486,524
54	667,016	661,348	649,472	639,626	586,644	487,433
56	668,302	662,635	650,761	640,916	587,761	488,342
58	669,587	663,922	652,050	642,206	588,877	489,251
60	670,873	665,209	653,339	643,497	589,994	490,160
62	672,159	666,496	654,629	644,787	591,110	491,069
64	673,444	667,783	655,918	646,078	592,227	491,978
66	674,730	669,070	657,207	647,368	593,343	492,887
68	676,016	670,357	658,496	648,658	594,460	493,796
70	677,301	671,644	659,785	649,949	595,576	494,704
72	678,587	672,931	661,074	651,239	596,692	495,613
74	679,873	674,218	662,363	652,530	597,809	496,522
76	681,158	675,505	663,652	653,820	598,925	497,431
78	682,444	676,792	664,941	655,111	600,042	498,340
80	683,730	678,079	666,230	656,401	601,158	499,249
82	685,015	679,366	667,519	657,691	602,275	500,158
84	686,301	680,653	668,808	658,982	603,391	501,067
86	687,587	681,940	670,097	660,272	604,508	501,975
88	688,872	683,227	671,386	661,563	605,624	502,884
90	690,158	684,514	672,675	662,853	606,741	503,793
92	691,444	685,801	673,964	664,143	607,857	504,702
94	692,729	687,088	675,253	665,434	608,973	505,611
96	694,015	688,375	676,542	666,724	610,090	506,520
98	695,301	689,662	677,831	668,015	611,206	507,429
100	696,586	690,949	679,120	669,305	612,323	508,338

ADMINISTRATIVE JOB PERFORMANCE MEASUREUNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: CONDUCT OF OPERATIONSTASK: Perform Azimuthal Power Tilt calculation using the CPC SystemJTA#: ANO2-RO-CPC-NORM-4KA VALUE RO: 4.6 SRO: 4.6 KA REFERENCE: 2.1.20APPROVED FOR ADMINISTRATION TO: RO: \_\_\_\_\_ SRO: XTASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: \_\_\_\_\_ BOTH: X

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: \_\_\_\_\_ CLASSROOM: Perform

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ CLASSROOM: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 20 minutesREFERENCE(S): OP 2103.017 Azimuthal Power Tilt Calculation using the CPC System Rev. 05

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- The Unit is at 100% Power
- Core Operating Limit Supervisory System (COLSS) is inoperable
- All four (4) CPC Channels are operable
- The last known good value of PMS Point CV9008 ( $T_{COLSS}$ ) is 0.0052
- CPC PID 063 Azimuthal Tilt Allowance is reading 1.015 on all 4 CPC channels
- CPC PID 171 Neutron Flux Power is reading as follows:
  - Channel A 99.89%
  - Channel B 99.85%
  - Channel C 100.10%
  - Channel D 100.12%

**TASK STANDARD:**

Applicant determines that the Azimuthal Power Tilt ( $T_q$ ) is between = 0.006 to 0.0072, AND that Calculated Azimuthal Power Tilt ( $T_q$ ) is in compliance with Tech Spec 3.2.3 COLR, and that Calculated CPC Azimuthal Tilt Allowance is less than the Azimuthal Tilt Allowance installed in the CPC.

**TASK PERFORMANCE AIDS:**

OP 2103.017 Azimuthal Power Tilt Calculation using the CPC System Rev. 05 Supplement 1

**EXAMINER NOTES:**

Perform an Azimuthal Power Tilt calculation using CPC System. This admin JPM has the applicant perform a required 12 hour surveillance to calculate the Azimuthal Power Tilt using CPC values for core flux since the normal calculating computer program COLSS is out of service. Once the Azimuthal Power Tilt value and the allowed value has been calculated, the applicant must verify that the Azimuthal Power Tilt value does not exceed the TS 3.2.3 TS and COLR value of  $\leq 0.03$  and the calculated CPC Azimuthal Tilt Allowance is less than the value that had been calculated by COLSS and inserted into CPC PID 63 prior to COLSS going out of service (1.015).

**Rev. 1:** Changed the approximate completion time to 20 minutes based on validation times. In step 4 of the JPM Standards, removed the requirement to "Record  $T_{cpc}$  in Table 1 of Section 3.0".

Split the Initiating Cue into two parts to clarify the JPM based on feedback from the Facility Representative.

JOB PERFORMANCE MEASURE**INITIATING CUE:**

The SM/CRS directs, perform an Azimuthal Power Tilt Calculation using the CPC System using OP 2103.017 Supplement 1 starting at step 2.0.

**AND**

Determine if the Azimuthal tilt value is within the acceptable TS and COLR limits.

Start Time: \_\_\_\_\_

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	1. (Step 2.1)	Record in Section 3.0 and step 2.5, the last valid COLSS calculated Azimuthal Tilt ( $T_{COLSS}$ ), obtained from PMS/PDS point CV9008 or from Power Distribution logs.	In step 2.5 and Section 3.0, recorded the last valid COLSS calculated Azimuthal Tilt ( $T_{COLSS}$ ), obtained from the initial JPM conditions  $T_{COLSS} = 0.0052$	N/A SAT UNSAT
	2. (Step 2.2)	Record in Table 1 of Section 3.0, the value of Neutron Flux Power, point I.D. 171, obtained from all operable CPCs.	In Table 1 of Section 3.0, recorded the value of Neutron Flux Power CPC PID 171 obtained from the initial JPM conditions for all operable CPCs.  <ul style="list-style-type: none"> <li>Channel A <math>99.89\% = D_1</math></li> <li>Channel B <math>99.85\% = D_2</math></li> <li>Channel C <math>100.10\% = D_3</math></li> <li>Channel D <math>100.12\% = D_4</math></li> </ul>	N/A SAT UNSAT
	3. (Step 2.3)	Record in Table 1 of Section 3.0, the value of Azimuthal Tilt Allowance, point I.D. 063, obtained from all operable CPCs.	In Table 1 of Section 3.0, recorded the value of Azimuthal Tilt Allowance, point I.D. 063, obtained from initial JPM conditions for all operable CPCs.  $CPC\ PID\ 063 = 1.015\ for\ all\ 4\ CPC\ Channels$	N/A SAT UNSAT



**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	4. (Step 2.4)	Calculate T <sub>CPC</sub> and record in Table 1 Section 3.0, N/A formulas not used.	Used the correct formula and calculated Azimuthal Power Tilt (T <sub>CPC</sub> ) for all CPCs operable.	N/A SAT UNSAT
	(Step 2.4.1)	CPC Azimuthal Power Tilt (T <sub>CPC</sub> ) Calculation with all CPCs operable.	$T_{CPC} = \sqrt{\left[\frac{D_2 - D_3}{D_2 + D_3}\right]^2 + \left[\frac{D_4 - D_1}{D_4 + D_1}\right]^2}$ $\sqrt{\left[\frac{99.85 - 100.10}{99.85 + 100.10}\right]^2 + \left[\frac{100.12 - 99.89}{100.12 + 99.89}\right]^2}$ $\sqrt{\left[\frac{-0.25}{199.95}\right]^2 + \left[\frac{0.23}{200.01}\right]^2} = 0.0017$ <p>Acceptable range = 0.001 to 0.002.</p>	
<b>EXAMINER'S NOTE:</b> Steps 2.4.2 through 2.4.5 will be NA due to all CPC channels operable.				
(C)	5. (Step 2.5)	Determine Calculated Azimuthal Power Tilt T <sub>q</sub> and record in Table 1 of Section 3.0. T <sub>q</sub> = T <sub>CPC</sub> + T <sub>COLSS</sub>	Calculated Azimuthal Power Tilt T <sub>q</sub> using T <sub>q</sub> = T <sub>CPC</sub> + T <sub>COLSS</sub>  0.0017 + 0.0052 = 0.0069  Recorded T <sub>q</sub> value of 0.0069 in Table 1 of Section 3.0  Acceptable range = 0.006 to 0.0072.	N/A SAT UNSAT
(C)	6. (Step 2.6)	Determine and record in Table 1 Section 3.0 the Calculated CPC Azimuthal Tilt Allowance.  Calculated CPC Azimuthal Tilt Allowance = T <sub>q</sub> + 1	Calculated CPC Azimuthal Tilt Allowance = T <sub>q</sub> + 1  0.0069 + 1 = 1.0069  Recorded T <sub>q</sub> + 1 value of 1.0069 in Table 1 of Section 3.0  Acceptable range = 1.006 to 1.0072.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	7. (Step 3.2)	Is Calculated Azimuthal Power Tilt Tq in compliance with the TS 3.2.3 limit?  (circle one) YES NO	Determined that the calculated Azimuthal Power <u>Tilt Tq</u> is in compliance with the TS 3.2.3 limit?  <u>Tilt Tq (0.0069) is less than the COLR Azimuthal Power Tilt – Tq limit of <math>\leq 0.03</math></u>  <u>Circled YES</u>	N/A SAT UNSAT
(C)	8. (Step 3.3)	Is Calculated CPC Azimuthal Tilt Allowance less than the Azimuthal Tilt Allowance (Pt. ID 063) installed in each CPC?  (circle one) YES NO	Determined that the calculated CPC Azimuthal Tilt Allowance is less than the Azimuthal Tilt Allowance (Pt. ID 063) installed in each CPC? Tilt Allowance = $T_q + 1$  <u>(1.006 to 1.0072) is less than 1.015</u>  <u>Circled YES</u>	N/A SAT UNSAT
END				

Stop Time: \_\_\_\_\_

**SEE KEY**

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# KEY

SUPPLEMENT 1

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## AZIMUTHAL POWER TILT CALCULATION USING THE CPC SYSTEM

This attachment is used to document the manual calculation of Azimuthal Tilt required by Technical Specification Surveillance Requirement listed below:

4.2.3 The AZIMUTHAL POWER TILT shall be determined to be within the limit above 20 % of RATED THERMAL POWER by:

b. Calculating the tilt at least once per 12 hours when the COLSS is inoperable.

WHEN COLSS is inoperable, THEN perform this calculation once each shift. A minimum of 3 operable CPCs are required for this calculation.

### 1.0 INITIAL CONDITIONS

1.1 COLSS is inoperable and RATED THERMAL POWER is greater than 20%.

1.2 At least 3 CPCs are operable.

### 2.0 INSTRUCTIONS

2.1 Record in Section 3.0 and step 2.5, the last valid COLSS calculated Azimuthal Tilt ( $T_{COLSS}$ ), obtained from PMS/PDS point CV9008 or from Power Distribution logs.

2.2 Record in Table 1 of Section 3.0, the value of Neutron Flux Power, point I.D. 171, obtained from all operable CPCs.

2.3 Record in Table 1 of Section 3.0, the value of Azimuthal Tilt Allowance, point I.D. 063, obtained from all operable CPCs.

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~~2.4~~

Calculate  $T_{CPC}$  and record in Table 1 Section 3.0, N/A formulas not used.

~~2.4.1~~

CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with all CPCs operable.

$$T_{CPC} = \sqrt{\left[ \frac{D_2 - D_3}{D_2 + D_3} \right]^2 + \left[ \frac{D_4 - D_1}{D_4 + D_1} \right]^2}$$

$$\sqrt{\left[ \frac{99.85 - 100.10}{99.85 + 100.10} \right]^2 + \left[ \frac{100.12 - 99.89}{100.12 + 99.89} \right]^2}$$

$$\sqrt{\left[ \frac{-0.25}{199.95} \right]^2 + \left[ \frac{0.23}{200.01} \right]^2} = 0.0017 \quad \text{Acceptable Range } 0.001 \text{ to } 0.002$$

NA

~~2.4.2~~

CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with D CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_3 - D_2}{D_3 + D_2} \right]^2 + \left[ \frac{D_3 + D_2 - 2D_1}{D_3 + D_2} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{+ - 2( )}{+} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2} = \frac{-}{+}$$

KEY

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NA

2.4.3

CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with B CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_4 - D_1}{D_4 + D_1} \right]^2 + \left[ \frac{2D_3 - D_4 - D_1}{D_4 + D_1} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{2( ) - -}{+} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2} = \frac{-}{+}$$

NA

2.4.4

CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with A CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_3 - D_2}{D_3 + D_2} \right]^2 + \left[ \frac{2D_4 - D_3 - D_2}{D_3 + D_2} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{2( ) - -}{+} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2} = \frac{-}{+}$$

KEY

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NA

2.4.5

CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with C CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_4 - D_1}{D_4 + D_1} \right]^2 + \left[ \frac{D_4 + D_1 - 2D_2}{D_4 + D_1} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{+ - 2( )}{+} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{+ - 2( )}{+} \right]^2} = \underline{\hspace{2cm}}$$

2.5

Determine Calculated Azimuthal Power Tilt  $T_q$  and record in Table 1 of Section 3.0.

$$T_q = T_{CPC} + T_{COLSS}$$

$$= \underline{0.0017} + \underline{0.0052}$$

$$= \underline{0.0069}$$

Acceptable Range  
0.006 to 0.0072

2.6

Determine and record in Table 1 Section 3.0 the Calculated CPC Azimuthal Tilt Allowance.

$$\text{Calculated CPC Azimuthal Tilt Allowance} = T_q + 1$$

$$= \underline{1.0069}$$

Acceptable Range  
1.006 to 1.0072

KEY

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**KEY**

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~~3.0~~ ACCEPTANCE CRITERIA

~~3.1~~ Data

COLSS Tilt  $T_{COLSS}$  0.0052

Table 1

	CPC A	CPC B	CPC C	CPC D
	(D <sub>1</sub> )	(D <sub>2</sub> )	(D <sub>3</sub> )	(D <sub>4</sub> )
Neutron Flux Power (Pt. ID 171)	99.89	99.85	100.10	100.12
Azimuthal Tilt Allowance (Pt. ID 063)	1.015	1.015	1.015	1.015
Calculated Azimuthal Power Tilt (from step 2.5)	(T <sub>q</sub> ) 0.0069	N/A	N/A	N/A
Calculated CPC Azimuthal Tilt Allowance (from step 2.6)	(T <sub>q</sub> + 1) 1.0069	N/A	N/A	N/A

~~3.2~~ Is Calculated Azimuthal Power Tilt  $T_q$  in compliance with the TS 3.2.3 limit?  
(circle one) YES NO

~~3.3~~ Is Calculated CPC Azimuthal Tilt Allowance less than the Azimuthal Tilt Allowance (Pt. ID 063) installed in each CPC?  
(circle one) YES NO

**NA** ~~3.4~~ IF No is circled in either question above,  
THEN perform following:

- 3.4.1 Immediately notify Shift Manager.
- 3.4.2 Refer to Tech Spec 3.2.3 for required actions.
- 3.4.3 Refer to 2105.001 for steps to change Pt. ID 063 in all operable CPCs as required.
- 3.4.4 Initiate Condition Report.

PERFORMED BY \_\_\_\_\_ DATE \_\_\_\_\_

INDEPENDENT REVIEW BY \_\_\_\_\_ DATE \_\_\_\_\_

**KEY**

JOB PERFORMANCE MEASURE**EXAMINER'S COPY****INITIAL CONDITIONS:**

- The Unit is at 100% Power
- Core Operating Limit Supervisory System (COLSS) is inoperable
- All four (4) CPC Channels are operable
- The last known good value of PMS Point CV9008 (TCOLSS) is 0.0052
- CPC PID 063 Azimuthal Tilt Allowance is reading 1.015 on all 4 CPC channels
- CPC PID 171 Neutron Flux Power is reading as follows:
  - Channel A 99.89%
  - Channel B 99.85%
  - Channel C 100.10%
  - Channel D 100.12%

**INITIATING CUE:**

The SM/CRS directs, perform an Azimuthal Power Tilt Calculation using the CPC System using OP 2103.017 Supplement 1 starting at step 2.0.

**AND**

Determine if the Azimuthal tilt value is within the acceptable TS and COLR limits.



JOB PERFORMANCE MEASURE**EXAMINEE'S COPY****INITIAL CONDITIONS:**

- The Unit is at 100% Power
- Core Operating Limit Supervisory System (COLSS) is inoperable
- All four (4) CPC Channels are operable
- The last known good value of PMS Point CV9008 (TCOLSS) is 0.0052
- CPC PID 063 Azimuthal Tilt Allowance is reading 1.015 on all 4 CPC channels
- CPC PID 171 Neutron Flux Power is reading as follows:
  - Channel A 99.89%
  - Channel B 99.85%
  - Channel C 100.10%
  - Channel D 100.12%

**INITIATING CUE:**

The SM/CRS directs, perform an Azimuthal Power Tilt Calculation using the CPC System using OP 2103.017 Supplement 1 starting at step 2.0.

**AND**

Determine if the Azimuthal tilt value is within the acceptable TS and COLR limits.

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AZIMUTHAL POWER TILT CALCULATION USING THE CPC SYSTEM

This attachment is used to document the manual calculation of Azimuthal Tilt required by Technical Specification Surveillance Requirement listed below:

4.2.3 The AZIMUTHAL POWER TILT shall be determined to be within the limit above 20 % of RATED THERMAL POWER by:

- b. Calculating the tilt at least once per 12 hours when the COLSS is inoperable.

WHEN COLSS is inoperable, THEN perform this calculation once each shift. A minimum of 3 operable CPCs are required for this calculation.

~~1.0~~ INITIAL CONDITIONS

~~1.1~~ COLSS is inoperable and RATED THERMAL POWER is greater than 20%.

~~1.2~~ At least 3 CPCs are operable.

2.0 INSTRUCTIONS

2.1 Record in Section 3.0 and step 2.5, the last valid COLSS calculated Azimuthal Tilt ( $T_{COLSS}$ ), obtained from PMS/PDS point CV9008 or from Power Distribution logs.

2.2 Record in Table 1 of Section 3.0, the value of Neutron Flux Power, point I.D. 171, obtained from all operable CPCs.

2.3 Record in Table 1 of Section 3.0, the value of Azimuthal Tilt Allowance, point I.D. 063, obtained from all operable CPCs.

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- 2.4 Calculate T<sub>CPC</sub> and record in Table 1 Section 3.0, N/A formulas not used.
- 2.4.1 CPC Azimuthal Power Tilt (T<sub>CPC</sub>) Calculation with all CPCs operable.

$$T_{CPC} = \sqrt{\left[\frac{D_2 - D_3}{D_2 + D_3}\right]^2 + \left[\frac{D_4 - D_1}{D_4 + D_1}\right]^2}$$

$$\sqrt{\left[\frac{-}{+}\right]^2 + \left[\frac{-}{+}\right]^2}$$

$$\sqrt{\left[\frac{-}{+}\right]^2 + \left[\frac{-}{+}\right]^2} = \frac{-}{+}$$

- 2.4.2 CPC Azimuthal Power Tilt (T<sub>CPC</sub>) Calculation with D CPC inoperable.

$$T_{CPC} = \sqrt{\left[\frac{D_3 - D_2}{D_3 + D_2}\right]^2 + \left[\frac{D_3 + D_2 - 2D_1}{D_3 + D_2}\right]^2}$$

$$\sqrt{\left[\frac{-}{+}\right]^2 + \left[\frac{+ - 2( )}{+}\right]^2}$$

$$\sqrt{\left[\frac{-}{+}\right]^2 + \left[\frac{-}{+}\right]^2} = \frac{-}{+}$$

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2.4.3 CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with B CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_4 - D_1}{D_4 + D_1} \right]^2 + \left[ \frac{2D_3 - D_4 - D_1}{D_4 + D_1} \right]^2}$$

$$= \sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{2( ) - -}{+} \right]^2}$$

$$= \sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2} = \frac{-}{+}$$

2.4.4 CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with A CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_3 - D_2}{D_3 + D_2} \right]^2 + \left[ \frac{2D_4 - D_3 - D_2}{D_3 + D_2} \right]^2}$$

$$= \sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{2( ) - -}{+} \right]^2}$$

$$= \sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{-}{+} \right]^2} = \frac{-}{+}$$

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- 2.4.5 CPC Azimuthal Power Tilt ( $T_{CPC}$ ) Calculation with C CPC inoperable.

$$T_{CPC} = \sqrt{\left[ \frac{D_4 - D_1}{D_4 + D_1} \right]^2 + \left[ \frac{D_4 + D_1 - 2D_2}{D_4 + D_1} \right]^2}$$

$$\sqrt{\left[ \frac{-}{+} \right]^2 + \left[ \frac{+ - 2( )}{+} \right]^2}$$

$$\sqrt{\left[ \frac{ }{ } \right]^2 + \left[ \frac{ }{ } \right]^2} \quad \text{_____}$$

- 2.5 Determine Calculated Azimuthal Power Tilt  $T_q$  and record in Table 1 of Section 3.0.

$$T_q = T_{CPC} + T_{COLSS}$$

$$\text{_____} + \text{_____}$$

$$= \text{_____}$$

- 2.6 Determine and record in Table 1 Section 3.0 the Calculated CPC Azimuthal Tilt Allowance.

$$\text{Calculated CPC Azimuthal Tilt Allowance} = T_q + 1$$

$$= \text{_____}$$

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3.0 ACCEPTANCE CRITERIA

3.1 Data

COLSS Tilt  $T_{COLSS}$ \_\_\_\_\_

Table 1

	CPC A	CPC B	CPC C	CPC D
Neutron Flux Power (Pt. ID 171)	( $D_1$ )	( $D_2$ )	( $D_3$ )	( $D_4$ )
Azimuthal Tilt Allowance (Pt. ID 063)				
Calculated Azimuthal Power Tilt (from step 2.5)	( $T_q$ )	N/A	N/A	N/A
Calculated CPC Azimuthal Tilt Allowance (from step 2.6)	( $T_q + 1$ )	N/A	N/A	N/A

3.2 Is Calculated Azimuthal Power Tilt  $T_q$  in compliance with  
the TS 3.2.3 limit?  
(circle one) YES NO

3.3 Is Calculated CPC Azimuthal Tilt Allowance less than the  
Azimuthal Tilt Allowance (Pt. ID 063) installed in each  
CPC?  
(circle one) YES NO

3.4 IF No is circled in either question above,

THEN perform following:

3.4.1 Immediately notify Shift Manager.

3.4.2 Refer to Tech Spec 3.2.3 for required actions.

3.4.3 Refer to 2105.001 for steps to change Pt. ID 063  
in all operable CPCs as required.

3.4.4 Initiate Condition Report.

PERFORMED BY \_\_\_\_\_ DATE \_\_\_\_\_

INDEPENDENT REVIEW BY \_\_\_\_\_ DATE \_\_\_\_\_

**ADMINISTRATIVE JOB PERFORMANCE MEASURE**UNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Equipment ControlsTASK: Determine CREVS TS/TRM applicability and any required actions.JTA#: ANO-SRO-ADMIN-NORM-103KA VALUE RO: 3.6 SRO: 4.6 KA REFERENCE: 2.2.37APPROVED FOR ADMINISTRATION TO: RO: \_\_\_\_\_ SRO: XTASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: \_\_\_\_\_ BOTH: X

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: Perform CLASSROOM: Perform

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ CLASSROOM: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 15 MinutesREFERENCE(S): 2104.007, Control Room Emergency Ventilation, Unit 2 Tech Specs.

EXAMINEE'S NAME: \_\_\_\_\_ Badge #: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time \_\_\_\_\_

SIGNED: \_\_\_\_\_ DATE: \_\_\_\_\_

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

**ADMINISTRATIVE JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- Unit 1 is in Mode 6 for a refueling outage and currently de-fueled.
- Unit 2 is in Mode 1 at 100% power.
- Unit 2 is loading a dry fuel cask with irradiated fuel.
- VSF-9 Unit 1 Emergency Filter/Fan is tagged out to align power from Unit 2 for a Unit 1 B55 bus outage.
- Chlorine Detector 2CLS-8761-1 is inoperable and bypassed due to sample pump failure.
- The Control Room is on emergency recirc with 2VSF-9 Unit 2 Emergency Filter/Fan running.

**NOW**

- I&C reports that 2CLS-8762-2 is inoperable because it will not actuate in response to a chlorine test surveillance.
- The CBOT discovers that 2VSF-9 feeder breaker is trip free.

**TASK STANDARD:**

Determined that 3.0.3 is applicable as directed by TS 3.7.6.1 action e. Determined that TS 3.7.6.1 action j is also applicable requiring immediately suspending handling of irradiated fuel.

**TASK PERFORMANCE AIDS:**

OP 2104.007, Control Room Emergency Ventilation will be provided to the applicants, Unit 2 Tech Specs Amendment #301.

**EXAMINER NOTES:**

Determine CREVS TS/TRM applicability and any required actions. This JPM requires the SRO applicant to evaluate conditions associated with the Unit1/2 combined Control Room envelope ventilation equipment including the chlorine monitoring system and the emergency ventilation units. There are a total of 4 chlorine monitors – 2 on Unit 1 and 2 on Unit 2. As long as there is at least one chlorine monitor operable on each unit with opposite train power supplies, there are no TRM action requirements applicable. Based on the given conditions, both trains of emergency ventilation are inoperable which will require entry into TS 3.0.3 as directed by TS 3.7.6.1 action e. to correct the condition within one hour or commence a shutdown and to suspend loading irradiated fuel into the Unit 2 Dry Fuel Cask.

**Rev. 1:** Updated the TASK PERFORMANCE AIDS to ensure OP 2104.007, Control Room Emergency Ventilation will be provided to the applicants



**ADMINISTRATIVE JOB PERFORMANCE MEASURE****INITIATING CUE:**

Determine all applicable Unit 2 Tech Specs/TRM requirements associated with Control room ventilation. Include any applicable TS/TRM required actions for the given plant conditions.

**START TIME:** \_\_\_\_\_

	PERFORMANCE CHECKLIST	STANDARD	(Circle One)
	1. Review OP 2104.007 attachment B and C, Control Room Emergency Ventilation and TS 3.7.6.1.	Examinee reviewed the control room ventilation procedure and Tech Specs.	N/A SAT UNSAT
	2. Using attachment C of 2104.007 determine that TRM entry is not required for the inoperable chlorine monitors.	Examinee determined that TRM entry is not required for chlorine monitors that are inoperable.	N/A SAT UNSAT
<b>EXAMINER NOTE: The candidate may indicate TS 3.7.6.1 action e. is applicable. TS 3.7.6.1 action 'e' states to apply the actions of TS 3.0.3</b>			
(C)	3. Using TS and 2104.007 determine applicable TS actions.	Examinee determined that TS 3.0.3 is applicable based on TS 3.7.6.1 action e.	N/A SAT UNSAT
(C)	4. Using TS and 2104.007 determine applicable TS actions.	Examinee determined that TS 3.7.6.1 action j is applicable.	N/A SAT UNSAT
(C)	5. Determine required action IAW TS.	Determined the following action of T.S 3.7.6.1 j:  Immediately suspend handling of irradiated fuel.	N/A SAT UNSAT

**ADMINISTRATIVE JOB PERFORMANCE MEASURE**

	PERFORMANCE CHECKLIST	STANDARD	(Circle One)
(C)	5. Determine required action IAW TS.	Determined the following action of T.S 3.0.3:  Within 1 hour, action shall be initiated to place the unit in a mode in which the specification does not apply.	N/A SAT UNSAT
<b>END</b>			

STOP TIME: \_\_\_\_\_

**ADMINISTRATIVE JOB PERFORMANCE MEASURE****EXAMINER'S COPY****INITIAL CONDITIONS:**

- Unit 1 is in Mode 6 for a refueling outage and currently de-fueled.
- Unit 2 is in Mode 1 at 100% power.
- Unit 2 is loading a dry fuel cask with irradiated fuel.
- VSF-9 Unit 1 Emergency Filter/Fan is tagged out to align power from Unit 2 for a Unit 1 B55 bus outage.
- Chlorine Detector 2CLS-8761-1 is inoperable and bypassed due to sample pump failure.
- The Control Room is on emergency recirc with 2VSF-9 Unit 2 Emergency Filter/Fan running.

**NOW**

- I&C reports that 2CLS-8762-2 is inoperable because it will not actuate in response to a chlorine test surveillance.
- The CBOT discovers that 2VSF-9 feeder breaker is trip free.

**INITIATING CUE:**

Determine all applicable Unit 2 Tech Specs/TRM requirements associated with Control room ventilation. Include any applicable TS/TRM required actions for the given plant conditions.

Applicable Tech Specs/TRM: TS 3.7.6.1 Action j and TS 3.0.3 as directed by TS 3.7.6.1 action e.

Required Tech Specs/TRM actions:

T.S 3.7.6.1 Action j: immediately suspend all activities involving the handling of irradiated fuel.

T.S 3.0.3:

Within 1 hour, action shall be initiated to place the unit in a mode in which the specification does not apply.

∴



**ENTERGY OPERATIONS INCORPORATED  
ARKANSAS NUCLEAR ONE**

**TITLE: CONTROL ROOM EMERGENCY AIR  
CONDITIONING AND VENTILATION**

**DOCUMENT NO.  
2104.007**

**CHANGE NO.  
071**

**WORK PLAN EXP. DATE  
N/A**

**REACTIVITY IMPACT  
☐ YES ☐ INPR ☒ NO**

**SET #**

**SAFETY-RELATED  
☒ YES ☐ NO**

**IPTE  
☐ YES ☒ NO**

**TEMP MOD  
☒ YES ☐ NO**

**LEVEL OF USE  
☒ CONTINUOUS  
☐ REFERENCE  
☐ INFORMATIONAL  
☐ MULTI-USE**

**PROGRAMMATIC EXCLUSION PER EN-LI-100  
☐ YES ☒ NO**

**When you see these TRAPS**

**Get these TOOLS**

Time Pressure  
Distraction/Interruption  
Multiple Tasks  
Overconfidence  
Vague or Interpretive Guidance  
First Shift/Last Shift  
Peer Pressure  
Change/Off Normal  
Physical Environment  
Mental Stress (Home or Work)

Effective Communication  
Questioning Attitude  
Placekeeping  
Self Check  
Peer Check  
Knowledge  
Procedures  
Job Briefing  
Coaching  
Turnover

**VERIFIED BY**

**DATE**

**TIME**

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**FORM TITLE:**

**VERIFICATION COVER SHEET**

**FORM NO.  
1000.006A**

**CHANGE NO.  
056**

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## **NOTE**

For Control Room Ventilation Boundary Breaches, refer to ANO Fire Impairment Program 1000.120.

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### 1.0 PURPOSE

This procedure addresses operation of Control Room Emergency Air Conditioning and Ventilation System.

### 2.0 SCOPE

This procedure addresses normal and emergency operation of Control Room Emergency Ventilation System (CREVS), common to Unit 1 and 2. It provides descriptions and testing of components for both Units. This procedure contains requirements for assessing conformance with Unit 1 and Unit 2 Tech Specs. The following surveillances are satisfied: for Unit 1, SR 3.3.16.2, SR 3.7.9.1, SR 3.7.9.3, SR 3.7.10.1, and TR 3.3.1.2; for Unit 2, TS 4.3-3.2.b, TRM 4.3.7.1, channel functional test, TS 4.7.6.1.2.a and TS 4.7.6.1.2.d.2.

### 3.0 DESCRIPTION

Unit 1 and Unit 2 Control Room Emergency Ventilation Systems are interrelated concerning system design and functions and are not completely isolable from each other. The systems share automatic protective isolation and radiation filtration functions to permit a habitable atmosphere for Control Room personnel during radiation and chlorine atmospheric hazards. Control Room Ventilation System provides independent automatic isolation and purging functions for protection and relief of smoke hazards. Attachment B provides a cross-reference of Tech Specs for each unit and affected components.

The common Control Room Emergency Air Conditioning and Ventilation System includes the following:

- Unit 1 Emergency Fan/Filter (VSF-9)
- Unit 2 Emergency Fan/Filter (2VSF-9)
- Control Room Emergency coolers (2VUC-27A AND 2VUC-27B)
- Emergency Control Room Chillers (2VE-1A AND 2VE-1B)

- Unit 1 Control Room Supply damper (CV-7905)
- Unit 1 Control Room Return damper (CV-7907)
- Unit 2 Control Room Supply damper (2UCD-8683)
- Unit 2 Control Room Return damper (2PCD-8685)

- Unit 1 Control Room Area Rad Monitor (RI-8001) (Does NOT satisfy Tech Specs)
- Unit 1 Control Room Inlet Air Rad Monitors (2RITS-8001A AND 2RITS-8001B)
- Unit 2 Control Room Inlet Air Rad Monitors (2RITS-8750-1A AND 2RITS-8750-1B)

#### Smoke Detectors, Chlorine Detectors and Radiation Monitors

Automatic protection from smoke, chlorine and radiation is provided by Control Room Emergency Ventilation System. When Control Room is in Emergency Recirculation mode of operation, operability of individual sensors is NOT required. However, these sensors are required to be operable to allow the Control Room to be removed from Emergency Recirc. Otherwise, entry in to the associated units T.S. 3.0.5/3.0.6 is required. (CR-ANO-C-2001-0207-004)



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Control Room supply and return air ductwork is equipped with ionization tube smoke detectors to alarm in Control Room with presence of combustion products in ventilation system. If smoke present in Unit 1 supply duct, QS-7905 will close Unit 1 Control Room isolation dampers, stop Unit 1 supply fans and will prevent auto-start of VSF-9. If smoke present in Unit 2 supply duct, 2XSH-8741A/B will close Unit 2 Control Room isolation dampers and stop supply fans 2VSF-8A/B and exhaust fans 2VEF-43A/B.

If smoke present in Unit 1 return ducting after isolation, QS-7907 will actuate to isolate return duct, open Control Room makeup air damper, start VEF-43 and open its suction damper. These actions may be taken manually if QS-7907 does not actuate. If smoke present in Unit 2 exhaust ducting after isolation, 2XSH-8740A/B will actuate to open exhaust damper, open outside air supply and close recirc damper. 2VEF-43 must be started manually. If 2XSH-8740A/B do not actuate, dampers may be positioned manually.

Two quick acting chlorine detectors (2CLS-8760-2 AND 2CLS-8761-1) are provided in supply air duct for Unit 1 Control Room and two detectors (2CLS-8762-2 AND 2CLS-8763-1) in Unit 2 supply air duct. Any one of these detectors will initiate automatic isolation of Control Room supply and return isolation dampers for both Control Rooms. 2CLS-8761-1 OR 2CLS-8763-1 stops 2VSF-8A/B, VSF-8A/B, 2VEF-43A/B AND starts 2VSF-9. 2CLS-8760-2 OR 2CLS-8762-2 stops VSF-8A/B AND starts VSF-9.

Each chlorine detector is equipped with a local amber power indicating light, Red alarm light and RESET pushbutton. If chlorine gas content in air reaches alarm setpoint of detector, Red alarm light illuminates and local alarm sounds. Alarm may be silenced by pushing Alarm Silence pushbutton. Once condition clears, detector alarm can be cleared by pressing local RESET pushbutton. Pressing RESET button with no alarm present will cause a Control Room Isolation.

Chlorine detectors are powered from Unit 2 emergency power supplies. If these power supplies are removed from service (i.e., during a Unit 2 Shutdown), then chlorine detectors may be bypassed using Unit 2 Chlorine Bypass handswitches on C141A AND C141B in Unit 1 Computer Room. Bypassing these detectors prevents spurious alarms in Unit 1 circuitry.

Two Radiation monitors (2RITS-8750-1A AND 2RITS-8750-1B) are located in supply duct for Unit 2 Control Room. Unit 1 Control Room contains an area radiation monitor (RI-8001) AND two radiation monitors (2RITS-8001A AND 2RITS-8001B) in supply duct. RI-8001 does not satisfy EITHER Unit 1 OR Unit 2 Tech Specs. One monitor on Unit 1 (2RITS-8001A OR 2RITS-8001B) AND one monitor on Unit 2 (2RITS-8750-1A OR 2RITS-8750-1B) are required to be operable to satisfy each units T.S. If high radiation detected by any monitor, isolation dampers for both Control Rooms close. 2RITS-8750-1A/B will stop VSF-8A/B, 2VSF-8A/B AND 2VEF-43A/B AND start 2VSF-9. RI-8001, 2RITS-8001A OR 2RITS-8001B will stop VSF-8A/B AND start VSF-9.

If power supply for 2RITS-8750-1A/B is removed from service (i.e., during Unit 2 Shutdown), the monitors may be bypassed using Unit 2 Radiation Bypass handswitch on C141A to prevent spurious alarms in Unit 1 circuitry.

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#### Unit 1 Emergency Fan/Filter (VSF-9)

This Emergency Air Filtering System consists of a filter train located in Unit 1 Computer Room. This filter train consists of a centrifugal fan, roughing filter, HEPA filter and charcoal absorber. It draws air from and returns air to Unit 1 section of Control Room, while adding filtered air from Computer Room to pressurize Control Room. Unit 1 Instrument Air, with backup CO<sub>2</sub> bottle, is available to supply closing force for outside air damper for Control Room envelope isolation. Upon loss of Unit 1 Instrument Air, CO<sub>2</sub> bottle is available to keep outside air damper closed. In order to provide a slightly positive pressure in Control Room while this unit in operation, outside damper (CV-7910) is left open to provide 333 CFM of filtered air from Computer Room. VSF-9 may be started from HS-7806 on C19 OR will start automatically on Unit 1 high radiation signal OR a signal from Unit 1 and Unit 2 chlorine detectors as previously mentioned.

#### Unit 2 Emergency Fan/Filter (2VSF-9)

This Emergency Air Filtering System consists of a filter train located outside Unit 1 Control Room. This filter train, which consists of a centrifugal fan, roughing filter, HEPA filter, charcoal absorber and three control dampers, actually draws air from and returns air to Unit 1 section of Control Room, adding filtered air from Auxiliary Building to pressurize Control Room. Two of the dampers isolate the train during normal ventilation operation when 2VSF-9 not running. In order to provide a slightly positive pressure in Control Room while this unit in operation, the third damper (2PCD-8607B) is left open to provide 465 CFM of filtered air from Auxiliary Building. Unit 1 Instrument Air System supplies instrument air to the outside air damper. A CO<sub>2</sub> bottle is available as a backup for Unit 1 Instrument Air System. The CO<sub>2</sub> bottle is relied on when Unit 1 Instrument Air lost to keep outside damper closed and maintain Control Room isolation envelope. 2VSF-9 may be started from 2HS-8603-1 on 2C33-1 OR will start automatically on Unit 2 Control Room high radiation signal OR a signal from EITHER of two specific Unit 1 and Unit 2 chlorine detectors as previously mentioned. 2VSF-9 may be powered from Unit 1 but is usually powered from Unit 2. If 2VSF-9 is powered from Unit 1, then it can not auto start. When 2VSF-9 powered from Unit 1, start/stop controls are only available at Unit 1 panel C19, handswitch HS-7852.

#### Control Room Emergency Coolers (2VUC-27A AND 2VUC-27B)

Control Room Emergency Air Conditioning System consists of two direct expansion unit coolers (2VUC-27A AND 2VUC-27B) located in Control Room. These units are also equipped with heating coils. Four thermostatic controllers located on wall in back half of Control Room are used to control output of each heating and cooling coil. 2VUC-27A/B provides 5580 CFM to Unit 2 Control Room, 360 CFM to Unit 2 Control Room above false ceiling, and 3960 CFM to Unit 1 Control Room. ER002956E202 installed loop seals in drain lines from condensate drains of 2VUC-27A AND 2VUC-27B. These chiller units operate at negative pressure inside the housing and this results in the possibility of unfiltered air being drawn into Control Room. Seals are sized for the expected condensate load and include visual level indication (2SG-8600A/B) and separate connections for filling.

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#### CPC Room Coolers (2VUC-25A AND 2VUC-25B)

Old CPC Room is normally cooled by 2VUC-28 AND condensing unit (2VE-2) located on the roof. 2VE-1A/B circuitry prevents operation of 2SV-3671-1 OR 2SV-3672-2 (freon admission valves) without the respective 2VUC-25A/B AND the respective 2VUC-27A/B running. This prevents excessive cycling of 2VE-1A/B under smaller loads and over dispersing oil throughout system.

#### Emergency Control Room Chillers (2VE-1A AND 2VE-1B)

The compressor/condensing units consist of direct drive reciprocating Trane compressor with condenser that supplies liquid R12 refrigerant to unit coolers for cooling. When coolers are started manually from 2C33, condensing unit is started automatically. Each unit may be powered and cooled by EITHER Unit 2 OR Unit 1. 2VE-1A/B are protected by low oil pressure and high discharge pressure cutout switches which must be manually reset locally inside control cabinet, a low suction pressure cutout switch and a motor overload trip. Thermostatically controlled solenoid valves control amount of liquid refrigerant admitted to unit coolers. Service Water to condenser is controlled by hydraulic control valve that is opened by hydraulic pressure and closed by spring pressure. Each chiller has a local control panel with two handswitches. Control Valve Test Switch is maintained in NORMAL. This switch can be used to manually position SW control valve with chiller secured. Local Control Switch is normally left in AUTO to permit remote operation from 2C33. This switch can be used to locally start OR stop chiller.

#### Control Room Isolation Channels

Unit 1 Control Room Isolation dampers (CV-7905 AND CV-7907) can be activated by a signal from one of two signal trains, Channel A OR Channel B. The signal actuates one of two solenoid valves, EITHER of which enables air pressure to bleed off and spring tension to close damper. Unit 2 Control Room Isolation dampers (2UCD-8683 AND 2PCD-8685) are designed to actuate similarly to Unit 1 Control Room isolation dampers. Solenoid valves and signal trains are shown in Attachment D of this procedure.

#### Control Room Habitability Barrier (CRHB)

Per ANO Fire Impairment Program (1000.120), the CRHB is composed of the floor, walls, and ceiling of the unit 1 and 2 control rooms. The CRHB includes the substrate, penetrations, and seals, and extensions to the penetrations, i.e., conduit, ducts, piping, etc., which are opened to the Control Room Envelope (see Attachment 2 of 1000.120).

#### CRHB Operability

Per ANO Fire Impairment Program (1000.120), the Control Room Envelope (boundary) must be maintained within the assumptions of the design analysis. The Control Room Envelope may be opened intermittently under administrative controls. Operability of the CRHB is considered to be maintained when a dedicated individual is stationed in the vicinity of the opening with the means to rapidly close the opening upon notification of an emergency which requires Control Room Isolation.

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#### 4.0 REFERENCES

##### 4.1 References Used in Procedure Preparation:

- Logic Prints M2423, M423
- P&IDs M2210, M2263, M263, M2221 (Sheet 2)
- Memorandum ANO-85-03061
- Reg Guide 1.78, Assumptions for Evaluating the Habitability of a Nuclear Power Plant CR During a Hazardous Chemical Release
- Reg Guide 1.95, Protection of Nuclear Power Plant CR Operators Against an Accidental Chlorine Release
- Bechtel Letter BL-25904, 5/20/77
- CR-C-88-0035, Concurrent Operation of VSF-9 and 2VSF-9
- Memorandum ANO-91-00610
- Chlorine Detector Technical Manual W025.0050
- CR-C-91-056, IA with CO<sub>2</sub> bottle Supply 2VSF-9 Outside Air damper
- CR-2-90-203, Action 9
- LIC-092-49, Operation with VSF-9 and 2VSF-9 powered from MCC B56
- DCP 84-2083, 2VE-1A/B Control Circuitry Modification
- Control Room Pressurization Test Plan (1409.161)
- DCP 90-2053, Control Room Expansion Facility
- CR-C-94-0011, Action 2
- CR-C-94-0110
- CR-C-95-0075, Action 1 (Smoke Detector Testing frequency)
- DCP 90-1064, Replacement of CV-7905 and CV-7907
- DCP 942021D201, Unit 2 Control Room Radiation monitor replacement
- ER 980039D101, Unit 1 Control Room Radiation monitor installation
- ER 980039D102, Unit 1 Control Room Radiation monitor addition
- CR-C-98-0203 Action 2, use appropriate test gas Supplement 4
- CR-ANO-C-1999-0189-004, Include Supervisor Signoffs in Supplement 3 for Both Units
- CR-ANO-C-2000-0190-003, Control Room Doors Closed at All Times Except During Temporary Breaches
- ER 991782N201, SW Pipe Replacement To CR Emergency Chillers
- ER 003021E201, Temporary Alteration for Installation and Removal of Blank-Off Plate on 2VSF-9 Outside Air damper
- CR-ANO-C-2000-0283, 0296 & 0299, Control Room Emergency Ventilation
- Federal Register: Oct. 25, 2000 (Volume 65, Number 207), Concerning CREVS not being reportable
- CR-ANO-C-2001-0207, CR in recirc w/no VSF-9/2VSF-9 in service.
- ER 002956E202, ER-ANO-2000-2956-009, CR-ANO-C-2001-0175, Control Room Emergency AC Drain System Sealing
- CR-ANO-C-2001-0271, Emergency Recirc Fan operable with outside air damper in Reserve
- CR-ANO-1-2002-0194 Control Room Chiller Tripped Due to Cycling from Extended Control Room Isolation
- LIC-02-005, 2VSF-9 Operability with 2DG1 Inoperable
- CR-ANO-C-2002-0334, Unit 1 inadvertently placed in time clock while transferring Unit 2 power supplies

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4.1 (cont.)

- LIC-02-033, Guidance on Implementation of ANO-1 and ANO-2 Tech Specs for Control Room Boundary Integrity
- CR-ANO-C-2002-00928, CV-7908 found with damper bladder leak
- CR-ANO-C-2003-0047, Inadequate Guidance in Maintenance Procedures
- WP 1409.731, Control Room Tracer Gas Testing
- ER-ANO-2003-0235, CV-7910 Damper Closure Devices
- EC13661, Evaluation of 2C-58 and 2C-59 Compressor Oil Levels
- ER003021E201, Blank-off Plate installation on 2PCD-8607B during 2VSF-9 power swap between units
- ER-ANO-2004-0802-000, CV-7908 and CV-7909 Abandonment
- CR-ANO-C-2006-1642, Evaluation of CREVS-Related Power Supplies
- CR-ANO-C-2006-1225, CV-7910 leakage
- CR-ANO-C-2007-0057, VSF-9 reverse rotation
- EC-10874, Control Room Emergency Ventilation Thermostat Settings
- 5120.523, Control Room Envelope Habitability Program
- EC-10746 (Alternate Source Term, AST Technical Specification changes)
- EC-31435 Control Room Extension HVAC Upgrade
- CR-ANO-2-2012-02421 CA-3, Clarification of T.S. 3.7.6.1 requirements for Unit 2 when EDG is inoperable.
- EC-44204 Control Room Emergency Air Conditioning Performance

4.2 References Used in Conjunction With This Procedure:

- ANO-1 TRM 3.3.1, TS 3.7.9, TS 3.7.10, and TS 3.3.16
- ANO-2 Tech Specs 3.3.3.1, TRM 3.3.7, and TS 3.7.6.1
- Control Room Chilled Water System (2104.048)
- Service Water System Operations (2104.029)
- ES Electrical System Operation (1107.002)
- Service Water and Auxiliary Cooling System (1104.029)
- Instrument Air System (2104.024)
- Unit 1 Control Room Air Conditioning (1104.034)
- Unit 1 Alternate Power Source For 2VE-1A/B and 2VUC-27A/B (1403.178)
- 2VSF-9 Repowering Procedure (2403.074)
- ANO Fire Impairment Program (1000.120)
- In-place Testing of Unit 1/2 Control Room Filtration System (5120.415/5120.425)
- ER-ANO-2003-0385-000 Temporary Alteration Evaluation for Lowering 2VUC-25A/25B Thermostats to 80F
- CR-ANO-C-2005-00342 2VSF-9 Declared Inoperable During Flow Testing Concurrent with VSF-9 in Off as Required by Procedure 2104.007
- CR-ANO-2-2008-00823 & and EC13661, Operability impacts of oil level on 2C-58/59
- Temporary Modifications (EN-DC-136)

4.3 NRC Commitments

- 4.3.1 P-17833, Maintain the Control Room Ventilation Testing Program as described in the source documents (contained in Supplements 1 through 5).

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## 5.0 LIMITS AND PRECAUTIONS

- 5.1 Smoking, welding, or cutting should be avoided in the areas of the chillers. When heated sufficiently, Freon breaks down into phosgene gas, which is lethal in small dosages.
- 5.2 Do NOT operate an air conditioning unit that has any safety devices inoperable.
- 5.3 In the event of Control Room isolation on high chlorine, all Control Room operators should don SCBAs upon determination that actual high chlorine concentration caused the isolation.
- 5.4 In the event of Control Room isolation on high airborne radiation, Emergency Fan/Filter Units (VSF-9 AND 2VSF-9) may be running simultaneously which will lead to operator exposure to greater whole body and skin doses than from single train operation due to the raised pressurization air flow. Per CR-ANO-C-2001-0271 CA08, "A review of the results of CR dose evaluations shows that the control room operator thyroid dose is limiting and controlling, and that the limiting configuration at ANO is the analyzed condition of VSF-9 operating. Operation with EITHER 2VSF-9 by itself OR with both units (VSF-9 AND 2VSF-9) running simultaneously would result in lower thyroid doses, but the thyroid dose would still be more limiting than CR operator whole body or skin dose. Unit 1 and Unit 2 SARs assume only one unit is continually in operation during accident conditions, and Design Engineering proposes one unit be secured when the control room is isolated. Therefore, continuous operation of both VSF-9 and 2VSF-9 is not preferred, and securing one of the emergency recirculation fans is consistent with the license basis and Engineering recommendations.
- 5.5 When Control Room is in emergency recirculation mode of operation, one of the emergency filtration fans may have its handswitch placed in STOP OR OFF, and its outside air damper placed in RESERVE, without affecting its operability. Emergency filtration fan operability is not affected in this case because Control Room isolation system has already performed its design safety function and the non-running filtration fan becomes manually actuated thereafter.  
(CR-ANO-C-2001-0271) **FOR THIS TO APPLY, CONTROL ROOM MUST BE IN EMERGENCY RECIRCULATION!**
- 5.6 If normal air conditioning for Control Rooms is lost AND Emergency Chillers NOT available, VSF-9, 2VSF-9 and 2VUC-27A/B may be run as necessary to provide air mixing for Control Rooms.
- 5.7 2VE-1A&B Heating Thermostats (2TC-8665-1 & 2TC-8666-2) should be set at 60-78°F AND at least 2°F lower than Cooling Thermostats.
- 5.8 Inform opposite Control Room when Control Room Emergency Ventilation System components are removed from service.

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- 5.9 Unit 1 Restroom Area, Unit 1 S/M Office, Unit 2 S/M Office, and Unit 2 Foyer shall be isolated from Control Room by closed doors at all times EXCEPT during temporary breaches (control of temporary breaches is established in procedure 1000.120, Attachment 2 (Control Room Habitability Barriers)).
- 5.10 Verify Unit 1 Service Water flow data sufficient to maintain operability before shifting 2VE-1A OR 2VE-1B Service Water to Unit 1.
- 5.11 Pressing Chlorine Detector RESET pushbutton with no alarm condition present will interrupt power to the detector causing a Control Room isolation.
- 5.12 If Chlorine Detector RESET pushbutton will not reset unit, then rinse spiral wound element with DI water AND allow drying before attempting to reset.
- 5.13 If Control Room temperature approaches 84°F during Emergency Chiller operation, then de-energize lighting as required to maintain < 84°F.
- 5.14 If Emergency Control Room Chillers are de-energized, chiller should be energized for two hours prior to starting to allow for oil warmup. Contact Electrical Maintenance to determine if oil warmup is necessary based on time chiller was de-energized.
- 5.15 For any Control Room breach refer to 1000.120 Attachment 2 (Control Room Habitability Barriers), U-1 TS 3.7.9 Condition B and U-2 TS 3.7.6.1.d.
- 5.16 Red indicating lights above handswitches for VSF-9 AND 2VSF-9 only indicate flow is present AND are not calibrated for any particular setpoint. If these lights are inoperable, airflow can be verified at appropriate ducts in Unit 1 Control Room. These lights, by themselves, do not represent fan operability status.
- 5.17 If irradiated material is moved in vicinity of Unit 1 Radiation monitors (2RITS-8001A or 2RITS-8001B) OR in vicinity of Unit 2 Radiation monitors (2RITS-8750-1A or 2RITS-8750-1B), then VSF-9 OR 2VSF-9 may start. CREVS actuation is not a reportable occurrence. Control Room Ventilation system is one of the ESF systems that is mentioned as an exclusion. This eliminates unnecessary reporting for systems considered ESF systems that have lower levels of risk significance.
- 5.18 IF removing Control Room damper inspection hatch,  
THEN the following apply:
- Implement actions of 1000.120 Attachment 2 (Control Room Habitability Barriers) as applicable.
  - Refer to U-1 TS 3.7.9. Condition B and U-2 TS 3.7.6.1.d.

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- 5.19 Due to strong cooling affect, smoke detector test gases should not be sprayed on skin or into eyes. Safety Glasses should be used anytime smoke detector test gas is used. Excess liquid contact with smoke detectors test gases used in this procedure will dry and defat human skin.
- 5.20 When control room is placed onto, during, and off of emergency recirculation mode, either automatically or manually in accordance with this procedure, operability of the chlorine and radiation monitors is not challenged. Other non-proceduralized ventilation system alignments "can" affect operability of associated monitors and should therefore be properly evaluated prior to their use.
- 5.21 Should equipment fail during control room restoration or unexpected delays occur, which impacts Chlorine and Radiation detector operability, steps shall be performed to return control room to emergency recirculation mode.
- 5.22 CR-ANO-2-2004-1080 identifies that Main Turbine EHC Control system on ANO2 is very sensitive to cabinet temperature changes. Rising cabinet temperature has resulted in control valve close travel and lowering cabinet temperature has resulted in control valve opening. Control valve position changes will result in Reactor Power changes.
- 5.23 Emergency Chiller Compressor (2C-58 and 2C-59) oil level requirements are as follows: (EC-13661)
- Operability determinations with respect to oil level are only made with chiller in operation. All other oil level criteria is guidance only.
  - 2VE-1A/B remain Operable with oil as much as 1/2 inch below the bottom of the sight glass, and at or below the top of the sight glass with chiller in operation. Oil should not be added unless oil level is below the bottom of the sight glass after 1 hour of operation.
  - Chiller may be run with any oil in sight glass.
  - After being idle for 3 hours, oil level should be between 1/4 full and top of the sight glass.
  - After running 1 hour, oil level should be between 1/4 and 3/4 in sight glass.
  - Oil should not be added unless oil level is below the bottom of sight glass after 1 hour of operation.
- 5.24 Aligning Service Water to an idle Emergency Control Room Chiller with SW temperature < 55°F renders chiller inoperable.
- 5.25 CR-ANO-C-2006-1225 determined minor leakage out of CV-7910 is acceptable and does not challenge operability of CREVS. CV-7910 is not designed as an air tight damper and minor leakage should be expected due to positive pressure design of Control Room Ventilation.
- 5.26 CR-ANO-C-2007-0057 determined slow reverse rotation of VSF-9 is acceptable and does not challenge the operability of CREVS.



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VSF-9 isolation dampers have been failed open which allow a small differential pressure causing fan to rotate.

- 5.27 2AC-38, 2AC-39, 2AC-41 and 2AC-42 are required to be maintained open and one turn off the backseat. Backseating these valves will result in inoperability of the associated Emergency Control Room chiller. Valve lineup checks are intended to be label checks only as the valves should not be repositioned unless required by maintenance.
- 5.28 Excore log channel calibrations should not be performed when the Control Room is on Emergency Recirculation due to temperature variations causing inaccurate calibration of the channel.
- 5.29 When a CREVS equipment power supply is aligned to the opposite unit, the appropriate attachment for transferring power supplies in this procedure should be referenced to determine impact prior to manipulating power supplies. CR-ANO-C-2013-2109

## 6.0 SETPOINTS

- 6.1 VSF-9 Filter  $\Delta$ P High
- Particulate (VFP-15 & VFP-15A) 1.0" H2O
  - HEPA Filter (VFA-3 & VFA-3A) 3.0" H2O
  - Charcoal Filter (VFC-2 & VFC-2A) 1.5" H2O
- 6.2 2VSF-9 Filter  $\Delta$ P High
- Particulate (2VFP-35) 1.0" H2O
  - HEPA Filter (2VFA-10) 3.0" H2O
  - Charcoal Filter (2VFC-8) 1.15" H2O
- 6.3 VSF-9 and 2VSF-9 Charcoal Filter High Temperature
- Pre-alarm 190 °F
  - High Alarm 300 °F
- 6.4 2VE-1A/B Compressor Trips
- Low Compressor Suction Pressure 15 psig
  - High Compressor Discharge Pressure 275 psig
  - Low Oil Pressure (2 minute time delay) 9 psig

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**NOTE**

- This procedure section establishes the Emergency Fan/Filter Units (VSF-9/2VSF-9) lineup as one fan in service/one fan in OFF/STOP with Outside Air damper in RESERVE - the "actuated state" for Control Room Ventilation with Chlorine or Radiation present.
- 2nd person verification refers to either a peer check or independent verification of the activity is performed.

**7.0 RADIATION AND CHLORINE DETECTOR ALARM RESPONSE ACTIONS**

**7.1 IF ANY of the following monitors/detectors are actuated:**

- Unit 2 Control Room Radiation monitor (2RITS-8750-1A)
- Unit 2 Control Room Radiation monitor (2RITS-8750-1B)
- Unit 1 Control Room Supply Vent Chlorine detector (2CLS-8761-1)
- Unit 2 Control Room Supply Vent Chlorine detector (2CLS-8763-1)

THEN perform the following:

- \* 7.1.1 IF actual high chlorine condition exists,  
THEN all Control Room Operators don SCBAs.

7.1.2 IF either of the following alarms actuated:

- CONTROL ROOM SUPPLY DUCT RADIATION HI (K10-D1)
- PROCESS GAS RADIATION HI/LO (2K11-D10)

AND radiation monitor tripped due to instantaneous spike/malfunction,  
THEN perform the following:

A. Determine if Control Room Isolation NOT valid by review of PMS/PDS trend of the following available instruments:

- 2RITS-8001A (R8001A)
- 2RITS-8001B (R8001B)
- 2RITS-8750-1A (R8750-1A)
- 2RITS-8750-1B (R8750-1B)

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B. IF actuation NOT valid,  
THEN perform the following:

1. IF desired to place Control Room Emergency Chiller (2VE-1A/2VE-1B) in service,  
THEN perform "Operation of Control Room Emergency chillers (2VE-1A/B)" section of this procedure.
2. GO TO "Restoration from Automatic or Manual Isolation" section of this procedure.

7.1.3 Verify the following isolation dampers closed:

A. Unit 1 dampers:

- CV-7905, Unit 1 Control Room Supply damper  
(Green light ON at C141A/B in Unit 1 Computer Room)
- CV-7907, Unit 1 Control Room Return damper  
(Green light ON at C141A/B in Unit 1 Computer Room)

B. Unit 2 Dampers:

- Place Unit 2 Control Room Supply damper 2UCD-8683  
(2HS-8683-1) on 2C33 in CLOSE.
  1. Check Green light ON above 2HS-8683-1 on 2C33.
- Place Unit 2 Control Room Return damper 2PCD-8685  
(2HS-8685-2) on 2C33 in CLOSE.
  1. Check Green light ON above 2HS-8685-2 on 2C33.

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7.1.4 Verify the following fans stopped AND place HS in OFF:

- Unit 1 Control Room Supply fans:
  - VSF-8A (HS-7820 on B1544)
  - VSF-8B (HS-7821 on B4161)
- Unit 2 Control Room Supply fans:
  - 2VSF-8A (2HS-8601 on 2C22)
  - 2VSF-8B (2HS-8602 on 2C22)
- Unit 2 Control Room Exhaust fans:
  - 2VEF-43A (2HS-8693 on 2C22)
  - 2VEF-43B (2HS-8694 on 2C22)
- Control Room Smoke exhauster VEF-43, non-actuated (HS-7840 on C19)

**NOTE**

If both Control Room isolation channels tripped, then 2VSF-9 may already be manually secured per step 7.2. In this case, step 7.1.5 may be N/A.

7.1.5 Verify Unit 2 Emergency Fan/Filter (2VSF-9) running as follows:

- 2VSF-9 fan running.
- 2VSF-9 Outside Air damper (2PCD-8607B) open.
- 2VSF-9 Air flow by ONE of the following:
  - Red light ON above (2FS-8603-1) on 2C33  
OR Red flow light ON above HS-7852 on C19
  - Air flow from duct in Unit 1 Control Room

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7.1.6 IF ANY of the following conditions exist:

- 2VSF-9 can NOT be started.
- 2VSF-9 Air flow NOT adequate with fan in service.
- 2VSF-9 NOT operable.

THEN perform the following:

- A. Close 2VSF-9 Outside Air damper 2PCD-8607B by placing (2HS-8607-B1) on 2C33 in RESERVE.
- B. Obtain 2<sup>nd</sup> person verification.  
IV \_\_\_\_\_ (if applicable)
- C. Verify 2VSF-9 secured by placing (2HS-8603-1) on 2C33 in STOP.
- D. IF Unit 1 Emergency Fan/Filter VSF-9 NOT running, THEN start VSF-9 by placing (HS-7806) on C19 in MAN.
- E. Verify Unit 1 Emergency Fan/Filter (VSF-9) running as follows:
  - VSF-9 fan running.
  - VSF-9 Outside Air damper (CV-7910) open.
  - VSF-9 Air flow by ONE of the following:
    - Red light ON above (FS-7806) on C19.
    - Air flow from duct in Unit 1 Control Room.
- F. Initiate Condition Report.
- G. Verify entry into applicable Technical Specifications for 2VSF-9 inoperability (failure to start OR low flow). Refer to Attachment B, Component/Tech Spec Cross-Reference.

**NOTE**

- When Control Room in Emergency Recirc, ONE Emergency Filtration fan may be placed in STOP or OFF AND associated outside air damper placed in RESERVE, without affecting operability (CR-ANO-C-2001-0271)
- If BOTH Control Room isolation channels tripped, then EITHER step 7.1.7 or 7.2.6 is performed. N/A steps for Emergency Filtration fan left running.

7.1.7 IF 2VSF-9 running properly, THEN perform the following to secure VSF-9:

- A. Close VSF-9 Outside Air damper CV-7910 by placing (HS-7910) on C19 in RESERVE.
- B. Verify VSF-9 secured by placing (HS-7806) on C19 in OFF.

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7.2 IF ANY of the following monitors/detectors are actuated:

- Unit 1 Control Room Area Radiation monitor (RI-8001)
- Unit 1 Control Room Supply Vent Radiation monitor (2RITS-8001A)
- Unit 1 Control Room Supply Vent Radiation monitor (2RITS-8001B)
- Unit 1 Control Room Supply Vent Chlorine detector (2CLS-8760-2)
- Unit 2 Control Room Supply Vent Chlorine detector (2CLS-8762-2)

THEN perform the following:

- \* 7.2.1 IF actual high chlorine condition exists,  
THEN all Control Room Operators don SCBAs.

7.2.2 Verify the following isolation dampers closed:

A. Unit 1 dampers:

- CV-7905, Unit 1 Control Room Supply damper (Green light ON at C141A/B in Unit 1 Computer Room)
- CV-7907, Unit 1 Control Room Return damper (Green light ON at C141A/B in Unit 1 Computer Room)

B. Unit 2 Dampers:

- Place Unit 2 Control Room Supply damper 2UCD-8683 (2HS-8683-1) on 2C33 in CLOSE.
  1. Check Green light ON above 2HS-8683-1 on 2C33.
- Place Unit 2 Control Room Return damper 2PCD-8685 (2HS-8685-2) on 2C33 in CLOSE.
  1. Check Green light ON above 2HS-8685-2 on 2C33.

7.2.3 Perform the following:

A. Verify Unit 1 Control Room Supply fans stopped:

- VSF-8A
- VSF-8B

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- B. IF actual high chlorine or high radiation condition exists,  
THEN verify the following fans stopped AND place HS in OFF:
- Unit 1 Control Room Supply fans:
    - VSF-8A (HS-7820 on B1544)
    - VSF-8B (HS-7821 on B4161)
  - Unit 2 Control Room Supply fans (non-actuated):
    - 2VSF-8A (2HS-8601 on 2C22)
    - 2VSF-8B (2HS-8602 on 2C22)
  - Unit 2 Control Room Exhaust fans (non-actuated):
    - 2VEF-43A (2HS-8693 on 2C22)
    - 2VEF-43B (2HS-8694 on 2C22)
  - Control Room Smoke Exhauster VEF-43, (non-actuated) (HS-7840) on C19

**NOTE**

If both Control Room isolation channels tripped, then VSF-9 may already be manually secured per step 7.1. In this case, step 7.2.4 may be N/A.

7.2.4 Verify Unit 1 Emergency Fan/Filter (VSF-9) running as follows:

- VSF-9 fan running.
- VSF-9 Outside Air damper CV-7910 open.
- VSF-9 Air flow by ONE of the following:
  - Red light ON above (FS-7806) on C19.
  - Air flow from duct in Unit 1 Control Room.

7.2.5 IF ANY of the following conditions exist:

- VSF-9 can NOT be started.
- VSF-9 Air flow NOT adequate with fan in service.
- VSF-9 NOT operable.

THEN perform the following:

- A. Close VSF-9 Outside Air damper CV-7910 by placing (HS-7910) on C19 in RESERVE.
- B. Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)

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- C. Verify VSF-9 secured by placing (HS-7806) on C19 in OFF.
- D. IF Unit 2 Emergency Fan/Filter 2VSF-9 NOT running, THEN start 2VSF-9 by placing (2HS-8603-1) on 2C33 in START AND releasing.
- E. Verify Unit 2 Emergency Fan/Filter (2VSF-9) running as follows:
  - 2VSF-9 fan running.
  - 2VSF-9 Outside Air damper (2PCD-8607B) open.
  - 2VSF-9 Air flow by ONE of the following:
    - Red light ON above (2FS-8603-1) on 2C33  
OR Red flow light ON above (HS-7852) on C19.
    - Air flow from duct in Unit 1 Control Room.
- F. Obtain 2<sup>nd</sup> person verification of the above three conditions.  
  
IV \_\_\_\_\_ (if applicable)
- G. Initiate Condition Report.
- H. Verify entry into appropriate Technical Specifications for VSF-9 inoperability (failure to start OR low flow). Refer to Attachment B, Component/Tech Spec Cross-Reference.

**NOTE**

- When Control Room in Emergency Recirc, ONE Emergency Filtration fan may be placed in STOP or OFF AND associated outside air damper placed in RESERVE, without affecting operability (CR-ANO-C-2001-0271)
- If BOTH Control Room isolation channels tripped, then EITHER step 7.1.6 or 7.2.6 is performed. N/A steps for Emergency Filtration fan left running.

7.2.6 IF VSF-9 running properly,  
THEN perform the following to secure 2VSF-9:

- A. Close 2VSF-9 Outside Air damper 2PCD-8607B by placing (2HS-8607-B1) on 2C33 in RESERVE.
- B. Verify 2VSF-9 secured by placing (2HS-8603-1) on 2C33 in STOP.



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- 7.3 Perform ONE of the following to start the Control Room Emergency coolers:
- 7.3.1 IF 2VUC-27A or 2VUC-27B aligned to Unit 2 power, THEN verify ONE of the following is in service:
- 2VUC-27A (place 2HS-8665-1 on 2C33 to ON and release)
  - 2VUC-27B (place 2HS-8666-2 on 2C33 to ON and release)
- 7.3.2 IF 2VUC-27A or 2VUC-27B aligned to Unit 1 power, THEN refer to "OPERATION OF CONTROL ROOM EMERGENCY AIR CONDITIONING SYSTEM WHEN POWERED FROM UNIT 1", section of this procedure.
- 7.4 Check associated Emergency Control Room chiller running:
- 2VE-1A
  - 2VE-1B
- 7.5 IF necessary to secure CR Extension HVAC for Control Room pressurization, THEN depress CREF HVAC Shutdown switch for 2VUC-42A and 2VUC-42B (2PB-8000) located adjacent to Door 341 (U2 SM Office).
- 7.6 Verify the following doors closed:
- Unit 1 Restroom (Door 65)
  - Unit 1 S/M office (Door 64)
  - Unit 2 S/M office (Door 450)
  - Unit 2 Control Room Foyer (Door 342)
- 7.7 IF there is NO seismic event, THEN maintain one door open between Control Rooms to equalize pressure.
- 7.8 IF Automatic Control Room Isolation caused by any of Unit 1 and/or Unit 2 Radiation monitor(s) failure (going inoperable), THEN perform the following:
- 7.8.1 Verify affected Unit 2 monitor (NOT both) placed in BYPASS on 2C25A.
- 7.8.2 Verify affected Unit 1 monitor (NOT both) placed in BYPASS on 2C474.
- 7.8.3 Verify Unit 1 Status Board updated for 2RITS-8001 present configuration.
- 7.9 Verify entry into appropriate TRM/TS. Refer to Attachment B, Component/Tech Spec Cross-Reference and Attachment C, Chlorine Detector Matrix.

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7.10 Except for Control Room offsite Notification laptop computers (one per Control Room), shutdown and de-energize any other laptop computers in BOTH Control Rooms. (EC 44204)

**NOTE**

If operating Control Room Chiller (VCH-2A/2B) trips on underload the ICS Relay Room may experience high temperature/high humidity.

- \* 7.11 IF Control Room expected to be isolated for more than 12 hours, THEN Unit 1 should monitor Control Room chillers (VCH-2A/2B) operation at least every 2 hours. (CR-ANO-1-2002-0194)

**NOTE**

If operating Control Room Chiller (2VCH-2A/2B) trips on underload, then CEDMCS and MG Set Rooms may experience high temperature/high humidity.

- \* 7.12 WHEN Control Room isolated, THEN Unit 2 should monitor Control Room chillers (2VCH-2A/2B) operation at least every 2 hours.

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**NOTE**

- Actuation of Unit 1 Control Room Supply Duct Smoke Detector (QS-7905) will interlock VSF-9 off preventing auto start but not manual. Therefore, Unit 2 must consider VSF-9 inoperable. Provided 2VSF-9 is operable with auto-start capability, Unit 1 is not impacted.
- No TS or TRM entries are required for Chlorine and Radiation Monitors due to Smoke Detector actuation for either Unit if Control Rooms are placed on Emergency Recirculation automatically or manually.

8.0 SMOKE DETECTOR ALARM RESPONSE ACTIONS

8.1 IF Unit 1 Control Room Supply Duct Smoke detector (QS-7905) actuated, THEN verify the following:

8.1.1 Unit 1 isolated with supply fans secured as follows:

- Unit 1 Control Room Supply damper (CV-7905) closed.  
(Green light ON at C141A/B in Unit 1 Computer Room)
- Unit 1 Control Room Return damper (CV-7907) closed.  
(Green light ON at C141A/B in Unit 1 Computer Room)
- The following Unit 1 Control Room Supply fans stopped:
  - VSF-8A
  - VSF-8B

8.1.2 Verify entry into the following Tech Specs/TRMs. Refer to Attachment B of this procedure:

- IF Control Rooms NOT placed on Emergency Recirc without delay,  
THEN both Units enter applicable TS/TRM for 1 Chlorine Detection System and 1 Radiation Channel inoperable.  
(Affected monitors 2CLS-8760-2, 2CLS-8761-1, 2RITS-8001A and 2RITS-8001B)
- IF 2VSF-9 NOT operable with auto-start capability,  
THEN Unit 1 enter applicable TS for VSF-9 inoperable.
- Unit 2 enter applicable TS for VSF-9 inoperable.
- IF VSF-9 NOT running,  
AND 2VSF-9 NOT operable with auto-start capability,  
THEN Unit 2 enter TS 3.0.3.

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8.2 IF Unit 1 Control Room Exhaust Duct Smoke detector (QS-7907) actuated,  
THEN verify the following:

- Unit 1 Control Room Plenum Return Air damper (CV-7845) closed.
- Unit 1 Control Room Makeup Air damper (CV-7840) open.
- Control Room Smoke Exhauster (VEF-43) Suction (CV-7846) open.
- Control Room Smoke Exhauster (VEF-43) running.

8.3 IF Unit 2 Control Room Supply Duct Smoke detectors (2XSH-8741A/B) actuated,  
THEN perform the following:

8.3.1 Verify the following dampers closed:

- 2UCD-8683, Unit 2 Control Room Supply damper (Green light ON above 2HS-8683-1 on 2C33)
- 2PCD-8685, Unit 2 Control Room Return damper (Green light ON above 2HS-8685-2 on 2C33)

8.3.2 Verify the following fans stop AND place HS in OFF:

- Unit 2 Control Room Supply fans:
  - 2VSF-8A (2HS-8601 on 2C22)
  - 2VSF-8B (2HS-8602 on 2C22)
- Unit 2 Control Room Exhaust fans
  - 2VEF-43A (2HS-8693 on 2C22)
  - 2VEF-43B (2HS-8694 on 2C22)

8.3.3 IF there is going to be a delay in placing the Control Rooms on Emergency Recirculation (automatically or manually),  
THEN BOTH Units enter applicable TS/TRM for ONE Chlorine and ONE Radiation Channel inoperable.  
(Affected monitors 2CLS-8762-2, 2CLS-8763-1, 2RITS-8750-1A and 2RITS-8750-1B)

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- 8.3.4      IF smoke only from air intake,  
              THEN perform the following to purge Control Room:
- A.      Place Control Room Recirc/Exh dampers (2HS-8700) on 2C22 in EXHAUST.
  - B.      Open Unit 2 Control Room Return damper (2PCD-8685) by placing the following switches on 2C33 in PURGE:
    - 2HS-8683-1
    - 2HS-8685-2

**NOTE**

Placing 2VEF-43A/B in HAND will disable the automatic stop supplied by smoke detector (2XSH-8741A/B) in control room supply ducting.

- C.      Start ONE of the following Exhaust fans:
    - 2VEF-43A (place 2HS-8693 on 2C22 to HAND)
    - 2VEF-43B (place 2HS-8694 on 2C22 to HAND)
- 8.3.5      IF desired to place Control Room on Emergency Recirc,  
              THEN perform the following:
- A.      Place the Control Room on Emergency Recirc using "Manual Control Room Isolation and Emergency Recirc" section of this procedure.
  - B.      IF TS/TRM was entered,  
              THEN exit TS/TRM entered for one Chlorine and one Radiation Channel inoperable.
- 8.4      IF Unit 2 Control Room Exhaust Duct Smoke detectors (2XSH-8740A/B) actuated,  
              THEN perform the following:
- 8.4.1      Verify the following isolation damper positions:
- Outside Air Supply damper (2HCD-8701) open.
  - Outside Exhaust damper (2HCD-8700) open.
  - Control Room Recirculation damper (2HCD-8699) closed.
- 8.4.2      Place Control Room Recirc and Exhaust dampers (2HS-8700) on 2C22 in EXHAUST.
- 8.4.3      Verify ONE of the Control Room Exhaust fans running:
- 2VEF-43A
  - 2VEF-43B

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8.5 Perform ONE of the following to start a Control Room Emergency cooler:

8.5.1 IF 2VUC-27A or 2VUC-27B aligned to Unit 2 power,  
THEN start one of the following:

- 2VUC-27A (place 2HS-8665-1 on 2C33 to ON and release)
- 2VUC-27B (place 2HS-8666-2 on 2C33 to ON and release)

8.5.2 IF 2VUC-27A or 2VUC-27B aligned to Unit 1 power,  
THEN refer to "OPERATION OF CONTROL ROOM EMERGENCY AIR  
CONDITIONING SYSTEM WHEN POWERED FROM UNIT 1", section of  
this procedure.

8.6 Check associated Emergency Control Room chiller starts:

- 2VE-1A
- 2VE-1B

**NOTE**

Due to low Service Water flow through VUC-9 Unit Condenser, one or both  
Compressors may trip on high compressor discharge pressure.

8.7 IF desired to start Unit 1 Control Room cooler VUC-9,  
THEN place (HS-7829) on VUC-9 to ON.

8.8 IF necessary to secure CR Extension HVAC for Control Room  
pressurization,  
THEN depress CREF HVAC Shutdown switch for 2VUC-42A and 2VUC-42B  
(2PB-8000) located adjacent to Door 341 (U2 SM Office).

8.9 Verify the following doors closed:

- Unit 1 Restroom (Door 65)
- Unit 1 S/M office (Door 64)
- Unit 2 S/M office (Door 450)
- Unit 2 Control Room Foyer (Door 342)

8.10 IF there is NO seismic event,  
THEN maintain one door open between Control Rooms to equalize  
pressure.

8.11 Except for Control Room offsite Notification laptop computers (one per  
Control Room), shutdown and de-energize any other laptop computers in  
BOTH Control Rooms. (EC 44204)

8.12 As time allows, verify the following fans in automatic:

- 2VEF-43A (place 2HS-8693 on 2C22 in AUTO)
- 2VEF-43B (place 2HS-8694 on 2C22 in AUTO)

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**NOTE**

- This procedure section establishes the Emergency Fan/Filter Units (VSF-9/2VSF-9) lineup as one fan in service/one fan in OFF/STOP with Outside Air damper in RESERVE - the "actuated state" for Control Room Ventilation with Chlorine OR Radiation present.
- Extended operation in Emergency Recirculation mode can result in excessive cycling of Unit 1 Control Room chillers (VCH-2A/2B). It is recommended to monitor the VCH-2s more frequently during periods of extended Emergency Recirculation.
- Chlorine and Radiation monitors are INOPERABLE with BOTH Control Rooms isolated and CREVS (VSF-9/2VSF-9) NOT in service. Therefore the Control Room must be un-isolated prior to securing CREVS. (CR-ANO-C-2001-0207-004)
- 2nd person verification refers to either a peer check or independent verification of the activity is performed.

**9.0 MANUAL CONTROL ROOM ISOLATION AND EMERGENCY RECIRC**

- 9.1 IF placing the control room on emergency recirculation due to an upcoming activity which has the potential to result in automatic actuation  
AND desired to consider NOT placing the control room on emergency recirculation,  
THEN perform the following with the opposite unit CRS/SM:
- 9.1.1 Discuss the probability of an automatic actuation occurring.
- 9.1.2 Discuss the impact of an automatic actuation on current control room activities.
- 9.1.3 Review the operability/availability of CREACS/CREVS equipment (i.e. some equipment emergency use only).
- 9.1.4 IF manually initiating emergency recirculation will NOT be performed,  
THEN perform the following:
- A. Perform a brief regarding section 7.0 of this procedure for follow up actions should an automatic actuation occur.
- \* B. IF an automatic actuation occurs,  
THEN note the actuation and a brief basis for not manually isolating in the station log.
- C. DO NOT perform the remaining steps of section 9.0.
- 9.2 IF necessary to stop CR Extension HVAC for Control Room pressurization,  
THEN depress CREF HVAC Shutdown switch for 2VUC-42A and 2VUC-42B (2PB-8000) located adjacent to Door 341 (U2 SM Office).

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9.3 Verify the following doors closed:

- Unit 1 Restroom (Door 65)
- Unit 1 S/M office (Door 64)
- Unit 2 S/M office (Door 450)
- Unit 2 Control Room Foyer (Door 342)

9.4 IF there is NO seismic event,  
THEN maintain one door open between Control Rooms to equalize pressure.

9.5 Perform ONE of the following to start a Control Room Emergency cooler:

9.5.1 IF 2VUC-27A or 2VUC-27B aligned to Unit 2 power,  
THEN start one of the following:

- 2VUC-27A (place 2HS-8665-1 on 2C33 to ON and release)
- 2VUC-27B (place 2HS-8666-2 on 2C33 to ON and release)

9.5.2 IF 2VUC-27A or 2VUC-27B aligned to Unit 1 power,  
THEN refer to "OPERATION OF CONTROL ROOM EMERGENCY AIR CONDITIONING SYSTEM WHEN POWERED FROM UNIT 1", section of this procedure.

9.6 Check associated Control Room Emergency chiller starts:

- 2VE-1A
- 2VE-1B

#### **NOTE**

- Since Automatic actuation NOT required when Control Room in Emergency Recirculation, ONE Emergency Filtration fan may be placed in STOP or OFF AND the associated outside air damper placed in RESERVE without affecting operability. (TS LCO Bases 3.7.9/3.7.6). (CR-ANO-C-2001-0271)
- HS-7811 actuates two red-powered solenoids (SV-7811/SV-7813) that close Unit 1 Control Room Isolation dampers (CV-7905/CV-7907).
- HS-7812 actuates two green-powered solenoids (SV-7812/SV-7814) that close CV-7905/CV-7907 AND start Unit 1 Emergency Recirc fan (VSF-9).

9.7 Perform the following to start ONE OPERABLE CREVS:  
(CR-ANO-C-2001-0207-004)

- VSF-9, Unit 1 Emergency Fan/Filter by placing Control Room Isolation Channel B switch (HS-7812) on C19 in MAN.
- 2VSF-9, Unit 2 Emergency Fan/Filter by placing (2HS-8603-1) on 2C33 in START and releasing.



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9.8      IF VSF-9 started,  
          THEN perform the following:

9.8.1      Perform the following to verify VSF-9 air flow:

A.      Check VSF-9 Air flow by ONE of the following:

- Red light ON above (FS-7806) on C19.
- Air flow from duct in Unit 1 Control Room.

B.      Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)

9.8.2      Close Unit 2 Control Room Isolation dampers by performing the following:

A.      Place Unit 2 Control Room Supply damper 2UCD-8683 (2HS-8683-1) on 2C33 in CLOSE.

B.      Place Unit 2 Control Room Return damper 2PCD-8685 (2HS-8685-2) on 2C33 in CLOSE.

C.      Obtain 2<sup>nd</sup> person verification of above steps.

IV \_\_\_\_\_ (if applicable)

D.      Check the following dampers closed:

- 2UCD-8683 (Green light ON above 2HS-8683-1 on 2C33)
- 2PCD-8685 (Green light ON above 2HS-8685-2 on 2C33)

9.8.3      Close 2VSF-9 Outside Air damper 2PCD-8607B by performing the following:

A.      Place 2HS-8607-B1 on 2C33 to RESERVE.

B.      Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)

9.8.4      Verify 2VSF-9 secured by placing (2HS-8603-1) on 2C33 in STOP.

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9.9     IF 2VSF-9 started,  
           THEN perform the following:

9.9.1     Close Unit 2 Control Room Isolation dampers by performing the following:

- A.     Place Unit 2 Control Room Supply damper 2UCD-8683 (2HS-8683-1) on 2C33 in CLOSE.
- B.     Place Unit 2 Control Room Return damper 2PCD-8685 (2HS-8685-2) on 2C33 in CLOSE.
- C.     Obtain 2<sup>nd</sup> person verification of above steps.  
           IV \_\_\_\_\_ (if applicable)
- D.     Check the following dampers closed:
  - 2UCD-8683 (Green light ON above 2HS-8683-1 on 2C33)
  - 2PCD-8685 (Green light ON above 2HS-8685-2 on 2C33)

9.9.2     Perform the following to verify 2VSF-9 air flow:

- A.     Check 2VSF-9 Air flow by ONE of the following:
  - Red light ON above (2FS-8603-1) on 2C33  
        OR Red flow light ON above (HS-7852) on C19
  - Air flow from duct in Unit 1 Control Room
- B.     Obtain 2<sup>nd</sup> person verification.  
           IV \_\_\_\_\_ (if applicable)

**NOTE**

Placing HS-7811 in MANUAL will actuate the following alarms:

- K12-E1 K16 Critical Trouble
- K16-B2 Actuation Control Room Isolation
- K16-B3 Trouble Control Room Isolation

9.9.3     Close Unit 1 Control Room Isolation dampers by performing the following:

- A.     Place Unit 1 Control Room Isolation Channel A switch (HS-7811) on C19 to MANUAL.
- B.     Obtain 2<sup>nd</sup> person verification.  
           IV \_\_\_\_\_ (if applicable)

9.9.4     Close VSF-9 Outside Air damper CV-7910 by placing (HS-7910) on C19 in RESERVE.

9.9.5     Verify VSF-9 secured by placing (HS-7806) on C19 in OFF.

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**NOTE**

Due to low Service Water flow through VUC-9 Unit Condenser, one or both Compressors may trip on high compressor discharge pressure.

- 9.10     IF desired to start Unit 1 Control Room cooler VUC-9,  
          THEN place (HS-7829) on VUC-9 to ON.

**NOTE**

If operating Control Room Chiller (VCH-2A/2B) trips on underload the ICS Relay Room may experience high temperature/high humidity.

- \* 9.11     IF Control Room expected to be isolated for more than 12 hours,  
          THEN Unit 1 should monitor Control Room chillers (VCH-2A/2B) operation at least every 2 hours. (CR-ANO-1-2002-0194)

**NOTE**

If operating Control Room Chiller (2VCH-2A/2B) trips on underload the CEDMCS and MG Set Rooms may experience high temperature/high humidity.

- \* 9.12     WHEN Control Room isolated,  
          THEN Unit 2 should monitor Control Room chillers (2VCH-2A/2B) operation at least every 2 hours.
- 9.12.1     IF 2VE-1A or 2VE-1B will be run for extended period during Refueling Outage,  
          THEN, if desired, secure the Control Room Chillers, (2VCH-2A/2VCH-2B) per applicable section of Control Room Chilled Water System (2104.048), to ensure adequate heat load for operation of Emergency Control Room Chillers.
- \* 9.13     IF operating fan (VSF-9/2VSF-9) becomes inoperable while Control Room on Emergency Recirculation mode,  
          THEN refer to attachment B.
- \* 9.14     IF desired to swap Control Room Emergency chillers,  
          THEN perform the following:
- 9.14.1     Start standby Control Room Emergency chiller using section 13 of this procedure.
- 9.14.2     Secure appropriate Control Room Emergency chiller using section 13 of this procedure.

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## 10.0 RESTORATION FROM AUTOMATIC OR MANUAL ISOLATION

### **CAUTION**

Pressing the RESET button on the chlorine detectors with no alarm present will interrupt power to the detector causing a Control Room isolation.

### **NOTE**

- Section 10.1 assumes Section 7.0, RADIATION AND CHLORINE DETECTOR ALARM RESPONSE ACTIONS, is completed.
- If handswitches for VSF-9 and 2VSF-9 are both placed to AUTO, then depending on how the Control Room was isolated, both Fan/Filter units may be running. Operable Fan/Filter Units must be in Auto or running prior to unisolating the Control Rooms.
- Design Engineering evaluation has determined both VSF-9 and 2VSF-9 may be in operation at the same time (CR-C-2001-00271 CA8). However, the time both units are in continuous operation should be minimized because U1 and U2 SARs both assume one unit is secured.
- If Setpoint/Background ratio for in-service Control Room Radmonitor NOT in range of 1.2 to 1.8, Radmonitor setpoint may be recalculated/reset using Radiation Monitoring System Check and Test (1305.001) for Unit One or Radiation Monitoring and Evacuation System (2105.016) and Control Room Intake Duct Rad Monitor Setpoint Calculation (OPS-B28/43) for Unit Two as applicable.
- 2nd person verification refers to either a peer check or independent verification of the activity is performed.

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10.1 Restoration from Automatic Isolation:

10.1.1 Verify the following conditions satisfied:

- Setpoint/Background ratio for in-service Control Room Radmonitors in range of 1.2 to 1.8 as per OPS Logs:
  - 2RITS-8001A – R8001AMG
  - 2RITS-8001B – R8001BMG
  - 2RITS-8750-1A – R8750AMG
  - 2RITS-8750-1B – R8750BMG
- Unit 1 Control Room Area Radiation monitor (RI-8001) reset.
- On-line Unit 1 Control Room Supply Radiation monitor reset:
  - 2RITS-8001A
  - 2RITS-8001B
- On-line Unit 2 Control Room Supply Vent Radiation monitor reset:
  - 2RITS-8750-1A
  - 2RITS-8750-1B
- Unit 1 Control Room supply Vent Chlorine detectors reset:
  - 2CLS-8760-2 (Locally)
  - 2CLS-8761-1 (Locally)
- Unit 2 Control Room supply Vent Chlorine detectors reset:
  - 2CLS-8762-2 (Locally)
  - 2CLS-8763-1 (Locally)
- Control Room Supply Duct Detector QS-7905
  - A. IF required,  
THEN perform the following to reset QS-7905:
    1. Depress red pushbutton on QS-7905.
    2. Check red light on detector flashing slowly.

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**NOTE**

VSF-9 will auto start when PB-2 on C141 is depressed while system trip on C141B is present. Following reset of C141, VSF-9 will stop when PB-2 on C141B is depressed.

- 10.1.2 Check actuation relay(s) for Control Room dampers reset on C141 as indicated by respective indicators NOT lit:
  - A. IF necessary to reset actuated relays,  
THEN depress respective RESET pushbutton:
    - Unit One Radiation Reset (PB-1)
    - Unit One Air Supp Duct Smoke Reset (PB-2)
    - VSF-9 Charcoal Fltr Heat Detector Reset (PB-3)
    - VSF-9 Fltr Differential Press Reset (PB-4)
- 10.1.3 Verify Unit 1 Fan/Filtration Unit VSF-9 aligned for automatic operation by performing the following:
  - A. Verify HS-7806 on C19 in AUTO.
  - B. Obtain 2<sup>nd</sup> person verification.  
IV \_\_\_\_\_ (if applicable)
- 10.1.4 Verify VSF-9 Outside Air damper CV-7910 released for normal operation by performing the following:
  - A. Verify HS-7910 on C19 in NORMAL.
  - B. Obtain 2<sup>nd</sup> person verification.  
IV \_\_\_\_\_ (if applicable)
- 10.1.5 Verify Unit 2 Fan/Filtration Unit **2**VSF-9 aligned for automatic operation by performing the following:
  - A. Verify 2HS-8603-1 on 2C33 in AUTO.
  - B. Obtain 2<sup>nd</sup> person verification.  
IV \_\_\_\_\_ (if applicable)

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10.1.6 Verify 2VSF-9 Outside Air damper 2PCD-8607B released for normal operation by performing the following:

A. Verify 2HS-8607-B1 on 2C33 in NORMAL.

B. Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)

10.1.7 Open Unit 2 Control Room normal ventilation dampers by performing the following:

A. Place Unit 2 Control Room Supply damper 2UCD-8683 (2HS-8683-1) on 2C33 in AUTO.

B. Place Unit 2 Control Room Return damper 2PCD-8685 (2HS-8685-2) on 2C33 in AUTO.

C. Obtain 2<sup>nd</sup> person verification of above steps.

IV \_\_\_\_\_ (if applicable)

10.1.8 Check the following dampers open:

- 2UCD-8683 (Green light OFF above 2HS-8683-1 on 2C33)
- 2PCD-8685 (Green light OFF above 2HS-8685-2 on 2C33)

10.1.9 Verify the following fans running:

- ONE Unit 2 Control Room Supply fan:
  - 2VSF-8A (2HS-8601 on 2C22 in ON)
  - 2VSF-8B (2HS-8602 on 2C22 in ON)

**NOTE**

Placing 2VEF-43A/B in HAND will disable the automatic stop supplied by smoke detector (2XSH-8741A/B) in control room supply ducting.

- ONE Unit 2 Control Room Exhaust fan:
  - 2VEF-43A (2HS-8693 on 2C22 in AUTO or HAND)
  - 2VEF-43B (2HS-8694 on 2C22 in AUTO or HAND)

10.1.10 Verify Unit 1 Control Room Isolation Channel A in automatic by verifying (HS-7811) on C19 in AUTO.

10.1.11 Verify Unit 1 Control Room Isolation Channel B in automatic by verifying (HS-7812) on C19 in AUTO.

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10.1.12 Reset U-1 Control Room Isolation Actuation System by performing the following in U1 Computer Room:

- Depress System Trip Reset button PB-2 on C141A
- Depress System Trip Reset button PB-2 on C141B

10.1.13 Verify ONE of the Unit 1 Control Room Supply fans running as follows:

A. IF Unit 1 Control Room Supply fans were placed in OFF, THEN perform the following to start ONE fan:

1. IF desired to start VSF-8A, THEN perform the following:

- a. Place VSF-8A HS (HS-7820) on BKR B1544 to ON.
- b. Verify VSF-8A Air flow.  
(FS-7820 Red light ON at C19)
- c. Obtain 2<sup>nd</sup> person verification.  
  
IV \_\_\_\_\_ (if applicable)
- d. Verify Filter drive (VFP-12A) NOT in OFF.
- e. Verify Chill Water valves (CV-6037 and CV-6044 inlet and outlet for VSF-8A cooling coils VCC-3A) controlling.

2. IF desired to start VSF-8B, THEN perform the following:

- a. Place VSF-8B (HS-7821) on BKR B4161 to ON.
- b. Check VSF-8B Air flow.  
(FS-7821 Red light ON at C19)
- c. Obtain 2<sup>nd</sup> person verification.  
  
IV \_\_\_\_\_ (if applicable)
- d. Verify Chill Water valves (CV-6043 and CV-6042 inlet and outlet for VSF-8B cooling coils VCC-3B) controlling.



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B. IF Unit 1 Control Room Supply fans were NOT placed in OFF,  
THEN perform the following:

1. Check Unit 1 Control Room Supply fan flow by ONE of the following:
  - VSF-8A Air flow (FS-7820 Red light ON at C19)
  - VSF-8B Air flow (FS-7821 Red light ON at C19)
2. Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)

10.1.14 IF VSF-9 running,  
THEN perform the following:

- A. Stop VSF-9 by placing (HS-7806) on C19 in OFF.
- B. Place VSF-9 (HS-7806) on C19 in AUTO.
- C. Obtain 2<sup>nd</sup> person verification HS-7806 in AUTO.

IV \_\_\_\_\_ (if applicable)

10.1.15 IF 2VSF-9 running,  
THEN perform the following:

- A. Stop 2VSF-9 by placing (2HS-8603-1) on 2C33 in STOP.
- B. Verify 2VSF-9 in automatic by placing (2HS-8603-1) on 2C33 in AUTO.
- C. Obtain 2<sup>nd</sup> person verification 2HS-8603-1 in AUTO.

IV \_\_\_\_\_ (if applicable)

10.1.16 Perform ONE of the following to secure the Control Room Emergency coolers:

- A. IF 2VUC-27A or 2VUC-27B aligned to Unit 2 power,  
THEN secure one of the following:
  - 2VUC-27A (place 2HS-8665-1 on 2C33 to OFF and release)
  - 2VUC-27B (place 2HS-8666-2 on 2C33 to OFF and release)
- B. IF 2VUC-27A or 2VUC-27B aligned to Unit 1 power,  
THEN refer to "OPERATION OF CONTROL ROOM EMERGENCY AIR CONDITIONING SYSTEM WHEN POWERED FROM UNIT 1", section of this procedure.

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- 10.1.17      Verify the CPC Room coolers are secured.
- 2VUC-25A (place 2HS-8535-1 on 2C33 in OFF and release)
  - 2VUC-25B (place 2HS-8536-2 on 2C33 in OFF and release)
- 10.1.18      Check associated Control Room Emergency chillers secured (should automatically stop on low suction pressure):
- 2VE-1A
  - 2VE-1B
- 10.1.19      IF necessary to restart CR Extension HVAC,  
THEN rotate CREF HVAC Shutdown switch for 2VUC-42A and 2VUC-42B (2PB-8000) until it pops out. (located immediately adjacent to U2 SM Office, Door 341)
- 10.1.20      Verify ONE of the following Control Room chillers running:
- 2VCH-2A
  - 2VCH-2B
- 10.1.21      Close door between Control Rooms as desired.

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## 10.2 Restoration from Manual Isolation

### 10.2.1 Verify the following conditions satisfied:

- Setpoint/Background ratio for in-service Control Room Rad monitors in range of 1.2 to 1.8 as per OPS Logs:
  - 2RITS-8001A – R8001AMG
  - 2RITS-8001B – R8001BMG
  - 2RITS-8750-1A – R8750AMG
  - 2RITS-8750-1B – R8750BMG
- Unit 1 Control Room Area Radiation monitor (RI-8001) reset.
- On-line Unit 1 Control Room Supply Radiation monitor reset:
  - 2RITS-8001A
  - 2RITS-8001B
- On-line Unit 2 Control Room Supply Vent Radiation monitor reset:
  - 2RITS-8750-1A
  - 2RITS-8750-1B
- Unit 1 Control Room supply Vent Chlorine detectors reset:
  - 2CLS-8760-2 (Locally)
  - 2CLS-8761-1 (Locally)
- Unit 2 Control Room supply Vent Chlorine detectors: reset
  - 2CLS-8762-2 (Locally)
  - 2CLS-8763-1 (Locally)

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**NOTE**

VSF-9 will auto start when PB-2 on C141 is depressed while system trip on C141B is present. Following reset of C141, VSF-9 will stop when PB-2 on C141B is depressed.

10.2.2 Check actuation relay(s) for Control Room dampers reset on C141 as indicated by respective indicators NOT lit:

A. IF necessary to reset actuated relays,  
THEN depress respective RESET pushbutton:

- Unit One Radiation Reset (PB-1)
- Unit One Air Supp Duct Smoke Reset (PB-2)

A. IF required,  
THEN perform the following to reset Unit 1  
Control Room Supply Duct Smoke Detector  
(QS-7905):

1. Depress red pushbutton on Unit 1 Control Room Supply Duct Smoke Detector (QS-7905).
2. Check red light on detector flashing slowly.

- VSF-9 Charcoal Fltr Heat Detector Reset (PB-3)
- VSF-9 Fltr Differential Press Reset (PB-4)

10.2.3 IF Unit 1 Fan/Filtration Unit (VSF-9) running,  
THEN perform the following to align Unit 2 Fan/Filtration Unit (2VSF-9):

A. Verify Unit 2 Fan/Filtration Unit 2VSF-9 aligned for automatic operation by performing the following:

1. Verify 2HS-8603-1 on 2C33 in AUTO.
2. Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)

B. Verify 2VSF-9 Outside Air damper 2PCD-8607B released for normal operation by performing the following:

1. Verify 2HS-8607-B1 on 2C33 in NORMAL.
2. Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)

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10.2.4      IF Unit 2 Fan/Filtration Unit (2VSF-9) running,  
THEN perform the following to align Unit 1 Fan/Filtration Unit (VSF-9):

- A.    Verify Unit 1 Fan/Filtration Unit VSF-9 aligned for automatic operation by performing the following:
  1.    Verify HS-7806 on C19 in AUTO.
  2.    Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)
- B.    Verify VSF-9 Outside Air damper CV-7910 released for normal operation by performing the following:
  1.    Verify HS-7910 on C19 in NORMAL.
  2.    Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)

10.2.5      Open Unit 2 Control Room normal ventilation dampers by performing the following:

- A.    Place Unit 2 Control Room Supply damper 2UCD-8683 (2HS-8683-1) on 2C33 in AUTO.
- B.    Place Unit 2 Control Room Return damper 2PCD-8685 (2HS-8685-2) on 2C33 in AUTO.
- C.    Obtain 2<sup>nd</sup> person verification of above steps.
 

IV \_\_\_\_\_ (if applicable)
- D.    Check the following dampers open on 2C33:
  - 2UCD-8683 (Green light OFF above 2HS-8683-1)
  - 2PCD-8685 (Green light OFF above 2HS-8685-2)

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10.2.6 Verify the following fans running:

- ONE Unit 2 Control Room Supply fan:
  - 2VSF-8A (2HS-8601 on 2C22 in ON)
  - 2VSF-8B (2HS-8602 on 2C22 in ON)

**NOTE**

Placing 2VEF-43A/B in HAND will disable the automatic stop supplied by smoke detector (2XSH-8741A/B) in control room supply ducting.

- ONE Unit 2 Control Room Exhaust fan:
  - 2VEF-43A (2HS-8693 on 2C22 in AUTO or HAND)
  - 2VEF-43B (2HS-8694 on 2C22 in AUTO or HAND)

10.2.7 Verify Unit 1 Control Room Isolation Channel A in automatic by verifying (HS-7811) on C19 in AUTO.

10.2.8 Verify Unit 1 Control Room Isolation Channel B in automatic by verifying (HS-7812) on C19 in AUTO.

10.2.9 Reset U-1 Control Room Isolation Actuation System by performing the following in the U1 Computer Room:

- Depress System Trip Reset button PB-2 on C141A
- Depress System Trip Reset button PB-2 on C141B

10.2.10 Check ONE of Unit 1 Control Room Supply fans running:

- VSF-8A (FS-7820 Red light on C19 lit)
- VSF-8B (FS-7821 Red light on C19 lit)

10.2.11 Obtain 2<sup>nd</sup> person verification of above step.

IV \_\_\_\_\_ (if applicable)

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10.2.12 IF VSF-9 is/was running,  
THEN perform the following to align VSF-9:

- A. Verify Unit 1 Fan/Filtration Unit VSF-9 aligned for automatic operation by performing the following:
  - 1. Verify HS-7806 on C19 in AUTO.
  - 2. Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)
- B. Verify VSF-9 Outside Air damper CV-7910 released for normal operation by performing the following:
  - 1. Verify HS-7910 on C19 in NORMAL.
  - 2. Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)

10.2.13 IF 2VSF-9 is/was running,  
THEN perform the following to align 2VSF-9:

- A. Stop 2VSF-9 by placing (2HS-8603-1) on 2C33 in STOP.
- B. Return 2VSF-9 to automatic by placing (2HS-8603-1) on 2C33 in AUTO.
- C. Obtain 2<sup>nd</sup> person verification of previous step.
 

IV \_\_\_\_\_ (if applicable)
- D. Verify 2VSF-9 Outside Air damper 2PCD-8607B released for normal operation by verifying (2HS-8607-B1) on 2C33 in NORMAL.
- E. Obtain 2<sup>nd</sup> person verification of previous step.
 

IV \_\_\_\_\_ (if applicable)

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10.2.14 Verify the following fans secured:

- A. IF Control Room Emergency coolers powered from Unit 2  
THEN verify the following are secured:
  - 2VUC-27A (place 2HS-8665-1 on 2C33 in OFF and release)
  - 2VUC-27B (place 2HS-8666-2 on 2C33 in OFF and release)
- B. IF 2VUC-27A or 2VUC-27B aligned to Unit 1 power,  
THEN refer to "OPERATION OF CONTROL ROOM EMERGENCY AIR CONDITIONING SYSTEM WHEN POWERED FROM UNIT 1", section of this procedure.
- C. CPC Room coolers:
  - 2VUC-25A
  - 2VUC-25B

10.2.15 Check associated Control Room Emergency chillers secured (should automatically stop on low suction pressure):

- 2VE-1A
- 2VE-1B

10.2.16 IF necessary to restart CR Extension HVAC,  
THEN rotate CREF HVAC Shutdown switch for 2VUC-42A and 2VUC-42B (2PB-8000) until it pops out. (located immediately adjacent to U2 SM Office, Door 341)

10.2.17 Verify ONE of Control Room chillers running:

- 2VCH-2A
- 2VCH-2B

10.2.18 Close door between Control Rooms as desired.



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**NOTE**

Reserve CO<sub>2</sub> bottle (VRA-1A) function is to close outside damper (CV-7910) to maintain Control Room isolation envelope.

**11.0 VSF-9 OUTSIDE AIR DAMPER MONITORING**

- IF VSF-9 Outside Air damper Reserve bottle (VRA-1A) drops below 680 psig,  
THEN initiate WR/WO to have it recharged.

**NOTE**

With the control room isolated, computer room ambient temperature has risen enough to result in >40 psig change in VRA-1A. 850 psig was chosen as a normal lower bounding pressure to minimize generation of Work Requests solely due to ambient temperature variations.

- IF VRA-1A pressure drops  $\geq 40$  psig in 24 hours,  
AND VRA-1A <850 psig,  
THEN initiate WR/WO to leak test system.
- IF VRA-1A pressure drops below 600 psig,  
THEN perform Attachment K.

**NOTE**

Reserve CO<sub>2</sub> bottle (2VRA-1B) function is to close outside damper (2PCD-8607B) to maintain Control Room isolation envelope.

**12.0 2VSF-9 OUTSIDE AIR DAMPER MONITORING**

- IF 2VSF-9 Outside Air damper Reserve bottle (2VRA-1B) drops below 680 psig,  
THEN initiate WR/WO to have it recharged.
- IF 2VRA-1B pressure drops  $\geq 40$  psig in 24 hours,  
THEN initiate WR/WO to leak test system.
- IF 2VRA-1B pressure drops below 600 psig,  
THEN perform Attachment L.

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### 13.0 OPERATION OF CONTROL ROOM EMERGENCY CHILLERS (2VE-1A/B)

#### NOTE

- If Control Room isolation NOT required, this section can be used to start EITHER Emergency Chiller.
- If Control Room isolation IS required, this section can be used to swap Emergency Chillers.

- 13.1 IF desired to place A Emergency Chiller (2VE-1A) in service,  
THEN perform the following:
- 13.1.1 IF 2VUC-27A aligned to Unit 2 power,  
THEN place 2HS-8665-1 to ON and release.
- 13.1.2 IF 2VUC-27A aligned to Unit 1 power,  
THEN place HS on B64A-4A to ON.
- 13.1.3 Check 2VE-1A starts.
- 13.1.4 IF desired to supply cooling to Old CPC Room,  
THEN start 2VUC-25A (place 2HS-8535-1 to ON and release).
- 13.2 IF desired to place B Emergency Chiller (2VE-1B) in service,  
THEN perform the following:
- 13.2.1 IF 2VUC-27B aligned to Unit 2 power,  
THEN place 2HS-8666-2 to ON and release.
- 13.2.2 IF 2VUC-27B aligned to Unit 1 power,  
THEN place HS on B64B-5A to ON.
- 13.2.3 Check 2VE-1B starts.
- 13.2.4 IF desired to supply cooling to Old CPC Room,  
THEN start 2VUC-25B (place 2HS-8536-2 to ON and release).
- 13.3 IF desired to secure A Emergency Chiller (2VE-1A),  
THEN perform the following:
- 13.3.1 IF 2VUC-25A running,  
THEN stop cooler (place 2HS-8535-1 to OFF and release).
- 13.3.2 IF 2VUC-27A aligned to Unit 2 power and running,  
THEN place 2HS-8665-1 to OFF and release).
- 13.3.3 IF 2VUC-27A aligned to Unit 1 power,  
THEN place HS on B64A-4A to OFF.
- 13.3.4 Check 2VE-1A secures (should automatically stop on low suction pressure).

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13.4 IF desired to secure B Emergency Chiller (2VE-1B),  
THEN perform the following:

13.4.1 IF 2VUC-25B running,  
THEN stop cooler (place 2HS-8536-2 to OFF and release).

13.4.2 IF 2VUC-27B aligned to Unit 2 power and running,  
THEN (place 2HS-8666-2 to OFF and release).

13.4.3 IF 2VUC-27B aligned to Unit 1 power,  
THEN place HS on B64B-5A to OFF.

13.4.4 Check 2VE-1B secures (should automatically stop on low suction pressure).

14.0 HS-1 ON C-141 AND HS-2 ON C-141B OPERATION (VSF-9 OPERABILITY)

14.1 Placing switches in ALTERNATE

14.1.1 Start Unit 2 Emergency Fan/Filter (2VSF-9), by performing "Manual Control Room Isolation and Emergency Recirc" section of this procedure.

14.1.2 Verify HS-7805 on VSF-9 supply breaker in NORMAL.

14.1.3 Obtain key (key #173) from Unit 1 SM for switches that will be operated:

- HS-1 (C-141)
- HS-2 (C-141B)

14.1.4 Place desired key operated switch in ALTERNATE:

- HS-1 (C-141)
- HS-2 (C-141B)

14.1.5 Place any operated switch in Equipment Status Log (E-DOC 1015.001I).

14.1.6 Verify VSF-9 HS (HS-7806) on C19 in OFF to prevent auto start (CR-C-2010-00758).

14.1.7 Place 2RITS-8001A keyswitch in OFF AND back to ON to reset monitor (key #172).

14.1.8 Place 2RITS-8001B keyswitch in OFF AND back to ON to reset monitor (key #172).

14.1.9 Perform "Restoration from Automatic or Manual Isolation" section of this procedure.

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- 14.1.10 Install Caution Tags alerting personnel that a portion of CR Ventilation actuation circuitry is powered from B-55 on the following components:
- CST-B56 on C10, 480V AC MCC B55 & 56 POWER SUPPLY SELECT
  - Cubicle 5611 on B56, MANUAL TRANSFER SWITCH

14.2 Placing switches in NORMAL

- 14.2.1 Start Unit 2 Emergency Fan/Filter (2VSF-9), by performing "Manual Control Room Isolation and Emergency Recirc" section of this procedure.
- 14.2.2 Place desired key operated switch in NORMAL:
- HS-1 (C-141)
  - HS-2 (C-141B)
- 14.2.3 Remove entry from Equipment Status Log (E-DOC 1015.001I).
- 14.2.4 Place 2RITS-8001A keyswitch in OFF AND back to ON to reset monitor.
- 14.2.5 Place 2RITS-8001B keyswitch in OFF AND back to ON to reset monitor.
- 14.2.6 Perform "Restoration from Automatic or Manual Isolation" section of this procedure.
- 14.2.7 Clear Caution Tags per Protective and Caution Tagging (EN-OP-102) from the following components:
- CST-B56 on C10, 480V AC MCC B55 & 56 POWER SUPPLY SELECT
  - Cubicle 5611 on B56, MANUAL TRANSFER SWITCH
- 14.2.8 Return applicable keys for handswitches to Unit 1 SM.
- HS-1 key (C-141)
  - HS-2 key (C-141B)

15.0 OPERATION OF CONTROL ROOM RECIRC & EXHAUST DAMPER (2HCD-8700)

**NOTE**

2HCD-8700 is normally maintained in the RECIRC position.

- 15.1 IF desired to place Control Room Recirc & Exhaust damper (2HCD-8700) in EXHAUST (2C22),  
THEN place 2HS-8700 in EXH position.
- 15.2 WHEN desired to restore 2HCD-8700 to RECIRC,  
THEN place 2HS-8700 in RECIRC.

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**NOTE**

- The following actions are required to be completed within 24 hours of the identified condition per ANO2 TS 3.7.6.1.d and ANO1 TS LCO 3.7.9 Condition B.
- The following steps may be performed in any order.
- This section is NOT intended for Tech Spec allowed intermittent openings under administrative controls, but is intended for unexpected, unplanned breaches of the control room boundary.

16.0 ACTIONS FOR INOPERABLE CONTROL ROOM VENTILATION BOUNDARY

16.1 Verify the following:

- IF applicable,  
THEN maintenance has been initiated to correct the boundary deficiency.
- Condition report has been initiated identifying the condition.
- Entry into ANO1 TS 3.7.9 Condition B.
- Entry into ANO2 TS 3.7.6.1.d.

16.2 Refer to ANO Fire Impairment Program (1000.120) to perform the following:

16.2.1 IF possible,  
THEN seal breach(es).

16.2.2 Establish controls for the Control Room Ventilation boundary breach(es).

16.3 Add a note to shift turnover sheet to verify all control room watchstanders (both units) have completed "ANO Medical Questionnaire - Iodine Sensitivity", Form 1903.035C of Administration of Potassium Iodide (1903.035).

16.4 Verify sufficient availability of Potassium Iodide for control room personnel (both units).

**NOTE**

Security Event 1203.048 contains information regarding availability of SCBAs in the areas near ANO.

16.5 Verify sufficient SCBA inventory for control room personnel.

16.6 Contact System Engineering to verify that the current control room unfiltered inleakage impact on control room dose is bounded by the DBA LOCA requirements for dose (not more than 5 REM TEDE for the duration of the accident).

16.7 Verify Unit 1 and Unit 2 have documented completion of the 24 hour TS action requirements and entry into the 90 day completion time.

16.8 Document method of breach closure in the station log.

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17.0 OPERATION OF CONTROL ROOM EMERGENCY AIR CONDITIONING SYSTEM WHEN POWERED FROM UNIT 1

17.1 Verify "ALIGNING UNIT 2 EMERGENCY CHILLER/COOLER TO UNIT 1", Attachment E of this procedure complete through aligning power to Unit 1.

17.2 IF Control Room Isolation/Actuation,  
OR desired to place Control Room Emergency Air Conditioning system in service,  
THEN perform the following as required:

17.2.1 IF desired to start 2VUC-27A,  
THEN place HS on B64A-4A to ON.

A. Verify 2VE-1A running.

17.2.2 IF desired to start 2VUC-27B,  
THEN place HS on B64B-5A to ON.

A. Verify 2VE-1B running.

17.3 WHEN desired to secure Control Room Emergency Air Conditioning system,  
AND the Control Room has been unisolated,  
THEN perform the following:

17.3.1 IF 2VUC-27A in service,  
THEN stop 2VUC-27A by placing HS on B64A-4A to OFF.

A. Verify 2VE-1A stops.

17.3.2 IF 2VUC-27B in service,  
THEN stop 2VUC-27B by placing HS on B64B-5A to OFF.

A. Verify 2VE-1B stops.

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**CAUTION**

Aligning Service Water to an idle Emergency Control Room Chiller with SW temperature < 55°F renders chiller inoperable.

**NOTE**

The following section is used for post maintenance testing or other testing which requires the Service Water Control valve be operated manually.

18.0 OPERATION OF 2VE-1A SERVICE WATER CONTROL VALVE (2CV-1509-1)

18.1 Perform the following to align Service Water to Emergency Control Room Chiller 2VE-1A:

18.1.1 Notify Unit 1 2VE-1A will be inoperable AND enter TS 3.7.10 Condition A if applicable.

U1 CRS/SM \_\_\_\_\_

18.1.2 IF applicable,  
THEN enter TS 3.7.6.1.

18.1.3 Place Control Valve Test switch 2HS-1509 to TEST.

18.1.4 Place Local SW Valve controller 2PIC-1509-1 to MANUAL.

18.1.5 Fully open Service Water Control valve 2CV-1509-1 using Local SW Valve controller 2PIC-1509-1.

18.2 WHEN no longer desired to maintain Service Water flow to Emergency Control Room Chiller 2VE-1A  
OR maintenance complete,  
THEN perform the following:

18.2.1 Close Service Water Control valve 2CV-1509-1 using Local SW Valve controller 2PIC-1509-1.

18.2.2 Place Local SW Valve controller 2PIC-1509-1 to AUTO.

18.2.3 Place Control Valve Test switch 2HS-1509 to NORMAL.

18.2.4 Notify Unit 1 that 2VE-1A operable AND exit TS 3.7.10 Condition A if applicable.

18.2.5 IF applicable,  
THEN exit TS 3.7.6.1.

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**CAUTION**

Aligning Service Water to an idle Emergency Control Room Chiller with SW temperature < 55°F renders chiller inoperable.

**NOTE**

The following section is used for post maintenance testing or other testing which requires the Service Water Control valve be operated manually.

19.0 OPERATION OF 2VE-1B SERVICE WATER CONTROL VALVE (2CV-1506-2)

19.1 Perform the following to align Service Water to Emergency Control Room Chiller 2VE-1B:

19.1.1 Notify Unit 1 that 2VE-1B will be inoperable AND enter TS 3.7.10 Condition A if applicable.

U1 CRS/SM \_\_\_\_\_

19.1.2 IF applicable,  
THEN enter TS 3.7.6.1.

19.1.3 Place Control Valve Test switch 2HS-1506 to TEST.

19.1.4 Place Local SW Valve controller 2PIC-1506-2 to MANUAL.

19.1.5 Fully open Service Water Control valve 2CV-1506-2 using Local SW Valve controller 2PIC-1506-2.

19.2 WHEN no longer desired to maintain Service Water flow to Emergency Control Room Chiller 2VE-1B  
OR maintenance complete,  
THEN perform the following:

19.2.1 Close Service Water Control valve 2CV-1506-2 using Local SW Valve controller 2PIC-1506-2.

19.2.2 Place Local SW Valve controller 2PIC-1506-2 to AUTO.

19.2.3 Place Control Valve Test switch 2HS-1506 to NORMAL.

19.2.4 Notify Unit 1 that 2VE-1B operable AND exit TS 3.7.10 Condition A if applicable.

19.2.5 IF applicable,  
THEN exit TS 3.7.6.1.



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20.0 SHIFTING CONTROL ROOM EMERGENCY SUPPLY FANS WITH  
CONTROL ROOM ON EMERGENCY RECIRC

20.1 IF shifting from 2VSF-9 in service to VSF-9 in service,  
THEN perform the following:

- 20.1.1 Verify Control Room on Emergency Recirc per section 7.0 OR 9.0 of this procedure.
- 20.1.2 Verify VSF-9 Outside Air damper CV-7910 released for normal operation by performing the following:
  - A. Verify HS-7910 on C19 in NORMAL.
  - B. Obtain 2nd person verification.

IV \_\_\_\_\_

**NOTE**

VSF-9 may Auto start when taking HS-7806 to Auto.

- 20.1.3 Place VSF-9 (HS-7806) on C19 in AUTO.
- 20.1.4 Verify VSF-9, Unit 1 Emergency Fan/Filter running by placing Control Room Isolation Channel B switch (HS-7812) on C19 in MAN.
- 20.1.5 Perform the following to verify VSF-9 air flow:
  - A. Check VSF-9 Air flow by ONE of the following:
    - Red light ON above (FS-7806) on C19
    - Air flow from duct in Unit 1 Control Room.
  - B. Obtain 2nd person verification.
- 20.1.6 Perform the following to secure Unit 2 Fan/Filtration Unit (2VSF-9):
  - A. Verify 2HS-8603-1 on 2C33 in STOP.
  - B. Obtain 2nd person verification.

IV \_\_\_\_\_

- C. Close 2VSF-9 Outside Air damper 2PCD-8607B by placing 2HS-8607-B1 on 2C33 to RESERVE.
- D. Obtain 2nd person verification.

IV \_\_\_\_\_

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20.2 IF shifting from VSF-9 in service to 2VSF-9 in service,  
THEN perform the following:

20.2.1 Verify Control Room on Emergency Recirc per section 7.0 OR 9.0 of this procedure.

20.2.2 Verify 2VSF-9 Outside Air damper 2PCD-8607B released for normal operation by performing the following:

A. Verify 2HS-8607-B1 on 2C33 in NORMAL.

B. Obtain 2<sup>nd</sup> person verification.

IV \_\_\_\_\_ (if applicable)

20.2.3 Verify 2VSF-9 in automatic by placing (2HS-8603-1) on 2C33 in AUTO.

20.2.4 IF Unit 2 Emergency Fan/Filter 2VSF-9 NOT running,  
THEN start 2VSF-9 by placing (2HS-8603-1) on 2C33 in START AND releasing.

20.2.5 Verify Unit 2 Emergency Fan/Filter (2VSF-9) running as follows:

- 2VSF-9 fan running.
- 2VSF-9 Outside Air damper (2PCD-8607B) open.
- 2VSF-9 Air flow by ONE of the following:
  - Red light ON above (2FS-8603-1) on 2C33  
OR Red flow light ON above (HS-7852) on C19.
  - Air flow from duct in Unit 1 Control Room.

20.2.6 Obtain 2<sup>nd</sup> person verification of the above three conditions.

IV \_\_\_\_\_ (if applicable)

20.2.7 Perform the following to secure Unit 1 Emergency Fan/Filter (VSF-9):

A. Close VSF-9 Outside Air damper CV-7910 by placing (HS-7910) on C19 in RESERVE.

B. Verify VSF-9 secured by placing (HS-7806) on C19 in OFF.

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ATTACHMENT A NORMAL VALVE LINEUP

COMPONENT NUMBER	COMPONENT DESCRIPTION	PRINT # GRID #	ADDITIONAL COMPONENT INFORMATION	REQUIRED POSITION	TAG	INITIAL	COMMENTS
<b>2VE-1A A EMERG CR CHILLER</b>							
2AC-38	2C-59 Compressor Inlet	M2221 G3 SH 2	A EMER CR CHILLER ON NORTH END OF 2VE-1A COMPRESSOR	(1)			Perform label check only
2AC-1507	2PS-1507 Isol	M2221 G2 SH 1	A EMER CR CHILLER BELOW W EDGE OF 2C-187, 3 FT UP AT 2VE-1A	OPEN			
2AC-6903	2C-59 High Press 2PI-6903 Isol	M2221 G2 SH 2	A EMER CR CHILLER UNDER 2C-187	OPEN			
2AC-6904	2C-59 Oil Press 2PI-6904 Isol	M2221 H2 SH 2	A EMER CR CHILLER BELOW 2C-187	OPEN			May be throttled to minimize oscillations
2AC-6905	2C-59 Low Press 2PI-6905 Isol	M2221 H2 SH 2	A EMER CR CHILLER BELOW 2C-187	OPEN			
2AC-39	2C-59 Compressor Outlet	M2221 G2 SH 2	A EMER CR CHILLER ON EAST SIDE OF 2VE-1A COMPRESSOR	(1)			Perform label check only
2AC-5033	2VE-1A Vent	M2221 E2 SH 2	A EMER CR CHILLER ON THE SIDE TOWARD ISLE OF 2VE-1A HEAT EXCHANGER	CLOSED			
2AC-5031	2VE-1A Drain	M2221 E2 SH 2	A EMER CR CHILLER COMING OUT BOTTOM OF 2VE-1A	CLOSED			
2AC-5032	2VE-1A Drain	M2221 F3 SH 2	A EMER CR CHILLER NORTH END OF 2VE-1A, 3.5 FT OFF FLOOR	CLOSED			
2AC-1509	2PT-1509-1 Isol	M2221 F2 SH 2	A EMER CR CHILLER ON SOUTH END OF 2VE-1A FRAME UNDER MOTOR FOR COMPRESSOR	OPEN			
2AC-40	2F-545 Filter Dryer Inlet	M2221 C3 SH 2	A EMER CR CHILLER BEHIND 2VE-1A, 1 FT OFF FLOOR S OF 2PSV-1509B	OPEN			
2AC-5030	2F-545 Filter Dryer Drain	M2221 C3 SH 2	A EMER CR CHILLER BETWEEN 2VE-1A TANK AND COMPRESSOR DIRECTLY EAST OF FD #238, 4 FT UP	CLOSED			
2AC-34	2F-545 Filter Dryer Outlet	M2221 C2 SH 2	A EMER CR CHILLER BETWEEN 2VE-1A COMPRESSOR AND HX, 6 IN ABOVE HX	OPEN			
<b>2VE-1B B EMER CR CHILLER</b>							
2AC-41	2C-58 Compressor Inlet	M2221 G6 SH 2	B EMER CR CHILLER ALONG EAST WALL, ON TOP OF COMP FOR 2VE-113	(1)			Perform label check only

- 1: 2AC-38, 2AC-39, 2AC-41 and 2AC-42 are required to be maintained open and one turn off the backseat. Backseating these valves will result in inoperability of the associated Emergency Control Room chiller. Valve lineup checks are intended to be label checks only as the valves should not be repositioned unless required by maintenance.

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ATTACHMENT A NORMAL VALVE LINEUP

COMPONENT NUMBER	COMPONENT DESCRIPTION	PRINT # GRID #	ADDITIONAL COMPONENT INFORMATION	REQUIRED POSITION	TAG	INITIAL	COMMENTS
2AC-1508	2PS-1508 Isol	M2221 G6 SH 2	B EMER CR CHILLER 3 FT OF FLOOR AT W EDGE OF 2C-188 AT 2VE-1B	OPEN			
2AC-6907	2C-58 Oil Press 2PI-6907 Isol	M2221 H6 SH 2	B EMER CR CHILLER UNDER 2C-188 NW CORNER 3 FT OFF FLOOR	OPEN			May be throttled to minimize oscillations
2AC-6906	2C-58 High Press 2PI-6906 Isol	M2221 H6 SH 2	B EMER CR CHILLER UNDER 2C-188 NW CORNER 3 FT OFF FLOOR	OPEN			
2AC-6908	2C-58 Low Press 2PI-6908 Isol	M2221 H6 SH 2	B EMER CR CHILLER UNDER 2C-188 NW CORNER 3 FT OFF FLOOR	OPEN			
2AC-42	2C-58 Compressor Outlet	M2221 C6 SH 2	B EMER CR CHILLER ALONG EAST WALL	(1)			Perform label check only
2AC-5029	2VE-1B Vent	M2221 E6 SH 2	B EMER CR CHILLER BEHIND HEAT EXCHANGER 2VE-1B	CLOSED			
2AC-5027	2VE-1B Drain	M2221 F6 SH 2	B EMER CR CHILLER COMING OUT OF TOP OF 2VE-1A, NORTH END, BELOW CENTER OF EVAP OF 2VE-1B	CLOSED			
2AC-5028	2VE-1B Drain	M2221 F7 SH 2	B EMER CR CHILLER ON TOP OF HEAT EXCHANGER 2VE-1B AT SOUTH END	CLOSED			
2AC-1506	2PT-1506-2 Isol	M2221 F6 SH 2	B EMER CR CHILLER SOUTH OF 2C-188, NORTH OF 2C-58 MOTOR, 5 FT OFF FLOOR	OPEN			
2AC-5040	2PT-1506-2 Isol	M2221 F6 SH 2	B EMER CR CHILLER BETWEEN 2C188 AND 2VE-1B COMP MOTOR OF SKID, 5 FT OFF FLOOR	OPEN			
2AC-43	2F-546 Filter Dryer Inlet	M2221 C6 SH 1	B EMER CR CHILLER UNDER 2VE-1B HEAT EXCHANGER, 4 IN UP FROM FRAME	OPEN			
2AC-5026	2F-546 Filter Dryer Drain	M2221 C6 SH 2	B EMER CR CHILLER ABOVE 2VE-1B HEAT EXCHANGER UNDER COMPRESSOR	CLOSED			
2AC-30	2F-546 Filter Dryer Outlet	M2221 C6 SH 2	B EMER CR CHILLER ABOVE WEST EDGE OF CONDENSER FOR 2VE-1B, 4 FT OFF FLOOR	OPEN			

1: 2AC-38, 2AC-39, 2AC-41 and 2AC-42 are required to be maintained open and one turn off the backseat. Backseating these valves will result in inoperability of the associated Emergency Control Room chiller. Valve lineup checks are intended to be label checks only as the valves should not be repositioned unless required by maintenance.

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ATTACHMENT A NORMAL VALVE LINEUP

2VSF-9 AREA							
2HVC-8607	2VRA-1B Reserve Air Bottle Isol	M2263 F6 SH 2	AGAINST COL B-4, 5 FT NORTH OF 2VSF-9, IN UNIT 1 AUX BLDG, 9 FT UP	OPEN			
2IA-386	2SV-8607B-1 Inlet IA Isol	M2263 A8 SH 1	N OF 2VSF-9 APPROX 7.5 FT FROM FLOOR, SOUTH OF 2VRA-1B	OPEN			
2IA-1025	2SV-8607B-1 Inlet IA Vent	M2263 A8 SH 1	N OF 2VSF-9 APPROX 6.5 FT FROM FLOOR, SOUTH OF 2VRA-1B	CLOSED			
2IA-1026	2PCV-8607B Inlet Test Connection	M2263 A8 SH 1	N OF 2VSF-9 APPROX 6.5 FT FROM FLOOR, NORTH OF 2VRA-1B	CLOSED			
2IA-29	IA SUPPLY TO 2VSF-9	M2263 B7 SH 1	SOUTH OF 2VSF-9, APPROX. 6.5 FT FROM FLOOR	OPEN			

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COMPONENT/TECH SPEC CROSS-REFERENCE

INSTRUCTIONS

- Refer to Table 1 for Component Tech Spec Cross-reference.
- Refer to Table 2 for Alternate power sources to CREVS/CREACS components.
- Refer to Table 3 for actions that should be taken due to a loss of power for CREVS components and applicable Tech Specs.
- Refer to Table 4 for fail safe and non-fail safe components.
- Refer to the flow chart on the last page of this attachment for Tech Spec implications due to Radiation monitor inoperability.

<b>TABLE 1</b> <b>COMPONENT TECH SPEC CROSS-REFERENCE</b>		
<b>COMPONENT</b>	<b>UNIT 1 Tech Spec</b>	<b>UNIT 2 Tech Spec</b>
VSF-9, 2VSF-9	TS 3.7.9 (Notes 1-14, 21, 22, 23, 24)	TS 3.7.6.1 (Notes 1-14, 21, 22, 23, 24)
2VUC-27A Fan or Heater	TS 3.7.10 (Notes 1-7, 15-17, 24)	TS 3.7.6.1 (Notes 1-7, 15-17, 24)
2VUC-27B Fan or Heater	TS 3.7.10 (Notes 1-7, 15-17, 24)	TS 3.7.6.1 (Notes 1-7, 15-17, 24)
2VE-1A, 2VE-1B	TS 3.7.10 (Notes 1-7, 15-17, 24)	TS 3.7.6.1 (Notes 1-7, 15-17, 24)
CV-7905, CV-7907	TS 3.3.16 and TS 3.7.9 (Notes 1-14, 19, 20, 24)	TS 3.7.6.1 (Notes 1-14, 19, 20, 24)
2UCD-8683, 2PCD-8685	TS 3.3.16 and TS 3.7.9 (Notes 1-14, 19, 20, 24)	TS 3.7.6.1 (Notes 1-13, 19, 20, 24)
QS-7905, QS-7907	None (Notes 11, 12)	None (Notes 11, 12)
2XSH-8740A/B, 2XSH-8741A/B	None (Notes 11, 12)	None (Notes 11, 12)
Chlorine Detectors	TRM 3.3.1 (Notes 9,10,11, 13,18-20)	TRM 3.3.7 (Notes 9,10,13,18-20)
2RITS-8001A OR 2RITS-8001B	TS 3.3.16, (Notes 9,10,11, 14,18-20, 24)	TS 3.3.3.1, Table 3.3-6 (Notes 9,10,14,18-20, 24)
2RITS-8750-1A OR 2RITS-8750-1B	TS 3.3.16, (Notes 9,10,11, 14,18-20, 24)	TS 3.3.3.1, Table 3.3-6 (Notes 9,10,14,18-20, 24)

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NOTES:

- 1.0 For Unit 1: In Modes 1, 2, 3, 4 AND any time when handling irradiated fuel (ref. note 6), BOTH CREVS and CREACS trains must be operable as required by Technical Specifications. TS power supplies required to support train operability must remain separated AND redundant.  
  
For Unit 2: In Modes 1, 2, 3, 4 AND any time when handling irradiated fuel (ref. note 6), BOTH CREVS and CREACS trains must be operable as required by Technical Specifications. TS power supplies required to support train operability must remain separated AND redundant.
- 2.0 When BOTH CREVS or CREACS trains are powered from Unit 2, operability is maintained provided both NORMAL and EMERGENCY power supplies remain separate and redundant with respect to the individual trains. If 2A3/4 OR 2B5/6 cross-tied, separation is lost and each Unit must consider ONE train INOPERABLE. Train considered inoperable may be different for each Unit.
- 3.0 When BOTH CREVS or CREACS trains are powered from Unit 1, electrical separation is lost. Therefore, each Unit must consider one train inoperable. Train considered inoperable may be different for each Unit.
- 4.0 When a CREVS or CREACS component (including Service Water loop supporting an operable CREACS train) is powered from the OPPOSITE Unit AND its associated NORMAL or EMERGENCY power source is INOPERABLE, Unit from which the component or loop is NOT aligned must consider the affected non-fail safe CREVS or CREACS components inoperable (See Exception - Note 5). This ensures operation in a degraded state is restricted since inoperability of one Units NORMAL or EMERGENCY power supply does not inherently result in TS entry for the other Unit. Unit from which the affected train is aligned must comply with the applicable electrical specifications of TS Section 3.8 (includes TS 3.0.5 for Unit 2).
- 5.0 When 2DG1 is INOPERABLE, Unit 1 is NOT required to consider 2VSF-9 INOPERABLE provided ALL the following are true:
  - VSF-9 is OPERABLE, aligned from Unit 1, and capable of auto-start
  - 2VSF-9 is capable of being manually aligned to be powered from OPERABLE 2DG2.

This is an exception to the requirements presented in Note 4 above.  
(LIC-02-005).

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**NOTE**

The License Bases are unit dependent (i.e. U1 TSS, SAR etc. are based on U1 accidents and not Unit 2 accidents) therefore fuel handling on one unit does not constitute fuel handling on the other unit. If equipment required for fuel handling is OOS on the unit handling fuel, then that unit would enter the required actions/conditions as required by the License Bases.

- 6.0 The definition of handling/movement of irradiated fuel is different for Unit 1 and Unit 2 as described below. Furthermore, the Tech Spec application for handling/movement of irradiated fuel is Unit specific. For example, during handling/movement of irradiated fuel on Unit 1, the Unit 2 Tech Specs do NOT apply and vice versa.

For Unit 1: Movement of irradiated fuel is defined as follows:

- The movement of an IRRADIATED fuel assembly in EITHER the Unit 1 Reactor Building or the Unit 1 Fuel Pool area at any time.
  - CEA shuffle, new fuel movement, movement of dummy assemblies, movement of the incore trash can, movement of fuel reconditioning equipment, and sealed cask movements (i.e. when both lids are welded in place) are NOT considered part of irradiated fuel handling/movement.

For Unit 2: Handling of irradiated fuel is defined as follows:

- The movement of ANY fuel assembly over irradiated fuel in EITHER the Unit 2 Reactor Building or the Unit 2 Fuel Pool area at any time. The movement of new fuel or a dummy assembly, if moved or suspended over one or more irradiated fuel assemblies **IS** considered irradiated fuel handling/movement.
- The movement of an IRRADIATED fuel assembly in EITHER the Unit 2 Reactor Building or the Unit 2 Fuel Pool area at any time.
  - CEA shuffle, movement of the incore trash can, movement of fuel reconditioning equipment and sealed cask movements (i.e. when both lids are welded in place) are NOT considered part of irradiated fuel handling/movement.

(Originally put in place by CR-ANO-C-1999-0054. Related to CR-ANO-C-2002-0334, CR-ANO-1-2002-0481)

- 7.0 UNIT 2 ONLY: During handling of irradiated fuel (ref. note 6) (when in Modes other than 1, 2, 3, or 4, the inoperability of a NORMAL or EMERGENCY power supply to a CREVS or CREACS train constitutes inoperability of an associated non-fail safe train/component (TS 3.0.5 does not apply). For example, during handling/movement of irradiated fuel on Unit 2 while in Mode 5, 6 or defueled: (CR-ANO-2-2012-02421-CA-3)

- Unit 2 must consider 2VSF-9 inoperable if 2DG1 is inoperable.
- Unit 2 must consider 2VE-1A inoperable if 2DG1 is inoperable.
- Unit 2 must consider 2VE-1B inoperable if 2DG2 is inoperable.



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- 8.0 When 2VSF-9 is aligned from Unit 1 power, Unit 2 must consider 2VSF-9 inoperable since Auto-start capability is lost (C19 handswitch for 2VSF-9 does not have an AUTO position). If VSF-9 is operable with Auto-start capability, this configuration does NOT impact Unit 1. If Control Rooms are automatically or manually placed on Emergency Recirculation, no TS and TRM entries are required for EITHER Unit.
- 9.0 TS and TRM actions associated with Control Room Radiation Monitor or Chlorine Detector inoperability are sufficient to ensure operability is restored or Control Room is placed in the fail-safe mode (Emergency Recirculation). Therefore, if Auto-start capability for EITHER Emergency Recirculation fan is lost due solely to inoperability of Control Room Radiation Monitor or Chlorine Detectors, VSF-9 or 2VSF-9 is NOT considered inoperable.
- 10.0 If VSF-9 AND 2VSF-9 are NOT capable of Auto-start for reasons other than Control Room Radiation Monitor or Chlorine Detector inoperability, Unit 1 must consider ONE fan inoperable. Unit 2 must consider BOTH fans inoperable. Placing Control Room in Emergency Recirculation mode will restore fan operability for BOTH units since Auto-start capability is NOT required when Control Room safety function is being maintained.
- 11.0 Actuation of Smoke Detector (2XSH-8741A/B, in Unit 2 Supply Duct) OR (QS-7905 in Unit 1 Supply Duct) will cause the respective Supply Damper to close rendering the respective Radiation Monitors and Chlorine Detectors in the duct inoperable due to loss of air flow to the monitors/detectors. If Control Rooms are automatically or manually placed on Emergency Recirculation, TS and TRM entries are NOT required for EITHER Unit. TS/TRM entry for Chlorine and Radiation Monitors during the testing of Smoke Detectors is NOT required provided the Control Rooms are restored to NORMAL operation OR automatically or manually placed on Emergency Recirculation WITHOUT DELAY.
- 12.0 With QS-7905 actuated, VSF-9 is interlocked OFF causing a loss of auto-start capability. Therefore, Unit 2 must consider VSF-9 inoperable. If 2VSF-9 is OPERABLE with Auto-start capability, Unit 1 is NOT impacted by this event.
- 13.0 Chlorine Detectors, per TRMs, are required to be operable in Modes 1 and 2 for Unit 1 AND in Modes 1, 2, 3, and 4 for Unit 2. Chlorine Detectors are NOT required to be operable during handling of irradiated fuel (ref. note 6).
- 14.0 Two of the four Radiation Monitors must be OPERABLE to satisfy Unit 1 and Unit 2 Tech Specs. The TWO must be comprised of the following: ONE Unit 1 monitor (2RITS-8001A or 2RITS-8001B) AND ONE Unit 2 monitor (2RITS-8750-1A or 2RITS-8750-1B). See flow chart on last page of this Attachment for further TS guidance.
- 15.0 In accordance with U2 T.S. 3.3.3.1 (Table 4.3-3) and U1 T.S. 3.3.16 (SR 3.3.16-2), when the Control Room Ventilation Intake Duct Monitor is placed in an inoperable status solely for performance of the Monthly functional Test Surveillance, entry into associated ACTIONS may be delayed up to 3 hours.
- 16.0 When EITHER CREACS train is electrically aligned from Unit 1, Unit 2 must consider the train inoperable since manual start cannot be accomplished from Control Room. This configuration does NOT impact Unit 1.

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- 17.0 A CREACS train may be supplied by any operable Service Water source (Either Unit) to meet operability requirements provided the Service Water source AND its power supplies are separate AND redundant with respect to the other CREACS train.
- 18.0 Emergency Cooling Pond (ECP) inoperability affecting only ONE CREACS train does NOT result in CREACS inoperability. If the redundant CREACS train is not operable, appropriate restrictions are applied by the TS actions required for a single CREACS train inoperability AND no further action is required. However, if ECP inoperability affects both CREACS trains, then each unit must consider one CREACS train inoperable. The train considered inoperable can be either train as desired.
- 19.0 IF equipment fails during Control Room restoration that impacts Chlorine and Radiation detector operability,  
THEN steps shall be performed to return the control room to Emergency Recirculation mode.
- 20.0 Operability requires all necessary equipment including, as applicable, normal and emergency power sources to be operable for non-fail safe equipment. Operability of CREVS/CREACS components that fail-safe on loss of power is not affected when either it's associated normal or emergency power source is inoperable.
- 21.0 Placing Unit 2 Vital inverters on Alternate Source does NOT affect operability of any CREVS/CREACS components. Inadvertent actuation of CREVS is NOT detrimental. Therefore, uninterruptible power is NOT required for CREVS components.
- 22.0 IF the operating fan (VSF-9/2VSF-9) becomes inoperable while Control Room is on Emergency Recirculation mode,  
THEN the following TSs apply:
  - One CREVS train inoperable due to an inoperable CREVS fan (TS 3.7.9 Condition A [ANO1], TS 3.7.6.1 Action b and/or action g [ANO2])

**NOTE**

CR-ANO-C-2006-1225 determined that minor leakage out of CV-7910 is acceptable and does not challenge the operability of CREVS. CV-7910 is not designed as an air tight damper.

- Inoperable Control Room boundary due to outside air makeup damper NOT being closed on inoperable fan (TS 3.7.9 Condition B and/or Condition E [ANO1], TS 3.7.6.1 Action d and/or Action j [ANO2])
- Two channels of radiation monitoring inoperable due to Control Room isolation AND no operable CREVS fan in service (TS 3.3.16 Condition B [ANO1], TS 3.3.3.1 Table 3.3-6 [ANO2])
- BOTH required channels of Chlorine Monitoring inoperable due to Control Room isolation AND no operable CREVS fan in service (TRM 3.3.1 Condition C [ANO1], TRM 3.3.7 Action b [ANO2])

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- 23.0 VSF-9/2VSF-9 should be considered Operable and capable of performing its design function (filtering 2000 cfm +/- 10% control room recirc and make-up air) when it has been restored from sampling activities per In-place Testing of Unit 1/2 Control Room Filtration System (5120.415/5120.425). Subsequent testing is performed per 5120.415/5120.425 with VSF-9/2VSF-9 in operation to verify appropriate acceptance criteria. (CR-ANO-C-2009-0806)
- 24.0 When Tech Spec conditions are NOT met (e.g. TS 3.7.9 Condition A [ANO1] or TS 3.7.6.1 Action b [ANO2]) then entry into a MODE or other specified condition in the Applicability (including the commencement of irradiated fuel movement/handling as defined by note 6) shall only be made when the applicable provision of TS LCO 3.0.4 is met.

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TABLE 2 CREVS/CREACS ALTERNATE POWER SUPPLIES				
Equipment	Normal Power	Emergency Power	Alternate Normal Power	Alternate Emergency Power
VSF-9	B5553	1DG1 OR 1DG2 to B55	2B64-D1	2DG2 to 2B64-D1
2VSF-9	2B54-C3	2DG1 to 2B54	<b>Note 1</b>	<b>Note 1</b>
2VUC-27A Fan	2B54-B1	2DG1 to 2B54	B64A-4A	1DG2 to B64A-4A
2VUC-27A Heater	2B54-D2	2DG1 to 2B54	B64A-2A	1DG2 to B64A-2A
2VUC-27B Fan	2B61-J4	2DG2 to 2B61	B64B-5A	1DG2 to B64B-5A
2VUC-27B Heater	2B61-J5	2DG2 to 2B61	B64B-3A	1DG2 to B64B-3A
2VE-1A	2B52-D5	2DG1 to 2B52	B64A-5A	1DG2 to B64A-5A
2VE-1B	2B63-K6	2DG2 to 2B63	B64B-6A	1DG2 to B64B-6A

**Note 1:**

Alternate Normal power for 2VSF-9 may be any one of the following:

- 1) Unit 1 B5666 having an operable offsite power source.
- 2) Powered from an operable offsite source via 2A3/4 OR 2B5/6 crossties.

Alternate Emergency power for 2VSF-9 may be any one of the following:

- 1) Unit 1 B5666 capable of being aligned to operable 1DG1 OR 1DG2.
- 2) Powered from operable 2DG2 via 2A3/4 OR 2B5/6 crossties.

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The following table should be used a guidance for actions that need to completed for a loss of certain components.

TABLE 3 CREVS ACTIONS			
Condition	Actions Required	TS/TRM	Comments
B5553 DE-ENERGIZED	Perform ONE of the following: <ul style="list-style-type: none"> <li><u>BOTH</u> Units declare VSF-9 and control room boundary inoperable <u>AND</u> install blank flange on VSF-9 IAW attachment K.</li> </ul>	U1 TS 3.7.9 A U1 TS 3.7.9 B U2 TS 3.7.6.1 b U2 TS 3.7.6.1 d	<ul style="list-style-type: none"> <li>VSF-9 inoperable due loss of power.</li> <li>VSF-9 suction CV-7910 damper fails open due to a loss of IA (Reserve bottle will still close the damper).</li> </ul>
	<ul style="list-style-type: none"> <li><u>BOTH</u> Units declare VSF-9 INOPERABLE <u>AND</u> without delay place CV-7910 handswitch to RESERVE (use Equipment Status Log for configuration control).</li> </ul>	U1 TS 3.7.9 U2 TS 3.7.6.1	<ul style="list-style-type: none"> <li><u>BOTH</u> Units must also enter the Control room boundary TS due to outside air damper failing open until actions are taken.</li> </ul>
Y01 breaker 32 OPEN OR Y01 DE-ENERGIZED.	Perform <u>ONE</u> of the following: <ul style="list-style-type: none"> <li>Without delay place Control Room on Emergency Recirc.</li> </ul>	None	<ul style="list-style-type: none"> <li>CV-7905 &amp; CV-7907 fail closed.</li> <li>VSF-8A/B will NOT auto-trip on high radiation or chlorine.</li> </ul>
	<ul style="list-style-type: none"> <li><u>BOTH</u> Units declare 2RITS-8001A, 2RITS-8001B, 2CLS-8761-1, &amp; 2CLS-8760-2 INOPERABLE</li> </ul>	U1 TS 3.3.16 (1) U1 TRM 3.3.1 (1) U2 TS 3.3.3.1 (1) U2 TRM 3.3.7 (1)	<ul style="list-style-type: none"> <li>VEF-43 auto-start is inoperable when CV-7907 closes.</li> <li>If VSF-8A or B are in service, QS-7905 remains operational</li> </ul>

(1) TS/TRM entry required only if the Control Room not on Emergency recirc.

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TABLE 3 CREVS ACTIONS			
Condition	Actions Required	TS/TRM	Comments
Y02 breaker 32 OPEN	Perform <u>ONE</u> of the following bulleted steps: <ul style="list-style-type: none"> <li><u>BOTH</u> Units declare VSF-9, 2RITS-8001A, and 2RITS-8001B INOPERABLE.</li> </ul>	U1 TS 3.3.16 (1) U2 TS 3.3.3.1 (1) U1 TS 3.7.9 U2 TS 3.7.6.1	<ul style="list-style-type: none"> <li>VSF-9 auto-start capability lost.</li> <li>CV-7905 &amp; CV-7907 fail closed.</li> </ul>
	<ul style="list-style-type: none"> <li>Without delay place Control Room on Emergency Recirc with 2VSF-9 running <u>AND</u> declare VSF-9 INOPERABLE.</li> </ul>	U1 TS 3.7.9 U2 TS 3.7.6.1	<ul style="list-style-type: none"> <li>VSF-8A/B will NOT auto-trip on high radiation or chlorine.</li> <li>Reserve bottle valve SV-7910 fails CV-7910 closed which causes VSF-9 to be inoperable.</li> </ul>
	<ul style="list-style-type: none"> <li>Perform <u>BOTH</u> of the following: <ol style="list-style-type: none"> <li>Verify B56 aligned to OPERABLE EDG.</li> <li>Place HS-2 on C-141B in ALTERNATE using applicable section of this procedure.</li> </ol> </li> </ul>	None	
Y02 breaker 39 OPEN	Perform <u>ONE</u> of the following bulleted steps: <ul style="list-style-type: none"> <li>Without delay place Control Room on Emergency Recirc with VSF-9 running</li> </ul>	None	<ul style="list-style-type: none"> <li><u>IF</u> VSF-9 NOT running, <u>THEN</u> VSF-9 operable for Unit 1 and Inoperable for Unit 2.</li> </ul>
	<ul style="list-style-type: none"> <li><u>BOTH</u> Units enter TS listed in the next column for 2RITS-8001A, 2RITS-8001B Radiation monitors.</li> </ul>	U1 TS 3.3.16 (1) U2 TS 3.3.3.1 (1) U2 TS 3.7.6.1	<ul style="list-style-type: none"> <li>VSF-9 auto-start lost.</li> <li>CV-7905 &amp; CV-7907 fail closed.</li> <li>VSF-8A/B will not auto-trip on high radiation or chlorine.</li> <li>QS-7905 de-energized (manual actions can be credited).</li> </ul>
	<ul style="list-style-type: none"> <li>Perform <u>BOTH</u> of the following: <ol style="list-style-type: none"> <li>Verify B56 aligned to operable EDG.</li> <li>Place HS-1 on C-141 in ALTERNATE using applicable section of this procedure.</li> </ol> </li> </ul>	None	

(1) TS/TRM entry required only if the Control Room not on Emergency recirc.

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TABLE 3 CREVS ACTIONS			
Condition	Actions Required	TS/TRM	Comments
Y02 DE-ENERGIZED	Perform <u>ONE</u> of the following bulleted steps: <ul style="list-style-type: none"> <li><u>BOTH</u> Units declare VSF-9, 2RITS-8001A, and 2RITS-8001B INOPERABLE.</li> </ul>	U1 TS 3.3.16 (1) U2 TS 3.3.3.1 (1) U1 TS 3.7.9 U2 TS 3.7.6.1	<ul style="list-style-type: none"> <li>VSF-9 auto-start capability lost.</li> <li>CV-7905 &amp; CV-7907 fail closed.</li> </ul>
	<ul style="list-style-type: none"> <li>Without delay place Control Room on Emergency Recirc with <b>2</b>VSF-9 running <u>AND</u> declare VSF-9 INOPERABLE.</li> </ul>	U1 TS 3.7.9 U2 TS 3.7.6.1	<ul style="list-style-type: none"> <li>VSF-8A/B will not auto-trip on high radiation or chlorine.</li> <li>Reserve bottle valve SV-7910 fails CV-7910 closed which causes VSF-9 to be inoperable.</li> </ul>
	<ul style="list-style-type: none"> <li>Perform <u>BOTH</u> of the following:  1) Verify B56 aligned to operable EDG.  2) Place HS-1 on C-141 and HS-2 on C-141B in ALTERNATE using applicable section of this procedure.</li> </ul>	None	<ul style="list-style-type: none"> <li>QS-7905 de-energized (manual actions can be credited).</li> </ul>

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**TABLE 3**  
**CREVS ACTIONS**

Condition	Actions Required	TS/TRM	Comments
K4A INOPERABLE	Perform <u>ANY</u> of the following bulleted steps: <ul style="list-style-type: none"> <li>Verify B56 aligned to OPERABLE EDG.</li> </ul>	None	<ul style="list-style-type: none"> <li>Loss of offsite power will require action for breaker Y01-32 being opened.</li> <li><u>IF</u> HS-1 <u>OR</u> HS-2 in ALTERNATE with an inoperable EDG aligned to B56, <u>THEN</u> Rad Monitors 2RITS-8001A, and 2RITS-8001B are inoperable</li> </ul>
	<ul style="list-style-type: none"> <li>Unit 2 declare VSF-9 INOPERABLE <u>AND</u> without delay verify the following in NORMAL: <ul style="list-style-type: none"> <li>HS-1 on C141</li> <li>HS-2 on C141B</li> </ul> </li> </ul>	U2 TS 3.7.6.1	
	<ul style="list-style-type: none"> <li>Verify VSF-9 power supply aligned to Unit Two using appropriate section of this procedure.</li> </ul>	None	
K4B INOPERABLE	Perform <u>ANY</u> of the following bulleted steps: <ul style="list-style-type: none"> <li>Unit 2 declare VSF-9, 2RITS-8001A, and 2RITS-8001B INOPERABLE.</li> </ul>	U2 TS 3.7.6.1 U2 TS 3.3.3.1 (1)	<ul style="list-style-type: none"> <li>VSF-9 auto-start capability lost, CR1B relay will not function</li> <li>Unit 1 does not declare VSF-9 or the Radiation monitors inoperable because they can apply TS bases for 3.8.1.</li> </ul> <p>The following applies during LOOP:</p> <ul style="list-style-type: none"> <li>CV-7905 &amp; CV-7907 fail closed.</li> <li>Reserve bottle valve SV-7910 fails CV-7910 closed.</li> <li>QS-7905 de-energized (manual actions can be credited).</li> <li>Loss of Power to RI-8001. (2)</li> </ul>
	<ul style="list-style-type: none"> <li>Perform BOTH of the following: <ol style="list-style-type: none"> <li>Verify B56 aligned to operable EDG.</li> <li>Place HS-1 on C-141 and HS-2 on C141B in ALTERNATE using appropriate section of this procedure.</li> </ol> </li> </ul>	None	
	<ul style="list-style-type: none"> <li>Verify VSF-9 power supply aligned to Unit Two using appropriate section of this procedure.</li> </ul>	None	

(1) TS/TRM entry required only if the Control Room not on Emergency recirc.

(2) RI-8001 NOT required for CREVS operability.



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TABLE 3 CREVS ACTIONS			
Condition	Actions Required	TS/TRM	Comments
Any of the following: <ul style="list-style-type: none"> <li>2RS1-08 OPEN</li> <li>2RS1-13 OPEN</li> <li>2D-11 INOPERABLE</li> <li>2D-01 INOPERABLE <u>or</u> DE-ENERGIZED</li> </ul>	None	None	<ul style="list-style-type: none"> <li>Loss of offsite power will result in a full actuation.</li> <li>Inadvertent actuation of CREVS is not detrimental. Therefore, uninterruptible power is not required for CREVS components.</li> </ul>
Any of the following: <ul style="list-style-type: none"> <li>2RS1-12 OPEN</li> <li>2RS1 INOPERABLE <u>or</u> DE-ENERGIZED</li> </ul>	BOTH Units declare 2VSF-9 INOPERABLE	U1 TS 3.7.9 U2 TS 3.7.6.1	<ul style="list-style-type: none"> <li>Reserve Bottle valve 2SV-8607B-1 fails 2PCD-8607B closed.</li> </ul>
Any of the following: <ul style="list-style-type: none"> <li>2RS2-08 OPEN</li> <li>2RS2 INOPERABLE <u>or</u> DE-ENERGIZED</li> <li>2D-12 INOPERABLE</li> <li>2D-02 INOPERABLE <u>or</u> DE-ENERGIZED.</li> </ul>	None	None	<ul style="list-style-type: none"> <li>Loss of offsite power will result in a full actuation.</li> <li>Inadvertent actuation of CREVS is not detrimental. Therefore, uninterruptible power is not required for CREVS components.</li> </ul>

(1) TS/TRM entry required only if the Control Room not on Emergency recirc.

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TABLE 3 CREVS ACTIONS			
Condition	Actions Required	TS/TRM	Comments
2D23-07 open OR 2D-23 DE-ENERGIZED with 2D-01 ENERGIZED	Perform <u>ONE</u> of the following:  • Without delay place Control Room on Emergency Recirc.		• 2UCD-8683 and 2PCD-8685 fail closed, but there is not a full actuation.
	• <u>BOTH</u> Units declare 2RITS-8750-1A, 2RITS-8750-1B, 2CLS-8763-1 and 2CLS-8762-2 INOPERABLE	U1 TS 3.3.16 (1) U1 TRM 3.3.1 (1) U2 TS 3.3.3.1 (1) U2 TRM 3.3.7 (1)	
2D24-07 open OR 2D-24 DE-ENERGIZED with 2D-02 ENERGIZED	Perform <u>ONE</u> of the following:  • Without delay place Control Room on Emergency Recirc.		• 2UCD-8683 and 2PCD-8685 fail closed, but there is not a full actuation.
	• <u>BOTH</u> Units declare 2RITS-8750-1A, 2RITS-8750-1B, 2CLS-8763-1 and 2CLS-8762-2 INOPERABLE	U1 TS 3.3.16 (1) U1 TRM 3.3.1 (1) U2 TS 3.3.3.1 (1) U2 TRM 3.3.7 (1)	
	• <u>BOTH</u> Units declare 2RITS-8750-1A, 2RITS-8750-1B, 2CLS-8763-1 and 2CLS-8762-2 INOPERABLE	U1 TS 3.3.16 (1) U1 TRM 3.3.1 (1) U2 TS 3.3.3.1 (1) U2 TRM 3.3.7 (1)	
2S-29 (power transfer switch for 2C341 fire panel) NOT energized from 2Y3-18 OR 2Y4-04	None	None	• Smoke detectors will not function.
2Y2-09 OPEN OR 2Y-2 DE-ENERGIZED.	Perform <u>ONE</u> of the following:  • Without delay place Control Room on Emergency Recirc.		• Relays for Smoke detectors are de-energized (manual actions can be credited).
	• <u>BOTH</u> Units declare 2RITS-8750-1A, 2RITS-8750-1B, 2CLS-8763-1, and 2CLS-8762-2 INOPERABLE	U1 TS 3.3.16 (1) U1 TRM 3.3.1 (1) U2 TS 3.3.3.1 (1) U2 TRM 3.3.7 (1)	

(1) TS/TRM entry required only if the Control Room not on Emergency recirc.

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Refer to Table 4 for fail safe and non-fail safe components.

<b>TABLE 4 COMPONENT FAILURE DETERMINATION</b>		
<b>Power Supply</b>	<b>Fail Safe Equipment</b>	<b>Non-Fail Safe Equipment</b>
2B54-C3 (N) B-5666(A)	N/A	2VSF-9
2D23-07	2SV-8683-1 2SV-8685-1	N/A
2RS1-08	Relay 2RITSX-8750-1 Relay 2CLSX-8761/63-1 Monitor 2CLS-8761-1 Monitor 2CLS-8763-1	
2RS1-13	Monitor 2RITS-8750-1A(1) Monitor 2RITS-8750-1B(1)	
2Y2-09	Relay 2XSHX-8741A Relay 2XSHX-8741B Relay 2XSHX-8741C	
2Y4-04 (N) 2Y3-18 (A) (2S-29 Disconnect)		Smoke detector 2XSH-8741A Smoke detector 2XSH-8741B Smoke detector 2XSH-8740A Smoke detector 2XSH-8740B
Y01-32	SV-7811 (CV-7905) SV-7813 (CV-7907)	Relay CR1A
B5553 (N) 2B64-D1 (A)		VSF-9
2D24-07	2SV-8683-2 (2UCD-8683) 2SV-8685-2 (2PCD-8685)	N/A
2RS2-08	Relay RIAY-8001 Relay 2CLSX-8760/62-2 Monitor 2CLS-8760-2 Monitor 2CLS-8762-2	
2RS1-12	2SV-8607B-1 (2PCD-8607B fails closed which is fail safe for Control Room boundary, but NOT fail safe for 2VSF-9 operation.)	
RS4-08		Monitor RI-8001
B1531		Smoke detector QS-7907
Y02-32 (N) B5553 Control Power xfmr (A)	SV-7812 (CV-7905) SV-7814 (CV-7907) Monitor 2RITS-8001A(1) Monitor 2RITS-8001B(1)	Relay CR1B
Y02-39 (N) B5553 Control Power xfmr (A)		Relay RIAX-8001 Smoke detector QS-7905 Relay QSX-7905

(1) Radiation Monitors are fail safe because they are monitored by a relay that will cause an actuation on a loss of power.

(N) Denotes normal power to components.

(A) Denotes alternate power to components.

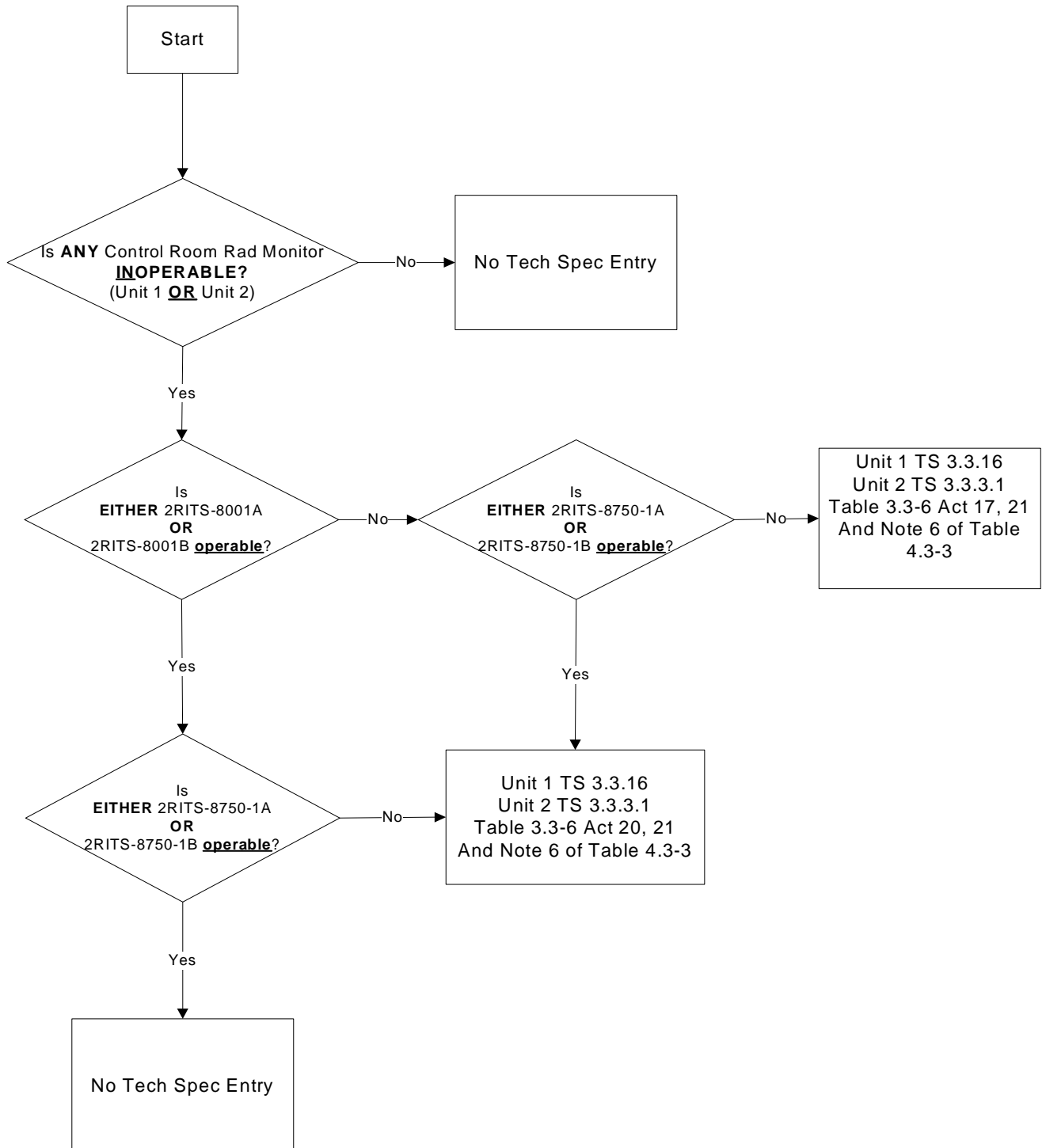
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ATTACHMENT B

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**NOTE**

- If Control Room NOT on Emergency Recirc, this Flow Chart is applicable.
- If Control Room aligned for Emergency Recirculation OR in the process of being placed on recirc, then TS entry is NOT required for the Control Room Rad Monitors.



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ATTACHMENT C

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CHLORINE DETECTOR MATRIX

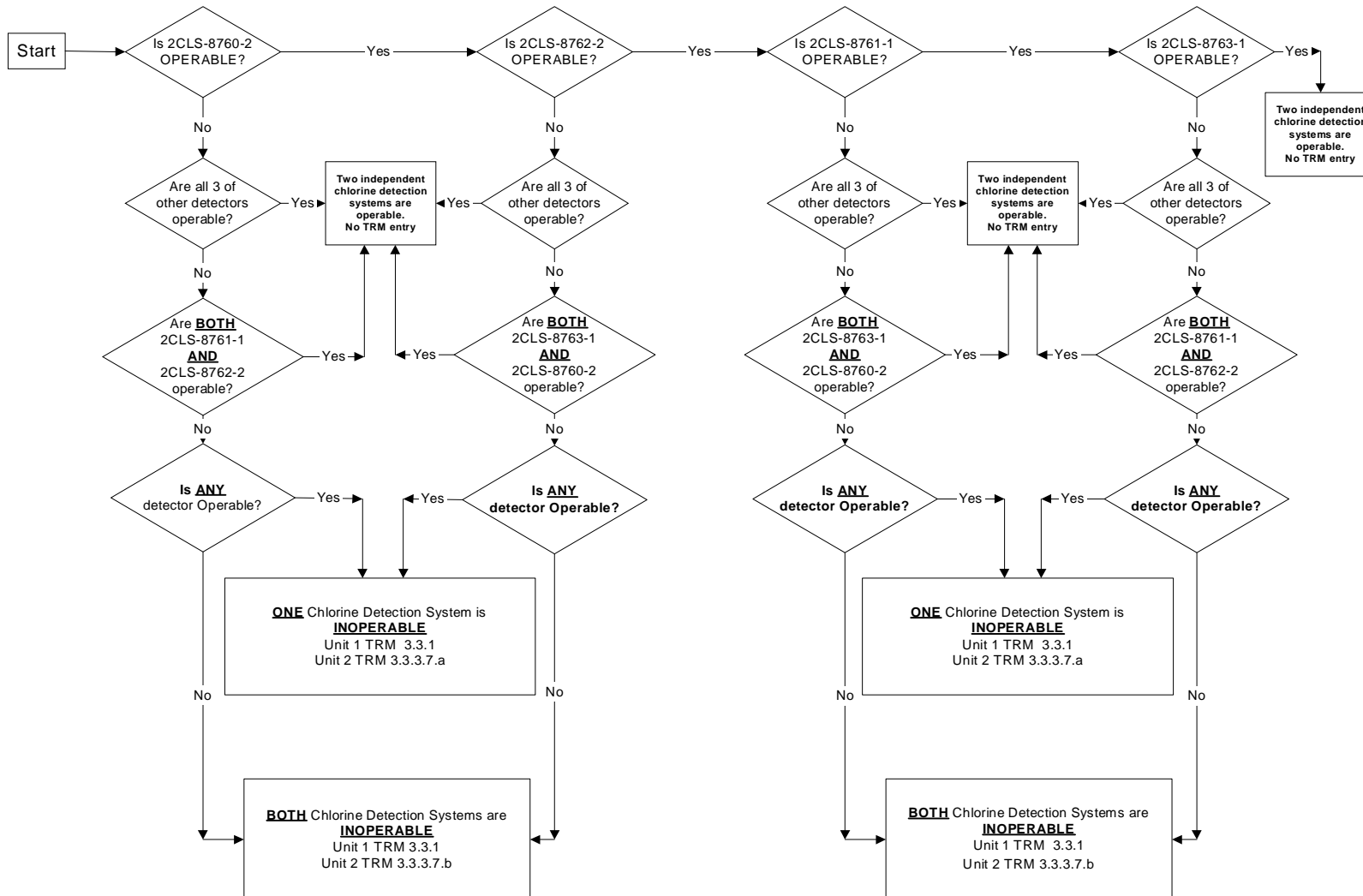
DETECTOR POWER SUPPLY UNIT DUCT	2CLS-8760-2 2RS-2 Bkr 8 UNIT 1	2CLS-8762-2 2RS-2 Bkr 8 UNIT 2	2CLS-8761-1 2RS-1 Bkr 8 UNIT 1	2CLS-8763-1 2RS-1 Bkr 8 UNIT 2
2CLS-8760-2 2RS-2 Bkr 8 UNIT		Same Power Different Unit (TRM entry Req.)	Different Power Same Unit (TRM entry Req.)	Fully Independent (No TRM entry)
2CLS-8762-2 2RS-2 Bkr 8 UNIT 2	Same Power (Different Unit TRM entry Req.)		Fully Independent (No TRM entry)	Different Power Same Unit (TRM entry Req.)
2CLS-8761-1 2RS-1 Bkr 8 UNIT 1	Different Power Same Unit (TRM entry Req.)	Fully Independent (No TRM entry)		Same Power Different Unit (TRM entry Req.)
2CLS-8763-1 2RS-1 Bkr 8 UNIT 2	Fully Independent (No TRM entry)	Different Power Same Unit (TRM entry Req.)	Same Power Different Unit (TRM entry Req.)	

- 1.0 With any ONE detector out of service, operability is maintained as required by TRMs.
- 2.0 Refer to the flow chart on the last page of this Attachment for TRM guidance relative to Chlorine Detector INOPERABILITY.
- 3.0 Fully Independent means detectors are powered from opposite ESF trains, sample different ducts, and can BOTH be out of service without a loss of operability. For example, 2CLS-8763-1 AND 2CLS-8760-2 can be out of service AND operability will be maintained.
- 4.0 If Same Unit and Same Power detectors are out of service simultaneously, operability can NOT be maintained. For example, 2CLS-8760-2 AND 2CLS-8762-2 can NOT be out of service and maintain operability per the TRM.
- 5.0 Chlorine Detectors are powered from Unit 2 Emergency power supplies. If these power supplies are removed from service, the detectors are bypassed using Unit 2 Chlorine Bypass switches on C141A and C141B in the Computer Room to prevent spurious alarms in Unit 1.
- 6.0 IF ANY Chlorine Detector inoperable  
AND Unit 1 or Unit 2 TRM does NOT requires Control Room isolation,  
THEN detector may be disabled by performing the following:
  - 6.1 Push AND hold reset button on INOPERABLE detector.
  - 6.2 Unplug sensor by pulling down on connector (located directly below push buttons on bottom of control module).
  - 6.3 Release reset button.
  - 6.4 Restore Control Room ventilation as desired.
  - 6.5 Initiate LCO Tracking Record.

ATTACHMENT C

**NOTE**

- If Control Room NOT on Emergency Recirc, this Flow Chart is applicable.
- If Control Room aligned for Emergency Recirculation OR in the process of being placed on Recirc, then TS entry is NOT required for Control Room Rad Monitors



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ATTACHMENT D

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CONTROL ROOM ISOLATION CHANNELS

<b>ACTUATION DEVICE</b>	<b>AUTO START</b>	<b>SOLENOID VALVES</b>	<b>DAMPER</b>	<b>POWER SUPPLY</b>
CR Isolation Ch A HS-7811 on C19	N/A			
Unit 1 Chlorine 2CLS-8761-1		SV-7811	CV-7905	
Unit 2 Chlorine 2CLS-8763-1				RED
Unit 2 Radiation 2RITS-8750-1A	2VSF-9	SV-7813	CV-7907	
Unit 2 Radiation 2RITS-8750-1B				
CR Isolation Ch B HS-7812 on C19				
Unit 1 Chlorine 2CLS-8760-2	VSF-9	SV-7812	CV-7905	
Unit 2 Chlorine 2CLS-8762-2				GREEN
Unit 1 Radiation RI-8001		SV-7814	CV-7907	
Unit 1 Radiation 2RITS-8001A				
Unit 1 Radiation 2RITS-8001B				
Unit 1 Smoke (QS-7905)	N/A			
Unit 2 CR Isolation 2HS-8683-1	N/A			
Unit 1 Chlorine 2CLS-8761-1				
Unit 2 Chlorine 2CLS-8763-1		2SV-8683-1	2UCD-8683	
Unit 2 Radiation 2RITS-8750-1A	2VSF-9			RED
Unit 2 Radiation 2RITS-8750-1B		2SV-8685-1	2PCD-8685	
Unit 2 Smoke 2XSH-8741	N/A			
Unit 2 CR Isolation 2HS-8685-2	N/A			
Unit 1 Chlorine 2CLS-8760-2				
Unit 2 Chlorine 2CLS-8762-2		2SV-8683-2	2UCD-8683	
Unit 1 Radiation RI-8001	VSF-9			GREEN
Unit 1 Radiation 2RITS-8001A		2SV-8685-2	2PCD-8685	
Unit 1 Radiation 2RITS-8001B				
Unit 2 Smoke 2XSH-8741	N/A			

- 1.0 First column lists the actuating devices that will result in Control Room isolation.
- 2.0 Second column shows which fan affected (N/A means device will isolate Control Room but will not start a fan).
- 3.0 Third column lists the actuated solenoid valves.
- 4.0 Fourth column lists isolation dampers closed by the individual isolation channel.
- 5.0 Fifth column lists the power supply to each channel.

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ATTACHMENT E

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ALIGNING UNIT 2 EMERGENCY CHILLER/COOLER TO UNIT 1

**NOTE**

Since Unit 1 Service Water Loop II only, supplies the Emergency Control Room chillers, Unit 1 may only normally maintain operability of a single chiller at a time.

- 1.0 IF desired to align 2VSF-9 to Unit 1,  
THEN use Attachment H of this procedure.
- 2.0 IF desired to align electrical power OR Service Water to ANY of the following components from Unit 1,
  - Control Room Emergency cooler (2VUC-27A or 2VUC-27B)
  - Emergency Control Room chiller (2VE-1A or 2VE-1B)

THEN verify entry into applicable Technical Specifications. (Reference Attachment B, Component/Tech Spec Cross-Reference).

**NOTE**

Sections 3.0 and 4.0 may be performed in any order and may not both be required to be performed.

- 3.0 IF desired to align electrical power from Unit 1,  
THEN perform the following:
  - 3.1 Notify Electrical Maintenance to make necessary connections using Unit 1 Alternate Power Source For 2VE-1A/B and 2VUC-27A/B (1403.178) to supply power from B64.  
  
Electrical \_\_\_\_\_
  - 3.2 Install Caution Tags on B64 AND B6521 to prevent inadvertent loss of power.
  - 3.3 Verify Electricians have measured proper heater current for 2VUC-27A/B by performing applicable portion of associated MPM OR applicable Maintenance procedure.  
  
Electrical \_\_\_\_\_
  - 3.4 Circle MPM OR list maintenance procedure performed.
    - MPM-8474 (2VUC-27A)
    - MPM-8475 (2VUC-27B)
    - Applicable Maintenance procedure used: \_\_\_\_\_



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**NOTE**

- Per Service Water System Flow Test (2311.002), minimum required 2VE-1A/B flow is 78 gpm.
- Unit 1 SW pump surveillances are Service Water and Auxiliary Cooling System (1104.029), Supplements 1A/1B/1C.

4.0 IF desired to align Service Water from Unit 1,  
THEN perform the following:

4.1 Verify Unit 1 SW flow sufficient to maintain operability considering additional heat load using ONE of the following:

- Verify last quarterly surveillance performed on SW pumps that provides flow showed pump performance within Acceptable Normal Range. (preferred)
- Verify last quarterly surveillance performed on SW pumps that provides flow showed pump performance within Limiting Range AND System Engineering concurrence of Service Water Loop operability obtained.

4.2 Verify Unit 1 Service Water flow to 2VE-1A or 2VE-1B measured during the last Unit 1 As Left SW Flow Test meets the flow requirements for operability.

**NOTE**

Per ER991782N201, additional butterfly valves 2SW-134A/135A/134B/135B added by ER are NOT required to be closed with corresponding valves 2SW-25A/26A/25B/26B when aligning Emergency Chiller SW to U1.

4.3 IF aligning Emergency chiller 2VE-1A from Unit 1 Service Water,  
THEN perform the following:

4.3.1 Verify 2VE-1A declared inoperable and appropriate Unit 1 and 2 Tech Specs entered.

4.3.2 Open Control Room Condensing Unit 2VE-1A breaker 2B52-D5 OR B64A-5A (if aligned to Unit 1).

4.3.3 Perform the following:

- Unlock and close 2VE-1A Supply (2SW-25A).
- Lock 2VE-1A Supply (2SW-25A).

Performed By: \_\_\_\_\_

- Unlock and close 2VE-1A Outlet (2SW-26A).
- Lock 2VE-1A Outlet (2SW-26A).

Performed By: \_\_\_\_\_

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4.3.4 Perform the following:

- Unlock and open Unit 1 Supply to 2VE-1A (2SW-69A).
- Lock Unit 1 Supply to 2VE-1A (2SW-69A).

Performed By: \_\_\_\_\_

- Unlock and open 2VE-1A Outlet to Unit 1 (2SW-71A).
- Lock 2VE-1A Outlet to Unit 1 (2SW-71A).

Performed By: \_\_\_\_\_

4.3.5 Independently verify the following:

- 2VE-1A Supply (2SW-25A) LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

- 2VE-1A Outlet (2SW-26A) LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

- Unit 1 Supply to 2VE-1A (2SW-69A) LOCKED OPEN.

IV Performed By: \_\_\_\_\_

- 2VE-1A Outlet to Unit 1 (2SW-71A) LOCKED OPEN.

IV Performed By: \_\_\_\_\_

4.3.6 Coordinate with Unit 1 to perform the following:

- Unlock and open 2VE-1A & 2VE-1B Supply (SW-632).
- Lock 2VE-1A & 2VE-1B Supply (SW-632).

Performed By: \_\_\_\_\_

- Unlock and open 2VE-1A & 2VE-1B Outlet (SW-84).
- Lock 2VE-1A & 2VE-1B Outlet (SW-84).

Performed By: \_\_\_\_\_

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4.3.7 Independently verify the following:

- 2VE-1A & 2VE-1B Supply (SW-632) LOCKED OPEN.

IV Performed By: \_\_\_\_\_

- 2VE-1A & 2VE-1B Outlet (SW-84) LOCKED OPEN.

IV Performed By: \_\_\_\_\_

4.3.8 Close Control Room Condensing Unit 2VE-1A breaker 2B52-D5 OR B64A-5A (if aligned to Unit 1).

4.4 IF aligning Emergency chiller 2VE-1B from Unit 1 Service Water, THEN perform the following:

4.4.1 Verify 2VE-1B declared inoperable and appropriate Unit 1 and 2 Tech Specs entered.

4.4.2 Open 2VUC-27B Condensing Unit 2VE-1B breaker 2B63-K6 OR B64B-6A (if aligned to Unit 1).

4.4.3 Perform the following:

- Unlock and close 2VE-1B Supply (2SW-25B).

– Lock 2VE-1B Supply (2SW-25B).

Performed By: \_\_\_\_\_

- Unlock and close 2VE-1B Outlet (2SW-26B).

– Lock 2VE-1B Outlet (2SW-26B).

Performed By: \_\_\_\_\_

4.4.4 Perform the following:

- Unlock and open Unit 1 Supply to 2VE-1B (2SW-69B).

– Lock Unit 1 Supply to 2VE-1B (2SW-69B).

Performed By: \_\_\_\_\_

- Unlock and open 2VE-1B Outlet to Unit 1 (2SW-71B).

– Lock 2VE-1B Outlet to Unit 1 (2SW-71B).

Performed By: \_\_\_\_\_

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4.4.5 Independently verify the following:

- 2SW-25B LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

- 2SW-26B LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

- 2SW-69B LOCKED OPEN.

IV Performed By: \_\_\_\_\_

- 2SW-71B LOCKED OPEN.

IV Performed By: \_\_\_\_\_

4.4.6 Coordinate with Unit 1 to perform the following:

- Unlock and open 2VE-1A & 2VE-1B Supply (SW-632).

– Lock 2VE-1A & 2VE-1B Supply (SW-632).

Performed By: \_\_\_\_\_

- Unlock and open 2VE-1A & 2VE-1B Outlet (SW-84).

– Lock 2VE-1A & 2VE-1B Outlet (SW-84).

Performed By: \_\_\_\_\_

4.4.7 Independently verify the following:

- SW-632 LOCKED OPEN.

IV Performed By: \_\_\_\_\_

- SW-84 LOCKED OPEN.

IV Performed By: \_\_\_\_\_

4.4.8 Close 2VUC-27B Condensing Unit 2VE-1B breaker 2B63-K6 OR B64B-6A (if aligned to Unit 1).

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5.0 Refer to Attachment B, Component/Tech Spec Cross-Reference, to determine TS impact while 2VUC-27A/B and/or 2VE-1A/B are aligned from Unit 1 electrical power and/or Service Water.

6.0 IF desired to demonstrate Operability for CREVS/CREACS,  
THEN perform Supplement 1 OR 2 of this procedure.

Performed by \_\_\_\_\_ Date \_\_\_\_\_

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

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RESTORING UNIT 2 EMERGENCY CHILLER/COOLER TO NORMAL LINEUP

1.0 IF desired to align power and/or Service Water from Unit 2 to ANY of the following,

- Control Room Emergency cooler (2VUC-27A or 2VUC-27B)
- Emergency Control Room chiller (2VE-1A or 2VE-1B)

THEN perform the following:

- 1.1 Notify Unit 1 of intent to swap power and/or Service Water to Unit 2.
- 1.2 Verify entry into applicable Tech Specs.  
(Refer to Attachment B, Component/Tech Spec Cross-Reference).

**NOTE**

Sections 2.0, 3.0 and 4.0 may be performed in any order and may not all be required to be performed.

2.0 IF aligning electrical power from Unit 2,  
THEN notify Electrical Maintenance to make necessary connections using Unit 1 Alternate Power Source for 2VE-1A and 2VUCM-27 A & B (1403.178) to supply power from Unit 2.

Electrical \_\_\_\_\_

3.0 IF desired to align 2VSF-9 to Unit 2,  
THEN use Attachment I of this procedure.

4.0 IF aligning Emergency chiller 2VE-1A to Unit 2 Service Water,  
THEN perform the following:

4.1 Verify 2VE-1A declared inoperable and appropriate Unit 1 and 2 Tech Specs entered.

4.2 Open Control Room Condensing Unit 2VE-1A breaker 2B52-D5 OR B64A-5A (if aligned to Unit 1).

4.3 Perform the following:

4.3.1 Unlock and close Unit 1 Supply to 2VE-1A (2SW-69A).

A. Lock Unit 1 Supply to 2VE-1A (2SW-69A).

B. Performed By: \_\_\_\_\_

4.3.2 Unlock and close VE-1A Outlet to Unit 1 (2SW-71A).

A. Lock VE-1A Outlet to Unit 1 (2SW-71A).

B. Performed By: \_\_\_\_\_

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4.4 Perform the following:

4.4.1 Unlock and open 2VE-1A Supply (2SW-25A).

A. Lock 2VE-1A Supply (2SW-25A).

B. Performed By: \_\_\_\_\_

4.4.2 Unlock and open 2VE-1A Outlet (2SW-26A).

A. Lock 2VE-1A Outlet (2SW-26A).

B. Performed By: \_\_\_\_\_

4.5 Coordinate with Unit 1 to perform the following:

- Unlock and close 2VE-1A & 2VE-1B Supply (SW-632).

– Lock 2VE-1A & 2VE-1B Supply (SW-632).

Performed By: \_\_\_\_\_

- Unlock and close 2VE-1A & 2VE-1B Outlet (SW-84).

– Lock 2VE-1A & 2VE-1B Outlet (SW-84).

Performed By: \_\_\_\_\_

4.6 Independently verify the following:

- 2VE-1A Supply (2SW-25A) LOCKED OPEN.

IV Performed By: \_\_\_\_\_

- 2VE-1A Outlet (2SW-26A) LOCKED OPEN.

IV Performed By: \_\_\_\_\_

- Unit 1 Supply to 2VE-1A (2SW-69A) LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

- VE-1A Outlet to Unit 1 (2SW-71A) LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

- 2VE-1A & 2VE-1B Supply (SW-632) LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

- 2VE-1A & 2VE-1B Outlet (SW-84) LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

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- 4.7 Verify Emergency Chiller Butterfly valves LOCKED OPEN:
  - 2VE-1A Supply (2SW-134A)
  - 2VE-1A Outlet (2SW-135A)
- 4.8 Close Control Room Condensing Unit 2VE-1A breaker 2B52-D5 OR B64A-5A (if aligned to Unit 1).
- 5.0 IF aligning Emergency chiller 2VE-1B to Unit 2 Service Water,  
THEN perform the following:
  - 5.1 Verify 2VE-1B declared inoperable and appropriate Unit 1 and 2 Tech Specs entered.
  - 5.2 Open 2VUC-27B Condensing Unit 2VE-1B breaker 2B63-K6 OR B64B-6A (if aligned to Unit 1).
  - 5.3 Perform the following:
    - 5.3.1 Unlock and close Unit 1 Supply to 2VE-1B (2SW-69B).
      - A. Lock Unit 1 Supply to 2VE-1B (2SW-69B).
      - B. Performed By: \_\_\_\_\_
    - 5.3.2 Unlock and close 2VE-1B Outlet to Unit 1 (2SW-71B).
      - A. Lock 2VE-1B Outlet to Unit 1 (2SW-71B).
      - B. Performed By: \_\_\_\_\_
  - 5.4 Perform the following:
    - 5.4.1 Unlock and open 2VE-1B Supply (2SW-25B).
      - A. Lock 2VE-1B Supply (2SW-25B).
      - B. Performed By: \_\_\_\_\_
    - 5.4.2 Unlock and open 2VE-1B Outlet (2SW-26B).
      - A. Lock 2VE-1B Outlet (2SW-26B).
      - B. Performed By: \_\_\_\_\_



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5.5 Coordinate with Unit 1 to perform the following:

- Unlock and close 2VE-1A & 2VE-1B Supply (SW-632).
  - Lock 2VE-1A & 2VE-1B Supply (SW-632).

Performed By: \_\_\_\_\_

- Unlock and close 2VE-1A & 2VE-1B Outlet (SW-84).
  - Lock 2VE-1A & 2VE-1B Outlet (SW-84).

Performed By: \_\_\_\_\_

5.6 Independently verify the following:

- 2VE-1B Supply (2SW-25B) LOCKED OPEN.

IV Performed By: \_\_\_\_\_

- 2VE-1B Outlet (2SW-26B) LOCKED OPEN.

IV Performed By: \_\_\_\_\_

- Unit 1 Supply to 2VE-1B (2SW-69B) LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

- 2VE-1B Outlet to Unit 1 (2SW-71B) LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

- 2VE-1A & 2VE-1B Supply (SW-632) LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

- 2VE-1A & 2VE-1B Outlet (SW-84) LOCKED CLOSED.

IV Performed By: \_\_\_\_\_

5.7 Verify Emergency Chiller Butterfly valves LOCKED OPEN:

- 2VE-1B Supply (2SW-134B)
- 2VE-1B Outlet (2SW-135B)

5.8 Close 2VUC-27B Condensing Unit 2VE-1B breaker 2B63-K6 OR B64B-6A (if aligned to Unit 1).

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- 6.0 IF any Caution Tags were installed per Attachment E of this procedure,  
THEN clear applicable Caution Tags.
- 7.0 IF power swapped to Unit 2,  
THEN verify Electricians have performed the applicable model work order (MWO)  
for 2VUC-27A/B. (Circle the MWO performed):
- MWO-50241609 (2VUC-27A)
  - MWO-50241610 (2VUC-27B)
- 8.0 IF power swapped to Unit 1,  
THEN coordinate with Unit 1 to perform B64 Breaker Alignment in accordance  
with ES Electrical System Operation (1107.002), Attachment C.
- 9.0 Perform applicable Supplement 1 or Supplement 2 of this procedure to prove  
operability.

Performed By \_\_\_\_\_ Date \_\_\_\_\_

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

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SHIFTING UNIT 1 EMERGENCY FAN/FILTER (VSF-9) POWER SUPPLY

Control Room is placed on Emergency Recirc to prevent automatic isolation when VSF-9 is de-energized. Unit 1 Annunciator K12-D1 will alarm due to de-energizing VSF-9 charcoal temperature elements.

**NOTE**

2nd person verification refers to either a peer check or independent verification of the activity is performed.

1.0 ALIGNING VSF-9 POWER SUPPLY TO UNIT 2

1.1 Verify the following for 2VSF-9:

- 2VSF-9 operable.
- 2VSF-9 normal power supply operable.
- 2VSF-9 emergency power supply operable.

1.2 Verify entry into applicable Tech Specs for VSF-9 inoperability during power shift.  
(Refer to Attachment B, Component/Tech Spec Cross-Reference).

1.3 Place Control Room on Emergency Recirc with 2VSF-9 running per Section 9.0 of this procedure.

1.4 Install temporary cover plate (top hat) for VSF-9 Outside Air damper (CV-7910) using Attachment K, VSF-9 Outside Air Damper Contingency Actions.

1.5 Place VSF-9 HS (HS-7806) on C19 in OFF to prevent auto start when power is restored.

1.6 Obtain Key (Key #173) for switches in Step 1.8 from Unit 1 S/M.

1.7 Lock open VSF-9 Normal Supply breaker (B5553).

**NOTE**

Expect CONTROL ROOM SUPPLY DUCT RADIATION HI (K10-D1)

1.8 Place the following key operated switches in ALTERNATE:

- (HS-7805) on B5553
- (HS-1) on C141
- (HS-2) on C141B

1.9 Unlock AND close VSF-9 Alternate Supply breaker (2B64-D1).

1.10 Place 2RITS-8001A keyswitch (Key #172) in OFF AND back to ON to reset monitor.

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- 1.11 Place 2RITS-8001B keyswitch (Key #172) in OFF AND back to ON to reset monitor.
  - 1.12 Perform the following to reset Unit 1 Control Room Isolation Actuation System:
    - 1.12.1 Depress Unit 1 Radiation Reset (PB 1) on C141.
    - 1.12.2 Depress System Trip Reset (PB 2) on C141A.
    - 1.12.3 Depress System Trip Reset (PB 2) on C141B.
  - 1.13 Place VSF-9 HS (HS-7806) on C19 in AUTO.
  - 1.14 Remove temporary cover plate (top hat) for VSF-9 Outside Air damper (CV-7910) using Attachment K, VSF-9 Outside Air Damper Contingency Actions.
  - 1.15 Place Control Room in normal ventilation mode using Restoration from Automatic or Manual Isolation Section of this procedure as desired.
  - 1.16 Start VSF-9 by placing (HS-7806) on C19 in MAN to verify operability.
  - 1.17 Secure VSF-9 by placing (HS-7806) on C19 in OFF.
    - 1.17.1 Place (HS-7806) on C19 in AUTO.
    - 1.17.2 2<sup>nd</sup> person verification: \_\_\_\_\_
  - 1.18 Exit Tech Specs as applicable.
  - 1.19 Install Caution Tags on B5553, (HS-1) on C141 AND (HS-2) on C141B to maintain switches in ALTERNATE while VSF-9 is powered from Unit 2.
  - 1.20 Install Caution Tag on 2B64-D1 stating that opening this breaker while VSF-9 is powered from Unit 2 will result in de-energizing 2RITS-8001A and 2RITS-8001B.
- 2.0 RESTORING VSF-9 POWER SUPPLY TO UNIT 1
- 2.1 Verify 2VSF-9 OPERABLE AND associated NORMAL and EMERGENCY power supply OPERABLE.
  - 2.2 Verify entry into applicable Tech Specs for VSF-9 INOPERABILITY during power shift.  
(Refer to Attachment B, Component/Tech Spec Cross-Reference).
  - 2.3 Place Control Room on Emergency Recirc with 2VSF-9 running per Section 9.0 of this procedure.
  - 2.4 Install temporary cover plate (top hat) for VSF-9 Outside Air damper (CV-7910) using Attachment K, VSF-9 Outside Air Damper Contingency Actions.

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- 2.5 Place VSF-9 HS (HS-7806) on C19 in OFF to prevent auto start when power is restored.
- 2.6 LOCK OPEN VSF-9 Alternate Supply breaker (2B64-D1).
- 2.7 Place the following key operated switches in NORMAL AND remove keys:
  - (HS-1) on C141
  - (HS-2) on C141B
  - (HS-7805) on B5553
- 2.8 Unlock AND close VSF-9 Normal Supply breaker (B5553).
- 2.9 Place 2RITS-8001A keyswitch in OFF AND back to ON to reset monitor.
- 2.10 Place 2RITS-8001B keyswitch in OFF AND back to ON to reset monitor.
- 2.11 Depress (PB-1) on C141 to reset Unit 1 Radiation Actuation.
- 2.12 Remove temporary cover plate (top hat) for VSF-9 Outside Air damper (CV-7910) using Attachment K, VSF-9 Outside Air Damper Contingency Actions.

**NOTE**

This attachment de-energizes Radmonitors 2RITS-8001A/B which results in an actuation.

- 2.13 Restore from Automatic Isolation per Section 10.0 of this procedure.
- 2.14 Start VSF-9 by placing (HS-7806) on C19 in MAN to prove operability.
- 2.15 Secure VSF-9 by placing (HS-7806) on C19 in OFF.
  - 2.15.1 Place (HS-7806) on C19 in AUTO.
  - 2.15.2 2<sup>nd</sup> person verification: \_\_\_\_\_
- 2.16 Exit Tech Specs as applicable.
- 2.17 Remove Caution Tags from B5553, C141, C141B and 2B64-D1.
- 2.18 Return keys to Unit 1 S/M.

Performed By \_\_\_\_\_ Date \_\_\_\_\_

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

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ALIGNING 2VSF-9 TO UNIT 1

This attachment provides guidance for swapping 2VSF-9 power supplies to Unit 1. Depending on what order components are Danger tagged, the possibility exists to have the outside air intake damper open without 2VSF-9 running. During the swap, the Blank-off plate provides Control Room envelope isolation regardless of 2VSF-9 Outside Air Intake damper position. The verification of damper position on restoration serves as verification that components are connected correctly, prior to removing the Blank-off plate. When 2VSF-9 is powered from Unit 1, auto start by actuation of 2CLS-8761-01, 2CLS-8763-1, 2RITS-8750-1A AND 2RITS-8750-1B is disabled. ER003021E201 is the reference Engineering document for Blank-off plate installation and removal.

**CAUTION**

Do NOT de-energize 2VSF-9 dampers before blank-off plate is installed.

- 1.0 WHEN desired to power 2VSF-9 from Unit 1,  
THEN perform the following:
  - 1.1 Verify the following for VSF-9:
    - VSF-9 operable.
    - VSF-9 normal power supply operable.
    - VSF-9 emergency power supply operable.
  - 1.2 Verify entry into appropriate Tech Specs.  
Refer to Attachment B, Component/Tech Spec Cross-Reference  
and Attachment C, Chlorine Detector Matrix.
- 2.0 Coordinate with Unit 1 AND declare 2VSF-9 inoperable.
- 3.0 Coordinate with Maintenance to install Blank-off plate at  
2VSF-9 Outside Air Intake damper (2PCD-8607B).
- 4.0 Independently verify Blank-off plate installed at 2PCD-8607B.  
  
IV Performed By \_\_\_\_\_
- 5.0 Request Electrical Maintenance perform 2VSF-9 Repowering Procedure (2403.074).  
  
Electrical \_\_\_\_\_
- 6.0 WHEN Electrical Maintenance requests completion of this attachment,  
THEN check the following 2VSF-9 dampers closed:
  - 2VSF-9 Outside Air damper (2PCD-8607B) (2C33-1)
  - 2VSF-9 Suction damper (2PCD-8607A)
  - 2VSF-9 Discharge damper (2UCD-8609)

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7.0 Independently verify the following closed:

- 2VSF-9 Outside Air damper (2PCD-8607B) (2C33-1)

IV Performed by \_\_\_\_\_

- 2VSF-9 Suction damper (2PCD-8607A)

IV Performed by \_\_\_\_\_

- 2VSF-9 Discharge damper (2UCD-8609)

IV Performed by \_\_\_\_\_

8.0 Coordinate with Maintenance to remove Blank-off plate from 2VSF-9 Outside Air damper (2PCD-8607B).

9.0 Obtain Independent Verification that Blank-off plate removed from 2PCD-8607B.

IV Performed by \_\_\_\_\_

10.0 Start 2VSF-9 by placing (HS-7852) on C19 in START to verify operability.

11.0 Secure 2VSF-9 by placing (HS-7852) on C19 in STOP.

12.0 Refer to Attachment B, Component/Tech Spec Cross-Reference AND Attachment C, Chlorine Detector Matrix, to determine continued Tech Spec impact while 2VSF-9 is aligned from Unit 1 electrical power.

Performed By \_\_\_\_\_ Date \_\_\_\_\_

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

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ALIGNING 2VSF-9 TO UNIT 2

This attachment provides guidance for swapping 2VSF-9 power supplies to Unit 2. Depending on what order components are Danger tagged, the possibility exists to have the outside air intake damper open without 2VSF-9 running. During the swap, the Blank-off plate provides Control Room envelope isolation regardless of 2VSF-9 Outside Air Intake damper position. The verification of damper position on restoration serves as verification that components are connected correctly, prior to removing the Blank-off plate. ER003021E201 is the reference Engineering document for Blank-off plate installation and removal.

**CAUTION**

Do NOT de-energize 2VSF-9 dampers before blank-off plate is installed.

**NOTE**

2nd person verification refers to either a peer check or independent verification of the activity is performed.

- 1.0 WHEN desired to power 2VSF-9 from Unit 2,  
THEN perform the following:
    - Verify VSF-9 operable AND associated NORMAL and EMERGENCY power source operable.
    - Notify Unit 1 to declare 2VSF-9 inoperable.
    - Verify entry into appropriate Tech Specs.
    - Refer to Attachment B, Component/Tech Spec Cross-Reference.
  - 2.0 Coordinate with Maintenance to install Blank-off plate at 2VSF-9 Outside Air Intake damper (2PCD-8607B).
  - 3.0 Obtain Independent Verification that Blank-off plate installed at 2PCD-8607B.
- IV Performed By \_\_\_\_\_
- 4.0 Request Electrical Maintenance perform 2VSF-9 Repowering Procedure (2403.074).  
Electrical \_\_\_\_\_
  - 5.0 WHEN Electrical Maintenance requests completion of this attachment,  
THEN check the following 2VSF-9 dampers CLOSED:
    - 2VSF-9 Outside Air damper (2PCD-8607B) (2C33-1)
    - 2VSF-9 Suction damper (2PCD-8607A)
    - 2VSF-9 Discharge damper (2UCD-8609)



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6.0 Obtain Independent Verification of the following dampers CLOSED:

- 2VSF-9 Outside Air damper (2PCD-8607B) (2C33-1)

IV Performed By: \_\_\_\_\_

- 2VSF-9 Suction damper (2PCD-8607A)

IV Performed By: \_\_\_\_\_

- 2VSF-9 Discharge damper (2UCD-8609)

IV Performed By: \_\_\_\_\_

7.0 Coordinate with Maintenance to remove Blank-off plate from 2VSF-9 Outside Air damper (2PCD-8607B).

8.0 Obtain Independent Verification that Blank-off plate removed from 2PCD-8607B.

IV Performed By \_\_\_\_\_

9.0 Start 2VSF-9 by placing (2HS-8603-1) on 2C33 in START AND releasing to verify operability.

10.0 Secure 2VSF-9 by placing (2HS-8603-1) on 2C33 in STOP.

10.1 Place (2HS-8603-1) on 2C33 in AUTO.

10.2 2<sup>nd</sup> person verification: \_\_\_\_\_

11.0 Exit Tech Specs as applicable.

Performed By \_\_\_\_\_ Date \_\_\_\_\_

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

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ATTACHMENT J

TEMPORARY MODIFICATION OF 2VUC-25A/25B THERMOSTATS

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This attachment provides for temporary adjustment of Old CPC Room Cooler (2VUC-25A/B) thermostats to provide greater cooling to Room 2150 (Old CPC Room).

Room 2150 is normally cooled by 2VUC-28 and condensing unit (2VE-2) located on roof. Also located in Room 2150 are 2VUC-25A/25B which are safety related units in the Control Room Emergency Air Conditioning System. 2VUC-25A/25B were originally sized to provide emergency cooling for Room 2150 post accident and their thermostats are set at 95°F. Cabinets 2C15-1 through 4 have high temperature alarms set at 85°F. Due to low heat load from the cabinets, the heat rise in the cabinets is generally 3-5°F above ambient. Therefore, when 2VUC-28 is out of service, 2VUC-25A/B will not maintain Room 2150 temperature so that the cabinet temperature will remain below the alarm set point. Therefore, this Temporary Modification allows adjustment of the 2VUC-25A/B control thermostats (2TC-8535-1 and 2TC-8536-2) to as low as 80°F. This Temporary Modification has been reviewed by ER-ANO-2003-0385-000.

**NOTE**

- Lowering the setpoint to 80°F will add approximately 10,920 BTU/hr cooling load to the Control Room Emergency Air Conditioning System which will reduce the design margin to 5000 BTU/hr under the worst case conditions of high ECP temperature and ambient conditions. Operation during expected conditions will provide much more margin.
- However, as a conservative measure, in the event of a Design Basis Accident requiring operation of the Control Room Emergency Ventilation System, 2TC-8535-1 and 2TC-8536-2 should be returned to 95°F.
- This Temporary Modification may be installed and/or removed in any mode of operation for Unit 1 and Unit 2.

1.0 Initial Conditions

- 1.1 Obtain approval to implement this Temporary Modification from both units.

Unit 1 CRS/SM \_\_\_\_\_

Unit 2 CRS/SM \_\_\_\_\_

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2.0 Installation

2.1 Perform the following:

2.1.1 Set 2VUC-25A Thermostat located in Old CPC Room (2TC-8535-1) to 80°F.

2.1.2 Install T-Mod Tag on 2TC-8535-1 (T-Mod number to be "2104.007 Att. J").

**NOTE**

To access temperature dial for 2TC-8536-2, the mounting screw on bottom bracket of 2TC-8536-2 must be removed to allow controller to be lifted off its base. Temperature dial can then be accessed by rotating face outward (away from wall).

2.1.3 Set 2VUC-25B Thermostat located in Old CPC Room (2TC-8536-2) to 80°F.

2.1.4 Install T-Mod Tag on 2TC-8536-2 (T-Mod number to be "2104.007 Att. J").

2.2 Independently verify the following:

- 2VUC-25A Thermostat (2TC-8535-1) set to 80°F  
IV Performed By: \_\_\_\_\_
- T-Mod Tag installed on 2TC-8535-1  
IV Performed By: \_\_\_\_\_
- 2VUC-25B Thermostat (2TC-8536-2) set to 80°F  
IV Performed By: \_\_\_\_\_
- T-Mod Tag installed on 2TC-8536-2  
IV Performed By: \_\_\_\_\_

2.3 IF T-Mod will be installed greater than one shift,  
THEN perform the following:

- Unit 1 Operations enter this procedure attachment in Temporary Modification Log (T-Mod number to be "2104.007 Att. J").
- Unit 2 Operations enter this procedure attachment in Temporary Modification Log (T-Mod number to be "2104.007 Att. J").

2.4 Independently Verify Modification has been properly installed per this attachment.

Engineer or Operator \_\_\_\_\_ Date \_\_\_\_\_

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- 2.5 Unit 1 Operations record installation of T-Mod in Station Log.
- 2.6 Unit 2 Operations record installation of T-Mod in Station Log.
- 2.7 Verify copy of the completed installation portion of this attachment placed in Unit 2 Control Room T-Mod file.

### 3.0 Removal

#### 3.1 Initial Conditions

- 3.1.1 Verify additional cooling no longer required for Room 2150.
- 3.1.2 Obtain authorization to return 2VUC-25A/25B thermostats to 95°F.

Unit 1 CRS/SM \_\_\_\_\_

Unit 2 CRS/SM \_\_\_\_\_

#### 3.2 Removal Instructions

##### 3.2.1 Perform the following:

- A. Set 2VUC-25A Thermostat located in Old CPC Room (2TC-8535-1) to 95°F.
- B. Remove T-Mod Tag on 2TC-8535-1.
- C. Set 2VUC-25B Thermostat located in Old CPC Room (2TC-8536-2) to 95°F.
- D. Remove T-Mod Tag on 2TC-8536-2.

##### 3.2.2 Independently Verify the following:

- 2VUC-25A Thermostat (2TC-8535-1) set to 95°F.

IV Performed By: \_\_\_\_\_

- T-Mod Tag removed on 2TC-8535-1.

IV Performed By: \_\_\_\_\_

- 2VUC-25B Thermostat (2TC-8536-2) set to 95°F.

IV Performed By: \_\_\_\_\_

- T-Mod Tag removed on 2TC-8536-2.

IV Performed By: \_\_\_\_\_

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3.2.3 Independent verify Temporary Modification has been removed per this attachment.

\_\_\_\_\_ Date \_\_\_\_\_  
Engineer or Operator

3.2.4 IF T-Mod was installed greater than one shift,  
THEN perform the following:

- Unit 1 Operations record T-Mod removal date in Temporary Modification Log.
- Unit 2 Operations record T-Mod removal date in Temporary Modification Log.
- Remove the copy of this attachment from Unit 2 T-Mod file.

3.2.5 Unit 1 Operations record removal of T-Mod in Station Log.

3.2.6 Unit 2 Operations record removal of T-Mod in Station Log.

3.2.7 Forward copy of this Attachment to System Engineering Manager.

Performed By \_\_\_\_\_ Date \_\_\_\_\_

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

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ATTACHMENT K

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TEMPORARY MODIFICATION FOR VSF-9 OUTSIDE AIR DAMPER CONTINGENCY ACTIONS

The following section implements the requirements of a temporary modification per ER-ANO-2003-0235-002, CV-7910 Damper Isolation Requirements. Mode restrictions are addressed via Unit 1 and Unit 2 Tech Specs. Both units are required to enter a 24-hr Control Room boundary Tech Spec when VRA-1A bottle pressure is < 600 psig until the VSF-9 Outside Air damper (CV-7910) is closed. VSF-9 is inoperable when the temporary cover plate upstream of CV-7910 is installed. This section may also be used if maintenance is required such that CV-7910 can NOT be maintained closed by normal means or when swapping VSF-9 power supply per Attachment G.

CV-7910 Temporary Cover Plate consists of a "top hat" and a rubber gasket which is attached to the VSF-9 duct inlet flange. Bolts for attaching the Temporary Cover Plate to VSF-9 duct inlet flange may be longer than 1" if desired. Additional 3/8" washers may be used as desired for ease of installation.

1.0 INITIAL CONDITIONS

- 1.1 IF VRA-1A pressure < 600 psig,  
THEN perform the following:

- 1.1.1 Verify entry into Unit 1 TS 3.7.9 Condition B  
AND Unit 2 TS 3.7.6.1.d.
- 1.1.2 Verify Unit 1 enter TS 3.7.9.A  
AND Unit 2 enter TS 3.7.6.1 for VSF-9 inoperable.

- 1.2 IF maintenance being performed that requires CV-7910 to be manually isolated (including swapping VSF-9 power supply per Attachment G),  
THEN perform the following:

- 1.2.1 Verify U1 and U2 SMs informed.
- 1.2.2 Verify Unit 1 enters TS 3.7.9.A.
- 1.2.3 Verify Unit 2 enters TS 3.7.6.1 for VSF-9 inoperable.

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## 2.0 INSTALLATION

- 2.1 Installation of Temporary Modification to isolate VSF-9 Outside Air Damper (CV-7910) authorized by:

Unit 1 SM/CRS \_\_\_\_\_ Date \_\_\_\_\_

Unit 2 SM/CRS \_\_\_\_\_ Date \_\_\_\_\_

### NOTE

- The following step is performed as a conservative measure to ensure VSF-9 is not operated with the makeup damper isolated (it is not expected that VSF-9 would be damaged by operation without makeup air supply).
- VSF-9 may be operated momentarily with the makeup damper isolated to perform post maintenance testing or as desired by CRS/SM.

- 2.2 IF "Top Hat" installed  
AND NOT desired to danger tag VSF-9,  
THEN secure VSF-9 by placing (HS-7806) on C19 in OFF.

### NOTE

The top hat is provided with sixteen 3/8" bolt holes for installation. Interference by limit switches may prevent installation of two bolts. This is acceptable per ER-ANO-2003-0235-002.

- 2.3 Perform the following to install Temp Mod for CV-7910 Top Hat:

2.3.1 Attach plate and gasket to VSF-9 Duct Inlet Flange using at least fourteen 3/8" x 1" UNC bolts, nuts and lock washers.

2.3.2 Tighten bolts.

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2.3.3 Independently Verify Top Hat AND gasket installed.

IV Performed By: \_\_\_\_\_

2.3.4 Hang T-Mod Tag at CV-7910 (T-Mod number "2104.007 Att. K").

2.4 IF T-Mod will be installed greater than one shift,  
THEN perform the following:

- Unit 1 and Unit 2 Operations enter this procedure attachment in Temporary Modification Log (T-Mod number "2104.007 Att. K").
- Verify copy of the completed installation portion of this attachment placed in Control Room T-Mod file.

2.5 Independently Verify CV-7910 Top Hat installed per ER-ANO-2003-0235-002.

Engineer or Operator: \_\_\_\_\_ Date: \_\_\_\_\_

2.6 Record installation of T-Mod in the Station Log.

2.7 IF entered Unit 1 TS 3.7.9 Condition B and Unit 2 TS 3.7.6.1.d,  
THEN exit applicable TSs.

2.8 Verify Condition Report initiated as applicable (e.g. low VRA-1A bottle pressure or other unexpected equipment failure).

2.9 Verify copy of ER-ANO-2003-0235-002 placed in Control Room T-Mod file.

### 3.0 REMOVAL

3.1 WHEN VRA-1A re-pressurized > 600 psig,  
OR maintenance complete (including swapping VSF-9 power supply per Attachment G),  
THEN coordinate with Maintenance as needed to perform this section.

3.2 Obtain authorization for removal of CV-7910 Top Hat:

Unit 1 SM/CRS \_\_\_\_\_ Date \_\_\_\_\_

Unit 2 SM/CRS \_\_\_\_\_ Date \_\_\_\_\_

3.3 Verify that Control Room Habitability Barrier controls are established per ANO Fire Impairment Program (1000.120).



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- 3.4 IF VSF-9 Outside Air Damper operability impacted by maintenance,  
THEN verify the applicable TS/TRM conditions of Note 22.0 of Attachment B of this procedure are entered.
- 3.5 Verify VSF-9 handswitch HS-7806 on C19 in OFF.
- 3.6 Remove T-Mod tag from CV-7910.
- 3.7 Remove CV-7910 Top Hat.
- 3.8 IF desired to store Top Hat,  
THEN attach Plate upside down to lower flange using five bolts tightened.
- 3.9 Independently verify CV-7910 Top Hat removed per ER-ANO-2003-0235-002 and system restored:
- \_\_\_\_\_ Date \_\_\_\_\_  
Engineer or Operator
- 3.10 IF tags installed on VSF-9 as per step 2.2 of this attachment,  
THEN clear tags installed on VSF-9.
- 3.11 Verify VSF-9 handswitch HS-7806 aligned as follows:
- IF 2VSF-9 secured,  
THEN HS-7806 in AUTO.
  - IF 2VSF-9 in service with Control Room on Emergency Recirculation,  
THEN HS-7806 in OFF.
- 3.12 IF maintenance impacted VSF-9 Outside Air Damper (CV-7910) operability,  
THEN test VSF-9 Outside Air Damper (CV-7910) as follows:
- 3.12.1 IF CV-7910 (HS-7910) in NORMAL,  
THEN place HS-7910 in RESERVE.
- A. Check CV-7910 indicates closed.
  - B. Place HS-7910 in NORMAL.
  - C. Check CV-7910 indicates closed or intermediate.
- 3.12.2 IF CV-7910 (HS-7910) in RESERVE,  
THEN place HS-7910 in NORMAL.
- A. Check CV-7910 indicates closed or intermediate.
  - B. Place HS-7910 in RESERVE.
  - C. Check CV-7910 indicates closed.

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- 3.13 Align VSF-9 outside damper CV-7910 as follows:
  - IF VSF-9 in AUTO,  
THEN VSF-9 outside damper CV-7910 (HS-7910) in NORMAL.
  - IF VSF-9 in OFF,  
THEN VSF-9 outside damper CV-7910 (HS-7910) in RESERVE.
- 3.14 Start VSF-9 by placing HS-7806 in MANUAL.
  - 3.14.1 Check VSF-9 outside damper CV-7910 indicates OPEN.
- 3.15 Stop VSF-9 by placing HS-7806 in AUTO.
  - 3.15.1 Check VSF-9 outside damper CV-7910 indicates closed or intermediate.
- 3.16 Exit TS/TRM actions as appropriate.
- 3.17 Verify that any applicable Control Room Habitability Barrier controls have been released.
- 3.18 IF T-Mod was installed greater than one shift,  
THEN perform the following:
  - Record T-Mod removal date on Temporary Modification Log Index Sheet.
  - Remove the copy of this attachment and ER from the T-Mod file.
- 3.19 Record removal of T-Mod in the Station Log.
- 3.20 Forward copy of this Attachment to System Engineering Manager.

Performed By \_\_\_\_\_ Date \_\_\_\_\_

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

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TEMPORARY MODIFICATION FOR 2VSF-9 OUTSIDE AIR DAMPER CONTINGENCY ACTIONS

The following section implements the requirements of ER 003021E201, Temporary Modification for Installation and Removal of Blank-Off Plate on 2VSF-9 Outside Air damper. Mode restrictions are addressed via Unit 1 and Unit 2 Tech Spec. Both units are required to enter a 24-hr Control Room boundary Tech Spec when 2VRA-1B bottle pressure is < 600 psig until the 2VSF-9 Outside Air damper (2PCD-8607B) is closed. 2VSF-9 is inoperable when Outside Air damper (2PCD-8607B) is latched closed. This section may also be used if maintenance is required such that 2PCD-8607B can NOT be maintained closed by normal means.

1.0 INITIAL CONDITIONS

- 1.1 IF 2VRA-1B pressure < 600 psig,  
THEN perform the following:
  - 1.1.1 Verify entry into Unit 1 TS 3.7.9 Condition B  
AND Unit 2 TS 3.7.6.1.d.
  - 1.1.2 Verify Unit 1 enters TS 3.7.9.A  
AND Unit 2 enters TS 3.7.6.1 for 2VSF-9 inoperable.
- 1.2 IF maintenance being performed that requires 2PCD-8607B to be manually isolated,  
THEN perform the following:
  - 1.2.1 Verify Unit 1 and Unit 2 SMs informed.
  - 1.2.2 Verify Unit 1 enter TS 3.7.9.A  
AND Unit 2 enter TS 3.7.6.1 for 2VSF-9 inoperable.

2.0 INSTALLATION

- 2.1 Installation of Temporary Modification for 2VSF-9 Outside Air Damper (2PCD-8607B) authorized by:

Unit 1 SM/CRS \_\_\_\_\_ Date \_\_\_\_\_

Unit 2 SM/CRS \_\_\_\_\_ Date \_\_\_\_\_

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**NOTE**

- The following step is performed as a conservative measure to ensure 2VSF-9 is not operated with the makeup damper isolated (it is not expected that 2VSF-9 would be damaged by operation without makeup air supply).
- 2VSF-9 may be operated momentarily with the makeup damper isolated to perform post maintenance testing or per CRS/SM.

2.2 Perform ONE of the following:

- Verify 2VSF-9 danger tagged on the applicable power supply:
  - 2B54-C3
  - B-5666
- Secure 2VSF-9 by placing (2HS-8603-1) on 2C33 in STOP.

2.3 Close 2VSF-9 Outside Air damper (2PCD-8607B) by installing a blank-off plate.

2.4 Independently Verify blank-off plate installed.

IV Performed by: \_\_\_\_\_

2.5 Hang T-Mod Tag at 2PCD-8607B (T-Mod number "2104.007 Att. L").

2.6 IF T-Mod will be installed greater than one shift,  
THEN perform the following:

- Unit 1 and Unit 2 Operations enter this procedure attachment in the Temporary Modification Log (T-Mod number "2104.007 Att. L").
- Verify copy of the completed installation portion of this attachment placed in the Control Room T-Mod file.
- Verify copy of ER 003021E201 placed in the Control Room T-Mod file.

2.7 Independently verify 2PCD-8607B blank-off plate installed per ER 003021E201:

\_\_\_\_\_ Date \_\_\_\_\_  
Engineer or Operator

2.8 Record installation of T-Mod in the Station Log.

2.9 IF entered Unit 1 TS 3.7.9 Condition B and Unit 2 TS 3.7.6.1.d,  
THEN exit applicable TSs.

2.10 Verify Condition Report initiated as applicable (e.g. low 2VRA-1B bottle pressure or other equipment failure).

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3.0 REMOVAL

- 3.1 WHEN 2VRA-1B repressurized > 600,  
OR maintenance complete  
THEN coordinate with Maintenance as needed to perform this section.
- 3.2 Obtain authorization for removal of blank-off plate from 2PCD-8607B:  
  
Unit 1 SM/CRS \_\_\_\_\_ Date \_\_\_\_\_  
Unit 2 SM/CRS \_\_\_\_\_ Date \_\_\_\_\_
- 3.3 IF control room envelope integrity impacted,  
THEN verify that Control Room Habitability Barrier controls  
are established per ANO Fire Impairment Program (1000.120).
- 3.4 IF 2VSF-9 Outside Air Damper operability impacted by  
maintenance,  
THEN verify the TS/TRM conditions of Note 22.0 of  
Attachment B of this procedure are entered.
- 3.5 Remove T-Mod tag from 2PCD-8607B.
- 3.6 Remove blank-off plate from 2PCD-8607B.
- 3.7 Independently verify blank-off plate removed from 2PCD-8607B per  
ER 003021E201 and system restored:  
  
\_\_\_\_\_ Date \_\_\_\_\_  
Engineer or Operator
- 3.8 IF maintenance impacted 2VSF-9 Outside Air Damper  
(2PCD-8607B) operability,  
THEN test 2VSF-9 Outside Air Damper (2PCD-8607B) as  
follows:
- 3.8.1 Verify TS/TRM conditions of Attachment B of this  
procedure entered as appropriate for running 2VSF-9  
AND performing stroke of makeup damper 2PCD-8607B.
- 3.8.2 IF 2VSF-9 secured,  
THEN start 2VSF-9 by placing 2HS-8603-1 (2C-33) in START  
(Spring Return to Auto).
- 3.8.3 IF 2PCD-8607B (2HS-8607-B1) in NORMAL,  
THEN place 2HS-8607-B1 in RESERVE.
- A. Check 2PCD-8607B indicates closed.
- B. Place 2HS-8607-B1 in NORMAL.
- C. Check 2PCD-8607B indicates open.

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- 3.8.4      IF 2PCD-8607B (2HS-8607-B1) in RESERVE,  
            THEN place 2HS-8607-B1 in NORMAL.
- A.      Check 2PCD-8607B indicates open.
- B.      Place 2HS-8607-B1 in RESERVE.
- C.      Check 2PCD-8607B indicates closed.
- 3.8.5      IF 2VSF-9 started in step 3.8.2,  
            THEN STOP 2VSF-9 by placing 2HS-8603-1 (2C-33) in STOP.
- 3.9      Verify 2VSF-9 returned to service:
- 3.9.1      IF VSF-9 in service with Control Room on emergency  
            recirculation,  
            THEN verify the following:
- 2VSF-9 outside damper (2PCD-8607B) closed with HS  
            (2HS-8607-B1) in RESERVE.
  - 2VSF-9 fan HS (2HS-8603-1) on 2C33 in STOP.
- 3.9.2      IF Control Room NOT on emergency recirculation,  
            THEN verify the following:
- 2VSF-9 outside damper (2PCD-8607B) closed with HS  
            (2HS-8607-B1) in NORMAL.
  - 2VSF-9 fan HS (2HS-8603-1) on 2C33 in AUTO.
- 3.10      Exit action(s) as appropriate.
- 3.11      IF applicable,  
            THEN verify that any Control Room Habitability Barrier  
            controls have been released.
- 3.12      IF T-Mod was installed greater than one shift,  
            THEN perform the following:
- Record T-Mod removal date on Temporary Modification Log Index  
            Sheet.
  - Remove the copy of this attachment and ER from T-Mod file.
- 3.13      Forward copy of T-Mod installation and removal instructions  
            to Manager, System Engineering.

Performed By \_\_\_\_\_ Date \_\_\_\_\_

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

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ATTACHMENT M

OPERATION WITH BOTH CREVS/CREACS TRAINS INOPERABLE

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This attachment was developed to provide mitigating actions in the unexpected or unplanned event both CREVS and/or both CREACS trains are inoperable in Modes 1, 2, 3 or 4. This attachment is not intended to be used to support voluntary inoperability of both trains of CREVS and/or CREACS. This attachment may also be used in any operational mode (or defueled). This guidance also considers whether normal (non-vital) ventilation is functional.

1.0 Initial Conditions:

- EITHER or BOTH of the following:
  - BOTH CREVS trains inoperable
  - BOTH CREACS trains inoperable

2.0 IF both CREVS trains inoperable,  
THEN perform the following to minimize potential for radiological, toxic gas, or smoke impact on Control Room personnel:

- Verify the following activities ceased:
  - Any Hot Work which could affect the Control Room atmosphere.
  - Maintenance, Chemistry, or Operations activities that involve toxic chemicals.
  - Transportation of toxic materials within the Owner Controlled Area.
  - Movement of radioactive materials (fuel handling, radioactive filter replacement/transportation, radioactive resin transfers, etc.). Cessation of fuel handling activities shall not prevent placing the fuel in a safe condition.
- IF any Control Room Envelope (ventilation) boundary inoperable,  
THEN perform "Actions for Inoperable Control Room Ventilation Boundary" section of this procedure.
- Verify the following:
  - Available Auxiliary Building Ventilation System exhaust fans on both units and at least one Fuel Handling Area Ventilation System exhaust fan (on either unit) in operation.
  - At least one Penetration Room Ventilation System exhaust fan is available on each unit.
  - At least five Turbine Building exhaust fans in operation on each unit, if available.

3.0 IF normal Control Room ventilation is available on BOTH Unit 1 and Unit 2,  
THEN perform the following:

- Verify normal Control Room ventilation system(s) in service.
- Protect available normal Control Room ventilation components and power supplies IAW Protected Equipment Postings (EN-OP-119).

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- 4.0 IF normal Control Room ventilation is available on only ONE unit,  
THEN perform the following:
- 4.1 Verify available normal Control Room ventilation system in service.
  - 4.2 Protect available normal Control Room ventilation components and power supplies IAW Protected Equipment Postings (EN-OP-119).
  - \* 4.3 Monitor Control Room temperature to ensure temperature can be maintained less than 84 °F.
  - 4.4 Open door separating Control Rooms.
  - 4.5 IF desired to open additional doors to provide sufficient air flow for personnel comfort and equipment cooling,  
THEN perform the following:
    - 4.5.1 Verify "Barrier Breach Checklist" section of Barrier Breach Checklist (COPD-003) performed for applicable door(s).
    - 4.5.2 IF any door opened that would cause the Control Room Envelope (ventilation) boundary to be inoperable,  
THEN verify Section 16, "Actions for Inoperable Control Room Ventilation Boundary", of this procedure completed for applicable door(s).
    - 4.5.3 Open required door(s).
  - 4.6 Open cabinet/panel doors as necessary to support ventilation and cooling of electrical components.

**NOTE**

Temporary fans/cooling in the following step is only for physical cooling of control room equipment and personnel comfort.

- 4.7 IF desired to install temporary fans/cooling,  
THEN perform the following:
  - 4.7.1 Establish temporary fans as necessary in the Control Room having no normal or emergency ventilation as necessary to provide additional air flow for personnel comfort and equipment cooling.
  - 4.7.2 Refer to Temporary Modifications (EN-DC-136).
- 4.8 De-energize unnecessary lighting as necessary to support maintenance of Control Room temperature.



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5.0 IF normal Control Room ventilation NOT available on EITHER unit,  
THEN perform the following:

5.1 Open door separating Control Rooms.

5.2 IF desired to open additional doors to Control Rooms as necessary to provide sufficient air flow for personnel comfort and equipment cooling,  
THEN perform the following:

5.2.1 Verify "Barrier Breach Checklist" section of Barrier Breach Checklist (COPD-003) performed for applicable door(s).

5.2.2 IF any door opened that would cause the Control Room Envelope (ventilation boundary) to be inoperable,  
THEN verify Section 16, "Actions for Inoperable Control Room Ventilation Boundary" of this procedure completed for applicable door(s).

5.2.3 Open required door(s).

5.3 Open cabinet/panel doors as necessary to support ventilation and cooling of electrical components.

**NOTE**

Temporary fans/cooling in the following steps is only for physical cooling of control room equipment and personnel comfort.

5.4 IF desired to install temporary fans/cooling,  
THEN perform the following:

5.4.1 Establish temporary fans in the Control Rooms as necessary to provide additional air flow for personnel comfort and equipment cooling.

5.4.2 Establish temporary cooling units in the Control Rooms as necessary to provide additional air flow for personnel comfort and equipment cooling.

5.4.3 Refer to Temporary Modifications (EN-DC-136).

**NOTE**

Alternate Shutdown (2203.014) may be considered as a guideline in the event that a loss of control functions due to excessive heating requires Control Room evacuation.

5.5 Perform Control Room staff briefing of applicable procedures in the event loss of control functions due to excessive heating requires Control Room evacuation.

5.6 Consider use of ice vests in support of area habitability.

5.7 De-energize unnecessary lighting as necessary to support maintenance of Control Room temperature.

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2104.007

EXHIBIT 1

Revised 05/05/05

UNIT 1 DOOR 64 AND UNIT 2 DOOR 450 CLOSURE INSTRUCTIONS

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IF Control Room is isolated for any reason (manual OR automatic),  
OR seismic event occurs,  
THEN maintain both Unit 1 Door 64 and Unit 2 Door 450 closed.

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2VE-1A/2VUC-27A/2VSF-9 MONTHLY

{4.3.1}

This test demonstrates the operability of Control Room Emergency Ventilation System per Unit 1 SR 3.7.9.1 and SR 3.7.10.1, AND Unit 2 Tech Specs 4.7.6.1.1.a and 4.7.6.1.2.a. When aligned to Unit 1 electric power, this Supplement does NOT prove operability per Unit 2 Tech Specs since 2VSF-9 auto-start capability is lost and 2VE-1A/2VUC-27A cannot be started from Control Room.

**NOTE**

2nd person verification refers to either a peer checker being present or independent verification of the activity is performed.

1.0 INITIAL CONDITIONS (May be performed in any order)

1.1 Verify Control Room Emergency cooler (2VUC-27A) secured by performing ONE of the following:

- IF powered from Unit 2,  
THEN verify green light ON above (2HS-8665-1) on 2C33.
- IF powered from Unit 1,  
THEN verify HS at B64A4A in OFF.

1.2 Circle the source of Service Water AND electrical power aligned to Emergency Control Room chiller (2VE-1A).

Unit 1

Unit 2

1.3 IF Biocide Addition System available,  
THEN verify in service.

**NOTE**

- 2VE-1A remains Operable with oil as much as 1/2 inch below the sight glass when in operation. Oil should not be added unless oil level is below the bottom of the sight glass after 1 hour of operation. (EC13661)
- After being idle for 3 hours, oil level should be between 1/4 full and top of the sight glass.
- Operability determinations with respect to high oil level should not be made until the chiller has been running at least 1 hour.

1.4 Check 2VE-1A compressor 2C-59 oil level.

1.5 Document known, quantifiable 2VE-1A oil leaks in Section 3.0 comments of this supplement.

\* 1.6 IF new oil leak identified or known oil leak rate rises,  
THEN submit a WR/CR and document in Section 3.0 comments.

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- 1.7 Verify switches on control panel 2C187 aligned as follows:
  - Local Control switch in AUTO.
  - Control Valve Test switch (2HS-1509) in NORMAL.
- 1.8 Verify the following for Local SW Valve controller (2PIC-1509-1):
  - Set at ~ 150 psig
  - In AUTO
- 1.9 Check the following 2VSF-9 dampers closed:
  - 2VSF-9 Outside Air damper (2PCD-8607B) on 2C33
  - 2VSF-9 Suction damper (2PCD-8607A)
  - 2VSF-9 Discharge damper (2UCD-8609)
- 1.10 Perform the following to verify power available to 2VUC-27A heaters:
  - Applicable supply breaker closed (2B54-D2 OR B64A-2A).
  - Electric Heater Manual Cutout switch on (up).
- 1.11 Inspect 2VUC-27A for the following:
  - Clean, undamaged filters
  - Suction clear of obstructions
  - Debris that might interfere with fan operation removed
- 1.12 Obtain a currently calibrated Thermistor Digital Thermometer (TDT) (ANO-C-2001-0589):  
M&TE number \_\_\_\_\_
- 1.13 Verify Control Room Cool Thermostat (2TC-8665A-1) set at 65°F.
- 1.14 Verify heating thermostat (2TC-8665-1) set at 60°F.
- 1.15 Secure Unit 1 Control Room cooler (VUC-9) in back of Unit 1 Control Room by placing (HS-7829) on VUC-9 in OFF.
- 1.16 Check water visible in VUC-9 drain loop seal (SG-3800).
- 1.17 Record any comments in Section 3.0 of this supplement.
- 1.18 IF needed to record data,  
THEN verify electricians available.

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1.19 Verify the following doors closed:

- Unit 1 Restroom (Door 65)
- Unit 1 S/M office (Door 64)
- Unit 2 S/M office (Door 450)
- Unit 2 Control Room Foyer (Door 342)

1.20 Record initial Control Room temperatures:

- Unit 1 Control Room near VUC-9: \_\_\_\_\_ °F
- Unit 1 Control Room near ATC Area: \_\_\_\_\_ °F
- Unit 2 Control Room near 2VUC-27A/B: \_\_\_\_\_ °F
- Unit 2 Control Room near 2C69B: \_\_\_\_\_ °F

- \* 1.21 IF Control Room Chlorine,  
OR Radiation actuation occurs during performance of this supplement,  
THEN GO TO section 7.0 of this procedure.

2.0 TEST METHOD

2.1 IF 2VUC-27A powered from Unit 1,  
THEN start 2VUC-27A by placing HS on B64A-4A to ON.

2.2 IF 2VUC-27A powered from Unit 2,  
THEN start 2VUC-27A by placing (2HS-8665-1) (2C33) to ON and releasing.

2.3 Verify 2VUC-27B secured by performing ONE of the following:

- IF powered from Unit 2,  
THEN green light ON above (2HS-8666-2) on 2C33.
- IF powered from Unit 1,  
THEN verify HS on B64B-5A in OFF.

2.4 Check Emergency Control Room chiller (2VE-1A) starts.

2.5 Record number of times 2VE-1A starts and stops (cycles) before running continuously: \_\_\_\_\_ cycles. (May continue on with remaining procedure steps while this step is being performed).

**NOTE**

Performing step 2.6 places both units in a 1 hour time clock. TIMELY completion of steps 2.6 to 2.18 is required.

2.6 IF 2VSF-9 CREVS train is INOPERABLE  
AND this test is being performed for PMT to restore operability,  
THEN refer to Note 22 of Attachment B to enter TS/TRM conditions that apply for operation of an INOPERABLE CREVS fan with the control room in Emergency Recirculation Mode.

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**NOTE**

Adequate flow is verified after Control Room isolation because adequate flow may be inaccurate when Control Room is isolated.

- 2.7 IF 2VSF-9 powered from Unit 2,  
THEN place 2VSF-9 in service by placing (2HS-8603-1) (2C33) in START and releasing.
- 2.8 IF 2VSF-9 powered from Unit 1,  
THEN place 2VSF-9 in service by placing (HS-7852) (C19) in START.
- 2.9 Record 2VSF-9 start time: \_\_\_\_\_.
- 2.10 Place Unit 2 Control Room Supply damper 2UCD-8683 (2HS-8683-1) in CLOSE. (2C33)
- 2.11 Place Unit 2 Control Room Return damper 2PCD-8685 (2HS-8685-2) in CLOSE. (2C33)
- 2.12 Independently verify the following in CLOSE:
- 2HS-8683-1 (2C33) IV Performed By: \_\_\_\_\_
  - 2HS-8685-2 (2C33) IV Performed By: \_\_\_\_\_
- 2.13 Check the following dampers closed:
- 2UCD-8683, Unit 2 Control Room Supply damper  
(Green light ON above 2HS-8683-1 on 2C33)
  - 2PCD-8685, Unit 2 Control Room Return damper  
(Green light ON above 2HS-8685-2 on 2C33)

**NOTE**

Placing HS-7811 in MANUAL will actuate the following alarms:

- K12-E1 K16 Critical Trouble
- K16-B2 Actuation Control Room Isolation
- K16-B3 Trouble Control Room Isolation

- 2.14 Close Unit 1 Control Room Isolation dampers by placing Control Room Isolation Channel A HS (HS-7811) in MAN. (C19)
- 2<sup>nd</sup> person verification: \_\_\_\_\_

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2.15 Check 2VSF-9 Air flow by ONE of the following:

- Red light ON above (2FS-8603-1) on 2C33  
OR Red flow light ON above (HS-7852) on C19.
- Air flow from duct in Unit 1 Control Room.

2<sup>nd</sup> person verification: \_\_\_\_\_

2.16 Record current time as 2VE-1A start time \_\_\_\_\_

**NOTE**

Steps 2.17 through 2.21 may be performed in any order.

2.17 Perform the following for 2VSF-9 AND record any comments in Section 3.0 of this supplement:

- Check 2VSF-9 dampers open:
  - Suction Damper (2PCD-8607A)
  - Discharge Damper (2UCD-8609)
  - Outside Air Intake (2PCD-8607B)
- Inspect for unusual or excessive noise or vibration.
- Inspect for water, oil or other foreign material.
- Check physical integrity of 2VSF-9.

2.18 IF 2VSF-9 CREVS Train has been INOPERABLE AND this test is for PMT of the train, THEN with Shift Manager concurrence, declare 2VSF-9 OPERABLE and exit the TS/TRM time clocks associated with INOPERABLE CREVS fan in service. (Reference: Note 22.0 of Attachment B.)

U1 SM concurrence\_\_\_\_\_

U2 SM concurrence\_\_\_\_\_

2.19 Perform the following for 2VUC-27A AND record any comments in Section 3.0 of this supplement:

- Inspect for unusual or excessive noise or vibration.
- Inspect for water, oil or other foreign material.
- Check physical integrity of 2VUC-27A.
- Check 2VUC-27A drain loop seal (2SG-8600A) indicates > 1.0" H<sub>2</sub>O above bottom of sight glass. (CR-ANO-C-2001-0175)

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2.20 Perform the following for 2VE-1A AND record any comments in Section 3.0 of this supplement:

- Inspect for unusual or excessive noise or vibration.
- Inspect for water, oil or other foreign material.
- Check physical integrity of 2VE-1A.

2.21 Record the following 2VSF-9 filter ΔPs:

- 2VFP-35 \_\_\_\_\_ "H<sub>2</sub>O (2PDI-8765A)
- 2VFA-10 \_\_\_\_\_ "H<sub>2</sub>O (2PDI-8765B)
- 2VFC-8 \_\_\_\_\_ "H<sub>2</sub>O (2PDI-8765C)

2.22 IF Control Room temperature exceeds 84°F  
OR when 2VE-1A and 2VSF-9 have operated for ≥ 60 minutes,  
THEN perform the following:

2.22.1 Record test STOP TIME: \_\_\_\_\_

- A. For 2VSF-9, subtract start time in step 2.9 from stop time to determine 2VSF-9 run time:

\_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_  
stop time      start time      run time

- B. Enter 2VSF-9 run time in Table 1.

- C. For 2VE-1A, subtract start time in step 2.16 from stop time to determine run time:

\_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_  
stop time      start time      run time

- D. Enter 2VE-1A run time in Table 1.



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**NOTE**

Steps 2.22.2 through 2.22.6 may be performed in any order.

2.22.2 Record final Unit 1 Control Room temperatures:

Near VUC-9: \_\_\_\_\_ °F

Near ATC Area: \_\_\_\_\_ °F

A. Average the above temperatures

B. Record as Unit 1 average temperature in Table 1.

2.22.3 Record final Unit 2 Control Room temperatures:

Near 2VUC-27A/B: \_\_\_\_\_ °F

Near 2C-69B: \_\_\_\_\_ °F

A. Average the above temperatures

B. Record as Unit 2 average temperature in Table 1.

2.22.4 Record the following for 2VE-1A:

- Discharge Pressure (2PI-6903) \_\_\_\_\_ psig
- Suction Pressure (2PI-6905) \_\_\_\_\_ psig
- Oil Pressure (2PI-6904) \_\_\_\_\_ psig
- SW Pump Discharge Temperature: \_\_\_\_\_ °F  
(T1430, T1436, T1650 or ECP Ave Temp)

**NOTE**

- 2VE-1A remains Operable with oil as much as 1/2 inch below the sight glass. Oil should not be added unless oil level is below the bottom of the sight glass after 1 hour of operation. (EC13661)
- After being idle for 3 hours, oil level should be between 1/2 full and top of the sight glass.
- Operability determinations with respect to high oil level should not be made until the chiller has been running at least 1 hour.

2.22.5 Check 2VE-1A compressor 2C-59 oil level.

2.22.6 Check Service Water Control valve (2CV-1509-1) controlling 2VE-1A discharge pressure ≤ 235 psig.

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- 2.23 IF Electricians taking data for 2VUC-27A,  
THEN verify Electricians complete.
- 2.24 IF desired to maintain the Control Room isolated with 2VUC-27A in service,  
THEN mark Steps 2.25 through 2.34 as N/A.
- 2.25 Place Unit 2 Control Room Supply damper 2UCD-8683 (2HS-8683-1) on 2C33 in AUTO.
- 2.26 Place Unit 2 Control Room Return damper 2PCD-8685 (2HS-8685-2) on 2C33 in AUTO.
- 2.27 Independently verify the following HS in AUTO:
- 2HS-8683-1 (2C33) IV Performed by: \_\_\_\_\_
  - 2HS-8685-2 (2C33) IV Performed by: \_\_\_\_\_
- 2.28 Check the following dampers positions on 2C33:
- 2UCD-8683 OPEN (Green light OFF above 2HS-8683-1)
  - 2PCD-8685 OPEN (Green light OFF above 2HS-8685-2)
- 2.29 Return Unit 1 Control Room ventilation to normal by performing the following:
- 2.29.1 Place Control Room Isolation Channel A HS (HS-7811) on C19 in AUTO.
- 2.29.2 Depress System Trip Reset Button (PB-2) on Panel C141A (Unit 1 Computer Room).
- 2.29.3 Verify ONE Unit 1 Control Room Supply fans running as desired:
- VSF-8A (FS-7820 Red Light on C19 lit)
  - VSF-8B (FS-7821 Red light on C19 lit)
- 2<sup>nd</sup> person verification: \_\_\_\_\_

**CAUTION**

Chlorine and radiation monitors are inoperable with both Control Room isolated and CREVS secured. Therefore actions need to be taken to un-isolate Control Room prior to securing CREVS. (CR-ANO-C-2001-0207-004)

- 2.30 IF 2VSF-9 powered from Unit 2,  
THEN perform the following:
- 2.30.1 Place (2HS-8603-1) on 2C33 in STOP.

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2.30.2 Place 2VSF-9 (2HS-8603-1) in AUTO.

2<sup>nd</sup> person verification: \_\_\_\_\_

2.31 IF 2VSF-9 powered from Unit 1,  
THEN place (HS-7852) on C19 in STOP.

2.32 IF 2VUC-27A powered from Unit 2,  
THEN stop 2VUC-27A by placing (2HS-8665-1) on 2C33 to OFF and releasing.

2.33 IF 2VUC-27A powered from Unit 1,  
THEN stop 2VUC-27A by placing HS on breaker B64A-4A in OFF.

2.34 Verify normal Control Room air conditioning restarts/remains in service:

- VCH-2A OR VCH-2B
- 2VCH-2A OR 2VCH-2B

2.35 IF Steps 2.25 through 2.34 marked as N/A,  
THEN perform the following:

2.35.1 IF necessary to stop CR Extension HVAC for Control Room pressurization,  
THEN depress CREF HVAC Shutdown switch for 2VUC-42A and 2VUC-42B (2PB-8000) located adjacent to Door 341 (U2 SM Office).

2.35.2 IF there is NO seismic event,  
THEN maintain one door open between Control Rooms to equalize pressure.

2.35.3 Close VSF-9 Outside Air damper (CV-7910) by placing (HS-7910) on C19 in RESERVE.

2.35.4 Verify VSF-9 secured by placing (HS-7806) on C19 in OFF.

2.35.5 Monitor Unit 1 Control Room chillers (VCH-2A/2B) and Unit 2 Control Room chillers (2VCH-2A/2B) per Manual Control Room Isolation and Emergency Recirc section of this procedure.

2.36 IF desired to start Unit 1 Control Room cooler (VUC-9),  
THEN place HS-7829 to ON.

2.37 Set cooling thermostat (2TC-8665A-1) to desired setpoint (62-82°F).

2.38 Verify heating thermostat (2TC-8665-1) set at minimum of 60°F.

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**NOTE**

When aligned to Unit 1 electric power, this Supplement does not prove operability per Unit 2 Tech Specs since 2VSF-9 auto-start capability is lost AND 2VE-1A/2VUC-27A cannot be started from Control Room.

3.0 TEST ACCEPTANCE CRITERIA

3.1 Record values observed during operation below.

Table 1		
Test Quantity	Measured Value	Limiting Value For Operability
Unit 1 Average Temp	°F	≤ 84°F
Unit 2 Average Temp	°F	≤ 84°F
2VSF-9 Run Time	minutes	≥ 60 minutes
2VE-1A Run Time	minutes	≥ 60 minutes

- 3.2 Did 2VE-1A operate for ≥ 1 hour AND maintain Control Room temperatures ≤ 84°F? YES NO
- 3.3 Did 2VSF-9 operate for ≥ 1 hour? YES NO
- 3.4 IF powered from Unit 2, YES N/A NO  
THEN did 2VE-1A start from Control Room?
- 3.5 Is power available to 2VUC-27A heaters per Step 1.10? YES NO
- 3.6 Did 2VUC-27A drain loop seal (2SG-8600A) indicate > 1.0" H<sub>2</sub>O above bottom of sight glass? YES NO

**NOTE**

Per ER-ANO-2000-2956-009, minimum design level for VUC-9 drain loop seal (SG-3800) is 2 inches above the centerline of the lower loop seal horizontal leg. The bottom of SG-3800 is at 2 inches above the centerline of the lower loop seal leg. (CR-ANO-C-2008-00964)

- 3.7 Water visible in VUC-9 drain loop seal (SG-3800)? YES N/A NO
- 3.8 IF NO circled in 3.2, 3.3, 3.4, or 3.5,  
THEN perform the following:
- Declare affected components INOPERABLE.
  - Notify Unit 1 Shift Manager.
  - Notify Unit 2 Shift Manager.
  - Refer to Attachment B, Component/Tech Spec Cross-Reference.
  - Initiate WR/WO as applicable.

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3.9 IF NO circled in 3.6 OR 3.7,  
THEN initiate Condition Report.

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

Performed By: \_\_\_\_\_ Date \_\_\_\_\_

4.0 SUPERVISOR REVIEW AND ANALYSIS

4.1 Do all measured values recorded in the Acceptance Criteria fall within specified LIMITING RANGE/VALUE for OPERABILITY? YES NO

4.2 IF NO answered to 4.1,  
THEN perform the following corrective actions:

- Verify LCO Tracking Record initiated.
- Verify Condition Report initiated.

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

4.4 Are all administrative requirements of this test satisfied? YES NO  
Supervisor: \_\_\_\_\_ Date \_\_\_\_\_

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2VE-1B/2VUC-27B/VSF-9 MONTHLY

{4.3.1}

This test demonstrates operability of Control Room Emergency Ventilation System per Unit 1 SR 3.7.9.1 and SR 3.7.10.1 AND Unit 2 Tech Specs 4.7.6.1.1.a and 4.7.6.1.2.a. When aligned to a Unit 1 electric power source, this supplement does not prove operability per Unit 2 Tech Specs since 2VE-1B/2VUC-27B cannot be started from Control Room.

**NOTE**

2nd person verification refers to either a peer checker being present or independent verification of the activity is performed.

1.0 INITIAL CONDITIONS (May be performed in any order)

1.1 Verify Control Room Emergency cooler (2VUC-27B) secured by performing ONE of the following:

- IF powered from Unit 2,  
THEN verify green light on above 2HS-8666-2 on 2C33.
- IF powered from Unit 1,  
THEN verify HS at B64B5A in OFF.

1.2 Circle the source of Service Water AND electrical power aligned to Emergency Control Room chiller (2VE-1B).

Unit 1

Unit 2

1.3 IF Biocide Addition System available,  
THEN verify in service.

**NOTE**

- 2VE-1B remains Operable with oil as much as 1/2 inch below the sight glass when in operation. Oil should not be added unless oil level is below the bottom of the sight glass after 1 hour of operation. (EC13661)
- After being idle for 3 hours, oil level should be between 1/4 full and top of the sight glass.
- Operability determinations with respect to high oil level should not be made until the chiller has been running at least 1 hour.

1.4 Check 2VE-1B compressor 2C-58 oil level.

1.5 Document known, quantifiable 2VE-1B oil leaks in Section 3.0 comments of this supplement.

- \* 1.6 IF new oil leak identified or known oil leak rate rises,  
THEN submit a WR/CR and document in Section 3.0 comments.

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- 1.7 Verify switches on control panel 2C188 aligned as follows:
  - Local Control switch in AUTO.
  - Control Valve Test switch (2HS-1506) in NORMAL.
- 1.8 Verify the following for Local SW Valve controller (2PIC-1506-2):
  - Set at ~ 150 psig
  - In AUTO
- 1.9 Perform the following to verify power available to 2VUC-27B heaters:
  - Verify applicable supply breaker closed (2B61-J5 OR B64B-3A).
  - Verify Electric Heater Manual Cutout switch on (up).
- 1.10 Inspect 2VUC-27B for the following:
  - Clean, undamaged filters
  - Suction clear of obstructions
  - Debris that might interfere with fan operation removed
- 1.11 Obtain a currently calibrated Thermistor Digital Thermometer (TDT) (ANO-C-2001-0589):  
M&TE number \_\_\_\_\_
- 1.12 Verify Control Room Cool Thermostat (2TC-8666A-2) set at 65°F.
- 1.13 Verify heating thermostat (2TC-8666-2) set at 60°F .
- 1.14 Secure Unit 1 Control Room cooler (VUC-9) in back of Unit 1 Control Room by placing (HS-7829) on VUC-9 in OFF.
- 1.15 IF needed to record data,  
THEN verify electricians available.
- 1.16 Verify the following doors closed:
  - Unit 1 Restroom (Door 65)
  - Unit 1 S/M office (Door 64)
  - Unit 2 S/M office (Door 450)
  - Unit 2 Control Room Foyer (Door 342)

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1.17 Record initial Control Room temperatures:

- Unit 1 Control Room near VUC-9: \_\_\_\_\_°F
- Unit 1 Control Room near ATC Area: \_\_\_\_\_°F
- Unit 2 Control Room near 2VUC-27A/B: \_\_\_\_\_°F
- Unit 2 Control Room near 2C69B: \_\_\_\_\_°F

\* 1.18 IF Control Room Chlorine,  
OR Radiation actuation occurs during performance of this supplement,  
THEN GO TO section [7.0](#) of this procedure.



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2.0 TEST METHOD

- 2.1 IF 2VUC-27B is powered from Unit 2,  
THEN start 2VUC-27B by placing (2HS-8666-2) on 2C33 to ON and releasing.
- 2.2 IF 2VUC-27B is powered from Unit 1,  
THEN start 2VUC-27B by placing HS on B64B-5A to ON.
- 2.3 Verify 2VUC-27A secured by performing ONE of the following:
- IF powered from Unit 2,  
THEN verify green light ON above (2HS-8665-1) on 2C33.
  - IF powered from Unit 1,  
THEN verify HS at B64A4A in OFF.
- 2.4 Check Emergency Control Room chiller (2VE-1B) starts.
- 2.5 Record number of times 2VE-1B starts and stops (cycles) before running continuously: \_\_\_\_\_ cycles. (May continue with remaining procedure steps while this step is being performed)

**NOTE**

Performing step 2.6 places both units in a 1 hour time clock. **TIMELY** completion of steps 2.6 to 2.18 is required.

- 2.6 IF VSF-9 CREVS train is INOPERABLE  
AND this test is being performed for PMT to restore operability,  
THEN refer to Note 22 of Attachment B to enter TS/TRM conditions that apply for operation of an INOPERABLE CREVS fan with the control room in Emergency Recirculation Mode.

**NOTE**

Placing HS-7812 in MANUAL will actuate the following alarms:

- K12-E1 K16 Critical Trouble
- K16-B2 Actuation Control Room Isolation
- K16-B3 Trouble Control Room Isolation

- 2.7 Close Unit 1 Control Room Isolation dampers and start VSF-9 by placing Control Room Isolation Channel B HS (HS-7812) on C19 in MAN.  
2<sup>nd</sup> person verification: \_\_\_\_\_
- 2.8 Verify Unit 1 Emergency Fan/Filter (VSF-9) running.
- 2.9 Record VSF-9 start time: \_\_\_\_\_
- 2.10 Place Unit 2 Control Room Supply damper 2UCD-8683 (2HS-8683-1) on 2C33 in CLOSE.

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- 2.11 Place Unit 2 Control Room Return damper 2PCD-8685 (2HS-8685-2) on 2C33 in CLOSE.
- 2.12 Independently verify the following hand switches positions on 2C33:
- 2HS-8683-1 CLOSED IV Performed by: \_\_\_\_\_
  - 2HS-8685-2 CLOSED IV Performed by: \_\_\_\_\_
- 2.13 Check the following dampers CLOSED ON 2C33:
- 2UCD-8683, Unit 2 Control Room Supply damper (Green light ON above 2HS-8683-1)
  - 2PCD-8685, Unit 2 Control Room Return damper (Green light ON above 2HS-8685-2)
- 2.14 Check VSF-9 Air flow by ONE of the following:
- Red light ON above (FS-7806) on C19.
  - Air flow from duct in Unit 1 Control Room
- 2<sup>nd</sup> person verification: \_\_\_\_\_
- 2.15 Record current time as 2VE-1B start time \_\_\_\_\_

**NOTE**

Steps 2.16 through 2.20 may be performed in any order.

- 2.16 Perform the following for VSF-9 AND record any comments in Section 3.0 of this supplement:
- Check VSF-9 Outside Air damper open locally OR red light ON above HS-7910 on C19.
  - Inspect for unusual or excessive noise or vibration.
  - Inspect for water, oil, or other foreign material.
  - Check physical integrity of VSF-9.
- 2.17 IF VSF-9 CREVS Train has been INOPERABLE AND this test is for PMT of the train, THEN with Shift Manager concurrence, declare VSF-9 OPERABLE and exit the TS/TRM time clocks associated with INOPERABLE CREVS fan in service. (Reference: Note 22.0 of Attachment B.)
- U1 SM concurrence\_\_\_\_\_
- U2 SM concurrence\_\_\_\_\_

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2.18 Perform the following for 2VUC-27B AND record any comments in Section 3.0 of this supplement:

- Check 2VUC-27B drain loop seal (2SG-8600B) indicates > 1.0" H<sub>2</sub>O above bottom of sight glass. (CR-ANO-C-2001-0175)
- Inspect for unusual or excessive noise or vibration.
- Inspect for water, oil or other foreign material.
- Check physical integrity of 2VUC-27B.

2.19 Perform the following for 2VE-1B AND record any comments in Section 3.0 of this supplement:

- Inspect for unusual or excessive noise or vibration.
- Inspect for water, oil, or other foreign material.
- Check physical integrity of 2VE-1B.

2.20 Record the following VSF-9 filter ΔPs:

VFP-15 \_\_\_\_\_ "H<sub>2</sub>O (PDI-7834)  
VFA-3 \_\_\_\_\_ "H<sub>2</sub>O (PDI-7835)  
VFC-2 \_\_\_\_\_ "H<sub>2</sub>O (PDI-7836)  
VFP-15A \_\_\_\_\_ "H<sub>2</sub>O (PDI-7842)  
VFA-3A \_\_\_\_\_ "H<sub>2</sub>O (PDI-7843)  
VFC-2A \_\_\_\_\_ "H<sub>2</sub>O (PDI-7844)

2.21 IF Control Room temperature exceeds 84°F  
OR when 2VE-1B and VSF-9 have operated for ≥ 60 minutes,  
THEN perform the following:

2.21.1 Record test STOP TIME: \_\_\_\_\_

- A. For VSF-9, Subtract start time in step 2.9 from stop time to determine run time:

\_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_  
stop time      start time      run time

- B. Enter VSF-9 run time in Table 1.

- C. For 2VE-1B, subtract start time in step 2.15 from stop time to determine run time:

\_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_  
stop time      start time      run time

- D. Enter 2VE-1B run time in Table 1.

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**NOTE**

Steps 2.21.2 through 2.21.6 may be performed in any order.

2.21.2 Record final Unit 1 Control Room temperature:

Near VUC-9 : \_\_\_\_\_ °F

Near ATC Area: \_\_\_\_\_ °F

A. Average the above temperatures

B. Record as Unit 1 average temperature in Table 1.

2.21.3 Record final Unit 2 Control Room temperature:

Near 2VUC-27A/B: \_\_\_\_\_ °F

Near 2C69B : \_\_\_\_\_ °F

A. Average the above temperatures

B. Record as Unit 2 average temperature in Table 1.

2.21.4 Record the following for 2VE-1B:

- Discharge Pressure (2PI-6906) \_\_\_\_\_ psig
- Suction Pressure (2PI-6908) \_\_\_\_\_ psig
- Oil Pressure (2PI-6907) \_\_\_\_\_ psig
- SW Pump Discharge Temperature \_\_\_\_\_ °F  
(T1442, T1436, T1650 or ECP ave temp)

**NOTE**

- 2VE-1B remains Operable with oil as much as 1/2 inch below the sight glass. Oil should not be added unless oil level is below the bottom of the sight glass after 1 hour of operation. (EC13661)
- After being idle for 3 hours, oil level should be between ½ full and top of the sight glass.
- Operability determinations with respect to high oil level should not be made until the chiller has been running at least 1 hour.

2.21.5 Check 2VE-1B compressor 2C-58 oil level.

2.21.6 Check Service Water Control valve (2CV-1506-2) controlling 2VE-1B discharge pressure ≤ 235 psig.

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- 2.22 IF Electricians taking data for 2VUC-27B,  
THEN verify Electricians complete.
- 2.23 IF desired to maintain the Control Room isolated with 2VUC-27B in service,  
THEN mark Steps 2.24 through 2.33 as N/A.
- 2.24 Place Unit 2 Control Room Supply damper 2UCD-8683 (2HS-8683-1) in AUTO. (2C33)
- 2.25 Place Unit 2 Control Room Return damper 2PCD-8685 (2HS-8685-2) in AUTO. (2C33)
- 2.26 Independently verify the following HS in AUTO:
- (2HS-8683-1) on 2C33 IV Performed by: \_\_\_\_\_
  - (2HS-8685-2) on 2C33 IV Performed by: \_\_\_\_\_
- 2.27 Check the following dampers positions on 2C33:
- 2UCD-8683 OPEN (Green light OFF above 2HS-8683-1)
  - 2PCD-8685 OPEN (Green light OFF above 2HS-8685-2)
- 2.28 Return Unit 1 Control Room ventilation to normal by performing the following:
- 2.28.1 Place Control Room Isolation Channel B HS (HS-7812) on C19 in AUTO.
- 2.28.2 Depress System Trip Reset Button (PB-2) on Panel C141B in Unit 1 Computer Room.
- 2.28.3 Verify ONE Unit 1 Control Room Supply fans on C19 running:
- VSF-8A (FS-7820 Red Light ON, OR flow from supply duct)
  - VSF-8B (FS-7821 Red light ON, OR flow from supply duct)
- 2<sup>nd</sup> person verification: \_\_\_\_\_

**CAUTION**

Chlorine and radiation monitors are inoperable with both Control Room isolated and CREVS secured. Therefore actions need to be taken to unisolate Control Room prior to securing CREVS. (CR-ANO-C-2001-0207-004)

- 2.29 Verify VSF-9 stopped.
- 2.30 Verify VSF-9 in automatic by verifying (HS-7806) in AUTO.
- 2<sup>nd</sup> person verification: \_\_\_\_\_

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- 2.31 IF 2VUC-27B powered from Unit 2,  
THEN stop 2VUC-27B by placing (2HS-8666-2) on 2C33 to OFF AND  
releasing.
- 2.32 IF 2VUC-27B powered from Unit 1,  
THEN stop 2VUC-27B by placing HS at breaker B64B-5A in OFF.
- 2.33 Verify normal Control Room air conditioning restarts/remains in service:
- VCH-2A OR VCH-2B
  - 2VCH-2A OR 2VCH-2B
- 2.34 IF Steps 2.24 through 2.33 marked as N/A,  
THEN perform the following:
- 2.34.1 IF necessary to stop CR Extension HVAC for Control Room  
pressurization,  
THEN depress CREF HVAC Shutdown switch 2VUC-42A and 2VUC-42B  
(2PB-8000) located adjacent to U2 SM Office (Door 341).
- 2.34.2 IF there is NO seismic event,  
THEN maintain ONE door open between Control Rooms to  
equalize pressure.
- 2.34.3 Close 2VSF-9 Outside Air damper 2PCD-8607B by placing  
(2HS-8607-B1) on 2C33 in RESERVE.
- 2.34.4 Verify 2VSF-9 secured by placing (2HS-8603-1) on 2C33 in  
STOP.
- 2.34.5 Monitor Unit 1 Control Room chillers (VCH-2A/2B) and Unit 2  
Control Room chillers (2VCH-2A/2B) per Manual Control Room  
Isolation And Emergency Recirc section of this procedure.
- 2.35 IF desired to start Unit 1 Control Room cooler (VUC-9),  
THEN place HS-7829 to ON.
- 2.36 Set cooling thermostat (2TC-8666A-2) to desired setpoint (62-82°F).
- 2.37 Verify heating thermostat (2TC-8666-2) set on minimum of 60°F.

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**NOTE**

When aligned to Unit 1 Service Water AND electric power, this Supplement does not prove operability per Unit 2 Tech Specs since 2VE-1B/2VUC-27B cannot be started from Control Room.

3.0 TEST ACCEPTANCE CRITERIA

3.1 Record values observed during operation below.

TABLE 1		
Test Quantity	Measured Value	Limiting Value For Operability
Unit 1 Average Temp	°F	≤ 84°F
Unit 2 Average Temp	°F	≤ 84°F
VSF-9 Run Time	minutes	≥ 60 minutes
2VE-1B Run Time	minutes	≥ 60 minutes

- 3.2 Did 2VE-1B operate for ≥ 1 hour AND maintain Control Room temperatures ≤ 84°F? YES NO
- 3.3 Did VSF-9 operate for ≥ 1 hour? YES NO
- 3.4 IF powered from Unit 2, THEN did 2VE-1B start from Control Room? YES N/A NO
- 3.5 Is power available to 2VUC-27B heaters per Step 1.9? YES NO
- 3.6 Did 2VUC-27B drain loop seal (2SG-8600B) indicate > 1.0" H<sub>2</sub>O above bottom of sight glass? YES NO
- 3.7 IF "NO" circled in step 3.6, THEN verify Condition Report initiated.

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- 3.8 IF NO circled in 3.2, 3.3, 3.4, or 3.5, THEN perform the following:
- Declare affected components INOPERABLE.
  - Notify Unit 1 Shift Manager.
  - Notify Unit 2 Shift Manager.
  - Refer to Attachment B, Component/Tech Spec Cross Reference.
  - Initiate WR/WO as applicable.

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

Performed By: \_\_\_\_\_ Date \_\_\_\_\_



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4.0 SUPERVISOR REVIEW AND ANALYSIS

4.1 Do all measured values recorded in the Acceptance Criteria fall within specified LIMITING RANGE/VALUE for OPERABILITY? YES NO

4.2 IF NO answered to 4.1,  
THEN perform the following corrective actions:

- Verify LCO Tracking Record initiated.
- Verify Condition Report initiated.

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

4.4 Are all administrative requirements of this test satisfied? YES NO  
Supervisor: \_\_\_\_\_ Date \_\_\_\_\_

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CHLORINE DETECTOR AND RADIATION MONITOR FUNCTIONAL TEST

{4.3.1}

This test provides methods for testing Control Room ventilation interlocks associated with Chlorine monitors (2CLS-8760-2, 2CLS-8671-1, 2CLS-8762-2 AND 2CLS-8763-1) AND Radiation monitors (2RITS-8001A, 2RITS-8001B, 2RITS-8750-1A AND 2RITS-8750-1B). This test satisfies Unit 1 TR 3.3.1.2, SR 3.3.16.2, AND the channel functional testing requirements of Unit 2 TR 4.3.7.1 and Unit 2 TS Table 4.3-3.2.b. When 2VSF-9 is powered from Unit 1 automatic start functions from Chlorine detectors and Radiation monitors are not available. The 18 month testing requirements included in Supplement 5 of this procedure will also satisfy the monthly testing requirements included in this Supplement. When Supplements 3 and 5 are both scheduled together, Supplement 5 is the only test that needs to be performed to satisfy the monthly and the 18 month testing requirements.

**NOTE**

2nd person verification refers to either a peer check or independent verification of the activity is performed.

1.0 INITIAL CONDITIONS (May be performed in any order)

1.1 Verify the following HS in AUTO on C19 in Unit 1 Control Room:

- Control Room Isolation Channel A (HS-7811)
- Control Room Isolation Channel B (HS-7812)
- Unit 1 Emergency Fan/Filter VSF-9 (HS-7806)

1.2 Verify the following on 2C33 in U2 Control Room:

- Control Room Supply Damper 2UCD-8683 (2HS-8683-1) in AUTO.
- 2UCD-8683 Green light OFF
- Control Room Return Damper 2PCD-8685 (2HS-8685-2) in AUTO.
- 2PCD-8685 Green light OFF
- Control Room Recirc & Exhaust dampers (2HS-8700) in RECIRC (2C22).

1.3 Verify the following on C141A/B in Unit 1 Computer Room:

- Control Room Supply damper (CV-7905) Green light OFF.
- Control Room Return damper (CV-7907) Green light OFF
- Chlorine Detector Bypass switch (HS-1A) in NORMAL
- Unit 2 Radiation Monitor Bypass switch (HS-2A) in NORMAL
- Chlorine Detector Bypass switch (HS-1B) in NORMAL

1.4 Verify the following:

- Small quantity of bleach (Purex, Clorox, etc.) available for actuating detectors.
- Small bottle of DI water available for resetting detectors.

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- 1.5 Verify the following:
- VSF-9 OPERABLE for Unit 1.
  - 2VSF-9 OPERABLE for Unit 1.
  - VSF-9 OPERABLE for Unit 2.
- 1.6 IF desired to start Control Room Emergency Air Conditioning  
THEN perform the following:
- 1.6.1 IF desired fan 2VUC-27A or 2VUC-27B aligned to Unit 2  
power,  
THEN start using the following:
- 2VUC-27A (place 2HS-8665-1 on 2C33 to ON and release)
  - 2VUC-27B (place 2HS-8666-2 on 2C33 to ON and release)
- 1.6.2 IF desired fan 2VUC-27A or 2VUC-27B aligned to Unit 1  
power,  
THEN refer to "OPERATION OF CONTROL ROOM EMERGENCY AIR  
CONDITIONING SYSTEM WHEN POWERED FROM UNIT 1", section of  
this procedure.
- 1.6.3 Check respective Emergency Control Room Chiller starts:
- 2VE-1A (2VUC-27A)
  - 2VE-1B (2VUC-27B)
- \* 1.7 IF Control Room Chlorine,  
OR Radiation actuation occurs during performance of this supplement,  
THEN complete section 7.0 of this procedure.
- \* 1.8 IF any component tested by this Supplement is inoperable,  
THEN perform the following:
- Verify Caution Tag installed on the inoperable component indicating the need to complete necessary portions of this Supplement prior to restoring operability.
  - N/A associated steps and tables.
- 1.9 Obtain keys #299 and #300 for operation of radiation monitor  
(2RITS-8001A, 2RITS-8001B, 2RITS-8750-1A and 2RITS-8750-1B) keypads.
- 1.10 Inform control rooms to expect the following alarms during the  
performance of this surveillance:
- 2K08-A4 (CR ISOL ACTUATION/TROUBLE)
  - 2K11-D10 (PROC GAS RADIATION HI/LO)
  - K12-E1 (K16 CRITICAL TROUBLE)
  - K16-B2 (ACTUATION CONTROL ROOM ISOLATION)
  - K10-D1 (CONTROL ROOM SUPPLY DUCT RADIATION HI)

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2.0 TEST METHOD (Sub-sections may be performed in any order)

2.1 Chlorine Detector 2CLS-8760-2 (Unit 1 Computer Room)

2.1.1 Perform the following to actuate 2CLS-8760-2:

- A. Remove Plexiglas analyzer cover.
- B. Dip pencil eraser or cotton swab in bleach.
- C. Touch spiral-wound element in 2CLS-8760-2.

2.1.2 Complete Table 1A.

TABLE 1A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Closed (Green Light lit on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

2.1.3 Complete Table 1B.

TABLE 1B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
Local Alarm	Actuated	N/A	N/A	N/A	YES NO
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO

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- 2.1.4 Rinse spiral-wound element as necessary.
- 2.1.5 Depress 2CLS-8760-2 RESET button.
- 2.1.6 Verify detector resets (e.g. red detector alarm light off).
- 2.1.7 Re-install analyzer cover.
- 2.1.8 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset Button PB-2 on C141B.
- 2.1.9 Complete Table 1C.

TABLE 1C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Starts	N/A	N/A	N/A	YES NO
VSF-9	Stops	N/A	N/A	N/A	YES NO

- 2.1.10 Complete Table 1D.

TABLE 1D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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2.2 Chlorine Detector 2CLS-8761-1 (Unit 1 Computer Room).

2.2.1 Perform the following to actuate 2CLS-8761-1:

- A. Remove Plexiglas analyzer cover.
- B. Dip pencil eraser OR cotton swab in bleach.
- C. Touch spiral-wound element in 2CLS-8761-1.

2.2.2 Complete Table 2A.

TABLE 2A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Closed (Green Light lit on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VSF-8A	Stopped	N/A	N/A	N/A	YES NO
2VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VEF-43A	Stopped	N/A	N/A	N/A	YES NO
2VEF-43B	Stopped	N/A	N/A	N/A	YES NO
2VSF-9	Starts with air flow (1,2)	N/A	N/A	N/A	YES NO N/A

- (1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.  
(2) 2VSF-9 will NOT actuate if aligned to Unit 1.

2.2.3 Complete Table 2B.

TABLE 2B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
Local Alarm	Actuated	N/A	N/A	N/A	YES NO
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO

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- 2.2.4 Rinse spiral-wound element as necessary.
- 2.2.5 Depress 2CLS-8761-1 RESET button.
- 2.2.6 Verify detector resets (e.g. red detector alarm light off).
- 2.2.7 Re-install analyzer cover.
- 2.2.8 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset button PB-2 on C141A.
- 2.2.9 IF 2VSF-9 operating,  
THEN secure 2VSF-9 by performing the following:
- A. Place (2HS-8603-1) on 2C33 in STOP.
- B. Return 2VSF-9 to automatic by placing 2VSF-9 (2HS-8603-1) in AUTO.
- 2.2.10 Complete Table 2C.

TABLE 2C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Started	N/A	N/A	N/A	YES NO
2VSF-8A OR 2VSF-8B	Started	N/A	N/A	N/A	YES NO
2VEF-43A OR 2VEF-43B	Started	N/A	N/A	N/A	YES NO

- 2.2.11 Complete Table 2D.

TABLE 2D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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2.3 Chlorine Detector 2CLS-8762-2 (RP Briefing Office)

2.3.1 Perform the following to actuate 2CLS-8762-2:

- A. Remove Plexiglas analyzer cover.
- B. Dip pencil eraser OR cotton swab in bleach.
- C. Touch spiral-wound element in 2CLS-8762-2.

2.3.2 Complete Table 3A.

TABLE 3A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Closed (Green Light lit on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

2.3.3 Complete Table 3B.

TABLE 3B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
Local Alarm	Actuated	N/A	N/A	N/A	YES NO
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO



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- 2.3.4 Rinse spiral-wound element as necessary.
- 2.3.5 Depress 2CLS-8762-2 RESET button.
- 2.3.6 Verify detector resets (e.g. red detector alarm light off).
- 2.3.7 Re-install analyzer cover.
- 2.3.8 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset button PB-2 on C141B.
- 2.3.9 Complete Table 3C.

TABLE 3C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Starts	N/A	N/A	N/A	YES NO
VSF-9	Stops	N/A	N/A	N/A	YES NO

- 2.3.10 Complete Table 3D.

TABLE 3D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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2.4 Chlorine Detector 2CLS-8763-1 (RP Briefing Office)

2.4.1 Perform the following to actuate 2CLS-8763-1:

- A. Remove Plexiglas analyzer cover.
- B. Dip pencil eraser OR cotton swab in bleach.
- C. Touch spiral-wound element in 2CLS-8763-1.

2.4.2 Complete Table 4A.

TABLE 4A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Closed (Green Light lit on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VSF-8A	Stopped	N/A	N/A	N/A	YES NO
2VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VEF-43A	Stopped	N/A	N/A	N/A	YES NO
2VEF-43B	Stopped	N/A	N/A	N/A	YES NO
2VSF-9	Starts with air flow (1,2)	N/A	N/A	N/A	YES NO N/A

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

(2) 2VSF-9 will NOT actuate if aligned to Unit 1.

2.4.3 Complete Table 4B.

TABLE 4B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
Local Alarm	Actuated	N/A	N/A	N/A	YES NO
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO

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- 2.4.4 Rinse spiral-wound element as necessary.
- 2.4.5 Depress 2CLS-8763-1 RESET button.
- 2.4.6 Verify detector resets (e.g. red detector alarm light off).
- 2.4.7 Re-install analyzer cover.
- 2.4.8 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset button (PB-2) on C141A.
- 2.4.9 IF 2VSF-9 operating,  
THEN perform the following to secure 2VSF-9:
- A. Place (2HS-8603-1) on 2C33 to STOP.
- B. Return 2VSF-9 to automatic by placing (2HS-8603-1) in AUTO.
- 2.4.10 Complete Table 4C.

TABLE 4C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Started	N/A	N/A	N/A	YES NO
2VSF-8A OR 2VSF-8B	Started	N/A	N/A	N/A	YES NO
2VEF-43A OR 2VEF-43B	Started	N/A	N/A	N/A	YES NO

- 2.4.11 Complete Table 4D.

TABLE 4D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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2.5 Unit 1 Control Room Radiation monitor (2RITS-8001A)

2.5.1 Perform the following to align 2RITS-8001A:

A. Verify 2RITS-8001A Bypass HS (2HS-8001A) in OPERATE.

- Check WHITE light ON
- Check AMBER light OFF

B. Verify 2RITS-8001B Bypass HS (2HS-8001B) in BYPASS.

- Check AMBER light ON
- Check WHITE light OFF

C. Verify Unit One Status Board updated to present 2RITS-8001 configuration.

2.5.2 Reposition key operated switch from ON to KEYPAD.

2.5.3 Push AND hold TEST button until Test Screen displayed.  
(~ 5 seconds)

2.5.4 Actuate 2RITS-8001A by pushing SET button.

2.5.5 WHEN local alarm actuates,  
THEN push RESET button to silence local alarm.

2.5.6 Complete Table 5A.

TABLE 5A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Closed (Green Light lit on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

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2.5.7 Complete Table 5B.

TABLE 5B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO
K10-D1	Actuated	N/A	N/A	N/A	YES NO

2.5.8 Push MODE button.

2.5.9 Check monitor returns to normal.

2.5.10 IF monitor does NOT return to normal,  
THEN perform the following:

- A. Verify Unit 1 enter TS 3.3.16 Condition A for ONE radiation monitor inoperable.
- B. Verify Unit 2 enter TS 3.3.3.1 for ONE radiation monitor inoperable.
- C. Place key operated switch to OFF for ~5 seconds.
- D. Place key operated switch to KEYPAD.
- E. IF desired to access other screens for functionality,  
THEN push MODE button.
- F. Check monitor returns to normal.
- G. IF monitor returns to normal,  
THEN exit TS entered for this monitor.
- H. IF monitor does NOT return to normal,  
THEN contact I&C for assistance.

2.5.11 Place key operated switch to ON.

2.5.12 Remove key.

2.5.13 Perform the following to reset Unit 1 Control Room Isolation Actuation System:

- A. Depress Unit 1 Radiation Reset (PB-1) on C141.
- B. Depress System Trip Reset (PB-2) on C141A.
- C. Depress System Trip Reset (PB-2) on C141B.

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2.5.14 Complete Table 5C.

TABLE 5C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Starts	N/A	N/A	N/A	YES NO
VSF-9	Stops	N/A	N/A	N/A	YES NO

2.5.15 Complete Table 5D.

TABLE 5D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO
K10-D1	Cleared	N/A	N/A	N/A	YES NO

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2.6 Unit 1 Control Room Radiation monitor (2RITS-8001B)

2.6.1 Perform the following to align 2RITS-8001B:

A. Verify 2RITS-8001B Bypass HS (2HS-8001B) in OPERATE.

- Check WHITE light ON
- Check AMBER light OFF

B. Verify 2RITS-8001A Bypass HS (2HS-8001A) in BYPASS.

- Check AMBER light ON
- Check WHITE light OFF

C. Verify Unit 1 Status Board updated to present 2RITS-8001 configuration.

2.6.2 Reposition key operated switch from ON to KEYPAD.

2.6.3 Push AND hold TEST button until Test Screen displayed.  
(~ 5 seconds)

2.6.4 Actuate 2RITS-8001B by pushing SET button.

2.6.5 WHEN local alarm actuates,  
THEN push RESET button to silence local alarm.

2.6.6 Complete Table 6A.

TABLE 6A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Closed (Green Light lit on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

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2.6.7 Complete Table 6B.

TABLE 6B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO
K10-D1	Actuated	N/A	N/A	N/A	YES NO

2.6.8 Push MODE button.

2.6.9 Check monitor returns to normal.

2.6.10 IF monitor does NOT return to normal,  
THEN perform the following:

- A. Verify Unit 1 enter TS 3.3.16 Condition A for ONE radiation monitor inoperable.
- B. Verify Unit 2 enter TS 3.3.3.1 for ONE radiation monitor inoperable.
- C. Place key operated switch to OFF for ~5 seconds.
- D. Place key operated switch to KEYPAD.
- E. IF desired to access other screens for functionality,  
THEN push MODE button.
- F. Check monitor returns to normal.
- G. IF monitor returns to normal,  
THEN exit TS entered for this monitor.
- H. IF monitor does NOT return to normal,  
THEN contact I&C for assistance.

2.6.11 Place key operated switch to ON

2.6.12 Remove key.

2.6.13 Perform the following to reset Unit 1 Control Room Isolation Actuation System:

- A. Depress Unit 1 Radiation Reset (PB-1) on C141.
- B. Depress System Trip Reset (PB-2) on C141A.
- C. Depress System Trip Reset (PB-2) on C141B.



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2.6.14 Complete Table 6C.

TABLE 6C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Starts	N/A	N/A	N/A	YES NO
VSF-9	Stops	N/A	N/A	N/A	YES NO

2.6.15 Complete Table 6D.

TABLE 6D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO
K10-D1	Cleared	N/A	N/A	N/A	YES NO

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2.7 Unit 2 Control Room Radiation monitor (2RITS-8750-1A)

2.7.1 Perform the following to align 2RITS-8750-1A:

A. Verify 2RITS-8750-1A Bypass (2HS-8750-1A) in OPERATE.

- Check WHITE light ON
- Check AMBER light OFF

B. Verify Bypass HS (2HS-8750-1B) in BYPASS.

- Check AMBER light ON
- Check WHITE light OFF

2.7.2 Reposition key operated switch from ON to KEYPAD.

2.7.3 Push AND hold TEST button until Test Screen displayed.  
(~ 5 seconds)

2.7.4 Actuate 2RITS-8750-1A by pushing SET button.

2.7.5 WHEN local alarm actuates,  
THEN push RESET button to silence local alarm.

2.7.6 Complete Table 7A.

TABLE 7A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Closed (Green Light lit on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VSF-8A	Stopped	N/A	N/A	N/A	YES NO
2VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VEF-43A	Stopped	N/A	N/A	N/A	YES NO
2VEF-43B	Stopped	N/A	N/A	N/A	YES NO
2VSF-9	Starts with air flow (1,2)	N/A	N/A	N/A	YES NO N/A

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

(2) 2VSF-9 will NOT actuate if aligned to Unit 1.

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2.7.7 Complete Table 7B.

TABLE 7B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
2K11-D10	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO

2.7.8 Push MODE button.

2.7.9 Check monitor returns to normal.

2.7.10 IF monitor does NOT return to normal,  
THEN perform the following:

- A. Verify Unit 1 enter TS 3.3.16 Condition A for ONE Radiation Monitor inoperable.
- B. Verify Unit 2 enter TS 3.3.3.1 for ONE Radiation Monitor inoperable.
- C. Place key operated switch to OFF for ~5 seconds.
- D. Place key operated switch to KEYPAD.
- E. IF desired to access other screens for functionality,  
THEN push MODE button.
- F. Check monitor returns to normal.
- G. IF monitor returns to normal,  
THEN exit TS entered for this monitor.
- H. IF monitor does NOT return to normal,  
THEN contact I&C for assistance.

2.7.11 Place key operated switch to ON

2.7.12 Remove key.

2.7.13 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset button PB-2 on C141A.

2.7.14 IF 2VSF-9 operating,  
THEN secure 2VSF-9 by performing the following:

- A. Place (2HS-8603-1) on 2C33 to STOP.
- B. Place 2VSF-9 handswitch (2HS-8603-1) in AUTO.

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2.7.15 Complete Table 7C.

TABLE 7C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Started	N/A	N/A	N/A	YES NO
2VSF-8A OR 2VSF-8B	Started	N/A	N/A	N/A	YES NO
2VEF-43A OR 2VEF-43B	Started	N/A	N/A	N/A	YES NO

2.7.16 Complete Table 7D.

TABLE 7D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
2K11-D10	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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- 2.8 Unit 2 Control Room Radiation monitor (2RITS-8750-1B)
- 2.8.1 Perform the following to align 2RITS-8750-1B:
- A. Verify 2RITS-8750-1B Bypass (2HS-8750-1B) in OPERATE.
- Check 2RITS-8750-1B WHITE light ON
  - Check 2RITS-8750-1B AMBER light OFF
- B. Verify 2RITS-8750-1A Bypass HS (2HS-8750-1A) in BYPASS.
- Check 2RITS-8750-1A AMBER light ON
  - Check 2RITS-8750-1A WHITE light OFF
- 2.8.2 Reposition key operated switch from ON to KEYPAD.
- 2.8.3 Push AND hold TEST button until Test Screen displayed.  
(~ 5 seconds)
- 2.8.4 Actuate 2RITS-8750-1B by pushing SET button.
- 2.8.5 WHEN local alarm actuates,  
THEN push RESET button to silence local alarm.
- 2.8.6 Complete Table 8A.

TABLE 8A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Closed (Green Light lit on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VSF-8A	Stopped	N/A	N/A	N/A	YES NO
2VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VEF-43A	Stopped	N/A	N/A	N/A	YES NO
2VEF-43B	Stopped	N/A	N/A	N/A	YES NO
2VSF-9	Starts with air flow (1,2)	N/A	N/A	N/A	YES NO N/A

- (1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.
- (2) 2VSF-9 will NOT actuate if aligned to Unit 1.

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2.8.7 Complete Table 8B.

TABLE 8B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
2K11-D10	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO

2.8.8 Push MODE button.

2.8.9 Check monitor returns to normal.

2.8.10 IF monitor does NOT return to normal,  
THEN perform the following:

- A. Verify Unit 1 enter TS 3.3.16 Condition A for ONE Radiation Monitor inoperable.
- B. Verify Unit 2 enter TS 3.3.3.1 for ONE Radiation Monitor inoperable.
- C. Place key operated switch to OFF for ~5 seconds.
- D. Place key operated switch to KEYPAD.
- E. IF desired to access other screens for functionality,  
THEN push MODE button.
- F. Check monitor returns to normal.
- G. IF monitor returns to normal,  
THEN exit TS entered for this monitor.
- H. IF monitor does NOT return to normal,  
THEN contact I&C for assistance.

2.8.11 Place key operated switch to ON.

2.8.12 Remove key.

2.8.13 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset button PB-2 on C141A.

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2.8.14 IF 2VSF-9 operating,  
THEN secure 2VSF-9 by performing the following:

- A. Place (2HS-8603-1) on 2C33 to STOP.
- B. Place 2VSF-9 handswitch (2HS-8603-1) in AUTO.

2.8.15 Complete Table 8C.

TABLE 8C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Started	N/A	N/A	N/A	YES NO
2VSF-8A OR 2VSF-8B	Started	N/A	N/A	N/A	YES NO
2VEF-43A OR 2VEF-43B	Started	N/A	N/A	N/A	YES NO

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2.8.16 Complete Table 8D.

TABLE 8D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
2K11-D10	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

2.9 Verify normal operation of following:

- Unit 1 Control Room Chillers (VCH-2A or VCH-2B) per Control Room Air Conditioning (1104.034).
- Unit 2 Control Room Chillers (2VCH-2A or 2VCH-2B) per Control Room Chilled Water System (2104.048).

2.10 IF 2VUC-27A OR 2VUC-27B operating,  
THEN secure as follows:

2.10.1 IF Control Room Emergency coolers powered from Unit 2  
THEN perform the following:

- 2VUC-27A (place 2HS-8665-1 on 2C33 in OFF and release).
- 2VUC-27B (place 2HS-8666-2 on 2C33 in OFF and release).

2.10.2 IF 2VUC-27A or 2VUC-27B aligned to Unit 1 power,  
THEN refer to "OPERATION OF CONTROL ROOM EMERGENCY AIR CONDITIONING SYSTEM WHEN POWERED FROM UNIT 1", section of this procedure.

2.10.3 Check Control Room Emergency chillers (2VE-1A/1B) secured (automatically stop based on low suction pressure).

2.11 Obtain 2<sup>nd</sup> Person verification that 2VSF-9 HS (2HS-8603-1) in AUTO.

2<sup>nd</sup> Person Verification: \_\_\_\_\_

2.12 Return keys #299 and #300 to the Shift Manager.



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3.0 ACCEPTANCE CRITERIA

**NOTE**

Two Radiation monitors, one on Unit 1 (2RITS-8001A OR 2RITS-8001B) and one on Unit 2 (2RITS-8750-1A OR 2RITS-8750-1B), are required to be operable to satisfy the Unit 1 and Unit 2 Tech Specs.

- 3.1 IF NO circled in Table 1A, 1C, 2A, 2C, 3A, 3C, 4A, 4C, 5A, 5C, 6A, 6C, 7A, 7C, 8A, OR 8C,  
THEN perform the following:
- Declare affected components inoperable.
  - Notify Unit 1 Shift Manager.
  - Notify Unit 2 Shift Manager.
  - Refer to Attachment B, Component/Tech Spec Cross-Reference AND Attachment C, Chlorine Detector Matrix.
  - Initiate WR/WO as applicable.
- 3.2 IF NO circled in Table 1B, 1D, 2B, 2D, 3B, 3D, 4B, 4D, 5B, 5D, 6B, 6D, 7B, 7D, 8B, OR 8D,  
THEN initiate WR/WO on affected component as applicable.
- 3.3 IF any tested component N/A'd or declared inoperable during performance of this supplement,  
THEN verify Caution Tag installed on inoperable component indicating the need to complete necessary portions of this Supplement prior to restoring operability.

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

Performed By: \_\_\_\_\_ Date \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ Date \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ Date \_\_\_\_\_

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4.0 SUPERVISOR REVIEW AND ANALYSIS

4.1 Do all values in Tables 1A, 2A, 3A, 4A, 5A, 6A, 7A, AND 8A indicate that components responded as required? YES NO

4.2 Has this equipment been proven operable per ACCEPTANCE CRITERIA? YES NO

4.3 Is at least one of the following operable? YES NO

- 2RITS-8001A

- 2RITS-8001B

4.4 Is at least one of the following operable? YES NO

- 2RITS-8750-1A

- 2RITS-8750-1B

4.5 IF answer to 4.1, 4.2, 4.3 or 4.4 NO, THEN perform the following corrective actions as applicable:

- Verify LCO Tracking Record initiated.
- Verify Condition Report initiated.

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

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4.7 Are all administrative requirements of this test satisfied? YES NO

Unit 1 Supervisor: \_\_\_\_\_ Date \_\_\_\_\_

Unit 2 Supervisor: \_\_\_\_\_ Date \_\_\_\_\_

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CONTROL ROOM VENTILATION SMOKE DETECTOR TEST

{4.3.1}

This Supplement tests Control Room Smoke Exhaust Fan (VEF-43) and Smoke Detectors (QS-7905 AND QS-7907). This test is required annually on QS-7905 and QS-7907 based on the 1996 edition of NFPA 72, National Fire Alarm Code.

1.0 INITIAL CONDITIONS (May Be Performed In Any Order)

1.1 Check purpose of test:

- \_\_\_ Regularly scheduled annual test
- \_\_\_ Operability test following significant maintenance
- \_\_\_ Other, Described in Section 4.0

1.2 Control Room Isolation Channel A HS (HS-7811) on C19 in AUTO.

1.3 Control Room Isolation Channel B HS (HS-7812) on C19 in AUTO.

1.4 Outside ambient temperature above freezing to prevent VSF-8A/B coils from freezing during VEF-43 one hour run.

**NOTE**

- Test gas shall be Home Safeguards Industries Inc. SMOKE DETECTOR TEST GAS (AR502-4533), OR approved substitute as determined by System Engineering.
- Unit 2 must consider VSF-9 inoperable when QS-7905 actuated because it interlocks VSF-9 OFF which results in loss of VSF-9 auto-start capability. If 2VSF-9 is operable with auto-start capability, Unit 1 is NOT impacted.
- If the Control Rooms are restored to NORMAL operation without delay in accordance with this supplement OR manually or automatically placed on Emergency Recirculation, TS or TRM entries are NOT required for Chlorine and Radiation Monitors during testing of Smoke Detector actuation.

1.5 Gas available for testing.

1.6 Verify Unit 2 Emergency Fan/Filter 2VSF-9 operable.

- \* 1.7 IF 2VSF-9 NOT operable with auto-start capability,  
THEN do NOT perform this test.

- \* 1.8 IF Control Room can NOT be restored to NORMAL ventilation mode without delay,  
AND can NOT be placed on Emergency Recirculation,  
THEN verify entry into applicable TS/TRM. for BOTH Unit 1 and Unit 2 for ONE Chlorine Detection System and ONE Radiation Channel inoperable. ( refer to Att. B)  
(Monitors affected: 2CLS-8760-2/2CLS-8761-1 and 2RE-8001A/2RE-8001B)

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2.0 TEST METHOD

- 2.1 Control Room Supply Duct Detector QS-7905 (in ceiling of Unit 1 Computer Room, above door immediately upon entering).

**NOTE**

Unit 2 must consider VSF-9 inoperable when QS-7905 actuated because it interlocks VSF-9 OFF which results in loss of VSF-9 auto-start capability.

- 2.1.1 Verify Unit 2 TS 3.7.6.1 entered for VSF-9 being inoperable.
- 2.1.2 Remove square head test hole plug.
- 2.1.3 Check red light on detector flashing slowly.
- 2.1.4 Briefly (~ 5 seconds) inject test gas into test hole.
- 2.1.5 Check the following:
- Unit 1 Control Room Supply damper (CV-7905) closed by green light lit on C141A/B.
  - Unit 1 Control Room Return damper (CV-7907) closed by green light lit on C141A/B.
  - Red light on detector burns steady.
  - Control Room Supply fan (VSF-8A) stopped.
  - Control Room Supply fan (VSF-8B) stopped.
  - K16-B2 Actuation Control Room Isolation in alarm.

**NOTE**

VSF-9 will auto start when PB-2 reset on C141 is depressed while system trip on C141B is present. Following reset of C141, VSF-9 will stop when C141B reset PB-2 is depressed.

- 2.1.6 Perform the following to reset QS-7905:
- A. Depress red pushbutton on QS-7905.
  - B. Check red light on detector flashing slowly.
  - C. Reinstall test hole plug.
  - D. Depress Unit 1 Supply Duct Smoke Reset button PB-2 on C141.
  - E. Depress System Trip Reset PB-2 on C141B.
  - F. Depress System Trip Reset PB-2 on C141A.

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- 2.1.7 Verify ONE Control Room Supply fan restarts.
  - VSF-8A
  - VSF-8B
- 2.1.8 Check damper CV-7905 open as indicated by:
  - Green light on C141A OFF.
  - Green light on C141B OFF.
- 2.1.9 Check damper CV-7907 open as indicated by:
  - Green light on C141A OFF.
  - Green light on C141B OFF.
- 2.1.10 WHEN auto start capability restored for VSF-9,  
THEN exit Unit 2 TS 3.7.6.1 for VSF-9 being inoperable.
- 2.1.11 IF additional Tech Specs/TRMs entered in accordance with  
step 1.8 of this supplement,  
THEN exit applicable Tech Specs and TRMs entered.
- 2.2 Control Room Return Duct Smoke Detector QS-7907  
(above B15, on side of ductwork)
  - 2.2.1 Remove square head test hole plug.
  - 2.2.2 Check red light on detector flashing slowly.
  - 2.2.3 Briefly (~ 5 seconds) inject test gas into test hole.
  - 2.2.4 Check detector red light burns steady.
  - 2.2.5 Check Control Room Smoke Exhaust Fan (VEF-43)  
starts.
    - A. Record VEF-43 start time. \_\_\_\_\_
  - 2.2.6 Place VEF-43 HS (HS-7840) on C19 to ON.
  - 2.2.7 Perform the following to reset QS-7907:
    - A. Depress red pushbutton on QS-7907.
    - B. Check red light on detector flashing slowly.
    - C. Reinstall test hole plug.

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2.2.8 Make visual inspection of VEF-43.  
(on turbine building roof near VCH-10/11)

- A. Inspect for abnormal noises.
- B. Inspect for excessive and/or unusual vibration.
- C. Record inspection results below:

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2.2.9 WHEN VEF-43 has run for one hour,  
THEN stop VEF-43.

- A. Record VEF-43 stop time. \_\_\_\_\_

3.0 ACCEPTANCE CRITERIA

3.1 Based on steps 2.2.5.A and 2.2.9.A, did VEF-43 operate for  $\geq 1$  hour? YES NO

3.2 IF NO circled in Step 3.1,  
THEN perform the following:

- Declare VEF-43 inoperable.
- Notify Unit 1 Shift Manager.
- Notify Unit 2 Shift Manager.
- Initiate WR/WO as applicable.

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

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Performed by: \_\_\_\_\_ Date \_\_\_\_\_

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4.0 SUPERVISOR REVIEW AND ANALYSIS

4.1 Do all measured values recorded in Acceptance Criteria YES NO  
section fall within specified Limiting Range For Operability?

4.2 IF NO answered to 4.1,  
THEN perform the following corrective actions:

- Verify LCO Tracking Record initiated.
- Verify Condition Report initiated.

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

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4.4 Are all administrative requirements of this test satisfied? YES NO

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

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CHLORINE AND RADIATION MONITOR 18 MONTH TEST

{4.3.1}

This test provides methods for testing Control Room ventilation interlocks associated with Chlorine monitors (2CLS-8760-2, 2CLS-8671-1, 2CLS-8762-2 and 2CLS-8763-1) and Radiation monitors (2RITS-8001A, 2RITS-8001B, 2RITS-8750-1A and 2RITS-8750-1B). This test satisfies Unit 1 TR 3.3.1.2, SR 3.3.16.2, SR 3.7.9.3 and the channel function testing requirements of Unit 2 TR 4.3.7.1, TR 4.3.7.2, TS 4.7.6.1.2.d.2 and TS Table 4.3-3.2.b. The 18 month testing requirements in this Supplement will also satisfy the monthly testing requirements in Supplement 3. When Supplements 3 and 5 are both scheduled together, Supplement 5 is the only test that needs to be performed to satisfy the monthly and the 18 month testing requirements. Partial performance of this supplement is allowed for testing individual components for post maintenance or other required testing. Reason for partial performance should be described in section 4.4 of this supplement.

**NOTE**

2nd person verification refers to either a peer check or independent verification of the activity is performed.

1.0 INITIAL CONDITIONS (May be performed in any order)

1.1 Verify the following in AUTO (U1 CR on C19):

- Control Room Isolation Channel A HS (HS-7811)
- Control Room Isolation Channel B HS (HS-7812)
- Unit 1 Emergency Fan/Filter VSF-9 HS (HS-7806)

1.2 Verify the following on 2C33 in Unit 2 Control Room:

- Control Room Supply damper 2UCD-8683 HS (2HS-8683-1) in AUTO AND Green light OFF.
- Control Room Return damper 2PCD-8685 HS (2HS-8685-2) in AUTO AND Green light OFF.
- Control Room Recirc & Exhaust dampers HS (2HS-8700) on 2C22 in RECIRC.

1.3 Verify the following on C141A/B in Unit 1 Computer Room:

- Control Room Supply damper (CV-7905) Green light OFF.
- Control Room Return damper (CV-7907) Green light OFF.
- Chlorine Detector Bypass switch (HS-1A) in NORMAL.
- Unit 2 Radiation Monitor Bypass switch (HS-2A) in NORMAL.
- Chlorine Detector Bypass switch (HS-1B) in NORMAL.

1.4 Verify the following:

- Small quantity of bleach (Purex, Clorox, etc.) available for actuating detectors.
- Small bottle of DI water available for resetting detectors.



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1.5 Verify one of the following:

- All of the following true:
  - VSF-9 AND 2VSF-9 OPERABLE for Unit 1.
  - VSF-9 OPERABLE for Unit 2.
  - 2VSF-9 OPERABLE and powered from Unit 2.
- ANO1 and ANO2 in appropriate Tech Spec Conditions (Refer to Attachment B of this procedure)

1.6 Record the following:

Stopwatch M&TE No. \_\_\_\_\_ Cal Due Date \_\_\_\_\_

Stopwatch M&TE No. \_\_\_\_\_ Cal Due Date \_\_\_\_\_

Stopwatch M&TE No. \_\_\_\_\_ Cal Due Date \_\_\_\_\_

Stopwatch M&TE No. \_\_\_\_\_ Cal Due Date \_\_\_\_\_

1.7 Obtain keys #299 and #300 for operation of radiation monitor (2RITS-8001A, 2RITS-8001B, 2RITS-8750-1A and 2RITS-8750-1B) keypads.

\* 1.8 IF Control Room Chlorine,  
OR Radiation actuation occurs during performance of this supplement,  
THEN complete section 7.0 of this procedure.

\* 1.9 IF any component tested by this supplement is inoperable,  
THEN perform the following:

- Verify Caution Tag installed on inoperable component indicating the need to complete necessary portions of this supplement prior to restoring operability.
- N/A the associated testing steps and tables for this test.

\* 1.10 IF desired to start Control Room Emergency Air Conditioning,  
THEN place respective HS to ON and release:

- 2VUC-27A (2HS-8665-1) (2C33)
- 2VUC-27B (2HS-8666-2) (2C33)

1.10.1 Check respective Emergency Control Room Chiller starts:

- 2VE-1A (2VUC-27A)
- 2VE-1B (2VUC-27B)

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2.0 TEST METHOD (Sub-sections may be performed in any order)

2.1 Chlorine Detector 2CLS-8760-2 (Unit 1 Computer Room)

2.1.1 Perform the following to actuate 2CLS-8760-2:

- A. Remove Plexiglas analyzer cover.
- B. Dip pencil eraser OR cotton swab in bleach.
- C. Touch spiral-wound element in 2CLS-8760-2.
- D. Measure time from introduction of chlorine to detector until damper closes.

2.1.2 Complete Table 1A.

TABLE 1A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)		< 10 sec	YES NO	YES NO
2PCD-8685			< 10 sec	YES NO	YES NO
CV-7905	Closed (Green Light lit on C141A/B)		< 10 sec	YES NO	YES NO
CV-7907			< 10 sec	YES NO	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

2.1.3 Complete Table 1B.

TABLE 1B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
Local Alarm	Actuated	N/A	N/A	N/A	YES NO
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO

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- 2.1.4 Rinse spiral-wound element as necessary.
- 2.1.5 Depress 2CLS-8760-2 RESET button.
- 2.1.6 Verify detector resets (e.g. red detector alarm light off).
- 2.1.7 Re-install analyzer cover.
- 2.1.8 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset Button PB-2 on C141B.
- 2.1.9 Complete Table 1C.

TABLE 1C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Starts	N/A	N/A	N/A	YES NO
VSF-9	Stops	N/A	N/A	N/A	YES NO

- 2.1.10 Complete Table 1D.

TABLE 1D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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2.2 Chlorine Detector 2CLS-8761-1 (Unit 1 Computer Room).

2.2.1 Perform the following to actuate 2CLS-8761-1:

- A. Remove Plexiglas analyzer cover.
- B. Dip pencil eraser or cotton swab in bleach.
- C. Touch spiral-wound element in 2CLS-8761-1.
- D. Measure time from introduction of chlorine to detector until damper closes.

2.2.2 Complete Table 2A.

TABLE 2A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)		< 10 sec	YES NO	YES NO
2PCD-8685			< 10 sec	YES NO	YES NO
CV-7905	Closed (Green Light lit on C141A/B)		< 10 sec	YES NO	YES NO
CV-7907			< 10 sec	YES NO	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VSF-8A	Stopped	N/A	N/A	N/A	YES NO
2VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VEF-43A	Stopped	N/A	N/A	N/A	YES NO
2VEF-43B	Stopped	N/A	N/A	N/A	YES NO
2VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

2.2.3 Complete Table 2B.

TABLE 2B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
Local Alarm	Actuated	N/A	N/A	N/A	YES NO
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO

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- 2.2.4 Rinse spiral-wound element as necessary.
- 2.2.5 Depress 2CLS-8761-1 RESET button.
- 2.2.6 Verify detector resets (e.g. red detector alarm light off).
- 2.2.7 Re-install analyzer cover.
- 2.2.8 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset button PB-2 on C141A.
- 2.2.9 Secure 2VSF-9 by performing the following:
- A. Place (2HS-8603-1) on 2C33 to STOP.
- B. Return 2VSF-9 to automatic by placing (2HS-8603-1) to AUTO.
- 2.2.10 Complete Tables 2C.

TABLE 2C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Started	N/A	N/A	N/A	YES NO
2VSF-8A OR 2VSF-8B	Started	N/A	N/A	N/A	YES NO
2VEF-43A OR 2VEF-43B	Started	N/A	N/A	N/A	YES NO

- 2.2.11 Complete Table 2D.

TABLE 2D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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2.3 Chlorine Detector 2CLS-8762-2 (RP Briefing Office)

2.3.1 Perform the following to actuate 2CLS-8762-2:

- A. Remove Plexiglas analyzer cover.
- B. Dip pencil eraser OR cotton swab in bleach.
- C. Touch spiral-wound element in 2CLS-8762-2.
- D. Measure time from introduction of chlorine to detector until damper closes.

2.3.2 Complete Table 3A.

TABLE 3A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)		< 10 sec	YES NO	YES NO
2PCD-8685			< 10 sec	YES NO	YES NO
CV-7905	Closed (Green Light lit on C141A/B)		< 10 sec	YES NO	YES NO
CV-7907			< 10 sec	YES NO	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

2.3.3 Complete Table 3B.

TABLE 3B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
Local Alarm	Actuated	N/A	N/A	N/A	YES NO
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO

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- 2.3.4 Rinse spiral-wound element as necessary.
- 2.3.5 Depress 2CLS-8762-2 RESET button.
- 2.3.6 Verify detector resets (e.g. red detector alarm light off).
- 2.3.7 Re-install analyzer cover.
- 2.3.8 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset button PB-2 on C141B.
- 2.3.9 Complete Table 3C.

TABLE 3C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Starts	N/A	N/A	N/A	YES NO
VSF-9	Stops	N/A	N/A	N/A	YES NO

- 2.3.10 Complete Table 3D.

TABLE 3D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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2.4 Chlorine Detector 2CLS-8763-1 (RP Briefing Office)

2.4.1 Perform the following to actuate 2CLS-8763-1:

- A. Remove Plexiglas analyzer cover.
- B. Dip pencil eraser OR cotton swab in bleach.
- C. Touch spiral-wound element in 2CLS-8763-1.
- D. Measure time from introduction of chlorine to detector until damper closes.

2.4.2 Complete Table 4A.

TABLE 4A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)		< 10 sec	YES NO	YES NO
2PCD-8685			< 10 sec	YES NO	YES NO
CV-7905	Closed (Green Light lit on C141A/B)		< 10 sec	YES NO	YES NO
CV-7907			< 10 sec	YES NO	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VSF-8A	Stopped	N/A	N/A	N/A	YES NO
2VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VEF-43A	Stopped	N/A	N/A	N/A	YES NO
2VEF-43B	Stopped	N/A	N/A	N/A	YES NO
2VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

2.4.3 Complete Table 4B.

TABLE 4B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
Local Alarm	Actuated	N/A	N/A	N/A	YES NO
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO



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- 2.4.4 Rinse spiral-wound element as necessary.
- 2.4.5 Depress 2CLS-8763-1 RESET button.
- 2.4.6 Verify detector resets(e.g. red detector alarm light off).
- 2.4.7 Re-install analyzer cover.
- 2.4.8 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset button PB-2 on C141A.
- 2.4.9 Secure 2VSF-9 by performing the following:
- A. Place (2HS-8603-1) on 2C33 to STOP.
- B. Return 2VSF-9 to automatic by placing (2HS-8603-1) to AUTO.
- 2.4.10 Complete Table 4C.

TABLE 4C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Started	N/A	N/A	N/A	YES NO
2VSF-8A OR 2VSF-8B	Started	N/A	N/A	N/A	YES NO
2VEF-43A OR 2VEF-43B	Started	N/A	N/A	N/A	YES NO

- 2.4.11 Complete Table 4D.

TABLE 4D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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- 2.5 Unit 1 Control Room Radiation monitor (2RITS-8001A)
- 2.5.1 Perform the following to align 2RITS-8001A:
- A. Verify 2RITS-8001A Bypass HS (2HS-8001A) in OPERATE.
- Check WHITE light ON
  - Check AMBER light OFF
- B. Verify 2RITS-8001B Bypass HS (2HS-8001B) in BYPASS.
- Check AMBER light ON
  - Check WHITE light OFF
- C. Verify Unit One Status Board updated to present 2RITS-8001 configuration.
- 2.5.2 Reposition key operated switch from ON to KEYPAD.
- 2.5.3 Push AND hold TEST button until Test Screen displayed. (~ 5 seconds)
- 2.5.4 Actuate 2RITS-8001A by pushing SET button  
AND measure time from local alarm until damper closes.
- 2.5.5 WHEN local alarm actuates,  
THEN push RESET button to silence local alarm.
- 2.5.6 Complete Table 5A.

TABLE 5A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)		< 10 sec	YES NO	YES NO
2PCD-8685			< 10 sec	YES NO	YES NO
CV-7905	Closed (Green Light lit on C141A/B)		< 10 sec	YES NO	YES NO
CV-7907			< 10 sec	YES NO	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room

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2.5.7 Complete Table 5B.

TABLE 5B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO
K10-D1	Actuated	N/A	N/A	N/A	YES NO

2.5.8 Push MODE button.

2.5.9 Check monitor returns to normal.

2.5.10 IF monitor does NOT return to normal,  
THEN perform the following:

- A. Verify Unit 1 enter TS 3.3.16 Condition A for ONE radiation monitor inoperable.
- B. Verify Unit 2 enter TS 3.3.3.1 for ONE radiation monitor inoperable.
- C. Place key operated switch to OFF for ~5 seconds.
- D. Place key operated switch to KEYPAD.
- E. IF desired to access other screens for functionality,  
THEN push MODE button.
- F. Check monitor returns to normal.
- G. IF monitor returns to normal,  
THEN exit TS entered for this monitor.
- H. IF monitor does NOT return to normal,  
THEN contact I&C for assistance.

2.5.11 Place key operated switch to ON

2.5.12 Remove key.

2.5.13 Perform the following to reset Unit 1 Control Room Isolation Actuation System:

- A. Depress Unit 1 Radiation Reset (PB-1) on C141.
- B. Depress System Trip Reset (PB-2) on C141A.
- C. Depress System Trip Reset (PB-2) on C141B.

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2.5.14 Complete Table 5C.

TABLE 5C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Starts	N/A	N/A	N/A	YES NO
VSF-9	Stops	N/A	N/A	N/A	YES NO

2.5.15 Complete Table 5D.

TABLE 5D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO
K10-D1	Cleared	N/A	N/A	N/A	YES NO

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- 2.6 Unit 1 Control Room Radiation monitor (2RITS-8001B)
- 2.6.1 Perform the following to align 2RITS-8001B:
- A. Verify 2RITS-8001B Bypass HS (2HS-8001B) in OPERATE.
- Check WHITE light ON
  - Check AMBER light OFF
- B. Verify 2RITS-8001A Bypass HS (2HS-8001A) in BYPASS.
- Check AMBER light ON
  - Check WHITE light OFF
- C. Verify Unit One Status Board updated to present 2RITS-8001 configuration.
- 2.6.2 Reposition key operated switch from ON to KEYPAD.
- 2.6.3 Push AND hold TEST button until Test Screen displayed. (~ 5 seconds)
- 2.6.4 Actuate 2RITS-8001B by pushing the SET button  
AND measure time from local alarm until damper closes.
- 2.6.5 WHEN local alarm actuates,  
THEN push RESET button to silence local alarm.
- 2.6.6 Complete Table 6A.

TABLE 6A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)		< 10 sec	YES NO	YES NO
2PCD-8685			< 10 sec	YES NO	YES NO
CV-7905	Closed (Green Light lit on C141A/B)		< 10 sec	YES NO	YES NO
CV-7907			< 10 sec	YES NO	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

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2.6.7 Complete Table 6B.

TABLE 6B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO
K10-D1	Actuated	N/A	N/A	N/A	YES NO

2.6.8 Push MODE button.

2.6.9 Check monitor returns to normal.

2.6.10 IF monitor does NOT return to normal,  
THEN perform the following:

- A. Verify Unit 1 enter TS 3.3.16 Condition A for ONE Radiation Monitor inoperable.
- B. Verify Unit 2 enter TS 3.3.3.1 for ONE Radiation Monitor inoperable.
- C. Place key operated switch to OFF for ~5 seconds.
- D. Place key operated switch to KEYPAD.
- E. IF desired to access other screens for functionality,  
THEN push MODE button.
- F. Check monitor returns to normal.
- G. IF monitor returns to normal,  
THEN exit TS entered for this monitor.
- H. IF monitor does NOT return to normal,  
THEN contact I&C for assistance.

2.6.11 Place key operated switch to ON.

2.6.12 Remove key.

2.6.13 Perform the following to reset Unit 1  
Control Room Isolation Actuation System:

- A. Depress Unit 1 Radiation Reset (PB-1) on C141.
- B. Depress System Trip Reset (PB-2) on C141A.
- C. Depress System Trip Reset (PB-2) on C141B.

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2.6.14 Complete Table 6C.

TABLE 6C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Starts	N/A	N/A	N/A	YES NO
VSF-9	Stops	N/A	N/A	N/A	YES NO

2.6.15 Complete Table 6D.

TABLE 6D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO
K10-D1	Cleared	N/A	N/A	N/A	YES NO

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2.7 Unit 2 Control Room Radiation monitor (2RITS-8750-1A)

2.7.1 Perform the following to align 2RITS-8750-1A:

A. Verify 2RITS-8750-1A Bypass HS (2HS-8750-1A) in OPERATE.

- Check WHITE light ON
- Check AMBER light OFF

B. Verify 2RITS-8750-1B Bypass HS (2HS-8750-1B) in BYPASS.

- Check AMBER light ON
- Check WHITE light OFF

2.7.2 Reposition key operated switch from ON to KEYPAD.

2.7.3 Push AND hold TEST button until Test Screen displayed. (~ 5 seconds)

2.7.4 Actuate 2RITS-8750-1A by pushing the SET button AND measure time from local alarm until damper closes.

2.7.5 WHEN local alarm actuates,  
THEN push RESET button to silence local alarm.

2.7.6 Complete Table 7A.

TABLE 7A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)		< 10 sec	YES NO	YES NO
2PCD-8685			< 10 sec	YES NO	YES NO
CV-7905	Closed (Green Light lit on C141A/B)		< 10 sec	YES NO	YES NO
CV-7907			< 10 sec	YES NO	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VSF-8A	Stopped	N/A	N/A	N/A	YES NO
2VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VEF-43A	Stopped	N/A	N/A	N/A	YES NO
2VEF-43B	Stopped	N/A	N/A	N/A	YES NO
2VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.



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2.7.7 Complete Table 7B.

TABLE 7B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
2K11-D10	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO

2.7.8 Push MODE button.

2.7.9 Check monitor returns to normal.

2.7.10 IF monitor does not return to normal,  
THEN perform the following:

- A. Verify Unit 1 enter TS 3.3.16 Condition A for ONE Radiation Monitor inoperable.
- B. Verify Unit 2 enter TS 3.3.3.1 for ONE Radiation Monitor inoperable.
- C. Place key operated switch to OFF for ~5 seconds.
- D. Place key operated switch to KEYPAD.
- E. IF desired to access other screens for functionality,  
THEN push MODE button.
- F. Check monitor returns to normal.
- G. IF monitor returns to normal,  
THEN exit TS entered for this monitor.
- H. IF monitor does NOT return to normal,  
THEN contact I&C for assistance.

2.7.11 Place key operated switch to ON.

2.7.12 Remove key.

2.7.13 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset button PB-2 on C141A.

2.7.14 Secure 2VSF-9 by performing the following:

- A. Place (2HS-8603-1) on 2C33 to STOP.
- B. Return 2VSF-9 to automatic by placing (2HS-8603-1) to AUTO.

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2.7.15 Complete Table 7C.

TABLE 7C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Started	N/A	N/A	N/A	YES NO
2VSF-8A OR 2VSF-8B	Started	N/A	N/A	N/A	YES NO
2VEF-43A OR 2VEF-43B	Started	N/A	N/A	N/A	YES NO

2.7.16 Complete Table 7D.

TABLE 7D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
2K11-D10	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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- 2.8 Unit 2 Control Room Radiation monitor (2RITS-8750-1B)
- 2.8.1 Perform the following to align 2RITS-8750-1B:
- A. Verify 2RITS-8750-1B Bypass HS (2HS-8750-1B) in OPERATE.
- Check WHITE light ON
  - Check AMBER light OFF
- B. Verify 2RITS-8750-1A Bypass HS (2HS-8750-1A) in BYPASS.
- Check AMBER light ON
  - Check WHITE light OFF
- 2.8.2 Reposition key operated switch from ON to KEYPAD.
- 2.8.3 Push AND hold TEST button until Test Screen displayed. (~ 5 seconds)
- 2.8.4 Actuate 2RITS-8750-1B by pushing the SET button AND measure time from local alarm until damper closes.
- 2.8.5 WHEN local alarm actuates, THEN push RESET button to silence local alarm.
- 2.8.6 Complete Table 8A.

TABLE 8A					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Closed (Green Light lit on 2C33)		< 10 sec	YES NO	YES NO
2PCD-8685			< 10 sec	YES NO	YES NO
CV-7905	Closed (Green Light lit on C141A/B)		< 10 sec	YES NO	YES NO
CV-7907			< 10 sec	YES NO	YES NO
VSF-8A	Stopped	N/A	N/A	N/A	YES NO
VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VSF-8A	Stopped	N/A	N/A	N/A	YES NO
2VSF-8B	Stopped	N/A	N/A	N/A	YES NO
2VEF-43A	Stopped	N/A	N/A	N/A	YES NO
2VEF-43B	Stopped	N/A	N/A	N/A	YES NO
2VSF-9	Starts with air flow (1)	N/A	N/A	N/A	YES NO

(1) Flow indicated by red lamp above handswitch OR airflow in Unit 1 Control Room.

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2.8.7 Complete Table 8B.

TABLE 8B					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Actuated	N/A	N/A	N/A	YES NO
2K11-D10	Actuated	N/A	N/A	N/A	YES NO
K16-B2	Actuated	N/A	N/A	N/A	YES NO

2.8.8 Push MODE button.

2.8.9 Check monitor returns to normal.

2.8.10 IF monitor does NOT return to normal,  
THEN perform the following:

- A. Verify Unit 1 enter TS 3.3.16 Condition A for ONE radiation monitor inoperable.
- B. Verify Unit 2 enter TS 3.3.3.1 for ONE radiation monitor inoperable.
- C. Place key operated switch to OFF for ~5 seconds.
- D. Place key operated switch to KEYPAD.
- E. IF desired to access other screens for functionality,  
THEN push MODE button.
- F. Check monitor returns to normal.
- G. IF monitor returns to normal,  
THEN exit TS entered for this monitor.
- H. IF monitor does NOT return to normal,  
THEN contact I&C for assistance.

2.8.11 Place key operated switch to ON.

2.8.12 Remove key.

2.8.13 Reset Unit 1 CR Isolation Actuation System by depressing System Trip Reset button PB-2 on C141A.

2.8.14 Secure 2VSF-9 by performing the following:

- A. Place (2HS-8603-1) on 2C33 to STOP.
- B. Return 2VSF-9 to automatic by placing (2HS-8603-1) to AUTO.

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2.8.15 Complete Table 8C.

TABLE 8C					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2UCD-8683	Open (Green Light extinguished on 2C33)	N/A	N/A	N/A	YES NO
2PCD-8685		N/A	N/A	N/A	YES NO
CV-7905	Open (Green Light extinguished on C141A/B)	N/A	N/A	N/A	YES NO
CV-7907		N/A	N/A	N/A	YES NO
VSF-8A OR VSF-8B	Started	N/A	N/A	N/A	YES NO
2VSF-8A OR 2VSF-8B	Started	N/A	N/A	N/A	YES NO
2VEF-43A OR 2VEF-43B	Started	N/A	N/A	N/A	YES NO

2.8.16 Complete Table 8D.

TABLE 8D					
COMPONENT	REQUIRED RESPONSE	MEASURED VALUE	LIMITING RANGE FOR OPERABILITY	IS DATA IN LIMITING RANGE?	DID COMPONENT RESPOND AS REQUIRED?
2K08-A4	Cleared	N/A	N/A	N/A	YES NO
2K11-D10	Cleared	N/A	N/A	N/A	YES NO
K16-B2	Cleared	N/A	N/A	N/A	YES NO

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- 2.9 2PCD-8607B Reserve bottle (2VRA-1B) Pressure Check and Test
- 2.9.1 Record 2VRA-1B pressure on 2PI-8601: \_\_\_\_\_ psig
- 2.9.2 IF 2VRA-1B pressure < 680 psig,  
THEN perform the following:
- Refer to Section [12.0](#), 2VSF-9 Outside Air Damper Monitoring.
  - Install Caution Tag on 2VSF-9 Outside Air damper (2HS-8607-B1) on 2C33 stating the remainder of this section must be completed prior to restoring 2VSF-9 to operable status.
  - Record in Remarks Section that 2VRA-1B test discontinued AND N/A remainder of [2.9](#).
- 2.9.3 Start Unit 2 Emergency Fan/Filter 2VSF-9 by placing (2HS-8603-1) on 2C33 in START (spring return to AUTO).

**NOTE**

- If reserve bottle handswitch returned to NORMAL without delay, stroke test of VSF-9/2VSF-9 outside air dampers in accordance with approved procedures does NOT render the associated fan inoperable
- Maintaining 2HS-8607-B1 in RESERVE position renders 2PCD-8607B incapable of automatically opening during operation of 2VSF-9. This renders 2VSF-9 OPERABLE as a manual actuation train for Unit 1 AND if VSF-9 is OPERABLE with Auto-actuation capability, then Unit 1 is NOT required to enter a time clock. 2VSF-9 will be rendered INOPERABLE for Unit 2 and require entry into Unit 2 Tech Spec LCO.

- 2.9.4 Close 2VSF-9 Outside Air damper 2PCD-8607B by placing (2HS-8607-B1) on 2C33 in RESERVE.
- 2.9.5 Check 2PCD-8607B closed.
- 2.9.6 Open 2PCD-8607B by placing (2HS-8607-B1) on 2C33 in NORMAL.
- 2.9.7 Check 2PCD-8607B open.
- 2.9.8 Stop 2VSF-9 by placing (2HS-8603-1) on 2C33 to STOP.
- 2.9.9 Return 2VSF-9 to automatic by placing (2HS-8603-1) to AUTO.

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- 2.10 CV-7910 Reserve bottle (VRA-1A) Pressure Check and Test
- 2.10.1 Record VRA-1A pressure on PI-8308: \_\_\_\_\_ psig
- 2.10.2 IF VRA-1A pressure < 680 psig,  
THEN perform the following:
- Refer to Section [11.0](#), VSF-9 Outside Air Damper Monitoring.
  - Install Caution Tag on VSF-9 Outside Air Damper (HS-7910) stating the remainder of this section must be completed prior to restoring VSF-9 to operable status.
  - Record in Remarks Section that VRA-1A test discontinued AND N/A remainder of [2.10](#).

**NOTE**

- If reserve bottle handswitch is returned to NORMAL without delay, stroke test of VSF-9/~~2~~VSF-9 outside air dampers in accordance with approved procedures does NOT render the associated fan inoperable
- Maintaining HS-7910 in RESERVE position renders CV-7910 incapable of auto opening during VSF-9 operation. This renders VSF-9 INOPERABLE for Unit 2 and requires entry into Unit 2 Tech Spec LCO. However, VSF-9 is still OPERABLE as a manual actuation train for Unit 1 AND if ~~2~~VSF-9 is OPERABLE and capable of Auto actuation, Unit 1 is NOT required to enter a time clock.

- 2.10.3 Close VSF-9 Outside Air damper CV-7910 by placing (HS-7910) on C19 in RESERVE.
- 2.10.4 Check CV-7910 indicates closed.
- 2.10.5 Return CV-7910 to automatic operation by placing (HS-7910) on C19 to NORMAL.
- 2.11 Verify normal operation of following:
- Unit 1 Control Room Chillers (VCH-2A or VCH-2B) per Control Room Air Conditioning (1104.034).
  - Unit 2 Control Room Chillers (2VCH-2A or 2VCH-2B) per Control Room Chilled Water System (2104.048).

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2.12 IF 2VUC-27A or 2VUC-27B operating,  
THEN secure by placing respective HS in OFF and releasing:

- 2VUC-27A HS (2HS-8665-1) on 2C33
- 2VUC-27B HS (2HS-8666-2)

**CRITICAL STEP**

- on 2C33

2.12.1 Check Control Room Emergency chillers (2VE-1A/1B) secured (should automatically stop based on low suction pressure).

2.13 Obtain 2<sup>nd</sup> Person verification that 2VSF-9 HS (2HS-8603-1) on 2C33 in AUTO.

2<sup>nd</sup> Person Verification: \_\_\_\_\_

2.14 Return keys #299 and #300 to the Shift Manager.

### 3.0 ACCEPTANCE CRITERIA

3.1 IF NO circled in Table 1A, 1C, 2A, 2C, 3A, 3C, 4A, 4C, 5A, 5C, 6A, 6C, 7A, 7C, 8A, OR 8C,  
THEN perform the following:

- Declare affected components inoperable.
- Notify Unit 1 Shift Manager.
- Notify Unit 2 Shift Manager.
- Refer to Attachment B, Component/Tech Spec Cross-Reference and Attachment C, Chlorine Detector Matrix.
- Initiate WR/WO as applicable.

3.2 IF NO circled in Table 1B, 1D, 2B, 2D, 3B, 3D, 4B, 4D, 5B, 5D, 6B, 6D, 7B, 7D, 8B, OR 8D,  
THEN initiate WR/WO on affected component as applicable.

3.3 IF any tested component N/A'd or declared inoperable during performance of this supplement,  
THEN verify Caution Tag installed on inoperable component indicating the need to complete necessary portions of this Supplement prior to restoring operability.

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

Performed By: \_\_\_\_\_ Date \_\_\_\_\_



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4.0 SUPERVISOR REVIEW AND ANALYSIS

4.1 Do all values in Tables 1A, 2A, 3A, 4A, 5A, 6A, 7A, AND 8A fall within specified LIMITING RANGE FOR OPERABILITY? YES NO

4.2 Has this equipment been proven operable per ACCEPTANCE CRITERIA? YES NO

4.3 IF answer to 4.1 OR 4.2 NO, THEN perform the following corrective actions as applicable:

- Verify LCO Tracking Record initiated.
- Verify Condition Report initiated.

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

4.5 Are all administrative requirements of this test satisfied? YES NO

Unit 1 Supervisor:\_\_\_\_\_ Date \_\_\_\_\_

Unit 2 Supervisor:\_\_\_\_\_ Date \_\_\_\_\_

**ADMINISTRATIVE JOB PERFORMANCE MEASURE**UNIT: 2 REV #: 2 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Radiation ControlsTASK: Approve administration of Potassium Iodide.JTA#: ANO-SRO-EPLAN-EMERG-292KA VALUE RO: 3.4 SRO: 3.8 KA REFERENCE: 2.3.14APPROVED FOR ADMINISTRATION TO: RO: \_\_\_\_\_ SRO: XTASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: \_\_\_\_\_ BOTH: X

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: Perform CLASSROOM: Perform

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ CLASSROOM: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 20 MinutesREFERENCE(S): 1903.035, Administration of Potassium Iodide

EXAMINEE'S NAME: \_\_\_\_\_ Login ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time \_\_\_\_\_

**ADMINISTRATIVE JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- The plant is tripped from 100% power
- 300 gpm LOCA in progress
- Loss of Offsite power is in progress
- RDACS indicates an offsite release in progress
- RP estimates that it will take approximately 20 minutes in the USPPR to complete required actions to stop the release and all RP required controls/authorizations are complete.
- Data indicates I-131 concentration in area of work in the Upper South Piping Penetration Room (USPPR) is 1.0 E-04  $\mu\text{Ci/cc}$
- Whole body dose rates in area of work are 1R/hr
- Site Area Emergency has been declared
- Joe Mechanic's KI Training (ASCBT-EP-OSCBRF) is NOT current.
- Joe Mechanic (Badge Number 22572) has read Attachment 2, "Consumer Package Insert" and has chosen to take Potassium Iodide if required
- Air Purifying Respirator with Iodine Canister having a protection factor of 1.0 will be used in place of a SCBA due to piping interference
- EOF, OSC and TSC are being staffed but are NOT operational

**TASK STANDARD:**

Applicant determined that Potassium Iodide is required to be administered for this task IAW 1903.035 due to exceeding 5 REM CDE Thyroid; however, Joe Mechanic should not be administered due to his allergic reaction to shell fish.

**TASK PERFORMANCE AIDS:** 1903.0035, Potassium Iodide Administration Rev. 16 will be provided to the applicants including Form 1903.035C (Completed), ANO Medical Questionnaire-Iodine Sensitivity and Form 1903.035A, Potassium Iodide Administration.

**EXAMINER NOTES:**

Approve administration of Potassium Iodide. In this administrative JPM, an individual has been selected to enter an area of high I-131 concentration to stop a release. The applicant must determine if the individual should be approved to have Potassium Iodide (KI) administered to him. The concentration of I-131 concentration will be determined to be high enough that KI is required to be administered. However, based on the medical questionnaire filled out by the individual the applicant should determine that the individual is allergic to shellfish/KI and thus cannot have KI administered to them. Another individual will need to be selected for the task

**Rev.1:** Updated JPM based on Revision 16 of the E-Plan procedure 1903.035 changed the criteria from 10 REM to 5 Rem dose to authorize KI.

**Rev. 2:** Changed the time to stop the release to 20 minutes and the I-131 concentration in the area of work to 1.0 E-04  $\mu\text{Ci/cc}$  in the Initial Conditions. Also updated the TASK PERFORMANCE AIDS to ensure OP 1903.035, Potassium Iodide Administration will be provided to the applicants based on feedback from the Facility Representative.

**ADMINISTRATIVE JOB PERFORMANCE MEASURE****INITIATING CUE:**

IAW OP 1903.035 Administration of Potassium Iodide, determine if KI, Potassium Iodide, is or is not required to be administered for this task. Also determine if administration of Potassium Iodide should or should not be approved for Joe Mechanic **AND** complete FORM OP-1903.035A

START TIME: \_\_\_\_\_

		PERFORMANCE CHECKLIST	STANDARD	(Circle One)
<b>EXAMINER NOTE: Provide the examinee a KI Administration Form 1903.035A and a Medical Questionnaire-Iodine Sensitivity Form 1903.035C that has been completed by Joe Mechanic</b>				
	1. (Step 6.1)	Review 1903.035, Administration of Potassium Iodide to determine criteria for administering KI.	Examinee determined the criteria for administration of KI to an individual is a dose commitment of 5 REM or greater exposure to thyroid committed dose equivalent (CDE)	N/A SAT UNSAT
	2. (Step 6.2.2)	Refer to Attachment 3, "Potassium Iodide Flowchart" as Necessary	Referred to and used Attachment 3, "Potassium Iodide Flowchart" to assist in decision to administer Potassium Iodide.	N/A SAT UNSAT
(C)	3. (Step 6.2.5)	Using graph on 1903.035 Attachment 1 and information provided in initial conditions, determine that Joe Mechanic will exceed 5 REM during the maintenance evolution.	On Attachment 1, Thyroid Committed Dose Equivalent Graph determined that expected exposure will exceed 5 REM threshold for 20 minutes of work at I-131 concentration of 1.0 E-04 $\mu\text{Ci/cc}$ .  Determined that these conditions will require administration of Potassium Iodide.	N/A SAT UNSAT

**ADMINISTRATIVE JOB PERFORMANCE MEASURE**

		PERFORMANCE CHECKLIST	STANDARD	(Circle One)
	4. (Step 6.3)	Review and fill out form 1903.035A Potassium Iodide (KI) Administration Form	Completed all areas of form 1903.035A, Potassium Iodide Administration, from initial conditions: <ul style="list-style-type: none"> <li>• Badge Number</li> <li>• Duration of Exposure</li> <li>• I-131 Concentration</li> <li>• Estimated Thyroid dose commitment.</li> <li>• Respiratory Protection Factor.</li> </ul>	N/A SAT UNSAT
	5. (Step 6.5.1)	Determine that Joe Mechanic is sensitive to and has experienced an allergic reaction to shellfish/iodide.	Reviewed 1903.035C form and determined that Joe Mechanic was sensitive to iodine and has experienced an allergic reaction to shellfish/iodine in the past.	N/A SAT UNSAT
(C)	6. (Step 6.5.2)	Determine that KI should NOT be approved for distribution to Joe Mechanic during the Upper South Piping penetration work.	Examinee applied step 6.5.2 and Caution on Form 1903.035A and did NOT approve distribution of KI to Joe Mechanic.	N/A SAT UNSAT
<b>END</b>				

STOP TIME: \_\_\_\_\_

**ADMINISTRATIVE JOB PERFORMANCE MEASURE****EXAMINER'S COPY****INITIAL CONDITIONS:**

- The plant is tripped from 100% power
- 300 gpm LOCA in progress
- Loss of Offsite power is in progress
- RDACS indicates an offsite release in progress
- RP estimates that it will take approximately 20 minutes in the USPPR to complete required actions to stop the release and all RP required controls/authorizations are complete.
- Data indicates I-131 concentration in area of work in the Upper South Piping Penetration Room (USPPR) is 1.0 E-04  $\mu\text{Ci/cc}$
- Whole body dose rates in area of work are 1R/hr
- Site Area Emergency has been declared
- Joe Mechanic's KI Training (ASCBT-EP-OSCBRF) is NOT current.
- Joe Mechanic (Badge Number 22572) has read Attachment 2, "Consumer Package Insert" and has chosen to take Potassium Iodide if required
- Air Purifying Respirator with Iodine Canister having a protection factor of 1.0 will be used in place of a SCBA due to piping interference
- EOF, OSC and TSC are being staffed but are NOT operational

**INITIATING CUE:**

IAW OP 1903.035 Administration of Potassium Iodide, determine if KI, Potassium Iodide, is or is not required to be administered for this task. Also determine if administration of Potassium Iodide should or should not be approved for Joe Mechanic **AND** complete FORM OP-1903.035A

**KEY**

1. IAW OP 1903.035, Potassium Iodide (KI) **IS** IS NOT required to be administered for this task. (Circle One)

Why: Greater than 5 Rem CDE to the thyroid is likely for this task or similar wording.

2. Joe Mechanic SHOULD **SHOULD NOT** be approved for receiving Potassium Iodide (KI). (Circle One)

Why: Joe Mechanic answered YES to Question 1 on the Form 1903.035C or similar wording to indicate Joe Mechanic is allergic to shellfish/iodine.

**ADMINISTRATIVE JOB PERFORMANCE MEASURE****EXAMINEE'S COPY****INITIAL CONDITIONS:**

- The plant is tripped from 100% power
- 300 gpm LOCA in progress
- Loss of Offsite power is in progress
- RDACS indicates an offsite release in progress
- RP estimates that it will take approximately 20 minutes in the USPPR to complete required actions to stop the release and all RP required controls/authorizations are complete.
- Data indicates I-131 concentration in area of work in the Upper South Piping Penetration Room (USPPR) is 1.0 E-04  $\mu\text{Ci/cc}$
- Whole body dose rates in area of work are 1R/hr
- Site Area Emergency has been declared
- Joe Mechanic's KI Training (ASCBT-EP-OSCBRF) is NOT current.
- Joe Mechanic (Badge Number 22572) has read Attachment 2, "Consumer Package Insert" and has chosen to take Potassium Iodide if required
- Air Purifying Respirator with Iodine Canister having a protection factor of 1.0 will be used in place of a SCBA due to piping interference
- EOF, OSC and TSC are being staffed but are NOT operational

**INITIATING CUE:**

IAW OP 1903.035 Administration of Potassium Iodide, determine if KI, Potassium Iodide, is or is not required to be administered for this task. Also determine if administration of Potassium Iodide should or should not be approved for Joe Mechanic **AND** complete FORM OP-1903.035A

1. IAW OP 1903.035, Potassium Iodide (KI) IS / IS NOT required to be administered for this task. (Circle One)

Why: \_\_\_\_\_  
\_\_\_\_\_

2. Joe Mechanic SHOULD / SHOULD NOT be approved for receiving Potassium Iodide (KI) (Circle One)

Why: \_\_\_\_\_  
\_\_\_\_\_

## Potassium Iodide (KI) Administration Form

Name of Exposed Individual: Mechanic, Joe, Robert  
Last First Middle

Badge Number:

Note:

Iodine Allergy / Previous Allergic Reaction to Iodine are based on answers from 1903.035C ANO Medical Questionnaire-Iodine Sensitivity.

Known Iodide Allergy/Previous Allergic Reaction to iodide: ☐ Yes ☐ No

### CAUTION

If the above box is checked yes, then **DO NOT** administer Potassium Iodide.

I verify that I have read and understand the precaution leaflet (Attachment 2) and I understand that taking thyroid blocking agent (KI) is strictly voluntary.

I ☒ choose to take KI ☐ do not choose to take KI.

Joe Mechanic  
Signature of Exposed Individual

Today  
Date

Approved:

Shift Manager/ED/EPM

☐ Check if approval is via telecom.

---

Date

KI Issued By: \_\_\_\_\_  
Signature

---

Date

Date of Exposure: Today

Respiratory Protection Worn During Exposure: ☐ Yes ☐ No

Respirator Protection Factor:

Duration of Exposure: \_\_\_\_\_ I-131 Concentration: \_\_\_\_\_  
Minutes uCi/cc in air

Estimated Thyroid Dose Commitment: ☐ < 5 Rem ☐ ≥ 5 Rem  
☐ Unknown, large exposure possible

Notes: \_\_\_\_\_

FORM TITLE:	CHANGE:.	REV.
<b>POTASSIUM IODIDE ADMINISTRATION</b>	<b>1903.035A</b>	<b>016</b>



## MEDICAL QUESTIONNAIRE: IODINE SENSITIVITY

Name: Mechanic , Joe , Robert  
LAST FIRST MIDDLE

Badge Number: 22572 Company: Entergy Dept: Mechanical Maint.

Please answer the following questions. Mark the appropriate box.

<u>NO.</u>	<u>QUESTION</u>	<u>YES</u>	<u>NO</u>
1.	When eating seafood or shellfish, do you suffer from symptoms of stomach or bowel upset or skin eruption? If so, explain below.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.	Has any physician told you that you have sensitivity to iodine?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.	If you have ever had a gallbladder dye test, kidney x-ray requiring dye injection or a thyroid isotope scan, were there any reactions?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Please explain any yes answers: Don't eat Seafood or Shellfish due to  
upset stomach and rash.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Print & Sign Signature: Joe Mechanic *Joe Mechanic* Date: Today

FORM TITLE:

ANO MEDICAL QUESTIONNAIRE: IODINE SENSITIVITY

CHANGE:

1903.035C

REV.

016



ENTERGY OPERATIONS INCORPORATED  
ARKANSAS NUCLEAR ONE

TITLE: ADMINISTRATION OF POTASSIUM IODIDE

DOCUMENT NO.  
1903.035

CHANGE NO.  
016

SET #

SAFETY-RELATED  
☒ YES ☐ NO

REACTIVITY IMPACT  
☐ YES ☐ INPR ☒ NO

TEMP MOD  
☐ YES ☒ NO

IPTE  
☐ YES ☒ NO

LEVEL OF USE  
☐ CONTINUOUS  
☐ REFERENCE  
☒ INFORMATIONAL  
☐ MULTI-USE

PROGRAMMATIC EXCLUSION PER EN-LI-100  
☐ YES ☒ NO

When you see these **TRAPS**

Get these **TOOLS**

Time Pressure  
Distraction/Interruption  
Multiple Tasks  
Overconfidence  
Vague or Interpretive Guidance  
First Shift/Last Shift  
Peer Pressure  
Change/Off Normal  
Physical Environment  
Mental Stress (Home or Work)

Effective Communication  
Questioning Attitude  
Placekeeping  
Self Check  
Peer Check  
Knowledge  
Procedures  
Job Briefing  
Coaching  
Turnover

CHECKED BY

DATE

TIME

FORM TITLE:

PROCEDURE COVER SHEET

FORM NO.

1000.006A

CHANGE NO.

057

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## 1.0 PURPOSE

The purpose of this procedure is to provide guidance for the administration of Potassium Iodide (KI) to avert the uptake of radioiodine into the thyroid gland.

## 2.0 SCOPE

This procedure applies to all ANO and contractor employees prior to a planned exposure to radioiodine and after an accidental exposure.

## 3.0 REFERENCES

### 3.1 REFERENCES USED IN PROCEDURE PREPARATION:

- 3.1.1 EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents
- 3.1.2 Consumer Package Insert for Commercially Packaged Potassium Iodide
- 3.1.3 ANO Emergency Plan
- 3.1.4 NUREG 0654/FEMA-REP-1, Criteria for the Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants (and Supplements)

### 3.2 REFERENCES USED IN CONJUNCTION WITH THIS PROCEDURE:

- 3.2.1 1903.033, Protective Action Guidelines for Rescue/Repair and Damage Control Teams
- 3.2.2 1903.065, Emergency Response Facility - Technical Support Center (TSC)
- 3.2.3 1903.067, Emergency Response Facility - Emergency Operations Facility (EOF)
- 3.2.4 1903.066, Emergency Response Facility - Operational Support Center (OSC)
- 3.2.5 EN-FAP-EP-009 Use of KI for the Emergency Response Organization

### 3.3 RELATED ANO PROCEDURES:

1903.060, "Emergency Supplies and Equipment"

### 3.4 REGULATORY CORRESPONDENCE CONTAINING NRC COMMITMENTS WHICH ARE IMPLEMENTED IN THIS PROCEDURE: Commitments noted in **[BOLD]**

None

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#### 4.0 DEFINITIONS

- 4.1 Potassium Iodide (KI) - A compound of potassium and iodine that, when ingested, delivers free stable (non-radioactive) iodine to the blood stream where it is available to the human thyroid to be absorbed in the normal course of thyroid function. The stable iodine now available to the thyroid, "competes for absorption" with radioactive iodine which may also be present in the blood stream as a result of the inhalation of air or the ingestion of food stuffs contaminated by radioactive iodine released as a result of an accident in a nuclear facility. The presence of sufficient non-radioactive iodine in the blood stream will substantially reduce the uptake of radioactive iodine by the thyroid gland thereby reducing the probability of potentially adverse effects on the thyroid. KI provides no protection against the internal effects of radionuclides other than iodine and bromine and no protection against external exposure from any radionuclide.
- 4.2 Impediments to a Plant Evacuation - Conditions exist that will not allow plant personnel to exit the protected area and SOCA. (e.g. terrorist threat, fire at exit points, equipment failures, etc.)

#### 5.0 RESPONSIBILITY AND AUTHORITY

- 5.1 The Radiological Coordinator (or the Shift Manager if the Radiological Coordinator is not available) is responsible for the implementation of this procedure for on-site emergency response personnel.
- 5.2 The Radiological Assessment Coordinator (RAC) is responsible for the implementation of this procedure for off-site emergency response personnel.
- 5.3 The Emergency Plant Manager (EPM) (or Shift Manager if the EPM is not available) is responsible for authorizing the administration of Potassium Iodide (KI) for on-site emergency response personnel.
- 5.4 The EOF Emergency Director (ED) is responsible for authorizing the administration of Potassium Iodide (KI) for offsite emergency response personnel.

#### 6.0 INSTRUCTIONS

- 6.1 Administration of Potassium Iodide (KI) shall be evaluated whenever any of the following conditions exist:
- 6.1.1. A dose commitment of 5 Rem CDE or greater to the thyroid is likely to be received by an individual.
  - 6.1.2. Exposure to large amounts of radioactive airborne iodine is possible and repair/damage control actions of a critical nature must occur prior to air sample analysis.
- 6.2 Determine the need to issue Potassium Iodide as follows:

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- 6.2.1 In all cases where airborne contamination is anticipated, the use of proper respiratory equipment shall be considered.
- 6.2.2 Reference Attachment 3, "Potassium Iodide Flowchart" as necessary.
- 6.2.3 IF in a General Emergency classification AND there are impediments to a plant evacuation, THEN evaluate administration of Potassium Iodide to all personnel on site except those personnel in the Control Room envelope.
- A. Go to Step 6.3
- 6.2.4 IF in a General Emergency classification, THEN evaluate administration of Potassium Iodide to the following personnel prior to being dispatched and to personnel already in the field:
- Rescue/Repair and Damage Control personnel
  - Offsite monitoring personnel
  - On-shift Control Room Operations personnel NOT within the control room envelope. (i.e. SM, STA, RO, WCO, NLO )
  - Security (affected security personnel)
  - Other personnel (medical team, Engineering, etc)
- 6.2.5 IF air sample analysis is available, THEN use Attachment 1, "Thyroid Committed Dose Equivalent Graph", to estimate the dose commitment for the thyroid.
- A. IF the Thyroid Committed Dose Equivalent from Attachment 1 is equal to or greater than 5 Rem CDE, THEN administer Potassium Iodide to these personnel. Go to step 6.3
- 6.2.6 IF repair/damage control actions of a critical nature must occur and NO air sample analysis is available, THEN determine if exposure to significant levels of radioactive iodine is possible using the following indicators:
- SPINGS, failed fuel monitors and process monitors
  - Dose Assessment
  - Reactor Engineering
- A. IF it is determined that exposure to significant levels of radioactive iodine is possible, THEN administer Potassium Iodide to these personnel. Go to step 6.3.
- 6.2.7 IF none of the above conditions exist, THEN exit this procedure.

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**NOTE**

The Shift Manager, EPM, or EOF ED may approve use of Potassium Iodide in the field after the personnel have complied with the guidelines of this procedure. Approval may be obtained via telecom.

- 6.3 Obtain approval to issue Potassium Iodide from the Shift Manager, EPM, or EOF ED during non-emergency, NUE, Alert and SAE classifications. Indicate approval on Form 1903.035A. During a General Emergency, approval is implied due to instructional guidance to issue KI.
  
- 6.4 Have the individuals who are designated to receive Potassium Iodide perform the following:
  - 6.4.1 **IF** KI Training (ASCBT-EP-OSCBRF) **HAS BEEN** completed and is current,  
**THEN** review of Attachment 2, Consumer Package Insert is **NOT REQUIRED**. Perform the following 2 steps.
    - A. Complete the appropriate sections of Form 1903.035A, Potassium Iodide Administration.
    - B. Complete Form 1903.035C, ANO Medical Questionnaire: Iodine Sensitivity.
  - 6.4.2 **IF** KI Training (ASCBT-EP-OSCBRF) **HAS NOT** been completed,  
**THEN** perform the following 3 steps.
    - A. Review Attachment 2, Consumer Package Insert.
    - B. Complete the appropriate sections of Form 1903.035A, Potassium Iodide Administration.
    - C. Complete Form 1903.035C, ANO Medical Questionnaire: Iodine Sensitivity.
  
- 6.5 Administration of Potassium Iodide

**NOTE**

Potassium Iodide is stored in the following locations:

- A. TSC Emergency Kit
- B. Onsite Radiological Monitoring Kit (located in the OSC)
- C. EOF Emergency Kit
- D. Field Monitoring Kits (located in the EOF)
- E. Control Room Emergency Kit

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**NOTE**

Potassium Iodide should be administered approximately one-half hour before exposure for maximum blockage.

Final uptake is halved if Potassium Iodide is administered within 3-4 hours after exposure.

Little benefit is gained with Potassium Iodide administration 10-12 hours after exposure.

- 6.5.1 Verify that each individual receiving Potassium Iodide has signed Forms 1903.035A and 1903.035C.
- 6.5.2 **IF** an individual has checked "I do not choose to take Potassium Iodide" on Form 1903.035A **OR** has answered "YES" to any question on Form 1903.035C, **THEN** perform the following:
  - A. **DO NOT** issue Potassium Iodide to this individual
  - B. Take one of the following actions:
    - 1. Replace this individual with other personnel if available.
    - 2. If available, take other protective actions for this individual to reduce radioiodine uptake.
  - C. Document actions on Form 1903.035A
  - D. **IF** individual is exposed to radioactive Iodine, **THEN** go to Post Exposure Actions, step 6.6, **OTHERWISE** exit this procedure.
- 6.5.3 Issue each individual designated to receive Potassium Iodide one (1) 130-mg KI tablet.
- 6.5.4 Record the issuance on Form 1903.035B, "KI Issue Record".

**NOTE**

Potassium Iodide should be administered daily until the exposure to radioactive iodine has stopped.

- 6.5.5 The Radiological Coordinator should determine if the continued issuance of Potassium Iodide tablets is recommended based on exposure levels.
- 6.5.6 Forward all completed paperwork to the Radiological Coordinator / RAC.
- 6.6 Post Exposure Actions
  - 6.6.1 **IF** the individual has been exposed to radioactive iodine **THEN** a whole body count and/or bioassay analysis should be performed at the earliest opportunity.



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A. Schedule whole body counts and/or bioassay analysis to be completed on a regular basis throughout the Potassium Iodide issue period to verify the effectiveness of the Potassium Iodide and to estimate dose commitment.

6.6.2 Ensure each individual whose estimated exposure to radioiodine was equal to or exceeded 5 Rem has been identified. Administer Potassium Iodide, as appropriate. **DO NOT** administer Potassium Iodide to those individuals that have chosen NOT to take Potassium Iodide or have answered "Yes" to any question on Form 1903.035C.

6.6.3 Ensure all necessary forms are completed and reviewed by the Radiological Coordinator / RAC and the Shift Manager/EPM/EOF ED.

6.6.4 Ensure documentation has been completed and assembled by the Radiological Coordinator and/or RAC for post-event assessments and records.

## 7.0 ATTACHMENTS AND FORMS

### 7.1 ATTACHMENTS

7.1.1 Attachment 1 - Thyroid Committed Dose Equivalent Graph

7.1.2 Attachment 2 - Consumer Package Insert

7.1.3 Attachment 3 - Potassium Iodide Flowchart

### 7.2 FORMS

7.2.1 Form 1903.035A - Potassium Iodide Administration

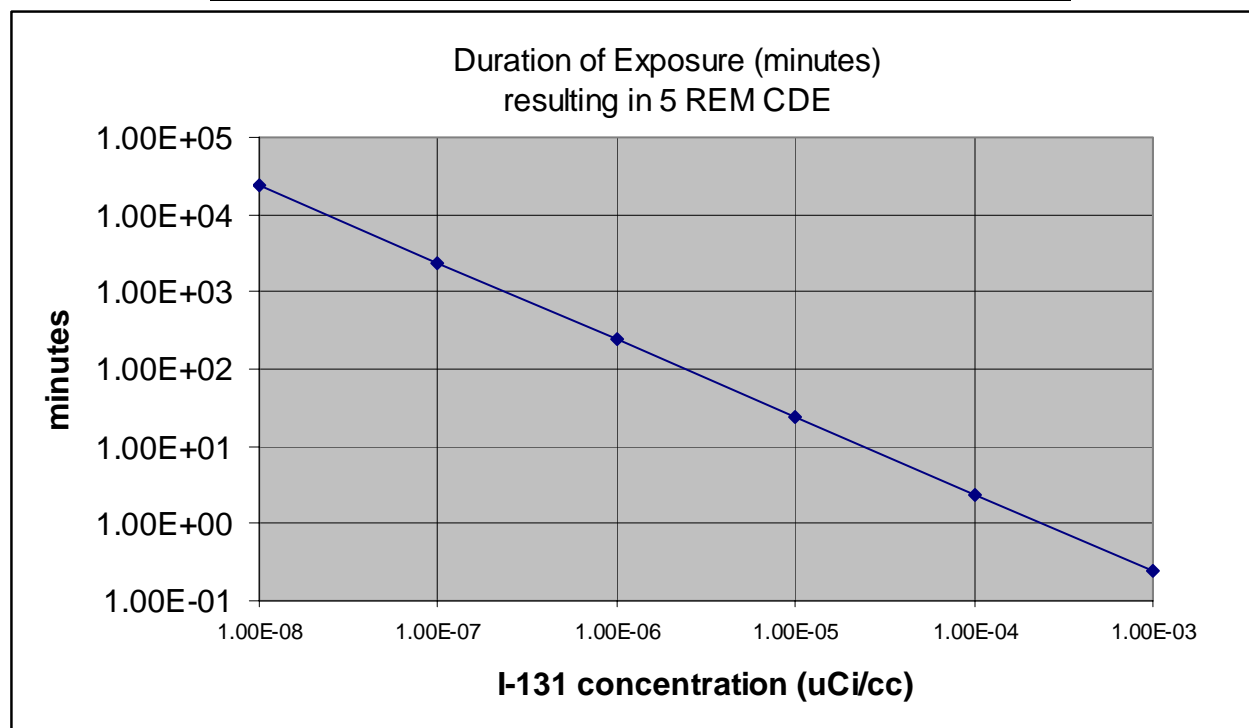
7.2.2 Form 1903.035B - KI Issue Record

7.2.3 Form 1903.035C - ANO Medical Questionnaire: Iodine Sensitivity

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## ATTACHMENT 1

### Time to 5 REM CDE verses I-131 concentration guideline



#### Instructions for Use:

- 1 . Determine the estimated or actual I-131 airborne concentration in the area(s) of interest. Divide this by the protection factor of the equipment used (if unknown, use 1). Locate this number on the Horizontal Axis.
- 2 . Locate the duration of exposure in minutes on the Vertical Axis. Find the point at which this value intersects with the number from step 1.
- 3 . If this point of intersection is located to the left (below) the line, the thyroid CDE is less than 5 rem
- 4 . If this point of intersection is located to the right (above) the line, the thyroid CDE is greater than 5 rem.
- 5 . If this point of intersection is located on the line, the thyroid CDE is 5 rem.

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## ATTACHMENT 2

### Consumer Package Insert

#### **IOSAT™**

(Potassium Iodide Tablets USP, 130 mg)  
(Abbreviated KI)

#### **DESCRIPTION**

Each white, round, cross-scored (the name IOSAT stamped on one side) tablet contains 130 mg of potassium iodide.

#### **HOW SUPPLIED**

Potassium iodide tablets, USP. Packages of 14 tablets. Each white, round, cross-scored tablet contains 130 mg potassium iodide. Store at 20-25° C (68-77° F). Keep dry and foil intact.

#### **HOW AND WHEN TO TAKE POTASSIUM IODIDE**

KI should be taken as soon as possible after public officials tell you. If you are told to repeat the dose, you should take the second dose 24 hours after the first dose. Do not take it sooner. More KI will not help you because the thyroid can "hold" only certain amounts of iodine. Taking more than 1 dose per day will increase the chances of side effects. The public officials will tell you how many days to take KI. You should take KI until the chances of major exposure to radioactive iodine by breathing or swallowing stops.

#### THYRO-BLOCK

#### Tablets

Potassium Iodide Tablets USP, 130 mg)

Take potassium iodide (KI) only when public officials tell you. In a nuclear radiation emergency, radioactive iodine could be released into the air. KI protects only the thyroid gland from uptake of radioactive iodine. Therefore, KI should be used along with other emergency measures that will be recommended to you by public officials. If you are told to take this medicine, take it 1 time every 24 hours. Do not take it more often. More KI will not help you. Too much KI may increase the chances of side effects. Do not take this medicine if you know you are allergic to iodine (see SIDE EFFECTS below).

#### **INDICATIONS**

IOSAT (Potassium iodide tablet, USP) is a thyroid blocking medicine that is used in a nuclear radiation emergency only.

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### DIRECTIONS FOR USE

Use only as directed by public officials if a nuclear radiation emergency happens.

Tablets can be crushed and mixed in many liquids. To take the tablet in liquid solution, use dosing directions under **"Making a Potassium Iodide Liquid Mixture"**.

Take KI every day (every 24 hours) as directed by public officials. Do not take more than 1 dose in 24 hours. More will not help you. Too much medicine may increase the chances of side effects.

### Making a Potassium Iodide Liquid Mixture:

1. Put one 130 mg KI tablet into a small bowl and grind it into a fine powder using the back of a metal teaspoon against the inside of the bowl. The powder should not have any large pieces.
2. Add 4 teaspoonfuls of water to the crushed KI powder in the bowl and mix until the KI powder is dissolved in the water.
3. Take the KI water mixture solution made in step 2 and mix it with 4 teaspoonfuls of low fat white or chocolate milk, orange juice, flat soda, raspberry syrup, or infant formula.
4. The KI liquid mixture will keep for up to 7 days in the refrigerator. It is recommended that the KI liquid mixtures be prepared weekly. Throw away unused portions.

### Patients with thyroid disease:

If you have both a nodular thyroid condition such as multinodular goiter with heart disease, you should not take KI. Patients with other thyroid conditions may take KI as directed above, but call a doctor if you need to take KI for more than a few days.

### WARNING

People who are allergic to iodine, have dermatitis herpetiformis or hypocomplementemic vasculitis, or have nodular thyroid disease with heart disease should not take KI. Keep out of the reach of children. In case of an allergic reaction (difficulty breathing, speaking or swallowing; wheezing; shortness of breath or swelling of the mouth or throat), call 911 or get medical care right away. In case of overdose, get medical help or call a Poison Control Center right away.

### HOW POTASSIUM IODIDE WORKS

Certain forms of iodine help your thyroid gland work right. Most people get the iodine they need from foods like iodized salt or fish. The thyroid can "store" or hold only a certain amount of iodine. In a nuclear radiation emergency, radioactive iodine may be released in the air. This material may be breathed or swallowed. It may enter the thyroid gland and damage it. The damage would probably not show itself for years. Children are most likely to have thyroid damage. If you take KI, it will block or reduce the chances that radioactive iodine will enter your thyroid gland.

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#### WHO SHOULD NOT TAKE POTASSIUM IODIDE

People should avoid KI if they are allergic to iodine, have dermatitis herpetiformis or hypocomplementemic vasculitis, or have nodular thyroid disease with heart disease, because these conditions may increase the chances of side effects to iodine.

#### SIDE EFFECTS

Short-term use of KI at the recommended dose is safe. You should not take this drug for longer than you are told.

Possible side effects include: swelling of the salivary glands, nausea, vomiting, diarrhea, stomach ache, fever, headache, metallic taste, and allergic reactions. Allergic reactions can include:

- skin rashes such as hives
- swelling of various parts of the body such as the face, lips, tongue, throat, hands or feet
- fever with joint pain
- trouble breathing, speaking or swallowing
- wheezing or shortness of breath

Get medical attention right away if you have trouble breathing, speaking or swallowing; wheezing; shortness of breath; or swelling of the mouth, tongue or throat. Taking iodide, in rare cases, may cause over activity of the thyroid gland, under activity of the thyroid gland, or enlargement of the thyroid gland (goiter). Symptoms of an overactive thyroid gland may include an irregular heart beat and chest pain. Patients with thyroid disease are more likely to get these side effects.

#### WHAT TO DO IF SIDE EFFECTS OCCUR

Stop taking KI and call a doctor if you have one or more of the following symptoms:

- swelling of the face, hands or feet
- fever and joint pain
- skin rash

Stop taking KI and get medical help right away if you have one or more of the following symptoms:

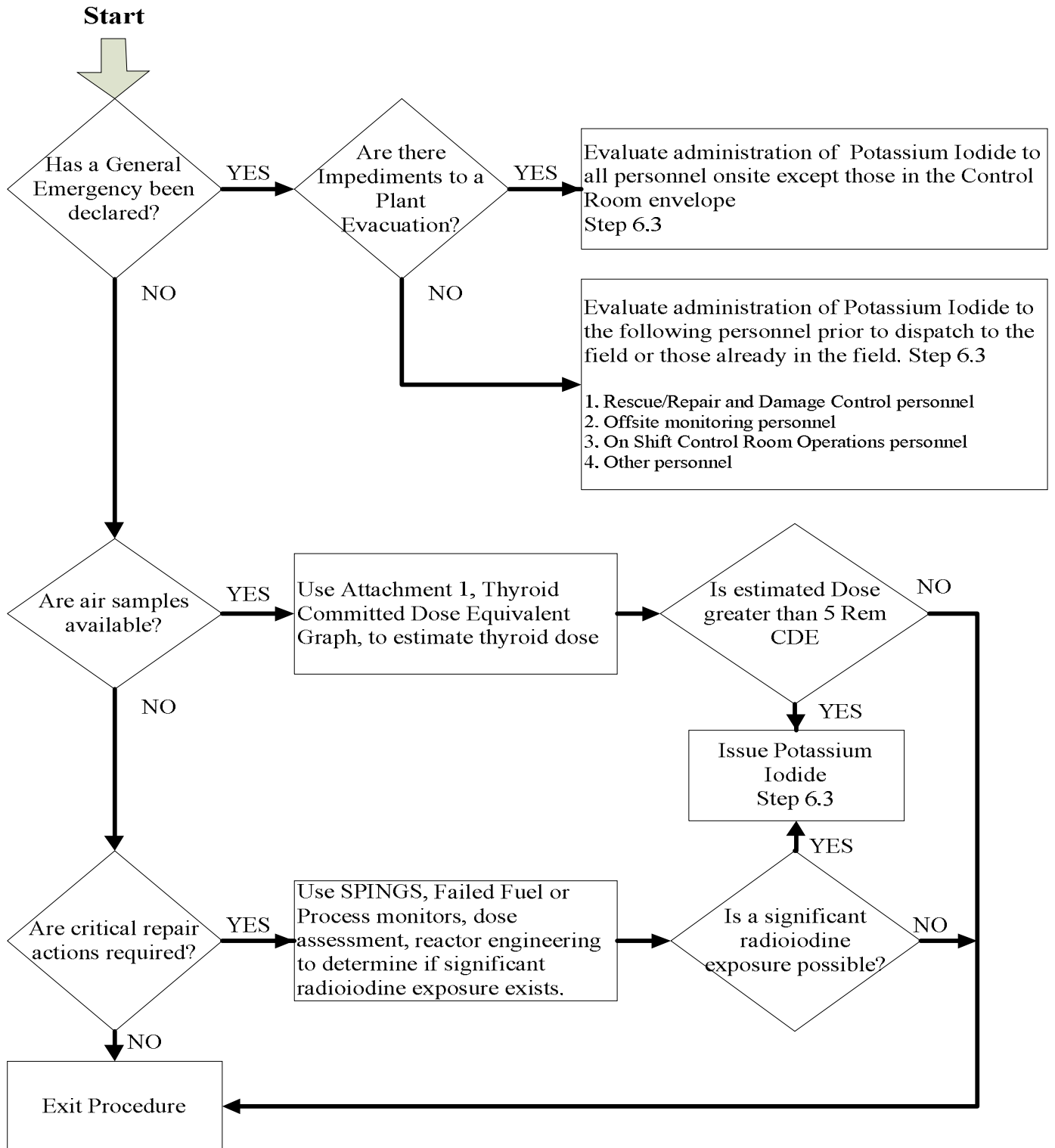
- trouble breathing, speaking or swallowing
- shortness of breath or wheezing
- swelling of the lips, tongue or throat
- irregular heart beat or chest pain

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ATTACHMENT 3

Potassium Iodide Flowchart



016

## KI ISSUE RECORD

		KI ADMINISTRATION									
Person Receiving KI		Init. Dose	Dose 2	Dose 3	Dose 4	Dose 5	Dose 6	Dose 7	Dose 8	Dose 9	Dose 10
Name:	Date										
Badge No:	Init.										
Name:	Date										
Badge No:	Init.										
Name:	Date										
Badge No:	Init.										
Name:	Date										
Badge No:	Init.										
Name:	Date										
Badge No:	Init.										

Instruction for Use:

1. Print the name and badge number of the individual(s) to whom KI is being administered in the blocks of the left-hand side of the form.
2. The individual assigned to administer KI will date and initial the blocks under the column corresponding to the day of issuance (for example: use column 1 for the initial issue: column 2 on the second day: etc.)
3. Forward completed attachment to the Radiological Coordinator or RAC.

FORM TITLE:	<b>KI ISSUE RECORD</b>	CHANGE: <b>1903.035B</b>	REV. <b>016</b>
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**MEDICAL QUESTIONNAIRE: IODINE SENSITIVITY**

Name: \_\_\_\_\_  
                     LAST                      FIRST                      MIDDLE

Badge Number: \_\_\_\_\_ Company: \_\_\_\_\_ Dept: \_\_\_\_\_

Please answer the following questions. Mark the appropriate box.

<u>NO.</u>	<u>QUESTION</u>	<u>YES</u>	<u>NO</u>
1.	When eating seafood or shellfish, do you suffer from symptoms of stomach or bowel upset or skin eruption? If so, explain below.	<input type="checkbox"/>	<input type="checkbox"/>
2.	Has any physician told you that you have sensitivity to iodine?	<input type="checkbox"/>	<input type="checkbox"/>
3.	If you have ever had a gallbladder dye test, kidney x-ray requiring dye injection or a thyroid isotope scan, were there any reactions?	<input type="checkbox"/>	<input type="checkbox"/>

Please explain any yes answers: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Print & Sign  
 Signature: \_\_\_\_\_

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

FORM TITLE:

**ANO MEDICAL QUESTIONNAIRE: IODINE SENSITIVITY**

CHANGE:

**1903.035C**

REV.

**016**

**JOB PERFORMANCE MEASURE**UNIT: 2 REV #: 001 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Emergency PlanTASK: Determine protective action recommendationsJTA#: ANO-SRO-EPLAN-EMERG-301Alternate Path Yes: \_\_\_\_\_ No: X Time Critical Yes: X No: \_\_\_\_\_KA VALUE RO: 2.4 SRO: 4.4 KA REFERENCE: 2.4.44APPROVED FOR ADMINISTRATION TO: RO: \_\_\_\_\_ SRO: XTASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: \_\_\_\_\_ BOTH: X

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: \_\_\_\_\_ Classroom: PerformPOSITION EVALUATED: RO: \_\_\_\_\_ SRO: X

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ Classroom: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 15 MinutesREFERENCE(S): Emergency Response/Notification; Attachment 6, Protective Action recommendations for General Emergency.

EXAMINEE'S NAME: \_\_\_\_\_ Login ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time \_\_\_\_\_

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS: (Time Critical JPM)**

- Unit 2 has experienced a 500 gpm LOCA.
- The site has just upgraded from SAE to a General Emergency due to FG-1 (Loss of ANY two barriers AND loss or potential loss of third barrier).
- Containment barrier is considered lost.
- Containment High Range radiation monitors are reading 2200 Rem/hr.
- A release is in progress and EPA Protective Action Guidelines are projected to be 750 mRem TEDE and 3000 mRem Child Thyroid outside of the site boundary and less than 2 miles from site.
- It has not been determined when the release will be terminated.
- RDACS projects EPA Protective Action Guidelines to NOT be exceeded in any zones outside of 2 miles.
- There are no impediments to evacuation.
- Wind direction is from 135°.

**TASK STANDARD: Determined the following (Time Critical - 15 minutes)**

A PAR 1 was declared.

Recommended evacuating to a 2 mile radius and 2-5 miles downwind. **(Zones G, K,N and O).**

Recommend zones **Zones H,I,J,L,M,P,Q,R,S,T, and U** to go indoors and listen to the emergency for this event.

Completed within 15 minutes of notifying the examiner of being ready to start.

**TASK PERFORMANCE AIDS:**

OP-1903.011 Emergency Response/Notification; Attachment 6, Protective Action recommendations for General Emergency.

**EXAMINER NOTES:**

This is a time critical JPM IAW 1903.011, Emergency Response/Notification, Attachment 6.

Evaluator will read initial conditions to applicant, verify applicant understands initial conditions, and state "Time Begins Now" and document Start Time.

Rev. 1: Changed JPM A9 to a PAR Call due to potential overlap with the written exam.

**JOB PERFORMANCE MEASURE**

INITIATING CUE:

Using 1903.011 Attachment 6, perform the following:

1. Determine the appropriate PAR for the given conditions.
2. Determine the zones to be recommended for evacuation/sheltering to the State Health Department for the given conditions.
3. Determine the zones to be recommended to go indoors to the State Health Department for the given conditions.

START TIME: \_\_\_\_\_

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
Examiner Note:				
The following steps are from the OP1903.011 Attachment 6 PAR flow chart page 1.				
	1. (Flow chart page 1)	Will this be the first PAR for the event?	Examinee determined that this is the first PAR due to the GE just being declared and answered YES.	N/A SAT UNSAT
	2. (Flow chart page 1)	Is there a LOSS of the containment fission product barrier in accordance with procedure 1903.010?	Examinee answered YES that the containment barrier is lost from the initial conditions.	N/A SAT UNSAT
(C)	3. (Flow chart page 1)	Is Containment High Range Rad Monitor reading > 4000 R/hr.	Examinee answered NO that the Containment High Range Rad Monitor reading > 4000 R/hr.	N/A SAT UNSAT
(C)	4. (Flow chart page 1)	Radiological release with site boundary dose > 1,000 mr TEDE or 5,000 mr CDE Thyroid is expected in <= 1hr?	Examinee answered NO that there is a release with site boundary dose greater than 1000 mr TEDE or 5,000 mr CDE Thyroid.	N/A SAT UNSAT
	5 (Flow chart page 2)	GO TO PAR Flow Chart Page 2	Examinee determined to GO TO PAR Flow Chart Page 2	N/A SAT UNSAT
	6 Flow chart page 2	General Emergency Declared	Examinee answered YES to General Emergency Declared	N/A SAT UNSAT
	7 Flow chart page 2	Release in Progress	Examinee answered YES to Release in Progress	N/A SAT UNSAT
(C)	8 Flow chart page 2	Can release duration be accurately determined AND will the release be of short duration (Puff Release < 1hr.)?	Examinee answered NO to release duration can be accurately determined	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

<b>PERFORMANCE CHECKLIST</b>			<b>STANDARDS</b>	(Circle One)
(C)	9 Flow chart page 2	Are EPA Protective Action Guidelines (PAG's) projected to be exceeded? (obtain from Dose Assessment)  1 REM TEDE OR 5 REM Child Thyroid CDE	Examinee answered NO to EPA Protective Action Guidelines (PAG's) are projected to be exceeded?	N/A SAT UNSAT
(C)	10 Flow chart page 2	Are there any known impediments to evacuation?	Examinee determined NO impediments to evacuation exist.	N/A SAT UNSAT
(C)	11 Flow chart page 2	Par 1 Evacuate 2 mile radius/ 2-5 miles downwind	Examinee determined Par 1 Evacuate 2 mile radius/ 2-5 miles downwind	N/A SAT UNSAT
	12. Flow chart page 2	Are EPA Protective Action Guidelines projected to be exceeded <b><u>outside the 10 mile EPZ?</u></b> (obtain from Dose Assessment)  1 REM TEDE OR 5 REM Child Thyroid CDE	Examinee answered NO to EPA Protective Action Guidelines) are projected to be exceeded <b><u>outside the 10 mile EPZ</u></b>	N/A SAT UNSAT
(C)	13. (PAR 1, Page 5.)	Recommend evacuation of 2 mile radius and 2-5 miles downwind. Recommend that the remainder of the EPZ go indoors.	Using 1903.011 Attachment 6, examinee recommended Evacuate Zones G, K, N, and O  AND  Zones H,I,J,L,M,P,Q,R,S,T, and U	N/A SAT UNSAT
(C)	14.	JPM complete in 15 minutes.	JPM completed by examinee in 15 minutes with 5 minutes to read conditions.	N/A SAT UNSAT
<b>END</b>				

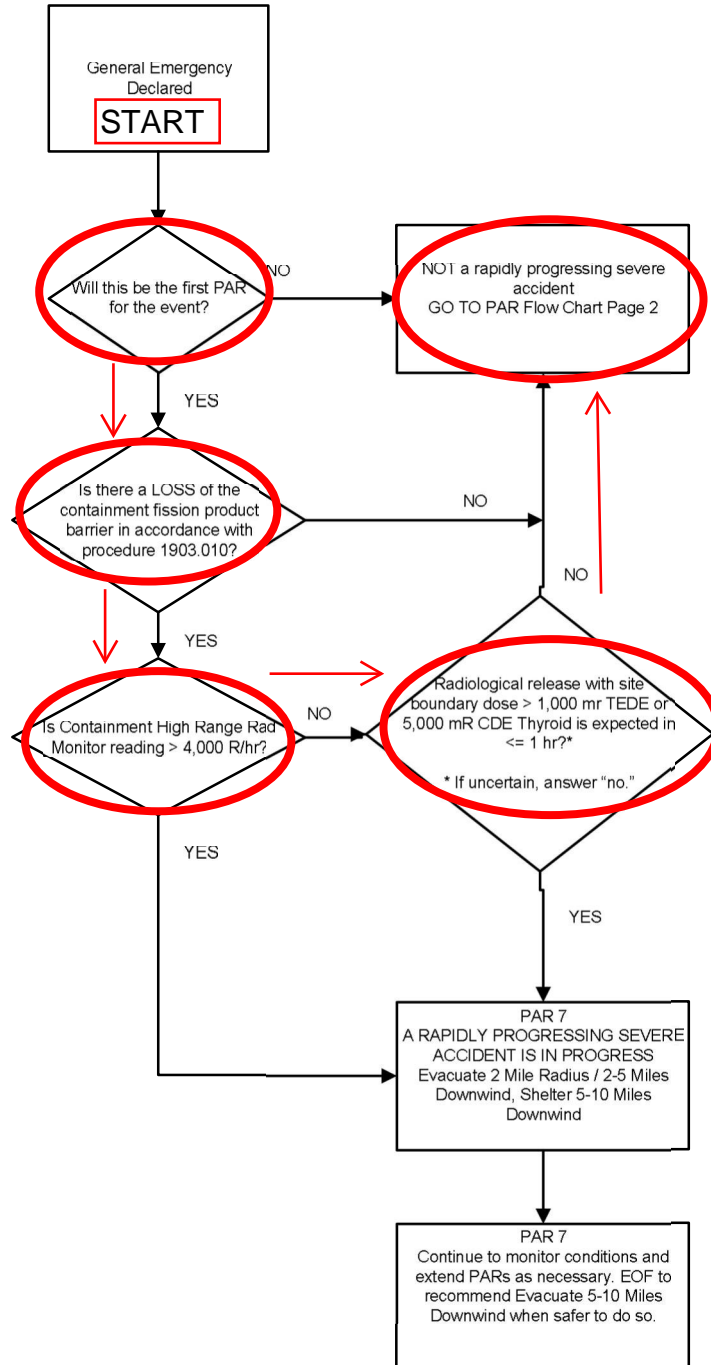
**STOP TIME:** \_\_\_\_\_

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KEY

ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs) FOR GENERAL EMERGENCY  
**PAR Flow Chart - Page 1**

(A Guide for Determining PARs)



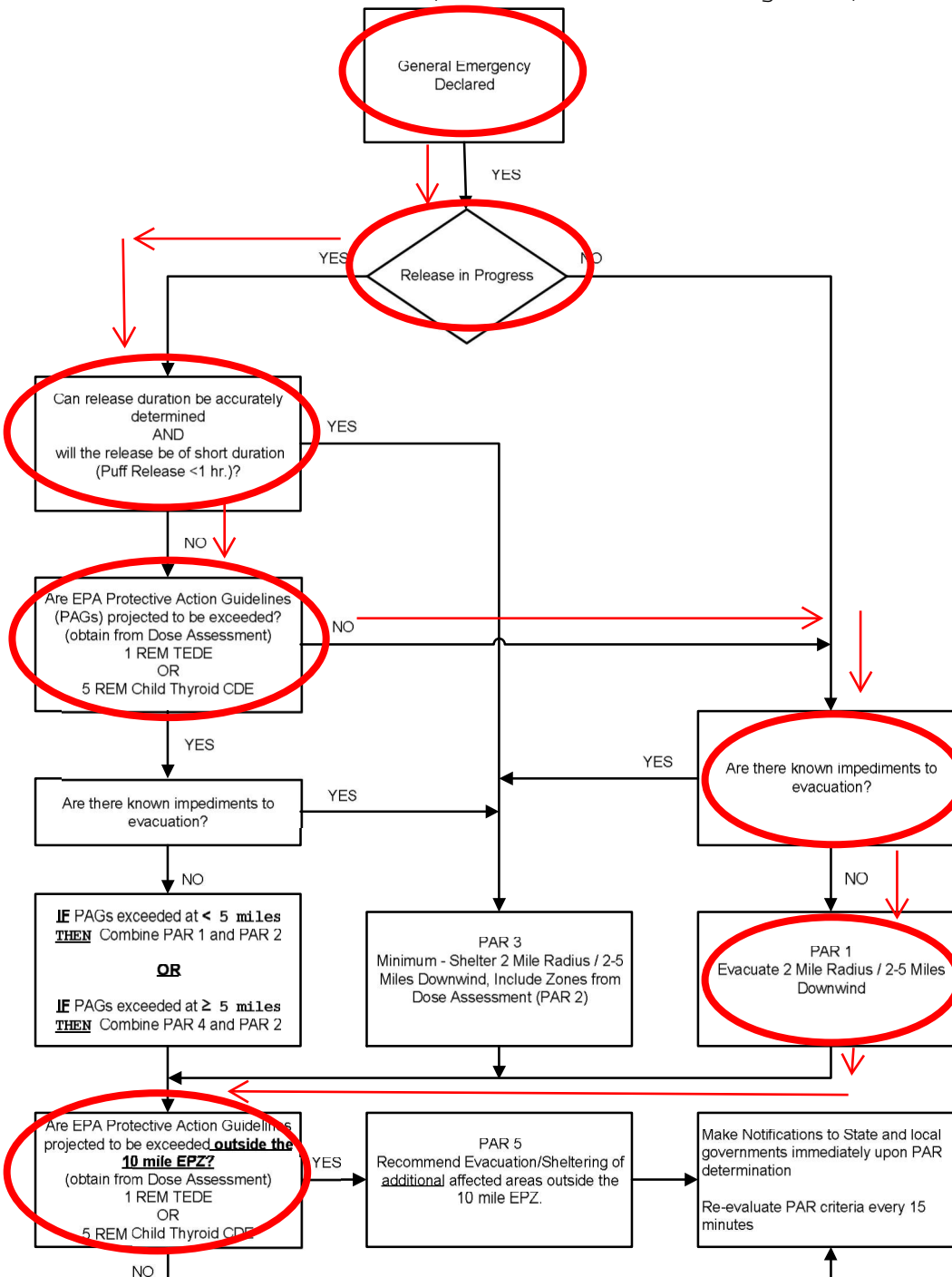
KEY

**KEY**

ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
FOR GENERAL EMERGENCY

**PAR Flow Chart - Page 2**

(A Guide for Determining PARs)

**NOTE**

IF Wind Shifts are forecasted, THEN PAR No. 6 shall be reviewed to assist with final PAR determination.

**KEY**

KEY

ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
FOR GENERAL EMERGENCY

PAR No. 1  
EVACUATE

NOTE

State and local governments must be notified within 15 minutes of PARs or changes to PARs using Form 1903.011-Y.

1. Entry Conditions

General Emergency Declared

2. Recommend the following Protective Action Recommendations:

Recommend **evacuation** of 2 mile radius and 2-5 miles downwind. Recommend the remainder of the 10 mile EPZ to go indoors and listen to the emergency broadcast for this event. Include any previously evacuated zones with this PAR. **DO NOT** change any previously evacuated zones to "shelter" or "go indoors" on this PAR.

Determine the affected zones for the PAR from the chart given below.

Wind Direction (from)	Evacuate Zones	Zones "to go indoors"
348.75 to 11.25	G U	H I J K L M N O P Q R S T
11.25 to 33.75	G R U	H I J K L M N O P Q S T
33.75 to 56.25	G R U	H I J K L M N O P Q S T
56.25 to 78.75	G R U	H I J K L M N O P Q S T
78.75 to 101.25	G N O R	H I J K L M P Q S T U
101.25 to 123.75	G N O R	H I J K L M P Q S T U
123.75 to 146.25	G K N O	H I J L M P Q R S T U
146.25 to 168.75	G K N O	H I J L M P Q R S T U
168.75 to 191.25	G K N	H I J L M O P Q R S T U
191.25 to 213.75	G K	H I J L M N O P Q R S T U
213.75 to 236.25	G K	H I J L M N O P Q R S T U
236.25 to 258.75	G H K	I J L M N O P Q R S T U
258.75 to 281.25	G H K	I J L M N O P Q R S T U
281.25 to 303.75	G H K U	I J L M N O P Q R S T
303.75 to 326.25	G H U	I J K L M N O P Q R S T
326.25 to 348.75	G H U	I J K L M N O P Q R S T

3. Reassess PARs every 15 minutes until downgrade or recovery phase is entered.

KEY



**JOB PERFORMANCE MEASURE****EXAMINER'S COPY****This is a time critical JPM****INITIAL CONDITIONS:**

- Unit 2 has experienced a 500 gpm LOCA.
- The site has just upgraded from SAE to a General Emergency due to FG-1 (Loss of ANY two barriers AND loss or potential loss of third barrier).
- Containment barrier is considered lost.
- Containment High Range radiation monitors are reading 2200 Rem/hr.
- A release is in progress and EPA Protective Action Guidelines are projected to be 750 mRem TEDE and 3000 mRem Child Thyroid outside of the site boundary and less than 2 miles from site.
- It has not been determined when the release will be terminated.
- RDACS projects EPA Protective Action Guidelines to NOT be exceeded in any zones outside of 2 miles.
- There are no impediments to evacuation.
- Wind direction is from 135°.

**Time Begins Now****INITIATING CUE:**

Using 1903.011 Attachment 6, perform the following:

1. Determine the appropriate PAR for the given conditions.
2. Determine the zones to be recommended for evacuation/sheltering to the State Health Department for the given conditions.
3. Determine the zones to be recommended to go indoors to the State Health Department for the given conditions.

Write Answer below:

1) PAR(s) declared      Par 1

---

2. Zones to be  
evacuated or  
sheltered (specify)      Evacuate Zones G, K, N, and O

---

3) Zones to go indoors      Zones H,I,J,L,M,P,Q,R,S,T, and U

---

**JOB PERFORMANCE MEASURE****EXAMINEE'S COPY****This is a time critical JPM****INITIAL CONDITIONS:**

- Unit 2 has experienced a 500 gpm LOCA.
- The site has just upgraded from SAE to a General Emergency due to FG-1 (Loss of ANY two barriers AND loss or potential loss of third barrier).
- Containment barrier is considered lost.
- Containment High Range radiation monitors are reading 2200 Rem/hr.
- A release is in progress and EPA Protective Action Guidelines are projected to be 750 mRem TEDE and 3000 mRem Child Thyroid outside of the site boundary and less than 2 miles from site.
- It has not been determined when the release will be terminated.
- RDACS projects EPA Protective Action Guidelines to NOT be exceeded in any zones outside of 2 miles.
- There are no impediments to evacuation.
- Wind direction is from 135°.

**Time Begins Now****INITIATING CUE:**

Using 1903.011 Attachment 6, perform the following:

1. Determine the appropriate PAR for the given conditions.
2. Determine the zones to be recommended for evacuation/sheltering to the State Health Department for the given conditions.
3. Determine the zones to be recommended to go indoors to the State Health Department for the given conditions.

Write Answer below:

1) PAR(s) declared

---

2) Zones to be  
evacuated or  
sheltered (specify)

---

3) Zones to go indoors

---

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ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
FOR GENERAL EMERGENCY

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ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
FOR GENERAL EMERGENCY

Discussion

This attachment provides instructions for the assessment and initiation of Protective Action Recommendations (PARs) following the declaration of a General Emergency classification. Offsite response agencies shall be notified of Protective Action Recommendation within 15 minutes. Revisions to Protective Action Recommendations may be based upon:

- Current plant conditions
- Projected offsite dose assessment
- Forecasted/actual wind shifts

Evacuation is the preferred method for protecting the public within the ANO 10-mile Emergency Planning Zone (EPZ) as a result of a radiological emergency event at ANO. However, some circumstances may warrant a protective action of "shelter" when evacuation cannot be performed due to impediments and/or severe weather conditions. Individuals responsible for determining PARs at ANO should consider all circumstances when developing protective actions.

In the event of a "shelter" PAR, coordinate with ADH to develop a plan for transitioning out of this protective action as soon as possible. This is especially of concern during weather extremes since the public is advised to shut down ventilation systems.

The Arkansas Department of Health (ADH) will be notified of the ANO protective action recommendations and are responsible for determining and issuing a Protective Action Advisory (PAA) to the County Judges (Conway, Johnson, Logan, Pope and Yell counties). Arkansas law places the responsibility for issuing protective actions to the public with the County Judges which will have both a Protective Action Recommendation and a Protective Action Advisory available for decision making. At a General Emergency classification, the Arkansas Department of Health, at a minimum, will issue a default Protective Action Advisory of "evacuate a 5-mile radius and evacuate 5-10 miles downwind and the remaining EPZ to remain indoors and listen to emergency broadcasts". At a General Emergency classification, ANO, at a minimum, will issue a default Protective Action Recommendation (PAR) of "evacuate a 2-mile radius and evacuate 2-5 miles downwind and the remaining EPZ to remain indoors and listen to emergency broadcasts". The ADH Protective Action Advisory encompasses a larger area than that recommended by federal guidance and the ANO General Emergency classification PAR. Be aware of this difference between the ANO protective action recommendation and the ADH protective action advisory should a question arise. ANO PARs meet all of the EPA/NRC recommended regulatory guidance and are consistent with the rest of the nuclear industry.

Guidance Involving Wind Shifts within the 10-mile EPZ

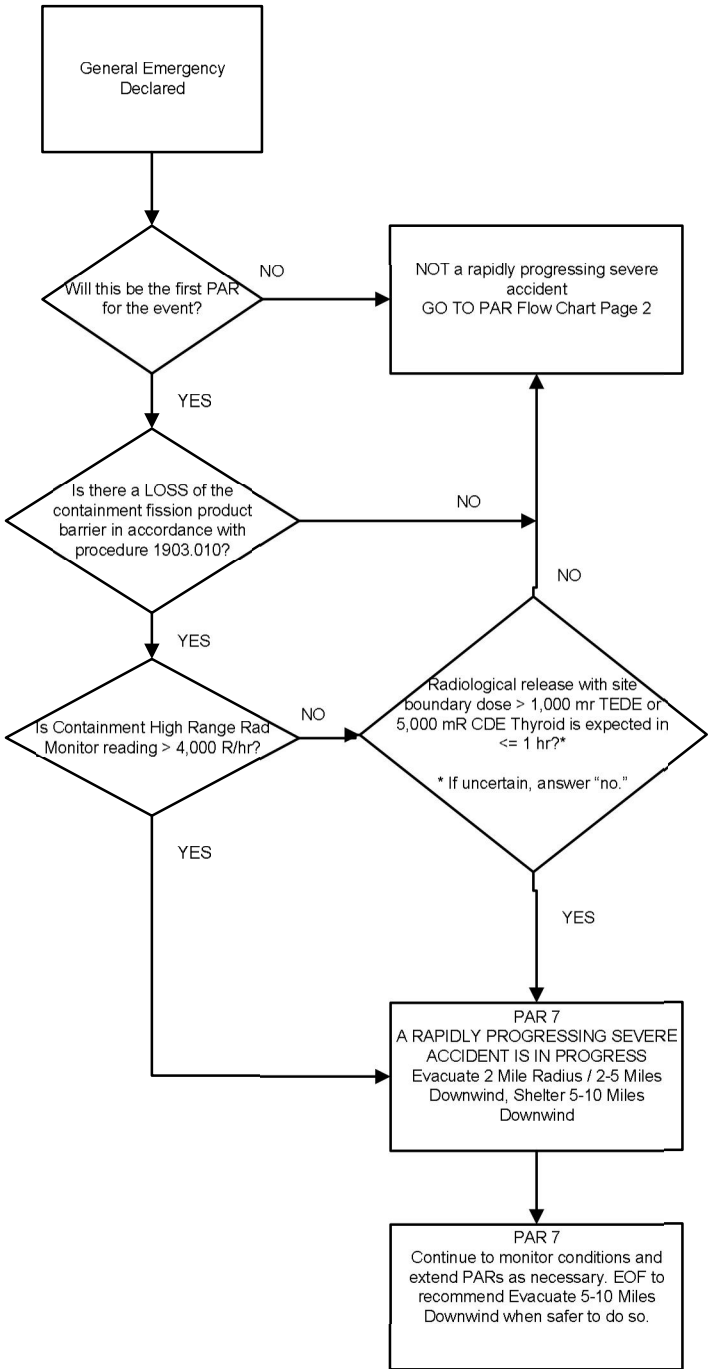
If wind shifts are occurring or are predicted to occur within the 10-mile EPZ, guidance is provided on PAR No. 6 within this attachment.

Use of the PAR Flowchart in Attachment 6

A PAR Flowchart is included on Pages 3 and 4 of this attachment. This flowchart should be used initially starting on Page 3 and at the beginning of each subsequent PAR evaluation (page 4) to help determine the correct PAR to issue based on plant conditions, release status, evacuation impediments and offsite dose assessment.

ATTACHMENT 6  
 PROTECTIVE ACTION RECOMMENDATIONS (PARs) FOR GENERAL EMERGENCY  
**PAR Flow Chart – Page 1**

(A Guide for Determining PARs)





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PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
FOR GENERAL EMERGENCY

**PAR No. 1**  
**EVACUATE**

**NOTE**

State and local governments must be notified within **15 minutes** of PARs or changes to PARs using Form 1903.011-Y.

1. Entry Conditions

General Emergency Declared

2. Recommend the following Protective Action Recommendations:

Recommend **evacuation** of 2 mile radius and 2-5 miles downwind. Recommend the remainder of the 10 mile EPZ to go indoors and listen to the emergency broadcast for this event. Include any previously evacuated zones with this PAR. **DO NOT** change any previously evacuated zones to "shelter" or "go indoors" on this PAR.

Determine the affected zones for the PAR from the chart given below.

Wind Direction (from)	Evacuate Zones	Zones "to go indoors"
348.75 to 11.25	G U	H I J K L M N O P Q R S T
11.25 to 33.75	G R U	H I J K L M N O P Q S T
33.75 to 56.25	G R U	H I J K L M N O P Q S T
56.25 to 78.75	G R U	H I J K L M N O P Q S T
78.75 to 101.25	G N O R	H I J K L M P Q S T U
101.25 to 123.75	G N O R	H I J K L M P Q S T U
123.75 to 146.25	G K N O	H I J L M P Q R S T U
146.25 to 168.75	G K N O	H I J L M P Q R S T U
168.75 to 191.25	G K N	H I J L M O P Q R S T U
191.25 to 213.75	G K	H I J L M N O P Q R S T U
213.75 to 236.25	G K	H I J L M N O P Q R S T U
236.25 to 258.75	G H K	I J L M N O P Q R S T U
258.75 to 281.25	G H K	I J L M N O P Q R S T U
281.25 to 303.75	G H K U	I J L M N O P Q R S T
303.75 to 326.25	G H U	I J K L M N O P Q R S T
326.25 to 348.75	G H U	I J K L M N O P Q R S T

3. Reassess PARs every **15 minutes** until downgrade or recovery phase is entered.

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ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
FOR GENERAL EMERGENCY

**PAR No. 2**  
**EVACUATE**

**NOTE**

State and local governments must be notified within **15 minutes** of PARs or changes to PARs using Form 1903.011-Y.

1. Entry Conditions

General Emergency declared

**AND**

Dose Assessment projects EPA Protective Action Guidelines (PAGs) exceeded

**1 Rem TEDE OR 5 Rem Child Thyroid CDE**

2. Recommend the following Protective Action Recommendation:

**NOTE**

If there are known impediments to evacuation, then consider "sheltering" of the affected zones versus evacuation.

2.1 **IF** PAGs are exceeded at  $\geq 5$  miles

**THEN** recommend the following PAR:

- **EVACUATE** zones from **PAR 4**
- **EVACUATE** any additional <sup>1</sup>ZONES projected by dose assessment to exceed the EPA PAGs (obtain from dose assessment).
- Remainder of the 10 mile EPZ to go indoors and listen to the Emergency Broadcasts

2.2 **IF** PAGs are exceeded at  $< 5$  miles,

**THEN** recommend the following PAR:

- **EVACUATE** zones from **PAR 1**
- **EVACUATE** any additional <sup>1</sup>ZONES projected by dose assessment to exceed the EPA PAGs (obtain from dose assessment).
- Remainder of the 10 mile EPZ to go indoors and listen to the Emergency Broadcasts

3. Include any previously evacuated zones on this PAR. **DO NOT** change any previously evacuated zones to "shelter" or "go indoors" on this PAR.

4. Reassess PARs every **15 minutes** until downgrade or recovery phase is entered.

<sup>1</sup>Dose assessment PARs will be initially provided by the Initial Dose Assessor in the Control Room. When the Dose Assessors becomes operational in the EOF, they will provide this information.



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ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
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**PAR No. 3**  
**Shelter**

**NOTE**

State and local governments must be notified within **15 minutes** of PARs or changes to PARs using Form 1903.011-Y.

1. **Entry Conditions**

General Emergency declared

**AND**

Known Impediments to Evacuation exist

**OR**

Offsite Release is a Puff Release (< 1 hour in duration)

2. **Recommend the following Protective Action Recommendation:**

Recommend **sheltering** a 2 mile radius and 2-5 miles downwind. Recommend the remainder of the 10-mile EPZ to go indoors and listen to the emergency broadcast for this event. Determine the affected zones for the PAR from the chart given below. **Include any zones recommended for evacuation by Dose Assessment. DO NOT** change any previously evacuated zones to "shelter" or "go indoors" on this PAR.

Determine the affected zones for the PAR from the chart given below.

Wind Direction (from)	Shelter Zones	Zones "to go indoors"
348.75 to 11.25	G U	H I J K L M N O P Q R S T
11.25 to 33.75	G R U	H I J K L M N O P Q S T
33.75 to 56.25	G R U	H I J K L M N O P Q S T
56.25 to 78.75	G R U	H I J K L M N O P Q S T
78.75 to 101.25	G N O R	H I J K L M P Q S T U
101.25 to 123.75	G N O R	H I J K L M P Q S T U
123.75 to 146.25	G K N O	H I J L M P Q R S T U
146.25 to 168.75	G K N O	H I J L M P Q R S T U
168.75 to 191.25	G K N	H I J L M O P Q R S T U
191.25 to 213.75	G K	H I J L M N O P Q R S T U
213.75 to 236.25	G K	H I J L M N O P Q R S T U
236.25 to 258.75	G H K	I J L M N O P Q R S T U
258.75 to 281.25	G H K	I J L M N O P Q R S T U
281.25 to 303.75	G H K U	I J L M N O P Q R S T
303.75 to 326.25	G H U	I J K L M N O P Q R S T
326.25 to 348.75	G H U	I J K L M N O P Q R S T

3. PARs must be reassessed every **15 minutes** until downgrade or recovery phase is entered.

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ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
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**PAR No. 4**  
**EVACUATE**

**NOTE**

State and local governments must be notified within **15 minutes** of PARs or changes to PARs using Form 1903.011-Y.

1. Entry Conditions

General Emergency Declared

**AND**

EPA Protective Action Guidelines (PAGs) are projected to be exceeded **5-10 miles downwind.**

1 Rem TEDE

**OR**

5 Rem Child Thyroid CDE

2. Recommend the following Protective Action Recommendation:

Recommend **evacuation** of 2 mile radius and 2-10 miles downwind. Recommend that the remainder of the 10-mile EPZ go indoors and listen to the emergency broadcasts for this event. Include any previously evacuated zones with this PAR. **DO NOT** change any previously evacuated zones to "shelter" or "go indoors" on this PAR.

Determine the affected zones for the PAR from the chart given below.

Wind Direction (from)	Evacuate Zones	Zones "to go indoors"
348.75 to 11.25	G U S T	H I J K L M N O P Q R
11.25 to 33.75	G Q R S U	H I J K L M N O P T
33.75 to 56.25	G Q R S U	H I J K L M N O P T
56.25 to 78.75	G Q R S U	H I J K L M N O P T
78.75 to 101.25	G N O P Q R	H I J K L M S T U
101.25 to 123.75	G N O P Q R	H I J K L M S T U
123.75 to 146.25	G K M N O P	H I J L Q R S T U
146.25 to 168.75	G K M N O P	H I J L Q R S T U
168.75 to 191.25	G K M N O P	H I J L Q R S T U
191.25 to 213.75	G K L M	H I J N O P Q R S T U
213.75 to 236.25	G J K L M	H I N O P Q R S T U
236.25 to 258.75	G H I J K L M	N O P Q R S T U
258.75 to 281.25	G H I J K L	M N O P Q R S T U
281.25 to 303.75	G H I J K U	L M N O P Q R S T
303.75 to 326.25	G H I J S T U	K L M N O P Q R
326.25 to 348.75	G H I S T U	J K L M N O P Q R

3. Reassess PARs every **15 minutes** until downgrade or recovery phase is entered.

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ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
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**PAR No. 5**  
**Outside the 10 Mile EPZ**

**NOTE**

Protective Action Recommendations beyond the 10-mile EPZ shall be coordinated with State and local government officials.

1. Entry Conditions

General Emergency declared

**AND**

EPA Protective Action Guidelines (PAGs) are projected to be exceeded **outside the 10-mile EPZ**.

1 Rem TEDE

**OR**

5 Rem Child Thyroid CDE

2. Recommend the following Protective Action Recommendation:

Recommend **evacuation** of the affected areas. If known impediments to evacuation exist consider sheltering of the affected area.

Use dose assessment personnel to determine the affected sector(s) and downwind distances and then use the chart below to determine the affected area(s) to evacuate.

Affected Sector(s)	Evacuate/Shelter Sectors	Distance from Site
1	16, 1, 2	10 miles to (Determined by Dose Assessment)
2	1, 2, 3	10 miles to (Determined by Dose Assessment)
3	2, 3, 4	10 miles to (Determined by Dose Assessment)
4	3, 4, 5	10 miles to (Determined by Dose Assessment)
5	4, 5, 6	10 miles to (Determined by Dose Assessment)
6	5, 6, 7	10 miles to (Determined by Dose Assessment)
7	6, 7, 8	10 miles to (Determined by Dose Assessment)
8	7, 8, 9	10 miles to (Determined by Dose Assessment)
9	8, 9, 10	10 miles to (Determined by Dose Assessment)
10	9, 10, 11	10 miles to (Determined by Dose Assessment)
11	10, 11, 12	10 miles to (Determined by Dose Assessment)
12	11, 12, 13	10 miles to (Determined by Dose Assessment)
13	12, 13, 14	10 miles to (Determined by Dose Assessment)
14	13, 14, 15	10 miles to (Determined by Dose Assessment)
15	14, 15, 16	10 miles to (Determined by Dose Assessment)
16	15, 16, 1	10 miles to (Determined by Dose Assessment)

3. Reassess PARs every **15 minutes** until downgrade or recovery phase is entered.

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ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
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**PAR No. 6**  
**Wind Shift PAR Determination**

**NOTE**

A wind shift is defined as any change in 15-minute averaged wind direction that affects new offsite protective action zones that are 2-5 or 5-10 miles downwind.

1. Entry Conditions

General Emergency Declared

**AND**

Previous PAR has been issued

**AND**

Actual/Forecasted Wind Shift

2. **IF** the conditions in 2.1 through 2.3 below are met,  
**THEN** revise PARs based on dose assessment results only. Go to Step 4.

2.1 Plant conditions are well understood and changes can be reasonably predicted.

2.2 Radiological releases have a high degree of predictability in terms of isotopic composition, release pathway, and release rate.

2.3 Meteorological conditions for the projected duration of the release are well understood.

3. **IF** the conditions described in 2.1 through 2.3 above are not met  
**AND** an actual wind shift occurs **OR** is forecasted to occur within 6 hours,  
**THEN**

**STEP 1** - Wind Direction Transition Area: Evacuate any additional zones projected to exceed the EPA PAGs (obtain from dose assessment).

**STEP 2** - Final Wind Direction: Revise the current PAR to include any downwind zones using the table below. If conditions warrant, evacuation out to 10 miles may be necessary. Refer to PAR 5, as needed, to determine those areas located outside of the 10-mile EPZ.

Wind Direction (from)	2-5 Miles Downwind Zones	5-10 Miles Downwind Zones
348.75 to 11.25	U	S T
11.25 to 33.75	R U	Q S
33.75 to 56.25	R U	Q S
56.25 to 78.75	R U	Q S
78.75 to 101.25	N O R	P Q
101.25 to 123.75	N O R	P Q
123.75 to 146.25	K N O	M P
146.25 to 168.75	K N O	M P
168.75 to 191.25	K N	M P
191.25 to 213.75	K	L M
213.75 to 236.25	K	J L M
236.25 to 258.75	H K	I J L M
258.75 to 281.25	H K	I J L
281.25 to 303.75	H K U	I J
303.75 to 326.25	H U	I J S T
326.25 to 348.75	H U	I S T

4. Reassess PARs every **15 minutes** until downgrade or recovery phase is entered.

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ATTACHMENT 6  
PROTECTIVE ACTION RECOMMENDATIONS (PARs)  
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**PAR No. 7**  
**EVACUATE**

**NOTE**

State and local governments must be notified within **15 minutes** of PARs or changes to PARs using Form 1903.011-Y.

1. Entry Conditions

General Emergency Declared

**AND**

A rapidly progressing severe accident is in progress

2. Recommend the following Protective Action Recommendation:

Recommend **evacuation** of 2 mile radius and 2-5 miles downwind. Recommend shelter for 5-10 miles downwind. Recommend that the remainder of the 10-mile EPZ go indoors and listen to the emergency broadcasts for this event.

Determine the affected zones for the PAR from the chart given below.

Wind Direction (from)	Evacuate Zones	Shelter Zones	Zones "to go indoors"
348.75 to 11.25	G U	S T	H I J K L M N O P Q R
11.25 to 33.75	G R U	Q S	H I J K L M N O P T
33.75 to 56.25	G R U	Q S	H I J K L M N O P T
56.25 to 78.75	G R U	Q S	H I J K L M N O P T
78.75 to 101.25	G N O R	P Q	H I J K L M S T U
101.25 to 123.75	G N O R	P Q	H I J K L M S T U
123.75 to 146.25	G K N O	M P	H I J L Q R S T U
146.25 to 168.75	G K N O	M P	H I J L Q R S T U
168.75 to 191.25	G K N O	M P	H I J L Q R S T U
191.25 to 213.75	G K	L M	H I J N O P Q R S T U
213.75 to 236.25	G K	J L M	H I N O P Q R S T U
236.25 to 258.75	G H K	I J L M	N O P Q R S T U
258.75 to 281.25	G H K	I J L	M N O P Q R S T U
281.25 to 303.75	G H K U	I J	L M N O P Q R S T
303.75 to 326.25	G H U	I J S T	K L M N O P Q R
326.25 to 348.75	G H U	I S T	J K L M N O P Q R

**NOTE**

Changing the recommendation for areas 5-10 miles downwind from shelter to evacuate is the responsibility of the EOF and will not be performed in the Control Room.

3. A recommendation of evacuation of 5-10 miles downwind should only be considered when safer to do so (when the EOF and state and local EOCs are staffed and operational AND the release source term has significantly reduced (i.e., a reduction of 25% or more))

a. A change in recommendation may be considered based on a change in wind direction with site wind variability taken into account.

b. The decision to change the recommendation relies ultimately upon the judgment of decision makers at the time of the event.

4. Reassess PARs every **15 minutes** until downgrade or recovery phase is entered.

Facility: <u>Arkansas Nuclear One Unit 2</u>		Date of Examination: <u>02/13/2017</u>
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	Operating Test No.: <u>2017-1</u>	
Control Room Systems: * 8 for RO; 7 for SRO-I; 2 or 3 for SRO-U		
System / JPM Title	Type Code*	Safety Function
S1. A2JPM-NRC-EOP07 062 A4.01; RO-3.3 / SRO-3.1 Energize 2A-4 during a LOOP	A/M/EN/L/S	6 Electrical
S2. A2JPM-NRC-RCS02 A13 AA1.3; RO-3.2 / SRO-3.8 Operate the RCS to collapse RCS Voids	A/L/D/S	3 Pressure Control
S3. A2JPM-NRC-H2003 028 A4.01; RO-4.0 / SRO-4.0 Start up a Hydrogen Recombiner	P/S	5 Containment
S4. A2JPM-NRC-CCW01 008 A4.01; -- RO 3.3 / SRO3.1 Secure CCW system using EOP	D/L/S	8 Plant Service systems
S5. A2JPM-NRC-SIT08 006 A1.13; RO-3.5 / SRO-3.7 Lower Safety Injection Tank level	D/EN/S	2 Inventory Control
S6. A2JPM-NRC-CEA05 001 A2.03; RO-3.5 / SRO-4.2 Perform control element assembly exercise	A/D/S	1 Reactivity control
S7. A2JPM-RO-RCP04 003 A2.02; RO-3.7 / SRO-3.9 Perform a normal RCP shutdown	A/D/L/S	4 Heat Removal Primary
S8. A2JPM-RO-AOP04 015 A2.02; RO-3.1 / SRO-3.5 Disable B channel excore nuclear instrumentation	D/L/S	7 Instrumentation
Plant Systems* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
P1. A2JPM-NRC-AUAVD 041 A2.03; RO-2.8 / SRO-3.1 Operate "A" Upstream Atmospheric Dump Valve locally	D/E/L	4 Heat Removal Secondary
P2. A2JPM-NRC-IA04 065 AA2.01; RO-2.9 / SRO-3.2 Respond to lowering Instrument Air pressure	A/E/N	8 Plant Service systems
P3. A2JPM-NRC-69REL2 068 A4.02 RO-3.2 / SRO-3.1 Perform a release of 2T-69A Boric Acid Condensate Tank	D/R	9 Radioactivity Release
* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	(5) 4-6 / 4-6 / 2-3  (8) $\leq 9 / \leq 8 / \leq 4$ (2) $\geq 1 / \geq 1 / \geq 1$ (2) $\geq 1 / \geq 1 / \geq 1$ (control room system) (5) $\geq 1 / \geq 1 / \geq 1$ (2) $\geq 2 / \geq 2 / \geq 1$ (1) $\leq 3 / \leq 3 / \leq 2$ (randomly selected) (1) $\geq 1 / \geq 1 / \geq 1$	

Facility: Arkansas Nuclear One Unit 2Date of Examination: 02/13/2017Exam Level: RO ☐ SRO-I ☐ SRO-U ☒Operating Test No.: 2017-1

Control Room Systems: \* 8 for RO; 7 for SRO-I; 2 or 3 for SRO-U

System / JPM Title	Type Code*	Safety Function
S1. A2JPM-NRC-EOP07 062 A4.01; RO-3.3/SRO-3.1 Energize 2A-4 during a LOOP.	A/M/EN/L/S	6 Electrical
S2. A2JPM-NRC-RCS02 A13 AA1.3; RO-3.2/SRO-3.8 Operate the RCS to collapse RCS Voids	A/L/D/S	3 Pressure Control
S3.		
S4.		
S5. A2JPM-NRC-SIT08 006 A1.13; RO-3.5 / SRO-3.7 Lower Safety Injection Tank level	D/EN/S	2 Inventory Control
S6.		
S7.		
S8.		

In-Plant Systems \* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

P1.		
P2. A2JPM-NRC-IA04 065 AA2.01; RO-2.9/SRO-3.2 Respond to lowering Instrument Air pressure.	A/E/N	8 Plant Service systems
P3. A2JPM-NRC-69REL2 068 A4.02 RO-3.2/SRO-3.1 Perform a release of 2T-69A Boric Acid Condensate Tank	D/R	9 Radioactivity Release

\* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	(3) 4-6 / 4-6 / 2-3  (3) $\leq 9 / \leq 8 / \leq 4$ (1) $\geq 1 / \geq 1 / \geq 1$ (2) $\geq 1 / \geq 1 / \geq 1$ (control room system) (2) $\geq 1 / \geq 1 / \geq 1$ (2) $\geq 2 / \geq 2 / \geq 1$ (0) $\leq 3 / \leq 3 / \leq 2$ (randomly selected) (1) $\geq 1 / \geq 1 / \geq 1$

JOB PERFORMANCE MEASUREUNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Steam Dump & Bypass ControlTASK: Operate "A" Upstream Atmospheric Dump Valve locallyJTA#: ANO2-AO-SDBCS-OFFNORM-3ALTERNATE PATH YES: \_\_\_\_\_ NO: X TIME CRITICAL YES: \_\_\_\_\_ NO: XKA VALUE RO: 2.8 SRO: 3.1 KA REFERENCE: 041 A2.03APPROVED FOR ADMINISTRATION TO: RO: X SRO: XTASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: X BOTH: \_\_\_\_\_

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: Simulate SIMULATOR: \_\_\_\_\_ LAB: \_\_\_\_\_

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ LAB: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 15 MinutesREFERENCE(S): OP 2105.008 SDBCS OPERATIONS Rev. 30

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time \_\_\_\_\_



**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- The plant is in Mode 3 due to a station blackout.
- The MSIV's are closed.
- Instrument Air is not available from Unit 1.
- 2PI-1007 has been aligned per 2.1 and is reading 1090 psig

**TASK STANDARD:**

"A" upstream atmospheric dump valve 2CV-1001 has been throttled opened to control "A" S/G pressure 950 – 1000 psig."

**TASK PERFORMANCE AIDS:**

OP 2105.008 Exhibit 2; flashlight

**EXAMINER NOTES:**

1. Two flashlights may be required for lighting. One for the instructor and one for the student

Operate "A" Upstream Atmospheric Dump Valve locally. In this JPM the applicant will locally control the upstream ADV to lower Steam generator pressure below the Main Steam Safety Valve setpoint. The applicant must first place manual pump up hydraulic pressure to allow control of the ADV. The Instrument Air is then isolated to the valve and a bleedoff plug opened to allow the stem to go down which will open the reverse seated valve. The applicant then will place the valve handle to operate to bump open the ADV.

**JOB PERFORMANCE MEASURE****INITIATING CUE:**

The SM/CRS directs, "Take local manual control of the "A" Upstream Atmospheric Dump Valve 2CV-1001 using OP 2105.008 Exhibit 2 step 2.3 and modulate to maintain S/G pressure 950 – 1000 psig."

**START TIME:** \_\_\_\_\_

PERFORMANCE CHECKLIST		STANDARDS	(Circle One)
<b><u>EXAMINER'S NOTES:</u></b>  Dump valves are reverse seating. Air is on the bottom of valve and valve is air to close. Therefore when valve strokes downward valve is opening.			
<b><u>NOTE</u></b> <ul style="list-style-type: none"> <li>Upstream ADVs fail open on loss of air with selector switch in OPER.</li> <li>Upstream Atmospheric Dump valves are reverse seating.</li> <li>Sections 1.0 and/or 2.0 may be performed in any order but sub-steps are to be performed in order.</li> </ul>			
(C)	1. (Step 2.3.1)	Place 2CV-1001 Handle Position Selector to MAN.  <b><u>Examiner Cue:</u></b>  When the applicant describes placing position selector switch in "MAN" then state as described.	At 2CV-1001 actuator, rotated position selector switch to "MAN".  N/A SAT UNSAT
(C)	2. (Step 2.3.2)	Rotate 2CV-1001 handwheel clockwise until resistance is felt.  <b><u>Examiner Cue:</u></b>  After the handwheel is simulated rotated CW state resistance felt.	Locally, rotated 2CV-1001 handwheel CW until resistance felt  N/A SAT UNSAT
(C)	3. (Step 2.3.3)	Verify 2CV-1001 fully closed.  <b><u>Examiner Cue:</u></b>  When the applicant describes that 2CV-1001 closed indication then state it is as seen.	Verified 2CV-1001 stem position is fully closed.  N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	4. (Step 2.3.4)	Place 2CV-1001 Handle Position Selector to LOCK.  <b><u>Examiner Cue:</u></b>  <b>When the applicant describes placing position selector switch in "LOCK" then state as described.</b>	Locally, rotated handle position selector to "LOCK".  (CW to center if looking down from top).  (Left to center if facing straight on)	N/A SAT UNSAT
	5. (Step 2.3.5)	Close 1A to 2CV-1001 (2IA-287).  <b><u>Examiner Cue:</u></b>  <b>When the applicant describes closing 2IA-287 then state as described.</b>	North of 2CV-1001, Closed 2IA-287 by rotating handwheel CW until resistance felt.	N/A SAT UNSAT
	6. (Step 2.3.6)	Remove 2CV-1001 local air bleed off valve cap.  <b><u>Examiner Cue:</u></b>  <b>When the applicant describes removing the local air bleed off valve cap then state as described.</b>	At 2CV-1001, removed the cap from one of the following bleed ports. <ul style="list-style-type: none"><li>• Air supply to the positioner.</li><li>• Positioner output to the operating diaphragm.</li></ul>	N/A SAT UNSAT
	7. (Step 2.3.7)	Open 2CV-1001 local air bleed off valve.  <b><u>Examiner Cue:</u></b>  <b>When the applicant describes opening the local air bleed off valve the state as described.</b>	At 2CV-1001, opened one of the following local air bleedoff valves by rotating valve CCW and removing the plug from the bleed port. <ul style="list-style-type: none"><li>• Air supply to the positioner.</li><li>• Positioner output to the operating diaphragm.</li></ul>	N/A SAT UNSAT
	8. (Step 2.3.8)	Open 2CV-1001 Upstream Isolation MOV (2CV-1002)  <b><u>Examiner Cue:</u></b>  <b>When the applicant describes 2CV-1002 as open then state as described.</b>	At 2CV-1002, checked open by visually verify valve stem position.	N/A SAT UNSAT
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <ul style="list-style-type: none"> <li>• ADV will open rapidly as hydraulic fluid is ported to release the diaphragm when Handle Position Selector is placed in OPER.</li> <li>• Selecting OPER should be momentary and intermittent to prevent excessive S/G depressurization and to allow S/G pressure to stabilize.</li> <li>•</li> </ul>				

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST		STANDARDS		(Circle One)
<b><u>EXAMINER'S NOTE:</u></b>				
Use Picture #1 to simulate pressure at 975# after 2CV-1001 Handle Position Selector in OPER. in step 9				
(C)	9. (Step 2.3.9.A.1)	<p><u>IF</u> desired to lower S/G A pressure <u>OR</u> establish valve position, <u>THEN</u> perform the following:</p> <p>1. Place 2CV-1001 Handle Position Selector in OPER.</p> <p><b><u>Examiner Cue:</u></b></p> <p><b><u>Examiner to use Picture #1</u></b></p> <p><b>When the 2CV-1001 Handle placed in "OPER". Pressure observed to be lowering and is now 975 psig on 2PI-1007</b></p>	<p>Place 2CV-1001 handle to OPER,</p> <p>Monitored downward movement for the valve stem on 2CV-1001 and SG pressure observed to be lowering on 2PI-1007</p>	N/A SAT UNSAT
(C)	10. (Step 2.3.9.A.2)	<p><u>WHEN</u> desired pressure in S/G A reached <u>OR</u> a more open valve position, <u>THEN</u> place 2CV-1001 Handle Position Selector in LOCK.</p> <p><b><u>Examiner Cue:</u></b></p> <p><b>When the applicant describes placing position selector switch in "LOCK" then state as described.</b></p>	<p>Locally, rotated handle position selector to "LOCK"</p> <p>(CW to center if looking down from top).</p> <p>(Left to center if facing straight on)</p>	N/A SAT UNSAT
<b>END</b>				

STOP TIME: \_\_\_\_\_

JOB PERFORMANCE MEASURE

**EXAMINER'S COPY**

**INITIAL CONDITIONS:**

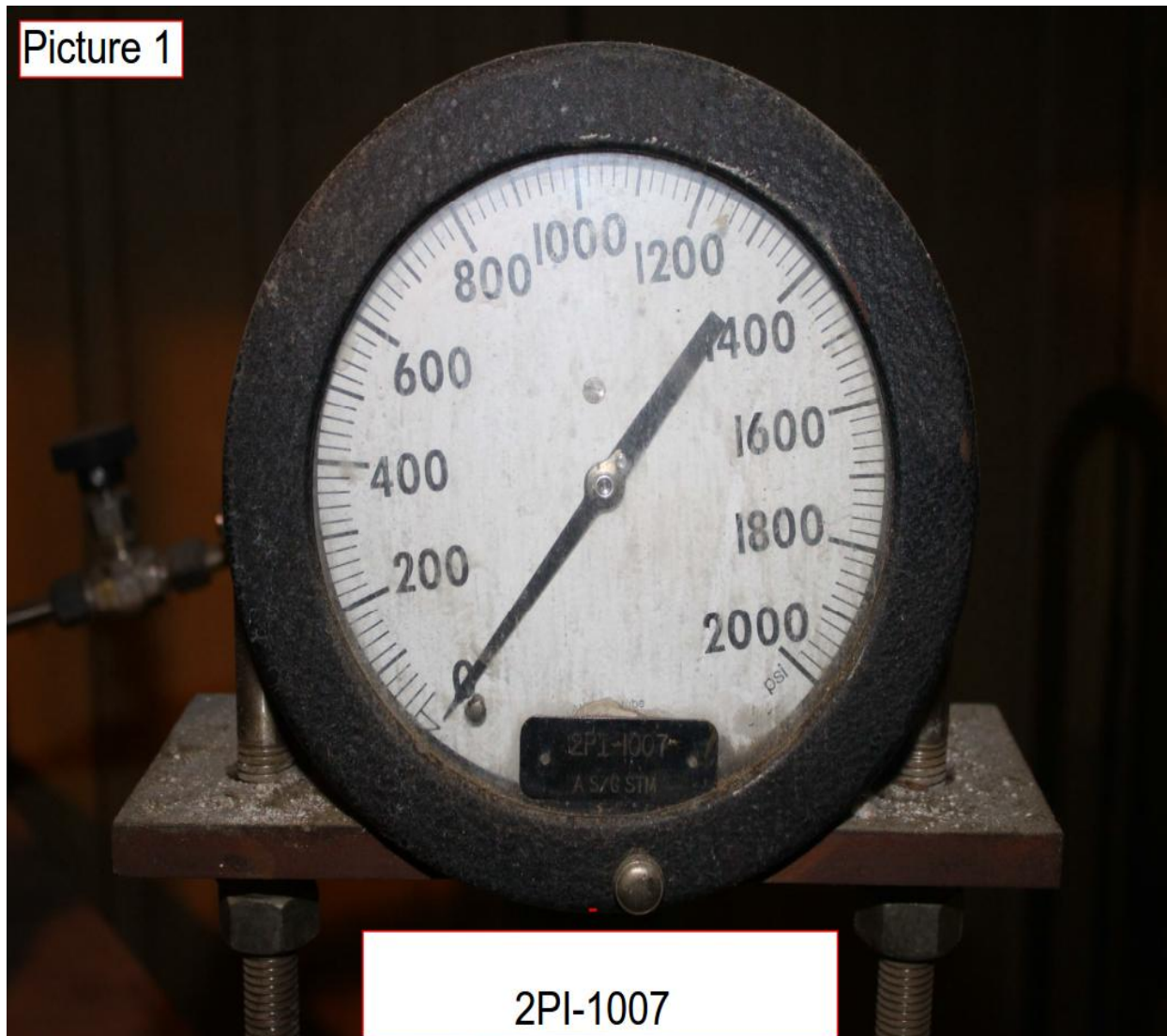
- The plant is in Mode 3 due to a station blackout.
- The MSIV's are closed.
- Instrument Air is not available from Unit 1.
- 2PI-1007 has been aligned per 2.1 and is reading 1090 psig

**INITIATING CUE:**

The SM/CRS directs, "Take local manual control of the "A" Upstream Atmospheric Dump Valve 2CV-1001 using OP 2105.008 Exhibit 2 step 2.3 and modulate to maintain S/G pressure 950 – 1000 psig."

JOB PERFORMANCE MEASURE

Picture 1



2PI-1007

JOB PERFORMANCE MEASURE

**EXAMINEE'S COPY**

**INITIAL CONDITIONS:**

- The plant is in Mode 3 due to a station blackout.
- The MSIV's are closed.
- Instrument Air is not available from Unit 1.
- 2PI-1007 has been aligned per 2.1 and is reading 1090 psig

**INITIATING CUE:**

The SM/CRS directs, "Take local manual control of the "A" Upstream Atmospheric Dump Valve 2CV-1001 using OP 2105.008 Exhibit 2 step 2.3 and modulate to maintain S/G pressure 950 – 1000 psig."

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2105.008

EXHIBIT 2

Revised 05/17/2016

## MANUAL OPERATION OF UPSTREAM ATMOSPHERIC DUMP VALVES

PAGE 1 OF 6

**NOTE**

The following section (section 1) is a suggested strategy for performing an RCS cooldown. Deviations from this strategy are allowed.

- \*1.0** IF directed to perform RCS cooldown,  
THEN observe the following strategy as desired:

- 1.1 Request new lower S/G pressure control band.
- 1.2 Inform control room personnel to monitor cooldown limits.
- 1.3 Slowly lower S/G pressure(s) into new control band.
- 1.4 Repeat steps 1.1 through 1.3 as necessary until cooldown complete.

**NOTE**

- ☒ Upstream ADVs fail open on loss of air with selector switch in OPER.
- ☒ Upstream Atmospheric Dump valves are reverse seating.
- ☒ Sections 1.0 and/or 2.0 may be performed in any order but sub-steps are to be performed in order.

- 2.0** IF desired to steam S/G A,  
THEN perform the following

- 2.1** Perform the following to place S/G A pressure indicator (2PI-1007) in service:

**N/A**

- 2.1.1** IF Non-emergency condition AND Containment controls in effect,  
THEN establish "Containment Penetration Administrative Controls" IAW Conduct of Operations (1015.001) for 2MS-3005 and 2MS-3006.

- 2.1.2** Verify pipe cap installed downstream of 2MS-3005.
- 2.1.3** Verify instrument tap capped downstream of 2MS-3005.
- 2.1.4** Open 2PI-1007 and 2CV-1001 Header Drain Isolation (2MS-3005).
- 2.1.5** Slowly open 2PI-1007 and 2CV-1001 Header Drain Isolation (2MS-3006).
- 2.1.6** Verify 2PI-1007 local tubing isolation valve open.
- \* 2.1.7** Monitor S/G A pressure on 2PI-1007.



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EXHIBIT 2

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MANUAL OPERATION OF UPSTREAM ATMOSPHERIC DUMP VALVES

PAGE 2 OF 6

N/A

~~2.2~~

IF directed to control S/G A pressure using Upstream Isolation MOV (2CV-1002),  
THEN perform the following:

- 2.2.1 Verify 2CV-1001 Handle Position Selector in OPER position.
- 2.2.2 Close IA to 2CV-1001 (2IA-287).
- 2.2.3 Remove 2CV-1001 local air bleed off valve cap.
- 2.2.4 Open 2CV-1001 local air bleed valve.
- 2.2.5 Maintain desired S/G pressure by throttling 2CV-1001 Upstream Isolation MOV (2CV-1002).

2.3 IF directed to throttle S/G A Upstream Atmospheric Dump Valve (2CV-1001),  
THEN perform the following:

- 2.3.1 Place 2CV-1001 Handle Position Selector to MAN.
- 2.3.2 Rotate 2CV-1001 handwheel clockwise until resistance is felt.
- 2.3.3 Verify 2CV-1001 fully closed.
- 2.3.4 Place 2CV-1001 Handle Position Selector to LOCK.
- 2.3.5 Close IA to 2CV-1001 (2IA-287).
- 2.3.6 Remove 2CV-1001 local air bleed off valve cap.
- 2.3.7 Open 2CV-1001 local air bleed off valve.
- 2.3.8 Open 2CV-1001 Upstream Isolation MOV (2CV-1002).

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EXHIBIT 2

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MANUAL OPERATION OF UPSTREAM ATMOSPHERIC DUMP VALVES

PAGE 3 OF 6

**CAUTION**

- ADV will open rapidly as hydraulic fluid is ported to release the diaphragm when Handle Position Selector is placed in OPER.
- Selecting OPER should be momentary and intermittent to prevent excessive S/G depressurization and to allow S/G pressure to stabilize.

2.3.9 Perform the following steps as required:

- A. IF desired to lower S/G A pressure  
OR establish valve position,  
THEN perform the following:
  1. Place 2CV-1001 Handle Position Selector in OPER.
  2. WHEN desired pressure in S/G A reached  
OR a more open valve position,  
THEN place 2CV-1001 Handle Position Selector in LOCK.
- B. IF desired to raise S/G A pressure  
OR establish a more closed valve position,  
THEN perform the following:
  1. Place 2CV-1001 Handle Position Selector in MAN.
  2. Rotate 2CV-1001 valve handwheel clockwise to desired S/G pressure or valve position.
  3. Place 2CV-1001 Handle Position Selector in LOCK.

2.4 Perform the following to restore S/G A Upstream Atmospheric Dump Valve (2CV-1001) to normal operation:

- 2.4.1 Close Upstream Isolation MOV (2CV-1002).
- 2.4.2 Close 2CV-1001 local air bleed off valve.
- 2.4.3 Install cap on 2CV-1001 local air bleed off valve.
- 2.4.4 Open IA to 2CV-1001 (2IA-287).
- 2.4.5 Verify 2CV-1001 Handle Position Selector in OPER.
- 2.4.6 Check 2CV-1001 fully closed.
- 2.4.7 Close the following valves:
  - 2PI-1007 and 2CV-1001 Header Drain Isolation (2MS-3005)
  - 2PI-1007 and 2CV-1001 Header Drain Isolation (2MS-3006)

(Step 2.4 continued on next page)

**JOB PERFORMANCE MEASURE**UNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Instrument Air SystemTASK: Respond to lowering Instrument Air pressureJTA#: ANO2-AO-IA-OFFNORM-18ALTERNATE PATH YES: X No: \_\_\_\_\_ TIME CRITICAL YES: \_\_\_\_\_ NO: XKA VALUE RO: 2.9 SRO: 3.2 KA REFERENCE: 065 AA2.01APPROVED FOR ADMINISTRATION TO: RO: X SRO: XTASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: X BOTH: \_\_\_\_\_

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: Simulate SIMULATOR: \_\_\_\_\_ LAB: \_\_\_\_\_

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ LAB: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 15 MinutesREFERENCE(S): OP 2203.021 Loss of IA AOP Rev. 18; OP 2104.024 IA System OPS Rev.49

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time \_\_\_\_\_

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- The plant is at full power
- Instrument Air header pressure has lowered from normal 100 psig to 79 psig
- The CRS has entered Loss of Instrument Air AOP 2203.021

**TASK STANDARD:**

Unit 2 IA header pressure has been restored to normal pressure by placing the standby IA filter in service.

**TASK PERFORMANCE AIDS:**

OP 2203.021 Rev 18 Step 7&8 and OP 2104.024 Instrument Air System OPS Rev.49 Section 14.1

**EXAMINER NOTES:**

Respond to lowering Instrument Air pressure. This is an Alternate Path JPM. The lowering IA header pressure is due to high DP across the in-service IA Filter 2F-173A . When performing step 8 of the IA AOP and checking the DP of the IA header pressure and receiver tanks pressure, the DP will be greater than 10 psid. Step 8 Contingency Actions A and B will fail to lower the IA to receiver tanks DP thus per Contingency Action Step 8.C, a transition will be made to OP 2104.024, IA System OPS, and the standby IA Filter will be placed in service which will restore header pressure back to normal. The Loss of IA AOP procedure Step 7 and 8 should be handed out first. When examinee, gets to Contingency Action Step 8.C, then provide Section 14.1 of the IA System Operating Procedure OP-2104.024.

**JOB PERFORMANCE MEASURE****INITIATING CUE:**

The SM/CRS directs, perform Loss of IA AOP starting at step 8.

**START TIME:** \_\_\_\_\_

PERFORMANCE CHECKLIST		STANDARDS		(Circle One)
<p align="center"><b><u>EXAMINER'S NOTES:</u></b></p> <ol style="list-style-type: none"> <li>When performing step 8 of the IA AOP and checking the DP of the IA header pressure and receiver tanks pressure, the DP will be greater than 10 psid thus the contingency actions apply.</li> <li>Step 8 Contingency Actions A and B will fail to lower the IA to receiver tanks DP.</li> <li>Therefore IAW Contingency Action Step C, a transition will be made to OP 2104.024, IA System OPS, and the standby IA Filter will be placed in service.</li> </ol>				
<p align="center"><b>PROCEDURE NOTE:</b></p> <p>Symptoms checked by the following two steps may be masked with IA cross-connected. Consider closing IA cross-connect valves.</p> <p><b>EXAMINER NOTE:</b> If Control Room contacted concerning the above note, inform the examinee that it was considered but the IA is still cross connected with Unit 1.</p>				
1. (Step 8.)	<p>Locally <b>CHECK</b> BOTH IA receivers pressure greater than 85 psig.</p> <p>"2T88A PRESS IND" 2PI-3033</p> <p>"2T88B PRESS IND" 2PI-3019</p> <p><b><u>Examiner Cue:</u></b></p> <p><b>Both IA receivers are reading 100 psig pressure.</b></p>	<p>Checked IA pressure readings on both IA receivers by reading 2PI-3033 and 2PI-3019.</p>	N/A SAT UNSAT	
2. (Step 9.)	<p>Locally <b>CHECK</b> IA header pressure and air receivers pressure within 10 psid.</p> <p>"IA MAIN SUPPLY HEADER" (2PIT-3013)</p> <p>"2T88A PRESS IND" 2PI-3033</p> <p>"2T88B PRESS IND" 2PI-3019</p> <p><b><u>Examiner Cue:</u></b></p> <p><b>IA Main Supply Header Pressure is reading 79 psig. Receivers are still at 100 psig.</b></p>	<p>Checked IA Main Supply Header pressure on 2PIT-3013 and receiver pressures on 2PI-3033 and 2PI-3019.</p> <p>Determined that the DP from the receivers to the IA Main Header supply is greater than 10 psid.</p> <p>(100psig – 79 psig = 21 psid)</p> <p>Determined that the Contingency Actions of 2203.001 Step are applicable.</p>	N/A SAT UNSAT	

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST		STANDARDS	(Circle One)
3. (Step CA 9.A.)	<p><b><u>IF</u></b> IA header and receivers pressure greater than 10 psid, <b><u>THEN</u></b> locally <b>PERFORM</b> the following as necessary:</p> <p><b>OPEN</b> "COALESCING PREFILTER BYPASS" valve (2IA-186C).</p> <p><b><u>Examiner Cue:</u></b></p> <p><b>Locking Device is removed from 2IA-186C.</b></p> <p><b>Resistance is felt and valve handle in line with pipe for 2IA-186C.</b></p> <p><b><u>Examiner Cue:</u></b></p> <p><b>IA Main Supply Header Pressure is reading 79 psig. Receivers are still at 100 psig.</b></p>	<p>Locally opened "COALESCING PREFILTER BYPASS" valve 2IA-186C:</p> <p>Removed locking device( if installed)</p> <p><b><u>AND</u></b></p> <p>turned valve handle counter clockwise until resistance is felt.</p> <p>Re-checked IA Main Supply Header pressure on 2PIT-3013 and receiver pressures on 2PI-3033 and 2PI-3019.</p>	N/A SAT UNSAT
4. (Step CA 9.B.)	<p><b>OPEN</b> "AIR DRYER BYPASS" valve (2IA-8).</p> <p><b><u>Examiner Cue:</u></b></p> <p><b>Locking Device is removed from 2IA-8.</b></p> <p><b>Resistance is felt and valve handle in line with pipe for 2IA-8.</b></p> <p><b><u>Examiner Cue:</u></b></p> <p><b>IA Main Supply Header Pressure is reading 79 psig. Receivers are still at 100 psig.</b></p>	<p>Locally opened "AIR DRYER BYPASS" valve 2IA-8:</p> <p>Removed locking device( if installed)</p> <p><b><u>AND</u></b></p> <p>turned valve handle counter clockwise until resistance is felt.</p> <p>Re-checked IA Main Supply Header pressure on 2PIT-3013 and receiver pressures on 2PI-3033 and 2PI-3019.</p>	N/A SAT UNSAT
<p><b>EXAMINER NOTE: If examinee attempts to place the standby IA dryer in service, inform the examinee that this has been completed by another operator.</b></p>			
5. (Step CA 9.C)	<p><b><u>WHEN</u></b> time allows, <b><u>THEN PLACE</u></b> standby IA Dryer in service (refer to 2104.024, Instrument Air System).</p>	<p>Applicant determines there is not currently enough time to place the standby dryer in service.</p>	N/A SAT UNSAT
<p><b>EXAMINER'S NOTE: The following steps are the Alternate Path portion of this JPM.</b></p> <p><b>EXAMINER NOTE: After examinee has determined the need to swap IA filters, provide a copy of OP 2104.024</b></p>			

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
<b>Section 14.1.</b>				
	5. (Step CA 9.D.)	<b>PLACE</b> standby IA Filter in service, refer to 2104.024, Instrument Air System.  <u><b>Examiner Note:</b></u>  <b>The applicant should determine which IA filter is in service at the plant and simulate shifting IA filters.</b>  <u><b>Examiner Cue:</b></u>  <b>If asked which IA filter is in service state it is as seen.</b>	Examinee transitioned to normal operating procedure 2104.024, Instrument Air System to place the standby IA Filter in service.	N/A SAT UNSAT
<b>EXAMINER NOTE:</b> The following steps are from OP 2104.024 Section 14.1.1 for placing 2F-173B in service. If the plant alignment has 2F-173B already in service then NA steps 6-14 and use the steps 15-23 to place 2F-173A in service.				
(C)	6. (Step 14.1.1.A.)	<b>IF</b> Instrument Air filter (2F-173A) in service, <u><b>THEN</b></u> place 2F-173B in service by performing the following:  Open Air Filter 2F-173B Inlet (2IA-9B).  <u><b>Examiner Cue:</b></u>  <b>Locking Device is removed from 2IA-9B</b>  <b>Resistance is felt and valve handle in line with pipe for 2IA-9B.</b>	Locally opened "Air Filter 2F-173B Inlet valve 2IA-9B  Removed locking device( if installed)  <u><b>AND</b></u>  turned valve handle counter clockwise until resistance is felt.	N/A SAT UNSAT
	7. (Step 14.1.1.B.)	Install locking device on 2IA-9B.  <u><b>Examiner Cue:</b></u>  <b>Locking Device is installed on 2IA-9B.</b>	Installed locking device on 2IA-9B	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	8. (Step 14.1.1.C.)	Open Air Filter 2F-173B Outlet (2IA-10B).  <b><u>Examiner Cue:</u></b>  <b>Locking Device is removed from 2IA-10B.</b>  <b>Resistance is felt and valve handle in line with pipe for 2IA-10B.</b>	Locally opened "Air Filter 2F-173B Outlet valve 2IA-10B:  Removed locking device( if installed)  <u>AND</u>  turned valve handle counter clockwise until resistance is felt.	N/A SAT UNSAT
	8. (Step 14.1.1.C.) CONT.	<b><u>Examiner Cue:</u></b>  <b>IA Main Supply Header pressure is reading 100 psig. Receivers are still at 100 psig.</b>	Re-checked IA Main Supply Header pressure on 2PIT-3013 and receiver pressures on 2PI-3033 and 2PI-3019.	
	9. (Step 14.1.1.D.)	Install locking device on 2IA-10B.  <b><u>Examiner Cue:</u></b>  <b>Locking Device is installed on 2IA-10B.</b>	Installed locking device on 2IA-10B.	N/A SAT UNSAT
	10. (Step 14.1.1.E.)	Remove locking device from Air Filter 2F-173A Inlet (2IA-9A)  <b><u>Examiner Cue:</u></b>  <b>Locking Device is removed from 2IA-9A.</b>	Removed locking device from Air Filter 2F-173A Inlet 2IA-9A.	N/A SAT UNSAT
(C)	11. (Step 14.1.1.F.)	Close Air Filter 2F-173A Inlet (2IA-9A).  <b><u>Examiner Cue:</u></b>  <b>Resistance is felt and valve handle perpendicular with pipe for 2IA-9A.</b>	Locally Closed Air Filter 2F-173A Inlet 2IA-9A by turning valve handle clockwise until resistance is felt.	N/A SAT UNSAT
	12. (Step 14.1.1.G.)	Remove locking device from Air Filter 2F-173A Outlet (2IA-10A).  <b><u>Examiner Cue:</u></b>  <b>Locking Device is removed from 2IA-10A.</b>	Removed locking device from Air Filter 2F-173A Outlet 2IA-10A.	N/A SAT UNSAT



**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	13. (Step 14.1.1.H.)	Close Air Filter 2F-173A Outlet (2IA-10A).  <b><u>Examiner Cue:</u></b>  <b>Resistance is felt and valve handle perpendicular with pipe for 2IA-10A.</b>	Locally Closed Air Filter 2F-173A Inlet 2IA-10A by turning valve handle clockwise until resistance is felt.	N/A SAT UNSAT
	14. (Step 14.1.1.I)	IF 2F-173A isolated due to high DP, <u>THEN</u> initiate WR/WO to change 2F-173A.  <b><u>Examiner Cue:</u></b>  <b>State another operator will initiate the Work Request/ Work Order.</b>	Initiated action to change out 2F-173A	N/A SAT UNSAT
<b>EXAMINER NOTE: The following steps are from OP 2104.024 Section 14.1.2 for placing 2F-173A in service. If the plant alignment has 2F-173A already in service then NA these step and use the steps to place 2F-173A in service on the previous page.</b>				
(C)	15. (Step 14.1.2.A.)	IF Instrument Air filter (2F-173B) in service, <u>THEN</u> place 2F-173A in service by performing the following:  Open Air Filter 2F-173A Inlet (2IA-9A).  <b><u>Examiner Cue:</u></b>  <b>Locking Device is removed from 2IA-9A</b>  <b>Resistance is felt and valve handle in line with pipe for 2IA-9A.</b>	Locally opened "Air Filter 2F-173A Inlet valve 2IA-9A:  Removed locking device( if installed)  <u>AND</u>  turned valve handle counter clockwise until resistance is felt.	N/A SAT UNSAT
	16. (Step 14.1.2.B.)	Install locking device on 2IA-9A.  <b><u>Examiner Cue:</u></b>  <b>Locking Device is installed on 2IA-9A.</b>	Installed locking device on 2IA-9A	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	17. (Step 14.1.2.C.)	<p>Open Air Filter 2F-173A Outlet (2IA-10A).</p> <p><b><u>Examiner Cue:</u></b></p> <p><b>Locking Device is removed from 2IA-10A</b></p> <p><b>Resistance is felt and valve handle in line with pipe for 2IA-10A.</b></p> <p><b><u>Examiner Cue:</u></b></p> <p><b>IA Main Supply Header pressure is reading 100 psig. Receivers are still at 100 psig.</b></p>	<p>Locally opened "Air Filter 2F-173A Outlet valve 2IA-10A:</p> <p>Removed locking device( if installed)</p> <p><b><u>AND</u></b></p> <p>turned valve handle counter clockwise until resistance is felt.</p> <p>Re-checked IA Main Supply Header pressure on 2PIT-3013 and receiver pressures on 2PI-3033 and 2PI-3019.</p>	N/A SAT UNSAT
	18. (Step 14.1.2.D.)	<p>Install locking device on 2IA-10A.</p> <p><b><u>Examiner Cue:</u></b></p> <p><b>Locking Device is installed on 2IA-10A.</b></p>	Installed locking device on 2IA-10A.	N/A SAT UNSAT
	19. (Step 14.1.2.E.)	<p>Remove locking device from Air Filter 2F-173A Inlet (2IA-9B)</p> <p><b><u>Examiner Cue:</u></b></p> <p><b>Locking Device is removed from 2IA-9B.</b></p>	Removed locking device from Air Filter 2F-173B Inlet 2IA-9B.	N/A SAT UNSAT
(C)	20. (Step 14.1.2.F.)	<p>Close Air Filter 2F-173B Inlet (2IA-9B).</p> <p><b><u>Examiner Cue:</u></b></p> <p><b>Resistance is felt and valve handle perpendicular with pipe for 2IA-9B.</b></p>	Locally Closed Air Filter 2F-173B Inlet 2IA-9B by turning valve handle clockwise until resistance is felt.	N/A SAT UNSAT
	21. (Step 14.1.2.G.)	<p>Remove locking device from Air Filter 2F-173B Outlet (2IA-10B).</p> <p><b><u>Examiner Cue:</u></b></p> <p><b>Locking Device is removed from 2IA-10B.</b></p>	Removed locking device from Air Filter 2F-173B Outlet 2IA-10B.	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	22. (Step 14.1.2.H.)	Close Air Filter 2F-173B Outlet (2IA-10B).  <b><u>Examiner Cue:</u></b>  <b>Resistance is felt and valve handle perpendicular with pipe for 2IA-10B.</b>	Locally Closed Air Filter 2F-173B Inlet 2IA-10B by turning valve handle clockwise until resistance is felt.	N/A SAT UNSAT
	23. (Step 14.1.2.I.)	<u>IF</u> 2F-173B isolated due to high DP, <u>THEN</u> initiate WR/WO to change 2F-173B.  <b><u>Examiner Cue:</u></b>  <b>State another operator will initiate the Work Request/ Work Order.</b>	Initiated action to change out 2F-173B	N/A SAT UNSAT

STOP TIME: \_\_\_\_\_

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#### 14.0 INSTRUMENT AIR FILTER OPERATION

##### 14.1 Shifting Unit 2 Instrument Air filters (2F-173A and 2F-173B)

14.1.1 IF Instrument Air filter (2F-173A) in service,  
THEN place 2F-173B in service by performing the following:

- A. Open Air Filter 2F-173B Inlet (2IA-9B).
- B. Install locking device on 2IA-9B.
- C. Open Air Filter 2F-173B Outlet (2IA-10B).
- D. Install locking device on 2IA-10B.
- E. Remove locking device from Air Filter 2F-173A Inlet (2IA-9A).
- F. Close Air Filter 2F-173A Inlet (2IA-9A).
- G. Remove locking device from Air Filter 2F-173A Outlet (2IA-10A).
- H. Close Air Filter 2F-173A Outlet (2IA-10A).
- I. IF 2F-173A isolated due to high DP,  
THEN initiate WR/WO to change 2F-173A.

14.1.2 IF Instrument Air filter (2F-173B) in service,  
THEN place 2F-173A in service by performing the following:

- A. Open Air Filter 2F-173A Inlet (2IA-9A).
- B. Install locking device on 2IA-9A.
- C. Open Air Filter 2F-173A Outlet (2IA-10A).
- D. Install locking device on 2IA-10A.
- E. Remove locking device from Air Filter 2F-173B Inlet (2IA-9B).
- F. Close Air Filter 2F-173B Inlet (2IA-9B).
- G. Remove locking device from Air Filter 2F-173B Outlet (2IA-10B).
- H. Close Air Filter 2F-173B Outlet (2IA-10B).
- I. IF 2F-173B isolated due to high DP,  
THEN initiate WR/WO to change 2F-173B.

(Step 14.0 continued on next page)

JOB PERFORMANCE MEASURE

**EXAMINER'S COPY**

**INITIAL CONDITIONS:**

- The plant is at full power
- Instrument Air header pressure has lowered from normal 100 psig to 79 psig
- The CRS has entered Loss of Instrument Air AOP 2203.021

**INITIATING CUE:**

The SM/CRS directs, perform Loss of IA AOP starting at step 8.

**JOB PERFORMANCE MEASURE**

**EXAMINEE'S COPY**

**INITIAL CONDITIONS:**

- The plant is at full power
- Instrument Air header pressure has lowered from normal 100 psig to 79 psig
- The CRS has entered Loss of Instrument Air AOP 2203.021.

**INITIATING CUE:**

The SM/CRS directs, perform Loss of IA AOP starting at step 8.

## INSTRUCTIONS

### NOTE

Symptoms checked by the following TWO steps may be masked with IA cross-connected. Consider closing IA cross-connect valves.

8. Locally **CHECK** BOTH IA receivers pressure greater than 85 psig.

- "2T88A PRESS IND" 2PI-3033
- "2T88B PRESS IND" 2PI-3019

9. Locally **CHECK** IA header pressure and air receivers pressure within 10 psid.

- "IA MAIN SUPPLY HEADER" (2PIT-3013)
- "2T88A PRESS IND" 2PI-3033
- "2T88B PRESS IND" 2PI-3019

## CONTINGENCY ACTIONS

8. **IF** IA receivers pressure less than 85 psig, **THEN ENSURE** BOTH IA compressors running (refer to 2104.024, Instrument Air System).

9. **IF** IA header and receivers pressure greater than 10 psid, **THEN** locally **PERFORM** the following as necessary:

- A. **OPEN** "COALESCING PREFILTER BYPASS" valve (2IA-186C).
- B. **OPEN** "AIR DRYER BYPASS" valve (2IA-8).
- C. **WHEN** time allows, **THEN PLACE** standby IA Dryer in service (refer to 2104.024, Instrument Air System).
- D. **PLACE** standby IA Filter in service, refer to 2104.024, Instrument Air System.

### NOTE

Attachment B aligns critical components to their "fail safe" position to prevent inadvertent repositioning as IA pressure restores.

- 10. **IF** AOVs have repositioned or are repositioning due to degraded IA pressure, **THEN PERFORM** Attachment B, Valve Switch Safe Positions, as required to prevent inadvertent repositioning.

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## JOB PERFORMANCE MEASURE

UNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Liquid Radwaste and Boron Management SystemTASK: Perform a release of 2T-69A Boric Acid Condensate TankJTA#: ANO2-WCO-LRWBMS-NORM-2ALTERNATE PATH YES: \_\_\_\_\_ NO: X TIME CRITICAL YES: \_\_\_\_\_ NO: XKA VALUE RO: 3.2 SRO: 3.1 KA REFERENCE: 068 A4.02APPROVED FOR ADMINISTRATION TO: RO: X SRO: XTASK LOCATION: INSIDE CR: \_\_\_\_\_ OUTSIDE CR: X BOTH: \_\_\_\_\_

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: Simulate SIMULATOR: \_\_\_\_\_ LAB: \_\_\_\_\_

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ LAB: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 20 MinutesREFERENCE(S): OP-2104.014 LRW and BMS Operations Sup. 3

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

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Start Time	Stop Time	Total Time
_____	_____	_____



**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**JPM INITIAL TASK CONDITIONS:**

- 2T-69A Boric Acid Condensate Tank level is 90%.
- 2104.014 Sup. 1 Liquid Radwaste Release permit for 2T-69A has been submitted and completed.
- 2P-47A Boric Acid Condensate pump is running.
- 2RE-2330 radiation monitor is OPERABLE.
- Maximum flow rate from Pre-Release report based on number of Circ pumps running is 250 gpm.
- 2CV-2330A and 2CV-2330B were both tested in Supplement 1 of 2104.014 and are both open.

**TASK STANDARD:**

A 2T-69A Boric Acid Condensate Tank release has been commenced using OP-2104.014 Sup. 3

**TASK PERFORMANCE AIDS:**

OP-2104.014 Sup. 3

**EXAMINER NOTES:**

Perform a release of 2T-69A Boric Acid Condensate Tank. The applicant will commence the release of 2T-69A by verifying that the pump 2P-47A is running then remove the red tag from the discharge isolation valve 2CV-2318 and opening the valve. The applicant will then align the automatic dump isolation valves 2CV-2330A and 2CV-2330B to OPEN. Next a manual isolation will be opened to commence the release. The applicant will then commence throttling the 2P-47A pump recirc isolation to achieve the desired release rate.

## JOB PERFORMANCE MEASURE

### INITIATING CUE:

The SM/CRS directs, "Commence a 2T-69A Boric Acid Condensate Tank release using OP-2104.014 Supplement 3 starting at Step 3.1."

START TIME: \_\_\_\_\_

PERFORMANCE CHECKLIST		STANDARDS		(Circle One)
<b><u>TRANSITION NOTE:</u></b>				
Proceed to the 335 elevation of the Aux Bldg by the WCO desk.				
<b><u>Examiner Note:</u></b> The Red_magnetic tags discuss in the JPM are stored on the panel 2C-112/2C-113 and can be referred to during the performance of this JPM. The Red_magnetic tags are simulated to be installed on 2HS-2312 and 2HS-2318 in step 1 and 2. Picture #1 is to be shown to the examinee for step 1 and Picture #2 to the examinee for step 2.				
	1. (Step 3.0/3.1 )	<p><u>IF</u> releasing Boric Acid Condensate tank (2T-69A), <u>THEN</u> perform the following:</p> <p>Check the following valve closed <u>AND</u> magnetic tag on hand switch:</p> <p>2T-69A Inlet 2CV-2312 (2HS-2312)</p> <p><b><u>Examiner's Cue:</u></b></p> <p><b><u>Show examinee Picture #1</u></b></p> <p>2CV-2312 indicates Red light off, green light on.</p> <p>Red "CLOSED" magnetic tag is installed on 2HS-2312.</p> <p>If observed locally, 2CV-2312 Valve stem is fully down.</p>	<p>Observed red "CLOSED" magnetic tag installed on 2HS-2312.</p> <p><b><u>AND EITHER:</u></b></p> <p>At 2C-112 panel, observed red light off, green light on for 2CV-2312.</p> <p><b><u>OR</u></b></p> <p>Locally, observed valve stem fully down.</p>	N/A SAT UNSAT
	2. (Step 3.1)	<p>Check the following valve closed <u>AND</u> magnetic tag on hand switch:</p> <p>2P-47A Discharge 2CV-2318 (2HS-2318)</p> <p><b><u>Examiner's Cue:</u></b></p> <p><b><u>Show examinee Picture #2</u></b></p> <p>2CV-2318 Red light off, green light on.</p> <p>Red "CLOSED" magnetic tag</p>	<p>Observed red "CLOSED" magnetic tag installed on 2HS-2318.</p> <p><b><u>AND EITHER:</u></b></p> <p>At 2C-112 panel, observed red light off, green light on for 2CV-2318.</p> <p><b><u>OR</u></b></p> <p>Locally, observed valve stem fully down.</p>	N/A SAT UNSAT

## JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST		STANDARDS	(Circle One)
	is installed on 2HS-2318. If observed locally, 2CV-2318 Valve stem is fully down.		
<b><u>EXAMINERS NOTE:</u></b>			
Step 3.2 is not applicable due to using 2P- 47A and Step 4 is not applicable due to releasing 2T-69A			
3. (Step 5.0)	IF any magnetic tag <u>NOT</u> on hand switch, <u>THEN</u> do <u>NOT</u> perform this release and submit new release permit (Supplement 1).	Observed that the required magnetic tag are on the proper handswitches 2HS-2312 and 2HS-2318	N/A SAT UNSAT
<b><u>EXAMINERS NOTE:</u></b>			
2P-47A Boric Acid Condensate Pump is currently running in the following step.			
4. (Step 6.0)	Verify selected Boric Acid Condensate pump running: 2P-47A (2HS-2316)  <b><u>Examiner's Cue:</u></b> <b>2P-47A Red light on, green light off.</b>  <b><u>OR</u></b> <b>2PI-2317 indicates 65 psig.</b>	Either: At 2C-112 panel, observed red light on, green light off for 2P-47A (2HS-2316).  <b><u>OR</u></b> At 2C-112 panel, observed pressure on 2PI-2317.	N/A SAT UNSAT
5. (Step 7.0/7.1 )	Perform the following to commence releasing selected 2T-69: Remove magnetic tag from selected Boric Acid Condensate Pump Discharge:  2P-47A Disch 2CV-2318 (2HS-2318)  <b><u>Examiner's Cue:</u></b> <b>Red "CLOSED" magnetic tag is removed from 2HS-2318.</b>	Removed red "CLOSED" magnetic tag from 2HS-2318 for 2P-47A Discharge.	N/A SAT UNSAT

## JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	6. (Step 7.2)	<p>Open selected Boric Acid Condensate Pump Discharge valve:</p> <p>2P-47A Disch 2CV-2318 (2HS-2318)</p> <p><b><u>Examiner's Cue:</u></b> <b>2CV-2318 Red light on, green light off.</b></p>	At 2C-112 panel, placed 2HS-2318 to OPEN. Observed Red light ON, green light Off for 2CV-2318	N/A SAT UNSAT
	7. (Step 7.3)	<p>Place "Open-Dump" magnetic tag near selected Boric Acid Condensate Pump Discharge valve:</p> <p>2P-47A Disch (2CV-2318)</p> <p><b><u>Examiner's Cue:</u></b> <b>Red "OPEN-DUMP" magnetic tag is near 2HS-2318.</b></p>	Placed red "OPEN-DUMP" magnetic tag near handswitch 2HS-2318 for 2CV-2318.	N/A SAT UNSAT

## JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	8. (Step 8.0/8.1)	<p>Verify the following (N/A valve if not opened):</p> <p><u>IF</u> BMS Liquid Discharge Rad Monitor (2RITS-2330) functional, <u>THEN</u> verify valves tested in Supplement 1 open:</p> <p>2CV-2330A</p> <p>2CV-2330B</p> <p><b><u>Examiner's Cue:</u></b></p> <p>Red light on, green light off for 2CV-2330A and 2CV-2330B.</p>	At 2C-112 panel verified Red light is illuminated for 2CV-2330A and 2CV-2330B.	N/A SAT UNSAT
<p align="center"><b><u>EXAMINERS NOTE:</u></b></p> <p align="center"><b>Step 8.2 is not applicable due to the BMS Liquid Discharge Rad Monitor (2RITS-2330) is operable.</b></p>				
	9. (Step 9.0)	<p>Verify flow on BMS Liquid Discharge recorder (2FR/RR-2331) ~ 0 gpm</p> <p><b><u>Examiner's Cue:</u></b></p> <p>Control room states, "2FR/RR-2331 recorder indicates 0 gpm."</p>	Contacted the Control room by radio or phone to verify no flow exists on 2FR/RR-2331.	N/A SAT UNSAT
<p align="center"><b><u>TRANSITION NOTE:</u></b></p> <p align="center"><b>Proceed to the 326 elevation area by the Squeeze valve.</b></p>				
(C)	10. (Step 10.0)	<p>Open 2P-47A/B Discharge to Circ Water Flume (2BM-35).</p> <p><b><u>Examiner's Cue:</u></b></p> <p><b>2BM-35 Valve stem is fully extended.</b></p>	Opened Circ Water Flume 2BM-35 by turning handwheel CCW until resistance felt and valve stem is fully extended.	N/A SAT UNSAT

## JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST		STANDARDS		(Circle One)
<b><u>PROCEDURE NOTE</u></b>				
<ul style="list-style-type: none"> <li>Recirc valves should be maintained at least one turn open to ensure minimum recirc flow if 2CV-2330A/B close.</li> <li>Boric Acid Condensate Pump Discharge flow can be established using indication 2FIC-2330 on 2C-112 / 2FR/RR-2331 on 2C14 or F2330 on PMS2.</li> </ul>				
(C)	11. (Step 11.0)	Throttle selected Boric Acid Condensate Pump Recirc 2BM-80A as needed to establish flow within the following limits using indications in above Note:  ≤ 75 gpm (Liquid Waste Discharge 2FIC-2330 range).  <b><u>Examiner's Cue:</u></b> <b>Flow noise is heard.</b> <b>Flow is 60 gpm</b> <b>Recirc valve is one turn open.</b>	Throttled 2BM-80A by turning handwheel CW until indicated flow on 2FIC-2330 on 2C112 is 60 gpm.  Ensured Recirc Valve 2BM-80A is left opened ~ 1 turn to ensure minimum recirc flow if the release is terminated.	N/A SAT UNSAT
<b>END</b>				

STOP TIME: \_\_\_\_\_

**JOB PERFORMANCE MEASURE**

**EXAMINER'S COPY**

**INITIAL CONDITIONS:**

- 2T-69A Boric Acid Condensate Tank level is 90%.
- 2104.014 Sup. 1 Liquid Radwaste Release permit for 2T-69A has been submitted and completed.
- 2P-47A Boric Acid Condensate pump is running.
- 2RE-2330 radiation monitor is OPERABLE.
- Maximum flow rate from Pre-Release report based on number of Circ pumps running is 250 gpm.
- 2CV-2330A and 2CV-2330B were both tested in Supplement 1 of 2104.014 and are both open.

**INITIATING CUE:**

The SM/CRS directs, "Commence a 2T-69A Boric Acid Condensate Tank release using OP-2104.014 Supplement 3 starting at Step 3.1."

JOB PERFORMANCE MEASURE

# Picture #1





JOB PERFORMANCE MEASURE

## Picture #2



**JOB PERFORMANCE MEASURE**

**EXAMINEE'S COPY**

**INITIAL CONDITIONS:**

- 2T-69A Boric Acid Condensate Tank level is 90%.
- 2104.014 Sup. 1 Liquid Radwaste Release permit for 2T-69A has been submitted and completed.
- 2P-47A Boric Acid Condensate pump is running.
- 2RE-2330 radiation monitor is OPERABLE.
- Maximum flow rate from Pre-Release report based on number of Circ pumps running is 250 gpm.
- 2CV-2330A and 2CV-2330B were both tested in Supplement 1 of 2104.014 and are both open.

**INITIATING CUE:**

The SM/CRS directs, "Commence a 2T-69A Boric Acid Condensate Tank release using OP-2104.014 Supplement 3 starting at Step 3.1."

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SUPPLEMENT 3

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BORIC ACID CONDENSATE TANK (2T-69A/B) RELEASE

N/A

1.0 IF BMS Liquid Discharge Rad Monitor (2RITS-2330) non-functional,  
THEN perform the following to implement ODCM L2.1.1 action 1:

- 1.1 Verify at least two independent samples of tank to be released have been analyzed.
- 1.2 Verify release rate computer input data independently verified by at least two technically qualified members of Facility Staff.
- 1.3 Verify discharge valve lineup independently verified by at least two technically qualified members of Facility Staff.

\* 2.0 IF Unit 1 Circ water flow adjusted during this release,  
THEN terminate release.

3.0 IF releasing Boric Acid Condensate tank (2T-69A),  
THEN perform the following:

- 3.1 Check the following valves closed  
AND magnetic tag on hand switch:

	Valve Closed	Tag on HS
• 2T-69A Inlet 2CV-2312 (2HS-2312)	_____	_____
• 2P-47A Discharge 2CV-2318 (2HS-2318)	_____	_____
- 3.2 IF using 2P-47B to pump 2T-69A,  
THEN check the following:
  - 2P-47B Discharge (2CV-2326) closed.
  - Magnetic tag on hand switch 2HS-2326.

4.0 IF releasing Boric Acid Condensate tank (2T-69B),  
THEN perform the following:

- 4.1 Check the following valves closed  
AND magnetic tag on hand switch:

	Valve Closed	Tag on HS
• 2T-69B Inlet 2CV-2320 (2HS-2320)	_____	_____
• 2P-47B Discharge 2CV-2326 (2HS-2326)	_____	_____
- 4.2 IF using 2P-47A to pump 2T-69B,  
THEN check the following:
  - 2P-47A Discharge (2CV-2318) closed.
  - Magnetic tag on hand switch 2HS-2318.

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SUPPLEMENT 3

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- 5.0 IF any magnetic tag NOT on hand switch,  
THEN do NOT perform this release and submit new release permit (Supplement 1).
- 6.0 Verify selected Boric Acid Condensate pump running:
  - 2P-47A (2HS-2316)
  - 2P-47B (2HS-2324)
- 7.0 Perform the following to commence releasing selected 2T-69:
  - 7.1 Remove magnetic tag from selected Boric Acid Condensate Pump Discharge:
    - 2P-47A Disch 2CV-2318 (2HS-2318)
    - 2P-47B Disch 2CV-2326 (2HS-2326)
  - 7.2 Open selected Boric Acid Condensate Pump Discharge valve:
    - 2P-47A Disch 2CV-2318 (2HS-2318)
    - 2P-47B Disch 2CV-2326 (2HS-2326)
  - 7.3 Place "Open-Dump" magnetic tag near selected Boric Acid Condensate Pump Discharge valve:
    - 2P-47A Disch (2CV-2318)
    - 2P-47B Disch (2CV-2326)

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SUPPLEMENT 3

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8.0 Verify the following (N/A valve if not opened):

8.1 IF BMS Liquid Discharge Rad Monitor (2RITS-2330) functional,  
THEN verify valves tested in Supplement 1 open:

- 2CV-2330A
- 2CV-2330B

8.2 IF BMS Liquid Discharge Rad Monitor (2RITS-2330) NOT functional,  
THEN open selected LRW/BMS Discharge to Circ Water Flume valves  
(EITHER or BOTH) as follows:

8.2.1 Verify Liquid Waste Disch (2FIC-2330) in MANUAL  
with output demand 100 %.

8.2.2 IF desired to open BOTH 2CV-2330A and 2CV-2330B,  
THEN verify the following:

- A. (2HS-2331) in position BOTH
- B. (2HS-2330) in position 1 OR 3

8.2.3 IF desired to open EITHER 2CV-2330A or 2CV-2330B,  
THEN verify the following:

- A. (2HS-2331) in position ONE.
- B. IF desired to open 2CV-2330A,  
THEN verify (2HS-2330) in position 1.
- C. IF desired to open 2CV-2330B,  
THEN verify (2HS-2330) in position 3.
- D. IF EITHER valve unavailable,  
THEN locally verify unavailable valve failed  
in closed position.

9.0 Verify flow on BMS Liquid Discharge recorder (2FR/RR-2331) ~ 0 gpm.

10.0 Open 2P-47A/B Discharge to Circ Water Flume (2BM-35).

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SUPPLEMENT 3

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<u>NOTE</u>
<ul style="list-style-type: none"> <li>Recirc valves should be maintained at least one turn open to ensure minimum recirc flow if 2CV-2330A/B close.</li> <li>Boric Acid Condensate Pump Discharge flow can be established using indication 2FIC-2330 on 2C-112 / 2FR/RR-2331 on 2C14 or F2330 on PMS2.</li> </ul>

- 11.0 Throttle selected Boric Acid Condensate Pump Recirc (2BM-80A or 2BM-80B) as needed to establish flow within the following limits using indications in above Note:
- ≤ \_\_\_\_\_ gpm (max flow rate from Pre-Release report based on number of Circ pumps running).
  - ≤ 75 gpm (Liquid Waste Discharge 2FIC-2330 range).
- 12.0 IF Liquid Discharge Discharge (2FIC-2330) non-functional, THEN perform the following:
- 12.1 Estimate pump flow using Attachment G at least once every four hours.
- 12.2 Document in Station Log.
- 13.0 IF BMS Liquid Discharge Rad Monitor (2RITS-2330) non-functional, THEN Independently Verify the following:
- 13.1 Selected Boric Acid Condensate Tank Inlet closed AND magnetic tag on hand switch:
- |                                    | Valve Closed | Tag on HS |
|------------------------------------|--------------|-----------|
| • 2T-69A Inlet 2CV-2312 (2HS-2312) | _____        | _____     |
| • 2T-69B Inlet 2CV-2320 (2HS-2320) | _____        | _____     |
- 13.2 Selected Boric Acid Condensate Pump Discharge valve open:
- 2P-47A Disch 2CV-2318 (2HS-2318)
  - 2P-47B Disch 2CV-2326 (2HS-2326)
- 13.3 One or both Discharge to Circ Water Flume valves (2CV-2330A/B) open IAW step 8.0.
- 13.4 2P-47A/B Discharge to Circ Water Flume (2BM-35) open.
- 13.5 Flow within limits of step 11.0.
- IV performed by: \_\_\_\_\_

**JOB PERFORMANCE MEASURE**Unit: 2 Rev #: 1 Date: \_\_\_\_\_System/Duty Area: Emergency Diesel GeneratorTask: Energize 2A-4 bus during LOOPJTA# ANO2-RO-EOPAOP-EMERG-32Alternate Path Yes: X No: \_\_\_\_\_ Time Critical Yes: \_\_\_\_\_ No: XKA Value RO: 3.3 SRO: 3.1 KA Reference: 062 A4.01Approved For Administration To: \_\_\_\_\_ RO: X SRO: XTask Location: Inside CR: X Outside CR: \_\_\_\_\_ Both: \_\_\_\_\_

Suggested Testing Environment And Method (Perform Or Simulate):

Plant Site: \_\_\_\_\_ Simulator: Perform Lab: \_\_\_\_\_

Position Evaluated: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

Actual Testing Environment: Simulator: \_\_\_\_\_ Plant Site: \_\_\_\_\_ Lab: \_\_\_\_\_

Testing Method: Simulate: \_\_\_\_\_ Perform: \_\_\_\_\_

Approximate Completion Time In Minutes: 15 minutesReferences(s): 2202.007 Loss of Offsite Power EOP

Examinee's Name: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

Evaluator's Name: \_\_\_\_\_

The Examinee's performance was evaluated against the standards contained in this JPM and is determined to be:

Satisfactory: \_\_\_\_\_ Unsatisfactory: \_\_\_\_\_

Performance Checklist Comments:

Start Time: \_\_\_\_\_ Stop Time: \_\_\_\_\_ Total Time: \_\_\_\_\_

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**JPM INITIAL TASK CONDITIONS:**

- Mode 3
- LOOP in progress
- # 1 EDG supplying 2A-3
- LOOP EOP has been entered and completed through step 6.

**SIMULATOR SETUP:**

- \* Unit off line, Mode 3.
- \* Start # 2 EDG,
- \* Insert remote LCK\_OP for 2A-408
- \* Insert malfunctions for LOOP, LOSE161 & LOSE500

**TASK STANDARD:**

Energize 2A-4 4160 volt bus from the Alternate AC Diesel Generator.

**TASK PERFORMANCE AIDS:**

2202.007, LOOP EOP

**EXAMINER'S NOTE:**

Energize 2A-4 bus during LOOP. This is an Alternate Path JPM. During a LOOP, when the applicant goes to verify 2DG2 output breaker is closed, it will not be closed and attempts to close the breaker fail. This will result in securing 2DG2 and energizing the 2A-4 4160 Volt Vital bus with the Alternate AC Diesel Generator. The LOOP EOP Procedure OP 2202.007 should be used first. When the applicant has completed JPM step 8 to LOCKOUT 2DG2 (Red Train Diesel), then the applicant will transition to Attachment E of OP 2104.037, Alternate AC Diesel Operations and start the AACG and energize the 2A-4 4160 Volt Vital bus.



**JOB PERFORMANCE MEASURE****INITIATING CUE:**

The CRS directs, "Perform actions required by OP-2202.007, LOOP EOP, starting at step 7, and verify both 4160 volt ESF busses energized."

**START  
TIME:**

		CHECKLISTS	STANDARDS	(Circle One)
<b>Examiner Note: Have the Applicant make radio calls to the NLO to allow the simulator booth operator to place #2 EDG in lockout out locally.</b>				
	1. (Step 7.A)	Evaluate operation of DGs as follows: Check BOTH DGs running.	On Panel 2C-33, checked both EDGs running.	N/A SAT UNSAT
	2. (Step 7.B)	Check running DG output breakers closed.	On Panel 2C-33, checked 2A-308 Closed for # 1 EDG, Red light on and 2A-3 bus energized.  On Panel 2C-33, checked 2A-408 status and noted breaker indicates Open by seeing Green light on and Red light off and 2A-4 indicates no voltage.	N/A SAT UNSAT
<b>EXAMINER NOTE: The following steps are the alternate path steps as the #2 EDG Breaker 2A-408 indicates OPEN.</b>				
	3. (Step 7.B CA 1)	Verify the following breakers open: <ul style="list-style-type: none"> <li>• 2A309, "2A3 Supply Breaker"</li> <li>• 2A310, "2A3-2A4 Tie Breaker"</li> <li>• 2A409, "2A4 Supply Breaker"</li> <li>• 2A410, "2A3-2A4 Tie Breaker"</li> </ul>	On Panel 2C-33, verified 2A-309, 2A-310, 2A-409 and 2A-410 Open by checking Green lights on and Red lights off.	N/A SAT UNSAT
	4. (Step 7.B CA 2)	Verify running DG voltage and frequency: <ul style="list-style-type: none"> <li>• 4100 to 4200v</li> <li>• 59.5-60.5 Hz</li> </ul>	On Panel 2C-33, verified #2 EDG voltage is between 4100 and 4200 volts.  On Panel 2C-33, verified #2 EDG frequency is between 59.5 and 60.5 Hz.	N/A SAT UNSAT
	5. (Step 7.B CA 3.a)	IF NO 4160v Vital bus lockouts exist, THEN perform the following:  Place running DG synch switch in ON position.  <b>Examiner Note: Alarm 2K09-B3 is clear for 2A-4 bus L.O. Trip indicating that there is not a bus lockout</b>	On Panel 2C-33, placed 2DG2 Synchronize Handswitch 152-408SS to ON position.	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

		CHECKLISTS	STANDARDS	(Circle One)
<b>EXAMINER NOTE: DG OUTPUT BREAKER WILL NOT CLOSE REMOTELY IN THE NEXT STEP</b>				
	6. (Step 7.B CA 3.b)	Close running DG Output breaker.	On Panel 2C-33, placed 2DG2 output breaker, 2A-408 Handswitch 152-408CS to the CLOSE position and checks 2A-408 status and noted breaker still indicates open by seeing Green light on and Red light off and 2A-4 indicates no voltage.	N/A SAT UNSAT
<b>EXAMINER NOTE: DG OUTPUT BREAKER WILL NOT CLOSE LOCALLY IN THE NEXT STEP</b>				
	7. (Step 7.B CA 3.c)	IF DG Output breaker will NOT close from 2C33, THEN locally close running DG Output breaker: <ul style="list-style-type: none"> <li>2A-408, "2DG 2 OUTPUT BREAKER"</li> </ul> <b>EXAMINER CUE:</b> <b>An attempt was made to Locally Close the 2DG2 Output Breaker 2A-408 and the breaker did not close.</b>	Called and directed the IAO to go to 2DG2 and locally close 2DG2 Output Breaker 2A-408 using the Local Handswitch.	N/A SAT UNSAT
	8. (Step 7.B CA 4.a)	IF bus can NOT be energized from DG, THEN perform the following:  Locally stop affected DG by unlocking and placing "ENGINE CONTROL" switch in LOCKOUT at respective cabinet: <ul style="list-style-type: none"> <li>2E11/2E21</li> </ul> <b>EXAMINER CUE:</b> <b>The 2DG2 "ENGINE CONTROL" switch has been placed in LOCKOUT at cabinet 2E21.</b>	Called and directed the IAO to Locally stop 2DG2 by unlocking and placing "ENGINE CONTROL" switch in LOCKOUT at cabinet 2E21.	N/A SAT UNSAT
	9. (Step 7.B CA 4.b)	Start AACG AND align to associated 4160v Vital bus using 2104.037, Alternate AC Diesel Generator Operations, Attachment E.	Obtained a copy of 2104.037, Alternate AC Diesel Generator Operations, Attachment E and proceeded to start the AACG AND align to 4160v Vital Bus 2A-4.	N/A SAT UNSAT
<b>EXAMINERS NOTE: The applicant will transition to using OP-2104.037, Alternate AC Diesel Generator Operations, Attachment E</b>				
	10. (Step 1.0)	IF PLC-A available, THEN reset PLC using EITHER of the following: <ul style="list-style-type: none"> <li>AACG Annunciator Screen</li> <li>Handswitch on 2C435.</li> </ul>	Reset the PLC using the AACG Annunciator Screen on the AACG Control Console on Panel 2C-14	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

		CHECKLISTS	STANDARDS	(Circle One)
	11. (Step 2.0)	IF EITHER of AACG network PLC (PLC-A or PLC-C) failed, <u>OR</u> both PCs failed, <u>THEN</u> PERFORM a local start using Exhibit 1, AAC Generator Local Start and Stop.	The AACG network PLCs have not failed; therefore this step is not applicable (NA).	N/A SAT UNSAT
<b>EXAMINER NOTE: The following steps will be performed to start the Alternate AC Generator (AACG).</b>				
	12. (Step 3.1/ 3.2)	<ul style="list-style-type: none"> <li>Touch ELECTRICAL BUS CONTROL.</li> <li>Touch 4160 V BREAKERS.</li> </ul>	On the AACG control screen, touched ELECTRICAL BUS CONTROL button then touched 4160 V BREAKERS button.	N/A SAT UNSAT
	13. (Step 3.3)	ENSURE the following breakers open: <ul style="list-style-type: none"> <li>2A901, AAC to 4.16KV Switchgear A3</li> <li>2A902, AAC to 4.16KV Switchgear 2A4</li> <li>2A903, AAC to 4.16KV Switchgear A1</li> <li>2A904, AAC to 4.16KV Switchgear 2A1</li> </ul>	On the AACG 4160 V BREAKER screen, verified the following breakers indicated OPEN by observing GREEN indication on the breakers on the AACG operating console: <ul style="list-style-type: none"> <li>2A901, AAC to 4.16KV Switchgear A3</li> <li>2A902, AAC to 4.16KV Switchgear 2A4</li> <li>2A903, AAC to 4.16KV Switchgear A1</li> <li>2A904, AAC to 4.16KV Switchgear 2A1</li> </ul>	N/A SAT UNSAT
(C)	14. (Step 3.4/ 3.5)	<ul style="list-style-type: none"> <li>Touch ENGINE START/STOP.</li> <li>Touch START SCREEN</li> </ul>	On the AACG control screen, touched ENGINE START/STOP button then touched START SCREEN button.	N/A SAT UNSAT
(C)	15. (Step 3.6)	<ul style="list-style-type: none"> <li>Touch START button.</li> </ul>	On the AACG START SCREEN, touched the START button and observed the AAC Generator accelerate to normal speed and voltage in less than 35 seconds.	N/A SAT UNSAT
	16. (Step 3.7)	IF engine does <u>NOT</u> start in ~ 35 seconds due to pre-lube interlock, <u>THEN</u> TOUCH and HOLD EMERGENCY START until engine speed reaches 180 RPM.	On the AACG START SCREEN observed the AAC Generator starts in less than 35 seconds; therefore, this step is not applicable (NA).	N/A SAT UNSAT
	17. (Step 3.8)	ENSURE the following generator parameters: <ul style="list-style-type: none"> <li>Generator frequency ~ 60 Hz (900 RPM)</li> <li>Voltage ~ 4160 volts.</li> </ul>	On the AACG START SCREEN, verified AACDG DG frequency ~ 60 Hz (900 RPM) and Verified AACDG voltage ~ 4160 volts.	N/A SAT UNSAT
<b>EXAMINER NOTE: The following steps will be performed to ensure proper AAC Electrical System alignment</b>				
	18. (Step 4.1/ 4.2)	<ul style="list-style-type: none"> <li>TOUCH ELECTRICAL BUS CONTROL.</li> <li>TOUCH 4160V BREAKERS.</li> </ul>	On the AACG control screen, touched ELECTRICAL BUS CONTROL button then touched 4160 V BREAKERS button.	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

		CHECKLISTS	STANDARDS	(Circle One)
	19. (Step 4.3)	ENSURE AAC Generator Output breaker (2A-1001) closed.	ENSURED AAC Generator Output breaker (2A-1001) closed by observing RED indication on the breaker on the AACG operating console.	N/A SAT UNSAT
	20. (Step 4.4/ 4.5)	<ul style="list-style-type: none"> <li>TOUCH ELECTRICAL BUS CONTROL.</li> <li>TOUCH 480V BREAKERS.</li> </ul>	On the AACG control screen, touched ELECTRICAL BUS CONTROL button then touches 480V BREAKERS button.	N/A SAT UNSAT
	21. (Step 4.6)	ENSURE Offsite Main Breaker M1 (2B16-A1) open.	ENSURED Offsite Main Breaker M1 (2B16-A1) open by observing GREEN indication on the breaker on the AACG operating console.	N/A SAT UNSAT
	22. (Step 4.7)	ENSURE Generator Main Breaker M2 (2B16-B1) closed.	ENSURED Generator Main Breaker M2 (2B16-B1) closed by observing RED indication on the breaker on the AACG operating console.	N/A SAT UNSAT
	23. (Step 4.8/ 4.9)	<ul style="list-style-type: none"> <li>TOUCH MONITOR</li> <li>TOUCH ANNUNCIATOR SCREEN</li> </ul>	On the AACG control screen, touched MONITOR button then touched ANNUNCIATOR SCREEN button.	N/A SAT UNSAT
	24. (Step 4.10)	ENSURE the following alarms clear: <ul style="list-style-type: none"> <li>Loss of 480 VAC POWER</li> <li>120 VAC UPS TROUBLE</li> </ul>	ENSURED the following alarms clear by observing none of the following flashing on the AACG operating console: <ul style="list-style-type: none"> <li>Loss of 480 VAC POWER</li> <li>120 VAC UPS TROUBLE</li> </ul>	N/A SAT UNSAT
	25. (Step 5.0)	COORDINATE with Unit 1 to determine electrical power status.  <b>EXAMINER CUE:</b> <b>Unit 1 is not using the Alternate AC Diesel for any electrical loads and does not plan to use the Alternate AC Diesel for the foreseeable future</b>	Contacted Unit 1 to determine if Unit 1 is using the Alternate AC Diesel for any electrical loads.	N/A SAT UNSAT
<b>EXAMINER NOTE: Step 6 is not applicable.</b>				
<b>EXAMINER NOTE: The following steps will be performed to energize 2A4 from the AACG (Dead-bus Transfer only)</b>				
	26. (Step 7.1)	IF powering Safety Related loads on BOTH Unit 1 and Unit 2, THEN ENSURE efforts are being pursued to restore normal offsite power or EDGs to minimize the vulnerability of total reliance upon the AACG by both units.	Unit 1 is not using the AACG for any electrical loads and do not plan to use the AACG for the foreseeable future; therefore this step is not applicable (NA).	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

		CHECKLISTS	STANDARDS	(Circle One)
	27. (Step 7.2)	ENSURE 2A3 - 2A4 Tie breaker (2A-410) open.	ENSURED 2A3 - 2A4 Tie breaker (2A-410) open by observing the Green flag on Handswitch 152-410 CS on 2C-33 with Green light on and Red light off above handswitch.	N/A SAT UNSAT
	28. (Step 7.3)	ENSURE 2A4 Supply breaker (2A-409) in PULL-TO-LOCK.	Took the Supply breaker (2A-409) Handswitch 152-409 CS on 2C-33 to the "PULL-TO-LOCK" position.	N/A SAT UNSAT
	29. (Step 7.4)	ENSURE 2DG2 Output breaker (2A-408) in PULL-TO-LOCK.	Took the 2DG2 Output breaker (2A-408) Handswitch 152-408 CS on 2C-33 to the "PULL-TO-LOCK" position.	N/A SAT UNSAT
	30 (Step 7.5/ 7.5.1)	IF 2A3 NOT energized from AAC Generator, THEN:  ENSURE 2A3 - 2A4 Tie breaker (2A-310) open.	ENSURED 2A3 - 2A4 Tie breaker (2A-310) open by observing the Green flag on Handswitch 152-310 CS on 2C-33 with Green light on and Red light off above handswitch.	N/A SAT UNSAT
(C)	31. (Step 7.5.2)	IF PLC available, THEN: A. TOUCH ELECTRICAL BUS CONTROL. B. TOUCH 4160 V BREAKERS. C. TOUCH 2A-902.	On the AACG control screen, touched ELECTRICAL BUS CONTROL button then touched 4160 V BREAKERS button then touched 2A-902 button.	N/A SAT UNSAT
(C)	32. (Step 7.5.3)	PERFORM the following as needed to close 2A-902: • TOUCH CLOSE on PLC. • USE 2A-902 Control switch (2HS-7101). • Locally OPERATE 2A-902 using Exhibit 4, AAC Generator 4160 V Breaker Operation Without DC.	On the AACG 4160 V BREAKERS screen, Touched CLOSE button on 2A-902, AACG Supply Breaker, and verified AACG Supply Breaker 2A-902 closes by observing RED indication on the breaker on the AACG operating console.  OR  Closed 2A-902 using HS 2HS-7101	N/A SAT UNSAT
(C)	33. (Step 7.6)	CLOSE and HOLD 2A3 - 2A4 Tie (2A-410) in CLOSE position for 3 seconds.	Took the 2A3 - 2A4 Tie (2A-410) Breaker Handswitch 152-309 CS on 2C33 to the CLOSE position and held for 3 seconds and observed the 2A-410 Breaker closes by RED Flag on Handswitch and Red light on and Green light off above handswitch.	N/A SAT UNSAT
	34. (Step 7.7)	ENSURE 2A4 voltage indicates approximately 4160 volts.	ENSURED 2A4 is energized and voltage on meter ESFAS BUS V-2A4/1B on 2C33 (or SPDS) indicates approximately 4160 volts.	N/A SAT UNSAT
END				

STOP TIME: \_\_\_\_\_

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## ATTACHMENT E

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### AAC GENERATOR EMERGENCY START

- 1.0 **IF** PLC-A available,  
**THEN RESET** PLC using EITHER of the following:

- ☐ AACG Annunciator Screen
- ☐ Handswitch on 2C435

#### **NOTE**

AACG can be started and tied to buses from either of the PCs (2C14 or 2C435) as long as both Network PLCs (PLC-A and PLC-C) are functional.

- 2.0 **IF** EITHER AACG network PLC (PLC-A or PLC-C) failed,  
**OR** BOTH PCs failed,  
**THEN PERFORM** a local start using Exhibit 1, AAC Generator Local Start and Stop.

- 3.0 **PERFORM** the following to start AAC Generator:

3.1 **TOUCH** ELECTRICAL BUS CONTROL.

3.2 **TOUCH** 4160 V BREAKERS.

3.3 **ENSURE** the following breakers open:

- ☐ 2A-901, AAC to 4.16KV Switchgear A3
- ☐ 2A-902, AAC to 4.16KV Switchgear 2A4
- ☐ 2A-903, AAC to 4.16KV Switchgear A1
- ☐ 2A-904, AAC to 4.16KV Switchgear 2A1

3.4 **TOUCH** ENGINE START/STOP.

3.5 **TOUCH** START SCREEN.

3.6 **TOUCH** START button.

3.7 **IF** engine does **NOT** start in 35 seconds due to pre-lube interlock,  
**THEN TOUCH** and **HOLD** EMERGENCY START until engine speed is 180 RPM.

3.8 **ENSURE** the following generator parameters:

- ☐ Frequency approximately 60 Hz (900 RPM)
- ☐ Voltage approximately 4160 volts

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## ATTACHMENT E

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4.0 **PERFORM** the following to ensure proper AAC Electrical System alignment:

- 4.1 **TOUCH** ELECTRICAL BUS CONTROL.
- 4.2 **TOUCH** 4160V BREAKERS.
- 4.3 **ENSURE** AAC Generator Output breaker (2A-1001) closed.
- 4.4 **TOUCH** ELECTRICAL BUS CONTROL.
- 4.5 **TOUCH** 480V BREAKERS.
- 4.6 **ENSURE** Offsite Main Breaker M1 (2B16-A1) open.
- 4.7 **ENSURE** Generator Main Breaker M2 (2B16-B1) closed.
- 4.8 **TOUCH** MONITOR
- 4.9 **TOUCH** ANNUNCIATOR SCREEN
- 4.10 **ENSURE** the following alarms clear:
  - ☐ Loss of 480 VAC POWER
  - ☐ 120 VAC UPS TROUBLE

5.0 **COORDINATE** with Unit 1 to determine electrical power status.

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## ATTACHMENT E

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### **NOTE**

2A3 and 2A4 should not be supplied at the same time in Modes 1-4 except to satisfy a safety function.

- 6.0 **IF** desired to energize 2A3 from the AACG (Dead-bus transfer only),  
**THEN:**
- 6.1 **IF** powering Safety Related loads on BOTH Unit 1 and Unit 2,  
**THEN ENSURE** efforts are being pursued to restore normal offsite power or EDGs to minimize the vulnerability of total reliance upon the AACG by both units.
- 6.2 **ENSURE** 2A3 - 2A4 Tie breaker (2A-310) open.
- 6.3 **ENSURE** 2A3 Supply breaker (2A-309) in PULL-TO-LOCK.
- 6.4 **ENSURE** 2DG1 Output breaker (2A-308) in PULL-TO-LOCK.
- 6.5 **IF** 2A4 **NOT** energized from AAC Generator,  
**THEN:**
- 6.5.1 **ENSURE** 2A3 - 2A4 Tie breaker (2A-410) open.
- 6.5.2 **IF** PLC available,  
**THEN:**
- A. **TOUCH** ELECTRICAL BUS CONTROL.
- B. **TOUCH** 4160 V BREAKERS.
- C. **TOUCH** 2A-902.
- 6.5.3 **PERFORM** the following as needed to close 2A-902:
- ☐ **TOUCH** CLOSE on PLC.
  - ☐ **USE** 2A-902 Control switch (2HS-7101).
  - ☐ Locally **OPERATE** 2A-902 using Exhibit 4, AAC Generator 4160 V Breaker Operation Without DC.
- 6.6 **CLOSE** and **HOLD** 2A3 - 2A4 Tie (2A-310) in CLOSE position for 3 seconds.
- 6.7 **ENSURE** 2A3 voltage indicates approximately 4160 volts.



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## ATTACHMENT E

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6.8 **IF** BOTH 2A3 and 2A4 energized from the AAC Generator in Modes 1-4,  
**THEN ENTER** Tech Spec 3.0.3.

6.9 **START** desired loads on 2A3 within the following limits:

- ☐ Any combination of Unit 1 and Unit 2 vital and non-vital buses may be energized as long as total load is less than 4400 KW.  
(4600 KW for 500 hours, 5320 KW for 30 minutes)
- ☐ Potential Unit 1 and Unit 2 loads are as follows:

COMPONENT	UNIT 1 LOAD	UNIT 2 LOAD
CHARGING PUMP	N/A	50 KW
SERVICE WATER PUMP	261 KW	640 KW
HPI/HPSI PUMP	522 KW	420 KW
LPI/LPSI PUMP	261 KW	340 KW
SPRAY PUMP	186 KW	340 KW
EFW PUMP	522 KW	500 KW
PZR PROPORTIONAL HTRS	N/A	0-180 KW
ESF BUS	800 KW	N/A

6.10 **ENERGIZE** other buses as desired using appropriate sections of this Attachment.

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## ATTACHMENT E

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### **NOTE**

2A3 and 2A4 should not be supplied at the same time in Modes 1-4 except to satisfy a safety function.

- 7.0 **IF** desired to energize 2A4 from the AACG (Dead-bus transfer only),  
**THEN:**
- 7.1 **IF** powering Safety Related loads on BOTH Unit 1 and Unit 2,  
**THEN ENSURE** efforts are being pursued to restore normal offsite power or EDGs in order to minimize the vulnerability of total reliance upon the AACG by both units.
- 7.2 **ENSURE** 2A3 - 2A4 Tie breaker (2A-410) open.
- 7.3 **ENSURE** 2A4 Supply breaker (2A-409) in PULL-TO-LOCK.
- 7.4 **ENSURE** 2DG2 Output breaker (2A-408) in PULL-TO-LOCK.
- 7.5 **IF** 2A3 **NOT** energized from AAC Generator,  
**THEN:**
- 7.5.1 **ENSURE** 2A3 - 2A4 Tie breaker (2A-310) open.
- 7.5.2 **IF** PLC available,  
**THEN:**
- A. **TOUCH** ELECTRICAL BUS CONTROL.
- B. **TOUCH** 4160 V BREAKERS.
- C. **TOUCH** 2A-902.
- 7.5.3 **PERFORM** the following as needed to close 2A-902:
- ☐ **TOUCH** CLOSE on PLC.
- ☐ **USE** 2A-902 Control switch (2HS-7101).
- ☐ Locally **OPERATE** 2A-902 using Exhibit 4, AAC Generator 4160 V Breaker Operation Without DC.
- 7.6 **CLOSE** and **HOLD** 2A3 - 2A4 Tie (2A-410) in CLOSE position for 3 seconds.
- 7.7 **ENSURE** 2A4 voltage indicates approximately 4160 volts.

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## ATTACHMENT E

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7.8 **IF** BOTH 2A3 and 2A4 energized from the AAC Generator in Modes 1-4,  
**THEN ENTER** Tech Spec 3.0.3.

7.9 **START** desired loads on 2A4 within the following limits:

- ☐ Any combination of Unit 1 and Unit 2 vital and non-vital buses may be energized as long as total load is less than 4400 KW.  
(4600 KW for 500 hours, 5320 KW for 30 minutes)
- ☐ Potential Unit 1 and Unit 2 loads are as follows:

COMPONENT	UNIT 1 LOAD	UNIT 2 LOAD
CHARGING PUMP	N/A	50 KW
SERVICE WATER PUMP	261 KW	640 KW
HPI/HPSI PUMP	522 KW	420 KW
LPI/LPSI PUMP	261 KW	340 KW
SPRAY PUMP	186 KW	340 KW
EFW PUMP	522 KW	500 KW
PZR PROPORTIONAL HTRS	N/A	0-180 KW
ESF BUS	800 KW	N/A

7.10 **ENERGIZE** other buses as desired using appropriate sections of this Attachment.

**JOB PERFORMANCE MEASURE****EXAMINER'S COPY****INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- Mode 3
- LOOP in progress
- # 1 EDG supplying 2A-3
- LOOP EOP has been entered and completed through step 6.

**INITIATING CUE:**

The CRS directs, "Perform actions required by OP-2202.007, LOOP EOP, starting at step 7, and verify both 4160 volt ESF busses energized."

**JOB PERFORMANCE MEASURE****EXAMINEE'S COPY****INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- Mode 3
- LOOP in progress
- # 1 EDG supplying 2A-3
- LOOP EOP has been entered and completed through step 6.

**INITIATING CUE:**

The CRS directs, "Perform actions required by OP-2202.007, LOOP EOP, starting at step 7, and verify both 4160 volt ESF busses energized."

# LOSS OF OFFSITE POWER

## CAUTION

Failure to use average CETs to monitor MTS with ALL RCPs stopped may result in misleading evaluation of core conditions.

~~\*1. Confirm diagnosis of only a Loss of Offsite Power by checking SFSC acceptance criteria satisfied every 15 minutes.~~

\*1. Rediagnose event using 2202.010, Exhibit 8, Diagnostic Actions.

~~\*2. Notify SM to refer to Technical Specifications and 1903.010, Emergency Action Level Classification.~~

~~3. Open Placekeeping page.~~

~~4. Notify Control Board Operators to perform the following:~~

~~A. Monitor floating steps.~~

~~B. Verify actuated ESFAS components using 2202.010 Exhibit 9, ESFAS Actuation.~~

~~\*5. Perform the following to protect Main Condenser:~~

~~A. Close MSIVs.~~

~~B. Close SG Blowdown Isolation valves:~~

~~• 2CV-1016-1~~

~~• 2CV-1066-1~~

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# LOSS OF OFFSITE POWER

~~\*6.~~ Check SG pressure greater than 950 psia.

\*6. IF SG pressure less than 950 psia,  
THEN perform the following as necessary:

A. Verify BOTH Upstream ADV Isolation valves closed:

- 2CV-1002
- 2CV-1052

B. Manually control EFW flow to SGs using 2202.010 Attachment 46, Establishing EFW Flow.

\*7. Evaluate operation of DGs as follows:

A. Check BOTH DGs running.

A. Perform the following:

1) IF EITHER DG NOT running,  
THEN perform the following:

- a) Initiate corrective actions to return ANY inoperable DG to service using 2104.036, Emergency Diesel Generator Operations.
- b) Initiate annunciator corrective actions for ANY alarms.
- c) WHEN ANY inoperable DG returned to service,  
THEN **GO TO** Step 7.B for returned DG.

2) IF inoperable DG NOT returned to service, THEN start AACG AND align to associated 4160v Vital bus using 2104.037, Alternate AC Diesel Generator Operations, Attachment E.

(Step 7 continued on next page)

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# LOSS OF OFFSITE POWER

7. (continued)

B. Check running DG Output breakers closed.

B. Perform the following:

- 1) Verify the following breakers open:
  - 2A309, "2A3 Supply Breaker"
  - 2A310, "2A3-2A4 Tie Breaker"
  - 2A409, "2A4 Supply Breaker"
  - 2A410, "2A3-2A4 Tie Breaker"
- 2) Verify running DG voltage and frequency:
  - 4100 to 4200v
  - 59.5 to 60.5 Hz
- 3) IF NO 4160v Vital bus lockouts exist, THEN perform the following:
  - a) Place running DG synch switch in ON position.
  - b) Close running DG Output breaker.
  - c) IF DG Output breaker will NOT close from 2C33, THEN locally close running DG Output breaker:
    - 2A308, "2DG 1 OUTPUT BREAKER"
    - 2A408, "2DG 2 OUTPUT BREAKER"

(Step 7 continued on next page)

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# LOSS OF OFFSITE POWER

7. (continued)

- 4) IF bus can NOT be energized from DG, THEN perform the following:
- a) Locally stop affected DG by unlocking and placing "ENGINE CONTROL" switch in LOCKOUT at respective cabinet:
- 2E11/2E21
- b) Start AACG AND align to associated 4160v Vital bus using 2104.037, Alternate AC Diesel Generator Operations, Attachment E.

C. Verify running DG voltage and frequency:

- 4100 to 4200v
- 59.5 to 60.5 Hz

D. Locally monitor DG operation.

E. IF desired to energize 4160v Non-vital bus 2A1, THEN start AACG AND align to associated 4160v Vital bus using 2104.037, Alternate AC Diesel Generator Operations, Attachment E.

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**JOB PERFORMANCE MEASURE**UNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Reactor Coolant SystemTASK: Operate the RCS to collapse RCS VoidsJTA#: ANO2-RO-EOPAOP-OFFNORM-13ALTERNATE PATH YES: X NO: \_\_\_\_\_ TIME CRITICAL YES: \_\_\_\_\_ NO: XKA VALUE RO: 3.2 SRO: 3.8 KA REFERENCE: A13 AA1.3APPROVED FOR ADMINISTRATION TO: RO: X SRO: XTASK LOCATION: INSIDE CR: X OUTSIDE CR: \_\_\_\_\_ BOTH: \_\_\_\_\_

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: Perform LAB: \_\_\_\_\_

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ LAB: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 10 MinutesREFERENCE(S): EOP 2202.002 STANDARD ATTACHMENT 9 VOID ELIMINATION

EXAMINEE'S NAME: \_\_\_\_\_ Logon ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

---

Start Time	Stop Time	Total Time
_____	_____	_____

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**JPM INITIAL TASK CONDITIONS:**

- A Natural Circ Cooldown is in progress.
- RCS voiding is preventing RCS pressure from being lowered.

**TASK STANDARD:**

Vent path established from reactor vessel head to the containment building.

**TASK PERFORMANCE AIDS:**

EOP 2202.002 Rev. 23 STANDARD ATTACHMENT 9 VOID ELIMINATION

**SIMULATOR SETUP:**

- Natural circulation Cooldown in progress
- Depressurize the RCS until voiding occurs in the Reactor Vessel head
- RVLMS indicates level 2 or 3 wet
- Set trigger T4 to UA4R6691 (whenever 2SV4669-1 is opened)
- Close 2SV4669-1, 2SV 4668-1 and 2SV 4636-1
- Turn red and green lights off for 2HS 4671-1, 2SV4669-1, 2SV 4668-1 and 2SV 4636-1

**EXAMINER NOTES:**

Operate the RCS to collapse RCS Voids. This is an Alternate Path JPM. The applicant is tasked with venting the Reactor Vessel Head to the Quench Tank due to indications of voids in the RCS. One head vent will be opened then when aligning the path to the Quench Tank, the Red train solenoid isolation valve to the Quench tank will lose power (along with all the RED train vent valves) and the valves will not open. The applicant should then transition to the green train vent valves and align the green train head vent to the Containment building atmosphere.

**JOB PERFORMANCE MEASURE****INITIATING CUE:**

The CRS directs: "Vent the Reactor Vessel Head to the Quench Tank to restore RVLMS 1 wet using 2202.010 Standard Attachment 9 starting with step 6."

START TIME: \_\_\_\_\_

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	1. (Step 6/6A)	<p>IF RVLMS indicates voiding, THEN vent Reactor Vessel as follows:</p> <p>Open ONE Reactor Vessel Head Vent valve (2SV-4668-1 on 2C336-1) or (2SV-4668-2 on 2C336-2).</p>	<p><u>EITHER</u></p> <p>On 2C336-1, opened Head Vent Valve 2SV-4668-1.</p> <p>Observed red light ON and green light OFF above 2HS-4668-1.</p> <p><u>OR</u></p> <p>On 2C336-2, opened Head Vent Valve 2SV-4668-2.</p> <p>Observed red light ON and green light OFF above 2HS-4668-2.</p>	N/A SAT UNSAT
	2. (Step 6B)	<p>Open vent path to EITHER Quench Tank (2SV-4669-1) or CNTMT (2SV-4670-2).</p> <p><b>Examiner Note:</b></p> <p><b>2SV-4669-1 will not stroke and will have indications of a tripped breaker.</b></p> <p><b>The power supply to the valves, 2SV4669-1, 2SV4668-1, 2SV4636-1, is fused in 2C336 from 2D23.</b></p> <p><b>Examiner Cue:</b></p> <p><b>If applicant reports that power was lost or that RCS pressure is not lowering ask for their recommendation.</b></p>	<p>On 2C336-1, took handswitch to the open position for Vent to Quench Tank 2SV-4669-1.</p> <p>Recognized valve did not open and fuse blown for valve.</p> <p>Observed red light OFF and green light OFF above 2HS-4669-1, 2SV4668-1, 2SV4636-1.</p>	N/A SAT UNSAT
<p><b>Examiner Note: The examinee may observe PZR level and RVLMS status to determine whether 2SV4669-1 is open. There should be no changes observed.</b></p> <p><b>Examinee may report problem with valve indication (fuse blown) to CRS/SM.</b></p> <p><b>Examinee may refer to 2103.002 ECCS and High point Vent drawing exhibit posted locally.</b></p>				

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST		STANDARDS		(Circle One)
<b>Examiner Note: The following 2 steps are the alternate path portion of this JPM. These steps may be performed in any order but must both be performed to allow the head to be vented.</b>				
(C)	3. (Step 6A)	Open Head Vent Valve 2SV 4668-2, if not previously opened.	On 2C336-2, opened 2SV 4668-2, if not previously opened.  Observed red light ON and green light OFF above 2HS4668-2.	N/A SAT UNSAT
(C)	4. (Step 6B)	Open Vent Path to Containment atmosphere 2SV-4670-2.	On 2C336-2, opened 2SV-4670-2.  Observed red light ON and green light OFF above 2HS-4670-2.	N/A SAT UNSAT
<p align="center"><b><u>EXAMINERS NOTE:</u></b></p> <p align="center"><b>Many possible indications are available for monitoring/trending pressurizer level and the RVLMS.</b></p>				
	5. (Step 6.C).	Monitor PZR level for trending of RCS inventory.	Monitored Pressurizer level/pressure for trending.  Using control board mounted indications OR PMS/ SPDS computers, verified PZR level/pressure lowering.	N/A SAT UNSAT
	6. (Step 6.C).	Monitor RVLMS for trending of RCS inventory	Monitored the Reactor Vessel Level Monitoring System trending.  Using control board mounted indications OR PMS/SPDS computers, verified RVLMS level increasing.	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	7. (Step 6.D)	WHEN Reactor vessel head bubble collapsed, THEN verify vent path valves closed.	<p>Verified Reactor vessel head bubble collapsed by RVLMS level 1 indicating WET and RCS pressure lowering.</p> <p>On 2C336-2, closed 2SV 4668-2.</p> <p>Observed red light OFF and green light ON above 2HS4668-2.</p> <p>On 2C336-2, closed 2SV-4670-2.</p> <p>Observed red light OFF and green light ON above 2HS-4670-2.</p> <p><b>Examiner Note: RMVLS level can be monitored on SPDS SFD screen as a number or the ICC screen blue indicating the level is wet.</b></p>	N/A SAT UNSAT
END				

STOP TIME: \_\_\_\_\_

**JOB PERFORMANCE MEASURE**

**EXAMINER'S COPY**

**INITIAL CONDITIONS:**

- A Natural Circ Cooldown is in progress.
- RCS voiding is preventing RCS pressure from being lowered.

**INITIATING CUE:**

The CRS directs: "Vent the Reactor Vessel Head to the Quench Tank to restore RVLMS level 1 wet using 2202.010 Standard Attachment 9 starting with step 6."

JOB PERFORMANCE MEASURE

EXAMINEE'S COPY

**INITIAL CONDITIONS:**

- A Natural Circ Cooldown is in progress.
- RCS voiding is preventing RCS pressure from being lowered.

**INITIATING CUE:**

The CRS directs: "Vent the Reactor Vessel Head to the Quench Tank to restore RVLMS level 1 wet using 2202.010 Standard Attachment 9 starting with step 6."



# ATTACHMENT 9

## VOID ELIMINATION

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1. Verify Letdown isolated.
2. Stop RCS depressurization.
3. Pressurize and depressurize RCS within P-T limits, refer to Attachment 1, P-T Limits.
4. Monitor PZR level and RVLMS for trending of RCS inventory.
5. **NA** IF voiding suspected in SG tubes,  
THEN attempt to eliminate voids by using EITHER of the following:

- Cooldown affected SG by steaming and feeding.
- Cooldown affected SG using SG blowdown and feeding.

6. IF RVLMS indicates voiding,  
THEN vent Reactor Vessel as follows:

- A. Open ONE Reactor Vessel Head Vent valve (2SV-4668-1 on 2C336-1) or (2SV-4668-2 on 2C336-2).
- B. Open vent path to EITHER Quench Tank (2SV-4669-1) or CNTMT (2SV-4670-2) valve.
- C. Monitor PZR level and RVLMS for trending of RCS inventory.
- D. WHEN Reactor vessel head bubble collapsed, THEN verify vent path valves closed.

7. **NA** IF this attachment entered due to inability to depressurize AND depressurization of RCS still NOT possible,  
THEN vent PZR as follows:

- A. Open ONE PZR vent valve (2SV-4636-1 on 2C336-1) or (2SV-4636-2 on 2C336-2).
- B. Open vent path to EITHER Quench Tank (2SV-4669-1) or CNTMT (2SV-4670-2) valve.
- C. Monitor PZR level and RVLMS for trending of RCS inventory.
- D. WHEN RCS depressurization completed, THEN verify vent path valves closed.

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JOB PERFORMANCE MEASUREUNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Hydrogen RecombinerTASK: Start Up a Hydrogen RecombinerJTA#: ANO2-RO-CONH2-NORM-3ALTERNATE PATH YES: \_\_\_\_\_ NO: X TIME CRITICAL YES: \_\_\_\_\_ NO: XKA VALUE RO: 4.0 SRO: 4.0 KA REFERENCE: 028 A4.01APPROVED FOR ADMINISTRATION TO: RO: X SRO: XTASK LOCATION: INSIDE CR: X OUTSIDE CR: \_\_\_\_\_ BOTH: \_\_\_\_\_

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: Perform LAB: \_\_\_\_\_

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ LAB: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 8 MinutesREFERENCE(S): OP-2104.044 Containment Hydrogen Control Operations

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_

Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time \_\_\_\_\_

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- LOCA in progress
- Containment Hydrogen is >1%
- TSC has directed to start one hydrogen recombiner
- Pre-LOCA containment temperature was 120 degrees F

**TASK STANDARD:**

Energized the Green Train Hydrogen recombiner and raised power to the required value (52 to 56 KW) to recombine hydrogen and oxygen.

**TASK PERFORMANCE AIDS:**

OP-2104.044 Containment Hydrogen Control Operations

**SIMULATOR SETUP:**

LOCA in progress.

Post-LOCA should be ~ 17.2 psia.

**EXAMINER'S NOTES:**

Start up a Hydrogen Recombiner. The applicant will have to start up a Hydrogen Recombiner post LOCA. They will energize the recombiner and then warm it up by raising the power output in stages. They will also determine the required power using a graph from the procedure and then adjust the output of the recombiner to plant conditions to recombine hydrogen.

JOB PERFORMANCE MEASURE**INITIATING CUE:**

The SM/CRS directs you to place 2M-55B Hydrogen Recombiner in service using OP-2104.044 starting with step 9.2.

START TIME: \_\_\_\_\_

PERFORMANCE CHECKLIST			STANDARD	(Circle One)
	1. (Step 9.2.1)	Verify Power Out switch in OFF.	Verified Power Out switch in OFF or down position.	N/A SAT UNSAT
	2. (Step 9.2.2)	Verify Power Adjust potentiometer (2POTR-6891) set to zero (000):	On 2C184 Verified Power Adjust potentiometer (2POTR-6891) set to zero (000).	N/A SAT UNSAT
	3. (Step 9.2.3)	Verify H2 Recombiner #2 supply breaker (2B-633) closed:  <b><u>EXAMINER CUE:</u></b> <b>When contacted as NLO report that 2B-633 breaker is closed.</b>	Contacted a NLO to verify that breaker 2B-633 is closed.	N/A SAT UNSAT
	4. (Step 9.2.4)	Check white Power Available light illuminated.	On 2C184, checked white power light illuminated.	N/A SAT UNSAT
(C)	5. (Step 9.2.5)	Place Power Out switch to ON.	On 2C184, placed power out switch in the ON or up position.  Verified Red light on above Power Out Switch.	N/A SAT UNSAT
(C)	6. (Step 9.2.6)	Turn Power Adjust potentiometer (2POTR-6891) clockwise to raise power to 5 KW (2WI-6893).	On 2C184, turned 2POTR-6891 clockwise until ~ 5 KW is indicated on 2WI-6893.	N/A SAT UNSAT
	7. (Step 9.2.7)	Using Power Adjust potentiometer (2POTR-6891), maintain power at 5 KW for 10 minutes.  <b><u>EXAMINER CUE:</u></b> <b>When comfortable with applicant performance instruct them 10 min have elapsed.</b>	On 2C184, monitored power meter to ensure power is maintained ~ 5 KW.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARD	(Circle One)
(C)	8. (Step 9.2.8)	Using Power Adjust potentiometer (2POTR-6891), raise power to 10 KW (2WI-6893).	On 2C184, turned 2POTR-6891 clockwise until ~ 10 KW is indicated on 2WI-6893.	N/A SAT UNSAT
	9. (Step 9.2.9)	Using Power Adjust potentiometer (2POTR-6891), maintain power at 10 KW (2WI-6893) for 10 minutes.  <b><u>EXAMINER CUE:</u></b> <b>When comfortable with applicant performance instruct them 10 min have elapsed.</b>	On 2C184, monitored power meter to ensure power is maintained ~ 10 KW.	N/A SAT UNSAT
	10. (Step 9.2.10)	Determine Recombiner Temperature Correction Factor using Attachment C.  <b><u>EXAMINER CUE:</u></b> <b>Attachment C has been completed and will be maintained by another operator.</b>	This attachment will not be completed by the examinee.	N/A SAT UNSAT
(C)	11. (Step 9.2.11)	Using Power Adjust potentiometer (2POTR-6891), raise power to 20 KW (2WI-6893).	On 2C184, turned 2POTR-6891 clockwise until ~ 20 KW is indicated on 2WI-6893.	N/A SAT UNSAT
	12. (Step 9.2.12)	Using Power Adjust potentiometer (2POTR-6891), maintain power at 20 KW (2WI-6893) for 5 minutes.  <b><u>EXAMINER CUE:</u></b> <b>When comfortable with applicant performance instruct them 5 min have elapsed.</b>	On 2C184, monitored power meter to ensure power is maintained ~ 20 KW.	N/A SAT UNSAT

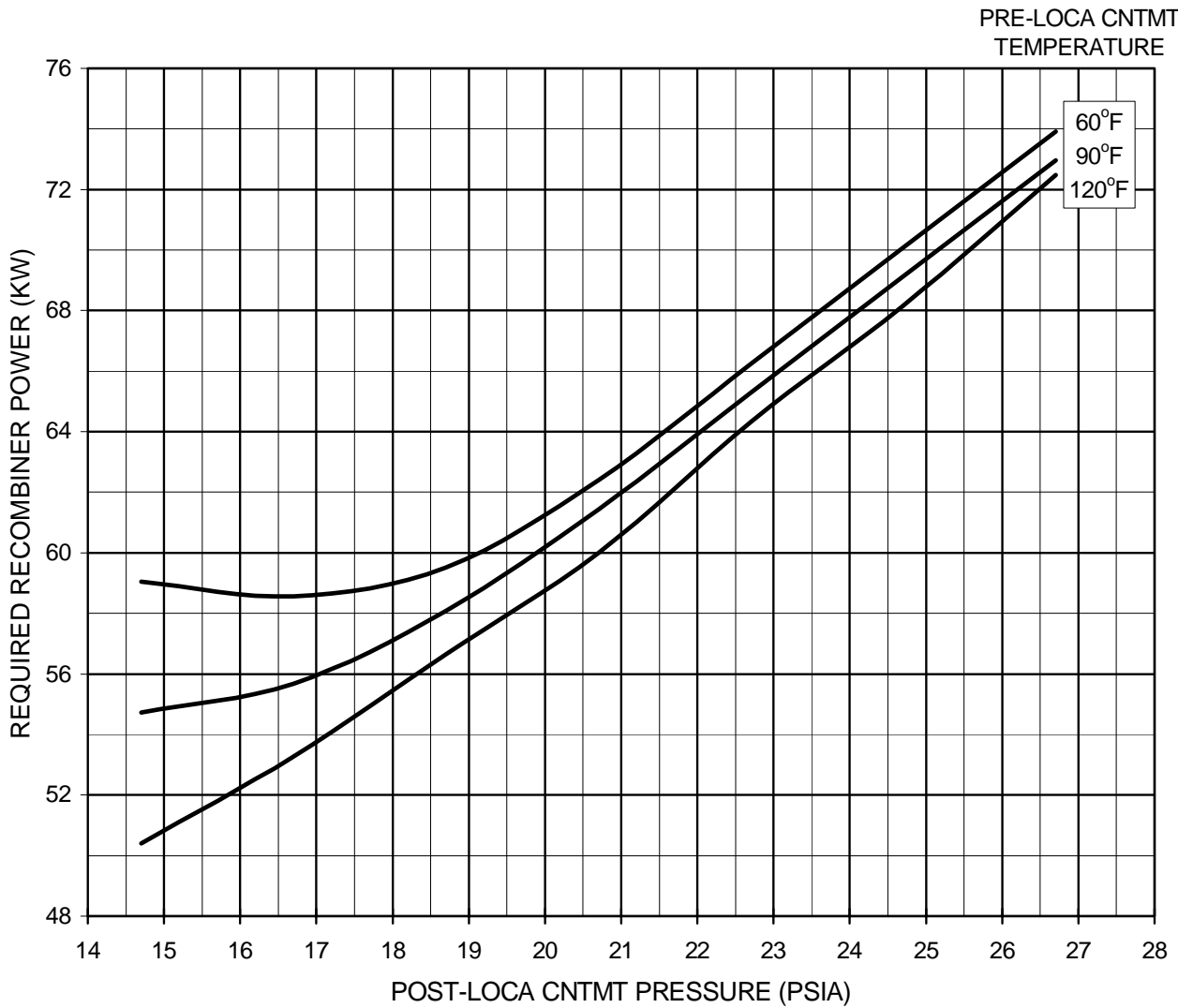
JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST		STANDARD		(Circle One)
<b>Examiner Note: acceptable numbers in the standards based on validation conditions check actual simulator conditions are similar. Attachment F is at the back of this JPM.</b>				
	13. (Step 9.2.13)	Determine required Recombiner power using Attachment F of this procedure based on Pre-LOCA CNTMT temperature and Post-LOCA CNTMT pressure.  <b>EXAMINER NOTE: Post-LOCA pressure is displayed in the simulator and should be ~ 17.2 psia.</b>	Examinee determined required Recombiner power is 52 to 56 KW from Attachment F.	N/A SAT UNSAT
(C)	14. (Step 9.2.14)	Using Power Adjust potentiometer (2POTR-6891), raise power (2WI-6893) to value determined in step 9.2.13.	Examinee raises power on 2WI-6893 using 2POTR-6891 to value determined in above step.  Acceptable value is 52 to 56 KW	N/A SAT UNSAT
<b>Examiner Note: End JPM after examinee has raised power to the Attachment F value.</b>				
<b>END</b>				

Stop time: \_\_\_\_\_

JOB PERFORMANCE MEASURE

Procedure 2104.044 Attachment F Recombiner power requirement



JOB PERFORMANCE MEASURE

**EXAMINER'S COPY**

**INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- LOCA in progress
- Containment Hydrogen is >1%
- TSC has directed to start one hydrogen recombiner
- Pre-LOCA containment temperature was 120 degrees F

**INITIATING CUE:**

The SM/CRS directs you to place 2M-55B Hydrogen Recombiner in service using OP-2104.044 starting with step 9.2.



JOB PERFORMANCE MEASURE

**EXAMINEE'S COPY**

**INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- LOCA in progress
- Containment Hydrogen is >1%
- TSC has directed to start one hydrogen recombiner
- Pre-LOCA containment temperature was 120 degrees F

**INITIATING CUE:**

The SM/CRS directs you to place 2M-55B Hydrogen Recombiner in service using OP-2104.044 starting with step 9.2.

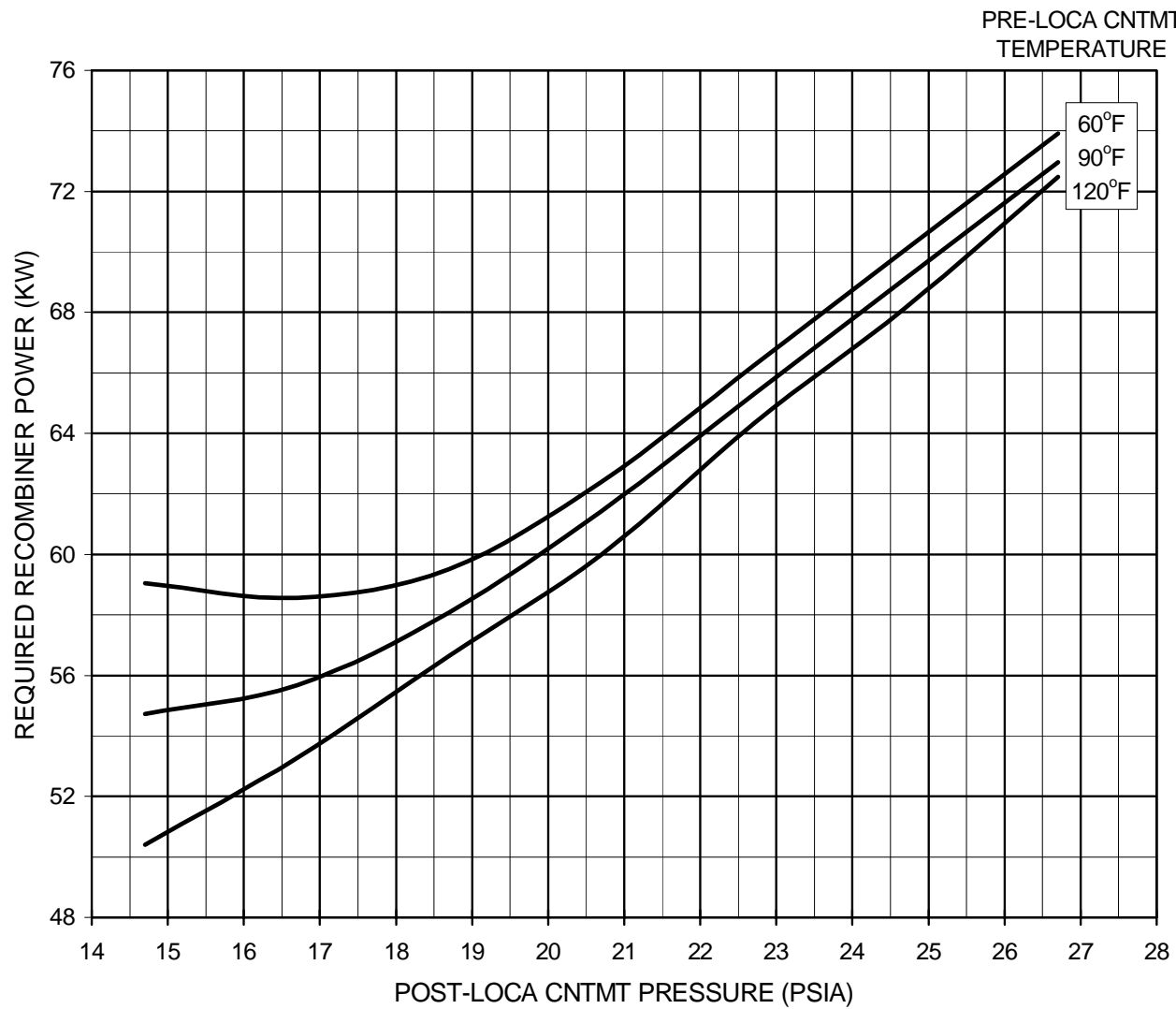
PROC./WORK PLAN NO. <b>2104.044</b>	PROCEDURE/WORK PLAN TITLE: <b>CONTAINMENT HYDROGEN CONTROL OPERATIONS</b>	PAGE: <b>19 of 54</b> CHANGE: <b>038</b>
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- 9.2 Perform the following to start Hydrogen Recombiner (2M-55B):
- 9.2.1 Verify Power Out switch in OFF.
  - 9.2.2 Verify Power Adjust potentiometer (2POTR-6891) set to zero (000):
  - 9.2.3 Verify H2 Recombiner #2 Supply Breaker (2B-633) closed:
  - 9.2.4 Check white Power Available light illuminated.
  - 9.2.5 Place Power Out switch to ON.
  - 9.2.6 Turn Power Adjust potentiometer (2POTR-6891) clockwise to raise power to 5 KW (2WI-6893).
  - 9.2.7 Using Power Adjust potentiometer (2POTR-6891), maintain power at 5 KW for 10 minutes.
  - 9.2.8 Using Power Adjust potentiometer (2POTR-6891), raise power to 10 KW (2WI-6893).
  - 9.2.9 Using Power Adjust potentiometer (2POTR-6891), maintain power at 10 KW (2WI-6893) for 10 minutes.
  - 9.2.10 Determine Recombiner Temperature Correction Factor using Attachment C of this procedure.
  - 9.2.11 Using Power Adjust potentiometer (2POTR-6891), raise power to 20 KW (2WI-6893).
  - 9.2.12 Using Power Adjust potentiometer (2POTR-6891), maintain power at 20 KW (2WI-6893) for 5 minutes.
  - 9.2.13 Determine required Recombiner power using Attachment F of this procedure based on Pre-LOCA CNTMT temperature and Post-LOCA CNTMT pressure.
  - 9.2.14 Using Power Adjust potentiometer (2POTR-6891), raise power (2WI-6893) to value determined in step 9.2.13.

Step 9.2 continued on next page.

ATTACHMENT F

RECOMBINER POWER REQUIREMENT



JOB PERFORMANCE MEASUREUNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Component Cooling Water SystemTASK: Secure CCW system using EOPJTA#: ANO2-RO-EOPAOP-EMERG-22ALTERNATE PATH YES: \_\_\_\_\_ NO: X TIME CRITICAL YES: \_\_\_\_\_ NO: XKA VALUE RO: 3.3 SRO: 3.1 KA REFERENCE: 008 A4.01APPROVED FOR ADMINISTRATION TO: RO: X SRO: XTASK LOCATION: INSIDE CR: X OUTSIDE CR: \_\_\_\_\_ BOTH: \_\_\_\_\_

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: Perform LAB: \_\_\_\_\_

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ LAB: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 10 MinutesREFERENCE(S): OP-2202.010 EOP Standard Attachment 6.

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

Start Time \_\_\_\_\_ Stop Time \_\_\_\_\_ Total Time \_\_\_\_\_

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL VERIFY THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- The Lake Dardanelle is not available due to low lake level. (level <333')
- Service Water pump suctions and returns have been shifted to the Emergency Cooling Pond.
- A LOCA event has occurred inside Containment from full power.
- A SIAS and CCAS have been initiated due to the LOCA.
- The CRS has entered OP 2202.003 LOCA EOP from SPTAs.

**TASK STANDARD:**

Secured all RCPs; isolated Controlled RCP bleedoff, all condensate pumps secured in PTL, CCW isolated to containment, CCW pumps secured in PTL, MFWP turning gear secured in PTL, and MPWP lube oil pumps secured in PTL.

**TASK PERFORMANCE AIDS:**

OP-2202.010 EOP Standard Attachment 6, Securing CCW and ACW

**SIMULATOR SETUP:**

- LOCA in progress
- SIAS and CCAS Actuated
- Low Lake Level <333'
- Service Water Pumps Suctions and Returns aligned to the ECP

**EXAMINER'S NOTES:**

Secure CCW system using EOP. The applicant will use to Standard Attachment 6, Securing Component Cooling Water (CCW) and Auxiliary Cooling Water. The applicant will secure the Reactor Coolant Pumps (RCPs), isolate RCP controlled bleedoff, ensure letdown isolated, and ensure emergency feedwater (EFW) suction source is from a condensate storage tank. They will then contact a NLO to ensure start up and blowdown DI suction to EFW is isolated and waste gas compressors are secured. They will contact chemistry to ensure sample flows are secured. The applicant will then isolate CCW to the RCPs, secure CCW pumps, Main Feedwater Pump (MFWP) turning gear and MFWP lube oil pumps.

JOB PERFORMANCE MEASURE**INITIATING CUE:**

The CRS directs: "Secure the CCW system using OP 2202.010 Attachment 6 Step 1."

START TIME: \_\_\_\_\_

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	1. (Step 1/1.A)	Secure CCW System by performing the following:  Verify ALL RCPs stopped.  <b>Examiner Note:</b> Applicant may start RCP lift pumps prior to securing RCPs	On 2C04, secured running RCPs and verified Green light indication is ON, RED light OFF above all 4 RCP handswitches:  2P32A  2P32B  2P32C  2P32D	N/A SAT UNSAT
	2. (Step 1.B)	Place both spray valves in MANUAL and closed.	On panel 2C04, placed spray valve man/auto select hand switches 2HS-4651B ("A" Spray Line) and 2HS-4652B ("B" Spray Line) in MANUAL.  <b>Examiner note: valves will already be closed.</b>	N/A SAT UNSAT
(C)	3. (Step 1.C)	Verify ALL of the following valves closed: <ul style="list-style-type: none"> <li>RCP Bleedoff to VCT (2CV-4846-1)</li> <li>RCP Bleedoff to VCT (2CV-4847-2)</li> <li>RCP Bleedoff Relief to Quench Tank (2CV-4856)</li> </ul>	On 2C16/2C17, verified GREEN light indication ON, RED light OFF above RCP BLEEDOFF handswitches for 2CV-4847-2 and 2CV-4846-1.  On 2C09, placed handswitch for 2CV-4856 to Close and verified GREEN light indication ON, RED light OFF above the handswitch for RCP BLEEDOFF RELIEF ISOL TO QT 2CV-4856.	N/A SAT UNSAT
<b>Procedure Note: The remaining steps of this attachment should have a lower priority than implementation of the controlling procedure.</b>				

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	4. (Step 1.D)	Verify at least ONE Letdown Isolation valve closed: <ul style="list-style-type: none"> <li>• 2CV-4820-2</li> <li>• 2CV-4821-1</li> <li>• 2CV-4823-2 (least preferred)</li> </ul>	On panel 2C09 closed at least on Letdown isolation valve.  2CV-4820-2  OR  2CV-4821-1  OR  2CV-4823-2  Observed green light ON; red light OFF above all of the above controlled bleedoff isolation valve handswitches.	N/A SAT UNSAT
	5. (Step 1.E)	Verify EFW suction aligned to a condensate storage tank.	On panel 2C17 observed green light OFF; red light ON above handswitch for 2CV-0789  On panel 2C16 observed green light OFF; red light ON above handswitch for 2CV-0795.	N/A SAT UNSAT
	6. (Step 1.F)	Locally close "SU/BD DI TO EFW PUMP SUCT" valve (2EFW-0706).	Directed AO to locally verify 2EFW-0706 closed.  OR On panel 2C33, observed green light ON; red light OFF for SU/BD DI Effluent to EFW 2EFW-0706.	N/A SAT UNSAT
(C)	7. (Step 1.G)	Verify ALL Condensate Pump handswitches in PTL.	On panel 2C02, placed the following hand switches in PULL TO LOCK: <ul style="list-style-type: none"> <li>• 2HS-0609 (2P2A)</li> <li>• 2HS-0614 (2P2B)</li> <li>• 2HS-0620 (2P2C)</li> <li>• 2HS-0626 (2P2D)</li> </ul> Observed green lights ON; red lights OFF above condensate pump hand switches.	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	8. (Step 1.H)	<p>Locally secure BOTH Waste Gas compressors by placing the following handswitches in OFF:</p> <ul style="list-style-type: none"> <li>"2C75A CONTROL SWITCH" (2HS-2402A)</li> <li>"2C75B CONTROL SWITCH" (2HS-2402B)</li> </ul> <p><b>Examiner Cue:</b> <b>WCO reports both waste gas compressors are secure.</b></p>	Directed the WCO to secure both waste gas compressors by placing hand switches 2HS-2402A and 2HS-2402B in OFF on panels 2C194A/B.	N/A SAT UNSAT
	9. (Step 1.I)	<p>Notify Chemistry to secure ALL unnecessary sample flows to the following sample panels:</p> <ul style="list-style-type: none"> <li>2C116 Sample System Control panel</li> <li>2C337 SG Secondary Sample panel</li> <li>2C145-I Secondary Sample panel</li> <li>2C145-II Secondary Sample panel</li> </ul> <p><b>Examiner Cue:</b> <b>Chemistry reports sampling is secured to the following panels:</b> <b>2C116</b> <b>2C337</b> <b>2C145-I</b> <b>2C145-II</b></p>	<p>Notified chemistry to secure all unnecessary sample flows to the following panels:</p> <ul style="list-style-type: none"> <li>2C116 Sample System Control Panel.</li> <li>2C337 SG Secondary Sample Panel.</li> <li>2C145-I Secondary Sample Panel.</li> <li>2C145-II Secondary Sample Panel.</li> </ul>	N/A SAT UNSAT
(C)	10. (Step 1.J.1)	<p>WHEN steps 1.A through 1.I complete, THEN secure CCW by performing the following: Verify closed ALL RCP CCW Isolation valves:</p> <ul style="list-style-type: none"> <li>2CV-5255-1</li> <li>2CV-5254-2</li> <li>2CV-5236-1</li> </ul>	<p>On Panel 2C17/2C16 closed the following valves by placing the hand switches to close:</p> <ul style="list-style-type: none"> <li>2CV-5255-1 (<b>Throttle valve</b>)</li> <li>2CV-5236-1</li> <li>2CV-5254-2</li> </ul> <p>Observed the Red light OFF and Green light ON.</p>	N/A SAT UNSAT



**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	11. (Step 1.J.2)	Place ALL CCW Pump handswitches in PTL.	<p>Placed the following hand switches in PULL TO LOCK on panel 2C14:</p> <ul style="list-style-type: none"> <li>• 2HS-5225 (2P33A)</li> <li>• 2HS-5228 (2P33B)</li> <li>• 2HS-5234 (2P33C)</li> </ul> <p>Observed green lights ON and red lights OFF above hand switches.</p>	N/A SAT UNSAT
(C)	12. (Step 1.K)	Secure BOTH MFW Pump Turning Gears by placing handswitches in PTL.	<p>On panel 2C02, placed the following hand switches in PULL TO LOCK:</p> <ul style="list-style-type: none"> <li>• 2K-2A turning gear (2HS-0353)</li> <li>• 2K-2B turning gear (2HS-0333)</li> </ul> <p>Observed green lights ON and red lights OFF above hand switches.</p>	N/A SAT UNSAT
(C)	13. (Step 1.L)	<p>WHEN BOTH MFW pumps stopped, THEN place the following handswitches in PTL:</p> <ul style="list-style-type: none"> <li>• MFW Pump Auxiliary Lube Oil pump 2P26</li> <li>• MFW Pump Auxiliary Lube Oil pump 2P27</li> <li>• MFW Pump Emergency Lube Oil pump 2P28</li> </ul> <p><b>Examiner Cue: Both Main Feedwater pump are not rotating.</b></p>	<p>On panel 2C02, placed the following hand switches in PULL TO LOCK:</p> <ul style="list-style-type: none"> <li>• 2P-26 handswitch (2HS-0331)</li> <li>• 2P-27 handswitch (2HS-0332)</li> <li>• 2P-28 handswitch (2HS-0351)</li> </ul> <p>Observed green lights ON and red lights OFF above hand switches.</p>	N/A SAT UNSAT
END				

JOB PERFORMANCE MEASURE

**EXAMINER'S COPY**

**INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- The Lake Dardanelle is not available due to low lake level. (level <333')
- Service Water pump suction and returns have been shifted to the Emergency Cooling Pond.
- A LOCA event has occurred inside Containment from full power.
- A SIAS and CCAS have been initiated due to the LOCA.
- The CRS has entered OP 2202.003 LOCA EOP from SPTAs.

**INITIATING CUE:**

The CRS directs: "Secure the CCW system using OP 2202.010 Attachment 6 Step 1."

JOB PERFORMANCE MEASURE

**EXAMINEE'S COPY**

**INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- The Lake Dardanelle is not available due to low lake level. (level <333')
- Service Water pump suction and returns have been shifted to the Emergency Cooling Pond.
- A LOCA event has occurred inside Containment from full power.
- A SIAS and CCAS have been initiated due to the LOCA.
- The CRS has entered OP 2202.003 LOCA EOP from SPTAs.

**INITIATING CUE:**

The CRS directs: "Secure the CCW system using OP 2202.010 Attachment 6 Step 1."

# ATTACHMENT 6

## SECURING CCW AND ACW

Page 1 of 3

1. Secure CCW System by performing the following:
  - A. Verify ALL RCPs stopped.
  - B. Verify BOTH PZR Spray valves in MANUAL and closed.
  - C. Verify ALL of the following valves closed:
    - RCP Bleedoff to VCT (2CV-4846-1)
    - RCP Bleedoff to VCT (2CV-4847-2)
    - RCP Bleedoff Relief to Quench Tank (2CV-4856)

### **NOTE**

**The remaining steps of this attachment should have a lower priority than implementation of the controlling procedure.**

- D. Verify at least ONE Letdown Isolation valve closed:
  - 2CV-4820-2
  - 2CV-4821-1
  - 2CV-4823-2 (least preferred)
- E. Verify EFW suction aligned to CST.
- F. Locally close "SU/BD DI TO EFW PUMP SUCT" valve (2EFW-0706).
- G. Verify ALL Condensate Pump handswitches in PTL.
- H. Locally secure BOTH Waste Gas compressors by placing the following handswitches in OFF:
  - "2C75A CONTROL SWITCH" (2HS-2402A)
  - "2C75B CONTROL SWITCH" (2HS-2402B)

(Step 1 continued on next page)

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# ATTACHMENT 6

## SECURING CCW AND ACW

1. (continued)

Page 2 of 3

- I. Notify Chemistry to secure ALL unnecessary sample flows to the following sample panels:
- 2C116 Sample System Control panel
  - 2C337 SG Secondary Sample panel
  - 2C145-I Secondary Sample panel
  - 2C145-II Secondary Sample panel
- J. WHEN steps 1.A through 1.I complete, THEN secure CCW by performing the following:
- 1) Verify closed ALL RCP CCW Isolation valves:
- 2CV-5255-1
  - 2CV-5254-2
  - 2CV-5236-1
- 2) Place ALL CCW Pump handswitches in PTL.
- K. Secure BOTH MFW Pump Turning Gears by placing handswitches in PTL.
- L. WHEN BOTH MFW pumps stopped, THEN place the following handswitches in PTL:
- MFW Pump Auxiliary Lube Oil pump 2P26
  - MFW Pump Auxiliary Lube Oil pump 2P27
  - MFW Pump Emergency Lube Oil pump 2P28

PROC NO	TITLE	REVISION	PAGE
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# ATTACHMENT 6

## SECURING CCW AND ACW

Page 3 of 3

2. Secure ACW loads as follows:
  - A. Close BOTH SG Blowdown Isolation valves:
    - 2CV-1016-1
    - 2CV-1066-1
  - B. Break Condenser vacuum and secure Gland Seal steam using 2106.010, Condenser Vacuum System.
  - C. Secure EH System by placing BOTH EH Pump handswitches in PTL.
  - D. Secure Main Turbine Turning Gear by placing handswitch 2HS-9630 in PTL.
  - E. Start Emergency Control Room chiller 2VUC-27A or 2VUC-27B.
  - F. Commence Lube oil and Seal Oil system shutdown using 2106.020, Main Turbine Oil Operations.
  - G. WHEN Main Turbine stopped, THEN place the following handswitches in PTL:
    - Motor Suction pump 2P19
    - Turning Gear Oil pump 2P76
  - H. Verify Control Room chillers secured.

PROC NO	TITLE	REVISION	PAGE
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**JOB PERFORMANCE MEASURE**UNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Safety Injection SystemTASK: Lower Safety Injection Tank levelJTA#: ANO2-RO-ECCS-NORM-5ALTERNATE PATH YES: \_\_\_\_\_ NO: X TIME CRITICAL YES: \_\_\_\_\_ NO: XKA VALUE RO: 3.5 SRO: 3.7 KA REFERENCE: 006 A1.13APPROVED FOR ADMINISTRATION TO: RO: X SRO: XTASK LOCATION: INSIDE CR: X OUTSIDE CR: \_\_\_\_\_ BOTH: \_\_\_\_\_

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: Perform LAB: \_\_\_\_\_

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ LAB: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 6 MinutesREFERENCE(S): OP 2104.001 SIT OPERATIONS REV 51

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

---

Start Time	Stop Time	Total Time
_____	_____	_____

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS**

- SIT 2T-2D level needs to be drained to clear the high pressure alarm and

**TASK STANDARD:**

2T-2D SIT level has been lowered to clear the high pressure alarm and pressure does not lower below 600 psig.

**TASK PERFORMANCE AIDS:**

OP-2104.001 SIT Operations Section 7.1

**SIMULATOR SETUP:**

2T-2D level is approximately 85.2% and pressure is 618 psig.

**EXAMINER NOTES:**

Lower Safety Injection Tank level (2T-2D). The applicant should align the SIT 2T-2D to the drain header and drain the 2T-2D to clear the high pressure alarm and then secure the drain path lineup. This task should be completed while monitoring all other SIT pressures and levels and no unplanned Technical Specifications should be entered during the evolution.



**JOB PERFORMANCE MEASURE****INITIATING CUE:**

The SM/CRS directs, "Lower SIT (2T2D) level to RDT to clear the high pressure alarm using OP 2104.001; Section 7.1 beginning with Step 7.1.1. OPS B-37 does not need to be completed."

START TIME: \_\_\_\_\_

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
<b><u>EXAMINER NOTE:</u> Steps 7.1.1 and 7.1.2 should be marked as completed/NA due to initiating cue.</b>				
	1 (Step 7.1.3)	* MONITOR RDT and ALL SIT levels and pressures during drain.	Monitored levels and pressures for the Reactor Drain Tank and All Safety Injection Tanks during this evolution.	N/A SAT UNSAT
	2 (Step 7.1.4)	ENSURE ALL SIT Drain valves closed: (CAPR RC2, CR-ANO-2-2016-0671 CA 16)  2T-2A - SIT A Drain Valve 2SV-5001-1 (2HS-5001-1)  2T-2B - SIT B Drain Valve 2SV-5021-1 (2HS-5021-1)  2T-2C - SIT C Drain Valve 2SV-5041-2 (2HS-5041-2)  2T-2D - SIT D Drain Valve 2SV-5061-2 (2HS-5061-2)	On panel 2C17, verified green light on, red light off for SIT Drain Valves 2SV-5001-1 and 2SV5021-1.  On panel 2C16, verified green light on, red light off for SIT Drain Valves 2SV-5041-2 and 2SV5061-2.	N/A SAT UNSAT
(C)	3 (Step 7.1.5)	OPEN SIT Drain to RDT 2CV-5081 (2HS-5081).	On panel 2C-33, placed handswitch for SIT Drain to RDT (2CV-5081) to OPEN.  Observed red light ON, green light OFF above handswitch.	N/A SAT UNSAT
(C)	4. (Step 7.1.6)	If desired level drop less than ½%, THEN CLOSE 2CV-5081 (2HS-5081).	On panel 2C33, placed handswitch for SIT Drain to RDT (2CV-5081) to CLOSED.  Observed green light ON, red light OFF above handswitch.	N/A SAT UNSAT
	5. (Step 7.1.7)	*MONITOR SIT Injection header pressure for SIT being drained:  SIS Injection to Loop 2P-32D (2PIS-5060)	On panel 2C16 observed 2PIS-5060 < 650 psig.	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST		STANDARDS		(Circle One)
<b><u>EXAMINER NOTE:</u></b> Step 7.1.8 should be marked as N/A since SIT Injection HDR pressure will be <650 psig.				
	6. (Step 7.1.8)	IF pressure of SIT Injection header being drained greater than 650 psig, THEN:	Applicant determines step is Not Applicable	N/A SAT UNSAT
(C)	7. (Step 7.1.9)	Open selected SIT Drain Valve:  2T-2D - SIT D Drain valve 2SV-5061-2 (2HS-5061-2)	On panel 2C16, placed handswitch for SIT 'D' Drain Valve (2SV-5061-2) to OPEN.  Observed red light ON, green light OFF above handswitch.	N/A SAT UNSAT
<b><u>PROCEDURE NOTE</u></b>				
If SIT drain header pressurized, SIT Drain valves may be slow to close due to no DP. (CR-ANO-2-2004-0802, EC-34646)				
(C)	8. (Step 7.1.10)	WHEN desired SIT level or pressure reached, THEN CLOSE applicable SIT Drain valve:  2T-2D - SIT D Drain valve 2SV-5061-2 (2HS-5061-2)	Verified SIT (2T2D) High Pressure alarm has cleared.  On panel 2C16, placed handswitch for SIT D Drain Valve (2SV-5061-2) to CLOSE.  Maintained 'D' SIT pressure greater than 600 psig.  Observed green light ON, red light OFF above handswitch.	N/A SAT UNSAT
<b><u>EXAMINER NOTE:</u></b> Step 7.1.11 and 7.1.12 should be marked as N/A.				
	9. (Step 7.1.13)	ENSURE SIT Drain to RDT 2CV-5081 (2HS-5081) closed.	On panel 2C33, placed OR verified handswitch for SIT Drain to RDT (2CV-5081) in CLOSE.  Observed green light ON, red light OFF above handswitch.	N/A SAT UNSAT
END				

STOP TIME: \_\_\_\_\_

**JOB PERFORMANCE MEASURE****Examiner's Copy****INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- SIT 2T-2D level needs to be lowered to clear the high pressure alarm.

**INITIATING CUE:**

- The SM/CRS directs, "Lower SIT (2T2D) level to RDT to clear the high pressure alarm using OP 2104.001; Section 7.1 beginning with Step 7.1.1. "
- OPS B-37 does not need to be completed.

**JOB PERFORMANCE MEASURE****Examinee's Copy****INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- 2T-2D SIT level needs to be lowered to clear the High Pressure alarm.

**INITIATING CUE:**

- The SM/CRS directs, "Lower SIT (2T2D) level to RDT to clear the high pressure alarm using OP 2104.001; Section 7.1 beginning with Step 7.1.1. "
- OPS B-37 does not need to be completed.

2104.001	SAFETY INJECTION TANK OPERATIONS	PAGE: 7 of 214 CHANGE: 051
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## 7.0 LOWERING SAFETY INJECTION TANK LEVEL

### 7.1 Draining SITs to RDT in Mode 1, 2, 3, or 4 with SIT Outlet Valves Open

7.1.1 **IF** source of SIT in-leakage unknown,  
**THEN INITIATE** OPS-B37, SIT Level Change as desired.

7.1.2 **IF** OPS-B37, SIT Level Change being maintained for applicable SIT,  
**THEN RECORD** initial level on OPS-B37.

\* 7.1.3 **MONITOR** RDT and ALL SIT levels and pressures during drain.

7.1.4 **ENSURE** ALL SIT Drain valves closed:  
(CAPR RC2, CR-ANO-2-2016-0671 CA 16)

- 2T-2A - SIT A Drain valve 2SV-5001-1 (2HS-5001-1)
- 2T-2B - SIT B Drain valve 2SV-5021-1 (2HS-5021-1)
- 2T-2C - SIT C Drain valve 2SV-5041-2 (2HS-5041-2)
- 2T-2D - SIT D Drain valve 2SV-5061-2 (2HS-5061-2)

7.1.5 **OPEN** SIT Drain to RDT 2CV-5081 (2HS-5081).

7.1.6 **IF** desired level drop less than 1/2%,  
**THEN CLOSE** 2CV-5081 (2HS-5081).

\* 7.1.7 **MONITOR** SIT Injection header pressure for SIT being drained:

- SIS Injection to Loop 2P-32A (2PIS-5000)
- SIS Injection to Loop 2P-32B (2PIS-5020)
- SIS Injection to Loop 2P-32C (2PIS-5040)
- SIS Injection to Loop 2P-32D (2PIS-5060)

2104.001	SAFETY INJECTION TANK OPERATIONS	<b>PAGE:</b> 8 of 214 <b>CHANGE:</b> 051
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7.1.8 **IF** pressure of SIT Injection header being drained greater than 650 psig,  
**THEN:**

- A. **CYCLE** selected valve open for maximum of ten seconds:
  - 2T-2A - SIT A Drain valve 2SV-5001-1 (2HS-5001-1)
  - 2T-2B - SIT B Drain valve 2SV-5021-1 (2HS-5021-1)
  - 2T-2C - SIT C Drain valve 2SV-5041-2 (2HS-5041-2)
  - 2T-2D - SIT D Drain valve 2SV-5061-2 (2HS-5061-2)
- B. **WAIT** at least six minutes.
- C. **IF** additional drain needed after six minute wait,  
**THEN CYCLE** valve open for maximum of ten seconds.
- D. **WAIT** at least two hours before repeating this sequence.
- E. **GO TO** step [7.1.11](#).

7.1.9 **OPEN** selected SIT Drain valve:

- 2T-2A - SIT A Drain valve 2SV-5001-1 (2HS-5001-1)
- 2T-2B - SIT B Drain valve 2SV-5021-1 (2HS-5021-1)
- 2T-2C - SIT C Drain valve 2SV-5041-2 (2HS-5041-2)
- 2T-2D - SIT D Drain valve 2SV-5061-2 (2HS-5061-2)

**NOTE**

If SIT drain header pressurized, SIT Drain valves may be slow to close due to no DP.  
 (CR-ANO-2-2004-0802, EC-34646)

7.1.10 **WHEN** desired SIT level or pressure reached,  
**THEN CLOSE** applicable SIT Drain valve:

- 2T-2A - SIT A Drain valve 2SV-5001-1 (2HS-5001-1)
- 2T-2B - SIT B Drain valve 2SV-5021-1 (2HS-5021-1)
- 2T-2C - SIT C Drain valve 2SV-5041-2 (2HS-5041-2)
- 2T-2D - SIT D Drain valve 2SV-5061-2 (2HS-5061-2)

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7.1.11 **IF** desired to raise SIT pressure,  
**THEN ADD** nitrogen to associated SIT IAW Raising Safety Injection Tank Pressure section of this procedure.

7.1.12 **IF** drain stopped based on SIT pressure,  
**AND** continued draining desired,  
**THEN:**

- A. **WAIT** two hours.
- B. **REPEAT** steps 7.1.5 through 7.1.11.

7.1.13 **ENSURE** SIT Drain to RDT 2CV-5081 (2HS-5081) closed.

**NOTE**

If SIT drain header pressurized, SIT Drain valves may be slow to close due to no DP.  
(CR-ANO-2-2004-0802, EC-34646)

7.1.14 **IF** SIT drained with SIT Drain to RDT (2CV-5081) open,  
**THEN:**

- A. **OPEN** associated SIT Drain valve to repressurize drain header:
  - 2T-2A - SIT A Drain valve 2SV-5001-1 (2HS-5001-1)
  - 2T-2B - SIT B Drain valve 2SV-5021-1 (2HS-5021-1)
  - 2T-2C - SIT C Drain valve 2SV-5041-2 (2HS-5041-2)
  - 2T-2D - SIT D Drain valve 2SV-5061-2 (2HS-5061-2)
- B. **WHEN** SIT Drain header pressurized,  
**THEN CLOSE** SIT Drain valve opened in previous step:
  - 2T-2A - SIT A Drain valve 2SV-5001-1 (2HS-5001-1)
  - 2T-2B - SIT B Drain valve 2SV-5021-1 (2HS-5021-1)
  - 2T-2C - SIT C Drain valve 2SV-5041-2 (2HS-5041-2)
  - 2T-2D - SIT D Drain valve 2SV-5061-2 (2HS-5061-2)

7.1.15 **IF** desired to raise SIT pressure,  
**THEN ADD** nitrogen to associated SIT IAW Raising Safety Injection Tank Pressure section of this procedure.

7.1.16 **IF** OPS-B37, SIT Level Change being maintained for drained SIT,  
**THEN RECORD** final level on OPS-B37.

**JOB PERFORMANCE MEASURE**UNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Abnormal/Emergency OperationsTASK: Perform control element assembly exercise.JTA#: ANO2-RO-CEDM-SURV-13ALTERNATE YES: X NO: \_\_\_\_\_ TIME CRITICAL YES: \_\_\_\_\_ NO: X  
PATH \_\_\_\_\_KA VALUE RO: 3.5 SRO: 4.2 KA REFERENCE: 001 A2.03APPROVED FOR ADMINISTRATION TO: RO: X SRO: XTASK LOCATION: INSIDE CR: X OUTSIDE CR: \_\_\_\_\_ BOTH: \_\_\_\_\_

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: Perform LAB: \_\_\_\_\_

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ LAB: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 8 MinutesREFERENCE(S): OP 2105.009 Rev.36 and ACA 2203.012J Rev. 43

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN  
THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

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Start Time	Stop Time	Total Time
_____	_____	_____



**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- OP-2105.009 Supplement 2, "CEA Exercise Test" is completed successfully for all CEA's except CEA # 46.
- Reactivity Management Brief is complete
- Voltage traces are setup to be taken on CEA #46
- No CEAs are on or need to be on the Hold Bus.
- No T-alt is installed on either RSPT for CEA #46.
- Unit 2 is currently at 260 EFPD.

**TASK STANDARD:**

- CEA #46 has been withdrawn to the Upper Electrical limit, inserted ~ 5"
- CEA movement stopped after taking the CEDMCS control switch to OFF.
- These actions have to occur before reaching the CEA Lower Electrical Limit (LEL) and the applicant does not manually trip the reactor.

**TASK PERFORMANCE AIDS:**

- Copy of partially completed OP-2105.009 Supplement 2.
- OP-2203.012J, 2K10 D-1 ACA Minor CEA Deviation
- OP-2203.012J, 2K10 C-1 ACA Major CEA Deviation
- OP 2203.002 CEA Malfunction AOP

**SIMULATOR SETUP:**

- All CEA's withdrawn to programmed insertion limit.
- Verify group 6 & CEA # 46 not selected on CEDMCS insert.
- Insert switch override, DI\_JC\_9058\_44 to true (CEA shim switch for insert) to a trigger that is set to FN3i905a that causes CEA 46 to continue to insert when CEDMCS shim switch is taken to insert and will not stop moving until the CEDMCS control switch is taken to stop.

**EXAMINER NOTES:**

Perform control element assembly exercise. This is an Alternate Success Path JPM. The examinee will be tasked with exercising a CEA for it required surveillance. When insertion demand is terminated the CEA will continue to move into the core. The examinee should take action to stop the unintended CEA movement.

**JOB PERFORMANCE MEASURE****INITIATING CUE:**

The CRS directs, "Complete the CEA Exercise Test for CEA #46 using OP 2105.009 Supplement 2, Step 3.2.5."

**START TIME:** \_\_\_\_\_

PERFORMANCE CHECKLIST		STANDARDS		(Circle One)
<b>Examiner's Note:</b>				
<b>Examinee may elect to review the CEA malfunction AOP prior to starting this JPM.</b>				
<b>Examinee should circle Step 3.2.5.A and move on to next step due to being a continuous action step.</b>				
	1. Step 3.2.5.B	ENSURE CEA within 7 inches of other CEAs in the group using operable CEA Position indicators. (TS 3.1.3.1)	Using RSPT1, RSPT2 or Pulse counter readings on PMS, examinee verified that CEA 46 remains within 7" of all Group 6 CEA's throughout exercise.	N/A SAT UNSAT
	2. Step 3.2.5.C	SELECT position indication for CEA to be exercised on ALL available CEAC Operator Module digital displays.	On panel 2C03, examinee displayed CEA #46 on all available CEAC module displays by one of the following methods: - Standard OM, - CEA group plot (Group 6 selected) - CEA values Page 2 - CEA subgroup plot (Group 6 selected)	N/A SAT UNSAT
(C)	3. Step 3.2.5.D	PLACE Group Select switch to group containing individual CEA.	On panel 2C03, Group Select Switch selected to CEA Group 6 by examinee.  <b>(Not Critical)</b> Examinee observed Group 6 white status light on the top row of the Group 6 CEA indicating lights ON.	N/A SAT UNSAT
(C)	4. Step 3.2.5.E	PLACE Individual CEA Selection switches to CEA to be exercised.	On panel 2C03, examinee selected CEA #46.  <b>(Not Critical)</b> Examinee observed the TENS in "4" and the UNITS in "6".  <u>OR</u>  Examinee observed CEA #46 individual light ON.	N/A SAT UNSAT

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	5. Step 3.2.5.F	ENSURE the mode select switch to in MANUAL INDIVIDUAL.	On panel 2C03, examinee placed mode select switch to MI.  <b>(Not Critical)</b> Examinee observed MI (MANUAL INDIVIDUAL) light ON.	N/A SAT UNSAT
	6. Step 3.2.5.G	ENSURE CEA to be exercised is at UEL.	On insert 2JC-9058, examinee moved CEA 46 to UEL by going to WITHDRAW on CEA insert until CEA #46 Upper Electrical Limit (UEL) red light on.  Examinee observed UEL red light ON.	N/A SAT UNSAT
(C)	7. Step 3.2.5.H	INSERT CEA seven steps (greater than or equal to 5 inches by RSPT).	Examinee inserted CEA seven steps ( $\geq 5''$ ).  Examinee observed insertion of 5.0 inches or greater on CEAC's #1 and #2 displays.	N/A SAT UNSAT
<p><b>EXAMINER'S NOTE:</b> This is the Alternate Path Portion of the JPM. As CEA #46 is inserted the CEA will not stop moving until the CEDMCS control switch, 2JC-9058, is taken to OFF. If ACA's or AOP's are desired, then let them use the copies in the Simulator.</p>				
<p><b>EXAMINER'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• CEA minor deviation alarm will occur at ~146.5" withdrawn (Other CEA's in Group 6 are withdrawn and alarm actuates with 3" deviation).</li> <li>• CEA Major Deviation alarm will annunciate at ~ 143.5" withdrawn (at 6" deviation).</li> <li>• At 140.38" the CEAC's will begin calculation and activate deviation alarms on 2K04, J5, J6, CEAC deviation alarms.</li> </ul> <p>These alarms are entry conditions for the CEA Malfunction AOP 2203.003 where the guidance is found in Step 2 of the AOP to "Stop ALL CEA movement".</p> <p>CEA will insert at ~30"/minute and will take about 5 minutes for CEA to insert to the lower electrical limit, LEL.</p>				

**JOB PERFORMANCE MEASURE**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	8.  AOP 2203.003 Step 2	<p>Recognize CEA # 46 has not stopped moving when shim switch is returned to center position.</p> <p><b><u>EXAMINER'S CUE:</u></b> <b>If examinee asks for guidance from CRS, ask examinee for their recommendation.</b></p> <p>Stop ALL CEA movement.</p>	<p>On CEAC inserts and PMS pulse counter indication, the examinee observed CEA #46 continuing to insert.</p> <p>CEDMCS control switch, 2JC-9058, is taken to OFF by examinee before the lower electrical limit (LEL) is reached.</p> <p>AND</p> <p>Examinee verified by CEAC and Pulse counter indication that the CEA movement stops.</p> <p>AND</p> <p>Examinee does not trip reactor.</p>	N/A SAT UNSAT
	9. Step: N/A	<p>Reports that CEA #46 did not stop moving until the CEDMCS control switch was taken to OFF.</p> <p><b><u>Examiner's CUE:</u></b> <b>Acknowledge the problem with CEDMCS and that the CRS will take care of the CR and possible Tech Spec entry.</b></p>	<p>Examinee reports to the CRS that CEA #46 did not stop moving until the CEDMCS control switch was taken to OFF and possible entry into the CEA malfunction AOP.</p>	N/A SAT UNSAT
END				

Stop Time: \_\_\_\_\_

**JOB PERFORMANCE MEASURE****EXAMINER'S COPY****INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- OP-2105.009 Supplement 2, "CEA Exercise Test" is completed successfully for all CEA's except CEA # 46.
- Reactivity Management Brief is complete
- Voltage traces are setup to be taken on CEA #46
- No CEAs are on or need to be on the Hold Bus.
- No T-alt is installed on either RSPT for CEA #46.
- Unit 2 is currently at 260 EFPD.

**INITIATING CUE:**

The CRS directs, "Complete the CEA Exercise Test for CEA #46 using OP 2105.009 Supplement 2, Step 3.2.5."

**JOB PERFORMANCE MEASURE****EXAMINEE'S COPY****INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- OP-2105.009 Supplement 2, "CEA Exercise Test" is completed successfully for all CEA's except CEA # 46.
- Reactivity Management Brief is complete
- Voltage traces are setup to be taken on CEA #46
- No CEAs are on or need to be on the Hold Bus.
- No T-alt is installed on either RSPT for CEA #46.
- Unit 2 is currently at 260 EFPD.

**INITIATING CUE:**

The CRS directs, "Complete the CEA Exercise Test for CEA #46 using OP 2105.009 Supplement 2, Step 3.2.5."

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## SUPPLEMENT 2

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### NOTE

The following apply to CEAs placed on the Hold Bus:

- ☒ CEAs are declared inoperable due to inability to move from the Control room.
- ☒ Entry into TS 3.1.3.1 Action C is required.
- ☒ CEAs are considered inoperable but trippable since Hold Buses are de-energized when TCBs open so all CEAs on Hold Bus will be inserted on a reactor trip.
- ☒ CEAs are considered as available for insertion for shutdown margin.
- ☒ CEAs are considered as having their full negative reactivity insertion potential and no SDM penalties should be applied unless CEA is known to be untrippable.

### CAUTION

A CEA with known problems (e.g., coil with missing phase) should be bumped one step and then stopped to allow I&C Maintenance to evaluate for additional problems on coil traces. Coordinate with I&C Maintenance and System Engineering for appropriate actions If additional problems are found. (CR-ANO-2-2001-0611)

### 3.2 Test Method

\*

#### 3.2.1

**IF** required to place CEAs on Hold Bus,  
**THEN ENTER** Tech Spec 3.1.3.1, Action C (CEAs inoperable but trippable, no SDM penalty).

\*

#### 3.2.2

**IF** CEAs placed on Hold Bus for any reason,  
**THEN:**

- A. **ENSURE** CEAs removed from Hold Bus.
- B. **EXIT** TS 3.1.3.1.C.

#### 3.2.3

**IF** voltage traces desired by Operations Management and I&C,  
**THEN COORDINATE** with I&C to perform voltage traces concurrent with CEA exercises.

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## SUPPLEMENT 2

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**CAUTION**

- Both PMS and COLSS receive pulse counter input. If CEA pulsed inward too far, the excessive peaking factors generated will render COLSS inoperable. When pulsing CEA in groups 1 through 5, with group out of sequence, this occurs at 142.5". For CEA in any group, this occurs at 10" deviation from its group.
- If the CEA providing position indication for another CEA drops, the associated CEAC will see two dropped CEAs instead of one. Placing associated CEAC in INOP will prevent unnecessary trip if this happens.
- Do not simultaneously insert CEAs from Groups 5 and 6 below 146.25 inches. Large Planar Radial Peaking Factors will be applied to CPC calculations, likely resulting in channel trips.
- Group 6 and Group P CEAs should be exercised first during the CEA Exercise Test to ensure CEAs used for ASI control are available in event of a required power reduction.

**3.2.4**

**IF** a CEA RSPT is providing position indication to another CEA by installation of a T-Mod,  
**THEN PLACE** associated CEAC in INOP in all 4 CPC channels using 2105.001, CPC/CEAC Operations prior to exercising the CEA that is providing position indication.

- Example: If CEA 46 RSPT 2 is providing position indication for CEA 1, then place CEAC 2 in INOP prior to exercising CEA 46.

3.2.5 Exercise CEAs in Table 1 as follows:

- \* A. **IF** CEA movement delayed for extended period,  
**THEN ENSURE** Mode Select switch in OFF.
- \* B. **ENSURE** CEA within 7 inches of other CEAs in the group using operable CEA Position indicators. (TS 3.1.3.1)
- C. **SELECT** position indication for CEA to be exercised on ALL available CEAC Operator Module digital displays.
- D. **PLACE** Group Select switch to group containing individual CEA.
- E. **PLACE** Individual CEA Selection switches to CEA to be exercised.
- F. **ENSURE** Mode Select switch in MANUAL INDIVIDUAL.
- G. **ENSURE** CEA to be exercised is at UEL.





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## SUPPLEMENT 2

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### NOTE

- CEA insertion is verified to be  $\geq 5$ " by observation of RSPTs. Observing 5.25" change in pulse counter position does not mean CEA has moved  $\geq 5$ ".
- If all CEAs in the subgroup of CEA being inserted are above upper alarm deadband of 140.83 inches, CEAC 1 or 2 CEA Deviation annunciators (2K04 J-5/J-6) will not actuate
- Use of CEAC #1 and CEAC #2 standard OM Module to monitor raw input signal is recommended to ensure CEA movement of 5 inches. CEAC group display uses process CEA positions that are rounded off to nearest inch.
- Due to scheduling or component malfunction it is acceptable for CEAs to be inserted to other than 2102.004, Power Operations, Attachment D Programmed Insertion Limit.

- H. **INSERT** CEA seven steps (greater than or equal to 5 inches by RSPT).
- I. **RETURN** CEA to UEL.
- J. **ENSURE** CEA returned to position required by 2102.004, Power Operation, Attachment D.
- K. **RECORD** results on Table 1.
- L. **WHEN** all required CEA movements complete,  
**THEN ENSURE** Mode Select switch in OFF.

3.2.6 **IF** either CEAC placed in INOP for this exercise,  
**THEN REMOVE** from INOP in all four CPC channels using 2105.001, CPC/CEAC Operations.

3.2.7 **IF** any CEA or CEDMCS circuits require maintenance,  
**THEN:**

- A. Complete repairs.
- B. List affected CEAs in step [4.3](#).

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## SUPPLEMENT 2

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### 4.0 ACCEPTANCE CRITERIA

4.1 Has each CEA been determined operable by movement of greater than or equal to 5 inches in any direction by RSPT indication? YES NO

4.2 **IF** NO is circled above,  
**THEN:**

- **DECLARE** affected CEAs inoperable.
- **REFER** to Tech Spec 3.1.3.1.
- **NOTIFY** S/M.
- **INITIATE** Condition Report.

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

Performed By \_\_\_\_\_ Date \_\_\_\_\_  
\_\_\_\_\_

### 5.0 SUPERVISOR REVIEW AND ANALYSIS

5.1 Are CEAs operable as required by Acceptance Criteria? YES NO

5.2 **IF** answer to 5.1 is NO,  
**THEN** describe action taken below:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5.3 Are all administrative requirements of this test satisfied? YES NO

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

<b>PROCEDURE NO.</b> 2105.009	<b>PROCEDURE TITLE:</b> CEDM CONTROL SYSTEM OPERATION	<b>PAGE:</b> 35 of 44 <b>CHANGE:</b> 038
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**SUPPLEMENT 2**

**PAGE 7 OF 10**

TABLE 1												
CEA#	SELECT position indication for CEA being exercised	PLACE group select switch to group containing CEA	PLACE individual CEA select switches to CEA being exercised	ENSURE mode select switch in Manual Individual	ENSURE CEA at UEL	INSERT CEA ≥ 5 inches by RSPT indication	RETURN CEA to UEL	RETURN CEA to program insertion limit as required	Voltage trace obtained?		CEA exercised satisfactory?	
	√	√	√	√	√	√	√	√	YES	NO	YES	NO
P-22	√	√	√	√	√	√	√	√	YES		YES	
P-23	√	√	√	√	√	√	√	√	YES		YES	
P-24	√	√	√	√	√	√	√	√	YES		YES	
P-25	√	√	√	√	√	√	√	√	YES		YES	
P-26	√	√	√	√	√	√	√	√	YES		YES	
P-27	√	√	√	√	√	√	√	√	YES		YES	
P-28	√	√	√	√	√	√	√	√	YES		YES	
P-29	√	√	√	√	√	√	√	√	YES		YES	
6-1	√	√	√	√	√	√	√	√	YES		YES	
6-46												
6-47	√	√	√	√	√	√	√	√	YES		YES	
6-48	√	√	√	√	√	√	√	√	YES		YES	
6-49	√	√	√	√	√	√	√	√	YES		YES	
B-2	√	√	√	√	√	√	√	√	YES		YES	
B-3	√	√	√	√	√	√	√	√	YES		YES	
B-4	√	√	√	√	√	√	√	√	YES		YES	
B-5	√	√	√	√	√	√	√	√	YES		YES	
2-6	√	√	√	√	√	√	√	√	YES		YES	
2-7	√	√	√	√	√	√	√	√	YES		YES	
2-8	√	√	√	√	√	√	√	√	YES		YES	
2-9	√	√	√	√	√	√	√	√	YES		YES	

JOB PERFORMANCE MEASUREUNIT: 2 REV #: 1 DATE: \_\_\_\_\_SYSTEM/DUTY AREA: Reactor Coolant PumpTASK: Perform a normal RCP shutdownJTA#: ANO-2-RO-RCP-NORM-3ALTERNATE YES: X NO: \_\_\_\_\_ TIME CRITICAL YES: \_\_\_\_\_ NO: X  
PATH \_\_\_\_\_ :KA VALUE RO: 3.7 SRO: 3.9 KA REFERENCE: 003 A2.02APPROVED FOR ADMINISTRATION TO: RO: X SRO: XTASK LOCATION: INSIDE CR: X OUTSIDE CR: \_\_\_\_\_ BOTH: \_\_\_\_\_

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: Perform LAB: \_\_\_\_\_

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ LAB: \_\_\_\_\_

TESTING METHOD: SIMULATE: \_\_\_\_\_ PERFORM: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 4 MinutesREFERENCE(S): OP 2103.006 RCP Operations Rev.31; OP 2203.012K ACA for 2K11 Rev. 46

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

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Start Time	Stop Time	Total Time
_____	_____	_____

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS**

The Unit is in Mode 3.

**TASK STANDARD:**

All RCP's secured within 10 minutes of receiving the 'A' RCP reverse rotation alarm.

**TASK PERFORMANCE AIDS:**

OP 2103.006 RCP OPS Rev. 31 Section 8.0, OP-2203.012K ACA for 2K11-C2 Rev. 46

**SIMULATOR SETUP:**

Mode 3.

All RCP's running.

Set malfunction RCP2P32AREV to a trigger with a 35 second time delay.

Set the trigger to gh4g4620 (green light for 2P-32A)

**EXAMINER NOTES:**

Perform a normal RCP shutdown. This JPM is ALTERNATE PATH. When securing the 1<sup>st</sup> RCP 2P-32A, a valid Reverse Rotation Alarm will come in which will require a transition to the Alarm Corrective Action procedure which requires securing all RCPs for a Valid alarm to stop the reverse rotation on 2P-32A.

**JOB PERFORMANCE MEASURE****INITIATING CUE:**

The CRS directs, "Shutdown RCP 2P-32A using OP 2103.006 Section 8.0."

Start Time: \_\_\_\_\_

PERFORMANCE CHECKLIST		STANDARDS		(Circle One)
PROCEDURE NOTE				
If the last two RCPs will be secured simultaneously, Operations management has determined stationing a local operator is not required.				
	1. (Step 8.1)	Place associated Lift Pump handswitch to START: <ul style="list-style-type: none"><li>2P-32A Lift Pump 2P-63A (2HS-6084)</li></ul> <b><u>EXAMINER CUE:</u></b> <b>Local lift pump discharge pressure is adequate.</b>	On panel 2C04, placed 2HS-6084 for 2P63A to START.  Observed red light on; green light OFF above 2HS-6084.	N/A SAT UNSAT
(C)	2. (Step 8.2)	Stop selected reactor coolant pump <ul style="list-style-type: none"><li>2P-32A (2HS-4620)</li></ul>	On panel 2C04, placed 2HS-4620 for 2P32A to STOP.  Observed green light ON; red light OFF above 2HS-4620.	N/A SAT UNSAT
	3. (Step 8.2.1)	IF RCP 2P-32A stopped, THEN verify the following:  RCS RCP 2P-32A PZR Spray (2HS-4651B) in MANUAL.  RCS RCP 2P-32A PZR Spray (2HS-4651A) valve CLOSED.	On panel 2C04, placed 2HS-4651B in MANUAL.  On panel 2C04, placed 2HS-4651A in CLOSED.  Observed green light ON; red light OFF above 2HS-4651A.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST		STANDARDS		(Circle One)
<p><b>EXAMINER NOTE:</b> At this point the A' RCP Reverse Rotation Alarm will come in and the applicant will transition to the Annunciator Corrective Action for annunciator 2K11-C2 of OP-2203.012. (He may know the ACA required action from memory) The action is to secure the rest of the RCPs to prevent reverse overspeed of the A RCP.</p> <p><b>This is the Alternate Path portion of this JPM.</b></p>				
	4 (Step NA)	Acknowledges 2K11-C2 'A' RCP Reverse Rotation Alarm Time: _____  <u><b>EXAMINER CUE:</b></u> If examinee tells the CRS of the reverse rotation alarm, then inform the examinee as the CRS to take the appropriate action.  <u><b>EXAMINER CUE:</b></u> If examinee asks for a NLO report of 'A' RCP report the shaft is rotating in the opposite direction.	On panel 2K11 recognized 'A' RCP Reverse Rotation Alarm	N/A SAT UNSAT
(C)	5. (Step 2.4.1)	IF 2P-32A Reverse Rotation alarm valid, THEN perform the following:  <b>Examiner Note: Applicant may start RCP lift pumps prior to securing the RCPs.</b> Secure ALL operating RCPs: <ul style="list-style-type: none"> <li>• 2P-32B (2HS-4621)</li> <li>• 2P-32C (2HS-4720)</li> <li>• 2P-32D (2HS-4721)</li> </ul>	On panel 2C04, placed the handswitches for the following RCP's in STOP:  2P-32B Time: _____ 2P-32C Time: _____ 2P-32D Time: _____  <b>All RCPs must be stopped within 10 minutes of receiving reverse rotation alarm.</b>	N/A SAT UNSAT
	6. (Step 2.4.2)	IF RCP (2P-32B) was stopped, THEN verify B Spray Valve (2HS-4652B) in MANUAL and CLOSED.	On panel 2C04, placed 2HS-4652B in MANUAL.  On panel 2C04, placed 2HS-4652A in CLOSED.  Observed green light ON; red light OFF above 2HS-4652A.	N/A SAT UNSAT
<b>END</b>				

Stop Time: \_\_\_\_\_

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## ANNUNCIATOR 2K11

### C-2

#### REVERSE ROTATION

#### 1.0 CAUSES

- 1.1 Reactor Coolant Pump 2P-32A reverse oil flow that corresponds to rotational speed of 75 to 200 RPM in reverse direction (2FS-6081)

#### 2.0 ACTION REQUIRED

- 2.1 Check Reactor Coolant pump (2P-32A) status.

#### **NOTE**

Relays associated with 2FS-6081 (2P-32A) and 2FS-6091 (2P-32B) are protected by single fuse F23 in cabinet 2C-21. Blown fuse is probable cause if both annunciators C-2 and C-4 in alarm. (reference E-2181-2 and CALC-85-E-0118-01)

- 2.2 IF 2P-32B REVERSE ROTATION (2K11-C4) also in alarm,  
THEN check status of fuse F23 in cabinet 2C-21.

- 2.3 IF EITHER of the following conditions exist:

- RCP (2P-32A) operating
- Fuse F23 in cabinet 2C-21 blown,

THEN alarm is NOT valid.

- 2.4 IF 2P-32A Reverse Rotation alarm valid,  
THEN perform the following:

- 2.4.1 Secure ALL operating RCPs:

- 2P-32B (2HS-4621)
- 2P-32C (2HS-4720)
- 2P-32D (2HS-4721)

- 2.4.2 IF RCP (2P-32B) was stopped,  
THEN verify B Spray valve (2CV-4652) in MANUAL and closed.

- 2.4.3 IF CNTMT building accessible,  
THEN locally verify RCP (2P-32A) has stopped rotating.

- 2.4.4 Contact System Engineering and Management for assistance in developing a troubleshooting plan.

(C-2 Continued on next page)



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## ANNUNCIATOR 2K11

C-2

### REVERSE ROTATION (Continued)

2.4.5 IF recommended by System Engineering and Management,  
THEN perform the following:

A. Station Operator to locally monitor RCP (2P-32A).

B. Start another RCP using Reactor Coolant Pump Operations (2103.006).

C. IF RCP (2P-32A) pump rotates backwards,  
THEN perform the following:

1. Secure RCP started:

- 2P-32B (2HS-4621)
- 2P-32C (2HS-4720)
- 2P-32D (2HS-4721)

2. Submit WR/VO.

D. IF RCP (2P-32A) pump remains stationary,  
THEN perform the following:

1. Start RCP (2P-32A) using Reactor Coolant Pump Operations (2103.006).

2. Monitor Reactor Coolant pump (2P-32A) for abnormal noise, vibration, and temperature trends.

2.5 IF 2P-32A Reverse Rotation alarm malfunctioning,  
THEN submit WR/VO.

3.0 TO CLEAR ALARM

3.1 Reduce RCP 2P-32A oil flow to value corresponding to reverse speed < 75 RPM.

4.0 REFERENCES

4.1 E-2457-1

JOB PERFORMANCE MEASURE

**EXAMINER'S COPY**

**INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task.  
All annunciators that are not applicable to this task will be performed by another operator.

The unit is in Mode 3.

**INITIATING CUE:**

The SM/CRS directs, "Shut down RCP 2P-32A using OP 2103.006 Section 8.0."

JOB PERFORMANCE MEASURE

**EXAMINEE'S COPY**

**INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task.  
All annunciators that are not applicable to this task will be performed by another operator.

The unit is in Mode 3.

**INITIATING CUE:**

The SM/CRS directs, "Shut down RCP 2P-32A using OP 2103.006 Section 8.0."

PROC./WORK PLAN NO. <b>2103.006</b>	PROCEDURE/WORK PLAN TITLE: <b>REACTOR COOLANT PUMP OPERATIONS</b>	PAGE: <b>11 of 31</b>  CHANGE: <b>032</b>
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## 8.0 REACTOR COOLANT PUMP SHUTDOWN

### NOTE

If the last two RCPs will be secured simultaneously, Operations management has determined stationing a local operator is not required.

8.1 Place associated Lift Pump handswitch in START:

- 2P-32A Lift pump 2P-63A (2HS-6084)
- 2P-32B Lift pump 2P-63B (2HS-6094)
- 2P-32C Lift pump 2P-63C (2HS-6104)
- 2P-32D Lift pump 2P-63D (2HS-6114)

8.2 Stop SELECTED Reactor Coolant pump.

- 2P-32A (2HS-4620)
- 2P-32B (2HS-4621)
- 2P-32C (2HS-4720)
- 2P-32D (2HS-4721)

8.2.1 IF RCP 2P-32A stopped,  
THEN verify the following:

- RCS RCP 2P-32A PZR Spray (2HS-4651B) in MANUAL.
- RCS RCP 2P-32A PZR Spray (2HS-4651A) valve CLOSED.

8.2.2 IF RCP 2P-32B stopped,  
THEN verify the following:

- RCS RCP 2P-32B PZR Spray (2HS-4652B) in MANUAL.
- RCS RCP 2P-32B PZR Spray (2HS-4652A) valve CLOSED.

8.3 WHEN RCP reaches zero speed as indicated on PMS or CPCs,  
THEN place associated Lift Pump handswitch in STOP.

- 2P-32A Lift pump 2P-63A (2HS-6084)
- 2P-32B Lift pump 2P-63B (2HS-6094)
- 2P-32C Lift pump 2P-63C (2HS-6104)
- 2P-32D Lift pump 2P-63D (2HS-6114)

(S8)

**JOB PERFORMANCE MEASURE**Unit: 2 Rev #: 1 Date: \_\_\_\_\_SYSTEM/DUTY AREA: Emergency & Abnormal OperationsTASK: Disable B channel excore nuclear instrumentation.JTA# ANO2-RO-EOPAOP-OFFNORM-172ALTERNATE PATH YES: \_\_\_\_\_ NO: X TIME CRITICAL YES: \_\_\_\_\_ NO: XKA VALUE RO: 3.1 SRO: 3.5 KA REFERENCE: 015 A2.02APPROVED FOR ADMINISTRATION TO: AO: \_\_\_\_\_ WCO: \_\_\_\_\_ RO: X SRO: XTASK LOCATION: INSIDE CR: X OUTSIDE CR: \_\_\_\_\_ BOTH: \_\_\_\_\_

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: \_\_\_\_\_ SIMULATOR: perform LAB: \_\_\_\_\_

POSITION EVALUATED: RO: \_\_\_\_\_ SRO: \_\_\_\_\_

ACTUAL TESTING ENVIRONMENT: SIMULATOR: \_\_\_\_\_ PLANT SITE: \_\_\_\_\_ LAB: \_\_\_\_\_

Testing Method: Simulate: \_\_\_\_\_ Perform: \_\_\_\_\_

APPROXIMATE COMPLETION TIME IN MINUTES: 8 minutesREFERENCES(S): OP 2203.026 Nuclear Instrument Malfunction Rev. 7

EXAMINEE'S NAME: \_\_\_\_\_ LOGON ID: \_\_\_\_\_

EVALUATOR'S NAME: \_\_\_\_\_

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: \_\_\_\_\_ UNSATISFACTORY: \_\_\_\_\_

PERFORMANCE CHECKLIST COMMENTS:

START TIME: \_\_\_\_\_ STOP TIME: \_\_\_\_\_ TOTAL TIME: \_\_\_\_\_

(S8)

**JOB PERFORMANCE MEASURE****THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:**

Verify the examinee has reviewed and been briefed on NUREG 1021 APPENDIX E, Policies and Guidelines for Taking NRC Exams.

**INITIAL CONDITIONS:**

- The plant is in mode 3.
- CEAs are capable of withdrawal.
- Shutdown bank CEAs are withdrawn for cocked rod protection
- Channel "A" Nuclear Instrument had previously failed and associated RPS channels were placed in bypass.
- Channel "B" Nuclear Instrument has just failed.

**SIMULATOR SETUP:**

Mode 3, CEAs capable of withdrawal, and SD banks withdrawn for cocked rod protection.  
SDBCS in AL 1000# setpoint  
Insert malfunction: NIALINEPWR with a value = 0  
Bypass bistables 1 thru 4 on RPS channel A.  
Insert malfunction: NIBLINEPWR with a value = 200

**TASK STANDARD:**

Channel B RPS bistables 2 thru 4 are tripped.

**TASK PERFORMANCE AIDS:**

OP 2203.026 Nuclear Instrument Malfunction Rev. 7

**EXAMINER NOTES:**

Disable B channel excore nuclear instrumentation. With a NI channel failed and already bypassed, a second NI channel failure will require the examinee to take contingency actions to place the second NI channel in the trip condition placing the RPS trip logic in a one out of two channels to trip the reactor.

(S8)

**JOB PERFORMANCE MEASURE****INITIATING CUE:**

The CRS directs you to disable Nuclear Instrument B Log channel using Nuclear Instrument Malfunction OP-2203.026 step 6.

**START TIME:** \_\_\_\_\_

		CHECKLISTS	STANDARDS	(Circle One)
	1. (Step 6/6A)	Disable affected log channel as follows:  If Three or more channels failed Then enter Tech Spec 3.0.3.	Examinee determined only two Channels are failed and marks step 6.A as N/A.	N/A SAT UNSAT
	2. (Step 6.B)	Verify affected Log Power channel NOT in Trip Channel Bypass at 2C23.	On the PPS 'B' Channel. Examinee verified Log Power channel NOT in Trip Channel Bypass at 2C23	N/A SAT UNSAT
<b>PROCEDURE CAUTION</b> Removing "LOG CALIBRATE" switch from operate will initiate Power Trip Test Interlock (PTTI).				
(C)	3. (Step 6.C)	Place associated LOG CALIBRATE switch at 2C23 to position #1.	Examinee placed LOG CALIBRATE switch at 2C23 to position #1 for the 'B' Channel.	N/A SAT UNSAT
	4. (Step 6.D)	Check associated High Log Power Operating Bypass OFF light at 2C03 is ON.	Examinee checked High Log Power Operating Bypass OFF light at 2C03 is ON for the 'B' Channel.	N/A SAT UNSAT
(C)	5. (Step 6.E)	Place associated LOG CALIBRATE switch at 2C23 to position #6.	Examinee placed LOG CALIBRATE switch at 2C23 to position #6 for the 'B' Channel.	N/A SAT UNSAT
	6. (Step 6.F)	Verify High Log Power Operating Bypass maintained in OFF.	On Panel 2C03, examinee verified High Log Power Operating Bypass maintained in OFF on the 'B' Channel by verifying High Log Power Operating Bypass OFF light at 2C03 is ON for the 'B' Channel.	N/A SAT UNSAT

(S8)

**JOB PERFORMANCE MEASURE**

		CHECKLISTS	STANDARDS	(Circle One)
	7. (Step 6.G)	Check following PPS Bistable Relay Indicating lamps at 2C23 are ON: <ul style="list-style-type: none"> <li>• Log power {2}</li> <li>• LPD {3}</li> <li>• DNBR {4}</li> </ul> <b>Examiner Note: the Bistable Relay Indicating lamps are the small red lights located below the associated points.</b>	Examinee checked following PPS Bistable Relay Indicating lamps at 2C23 are ON for the 'B' Channel: <ul style="list-style-type: none"> <li>• Log power {2}</li> <li>• LPD {3}</li> <li>• DNBR {4}</li> </ul>	N/A SAT UNSAT
	8. (Step 6.H)	Install clearance on High Log Power Operating Bypass switch at 2C03 to maintain switch in OFF.  <b><u>Examiner Cue:</u></b> <b>Another operator will take care of this.</b>	Examinee asked SM/CRS to install clearance on High Log Power Operating Bypass switch at 2C03 to maintain switch in OFF.	N/A SAT UNSAT
END				

STOP TIME: \_\_\_\_\_



(S8)

**JOB PERFORMANCE MEASURE****EXAMINER'S COPY****INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- The plant is in mode 3.
- CEAs are capable of withdrawal.
- Shutdown bank CEAs are withdrawn for cocked rod protection
- Channel "A" Nuclear Instrument had previously failed and associated RPS channels were placed in bypass.
- Channel "B" Nuclear Instrument has just failed.

**INITIATING CUE:**

The CRS directs you to disable Nuclear Instrument B Log channel using Nuclear Instrument Malfunction OP-2203.026 step 6.

(S8)

**JOB PERFORMANCE MEASURE****EXAMINEE'S COPY****INITIAL CONDITIONS:**

You are responsible for any applicable annunciators during the performance of this task. All annunciators that are not applicable to this task will be performed by another operator.

- The plant is in mode 3.
- CEAs are capable of withdrawal.
- Shutdown bank CEAs are withdrawn for cocked rod protection
- Channel "A" Nuclear Instrument had previously failed and associated RPS channels were placed in bypass.
- Channel "B" Nuclear Instrument has just failed.

**INITIATING CUE:**

The CRS directs you to disable Nuclear Instrument B Log channel using Nuclear Instrument Malfunction OP-2203.026 step 6.

## INSTRUCTIONS

## CONTINGENCY ACTIONS

5. **GO TO Step 8.**
6. **Disable affected Log Power channel as follows:**
  - A. IF THREE or more channels failed,  
THEN refer to TS 3.0.3.
  - B. Verify affected Log Power channel NOT in Trip Channel Bypass at 2C23.

### CAUTION

**Removing "LOG CALIBRATE" switch from operate will initiate Power Trip Test Interlock (PTTI).**

- C. Place associated "LOG CALIBRATE" switch at 2C23 to position #1.
- D. Check associated High Log Power Operating Bypass OFF light at 2C03 is ON.
- E. Place associated "LOG CALIBRATE" switch at 2C23 to position #6.
- F. Verify High Log Power Operating Bypass maintained in OFF.
- G. Check following PPS Bistable Relay Indicating lamps at 2C23 are ON:
  - Log power {2}
  - LPD {3}
  - DNBR {4}
- H. Install clearance on High Log Power Operating Bypass switch at 2C03 to maintain switch in OFF.

PROC NO	TITLE	REVISION	PAGE
2203.026	NUCLEAR INSTRUMENT MALFUNCTION	007	6 of 7

## INSTRUCTIONS

7. **IF in Modes 3, 4 or 5  
AND CEAs capable of withdrawal,  
THEN check at least TWO Log Power  
channels operable.**
8. **Notify I&C of Nuclear Instrument  
malfunctions.**

## CONTINGENCY ACTIONS

7. **Perform the following:**
  - A. Within 1 hour verify Shutdown Margin requirements of TS 3.1.1.1 or 3.1.1.2 as applicable.
  - B. Verify Shutdown Margin at least once every 12 hours.

**END**

PROC NO	TITLE	REVISION	PAGE
2203.026	NUCLEAR INSTRUMENT MALFUNCTION	007	7 of 7

Facility: ANO-2	Scenario #2 (New)	Op-Test No.: 2017-1	
Examiners:	Operators:		
Initial Conditions: 100% MOL, RED Train Maintenance Week.			
Turnover: 100%. 260 EFPD. EOOS indicates 'Minimal Risk'. RED Train Maintenance Week.			
Evolution scheduled: Drain Containment Sump to 50% level. Steps 20.1.1 and 20.1.2 of OP-2104.014 have been completed.			
Event No.	Malf. No.	Event Type*	Event Description
1	XSI2LT56412	I (BOP) I (SRO) TS (SRO)	Containment sump level indicator fails during normal drain evolution. <b>OP-2104.014, LRW and BMS Operations</b>
2	XCV2LT4861	I (ATC) I (SRO)	Volume Control Tank level instrument fails low resulting in Refueling Water Tank being aligned to Coolant Charging Pump suction. <b>OP-2203.012L Annunciator 2K12 Corrective Action.</b>
3	XRC2PT46012	I (BOP) I (SRO) TS (SRO)	RCS narrow range pressure transmitter fails high. <b>OP-2203.012D Annunciator 2K04 Corrective Action.</b>
4		R (ATC) N (BOP) N (SRO)	System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min. <b>OP-2203.054 Abnormal Grid.</b> <b>OP-2203.053 Rapid Power Reduction.</b>
5	CVCPRESS	C (ATC) C (SRO)	Letdown flow and pressure oscillations. <b>OP-2203.012L Annunciator 2K12 Corrective Action.</b>
6	CV10101 MS1002	M (ALL)	'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G. <b>OP-2202.001, Standard Post Trip Actions (SPTAs) EOP</b> <b>OP-2202.005, Excess Steam Demand.</b>
7	CV1051	C (BOP) C (SRO)	Upstream ADV 2CV-1051 fails open. <b>OP-2105.008, Steam Dump and Bypass Control System operations.</b>
End Point	Post ESD Blowdown RCS temperature and RCS pressure have been stabilized within the PT limits		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Target Quantitative Attributes (Section D.5.d)	Actual Attributes
Malfunctions after EOP entry (1-2)	1
Abnormal Events (2-4)	4
Major Transients (1-2)	1
EOPs entered requiring substantive actions (1-2)	1
EOP contingencies requiring substantive actions (0-1)	0
Critical Tasks (2-3)	2

Critical Task	Justification	
Stabilize and control RCS temperature after the ESD blowdown terminates. RCS Tc must be limited to less than 80 degree F heatup.	Rates of temperature and pressure changes are limited so that the maximum specified heatup and cooldown rates do not exceed the design assumptions and satisfy the stress limits for cyclic operation.  Also, If RCS heatup is allowed after SG blowdown, the RCS could over pressurize and result in lifting PZR and SG safeties. These pressure stresses added to thermal stresses of rapid cooldown could present PTS concerns.	<ul style="list-style-type: none"> <li>• CE EPGB Simulator CTs: CT-07, Establish RCS temperature Control (SPTA-07, ESDE-05)</li> <li>• TS 3.4.9.1 RCS Pressure/Temperature Limits</li> </ul>
Maintain RCS pressure within the Pressure-Temperature limits of 200°F and 30°F Margin to Saturation throughout implementation of SPTAs and Excess Steam Demand EOP.	RCS pressure must be maintained in these limits to allow natural circulation of the RCS and prevent over pressurizing the RCS boundary.  If the failure of 2CV-1051 goes undetected 200°F will be exceeded.	<ul style="list-style-type: none"> <li>• CE EPGB Simulator CTs: CT-06, Establish RCS Pressure Control (SPTA-05, ESDE-07)</li> <li>• EOP 2202.005 Excess Steam Demand EOP.</li> </ul>

### Scenario #2 Objectives

- 1) Evaluate individual response to a failure of a Containment sump level transmitter.
- 2) Evaluate individual response to the VCT level transmitter failure.
- 3) Evaluate individual response to a failure of a RCS narrow range pressure transmitter.
- 4) Evaluate individual ability to perform a rapid power reduction in plant power.
- 5) Evaluate individual response to a failure of Letdown pressure controller.
- 6) Evaluate individual response to a failed closed Main Steam Isolation Valve.
- 7) Evaluate crew's ability to mitigate an Excess Steam Demand Outside containment.
- 8) Evaluate individual response to and Atmosphere Dump valve failure.

## SCENARIO #2 NARRATIVE

When the crew has completed their control room walk down and brief, The BOP will drain the Containment sump to the Auxiliary building sump using the normal drain method. When level lowers below ~60% the containment sump level indicator will fail high. The BOP should secure the containment sump drain. The SRO will determine that Tech Spec 3.4.6.1 is applicable and will enter Tech Spec 3.4.6.1 action b. [Site OE: CR-ANO-2-1993-1669, CR-ANO-2-2003-071, Failed Containment sump level indicator.]

After the SRO has entered the appropriate Tech Spec, secured containment sump drain or cued by lead examiner, one of the Volume Control Tank level transmitters, 2LT-4861, will fail low. The crew will respond to VCT low low level alarm, 2K12 G5. This will result in the VCT outlet valve to the charging pump suction closing and the Refueling Water tank (RWT) suction to the charging pumps opening. RCS temperature and pressure will lower due to boration until the ATC opens VCT outlet valve manually and closes the RWT valve manually.

After the Crew has realigned Charging pump suction to the VCT or at the lead examiner's cue, the 'B' narrow range Pressurizer pressure safety channel pressure instrument, 2PT-4601-2, will fail high. This will trip one of the four PPS trip channels for High Pressurizer pressure, Linear Power Density (LPD), and Departure from Nucleate Boiling (DNBR). RPS channel trip/pre-trip, and channel 'B' operator insert (2C03) trip and pre-trip lights will be lit for High Pressurizer pressure, and trip lights without pre-trip lights for LPD and DNBR. The SRO will refer to the ACA 2203.012D and tech specs 3.3.1.1 for guidance. The BOP will place Channel 'B' PPS in bypass for point 3, 4, & 5, for maintenance and trouble shooting. The crew will have one hour to place these points in bypass before exceeding the tech spec LCO. [Site OE: CR-ANO-2-2013-1721, Pressurizer pressure narrow range failed low.]

After the 'B' channel PPS points have been bypassed or at the lead examiner's cue, The Dispatcher will call the Control Room with a Transmission Loading Relief (TLR) to reduce plant output by ~150 MWe. The SOC will also report that all limits of EN-DC-199 are still met. If Contacted, Unit 1 will be unable to maneuver due to a planned refueling outage. The SRO will enter Abnormal Grid and Rapid Power Reduction and commence a power reduction to comply with the dispatcher's request. [Site OE: CR-ANO-C-2014-1142, CR-ANO-C-2014-03353, Dispatcher required power reductions]

After the ATC has completed the required reactivity manipulation and cued by lead the examiner, letdown pressure and flow will commence oscillating. The ATC should recognize this oscillation. The ATC will place letdown back pressure and letdown flow controllers in manual and stabilize flow and pressure. [Site OE: CR-ANO-2-2016-1648, Letdown oscillations.]

Once letdown flow/back pressure is being controlled manually and cued by the lead examiner, 2CV-1010-1 'A' Steam Generator Main Steam Isolation Valve will fail closed. The crew will verify the reactor is tripped. [Industry OE: SER 8-82, Inadvertent MSIV closure.]

The Crew will implement Standard Post Trip Actions (SPTA), OP 2202.001. Main Steam Safety Valve (MSSV) will lift and then the setpoint will drift due to the castle nut backing off. The Crew will manually actuate Main Steam Isolation Signal (MSIS) or verify that a Main Steam Isolation signal automatically actuates. The Crew will secure and/or verify that Emergency Feedwater (EFW) is not feeding 'A' Steam generator. The ATC will secure two Reactor coolant Pumps when RCS pressure goes below 1400 psia. The SRO will diagnose Excess Steam Demand (ESD) EOP 2202.005. The SRO will direct the BOP to maintain post blowdown temperature and the ATC to maintain post blowdown RCS pressure. The crew will restore Service Water to Component Cooling Water. [PRA item # 9 restore service water to CCW] [Industry OE for Excess Steam Demand, SOER 82-7, Reactor Vessel Pressurized Thermal Shock.]

When the BOP aligns for 'B' Steam Generator pressure control, 2CV-1051 Atmospheric Dump Valve (ADV) will fail open. The BOP should recognize it and use the ADV MOV isolation valve 2CV-1052 to control 'B' Steam Generator pressure. [Site OE: CR-ANO-2-1988-0215, CR-ANO-2-1989-157, ADV failure.]



### Simulator Instructions for Scenario 2

Reset simulator to MOL 100% power IC stead state.

Place MINIMAL RISK and RED Train Maintenance Week signs on 2C11.

Containment Sump level ~ 74%

T1 set to CTL100 < 3

T6 set to E13M1051

Event No.	Malf. No.	Value/ Ramp Time	Event Description
1	XSI2LT56412 Trigger = T1	100	Containment sump level indicator fails during normal drain evolution. <b>OP-2104.014, LRW and BMS Operations</b>
2	XCV2LT4861 Trigger = T2	0	Volume Control Tank level instrument fails low resulting in Refueling Water Tank being aligned to Coolant Charging Pump suction. <b>OP-2203.012L Annunciator 2K12 Corrective Action</b>
3	XRC2PT46012 Trigger = T3	2500	RCS narrow range pressure transmitter fails. <b>OP-2203.012D Annunciator 2K04 Corrective Action.</b>
4			System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min. <b>OP-2203.054 Abnormal Grid.</b> <b>OP-2203.053 Rapid Power Reduction.</b>
5	CVCPRESS Trigger = T4	.5	Letdown flow and pressure oscillations. <b>OP-2203.012L Annunciator 2K12 Corrective Action.</b>
6	CV10101 Trigger = T5 MS1002 Trigger = T5	0 0 / 10 min.	'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G. <b>OP-2202.001, Standard Post Trip Actions (SPTAs) EOP</b>
7	CV1051 Trigger = T6	1 / 10 Sec.	Upstream ADV 2CV-1051 fails open. <b>OP-2105.008, Steam Dump and Bypass Control System operations.</b>

Simulator Operator CUEs		
At T=0	Trigger T1	Containment sump level indicator fails high during normal drain evolution
<p><b>Cue: If contacted as a NLO to monitor Aux. building sump level or Waste Tank level, then respond as requested.</b></p> <p><b>Cue: When contacted as the WWM, then report that I&amp;C will troubleshoot Containment sump level indicator 2LI-5641-2.</b></p>		
Cued by lead examiner	Trigger T2	Volume Control Tank level instrument fails low resulting in Refueling Water Tank being aligned to Coolant Charging Pump suction.
<p><b>Cue: When contacted as the WWM, then report that I&amp;C will troubleshoot the level transmitter.</b></p> <p><b>Cue: If asked to investigate VCT level at 2C-80 then report VCT level instrument is 2LI-4857A and is reading the ~ VCT level in the simulator.</b></p>		
Cued by lead examiner	Trigger T3	RCS narrow range pressure transmitter fails.
<p><b>Cue: When contacted as the WWM, then report that I &amp; C planner will begin planning work on failed Pressurizer pressure instrument.</b></p>		
Cued by lead examiner		System Dispatcher call with a TLR to reduce power to ~ 850MWe within 30 min.
<p><b>Cue: Call as the Systems Operations Center (SOC) with a Transmission Loading Relief (TLR) to reduce plant output by 150 MWe within 30 min. The SOC will also report that all limits of EN-DC-199 are satisfied and the reliability of Offsite power is not impacted. Unit 2 is being directed to lower load because Unit 1 is within 2 weeks of a Refueling Outage.</b></p> <p><b>Cue: If requested as the WWM or off shift SRO to initiate Attachment B Transmission Loading Relief (TLR) Request, then respond as requested.</b></p> <p><b>Cue: If requested as off-shift operators to complete 2107.004 Supplement 4, then state you will comply with the request. If asked later in the scenario if the supplement was completed then report it was completed sat.</b></p> <p><b>Cue: If requested as WWM or Off shift operator, then perform Attachment B Notifications.</b></p> <p><b>Cue: If requested as an off-shift operator or NLO communicator to make notifications then respond as requested.</b></p>		

Cued by lead examiner	Trigger T4	Letdown flow and pressure oscillations.
<b>Cue: When contacted as a NLO to investigate the letdown flow control valve, then report 2CV-4816 is stable and not oscillating.</b> <b>Cue: When contacted as the WWM, then report that I&amp;C maintenance will investigate the failed controller.</b>		
Cued by lead examiner	Trigger T5	'A' Steam Generator MSIV 2CV-1010-1 fails closed.
Cued by lead examiner	Trigger T5	Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.
<b>Cue: If contacted as the STA to report to the control room, acknowledge the request.</b> <b>Cue: If contacted as a NLO to perform Attachment 47 Field Operator Post Trip Actions, acknowledge request.</b>		
2CV-1051 permissive.		Upstream ADV 2CV-1051 fails open.

Op-Test No.: 2017-1		Scenario #2	Event No.: 1
Event Description: Draining the Containment sump beginning with step 20.1.3 and Containment Sump level instrument fails high (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
		<b>Examiner Note: Per turnover steps 20.1.1 and 20.1.2 of 2104.014, LRW and BMS Operations, were previously completed.</b>	
<b><u>NOTE</u></b> Draining Containment Sump will cause rate of change hi alarm (2K01-H9).			
	BOP	20.1.3 Open the following valves to drain CNTMT sump: <ul style="list-style-type: none"> <li>• Containment Sump Isolation valve (2CV-2060-1)</li> <li>• Containment Sump Isolation valve (2CV-2061-2)</li> </ul>	
<b>Cue: If contacted as a NLO to monitor Aux. building sump level or Waste Tank level, then respond as requested.</b>			
	ANY	*20.1.4 Using level indication or corresponding computer points, monitor the following to prevent overflow: <ul style="list-style-type: none"> <li>• Aux Building sump (2LIS-2000 or 2LIS-2000B)</li> <li>• In service Waste tank:             <ul style="list-style-type: none"> <li>- 2T-20A (2LIS-2010)</li> <li>- 2T-20B (2LIS-2012)</li> </ul> </li> </ul>	
	BOP	*20.1.5 Cycle 2CV-2061-2 as necessary to prevent overflowing Aux Building sump.	
<b><u>NOTE</u></b> It is undesirable to drain Containment Sump below indication range.			
	BOP	20.1.6 <u>WHEN</u> draining is complete, <u>THEN</u> close the following valves: <ul style="list-style-type: none"> <li>• 2CV-2061-2</li> <li>• 2CV-2060-1</li> </ul>	

Op-Test No.: 2017-1		Scenario #2	Event No.: 1
Event Description: Draining the Containment sump beginning with step 20.1.3 and Containment Sump level instrument fails high (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
	ANY	Announce alarm: <ul style="list-style-type: none"> <li>2K10-B7, CNTMT SUMP LEVEL HI</li> </ul> <b>Examiner Note: At ~ 60%, Containment Sump level, 2LIS-5641-2 fails high.</b>	
	BOP	Report to the SRO that Containment Sump level indicator 2LIS-5641-2 has failed HIGH. <b>Examiner Note: Crew should secure Cntmt Sump draining.</b>	
<b>Enter 2203.012J, Annunciator 2K10 Corrective Action.</b>			
<p style="text-align: center;"><b><u>NOTE</u></b></p> CNTMT Sump level of 85% (2LIS-5641-2) is EL 335' 11.25" and the containment floor is EL 336' (M-2505 Sh 95)			
	BOP	1.0 CAUSES 1.1 CNTMT Sump level > 85% (2LIS-5641-2)	
	BOP	2.0 ACTION REQUIRED 2.1 Check CNTMT Sump level (2LIS-5641-2) and PMS/PDS trends to validate alarm. <ul style="list-style-type: none"> <li>IF alarm invalid, THEN no further action required.</li> </ul>	
	BOP	2.2 IF LOCA NOT in progress, THEN drain CNTMT Sump using LRW and BMS Operations (2104.014).	
	BOP	2.3 Perform RCS LKRT using Reactor Coolant System Leak Detection (2305.002).	

Op-Test No.: 2017-1		Scenario #2	Event No.: 1
Event Description: Draining the Containment sump beginning with step 20.1.3 and Containment Sump level instrument fails high (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
	BOP	<p>2.4 IF containment activity NOT rising on CAMS, THEN check the following:</p> <p>2.4.1 CNTMT Sump valves closed:</p> <ul style="list-style-type: none"> <li>• Suction Isolation 2CV-5649-1 (2HS-5649-1)</li> <li>• Suction Isolation 2CV-5650-2 (2HS-5650-2)</li> </ul> <p>2.4.2 CCW Expansion tank (2T-37B) level NOT lowering.</p> <p>2.4.3 SW Header Pressure (2PIS-1417-1 and 2PIS-1423-2) normal (55 to 118 psig).</p> <p>2.4.4 CNTMT BLDG CHILLED WATER PRESS LOW (2K13-A4) NOT in alarm.</p> <p>2.4.5 FIRE WATER FLOW (2K11-B9) NOT in alarm.</p> <p>2.4.6 No unexplained trends in Steam Flow, Feed Flow, or Steam Generator Levels.</p>	
	SRO	<p>2.5 IF sump level greater than 100%, THEN refer to Tech Spec 3.4.6.1.</p> <p><b>Examiner note: SRO must enter Tech Spec 3.4.6.1 action 'b' due to sump indication failure.</b></p>	
	ANY	Contact work management.	
<p><b>Cue: When contacted as the WWM, then report that I&amp;C will troubleshoot Containment sump level indicator 2LI-5641-2.</b></p>			
<p><b>Termination criteria: When Tech Spec 3.4.6.1 action b. is entered and Cntmt sump draining secured or at lead examiner's discretion.</b></p>			

Op-Test No.: 2017-1		Scenario #2		Event No.: 2	
Event Description: Volume Control Tank level instrument fails low resulting in Refueling Water Tank being aligned to Coolant Charging Pump suction.					
Time	Position	Applicant's Actions or Behavior			
Cued by Lead Examiner	ANY	Announce alarm: <ul style="list-style-type: none"> <li>2K12-G5, VCT 2T4 level LO LO</li> </ul>			
<b>Enter 2203.012L, Annunciator 2K12 Corrective Actions.</b>					
	ATC	1.0	CAUSES		
		1.1	VCT level (2LS-4861B) $\leq 9.6\%$		
	ATC	2.1	Check the following indications: <ul style="list-style-type: none"> <li>VCT level (2LIS-4857)</li> <li>Computer Point C&amp;VCS VOLUME CONT TK2T4 LVL (L4857) ~ <b>72%</b></li> <li>Computer Point C&amp;VCS VOLUME CONT TK2T4 LVL (L4861) - <b>0%</b></li> </ul>		
	ATC	2.2	IF VCT level lowers to 5%, THEN verify Charging Pump suction shifts to RWT: <ul style="list-style-type: none"> <li>CCPs Suction From RWT (2CV-4950-2) open</li> <li>VCT Outlet (2CV-4873-1) closed</li> </ul>		
<b>Examiner Note: This step is NA.</b>					

	ATC	<p>2.3 <u>IF</u> diverse indications reveal LO LO Level is false (e.g. instrument failure) <u>AND</u> Charging pump suction has shifted to RWT, <u>THEN</u> perform the following as necessary:</p> <p>2.3.1 Open VCT Outlet (2CV-4873-1) (2HS-4873-1).</p> <p>2.3.2 Close CCPs Suction From RWT (2CV-4950-2) (2HS-4950-2).</p> <p>2.3.3 Match Tave within 2°F of Tref per Power Operation (2102.004).</p> <p>2.3.4 Submit CR/WR as necessary.</p> <p><b>Examiner Note: It will take approximately 4 minutes to see a change in RCS temperature. The BOP should lower main turbine load to maintain Tave constant.</b></p>
<b>Cue: When contacted as the WWM, then report that I&amp;C will troubleshoot the level transmitter.</b>		
<b>Cue: If asked to investigate VCT level at 2C-80 then report VCT level instrument is 2LI-4857A and is reading the ~ VCT level in the simulator.</b>		
<b>Termination criteria: When Charging pump suction has been aligned to the VCT or at lead examiner's discretion.</b>		



Op-Test No.: 2017-1		Scenario #2	Event No.: 3
Event Description: RCS narrow range press. transmitter fails HI, (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
Cued by Lead Examiner	ANY	Announce annunciators: <ul style="list-style-type: none"> <li>• 2K04-A5 CH B RPS/ESF/PRETRIP/TRIP</li> <li>• 2K04-B3 PPS Channel TRIP</li> </ul>	
	ANY	Report Pressurizer pressure pretrip/trip on PPS insert.	
<b>Enter 2203.012D, Annunciator 2K04 Corrective Action.</b>			
	ATC	Compare all four channels and report 2PT-4601-2N failed HI.	
	SRO	<p><b><u>2K04-A5 CH B RPS/ESF/PRETRIP/TRIP applicable actions:</u></b></p> <p>2.1 Refer to PPS insert on 2C03 to determine cause.</p> <p>2.2 Compare all Channels to validate alarm.</p> <p>2.6 <u>IF</u> channel failed, <u>THEN</u> refer to Tech Specs 3.3.1.1, 3.3.2.1, 3.3.3.5, 3.3.3.6, and TRM 3.3.1.</p> <p><b><u>2K04-B3 PPS Channel TRIP applicable actions:</u></b></p> <p>2.1 Determine which RPS or ESFAS trips have occurred on PPS inserts.</p> <p>2.3 <u>IF</u> channel failed, <u>THEN</u> refer to Tech Specs 3.3.1.1 and 3.3.2.1 and TRM 3.3.1.</p>	
	SRO	Enter Tech Spec <b>3.3.1.1</b>  Direct BOP to bypass the associated functional units: <ul style="list-style-type: none"> <li>• Pressurizer Pressure - High</li> <li>• Local Power Density – High</li> <li>• DNBR – Low</li> </ul>	

Op-Test No.: 2017-1		Scenario #2	Event No.: 3
Event Description: RCS narrow range press. transmitter fails HI, (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
	BOP	<p>Bypass the points 3, 4 and 5 on Channel B:</p> <p>11.1 Refer to Tech Spec 3.3.1.1, 3.3.2.1, 3.3.3.5, 3.3.3.6 and TRM 3.3.1.</p> <p>11.2 Circle channel and functional units (points) to be bypassed below:  Channel to be bypassed: A <b>B</b> C D  Points to be bypassed:  1 2 <b>3</b> <b>4</b> <b>5</b> 6 7 8 9 10 11 12 13 16 17 18 19 20</p> <p>11.3 Enter appropriate Tech Spec/TRM actions.</p> <p>11.4 Verify points to be bypassed <u>NOT</u> bypassed in ANY other channel.</p> <p>11.5 Place desired points in BYPASS for selected channel on 2C23.</p> <p><b>Examiner Note: SRO must enter LCO 3.3.1.1 action 2.</b></p>	
	ANY	<p>Annunciator 2K04-F3 PPS TEST/SECURITY will alarm while opening PPS door</p> <p>Annunciator 2K04-C3 PPS CHANNEL BYPASSED remains in alarm</p> <p>Verify correct channels in bypass.</p>	
	SRO	Contact work management.	
<p><b>Cue: When contacted as the WWM, then report that I &amp; C planner will begin planning work on failed Pressurizer pressure instrument.</b></p>			
<p><b>Termination Criteria: Affected channel parameters placed in bypass or at lead examiner's discretion.</b></p>			

Op-Test No.: 2017-1	Scenario #2	Event No.: 4
Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.		
Time	Position	Applicant's Actions or Behavior
<b>Cued by Lead Examiner:</b> <b>Cue: Call as the Systems Operations Center (SOC) with a Transmission Loading Relief (TLR) to reduce plant output by 150 MWe within 30 min. The SOC will also report that all limits of EN-DC-199 are satisfied and the reliability of Offsite power is not impacted.</b> <b>Unit 2 is being directed to lower load because Unit 1 is within 2 weeks of a Refueling Outage.</b>		
<b>Enter AOP 2203.054, Abnormal Grid</b>		
	SRO	*1. <b><u>IF</u></b> unplanned loss of ANO transmission line has occurred, <b><u>OR</u></b> notified by dispatcher that a Transmission Loading Relief (TLR) has been issued for ANO, <b><u>THEN PERFORM</u></b> the following:
<b><u>CAUTION</u></b> When EITHER Mabelvale OR Pleasant Hill 500 KV transmission line out of service, a total net ANO generation limit is imposed to prevent overload of transmission equipment on Conway West to Morrilton line.		
<div style="text-align: center;"><b><u>NOTE</u></b></div> <ul style="list-style-type: none"> <li>The requested power level should be achieved within 30 minutes, if possible.</li> <li>Unit 1 will generally take these requests unless Unit 1 is within 60 days of Refueling Outage</li> <li>Total net ANO generation limit with an out of service 500 KV transmission line is a seasonal and expected to be between 100 and 1300 MW.</li> <li>Combined Units in-house loads are ~ 80MW.</li> </ul>		
	ALL	A. <b><u>IF</u></b> Unit 2 is selected to reduce power, <b><u>THEN COMMENCE</u></b> power reduction using EITHER of the following in conjunction with this procedure: <ul style="list-style-type: none"> <li>2203.053, Rapid Power Reduction</li> <li>2102.004, Power Operations</li> </ul>

Op-Test No.: 2017-1		Scenario #2	Event No.: 4
Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.			
Time	Position	Applicant's Actions or Behavior	
	SRO	B. <b>IF</b> TLR issued for ANO, <b>THEN INITATE</b> Attachment B, Transmission Loading Relief (TLR) Request.  <b>Examiner Note: The SRO applicant may request someone else to initiate Attachment B.</b>	
<b>Cue: If requested as the WWM or off shift SRO to initiate Attachment B Transmission Loading Relief (TLR) Request, then respond as requested.</b>			
	SRO	C. <b>PERFORM</b> Risk assessment using guidance in COPD 024, Risk Assessment Guidelines.	
	SRO	D. <b>EVALUATE</b> offsite power operability using 2107.001 Supplement 4, Electrical System Alignment and Power Availability Check.	
<b>Cue: If requested as off-shift operators to complete 2107.004 Supplement 4, then state you will comply with the request. If asked later in the scenario if the supplement was completed then report it was completed sat.</b>			
	SRO	E. <b>GO TO</b> Step 3.	
	SRO	3. <b>Check</b> London Line has NOT been lost.  <b>Examiner Note: London line is not lost.</b>	
	BOP	4. <b>Perform</b> Attachment C, Voltage Limits.	

Op-Test No.: 2017-1

Scenario #2

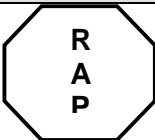
Event No.: 4

Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.

Time	Position	Applicant's Actions or Behavior				
<b>Attachment C, Voltage Limits</b>						
1.0 <b>Perform</b> every 30 minutes or as directed by SM/CRS.						
Component	Time: _____	Time: _____	Time: _____	Time: _____	Low Voltage	High Voltage
2B5 voltage (SPDS E2B5)					<ul style="list-style-type: none"> <li>&lt;445V</li> <li>&lt;436V (Divorce from grid)</li> </ul>	>515V in all Modes
2B6 voltage (SPDS E2B6)					<ul style="list-style-type: none"> <li>&lt;445V</li> <li>&lt;436V (Divorce from grid)</li> </ul>	>515V in all Modes
2A3 voltage (SPDS E2A3)						>4440V in all Modes
2A4 voltage (SPDS E2A4)						>4440V in all Modes
SU2 voltage (SPDS E161ST2, C10, 2C10 or Dispatcher)					EITHER of the following: <ul style="list-style-type: none"> <li>&lt; 161 KV (Voltage Regulator bypassed)</li> <li>&lt; 146 KV (Voltage Regulator in service)</li> </ul>	EITHER of the following: <ul style="list-style-type: none"> <li>&gt; 170 KV (Voltage Regulator bypassed)</li> <li>&gt; 175 KV (Voltage Regulator in service)</li> </ul>
SU3 voltage (SPDS E22AT or Dispatcher)					EITHER of the following: <ul style="list-style-type: none"> <li>&lt; 22.7 KV (Voltage Regulator bypassed)</li> <li>&lt; 20.9 KV (Voltage Regulator in service)</li> </ul>	EITHER of the following: <ul style="list-style-type: none"> <li>&gt; 23.2 KV (Voltage Regulator bypassed)</li> <li>&gt; 23.9 KV (Voltage Regulator in service)</li> </ul>
<ul style="list-style-type: none"> <li>If 2203.053, Rapid Power Reduction is entered continue below.</li> <li>If 2102.004, Power Operation starts on page 25.</li> </ul>						

Op-Test No.: 2017-1		Scenario #2	Event No.: 4
Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.			
Time	Position	Applicant's Actions or Behavior	
<b>Enters 2203.053 Rapid Power Reduction.</b>			
<b><u>NOTE</u></b>			
<ul style="list-style-type: none"> <li>This procedure was created in response to CR-ANO-C-2014-1142 CA 17 and designated as a CAPR by CR-ANO-C-2014-1142 CA 56.</li> <li>Use of this procedure may be terminated at any point if a complete shutdown is not required.</li> <li>Shutdown rate shall be based on plant conditions and safety considerations. Rate may be raised or lowered as plant conditions warrant.</li> </ul>			
	SRO	<p><b>*1.</b> <u>IF</u> at any time, it is determined that significant manual actions are required to <u>EITHER</u> maintain the plant online, <u>OR</u> maintain the desired maneuvering rate, <u>THEN</u> perform the following:</p> <p>A. Trip the Reactor.</p> <p>B. GO TO 2202.001, Standard Post Trip Actions.</p>	
<b><u>NOTE</u></b>			
If Emergency Boration in progress, changing the number of running Charging pumps will change Boration rate.			
	ALL	<p>2. Commence Power reduction using appropriate reactivity plan.</p> <p><b>*A.</b> Operate Charging and Letdown as necessary during power reduction.</p> <p><b>Examiner Note:</b></p> <ul style="list-style-type: none"> <li><b>Boration should be ~ 280 gallons at 13 gpm per the 2 hour Reactivity Plan or ~ 300 gallons at 16 gpm.</b></li> <li><b>Boration steps (2104.003, Exhibit 3) are found on page 20.</b></li> <li><b>CEDMCS steps (2105.009, Exhibit 3) are found on page 23.</b></li> </ul>	
<b><u>NOTE</u></b>			
The CBOT is the preferred RO to lower turbine load so that the ATC can focus on primary plant control. However, either individual can operate the turbine as plant conditions dictate.			

Op-Test No.: 2017-1		Scenario #2	Event No.: 4
Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.			
Time	Position	Applicant's Actions or Behavior	
	BOP	<p>* 3. Lower Turbine load as necessary to hold Tave within <math>\pm 3^{\circ}\text{F}</math> of program Tref.</p>	
<p style="text-align: center;"><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>CEAs should not be inserted below 80 inches withdrawn when the Reactor is at power and the CPC Aux trip is active. ASI would tend to shift back to the top of the core if CEAs are inserted more than halfway.</li> <li>At higher power levels, larger (more aggressive) CEA insertions may be required (6 to 8 inches recommended initially).</li> <li>ASI response to power changes at the end of core life is more severe, at times significantly so. The effects of ASI may not be seen until well into the power change.</li> <li>Proactively driving ASI more positive than ESI (up to +0.05 deviation) will improve the ability to control ASI at lower power levels.</li> <li>Exceeding COLR ASI limit will challenge CPC QASI Aux Trip setpoint and may result in automatic trip. CPC QASI Aux Trip occurs at <math>\pm 0.45</math> (PID 187).</li> </ul>			
	ATC	<p>* 4. Perform the following for ASI:</p> <ul style="list-style-type: none"> <li>Maintain ASI within Core Operating Limits Report (COLR) limits using CEA Group 6 or Group P.</li> <li>Use ONE of the following to monitor ASI closely: <ul style="list-style-type: none"> <li>COLSS (CV9198)</li> <li><u>IF</u> COLSS inoperable, <u>THEN</u> use CPC channel ASI (PID 268) that most closely agreed with COLSS when it was operable.</li> </ul> </li> <li>Periodically monitor QASI (PID 187).</li> <li>Insert Group 6 (preferred at higher power) OR Group P CEAS (preferred at lower power) using Exhibit 3 of 2105.009, CEDM Control System Operation, as necessary.</li> </ul>	
	BOP	<p>* 5 <u>IF</u> desired to transfer unit auxiliaries from Unit Aux transformer to SU #3, <u>THEN</u> perform Attachment A, Transferring Loads to SU #3.</p>	

Op-Test No.: 2017-1		Scenario #2	Event No.: 4
Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.			
Time	Position	Applicant's Actions or Behavior	
	BOP	*6 Throttle Condensate recircs as necessary to maintain 650-750 psig Condensate Pump Discharge pressure: <ul style="list-style-type: none"> <li>• 2CV-0662 (2FIC-0662)</li> <li>• 2CV-0663 (2FIC-0663)</li> </ul>	
	ANY	7. Perform notifications of power reduction using Attachment B, Notifications.	
<b>Cue: If requested as WWM or Off shift operator, then perform Attachment B Notifications.</b>			
	ANY	*8. Monitor Secondary chemistry and adjust chemical feed as needed using 2106.028, Secondary System Chemical Addition.	
<b>OP-2104.003, Chemical Addition Exhibit 3 (Normal Boration).</b>			
		<b>CAUTION</b> The following section has been determined to have a Reactivity Addition Potential (RAP) and this activity is classified as a Risk Level R3.	
	ATC	1.0 <u>IF</u> a Reactivity Management Brief has <u>NOT</u> been conducted, <u>THEN</u> perform a Reactivity Management Brief per COPD-030 with an SRO.  2.0 <u>IF</u> this is the first Boration of the shift, <u>THEN</u> verify BAM Flow totalizer (2FQI-4926) reset.  3.0 <u>IF</u> desired, <u>THEN</u> record initial controller data:  2FIC-4926 Setpoint: _____ Demand: _____	



Op-Test No.: 2017-1

Scenario #2

Event No.: 4

Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.

Time	Position	Applicant's Actions or Behavior
	ATC	<p>4.0 Verify Boric Acid Makeup Flow controller (2FIC-4926) set as follows:</p> <ul style="list-style-type: none"> <li>• Setpoint set to desired flow rate.</li> <li>• <u>IF</u> in MANUAL, <u>THEN</u> demand set to desired value.</li> </ul> <p>5.0 Verify desired BAM pump (2P-39A OR 2P-39B) selected for automatic operation using BAM pump Select switch (2HS-4911-2).</p> <p>6.0 Place Mode Select switch (2HS-4928) to BORATE.</p> <p>7.0 Verify Charging Pump Suction From Boric Acid (2CV-4930) opens (2HS-4930).</p> <p>8.0 Verify selected BAM pump running:</p> <ul style="list-style-type: none"> <li>• 2P-39A (2HS-4919-2)</li> <li>• 2P-39B (2HS-4910-2)</li> </ul>
	ATC	<p>*9.0 Verify BAM Tank Recirc open for running pumps:</p> <ul style="list-style-type: none"> <li>• 2T-6A recirc (2HS-4903-2)</li> <li>• 2T-6B recirc (2HS-4915-2)</li> </ul> <p>*10.0 <u>IF</u> additional boric acid flow required, <u>THEN</u> manually start additional BAM pump:</p> <ul style="list-style-type: none"> <li>• 2P-39A (2HS-4919-2)</li> <li>• 2P-39B (2HS-4910-2)</li> </ul>

Op-Test No.: 2017-1

Scenario #2

Event No.: 4

Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.


Time	Position	Applicant's Actions or Behavior
	ATC	<div style="border: 2px solid black; padding: 5px; text-align: center; margin-bottom: 10px;"><b>CRITICAL STEP</b></div> <p>11.0 Operate Boric Acid Makeup Flow Batch controller (2FQIS-4926) as follows:</p> <p style="margin-left: 40px;">11.1 Depress AND hold red pushbutton.</p> <p style="margin-left: 40px;">11.2 Verify Boric Acid Makeup Flow Batch controller (2FQIS-4926) set for desired quantity.</p> <p style="margin-left: 40px;">11.3 Release Red pushbutton.</p> <p>12.0 Verify Boric Acid Makeup Flow controller (2FIC-4926) indicates desired flow rate.</p>
	ATC	<p>*13.0 Perform the following to Start/Stop additional Charging pumps:</p> <p style="margin-left: 40px;">13.1 <u>IF</u> desired to raise flow, <u>THEN</u> perform the following:</p> <p style="margin-left: 80px;">A. Start additional charging pumps as necessary.</p> <p style="margin-left: 80px;">B. Adjust Boric Acid Makeup Flow controller (2FIC-4926) to desired flow rate.</p> <p style="margin-left: 40px;">13.2 <u>IF</u> desired to lower flow, <u>THEN</u> perform the following:</p> <p style="margin-left: 80px;">A. Adjust Boric Acid Makeup Flow controller (2FIC-4926) to desired flow rate.</p> <p style="margin-left: 80px;">B. Secure additional Charging Pumps as necessary.</p>


Op-Test No.: 2017-1

Scenario #2

Event No.: 4

Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.

Time	Position	Applicant's Actions or Behavior
	ATC	<p>*14.0 Monitor the following parameters:</p> <ul style="list-style-type: none"> <li>• RCS <math>T_{AVE}</math></li> <li>• Axial Shape Index</li> <li>• Reactor power</li> </ul> <p style="text-align: center;"><b>CRITICAL STEP</b></p> <p>16.0 <u>WHEN</u> Boric Acid Makeup Flow Batch controller (2FQIS-4926) at zero, <u>THEN</u> verify the following:</p> <ul style="list-style-type: none"> <li>• Boric Acid Makeup Flow Control (2CV-4926) closes.</li> <li>• No flow indicated on Boric Acid Makeup Flow controller (2FIC-4926).</li> </ul>
<b>Enter 2105.009, CEDM Control System Operation (CEDMCs Operations, Exhibit 3)</b>		
<p style="text-align: center;"><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>• "CEA SELECTED" indicates selected CEA position.</li> <li>• "GROUP SELECTED" indicates average position of selected group.</li> <li>• Rod motion is inhibited by PMS CEA sequencing program if a deviation of six inches occurs in any regulating group.</li> <li>• CEAC CH1 and CH2 annunciators on 2K04 and CEDMCS annunciators on 2K10 should be checked for applicability prior to moving CEAs.</li> </ul>		
<div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 20px;">  </div> <div> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>The following section has a Reactivity Addition Potential (RAP) and is classified as Risk Level R2. For an Unplanned Reactivity Manipulation, the required controls for planned reactivity evolutions are not applicable during AOP (including ACA response) or EOP conditions IAW COPD-030, Reactivity Management Program.</p> </div> </div>		


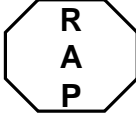
Op-Test No.: 2017-1		Scenario #2	Event No.: 4
Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.			
Time	Position	Applicant's Actions or Behavior	
	SRO	1.0	<b>IF</b> time allows <b>AND</b> Reactivity Management Brief has <b>NOT</b> been conducted, <b>THEN PERFORM</b> a Reactivity Management Brief per COPD-030 with an SRO.
	ATC	2.0	<b>IF</b> moving CEAs in group, <b>THEN</b> :
		2.1	<b>ENSURE</b> Group Select switch to desired group position.
		2.2	<b>IF</b> moving Group P CEAs, <b>THEN PLACE</b> P Group Select switch to P.
		2.3	<b>ENSURE</b> Individual CEA Selection switches aligned to CEA in group selected to move.
		2.4	<b>PLACE</b> Mode Select switch to MANUAL GROUP (MG) or MANUAL SEQUENTIAL (MS).
		* 2.5	<b>OBSERVE</b> CEAC and Pulse Counter CEA position indications to ensure CEA motion and alignment as CEAs are moved.
	ATC	 2.6	<b>POSITION</b> groups as desired using Manual Control lever.
		2.7	<b>PLACE Mode</b> Select switch to OFF.
		2.8	<b>ENSURE Pulse</b> Counter and CEAC indications match.

Op-Test No.: 2017-1

Scenario #2

Event No.: 4

Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.

Time	Position	Applicant's Actions or Behavior
	ATC	<p>3.0 <b><u>IF</u></b> moving CEA individually, <b><u>THEN</u></b>:</p> <p>3.1 <b>ENSURE</b> Group Select switch selected to group containing individual CEA.</p> <p>3.2 <b>PLACE</b> Individual CEA Selection switches to desired CEA.</p> <p>3.3 <b>PLACE</b> Mode Select switch to MANUAL INDIVIDUAL (MI).</p> <p>* 3.4 <b>OBSERVE</b> CEAC and Pulse Counter CEA position indications to ensure CEA motion and alignment as CEAs are moved.</p> <p> 3.5 <b>POSITION</b> CEA as desired using Manual Control lever.</p> <p>3.6 <b><u>WHEN</u></b> individual CEA movement complete, <b><u>THEN PLACE</u></b> Mode Select switch to OFF.</p> <p>3.7 <b>ENSURE</b> Pulse Counter and CEAC indications match.</p>
Enter 2102.004, Section 12 (Emergent Power Reduction) of Power Operation.		
<div style="display: flex; align-items: center;">  <div> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>The following section has been determined to have a Reactivity Addition Potential (RAP) and this activity is classified as a Risk Level R1.</p> <p>For an Unplanned Reactivity Manipulation, the required controls for planned reactivity evolutions are not applicable during AOP (including ACA response) or EOP conditions IAW COPD-030.</p> </div> </div>		
	SRO	<p>12.1 <b><u>IF</u></b> time allows <b><u>AND</u></b> Reactivity Management Brief has <b><u>NOT</u></b> been conducted, <b><u>THEN</u></b> perform a Reactivity Management Brief per COPD-030 with an SRO.</p>

Op-Test No.: 2017-1		Scenario #2	Event No.: 4
Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.			
Time	Position	Applicant's Actions or Behavior	
<p style="text-align: center;"><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>Plant parameters may be monitored using Exhibit 2, Various Parameters Vs Reactor Power.</li> <li>Boron adjustment data for power change may be obtained from Reactivity curves located in Plant Data book.</li> </ul>			
	SRO	<p>12.2 IF plant must be off-line within one hour, <u>THEN</u> refer to Attachment H, Rapid Power Reduction.</p> <p><b>Examiner Note: This step should be NA.</b></p>	
<p style="text-align: center;"><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>Initially, only enough boric acid should be added to reduce power by a few percent (less than 5%). As power lowers, Xenon will start to peak causing power to drop faster. Dilution may be required to slow power reduction rate.</li> <li>If one BAM Tank is out of service for Acid Reducing Chemistry, depletion of on-line BAMT during power reduction may result in TRM 3.1.8 entry.</li> </ul>			
	ATC	<div style="border: 1px solid black; padding: 2px; text-align: center; width: fit-content; margin: 0 auto;"><b>CRITICAL STEP</b></div> <p>12.3 Commence Power reduction by performing the following as necessary:</p> <ul style="list-style-type: none"> <li>Boration using Normal Borate Mode to Charging pump suction (unless directed otherwise by Abnormal Operating Procedure). Refer to Chemical Addition (2104.003), Exhibit 3, Normal RCS Boration at Power.</li> <li>Boration from RWT or BAMT using Chemical Addition (2104.003), Attachment R, RCS Boration From The RWT or BAMT.</li> <li>CEA insertion using CEDMCS Control System Operation (2105.009), Exhibit 3 CEDMCS Operations (normally for ASI control).</li> </ul> <p><b>Examiner Note:</b></p> <ul style="list-style-type: none"> <li>Boration should be ~ 280 gallons at 13 gpm per the 2 hour Reactivity Plan or ~ 300 gallons at 16 gpm.</li> <li>Boration steps (2104.003, Exhibit 3) are found on page 20.</li> <li>CEDMCS steps (2105.009, Exhibit 3) are found on page 23.</li> </ul>	

Op-Test No.: 2017-1		Scenario #2	Event No.: 4
Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.			
Time	Position	Applicant's Actions or Behavior	
	BOP/ATC	<p>*12.4 Lower Turbine load as necessary to hold Tave within <math>\pm 2^{\circ}\text{F}</math> of program Tref using Exhibit 1, <math>T_{\text{AVE}}</math> VS <math>T_{\text{REF}}</math>.</p> <p>*12.4.1 <u>IF</u> desired to stop Turbine load OR Power reduction, <u>THEN</u> perform the following as necessary:</p> <p>A. Secure RCS Boration using Chemical Addition (2104.003).</p> <p>B. Commence RCS dilution using Chemical Addition (2104.003).</p>	
Examiner Note: Steps 12.5 and 12.6 are Not applicable.			
	ATC	<p>12.7 Perform the following for ASI:</p> <ul style="list-style-type: none"> <li>• Maintain ASI (CV9198 with COLSS in service, PID 268 with COLSS out of service) within Core Operating Limits Report (COLR) limits using CEA Group 6 or Group P.</li> <li>• Periodically monitor QASI (PID 187, trip setpoint <math>\pm 0.45</math>).</li> <li>• Maintain CEAs above 80 inches withdrawn when CPC Aux trip is active.</li> </ul>	
Examiner Note: Step 12.9 is Not applicable.			
	BOP	<p>12.10 Throttle Condensate recircs as necessary to maintain 650-750 psig Condensate Pump Discharge pressure:</p> <ul style="list-style-type: none"> <li>• 2CV-0662 (2FIC-0662)</li> <li>• 2CV-0663 (2FIC-0663)</li> </ul>	

Op-Test No.: 2017-1		Scenario #2	Event No.: 4
Event Description: System Dispatcher call with a request to reduce power ~ 150 MWe within 30 min.			
Time	Position	Applicant's Actions or Behavior	
		<p>12.11 Notify the following of power reduction:</p> <ul style="list-style-type: none"><li>• Chemistry</li><li>• Reactor Engineering</li><li>• Radiation Protection</li><li>• Little Rock Dispatcher (TOC)</li><li>• Woodlands Dispatcher (SPO/EMO)</li></ul>	
<b>Cue: If requested as an off-shift operator or NLO communicator to make notifications then respond as requested.</b>			
<b>Termination Criteria: When the required reactivity manipulations is complete or at Lead Examiner's discretion.</b>			



Op-Test No.: 2017-1		Scenario #2	Event No.: 5
Event Description: Letdown flow and pressure oscillations			
Time	Position	Applicant's Actions or Behaviors	
Cued by Lead Examiner	ANY	Announce alarms: <ul style="list-style-type: none"> <li>• 2K12-E1, LETDOWN DISCH PRESS HI/LO</li> <li>• 2K12-J1, RADMONITOR FLOW LO</li> </ul> Examiner Note: May not receive alarms prior to noticing oscillations.	
<b>Enter 2203.012L, Annunciator 2K12 Corrective Action.</b>			
	ATC	2.2 Check the following indications: <ul style="list-style-type: none"> <li>• Letdown HX BackPress CNTRL (2PIC-4812)</li> <li>• Computer Point C&amp;VCS INTERM LD PRESS CONT (P4812)</li> </ul> <b>Reports flow and pressure oscillations</b>	
	ATC	2.3 Verify all Letdown Isolation valves open: <ul style="list-style-type: none"> <li>• 2CV-4820-2</li> <li>• 2CV-4821-1</li> <li>• 2CV-4823-2</li> </ul>	
	ATC	2.5 <u>IF</u> Letdown HX Outlet Valve controller (2PIC-4812) NOT controlling in AUTOMATIC, <u>THEN</u> perform the following IAW Chemical and Volume Control (2104.002):	
	ATC	2.5.1 Place the following in MANUAL: <ul style="list-style-type: none"> <li>• Letdown HX Outlet Valve controller (2PIC-4812)</li> <li>• Letdown Flow controller (2HIC-4817)</li> </ul>	
<b>Cue: When contacted as a NLO to investigate the letdown flow control valve, then report 2CV-4816 is stable and not oscillating.</b>			
	ATC	2.5.2 Stabilize pressure (P4812) at 350 psig.	
<b>Cue: When contacted as the WWM, then report that I&amp;C maintenance will investigate the failed controller.</b>			
<b>Termination criteria: When the crew has taken manual control and stabilized Letdown pressure or at lead examiner's discretion.</b>			

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
<p>Event Description:</p> <ul style="list-style-type: none"> <li>'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
Cued by Lead Examiner	ANY	Report Reactor Tripped	
<b>Enter EOP 2202.001, Standard Post Trip Actions.</b>			
	SRO	<ol style="list-style-type: none"> <li>1. Notify Control Board Operators to perform the following:               <ol style="list-style-type: none"> <li>Monitor safety functions using Exhibit 7, CBO Reactor Trip Checklist.</li> <li>Perform post trip contingencies as required.</li> </ol> </li> <li>2. Open Safety Function Tracking page.</li> </ol>	
<b>Examiner Note: Crew may actuate MSIS due to the MSSV failing open.</b>			
Reactivity Control Safety Function	ATC	<ol style="list-style-type: none"> <li>3. Check Reactivity Control established as follows:               <ol style="list-style-type: none"> <li>Reactor power lowering.</li> <li>Check startup rate is negative.</li> <li>ALL CEAs fully inserted by observing ANY of the following:                   <ol style="list-style-type: none"> <li>1) CEA Rod bottom lights illuminated.</li> <li>2) CEAC 1 indicates ALL CEAs fully inserted.</li> <li>3) CEAC 2 indicates ALL CEAs fully inserted.</li> </ol> </li> </ol> </li> </ol>	

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
Vital Auxiliaries Safety Function	BOP	4. Check Maintenance of Vital Auxiliaries satisfied: <ul style="list-style-type: none"> <li>A. Check Main Turbine tripped by BOTH of the following:             <ul style="list-style-type: none"> <li>• ALL Main Stop Valves closed.</li> <li>• Generator megawatts indicate zero.</li> </ul> </li> <li>B. Generator Output breakers open.</li> <li>C. Exciter Field Breaker open.</li> <li>D. Perform EITHER of the following as required:             <ul style="list-style-type: none"> <li>1) Check the following valves closed:                 <ul style="list-style-type: none"> <li>• MSR 2E-12A Steam Supply From SG A (2CV-0400)</li> <li>• MSR 2E-12B Steam Supply From SG B (2CV-0460)</li> </ul> </li> <li>2) No flow indicated on the following MSR second stage flow instruments:                 <ul style="list-style-type: none"> <li>• 2FI-0402</li> <li>• 2FI-0462</li> </ul> </li> </ul> </li> <li>E. At least ONE 6900v AC bus energized.</li> <li>F. At least ONE 4160v Non-vital AC bus energized.</li> <li>G. BOTH 4160v Vital AC buses energized</li> <li>H. BOTH DGs secured. <b>(DGs running unloaded, contingency satisfied)</b></li> <li>I. At least ONE 125v Vital DC bus energized:             <ul style="list-style-type: none"> <li>• 2D01 - SPDS point E2D01</li> <li>• 2D02 - SPDS point E2D02</li> </ul> </li> </ul>	

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
RCS Inventory Control Safety Function	ATC	5. Check RCS Inventory Control established as follows: <ul style="list-style-type: none"> <li>A. PZR level:             <ul style="list-style-type: none"> <li>• 10 to 80%.</li> <li>• Trending to setpoint. <b>(Not Met due to the ESD, contingency actions may have to be performed.)</b></li> </ul> </li> <li>B. RCS MTS 30°F or greater.</li> </ul> <b>A. Perform as necessary:</b> <ol style="list-style-type: none"> <li>1) <b><u>IF</u> SIAS actuated on PPS inserts, <u>THEN</u> GO TO Step 6.</b></li> <li>2) <b>Verify PZR Level Control system restoring level to setpoint.</b></li> </ol>	
RCS Pressure Control Safety Function	ATC	6. Check RCS Pressure Control: <ul style="list-style-type: none"> <li>• 1800 to 2250 psia. <b>(Not Met due to the ESD, contingency actions may have to be performed.)</b></li> <li>• Trending to setpoint. <b>(Not Met due to the ESD, contingency actions may have to be performed.)</b></li> <li>• Normal PZR Spray and heaters controlling pressure.</li> <li>• Valid CNTMT Spray NOT in progress.</li> </ul>	

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
RCS Pressure Control Safety Function	ATC	<p><b>Examiners Note: Contingency actions may have to be performed depending on the PZR pressure trend at the time this safety function is assessed.</b></p> <p><b>6. Perform as necessary:</b></p> <p><b>A. IF RCS pressure lowers to less than 1400 psia, <u>THEN</u> trip ONE RCP in EACH loop.</b></p> <p><b>B. IF NPSH requirements violated <u>OR</u> RCS MTS less than 30°F, <u>THEN</u> verify ALL RCPs tripped.</b></p> <p><b>D. IF RCP 2P32A or 2P32B stopped, <u>THEN</u> verify associated PZR Spray valve in MANUAL and closed.</b></p> <ul style="list-style-type: none"> <li>• RCP A Spray Valve (2CV-4651)</li> <li>• RCP B Spray Valve (2CV-4652)</li> </ul> <p><b>F. IF RCS pressure lowers to 1650 psia or less, <u>THEN</u> perform the following:</b></p> <ol style="list-style-type: none"> <li>1) Verify SIAS actuated on PPS inserts.</li> <li>2) GO TO Step 7.</li> </ol>	

Op-Test No.: 2017-1	Scenario #2	Event No.: 6 & 7
<p>Event Description:</p> <ul style="list-style-type: none"> <li>'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>Upstream ADV 2CV-1051 fails open</li> </ul>		
Time	Position	Applicant's Actions or Behavior
Core Heat Removal Safety Function.	ATC	<p>7. Check Core Heat Removal by forced circulation:</p> <ul style="list-style-type: none"> <li>A. At least ONE RCP running.</li> <li>B. CCW flow aligned to RCPs.</li> <li>C. Loop delta T less than 10°F.</li> <li>D. RCS MTS 30°F or greater.</li> <li>E. Check SW aligned to CCW.</li> <li>F. <u>IF</u> SIAS or MSIS actuated, <u>THEN</u> maintain SW header pressure greater than 85 psig.</li> </ul> <p><b>Direct the contingency for step 7. E</b></p> <p><b>E. IF CCW available, THEN restore SW to CCW, refer to 2202.010 Exhibit 5, CCW/ACW/SW Alignment.</b></p>
<b>Perform 2202.010, Exhibit 5 (CCW/ACW/SW Alignment)</b>		
	BOP	<p>1. <u>IF</u> SW suction <u>NOT</u> aligned to lake, <u>THEN</u> RETURN TO procedure in effect.</p>
	BOP	<p>2. <u>IF</u> SW <u>NOT</u> aligned to CCW <u>AND</u> CCW available, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>A. <u>IF</u> RCP seal temperatures less than 180°F, <u>THEN</u> restore SW to CCW by performing the following:             <ul style="list-style-type: none"> <li>1). Override and open at least ONE SW to CCW/ACW Return valve:                 <ul style="list-style-type: none"> <li>2CV-1543-1</li> <li>2CV-1542-2</li> </ul> </li> </ul> </li> </ul>
<p><b><u>CAUTION</u></b></p> <p>Supplying ACW flow and CCW cooling from a single pump may result in a low SW header pressure</p>		

Op-Test No.: 2017-1			Scenario #2			Event No.: 6 & 7		
Event Description:								
<ul style="list-style-type: none"><li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li><li>• Upstream ADV 2CV-1051 fails open</li></ul>								
Time		Position		Applicant's Actions or Behavior				
		BOP		2). Override and throttle open at least ONE SW to CCW /Main Chillers Supply valve: <ul style="list-style-type: none"><li>• 2CV-1530-1</li><li>• 2CV-1531-2</li></ul> 3). Maintain SW header pressure greater than 85 psig.				
<b>Continue EOP 2202.001, Standard Post Trip Actions.</b>								

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
RCS Heat Removal Safety Function	BOP	8. Check RCS Heat Removal:  A. Check SG available by BOTH of the following: <ul style="list-style-type: none"> <li>• At least ONE SG level 10 to 90%.</li> <li>• FW maintaining SG level. <b>(Not met due to MSIS, perform contingency as necessary)</b></li> </ul> B. Check MFW in RTO. <b>(Not met due to MSIS, perform contingency as necessary)</b>  C. Check Feedwater line intact by the following: <ul style="list-style-type: none"> <li>• SG level stable or rising.</li> <li>• NO unexplained step changes or erratic FW flow.</li> <li>• NO unexplained step changes or erratic Condensate flow.</li> </ul> D. Check RCS T <sub>C</sub> 540°F to 555°F <b>(NOT met)</b>  E. Check SG pressure 950 to 1050 psia. <b>(NOT met)</b>  F. <u>IF</u> MSIVs open, <u>AND</u> desired, <u>THEN</u> place SDBCS Master Controller in Auto/Local with setpoint of 960 psia using 2105.008 Exhibit 3, SDBCS Emergency Operation.  <b>Examiner Note: BOP may isolate EFW to 'A' SG or it will happen automatically depending on DP between the SGs.</b>	
	BOP	<b>Perform step 8 contingency actions that are applicable:</b>  A. Perform the following: <ol style="list-style-type: none"> <li>1) <u>IF</u> SG level lowering, <u>THEN</u> verify EFAS actuated. (To the 'B' S/G only)</li> </ol>	



Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
	BOP	<b>B. Verify EITHER of the following:</b> <ul style="list-style-type: none"> <li>• BOTH MFW pumps tripped.</li> <li>• SG levels controlling at setpoint</li> </ul>	
RCS Heat Removal Safety Function	BOP	<b>D. Perform as necessary:</b> <ol style="list-style-type: none"> <li>2) <u>IF</u> <math>T_C</math> less than 540°F, <u>THEN</u> perform the following:               <ol style="list-style-type: none"> <li>a) Verify Feedwater flow rate (MFW OR EFW) <u>NOT</u> causing <math>T_C</math> to lower.</li> <li>b) Verify SDBCS restoring <math>T_C</math> 540°F to 555°F using 2105.008 Exhibit 3, SDBCS Emergency Operation.</li> </ol> </li> </ol>	

Op-Test No.: 2017-1	Scenario #2	Event No.: 6 & 7
<p>Event Description:</p> <ul style="list-style-type: none"> <li>'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>Upstream ADV 2CV-1051 fails open</li> </ul>		
Time	Position	Applicant's Actions or Behavior
RCS Heat Removal Safety Function	BOP	<p>E. Perform as necessary:</p> <ol style="list-style-type: none"> <li>1) <u>IF</u> SG pressure 751 psia or less, <u>THEN</u> perform the following:               <ol style="list-style-type: none"> <li>a) Verify MSIS actuated on PPS inserts.</li> <li>b) Verify feed secured to the affected SG.</li> </ol> </li> </ol> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%; text-align: center;"> <p><u>NOTE</u></p> <p>If possible, maintain SG to RCS <math>\Delta p</math> less than 1600 psid.</p> </div> <ol style="list-style-type: none"> <li>c) Maintain RCS post-cooldown conditions as follows:               <ul style="list-style-type: none"> <li>Maintain RCS pressure within P-T limits with PZR heaters and spray using Attachment 48, RCS Pressure Control.</li> <li>Maintain RCS temperature by steaming intact SG using Upstream ADV or Upstream ADV Isolation MOV using 2105.008 Exhibit 3, SDBCS Emergency Operation.</li> </ul> </li> <li>d) <b>GO TO</b> Step 9.</li> </ol>
<p><b>Critical Task:</b></p> <p><b>Stabilize and control RCS temperature after the ESD blowdown terminates. RCS Tc must be limited to less than 80 degree F heatup.</b></p>		
<p><b>Critical Task:</b></p> <p><b>Maintain RCS pressure within the Pressure-Temperature limits of 200°F and 30°F Margin to Saturation throughout implementation of SPTAs and Excess Steam Demand EOP.</b></p>		

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
<b>Perform Attachment 48, RCS Pressure Control</b>			
<b><u>NOTE</u></b>			
Once method of pressure control is established, this attachment is not required in hand or continuous use.  A change to the method of pressure control will require in hand or continuous use until the new pressure method is established.			
	ATC	1. Maintain RCS pressure with heaters and spray using one or more of the following: A. <u>IF</u> desired to use PZR Pressure controller (2PIC-4626A/B), <u>THEN</u> perform the following: * 1) Verify RCS MTS greater than 30 degrees. 2) Adjust PZR Pressure controller (2PIC-4626A/B) setpoint to desired pressure.	
	ATC	B. <u>IF</u> desired to use PZR Heaters, <u>THEN</u> perform the following: 1) Cycle available PZR Backup heaters as necessary. 2) Cycle available PZR Proportional heaters as necessary.	
		C. <u>IF</u> desired to use NORMAL Spray, <u>THEN</u> perform the following: * 1) Verify RCS MTS greater than 30 degrees. 2) <u>IF</u> PZR Spray Valve (2CV-4651) to be used, <u>THEN</u> perform the following: a) Verify RCP 2P32A running. b) Place 2HS-4651B in MANUAL. c) Cycle PZR Spray Valve (2CV-4651) using 2HS-4651A.	

Op-Test No.: 2017-1	Scenario #2	Event No.: 6 & 7
<p>Event Description:</p> <ul style="list-style-type: none"> <li>'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>Upstream ADV 2CV-1051 fails open</li> </ul>		
Time	Position	Applicant's Actions or Behavior
Attach. 48	ATC	<p>3) <u>IF</u> PZR Spray Valve (2CV-4652) to be used, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>a) Verify RCP 2P32B running.</li> <li>b) Place 2HS-4652B in MANUAL.</li> <li>c) Cycle PZR Spray Valve (2CV-4652) using 2HS-4652A.</li> </ul> <p>4) <u>IF</u> RCS margin to saturation greater than 160°F, <u>THEN</u> complete Table 1 of this attachment.</p>
Attach. 48	ATC	<p>D. <u>IF</u> desired to use AUXILIARY Spray, <u>THEN</u> perform the following:</p> <p>* 1) Verify RCS MTS greater than 30 degrees.</p> <p>2) Verify at least ONE Charging pump running.</p> <p>3) Close Regen HX to RCP B/C valves:</p> <ul style="list-style-type: none"> <li>2CV-4827-2</li> <li>2CV-4831-2</li> </ul>
<p><b><u>NOTE</u></b></p> <p>PZR Spray Block valves 2CV-4653 and 2CV-4655 are de-energized due to degraded power supply cables.</p>		
	ATC	<p>4) Verify PZR Spray (2CV-4651/2CV-4652) or PZR Spray Isolation valves (2HS-4655/2HS-4653) closed.</p>
<p><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>Securing Charging pumps will secure/change Aux Spray flow.</li> <li>Securing all Charging pumps will terminate emergency boration if in progress.</li> </ul>		
Attach. 48	ATC	<p>5) Perform EITHER of the following to control RCS pressure:</p> <ul style="list-style-type: none"> <li>Throttle Aux Spray valve (2CV-4824-2) as necessary.</li> <li>Start and stop Charging pumps as necessary</li> </ul>

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
<b>Perform 2105.008, Exhibit 3, SDBCS Emergency Operation</b>			
Exhibit 3	BOP	1.0 IF BOTH MSIV's closed, THEN GO TO step 5.0.	
	BOP	5.0 Perform the following to determine availability of UPSTREAM SDBCS valves:  5.1 IF the following conditions satisfied: <ul style="list-style-type: none"> <li>• Instrument air available</li> <li>• EMERGENCY OFF (2K02-A14) annunciator clear</li> <li>• Power available to selected controllers/valves,</li> </ul> <u>THEN</u> Upstream ADVs are available.	
	BOP	5.2 IF the following conditions satisfied: <ul style="list-style-type: none"> <li>• EMERGENCY OFF (2K02-A14) clear or Upstream ADV locally failed open</li> <li>• Power available,</li> </ul> <u>THEN</u> ADV Upstream Isolation valve(s) are available.	
	BOP	6.0 <u>IF</u> operation of Upstream Atmospheric Dump valve from the Control Room desired, <u>THEN</u> perform the following:  6.1 Verify selected HIC in MANUAL with ZERO output demand: <ul style="list-style-type: none"> <li>• Hdr #1 UPSTM ADV 2CV-1001 (2HIC-1001)</li> <li>• Hdr #2 UPSTM ADV 2CV-1051 (2HIC-1051)</li> </ul>	

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
Exhibit 3	BOP	6.2 Place selected valve(s) permissive handswitch in MANUAL: <ul style="list-style-type: none"> <li>• 2CV-1001 Permissive (2HS-1001)</li> <li>• 2CV-1051 Permissive (2HS-1051)</li> </ul> <b>Examiner Note: When upstream ADV 2CV-1051 permissive is taken to manual the ADV will fail open.</b>	
	BOP	6.3 IF MSIS actuated, THEN override "MSIS CLOSE" actuation for selected MOV isolation: <ul style="list-style-type: none"> <li>• ADV Upstream Isolation valve (2CV-1002)</li> <li>• ADV Upstream Isolation valve (2CV-1052)</li> </ul>	
Exhibit 3	BOP	*6.4 Throttle open selected MOV as desired: <ul style="list-style-type: none"> <li>• ADV Upstream Isolation valve (2CV-1002)</li> <li>• ADV Upstream Isolation valve (2CV-1052)</li> </ul> <b>Examiner Note: Upstream AOV has failed; Examine should transition to section 7.</b>	
	BOP	7.0 IF using ADV Upstream Isolation valve to control S/G pressure, THEN perform the following: 7.1 Verify selected HIC in MANUAL with output of 100%: <ul style="list-style-type: none"> <li>• Hdr #1 UPSTM ADV 2CV-1001 (2HIC-1001)</li> <li>• Hdr #2 UPSTM ADV 2CV-1051 (2HIC-1051)</li> </ul>	
Exhibit 3	BOP	7.2 Place selected valve permissive handswitch in MANUAL: <ul style="list-style-type: none"> <li>• 2CV-1001 Permissive (2HS-1001)</li> <li>• 2CV-1051 Permissive (2HS-1051)</li> </ul>	

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
Exhibit 3	BOP	7.3 <u>IF</u> MSIS actuated, <u>THEN</u> override "MSIS CLOSE" actuation for selected MOV isolation: <ul style="list-style-type: none"> <li>• ADV Upstream Isolation valve (2CV-1002)</li> <li>• ADV Upstream Isolation valve (2CV-1052)</li> </ul>	
	BOP	*7.4 Throttle open selected MOV as desired: <ul style="list-style-type: none"> <li>• ADV Upstream Isolation valve (2CV-1002)</li> <li>• ADV Upstream Isolation valve (2CV-1052)</li> </ul>	
<b>Continue with SPTAs</b>			

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
<p>Event Description:</p> <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
Cntmt Safety Function	ANY	<p>9. Check CNTMT parameters:</p> <p>A. Temperature and Pressure:</p> <ul style="list-style-type: none"> <li>• Temperature less than 140°F.</li> <li>• Pressure less than 16 psia.</li> </ul> <p>B. Check CNTMT Spray pumps secured.</p> <p>C. NO CNTMT radiation alarms or unexplained rise in activity:</p> <p>1) CAMS alarms:</p> <ul style="list-style-type: none"> <li>• "CNTMT PART/GAS RAD HI/LO" annunciator (2K10-B6) clear.</li> </ul> <p>2) RCS leakage alarms:</p> <ul style="list-style-type: none"> <li>• "AREA RADIATION HI/LO" annunciator (2K11-B10) clear.</li> <li>• "PROC LIQUID RADIATION HI/LO" annunciator (2K11-C10) clear.</li> </ul> <p>3) Check the following radiation monitors trend stable:</p> <ul style="list-style-type: none"> <li>• CNTMT Area</li> <li>• CAMS</li> <li>• Process Liquid</li> </ul> <p>D. NO secondary system radiation alarms or unexplained rise in activity:</p> <p>1) "SEC SYS RADIATION HI" annunciator (2K11-A10) clear.</p> <p>2) Secondary Systems Radiation monitors trend stable:</p> <ul style="list-style-type: none"> <li>• Main Steam lines</li> <li>• SG Sample</li> <li>• Condenser Off Gas</li> </ul>	



Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
	SRO	10. Notify STA to report to control room.  11. Direct NLOs to perform Attachment 47, Field Operator Post Trip Actions  12. Verify Reactor trip announced on Plant page.  13. Notify SM to refer to Technical Specifications and 1903.010, Emergency Action Level Classification.	
<b>Cue: If contacted as the STA to report to the control room, acknowledge the request.</b> <b>Cue: If contacted as a NLO to perform Attachment 47 Field Operator Post Trip Actions, acknowledge request.</b>			
	SRO	14. Direct control board operators to acknowledge ALL annunciators and announce ALL significant alarms.	
	SRO	15. Check ALL safety function acceptance criteria satisfied. <b>(All safety functions are not satisfied, perform contingency)</b>  <b>15. IF ANY safety function acceptance criteria <u>NOT</u> satisfied, <u>THEN</u> perform the following:</b>  <b>A. Notify control room staff of safety functions <u>NOT</u> satisfied.</b>  <b>B. GO TO Exhibit 8, Diagnostic Actions.</b>	
	SRO	Diagnose Excess Steam Demand, EOP 2202.005.	

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
<b>Enter and implement Excess Steam Demand EOP 2202.005.</b>			
<b><u>CAUTION</u></b>			
Failure to use average CETs to monitor MTS with ALL RCPs stopped may result in misleading evaluation of core conditions.			
<b><u>NOTE</u></b>			
Parameters in brackets [ ] reflect normal values corrected for harsh CNTMT environment with CNTMT temperature greater than 200°F or CNTMT radiation greater than 10 <sup>5</sup> R/hr.			
	SRO	* 1. Confirm diagnosis of Excess Steam Demand as follows: <ul style="list-style-type: none"> <li>A. Check SFSC acceptance criteria satisfied every 15 minutes.</li> <li>B. <u>IF</u> CCW in service to provide SG Sample Cooler cooling, <u>THEN</u> perform the following:             <ul style="list-style-type: none"> <li>1) <u>IF</u> SG "A" has indicated water level, <u>THEN</u> verify the following SG 'A' Sample Valves open:                 <ul style="list-style-type: none"> <li>• 2CV-5850</li> <li>• 2CV-5852-2</li> </ul> </li> <li>2) <u>IF</u> SG "B" has indicated water level, <u>THEN</u> verify the following SG 'B' Sample Valves open:                 <ul style="list-style-type: none"> <li>• 2CV-5858</li> <li>• 2CV-5859-2</li> </ul> </li> </ul> </li> <li>C. Notify Chemistry to sample available SGs for activity.</li> </ul>	
	SRO	2. Notify SM to refer to Technical Specifications and 1903.010, Emergency Action Level Classification.	

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
	SRO	3. Open Placekeeping page.	
	SRO	4. Notify Control Board Operators to monitor floating steps.	
<b>Examiner Note: The SRO may implement the floating step to Maintain RCS post-cooldown conditions if not direct from SPTAs.</b>			
		■21. Maintain RCS post-cooldown conditions as follows: <ul style="list-style-type: none"> <li>A. Maintain RCS temperature by steaming intact SG using EITHER of the following:             <ul style="list-style-type: none"> <li>• Upstream ADV</li> <li>• Upstream ADV Isolation MOV</li> </ul> </li> <li>B. Control feedwater flow to intact SG using 2202.010 Attachment 46, Establishing EFW Flow.</li> <li>C. Maintain RCS pressure within P-T limits using 2202.010 Attachment 48, RCS Pressure Control.</li> </ul>	
	ANY	5. Verify the following: <ul style="list-style-type: none"> <li>• MSIS actuated on PPS inserts</li> <li>• MSIVs closed</li> </ul>	
	ANY	*6. <u>IF</u> SIAS setpoints exceeded by EITHER of the following: <ul style="list-style-type: none"> <li>• RCS pressure 1650 psia or less</li> <li>• CNTMT pressure 18.3 psia or greater</li> </ul> <u>THEN</u> verify SIAS and CCAS actuated on PPS inserts.	

Op-Test No.: 2017-1	Scenario #2	Event No.: 6 & 7
<p>Event Description:</p> <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>		
Time	Position	Applicant's Actions or Behavior
	ANY	*6. <b><u>IF</u> SIAS setpoints <u>NOT</u> exceeded, <u>THEN</u> GO TO Step 7.</b>
	ANY	<p>*7. Verify actuated ESFAS components using 2202.010, Exhibit 9, ESFAS Actuation.</p> <p>Evaluator Note: Exhibit 9 is a checklist of actuated components which will all be in the expected alignment.</p>
	ANY	■ 8. Restore ESF/Non-ESF systems post-MSIS using 2202.010 Attachment 51, Post ESFAS Actuation System Restoration.
<b>Attachment 51, Post ESFAS Actuation System Restoration</b>		
	BOP	<p>1. Verify at least ONE SW pump running on EACH loop.</p> <p>2. IF ANY EDG in operation, THEN perform the following.</p>
<p><b><u>CAUTION</u></b></p> <p>Operation of loaded DG without Service Water for greater than three minutes may cause engine damage.</p>		
Attach. 51	BOP	<p>A. Check running EDG SW Outlet valve open:</p> <ul style="list-style-type: none"> <li>• 2DG-1 SW Outlet (2CV-1503-1)</li> <li>• 2DG-2 SW Outlet (2CV-1504-2)</li> </ul>
	BOP	3. Verify SW pump suction aligned to Lake.
	<b>Examiner Note: Steps 4 and 5 are NA.</b>	
	BOP	*6. <b><u>IF</u> BOTH 4160v Vital buses 2A3 <u>AND</u> 2A4 energized from offsite power, <u>THEN</u> start SW pumps as needed to maintain SW header pressure.</b>
	BOP	<b>Examiner Note: Steps 7, 8 and 9 are NA.</b>

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
Attach. 51	BOP	*10. Maintain Service Water header pressure greater than 85 psig while performing the following using 2202.010 Exhibit 5, CCW/ACW/SW Alignment:  A. IF Loop 2 CCW available, <u>THEN</u> restore Service Water to Component Cooling Water.  B. Restore Service Water to Auxiliary Cooling Water.	
<b>Perform 2202.010, Exhibit 5 (CCW/ACW/SW Alignment)</b>			
Exhibit 5		<b>Examiner Note: Steps 1, 2 and 3 are NA.</b>	
	ANY	4. IF SW NOT aligned to ACW, THEN perform the following:  A. Verify at least ONE SW to CCW/ACW Return valve open: <ul style="list-style-type: none"> <li>• 2CV-1543-1</li> <li>• 2CV-1542-2</li> </ul> B. Override and throttle open ACW Supply valves: <ul style="list-style-type: none"> <li>• 2CV-1425-1</li> <li>• 2CV-1427-2</li> </ul> C. Maintain SW header pressure greater than 85 psig.	
<b>Return to Excess Steam Demand</b>			
	ANY	*9. IF SIAS actuated, <u>THEN</u> verify Safety Injection flow to RCS as follows:  A. Check total HPSI flow acceptable using Exhibit 2, HPSI Flow Curve.  B. Check total LPSI flow acceptable using Exhibit 3, LPSI Flow Curve.	

Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description: <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>			
Time	Position	Applicant's Actions or Behavior	
	ANY	*10. Verify the following for any operating RCP: <ul style="list-style-type: none"> <li>A. CSAS NOT actuated.</li> <li>B. Proper seal staging.</li> </ul>	
	ANY	■11. Check CCW flow aligned to RCPs.	
	ANY	■12. <u>IF</u> Circ Water flow lost to the Main condenser, <u>THEN</u> perform the following:  <b>Examiner Note: This step should be NA</b>	
	ANY	■13. Check RCS pressure greater than 1400 psia.	
	ANY	■13. Perform the following: (Contingency Actions) <ul style="list-style-type: none"> <li>A. <u>IF</u> RCS pressure less than 1400 psia, <u>THEN</u> perform the following:             <ul style="list-style-type: none"> <li>1) Verify maximum of ONE RCP running in EACH loop.</li> <li>2) <u>IF</u> RCP 2P32A or 2P32B stopped, <u>THEN</u> verify associated PZR Spray valve in MANUAL and closed.</li> </ul> </li> </ul>	
	ANY	■14. <u>WHEN</u> RCS T <sub>C</sub> less than 510°F, <u>THEN</u> reduce number of running RCPs as follows: <ul style="list-style-type: none"> <li>A. Verify maximum of ONE RCP running in EACH loop.</li> <li>B. <u>IF</u> RCP 2P32A or 2P32B stopped, <u>THEN</u> verify associated PZR Spray valve in MANUAL and closed.</li> </ul>	
	ANY	15. Determine most affected SG by comparing the following: <ul style="list-style-type: none"> <li>• SG steam flows</li> <li>• SG pressures</li> <li>• SG levels</li> <li>• RCS T<sub>C</sub></li> </ul>	

Op-Test No.: 2017-1	Scenario #2	Event No.: 6 & 7
<p>Event Description:</p> <ul style="list-style-type: none"> <li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li> <li>• Upstream ADV 2CV-1051 fails open</li> </ul>		
Time	Position	Applicant's Actions or Behavior
	ANY	16. Check MSIS stopped Excess Steam Demand event.
	ANY	<p><b>16. Perform the following: (Contingency Actions)</b></p> <p><b>A. Commence MSIS verification using 2202.010 Attachment 4, MSIS Verification.</b></p> <p><b>B. GO TO Step 18.</b></p> <p><b>Examiner Note: Attachment 4, MSIS Verification, is a checklist of actuated components which will all be in the expected condition.</b></p>
	ANY	<p>■18. <u>IF</u> BOTH SGs equally affected, <u>THEN</u> close Main Steam to EFW Pump Turbine valves:</p> <ul style="list-style-type: none"> <li>• 2CV-1000-1</li> <li>• 2CV-1050-2</li> </ul> <p><b>Examiner Note: This step is NA.</b></p>
	ANY	<p>■19. Isolate most affected SG using 2202.010 Attachment 10, SG Isolation.</p> <ul style="list-style-type: none"> <li>• <u>IF</u> affected SG still pressurized, <u>THEN</u> check MSSVs for affected SG closed by locally checking individual valve tail pipes for leakage.</li> </ul>
<b>2202.010 - Attachment 10, SG Isolation</b>		
		STEAM GENERATOR A
<p><b><u>NOTE</u></b></p> <p>Goal is to isolate the SG within 30 minutes of procedure entry to limit off-site release.</p>		
	BOP	<p>1. <u>IF</u> SG B to be isolated, <u>THEN</u> <b>GO TO</b> Step 4.</p> <p><b>Examiner Note: This step is NA.</b></p>

Op-Test No.: 2017-1

Scenario #2

Event No.: 6 &amp; 7

## Event Description:

- 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.
- Upstream ADV 2CV-1051 fails open

Time	Position	Applicant's Actions or Behavior																																																																																
<p style="text-align: center;"><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>• Steps two and three may be performed in any order.</li> <li>• Valves in Table 1 and Table 2 may be positioned in any order.</li> </ul>																																																																																		
Attach. 10	BOP	<p>2. Verify each component in the following table in the indicated position:</p> <p style="text-align: center;"><b>TABLE 1</b></p> <table border="1"> <thead> <tr> <th>COMPONENT DESCRIPTION</th> <th>NUMBER</th> <th>LOCATION</th> <th>POSITION</th> <th>√</th> </tr> </thead> <tbody> <tr> <td>ADV UPSTRM ISOL</td> <td>2CV-1002*</td> <td>2C02</td> <td>CLOSED (1)</td> <td></td> </tr> <tr> <td>2CV-1001 PERMISSIVE</td> <td>2CV-1001</td> <td>2C02</td> <td>OFF (1)</td> <td></td> </tr> <tr> <td>MSIV HEADER #1</td> <td>2SV-1010-1A</td> <td>2C17</td> <td>CLOSED</td> <td></td> </tr> <tr> <td>MSIV HEADER #1</td> <td>2SV-1010-2A</td> <td>2C16</td> <td>CLOSED</td> <td></td> </tr> <tr> <td>MSIV HEADER #1 BYP</td> <td>2CV-1040-1</td> <td>2C17</td> <td>CLOSED (1)</td> <td></td> </tr> <tr> <td>MAIN STEAM TO EFWP TURB 2K03</td> <td>2CV-1000-1</td> <td>2C17</td> <td>CLOSED</td> <td></td> </tr> <tr> <td>FEEDWATER BLOCK VALVE TO SG-A</td> <td>2CV-1024-1</td> <td>2C17</td> <td>CLOSED</td> <td></td> </tr> <tr> <td>FEEDWATER BLOCK VALVE TO SG-A</td> <td>2CV-1023-2</td> <td>2C16</td> <td>CLOSED</td> <td></td> </tr> <tr> <td>SG BLOWDOWN ISOLATION</td> <td>2CV-1016-1</td> <td>2C17</td> <td>CLOSED (1)</td> <td></td> </tr> <tr> <td>2P7B DISCHARGE TO SG-A</td> <td>2CV-1038-2*</td> <td>2C17</td> <td>CLOSED (1)</td> <td></td> </tr> <tr> <td>FLOW CONTROL VALVE TO SG-A</td> <td>2CV-1025-1*</td> <td>2C17</td> <td>CLOSED (1)</td> <td></td> </tr> <tr> <td>SAMPLE ISOLATION VALVE SG-A</td> <td>2CV-5850</td> <td>2C17</td> <td>CLOSED (1)</td> <td></td> </tr> <tr> <td>2P7A DISCHARGE TO SG-A</td> <td>2CV-1026-2*</td> <td>2C16</td> <td>CLOSED (1)</td> <td></td> </tr> <tr> <td>2P7A DISCHARGE TO SG-A</td> <td>2CV-1037-1*</td> <td>2C16</td> <td>CLOSED (1)</td> <td></td> </tr> <tr> <td>SAMPLE ISOLATION VALVE STEAM GEN A</td> <td>2CV-5852-2*</td> <td>2C16</td> <td>CLOSED (1)</td> <td></td> </tr> </tbody> </table> <p>* Denotes override capability.</p> <p>NOTE #1: Valves may be open at SM/CRS discretion.</p>	COMPONENT DESCRIPTION	NUMBER	LOCATION	POSITION	√	ADV UPSTRM ISOL	2CV-1002*	2C02	CLOSED (1)		2CV-1001 PERMISSIVE	2CV-1001	2C02	OFF (1)		MSIV HEADER #1	2SV-1010-1A	2C17	CLOSED		MSIV HEADER #1	2SV-1010-2A	2C16	CLOSED		MSIV HEADER #1 BYP	2CV-1040-1	2C17	CLOSED (1)		MAIN STEAM TO EFWP TURB 2K03	2CV-1000-1	2C17	CLOSED		FEEDWATER BLOCK VALVE TO SG-A	2CV-1024-1	2C17	CLOSED		FEEDWATER BLOCK VALVE TO SG-A	2CV-1023-2	2C16	CLOSED		SG BLOWDOWN ISOLATION	2CV-1016-1	2C17	CLOSED (1)		2P7B DISCHARGE TO SG-A	2CV-1038-2*	2C17	CLOSED (1)		FLOW CONTROL VALVE TO SG-A	2CV-1025-1*	2C17	CLOSED (1)		SAMPLE ISOLATION VALVE SG-A	2CV-5850	2C17	CLOSED (1)		2P7A DISCHARGE TO SG-A	2CV-1026-2*	2C16	CLOSED (1)		2P7A DISCHARGE TO SG-A	2CV-1037-1*	2C16	CLOSED (1)		SAMPLE ISOLATION VALVE STEAM GEN A	2CV-5852-2*	2C16	CLOSED (1)	
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Op-Test No.: 2017-1		Scenario #2	Event No.: 6 & 7
Event Description:			
<ul style="list-style-type: none"><li>• 'A' Steam Generator MSIV 2CV-1010-1 fails closed and a Main Steam Safety fails open causing an Excess Steam Demand on 'A' S/G.</li><li>• Upstream ADV 2CV-1051 fails open</li></ul>			
Time	Position	Applicant's Actions or Behavior	
<b>Termination criteria: When post-cooldown conditions have been stabilized or at examiner's discretion.</b>			

Facility: ANO-2	Scenario No.: 3 (New)	Op-Test No.: 2017-1	
Examiners:	Operators:		
Initial Conditions: ~100 % MOL, RED Train Maintenance Week. Alternate AAC diesel OOS for maintenance.			
Turnover: 100%. 260 EFPD. EOOS indicates 'Minimal Risk'. RED Train Maintenance Week. Alternate AAC Diesel tagged for Maintenance. Evolution scheduled: Pump the Reactor Drain Tank.			
Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP) N (SRO)	Pump the Reactor Drain Tank. <b>OP-2103.007, Quench Tank and RDT Operations</b>
2	XRCCHAPLVL	I (ATC) I (SRO) TS (SRO)	'A' Pressurizer Level channel fails low. <b>OP-2203.028, Pressurizer System Malfunction AOP</b>
3	CWS2P3BFLT	R (ATC) C (BOP) C (SRO)	'B' Circulating Water pump trip. <b>OP-2203.019, Loss of Condenser Vacuum AOP</b>
4	RCLOCATCA	C (ATC) C (SRO) TS (SRO)	A 7 gpm LOCA starts on the 'A' RCS cold leg. <b>OP-2203.016, Excess RCS leakage AOP</b>
5	XFW2TE0361	I (BOP) I (SRO)	Main Feedwater pump (MFWP) Lube oil controller temperature input fails. <b>OP-2203.012C, Annunciator 2K03 Corrective Action</b>
6	BUS2A1 FAILSU3	M (ALL)	2A-1 4160 Volt vital bus lockout, which will propagate to a Startup Transformer #3 (SU#3) lockout. (LOOP) <b>OP-2202.001, Standard Post Trip Actions (SPTAs) EOP</b>
7	EDGDG1OIL EDG2OS	M (ALL)	#1 Emergency Diesel Generator (EDG) loss of lube oil, and #2 EDG will overspeed trip on start. (Station Blackout) <b>OP-2202.009, Functional Recovery EOP</b>
8	ESFEFAS12 ESFEFAS22	C (BOP) C (SRO)	2CV-1026-2 does not respond to (Emergency Feedwater Actuation Signal) EFAS. 2CV-1076-2 does not respond to EFAS.
End Point	Power is restored to a vital bus and feedwater aligned to at least on Steam Generator		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Target Quantitative Attributes (Section D.5.d)	Actual Attributes
Malfunctions after EOP entry (1-2)	1
Abnormal Events (2-4)	4
Major Transients (1-2)	2
EOPs entered requiring substantive actions (1-2)	1
EOP contingencies requiring substantive actions (0-1)	1
Critical Tasks (2-3)	3

Critical Task	Justification	
Energize at least one vital AC bus prior to Margin to Saturation lowering below 30 degrees F.	Without any AC power available for ESF pumps, the ability to maintain the plant in a safe state is severely degraded since no makeup water can be added to the RCS for inventory control purposes.	<ul style="list-style-type: none"> <li>• CE EPGB Simulator CTs: CT-03, Energize at least one vital AC bus. (MVA-03)</li> <li>• EOP 2202.009 Functional Recovery EOP.</li> <li>• ANO-2 SAR table 8.3.7, Reg Guide 1.155 and DCP 92-2011.</li> </ul>
Maintain RCS pressure within the Pressure-Temperature limits of 200°F and 30°F Margin to Saturation and less than 2500 psia by performing any of the flowing : <ul style="list-style-type: none"> <li>• Controlling PZR heaters,</li> <li>• Controlling charging and/or HPSI flow once power is restored.</li> </ul>	Loss of RCS pressure control low will result in a loss of RCS subcooling. Once subcooling is lost, pressurizer level is no longer a valid indication of RCS mass inventory, and a reactor head void can form, both of which complicate the event recovery. Uncontrolled void growth could result in eventual core uncover and fuel damage.	<ul style="list-style-type: none"> <li>• CE EPGB Simulator CTs: CT-06, Establish RCS Pressure Control (PC-01)</li> <li>• EOP 2202.009 Functional Recovery EOP.</li> </ul>
Restore Feedwater prior to both SG levels reaching 70" wide range.	Without feedwater, the SG being steamed will eventually boil dry, RCS heat removal will cease, and the reactor core will begin overheating (core melt potential). Thus, it is essential to steam and feed at least one SG to continue to remove RCS decay heat.	<ul style="list-style-type: none"> <li>• CE EPGB Simulator CTs: CT-08, Establish RCS Heat Removal (HR-01)</li> <li>• EOP 2202.009 Functional Recover EOP</li> <li>• EOP 2202.006 Loss of Feedwater EOP Tech Guide</li> </ul>

### Scenario #3 Objectives

- 1) Evaluate individual ability to pump the Reactor Drain Tank.
- 2) Evaluate individual response to a failure of PZR level control channel failing low.
- 3) Evaluate individual response to a trip of the "B" Circ Water pump.
- 4) Evaluate individual response to an Excess RCS leakage event.
- 5) Evaluate individual response to Feedwater pump Lube oil controller temperature failure.
- 6) Evaluate individual response to a 2A-1 bus lockout and Startup Transformer #3 (SU#3) lockout.
- 7) Evaluate crew's and individual ability to perform standard post trip actions.
- 8) Evaluate crew's ability to respond to a Station Blackout out using Functional Recovery EOP.
- 9) Evaluate individual response to a failure of EFW MOV's to respond to Emergency Feedwater Actuation Signal (EFAS).

### SCENARIO #3 NARRATIVE

Simulator session begins with the plant at 100% power steady state.

When the crew has completed their control room walk down and brief, the BOP will pump the Reactor Drain Tank (RDT) to the online hold up tank. The BOP will pump the RDT from 50% level until the RDT pump cutout on low level at approximately 20.8%.

When the crew has pumped the Reactor Drain Tank or at the lead examiner's cue, the 'A' Pressurizer level channel will fail low causing letdown to go to minimum, all pressurizer heaters to de-energize, all backup charging pumps to start and actual pressurizer level will rise. The SRO will enter Pressurizer Systems Malfunction AOP, OP 2203.028. The ATC will place letdown in manual to control flow and pressurizer level. The ATC will then select the unaffected pressurizer level channel for control of letdown, charging, and pressurizer heater control. After the unaffected pressurizer level channel is selected the ATC will restore letdown control to automatic. The SRO will enter Tech Spec 3.3.3.6 Post Accident Instrumentation. [Site OE: CR-ANO-2-2011-1575, Pressurizer level transmitter failed low due to a reference line failure.]

When the ATC has placed letdown in automatic or at the lead examiner's cue, the 'B' Circulating Water pump will trip causing a reduction in Main Condenser vacuum. The SRO will enter Loss of Condenser Vacuum, 2203.019. The BOP will verify Condenser vacuum less than 7 inches HG Abs. The SRO will direct the ATC to commence emergency boration from a Boric Acid Makeup tank to lower reactor power. The SRO will direct the BOP to lower turbine load to maintain condenser vacuum within the acceptable region described in the AOP. When condenser vacuum has started to improve and is within the acceptable region of the AOP attachment, emergency boration and CEA insertion will be secured. The crew should then prepare to commence a controlled down power to restore condenser vacuum less than 5.15 inches HG Abs. [Site OE: CR-ANO-2-2003-1142, 'A' Circulating Water Pump Failure.]

**SCENARIO #3 NARRATIVE (continued)**

When condenser vacuum has been stabilized or at the lead examiner's cue, a 7 gpm RCS leak will start. The SRO will enter the excess RCS leakage AOP, OP 2203.016. ATC and BOP will perform RCS Leak rate determinations. The SRO will enter Tech Spec 3.4.6.2. The SRO will direct the ATC to maintain pressurizer level within 5% of set point by starting additional charging pumps as needed. The SRO will also direct the ATC to isolate letdown to determine the leak location. After the crew has determined the leak is not in letdown, they will restore letdown and the crew will commence a plant shutdown. [Industry OE: SEN-220, SEN-216, & SEN-182, RCS leakage events.]

The Main Feedwater pump (MFWP) Lube oil controller temperature input fails at the same time as the Circulating water pump trip. Temperatures will trend up and ~ 24 minutes of the input fails the rising temperature will cause 2K03 "TURB BRG OIL TEMP HI" to alarm. BOP refers to OP-2203.012C (D-8), Annunciator 2K03 Corrective Actions and will determine the input to the Lube oil temperature controller has failed. The BOP will take manual control of the MFWP Lube Oil temperature 2TIC-5283 and restore Lube oil temperature to ~ 115 degrees F.

After control of the MFWP Lube Oil temperature has been established, or at the lead examiner's discretion 2A-1 Non-Vital 4160V bus will lockout and cause a Startup Transformer #3 (SU#3) lockout (this will de-energize non-vital busses but Offsite power will be available to be restored from Startup #2 Transformer) the crew will manually trip the reactor due the in-ability to maintain Steam Generator levels. The crew will then commence Standard Post Trip Actions. #1 EDG will fail shortly after it starts due to a loss of lube oil, and #2 EDG will overspeed trip on start and not be able to be reset. This will cause a station blackout. The SRO should diagnose Functional Recovery EOP due to the blackout and RCS leak. Also when EFAS actuates 2CV-1026-2 and 2CV-1076-2 EFW flow control valves will fail to automatically respond. The crew should manually open 2CV-1026-2 and 2CV-1076-2 and allow the series EFW valve to control SG level.[PRA item #6, Manually open EFW discharge valves to SG A or SG B] [Site OE: IER L2-14-46 Multiply Electrical Faults result in Explosion and transformer and Auto scram. Industry OE: SER 3-10 Electrical fault complicated by equipment failures, SOER 86-0: Reliability of PWR Auxiliary Feedwater Systems]

The SRO will enter Functional Recovery EOP, complete the entry section, and then direct actions using MVAC-1 to restore power from Startup Transformer #2 (SU#2).

### Simulator Instructions for Scenario 3

Reset simulator to MOL 100% power IC steady state.

Ensure that AACG is out of service. AACEXPTANK = active, AACOVERSPD = active, AACLOPRESS = active, K12K03 = on

Place MINIMAL RISK and RED Train Maintenance Week signs on 2C11.

T5 = Reactor Trip

Event No.	Malf. No. / Trigger Number	Value/ Ramp/Time	Event Description
1			Pump the Reactor Drain Tank. <b>OP-2103.007, Quench Tank and RDT Operations</b>
2	XRCCHAPLVL Trigger = T1	0%	'A' Pressurizer Level channel fails low. <b>OP-2203.028, Pressurizer System Malfunction AOP</b>
3	CWS2P3BFLT Trigger = T2	active	'B' Circulating Water pump trips. <b>OP-2203.019, Loss of Condenser Vacuum AOP</b>
4	RCLOCATCA Trigger = T3	7 gpm	A 7 gpm LOCA starts on the 'A' RCS cold leg. <b>OP-2203.016, Excess RCS leakage AOP</b>
5	XFW2TE0361 Trigger = T2	0	Main Feedwater pump (MFWP) Lube oil controller temperature input fails. <b>OP-2203.012C, Annunciator 2K03 Corrective Action</b>
6	BUS2A1 Trigger = T4 FAILSU3 Trigger = T5	active active / delay = 10 sec.	2A-1 4160 Volt vital bus lockout, which will propagate to a Startup Transformer #3 (SU#3) lockout. (LOOP) <b>OP-2202.001, Standard Post Trip Actions (SPTAs) EOP</b>
7	EDGDG1OIL Trigger = T4  EDG2OS	Active Delay = 2 min.  Active	#1 Emergency Diesel Generator (EDG) loss of lube oil, and #2 EDG will overspeed trip on start. (Station Blackout) <b>OP-2202.009, Functional Recovery EOP</b>
8	ESFEFAS12 ESFEFAS22	Active Active	2CV-1026-2 does not respond to (Emergency Feedwater Actuation Signal) EFAS. 2CV-1076-2 does not respond to EFAS.

Simulator Instructions for Scenario 3		
At T=0		Pump the Reactor Drain Tank
<p><b>Cue: When contacted as the NLO, then respond to the request and use remote function BMS2P41A to start the RDT pump and then inform the CR 2P-41A is running.</b></p> <p><b>Cue: When contacted as the NLO, then respond to the request and use remote function BMS2P41A to stop the RDT pump and then inform the CR 2P-41A is secured.</b></p>		
CUED by Lead Examiner	Trigger T1	'A' Pressurizer Level channel fails high. TS for SRO.
<p><b>Cue: If contacted as a NLO to post start checks on the charging pumps, then after 2 min. report post start/stop checks are sat.</b></p> <p><b>Cue: If contacted as RP that letdown is elevated, then acknowledge the information.</b></p> <p><b>Cue: When contacted as the WWM, then report that I &amp; C planner will begin planning work on failed level instrument.</b></p>		
CUED by Lead Examiner	Trigger T2	'B' Circulating Water pump trips.
<p><b>Cue: When contacted as the NLO, then after 5 min. report that 2P-3B has an acrid odor.</b></p> <p><b>Cue: When contacted as the NLO, then after 2 min. report the 2P-3B breaker (2H-20) has over current drop flags.</b></p> <p><b>Cue: When contacted as the NLO to perform post start checks on B vacuum pump, then after 2 min. report post start checks for 2C-5B Vacuum pump.</b></p> <p><b>Cue: When contacted as chemistry, then report that chemistry will sample for iodine at the time requested.</b></p> <p><b>Cue: When contacted as the WWM, then report that a planner will begin planning work on 2P-3B.</b></p>		
CUED by Lead Examiner	Trigger T3	A 7 gpm LOCA starts on the 'A' RCS cold leg. TS for SRO.
<p><b>Cue: When contacted as RP, acknowledge that the crew will be restoring letdown.</b></p> <p><b>Cue: If contacted as NLO to check 2CVC-139 status then report 2CVC-139 fully open.</b></p>		

Simulator Instructions for Scenario 3		
CUED by Lead Examiner	Trigger = T4	Main Feedwater pump (MFWP) Lube oil controller temperature input fails.
<p><b>Cue: When contacted as the NLO, then report oil flows and pressure are normal but temperatures are elevated.</b></p> <p><b>Cue: When contacted as the WWM, then report that I &amp; C planner will begin planning work on failed temperature instrument.</b></p>		
CUED by Lead Examiner		2A-1 4160 Volt vital bus lockout, that propagates to a SU#3 transformer lockout. #1 EDG loss of lube oil, and #2 EDG will overspeed trip on start causes a station blackout.
<p><b>Cue: When contacted as a NLO to investigate 2A-1, report there is an acrid odor and the overcurrent flags are dropped.</b></p> <p><b>Cue: If contacted as a NLO to investigate #1 EDG, report lube oil strainer gasket has failed and #1 EDG has tripped on low oil pressure.</b></p> <p><b>Cue: If contacted as a NLO to investigate #2 EDG, overspeed tripped, there is damage to the linkage to the fuel racks, and cannot be reset.</b></p> <p><b>Cue: If requested as Work Management for AAC status, then report it will take 12 hours to be ready to start due to a faulty overspeed device.</b></p> <p><b>Cue: If contacted as the STA to report to the control room, acknowledge the request.</b></p> <p><b>Cue: If contacted as a NLO to perform Attachment 47 Field Operator Post Trip Actions, acknowledge request.</b></p> <p><b>Cue: When contacted as Chemistry, then report you will monitor RDACS for off site releases.</b></p> <p><b>Cue: When contacted as a NLO to close the LTOP relief isolation valves, after 2 min have the booth operator close the LTOP breakers, then report the 2B51-E4, and 2B51-K2 are closed</b></p> <p><b>Cue: If contacted as the dispatcher and requested report that SU2 voltage regulator is not in the 3% reduction mode, and The ANO Russellville East and Pleasant Hill East transmission lines are in service.</b></p> <p><b>Cue: If contacted as a NLO then report that SU2 load shedding is enabled.</b></p> <p><b>Cue: When contacted as Unit 1, report that you are NOT energizing any buses from XFMR #2.</b></p> <p><b>Cue: If contacted as the AO, then report after 2 min report that the Key switches (143-2H09) at 2H-13 and (143-2A16) at 2A-111 are in normal.</b></p>		
		2CV-1026-2 and 2CV-1076 do respond to EFAS signal.



Op-Test No.: 2017-1		Scenario #3	Event No: 1
Event Description: Lowering RDT Level – Normal Method			
Time	Position	Applicant's Actions or Behavior	
	BOP	8.0 REACTOR DRAIN TANK OPERATIONS 8.1 Lowering RDT Level – Normal Method	
<p style="text-align: center;"><b><u>NOTE</u></b></p> <p>If the RDT is vented to atmosphere, RDT level response can be improved by verifying Containment sump level less than or equal to 50%. This improves RDT level response due to uncovering the RDT vent line inside the Containment sump.</p>			
	BOP	*8.1.1 Verify system aligned IAW System Alignment Verification section of 1015.001, Conduct of Operations.	
	BOP	*8.1.2 IF NOT vented to atmosphere, THEN use applicable “Adding N2 to RDT” step of this procedure to maintain greater than 1 psig nitrogen overpressure in RDT. (CR-ANO-2-2000-0208)  <b>Examiner Note: RDT is not vented to atmosphere however pressure is high and needs to be lowered by pumping and should not require N2 addition.</b>	
	BOP	*8.1.3 Monitor the following: <ul style="list-style-type: none"> <li>Reactor Drain Tank level (2LIS-2200/L2200)</li> <li>Reactor Drain Tank pressure (2PIS-2200/P2200)</li> </ul>	
	BOP	8.1.4 Verify at least ONE BMS Holdup Tank Inlet valve open: <ul style="list-style-type: none"> <li>2T-12A Inlet 2CV-2230 (2HS-2230)</li> <li>2T-12B Inlet 2CV-2231 (2HS-2231)</li> <li>2T-12C Inlet 2CV-2232 (2HS-2232)</li> <li>2T-12D Inlet 2CV-2233 (2HS-2233)</li> </ul> <b>Examiner Note: 2T-12B inlet valve is open.</b>	
	BOP	8.1.5 Open the following valves: <ul style="list-style-type: none"> <li>RDT Pump Suction 2CV-2201-2 (2HS-2202-2)</li> <li>RDT Pump Suction 2CV-2202-1 (2HS-2202-1)</li> </ul>	

Op-Test No.: 2017-1		Scenario #3	Event No: 1
Event Description: Lowering RDT Level – Normal Method			
Time	Position	Applicant's Actions or Behavior	
	BOP	Directs the NLO to perform step 8.1.6  8.1.6 Start ONE or BOTH Reactor Drain Pumps: <ul style="list-style-type: none"> <li>• RDT Pump 2P-41A (2HS-2205)</li> <li>• RDT Pump 2P-41B (2HS-2204)</li> </ul>	
<b>Cue: When contacted as the NLO, then respond to the request and use remote function BMS2P41A to start the RDT pump and then inform the CR 2P-41A is running.</b>			
<p style="text-align: center;"><b><u>NOTE</u></b></p> <p style="text-align: center;">Reactor Drain Pumps automatically secure at 20.8% RDT level (2LIS-2200)</p>			
	BOP	Direct the NLO to stop RDT pump if RDT pressure approaches 1 psig.  *8.1.7 IF required to maintain greater than 1 psig in the Reactor Drain Tank (2PSI-2200/P2200), THEN cycle Reactor Drain Pump (s) as necessary: <ul style="list-style-type: none"> <li>• RDT Pump 2P-41A (2HS-2205)</li> <li>• RDT Pump 2P-41B (2HS-2204)</li> </ul>	
	BOP	Direct the NLO to perform step 8.1.8  8.1.8 WHEN Reactor Drain Tank reaches desired level, THEN stop Reactor Drain Pump(s): <ul style="list-style-type: none"> <li>• RDT Pump 2P-41A (2HS-2205)</li> <li>• RDT Pump 2P-41B (2HS-2204)</li> </ul>	
<b>Cue: When contacted as the NLO, then respond to the request and use remote function BMS2P41A to stop the RDT pump and then inform the CR 2P-41A is secured.</b>			
	BOP	8.1.9 Close the following valves: <ul style="list-style-type: none"> <li>• RDT Pump Suction 2CV-2201-2 (2HS-2201-2)</li> <li>• RDT Pump Suction 2CV-2202-1 (2HS-2202-1)</li> </ul>	
<b>Termination criteria: When the RDT has been pumped or at lead examiner's discretion.</b>			

Op-Test No.: 2017-1		Scenario #3	Event No: 2
Event Description: 'A' Pressurizer Level Channel Fails Low. Tech Spec for SRO.			
Time	Position	Applicant's Actions or Behavior	
Cued by Lead Examiner	ANY	Announce alarms: <ul style="list-style-type: none"> <li>• 2K10-G6 CNTRL CH 1 LEVEL LO</li> <li>• 2K10-F6 CNTRL CH 1 LO LO</li> </ul> Report 2LI-4627-2 and 2LR-4625 indicate normal.	
Enter and implement AOP 2203.028, PZR Systems Malfunctions.			
	SRO	1.E. Check the following PZR level annunciators clear: <ul style="list-style-type: none"> <li>• "CNTRL CH 1/2 LEVEL LO" 2K10-G6/G7</li> <li>• "CNTRL CH 1/2 LEVEL HI" 2K10-J6/J7</li> </ul> <b>Annunciators not clear, implement contingency, GO TO Step 7</b>	
	ANY	7. Check the following PZR level annunciators clear: <ul style="list-style-type: none"> <li>• "CNTRL CH 1/2 LEVEL LO" - 2K10-G6/G7</li> <li>• "CNTRL CH 1/2 LEVEL HI" - 2K10-J6/J7</li> </ul> <b>(2K10-G6 not clear, implement contingencies)</b>	
	ANY	<b>7. Perform the following:</b> A. Compare PZR level instruments to determine the affected channel.	
		B. <u>IF</u> BOTH PZR level control channels failed, <u>THEN</u> <b>GO TO</b> Step 8 <b>Examiner Note: Contingency B is N/A</b>	
	ATC	C. <u>IF</u> selected control channel failed, <u>THEN</u> perform the following: <ol style="list-style-type: none"> <li>1) Perform the following for Letdown Flow controller (2HIC-4817):               <ol style="list-style-type: none"> <li>a) Place controller in MANUAL.</li> <li>b) Adjust output to control PZR level within 5% of setpoint.</li> </ol> </li> </ol>	
	ATC	2) Place PZR Level Channel Select switch (2HS-4628) to unaffected channel. <b>(Channel 2 / B)</b>	

Op-Test No.: 2017-1		Scenario #3	Event No: 2
Event Description: 'A' Pressurizer Level Channel Fails Low. Tech Spec for SRO.			
Time	Position	Applicant's Actions or Behavior	
	ATC	3) Place PZR Low Level Cutoff select switch (2HS-4642) to unaffected channel. <b>(Channel B)</b>	
	ANY	4) Verify PZR heaters and Normal Spray operating to restore RCS pressure 2025 to 2275 psia.	
	ATC	5) <u>WHEN</u> Letdown Flow controller (2HIC-4817) automatic <u>AND</u> manual signals match, <u>THEN</u> restore 2HIC-4817 controller to AUTO using 2104.002 Chemical and Volume Control.  <b>Examiner Note: This step does not have to be completed to proceed to the next malfunction.</b>	
<b>Cue: If contacted as a NLO to post start checks on the charging pumps, then after 2 min. report post start/stop checks are sat.</b>  <b>Cue: If contacted as RP that letdown is elevated, then acknowledge the information.</b>			
	ATC	D. <u>IF</u> non-selected control channel failed, <u>THEN</u> perform the following:  <b>Examiner Note: This step is N/A</b>	
	ATC	E. <u>IF</u> Letdown Radiation monitor isolated due to high temperature <u>AND</u> Letdown HX Outlet temperature lowered to less than 140°F, <u>THEN</u> restore Letdown Radiation Monitor flow by opening Letdown Rad Monitor Isolation, 2CV-4804 (2HS-4804).	
	SRO	F. Refer to TS 3.3.3.5, Remote Shutdown Instrumentation and 3.3.3.6, Post-Accident Instrumentation.  <b>Examiner Note: SRO must enter Tech Spec 3.3.3.6 action 1 for Post Accident Instrumentation.</b>	
	SRO	Contact work management.	
<b>Cue: When contacted as the WWM, then report that I &amp; C planner will begin planning work on failed level instrument.</b>			
<b>Termination Criteria: PZR level control selected to channel 2 or at lead examiner's discretion.</b>			

Op-Test No.: 2017-1	Scenario #3	Event No: 3				
Event Description: 'B' Circulating Water pump trips.						
Time	Position	Applicant's Actions or Behavior				
Cued by Lead Examiner	ANY	Announce alarm: 2K12-A9 CIRC WTR SYS POTENTIAL FAILURE.				
	ANY	Report 2P-3B is tripped and the discharge valve is closing / closed.				
Enter and implement AOP 2203.019, Loss of Condenser Vacuum.						
<p><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>Steps marked with (*) are continuous action steps.</li> <li>Steps marked with (■) are floating steps.</li> </ul>						
	SRO	<ol style="list-style-type: none"> <li>Open Placekeeping page.</li> <li>Notify Control Board Operators to monitor floating steps.</li> <li>Check procedure entered due to loss of OR reduced Circulating Water flow.</li> </ol>				
	BOP	<ol style="list-style-type: none"> <li>Verify Circ Water pump operation as follows: <ul style="list-style-type: none"> <li>At least ONE Circ Water pump (2P3A/B) running.</li> <li>ANY stopped Circ Water Pump associated Discharge valve closed.</li> </ul> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;">2P3A</td> <td style="padding: 5px;">2P3B</td> </tr> <tr> <td style="padding: 5px;">2CV-1224</td> <td style="padding: 5px; border: 2px solid black;">2CV-1215</td> </tr> </table> </li> </ol>	2P3A	2P3B	2CV-1224	2CV-1215
2P3A	2P3B					
2CV-1224	2CV-1215					
<p><b>Cue: When contacted as the NLO, then after 5 min. report that 2P-3B has an acrid odor.</b></p> <p><b>Cue: When contacted as the NLO, then after 2 min. report the 2P-3B breaker (2H-20) has over current drop flags.</b></p>						
<p><b><u>NOTE</u></b></p> <p>Main Feedwater pumps trip at Condenser vacuum of 13.4 inches HG Abs.</p> <p>Turbine Generator trips at Condenser vacuum of 7.0 inches HG Abs.</p> <p>SDBCS Condenser Interlock automatically resets at 5.15 inches HG Abs, with controllers in automatic.</p>						

Op-Test No.: 2017-1		Scenario #3	Event No: 3
Event Description: 'B' Circulating Water pump trips.			
Time	Position	Applicant's Actions or Behavior	
	BOP	■5. Check Condenser Vacuum less than 7 inches HG Abs.	
	BOP	■6. Check Condenser Vacuum stable or improving.	
	SRO	<b>Direct Step 6 Contingencies.</b> ■6. Perform the following:	
	ATC	A. Commence Emergency Boration using 2202.010 Exhibit 1, Emergency Boration	
2202.010 Exhibit 1, Emergency Boration			
Exhibit 1 Emergency Boration	ATC	1. Select ONE of the following Emergency Boration flowpaths:	
		<b>FLOWPATH</b>	<b>ACTIONS REQUIRED</b>
		A. Gravity Feed	A. Verify at least ONE BAM Tank Gravity Feed valve open: <ul style="list-style-type: none"> <li>• 2CV-4920-1</li> <li>• 2CV-4921-1</li> </ul>
		B. BAM pumps	B. 1) Start at least ONE BAM pump. 2) Open Emergency Borate valve (2CV-4916-2). 3) Verify Boric Acid Makeup Flow Control valve (2CV-4926) closed.
		<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>CAUTION</b>          Aligning Charging pump suction to RWT during RWT purification with ALL Charging pumps running may cause Charging pumps to trip due to low suction pressure.       </div>	
		C. RWT to Charging pumps	C. Open Charging Pump Suction Source From RWT valve (2CV-4950-2).
<b>Examiner Note: Gravity Feed is the normal method used for a Circulating water pump trip.</b>			

Op-Test No.: 2017-1		Scenario #3	Event No: 3
Event Description: 'B' Circulating Water pump trips.			
Time	Position	Applicant's Actions or Behavior	
Exhibit 1 Emergency Boration	ATC	2. Close VCT Outlet valve (2CV-4873-1).	
	ATC	3. IF VCT Outlet valve does <u>NOT</u> close, <u>THEN</u> verify BAM Pumps Emergency Boration flowpath selected.	
	ATC	4. Verify Reactor Makeup Water Flow Control valve (2CV-4927) closed.	
	ATC	5. Verify at least ONE Charging pump running and charging header flow greater than 40 gpm.	
	ATC	6. Verify charging header flow greater than 40 gpm by either of the following: <ul style="list-style-type: none"> <li>• 2FIS-4863 Disch Flow (2C09)</li> <li>• Computer Point F4863 (PDS or SPDS)</li> </ul>	
<b>Returns to Step 6, Contingency Actions</b>			
	BOP	B. Perform Attachment A, Backpressure and Temperature Limits.	
	ATC	C. IF CEA insertion necessary to maintain Tc less than 554.7°F, <u>THEN</u> perform the following: <ol style="list-style-type: none"> <li>1) PERFORM insertion of Group 6 or Group P CEAs using 2105.009 Exhibit 3.</li> <li>2) Maintain CEAs in Acceptable region of COLR.</li> </ol>	
	SRO	D. IF RCS Tc exceeds 554.7°F, <u>THEN</u> refer to TS 3.2.6 Reactor Coolant System Cold Leg temperature. <b>Examiner Note: The crews may raise temperature &gt; the TC TS limit and if they do TS 3.2.6 is applicable.</b>	
	ATC	E. <u>WHEN</u> Condenser Vacuum stable or improving, <u>THEN</u> secure Emergency Boration.	
<b>Cue: When contacted as the NLO to perform post start checks on B vacuum pump, then after 2 min. report post start checks for 2C-5B Vacuum pump.</b>			

Op-Test No.: 2017-1		Scenario #3	Event No: 3
Event Description: 'B' Circulating Water pump trips.			
Time	Position	Applicant's Actions or Behavior	
2202.010 Exhibit 1, Emergency Boration			
<b><u>NOTE</u></b>			
Reactor Engineering assistance may be required to determine shutdown margin.			
Secure Emergency Boration	ATC	<p>7. <u>WHEN</u> boron concentration greater than minimum required for shutdown margin, <u>THEN</u> perform the following:</p> <p>A. Verify VCT level <math>\geq 20\%</math>.</p> <p>B. Place VCT Outlet valve (2CV-4873-1) in AUTOMATIC.</p> <p>C. <u>WHEN</u> 2CV-4873-1 open, <u>THEN</u> perform the following:</p> <p>1) Verify BOTH BAM pumps secured.</p> <p>2) Verify the following valves closed:</p> <ul style="list-style-type: none"> <li>• 2CV-4920-1</li> <li>• 2CV-4921-1</li> <li>• 2CV-4916-2</li> </ul> <p>3) <u>IF</u> 2CV-4950-2 was opened, <u>THEN</u> place handswitch in AUTOMATIC and check that valve closes.</p>	
	<b>Returns to Step 6, Contingency Actions</b>		
	ATC	<p>G. Perform the following:</p> <p>1) Refer to Attachment B, Circ Water Temperature Limiting Rx Power Levels, for a suggested maximum power level for the present Circ Water inlet temperature.</p> <p>2) Commence a power reduction using 2102.004, Power Operations until condenser pressure is less than 5.15 inches HG Abs.</p>	
	SRO	*7. Check RCS pressure 2025 to 2275 psia.	
	ANY	*8. Check RCS TC 542 to 554.7°F using CPC PID 5, 6, 160 or 161.	



Op-Test No.: 2017-1		Scenario #3	Event No: 3
Event Description: 'B' Circulating Water pump trips.			
Time	Position	Applicant's Actions or Behavior	
	ANY	*9. Maintain ASI within limits as specified in Core Operating Limits Report (COLR).	
	ANY	*10. Check CEA positions as follows: A. ALL Regulating Group 6 CEAs greater than 112.5 inches withdrawn. B. ALL Regulating Group 1 through 5 CEAs fully withdrawn. C. ALL Group P CEAs greater than 135 inches withdrawn.	
	ANY	*11. Check PZR level within 5% of setpoint.	
	ANY	12. Notify Chemistry to perform the following: A Sample for RCS Iodine within 2 to 6 hours following Reactor power change greater than 15% in any one hour, refer to TS 3.4.8, Specific Activity. B Monitor Secondary system chemistry.	
<b>Cue: When contacted as chemistry, then report that chemistry will sample for iodine at the time requested.</b>			
	SRO	13. Perform EITHER of the following as directed by Operations Management: A. Maintain Plant conditions using 2102.004, Power Operation. B. <u>IF</u> plant shutdown to be performed, <u>THEN</u> perform the following: Examiner Note: Plant shutdown should not be performed.	
<b>Cue: When contacted as the WWM, then report that a planner will begin planning work on 2P-3B.</b>			
<b>Termination criteria: When Emergency Boration has been secured or at lead examiner's discretion.</b>			

Op-Test No.: 2017-1		Scenario #3	Event No: 4
Event Description: A 7 gpm LOCA starts on the 'A' RCS cold leg. (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
Cued by Lead Examiner	ANY	<p>Determine that a RCS leak is occurring by monitoring RCS and CNTMT parameters.</p> <p>Some available indications are CAMS radiation monitors trending up, CNTMT dew point trending up, and 2K01-H9 programmable alarm for CNTMT dew point.</p>	
AOP, OP-2203.016 Excess RCS Leakage			
<p style="text-align: center;"><b><u>NOTE</u></b></p> <p><b>Steps marked with (*) are continuous action steps.</b></p> <p><b>Steps marked with (■) are floating steps.</b></p>			
	SRO	<p>Enter and direct the actions of:</p> <p>1. Open Placekeeping page.</p>	
	SRO	<p>2. Notify Control Board Operators to monitor floating steps.</p>	
	ANY	<p>*3. Determine RCS leakrate by ANY of the following:</p> <ul style="list-style-type: none"> <li>• Computer LKRT programs.</li> <li>• Check PZR level stable and use Charging and Letdown mismatch minus Controlled Bleed Off.</li> <li>• Check Letdown isolated and estimate RCS leak rate by total Charging flow minus Controlled Bleed Off.</li> <li>• CNTMT Sump level rate of rise.</li> </ul>	

Op-Test No.: 2017-1		Scenario #3	Event No: 4
Event Description: A 7 gpm LOCA starts on the 'A' RCS cold leg. (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
	ATC	<p>*4. Maintain PZR level within 5% of setpoint by performing the following as necessary:</p> <p>A. Cycle Charging pumps.</p> <p>B. Isolate Letdown as follows:</p> <ol style="list-style-type: none"> <li>1) Verify at least ONE Letdown Isolation valve closed: <ul style="list-style-type: none"> <li>• 2CV-4820-2</li> <li>• 2CV-4821-1</li> <li>• 2CV-4823-2 (least preferred)</li> </ul> </li> <li>2) Record Charging Header Data in 2202.010 Attachment 44, Charging Header Data.</li> </ol>	
	ANY	<p>*5. IF in Modes 1 OR 2, THEN check PZR level maintained within 10% of setpoint.</p>	
<p><b><u>CAUTION</u></b></p> <p>Aligning Charging pump suction to RWT during RWT purification with ALL Charging pumps running may cause Charging pumps to trip due to low suction pressure.</p>			
	ATC	<p>*7. Maintain VCT level 60 to 75%, refer to 2104.003, Chemical Addition.</p>	
	BOP	<p>■ 8. IF RCS leakage greater than 44 gpm AND in Mode 1 OR 2, THEN perform the following:</p> <ol style="list-style-type: none"> <li>A. Trip Reactor.</li> <li>B. Actuate SIAS.</li> <li>C. Actuate CCAS.</li> <li>D. GO TO 2202.001, Standard Post Trip Actions.</li> </ol> <p><b>Examiner Note: This step is NA, leakrate is ~ 7 gpm</b></p>	
	SRO	<p>*10. Refer to 1903.010, Emergency Action Level Classification. (Directs the Shift Manager to evaluate EALs)</p>	

Op-Test No.: 2017-1		Scenario #3	Event No: 4
Event Description: A 7 gpm LOCA starts on the 'A' RCS cold leg. (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
	SRO	<p>*11. <u>IF</u> location of leak known, <u>THEN</u> perform the applicable following steps (12.A through 12.J):</p> <ul style="list-style-type: none"> <li>CNTMT step 12.A</li> </ul>	
<p style="text-align: center;"><b><u>NOTE</u></b></p> <p>If this step entered from step 11, then only perform substep for identified leak path.</p>			
	ATC	<p>*12. <u>IF</u> location of leak unknown, <u>THEN</u> locate and isolate leak as follows:</p> <p>A. Check the following CNTMT parameters stable or lowering:</p> <ul style="list-style-type: none"> <li>Humidity (Dewpoint temperature)</li> <li>Sump level</li> <li>Temperature</li> <li>Pressure</li> </ul> <p><b>Examiner Note: CNTMT parameters will not be stable.</b></p>	
	SRO	<p><b>Directs step 12 - A. Contingency Actions</b></p> <p>A. Perform the following:</p> <ol style="list-style-type: none"> <li>IF leakage is within allowable limits of TS 3.4.6.2, THEN attempt to locate leak in CNTMT by monitoring CAMS suction points and CNTMT Area Radiation monitors.</li> <li>Verify leak NOT in Letdown line inside CNTMT by performing the following:             <ol style="list-style-type: none"> <li>Isolate Letdown by verifying at least ONE Letdown Isolation valve closed:                 <ul style="list-style-type: none"> <li>2CV-4820-2</li> <li>2CV-4821-1</li> <li>2CV-4823-2 (least preferred)</li> </ul> </li> <li>IF RCS leakage NOT stopped, THEN letdown may be restored at discretion of SM using 2104.002, Chemical and Volume Control.</li> </ol> </li> </ol>	

Op-Test No.: 2017-1		Scenario #3	Event No: 4
Event Description: A 7 gpm LOCA starts on the 'A' RCS cold leg. (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
<b>2104.002, Chemical and Volume Control</b>			
	ANY	9.2 Restoring Letdown Flow (After Temporary Isolation) 9.2.1 Notify Radiation Protection of changing Letdown alignment. (CR-ANO-2-2002-00249)	
<b>Cue: When contacted as RP, acknowledge that the crew will be restoring letdown.</b>			
	ATC	9.2.2 <u>IF</u> Letdown Flow controller (2HIC-4817) <u>NOT</u> in MANUAL <u>THEN</u> transfer to MANUAL as follows:  1. Match MANUAL signal to AUTOMATIC signal. 2. Transfer controller from AUTOMATIC to MANUAL.  9.2.3 Using Letdown Flow controller (2HIC-4817), verify Letdown Flow Control valves closed:  <ul style="list-style-type: none"> <li>• 2CV-4816</li> <li>• 2CV-4817</li> </ul>	
	ATC	9.2.4 Verify Letdown Pressure controller (2PIC-4812) in MANUAL.  9.2.5 Verify 2HS-4812 selected to desired valve(s) to be placed in service: <ul style="list-style-type: none"> <li>• 2CV-4810</li> <li>• 2CV-4811</li> <li>• BOTH</li> </ul> 9.2.6 Verify valve(s) selected on 2HS-4812 (2CV-4810/2CV-4811) fully open using 2PIC-4812.	

Op-Test No.: 2017-1		Scenario #3	Event No: 4
Event Description: A 7 gpm LOCA starts on the 'A' RCS cold leg. (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
	ATC	9.2.7	Verify Letdown Isolation 2CV-4820-2 (2HS-4820-2) open.
		9.2.8	Verify Regen Hx Inlet 2CV-4821-1 (2HS-4821-1) open.
		9.2.9	Verify Letdown Regen Hx Outlet valve 2CV-4823-2 (2HS-4823-2) open.
<b><u>NOTE</u></b>			
If LD/DI 2T-36A/B, 2T-70 Inlet/Bypass (2CV-4803) has been actuated it must be taken to BYPASS and then back to AUTO/ION EXCH to restore flow through the Ion Exch.			
	SRO	Contact work management.	
	ATC	9.2.10	Verify LD/DI 2T-36A/B, 2T-70 Inlet/Bypass (2CV-4803) hand switch (2HS-4803) in AUTO/ION EXCH:
		9.2.11	Verify 2F-3A/B Inlet Isolation (2CVC-139) fully open.
<b>Cue: If contacted as NLO to check 2CVC-139 status then report 2CVC-139 fully open.</b>			
	ATC	9.2.12	Verify CCP running (2FIS-4863).
	ATC	9.2.13	Verify Letdown Rad Monitor Isolation (2CV-4804) open.
<b><u>CAUTION</u></b>			
High Pressure Letdown Relief valve (2PSV 4822) lifts at 600 psia			
	ATC	9.2.14	Verify 2HS-4817 selected to desired valve(s) to be placed in service: <ul style="list-style-type: none"> <li>• 2CV-4816</li> <li>• 2CV-4817</li> <li>• BOTH</li> </ul>

Op-Test No.: 2017-1		Scenario #3	Event No: 4
Event Description: A 7 gpm LOCA starts on the 'A' RCS cold leg. (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
	ATC	<p>9.2.15 Using Letdown Flow controller (2HIC-4817) slowly open 2CV-4816/2CV-4817 to initiate flow.</p> <p>9.2.16 Using Letdown Pressure controller (2PIC-4812) slowly close 2CV-4810/2CV-4811 to establish desired pressure:</p> <ul style="list-style-type: none"> <li>• IF RCS pressure &lt; 450 psia, THEN maintain L/D backpressure (2PIC-4812) above saturation for letdown temperature (2TI-4820).</li> <li>• IF RCS pressure &gt; 450 psia, THEN maintain L/D backpressure (2PIC-4812) at setpoint (normal setpoint is 350 psig).</li> </ul> <p>9.2.17 WHEN letdown pressure at desired setpoint, THEN Letdown Pressure controller (2PIC-4812) may be placed in AUTO.</p>	
	ATC	<p>*9.2.18 Using Letdown Flow controller (2HIC-4817) manually adjust 2CV-4816/2CV-4817 position to maintain desired pressurizer level.</p> <p>9.2.19 Check L/D backpressure controller (2PIC-4812) maintained at setpoint.</p>	
	ATC	<p>9.2.20 Establish 0.5 to 1.5 gpm flow through Rad Monitor Flow Indicator (2FIS-4807) IAW Letdown Line Radiation Monitor Flow Control section of this procedure.</p>	
<b>Transition back to 2203.016 Excess RCS Leakage</b>			
	SRO	<p>*13. Check leakage within allowable limits, refer to TS 3.4.6.2, Reactor Coolant System Leakage.</p> <p><b>Examiner Note: SRO must enter LCO 3.4.6.2, action b. Unidentified leakage is greater than 1 gpm.</b></p>	

Op-Test No.: 2017-1		Scenario #3	Event No: 4
Event Description: A 7 gpm LOCA starts on the 'A' RCS cold leg. (Tech Spec for SRO)			
Time	Position	Applicant's Actions or Behavior	
	ALL	<p><b>Directs step 13 Contingency Actions</b></p> <p>*13. Perform the following:</p> <p>A. Continue efforts to locate and isolate leak.</p> <p>B. IF plant shutdown required, THEN perform the following:</p> <ol style="list-style-type: none"> <li>1) Refer to applicable reactivity plan.</li> <li>2) IF leakage less than 10 gpm, THEN perform EITHER of the following using 2102.004, Power Operations: <ul style="list-style-type: none"> <li>• RCS boration using 2104.003, Chemical Addition, Attachment R, RCS Boration from the RWT or BAMT.</li> <li>• RCS boration using 2104.003, Chemical Addition, Exhibit 3, Normal RCS Boration at Power.</li> </ul> </li> <li>3) <u>IF</u> leakage greater than or equal to 10 gpm <u>THEN</u> perform RCS boration using 2104.003, Chemical Addition, Attachment R, RCS Boration from the RWT or BAMT using 2102.004, Power Operations.</li> </ol> <p>C. <u>WHEN</u> Reactor shutdown <u>AND</u> 2202.001, Standard Post Trip Actions completed, <u>THEN GO TO</u> Step 16.</p>	
<p><b>Termination Criteria: When Letdown is restored and the SRO has addressed Tech Specs or at the discretion of the lead examiner.</b></p>			



Op-Test No.: 2017-1		Scenario #3	Event No.: 5
Event Description: Feedwater pump 'A" Lube oil controller temperature input fails low.			
Time	Position	Applicant's Actions or Behavior	
Triggered the same time as event 3.	ANY	Announce annunciators: 2K03-D8 TURB BRG OIL TEMP HI 2K03-E8 TURB BRG METAL TEMP HI 2K03-D11 TURB BRG OIL TEMP HI 2K03-E11 TURB BRG METAL TEMP HI	
Examiner Note: 2K03-D8 and 2K03-D11 have the same guidance below. 2K03-E8 and 2K03-E11 have similar guidance but the oil temperature annunciators are more applicable.			
	ANY	Implement Annunciator Corrective Action OP-2203.012C Annunciator 2K03 Corrective Action  2.1 Dispatch Operator to locally check MFP turbine (2K-2A) Bearing temperature, oil flows and pressure. Refer to Main Feedwater Pump and FWCS Operations (2106.007).	
<b>Cue: When contacted as the NLO, then report oil flows and pressure are normal but temperatures are elevated.</b>			
	BOP	2.2 Check MFP turbine (2K-2A) Bearing Inlet Oil temperature: <ul style="list-style-type: none"> <li>• Computer point T0374 (available on PMS 2P-1A screen)</li> <li>• MFP Bearing/Oil Temperature recorder 2TRS-0325 (2TE-0374) - #5, 2K-2A LO TO BRG</li> </ul>	
	BOP	2.3 Validate alarm using trending capability of PMS/PDS – 2P-1A screen and/or results of local inspection.  2.3.1 IF alarm is determined to be invalid, THEN no further action required.	

Op-Test No.: 2017-1		Scenario #3		Event No.: 5	
Event Description: Feedwater pump 'A" Lube oil controller temperature input fails low.					
Time	Position	Applicant's Actions or Behavior			
	BOP	2.4 Check MFP LO Temp controller (2TIC-5283) operating properly:  2.4.1 IF MFP LO Temp controller (2TIC-5283) NOT operating properly, THEN perform the following: A. Place MFP LO Temp controller (2TIC-5283) in manual. B. Control MFP LO Temp controller (2TIC-5283) to maintain temperature less than 135°F.			
	BOP	2.5 IF necessary, THEN verify CCW aligned to in service Lube Oil cooler per Component Cooling Water System Operations (2104.028).  <b>Examiners Note: CCW alignment verification should not be required.</b>			
	BOP	2.6 Shift LO coolers as necessary using Main Feedwater Pump and FWCS Operations (2106.007).  <b>Examiners Note: Shifting LO coolers is not necessary.</b>			
	BOP	2.7 IF bearing oil temperature can NOT be lowered, THEN reduce load on MFW pump 2P-1A IAW Power Operations (2102.004).  <b>Examiners Note: Temperature can be lowered.</b>			
	BOP	3.0 TO CLEAR ALARM  3.1 Reduce MFP Turbine 2K-2A Bearing Inlet supply oil temperature < 135°F.			
<b>Cue: When contacted as the WWM, then report that I &amp; C planner will begin planning work on failed temperature instrument.</b>					
<b>Termination Criteria: 2K03-D8 TURB BRG OIL TEMP HI alarm is clear or at lead examiner's discretion.</b>					

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).			
Time	Position	Applicant's Actions or Behavior	
Cued by Lead Examiner	ANY	Report 2A-1 bus Lockout.	
<b>Cue: When contacted as a NLO to investigate 2A-1, report there is an acrid odor and the overcurrent flags are dropped.</b>			
	SRO	Direct BOP/ATC to trip reactor.	
	ATC BOP	Trip the Reactor.	
<b>Enter and implement EOP 2202.001, Standard Post Trip Actions.</b>			
	SRO	<ol style="list-style-type: none"> <li>1. Notify Control Board Operators to perform the following:               <ol style="list-style-type: none"> <li>A. Monitor safety functions using Exhibit 7, CBO Reactor Trip Checklist.</li> <li>B. Perform post trip contingencies as required.</li> </ol> </li> <li>2. Open Safety Function Tracking page.</li> </ol>	
Reactivity Control	ATC	<ol style="list-style-type: none"> <li>3. Check Reactivity Control established as follows:               <ol style="list-style-type: none"> <li>A. Reactor power lowering.</li> <li>B. Check startup rate is negative.</li> <li>C. ALL CEAs fully inserted by observing ANY of the following:</li> </ol> </li> </ol>	

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).			
Time	Position	Applicant's Actions or Behavior	
Vital Auxiliaries	BOP	4. Check Maintenance of Vital Auxiliaries satisfied: <ul style="list-style-type: none"> <li>A. Check Main Turbine tripped by BOTH of the following:             <ul style="list-style-type: none"> <li>• ALL Main Stop Valves closed.</li> <li>• Generator megawatts indicate zero.</li> </ul> </li> <li>B. Generator Output breakers open.</li> <li>C. Exciter Field Breaker open.</li> <li>D. Perform EITHER of the following as required: <b>(Not met, perform contingency)</b> <ul style="list-style-type: none"> <li>1) Check the following valves closed:               <ul style="list-style-type: none"> <li>• MSR 2E-12A Steam Supply From SG A (2CV-0400)</li> <li>• MSR 2E-12B Steam Supply From SG B (2CV-0460)</li> </ul> </li> <li>2) No flow indicated on the following MSR second stage flow instruments:               <ul style="list-style-type: none"> <li>• 2FI-0402</li> <li>• 2FI-0462</li> </ul> </li> </ul> </li> <li>D. <b>Close MSIVs: (Contingency Action)</b> <ul style="list-style-type: none"> <li>• <b>2CV-1010-1</b></li> <li>• <b>2CV-1060-2</b></li> </ul> </li> <li>E. At least ONE 6900v AC bus energized</li> <li>F. At least ONE 4160v Non-vital AC bus energized.</li> <li>G. BOTH 4160v Vital AC buses energized. <b>(Not met, perform contingency)</b></li> </ul>	

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
<p>Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).</p>			
Time	Position	Applicant's Actions or Behavior	
Vital Auxiliaries	BOP	<p><b>Evaluator Note: Contingency Actions cannot be accomplished, neither DG is available: #1 EDG has a loss of lube oil and #2 EDG had an overspeed trip on the start signal. NO 4160v or 480v Vital AC bus is energized.</b></p> <p><b>F. Perform the following: (Contingency Actions)</b></p> <ol style="list-style-type: none"> <li>1) IF de-energized 4160v Vital AC bus available AND associated EDG available, THEN verify associated EDG supplying bus. (EDG's are not available)</li> <li>2) IF NEITHER DG available, THEN start AACG AND align to associated 4160v Vital bus using 2104.037, Alternate AC Diesel Generator Operations, Attachment E. (AAC overspeed)</li> <li>3) Check at least ONE 4160v and 480v Vital AC bus energized.</li> </ol> <p>H. BOTH DGs secured.</p> <p>I. At least ONE 125v Vital DC bus energized:</p> <ul style="list-style-type: none"> <li>• 2D01 - SPDS point E2D01</li> <li>• 2D02 - SPDS point E2D02</li> </ul>	
<p><b>Cue: If contacted as a NLO to investigate #1 EDG, report lube oil strainer gasket has failed and #1 EDG has tripped on low oil pressure.</b></p> <p><b>Cue: If contacted as a NLO to investigate #2 EDG, overspeed tripped, there is damage to the linkage to the fuel racks, and cannot be reset.</b></p> <p><b>Cue: If requested as Work Management for AAC status, then report it will take 12 hours to be ready to start due to a faulty overspeed device.</b></p>			

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
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Time	Position	Applicant's Actions or Behavior	
RCS Inventory Control	ATC	5. Check RCS Inventory Control established as follows:  A. PZR level: <ul style="list-style-type: none"> <li>• 10 to 80%.</li> <li>• Trending to setpoint. <b>(May not be met due to RCS leak, may be trending up due to RCS heat up, review contingencies)</b></li> </ul> B. RCS MTS 30°F or greater.	
RCS Inventory Control	SRO	<b>Direct the following as necessary:</b>  <b>A. Perform as necessary:</b> 1) <b><u>IF</u> SIAS actuated on PPS inserts, <u>THEN</u> GO TO Step 6.</b> 2) <b>Verify PZR Level Control system restoring level to setpoint.</b>	
RCS Pressure Control	ATC	6. Check RCS Pressure Control: <ul style="list-style-type: none"> <li>• 1800 to 2250 psia.</li> <li>• Trending to setpoint. <b>(May not be met due to RCS leak or heatup, perform contingency as required)</b></li> <li>• Normal PZR Spray and heater controlling pressure <b>(Not met due to Loss of power, perform contingency)</b></li> <li>• Valid CNTMT Spray NOT in progress.</li> </ul>	

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Time	Position	Applicant's Actions or Behavior	
RCS Pressure Control	SRO	<b>Direct the following contingency actions as necessary:</b> <b>6. Perform as necessary:</b> <b>D. IF RCP 2P32A or 2P32B stopped, THEN verify associated PZR Spray valve in MANUAL and closed.</b> <ul style="list-style-type: none"> <li>• RCP A Spray Valve (2CV-4651)</li> <li>• RCP B Spray Valve (2CV-4652)</li> </ul> <b>E. IF ALL RCPs stopped AND RCS pressure control required, THEN initiate Aux spray using 2202.010 Attachment 48, RCS Pressure Control.</b> <b>G. Verify PZR Pressure Control system restoring pressure to setpoint.</b>	
Core Heat Removal	ATC	<b>7. Check Core Heat Removal by forced circulation:</b> <b>A. At least ONE RCP running. (RCPs will be secured due Loss of power and CRS should perform the contingency)</b>	
	ATC	<b>Direct the contingency for step 7. A</b> <b>A. IF ALL RCPs stopped, THEN perform the following:</b> <ol style="list-style-type: none"> <li>1) Verify BOTH PZR Spray valves in MANUAL and closed.</li> <li>2) GO TO Step 8.</li> </ol>	

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Time	Position	Applicant's Actions or Behavior	
RCS Heat Removal	ANY	<p>8. Check RCS Heat Removal:</p> <p>A. Check SG available by BOTH of the following:</p> <ul style="list-style-type: none"> <li>At least ONE SG level 10 to 90%.</li> <li>FW maintaining SG level. <b>(Not met, perform contingency)</b></li> </ul> <p>B. Check MFW in RTO <b>(Not met, contingency is satisfied)</b></p> <p>C. Check Feedwater line intact by the following:</p> <ul style="list-style-type: none"> <li>SG level stable or rising.</li> <li>NO unexplained step changes or erratic FW flow.</li> <li>NO unexplained step changes or erratic Condensate flow.</li> </ul> <p>D. Check RCS TC 540 to 555°F. <b>(May not be met perform contingency if not met.)</b></p> <p>E. Check SG pressure 950 to 1050 psia. <b>(Not met perform contingency)</b></p>	



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Time	Position	Applicant's Actions or Behavior	
RCS Heat Removal	ANY	<p><b>A. Perform the following: (Contingency Actions)</b></p> <p>1) IF SG level lowering, THEN verify EFAS actuated.</p> <p><b>B. Verify EITHER of the following:</b></p> <ul style="list-style-type: none"> <li>BOTH MFW pumps tripped.</li> <li>SG levels controlling at setpoint</li> </ul> <p><b>D. Perform as necessary:</b></p> <p>1) IF TC greater than 555° F, THEN perform the following:</p> <p>a) Verify level being restored to at least one SG.</p> <p>b) Verify SDBCS restoring T<sub>C</sub> 540°F to 555°F using 2105.008 Exhibit 3, SDBCS Emergency Operation.</p> <p>c) IF SDBCS <u>NOT</u> restoring T<sub>C</sub>, <u>THEN</u> check MSSVs operating to control SG pressure 1050 psia to 1100 psia.</p> <p><b>E. Perform as necessary:</b></p> <p>2) Verify SDBCS restoring SG pressure 950 psia to 1050 psia using 2105.008 Exhibit 3, SDBCS Emergency Operation.</p> <p>4) IF SG pressure greater than 1050 psia, THEN check MSSVs operating to control SG pressure 1050 psia to 1100 psia.</p> <p><b>Examiner Note: SG pressure cannot be control from the control room due to the loss of power.</b></p>	

Op-Test No.: 2017-1

Scenario #3

Event No.: 6 &amp; 7

Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).

Time	Position	Applicant's Actions or Behavior
Cntmt	ANY	<p>9. Check CNTMT parameters:</p> <p>A. Temperature and Pressure:</p> <ul style="list-style-type: none"> <li>• Temperature less than 140°F.</li> <li>• Pressure less than 16 psia.</li> </ul> <p>B. Check CNTMT Spray pumps secured.</p> <p>C. NO CNTMT radiation alarms or unexplained rise in activity:</p> <p>1) CAMS alarms:</p> <ul style="list-style-type: none"> <li>• "CNTMT PART/GAS RAD HI/LO" annunciator (2K10-B6) clear.</li> </ul> <p>2) RCS leakage alarms:</p> <ul style="list-style-type: none"> <li>• "AREA RADIATION HI/LO" annunciator (2K11-B10) clear.</li> <li>• "PROC LIQUID RADIATION HI/LO" annunciator (2K11-C10) clear.</li> </ul> <p>3) Check the following radiation monitors trend stable:</p> <ul style="list-style-type: none"> <li>• CNTMT Area (<b>Not met due to RCS leak</b>)</li> <li>• CAMS</li> <li>• Process Liquid</li> </ul> <p>D. NO secondary system radiation alarms or unexplained rise in activity:</p> <p>1) "SEC SYS RADIATION HI" annunciator (2K11-A10) clear.</p> <p>2) Secondary Systems Radiation monitors trend stable:</p> <ul style="list-style-type: none"> <li>• Main Steam lines</li> <li>• SG Sample</li> <li>• Condenser Off Gas</li> </ul>

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
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Time	Position	Applicant's Actions or Behavior	
	SRO	10. Notify STA to report to control room. 11. Direct NLOs to perform 2202.010 Attachment 47, Field Operator Post trip actions. 12. Verify Reactor trip announced on Plant page. 13. Notify SM to refer to Technical Specifications and 1903.010, Emergency Action Level Classification.	
<b>Cue: If contacted as the STA to report to the control room, acknowledge the request.</b> <b>Cue: If contacted as a NLO to perform Attachment 47 Field Operator Post Trip Actions, acknowledge request.</b>			
	SRO	14. Direct control board operators to acknowledge ALL annunciators and announce ALL critical alarms.	
	SRO	15. Check ALL safety function acceptance criteria satisfied. <b>(All safety functions are not satisfied, perform contingency)</b>  15. <b><u>IF</u> ANY safety function acceptance criteria <u>NOT</u> satisfied, <u>THEN</u> perform the following:</b>  <b>A. Notify control room staff of safety functions <u>NOT</u> satisfied.</b>  <b>B. GO TO Exhibit 8, Diagnostic Actions.</b>	
	SRO	Diagnose Functional Recovery EOP 2202.009	
<b>Enters and Implements Functional Recovery Procedure, 2202.009</b>			
<b><u>NOTE</u></b>			
Parameters in brackets [ ] reflect normal values corrected for harsh CNTMT environment with CNTMT temperature greater than 200°F or CNTMT radiation greater than 10 <sup>5</sup> R/hr.			

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Time	Position	Applicant's Actions or Behavior	
	SRO	*1. Notify Shift Technical Advisor to perform Safety Function Status Checks for appropriate success paths at the following times: <ul style="list-style-type: none"> <li>Initially after appropriate success paths identified</li> <li>Every 15 minutes thereafter.</li> </ul>	
	SRO	2. Record present time: <ul style="list-style-type: none"> <li>Time _____.</li> </ul>	
	SRO	*3. Notify SM to refer to Technical Specifications and 1903.010, Emergency Action Level Classification.	
	SRO	*4. Check RCS pressure greater than 1400 psia.	
	SRO	*5. Verify the following for any operating RCP: <ul style="list-style-type: none"> <li>A. CSAS NOT actuated.</li> <li>B. Proper seal staging.</li> <li>C. CCW aligned.</li> </ul> <b>Examiner Note: No RCPs are operating</b>	
	SRO	*6. <u>IF</u> SIAS or MSIS actuated, <u>THEN</u> perform the following:  <b>Examiner Note: SIAS and MSIS should not be actuated.</b>	

Op-Test No.: 2017-1                      Scenario #3                      Event No.: 6 & 7		
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).		
Time	Position	Applicant's Actions or Behavior
	SRO	<p>7. IF CCW in service to provide SG Sample Cooler cooling, THEN perform the following:</p> <p>A. IF SG "A" has indicated water level, THEN verify the following SG 'A' Sample Valves open:</p> <ul style="list-style-type: none"> <li>• 2CV-5850</li> <li>• 2CV-5852-2</li> </ul> <p>B. IF SG "A" has indicated water level, THEN verify the following SG 'A' Sample Valves open:</p> <ul style="list-style-type: none"> <li>• 2CV-5858</li> <li>• 2CV-5859-2</li> </ul> <p>C. Notify Chemistry to sample available SGs for activity.</p> <p><b>Examiner Note: CCW is not available</b></p>
	SRO	8. Check ALL available Hydrogen Analyzers in service using 2104.044, Containment Hydrogen Control Operations. <b>(Not met, perform contingency)</b>
	ANY	<p>8. <b>Verify all available Hydrogen Analyzers in service within 70 minutes from start of event.</b></p> <p style="padding-left: 40px;">* <b>Record time from Entry Section step 2:</b></p> <p><b>Time</b> _____</p>
	SRO	9. Open Functional Recovery Success Path Tracking page.
	SRO	<p>10. Notify Control Board Operators to perform the following:</p> <p>A. Monitor floating steps.</p> <p>B. Verify actuated ESFAS components using 2202.010 Exhibit 9, ESFAS Actuation.</p>

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
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Time	Position	Applicant's Actions or Behavior	
	ANY	<p>11. Determine safety function status as follows:</p> <p>A. Check Reactivity Control satisfied by EITHER of the following:</p> <ul style="list-style-type: none"> <li>Maximum of ONE CEA NOT fully inserted and Reactor power lowering.</li> <li>Reactor power less than 10-1% and stable or lowering.</li> </ul> <p><b>Examiners note: Reactivity will be satisfied.</b></p>	
	ANY	<p>B. Check Vital DC Auxiliaries satisfied:</p> <p>1) At least ONE 125v Vital DC bus energized:</p> <ul style="list-style-type: none"> <li>2D01-SPDS point E2D01</li> <li>2D02-SPDS point E2D02</li> </ul> <p>2) At least ONE 120v Vital AC bus energized:</p> <ul style="list-style-type: none"> <li>2RS1 - SPDS point E2RS1 or E2RS1RS3</li> <li>2RS2 - SPDS point E2RS2 or E2RS2RS4</li> <li>2RS3 - SPDS point E2RS3 or E2RS1RS3</li> <li>2RS4 - SPDS point E2RS4 or E2RS2RS4</li> </ul> <p><b>Examiners note: Vital DC will be satisfied.</b></p>	
	ANY	<p>C. Check Vital AC Auxiliaries satisfied:</p> <p>1) At least ONE 4160v Vital AC bus (2A3/2A4) energized.</p> <p><b>Examiners note: Vital AC will NOT be satisfied.</b></p>	

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).			
Time	Position	Applicant's Actions or Behavior	
	ANY	D. Check RCS Inventory Control satisfied: <ul style="list-style-type: none"> <li>1) CVCS maintaining PZR level 10 to 80% [40 to 70%] and level stable or trending to setpoint.</li> <li>2) RCS MTS 30°F or greater.</li> <li>3) RVLMS LVL 03 or higher elevation indicates WET.</li> </ul> <b>Examiners note: Inventory Control will NOT be satisfied due to power loss.</b>	
	ANY	E. Check RCS Pressure Control satisfied: <ul style="list-style-type: none"> <li>1) RCS pressure maintained within P-T limits, refer to Attachment 1, P-T Limits.</li> </ul> <b>Examiners note: P-T limits should be satisfied.</b>	

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).			
Time	Position	Applicant's Actions or Behavior	
	ANY	<p>F. Check RCS and Core Heat Removal satisfied:</p> <ol style="list-style-type: none"> <li>1) At least ONE intact SG available for Heat Removal by EITHER of the following:             <ul style="list-style-type: none"> <li>• Level 10 to 90% [20 to 90%] with FW available.</li> <li>• Level being restored with total FW flow of 485 gpm or greater.</li> </ul> </li> <li>2) <u>IF</u> ANY RCP operating, <u>THEN</u> RCS <math>\Delta T</math> less than 10°F and <u>NOT</u> rising.</li> <li>3) <u>IF</u> ALL RCPs secured, <u>THEN</u> RCS <math>\Delta T</math> less than 50°F and <u>NOT</u> rising.</li> <li>4) RCS <math>T_C</math> less than 555°F and <u>NOT</u> rising.</li> <li>5) RCS MTS 30°F or greater.</li> <li>6) RVLMS LVL 01 indicates WET.</li> </ol> <p><b>Examiners note: RCS and Core Heat Removal may not be satisfied due to Tc.</b></p>	



Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).			
Time	Position	Applicant's Actions or Behavior	
	ANY	<p>G. Check CNTMT Isolation satisfied:</p> <p>1) CNTMT parameters normal:</p> <p>a) "CNTMT RADIATION HI" annunciator (2K10-A6) clear.</p> <p>b) NO unexplained rise in CNTMT radiation.</p> <p>c) CNTMT pressure less than 18.3 psia.</p> <p>2) "SEC SYS RADIATION HI" annunciator (2K11-A10) clear.</p> <p>3) NO unexplained rise in Secondary Systems Radiation monitor trends:</p> <ul style="list-style-type: none"><li>• Main Steam lines</li><li>• SG Sample</li><li>• Condenser Off Gas</li></ul> <p><b>Examiners note: Not met due to the RCS leak.</b></p>	
	ANY	<p>H. Check CNTMT Temperature and Pressure Control satisfied:</p> <p>1) CNTMT pressure less than 16 psia.</p> <p>2) CNTMT temperature less than 140°F.</p> <p><b>Examiners note: CNTMT Temperature and Pressure Control should be satisfied.</b></p>	
	ANY	<p>12. Locally remove danger tags and close the following breakers.</p> <ul style="list-style-type: none"><li>• 2B51-E4 "LTOP RELIEF ISOL 2CV-4730-1"</li><li>• 2B51-K2 "LTOP RELIEF ISOL 2CV-4741-1"</li></ul>	

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).			
Time	Position	Applicant's Actions or Behavior	
<b>Cue: When contacted as a NLO to close the LTOP relief isolation valves, after 2 min have the booth operator close the LTOP breakers, then report the 2B51-E4, and 2B51-K2 are closed</b>			
		*13. Check ALL Safety Function acceptance criteria satisfied.  <b>Examiners note: Perform Contingency Actions.</b>	

Op-Test No.: 2017-1	Scenario #3	Event No.: 6 & 7
<p>Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).</p>		
Time	Position	Applicant's Actions or Behavior
	SRO	<p><b>*13. Perform the following:</b></p> <ul style="list-style-type: none"> <li><b>A. Determine appropriate success paths using Success Path Decision Trees.</b></li> <li><b>B. Initiate success paths for ALL Safety Functions in the following order:</b> <ul style="list-style-type: none"> <li>1) Jeopardized.</li> <li>2) Challenged.</li> <li>3) Satisfied.</li> </ul> </li> <li><b>C. <u>IF</u> higher priority Safety Function jeopardized <u>AND</u> lower priority safety function success path in progress, <u>THEN</u> GO TO appropriate success path for highest priority safety function in jeopardy.</b></li> <li><b>D. <u>IF</u> it is determined that a de-energized electrical bus is needed to satisfy a SAFETY FUNCTION, <u>THEN</u> restore power to affected bus using 2202.010 Attachment 11, Degraded Power</b></li> <li><b>E. <u>WHEN</u> success path implemented for EACH Safety Function, <u>THEN</u> RETURN TO Step 14 of Entry procedure.</b></li> </ul> <p><b>Examiner Note: The SRO may restore power using 2202.010 attachment 11 or complete MVAC-1. Either path will direct restoring power using Att. 29 for SU#2 transformer.</b></p> <p><b>Examiner Note: Steps for Att. 29 start on page 46.</b></p> <p><b>Examiner Note: The SRO will complete the safety functions in order of hierarchy; MVAC is the highest "Jeopardized" safety function.</b></p> <p><b>SRO determines that an Offsite source and Startup transformer are available and selects MVAC-1.</b></p>

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).			
Time	Position	Applicant's Actions or Behavior	
<b>Enters and Implements MVAC-1, Startup Transformers</b>			
	BOP	1. Verify BOTH of the following: <ul style="list-style-type: none"> <li>• XFMR Feeder Breaker switches for ANY de-energized bus in PTL AND breakers open.</li> <li>• XFMR Feeder Breaker switches for ANY de-energized power source in PTL AND breakers open.</li> <li>• 2H13, SU #2 Feeder to 2H1</li> <li>• 2H14, Unit Aux Feeder to 2H1</li> <li>• 2H15, SU #3 Feeder to 2H1</li> <li>• 2H23, SU #2 Feeder to 2H2</li> <li>• 2H24, Unit Aux Feeder to 2H2</li> <li>• 2H25, SU #3 Feeder to 2H2</li> <li>• 2A111, SU #2 Feeder to 2A1</li> <li>• 2A112, Unit Aux Feeder to 2A1</li> <li>• 2A113, SU #3 Feeder to 2A1</li> <li>• 2A211, SU #2 Feeder to 2A2</li> <li>• 2A212, Unit Aux Feeder to 2A2</li> <li>• 2A213, SU #3 Feeder to 2A2</li> </ul>	
	ANY	2. Check offsite power available using 2C10 indications and System Dispatcher.	

Op-Test No.: 2017-1	Scenario #3	Event No.: 6 & 7						
<p>Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).</p>								
Time	Position	Applicant's Actions or Behavior						
<p><b><u>Note:</u></b></p> <p>Voltage indication for SU XFMRs may indicate SU XFMRs available with associated disconnect or breaker open.</p>								
	ANY	<p>3. Check EITHER SU XFMR energized from offsite power AND meets the below listed criteria for the respective transformer:</p> <ul style="list-style-type: none"> <li>• SU XFMR #3 meets EITHER of the following voltage criteria:             <ul style="list-style-type: none"> <li>- Greater than or equal to 22.7 KV, regulator out of service (E22AT or E9664).</li> <li>- Greater than or equal to 20.9 KV with regulator in service (E22AT).</li> </ul> </li> </ul> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 50%; text-align: center;">Regulated Voltage</td> <td style="width: 50%; text-align: center;">Unregulated Voltage</td> </tr> <tr> <td style="text-align: center;">SPDS E2ST3R</td> <td style="text-align: center;">SPDS E22AT</td> </tr> <tr> <td style="text-align: center;">PMS E9664</td> <td></td> </tr> </table> <p><b>Examiner Note: SU XFMR #3 is not available.</b></p>	Regulated Voltage	Unregulated Voltage	SPDS E2ST3R	SPDS E22AT	PMS E9664	
Regulated Voltage	Unregulated Voltage							
SPDS E2ST3R	SPDS E22AT							
PMS E9664								

Op-Test No.: 2017-1	Scenario #3	Event No.: 6 & 7				
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).						
Time	Position	Applicant's Actions or Behavior				
		<p>SU XFMR #2 with ALL of the following requirements satisfied:</p> <ul style="list-style-type: none"> <li>- Voltage greater than or equal to 161 KV with voltage regulator out of service OR voltage greater than or equal to 146 KV (E161ST2) with voltage regulator in service using the following indications:</li> </ul> <table border="1" style="margin: 10px auto; width: 60%; border-collapse: collapse;"> <tr> <td style="padding: 5px; text-align: center;">Regulated Voltage</td> <td style="padding: 5px; text-align: center;">Unregulated Voltage</td> </tr> <tr> <td style="padding: 5px;">SPDS EST2R PMS E4013</td> <td style="padding: 5px;">SPDS E161ST2</td> </tr> </table> <ul style="list-style-type: none"> <li>- EITHER of the following 161 KV transmission lines in service:               <ul style="list-style-type: none"> <li>▪ ANO-Russellville East</li> <li>▪ ANO-Pleasant Hill</li> </ul> </li> <li>- SU2 load shedding enabled.</li> <li>- No Unit 1 buses powered from SU2.</li> <li>- SU2 voltage regulator 3% reduction disabled.</li> </ul>	Regulated Voltage	Unregulated Voltage	SPDS EST2R PMS E4013	SPDS E161ST2
Regulated Voltage	Unregulated Voltage					
SPDS EST2R PMS E4013	SPDS E161ST2					
<p><b>Cue: If contacted as the dispatcher and requested report that SU2 voltage regulator is not in the 3% reduction mode and the ANO Russellville East and Pleasant Hill East transmission lines are in service.</b></p> <p><b>Cue: If contacted as a NLO then report that SU2 load shedding is enabled.</b></p> <p><b>Cue: When contacted as Unit 1, report that you are NOT energizing any buses from XFMR #2.</b></p>						
	BOP	<p>4. Energize 6900 and 4160v Non-vital buses from available SU XFMR as follows:</p> <p style="padding-left: 20px;">A. Check SU XFMR #3 available.</p> <p><b>Examiner Note: SU XFMR #3 is not available perform contingency</b></p>				
<p><b><u>NOTE</u></b></p> <p>Due to SU XFMR #2 limitations it may be desirable to maintain 4160v Vital buses on DGs.</p>						

Op-Test No.: 2017-1	Scenario #3	Event No.: 6 & 7								
<p>Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).</p>										
Time	Position	Applicant's Actions or Behavior								
	BOP	<p><b>A. IF SU XFMR #2 available, THEN perform the following:</b></p> <ol style="list-style-type: none"> <li><b>1) Energize electrical buses using 2202.010 Attachment 29, Startup XFMR #2 Usage.</b></li> <li><b>2) <u>WHEN</u> offsite power has been restored from SU XFMR #2, <u>THEN</u> GO TO Step 6.</b></li> <li><b>3) Do NOT continue.</b></li> </ol>								
<b>Go to Step 1 of Att. 29.</b>										
	BOP	<p><b>A. IF ONLY Unit 2 energizing buses from SU XFMR #2 AND Auto XFMR energized from 500 KV, THEN perform the following:</b></p> <p><b>B. Locally verify SU XFMR #2 load shed circuit enabled.</b></p> <ul style="list-style-type: none"> <li>• Key Lock Switch (143-2H09) at 2H-13 in NORMAL.</li> <li>• Key Lock Switch (143-2A16) at 2A-111 in NORMAL.</li> </ul>								
<p><b>Cue: If contacted as the AO, then report after 2 min report that the Key switches (143-2H09) at 2H-13 and (143-2A16) at 2A-111 are in normal.</b></p> <p><b>Cue: When contacted as Unit 1, report that you are NOT energizing any buses from XFMR #2.</b></p>										
	BOP	<b>B. Verify Unit 1 is NOT energizing ANY buses from SU XFMR #2.</b>								
<b>Examiner Note: This step C and D are NA.</b>										
	BOP	<p><b>E. IF 2A2 to be energized, THEN place handswitches for the following breakers in PTL:</b></p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">BREAKER</th> <th style="width: 50%;">DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>2A202</td> <td>2A2 to 2B2</td> </tr> <tr> <td>2B424</td> <td>2C-5B</td> </tr> <tr> <td>2B223</td> <td>2P33B</td> </tr> </tbody> </table>	BREAKER	DESCRIPTION	2A202	2A2 to 2B2	2B424	2C-5B	2B223	2P33B
BREAKER	DESCRIPTION									
2A202	2A2 to 2B2									
2B424	2C-5B									
2B223	2P33B									

Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
<p>Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).</p>			
Time	Position	Applicant's Actions or Behavior	
	BOP	<p>F. Energize required Non-vital buses 2A1, 2A2, 2H1, and 2H2 from SU XFMR #2 as follows:</p> <p>1) <u>IF</u> energizing 2A1, <u>THEN</u> perform the following:</p> <p><b>Examiner Note: 2A1 is the faulted bus and will NOT be energized.</b></p> <p>2) <u>IF</u> energizing 2A2, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>Place synch switch for 2A2 Feeder breaker in ON</li> <li>Close SU XFMR Feeder breaker 2A211 to energize bus 2A2.</li> <li>Check voltage indicated on 2A2.</li> <li>Place synch switch for 2A2 Feeder breaker in OFF.</li> <li>Remove synch switch from SU XFMR Feeder breaker 2A211.</li> </ol> <p><b>Examiner Note: Energizing 2A2</b></p>	
<b>Examiner Note: Steps 3 and 4 are NA.</b>			
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <ul style="list-style-type: none"> <li>Minimum Non-vital bus voltage during SU XFMR #2 loading is 3640v on 4160v Non-vital buses.</li> <li>Minimum Non-vital bus voltage during SU XFMR #2 loading is 6010v on 6900v buses.</li> <li>Minimum 480v Vital bus voltage is 436v when 4160v Vital buses energized.</li> </ul>			
<b>Examiner Note: Step G is NA.</b>			



Op-Test No.: 2017-1		Scenario #3	Event No.: 6 & 7
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).			
Time	Position	Applicant's Actions or Behavior	
	BOP	<p>H. <u>IF</u> desired to energize 4160v Vital bus 2A4, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Place synch switch for 2A4 Normal Feeder breaker in ON.</li> <li>2) Hold Normal Feeder breaker (2A409) in closed position for 3 seconds.</li> <li>3) Check voltage indicated on 2A4.</li> <li>4) Place synch switch for 2A4 Normal Feeder breaker in OFF.</li> <li>5) Remove synch switch from 2A4 Normal Feeder breaker 2A409.</li> </ol>	
<b>CRITICAL TASK: Energize at least one vital AC bus prior to Margin to Saturation lowering below 30 degrees F.</b>			
<b>Returns to Step 6 of MVAC-1</b>			
	SRO	*6. Check BOTH 4160v Vital buses energized. <b>(Not met)</b>	
	SRO	<p>*6. <u>IF</u> ESF equipment on energized train fails AND ESF equipment on de-energized train needed to satisfy a safety function, <u>THEN</u> crosstie 4160v Vital buses using 2107.002, ESF Electrical System Operation.</p> <p><b>Examiner Note: Crosstie should not be required.</b></p>	
	ANY	<p>7. Check acceptance criteria for Maintenance of Vital AC Power satisfied:</p> <ul style="list-style-type: none"> <li>• At least ONE 4160v Vital bus (2A3/2A4) energized.</li> </ul>	
	SRO	Transition to the next jeopardized or challenged safety function IC	

Op-Test No.: 2017-1	Scenario #3	Event No.: 6 & 7
Event Description: (6) 2A-1 4160 Volt vital bus lockout, which will propagate to a SU#3 transformer lockout (LOOP). (7) #1 EDG loss of lube oil, #2 EDG Overspeed trip and AAC Diesel Generator is Out of Service (Station Blackout).		
Time	Position	Applicant's Actions or Behavior
<b>CRITICAL TASK:</b> Maintain RCS pressure within the Pressure-Temperature limits of 200°F and 30°F Margin to Saturation and less than 2500 psia by performing any of the following : <ul style="list-style-type: none"><li>• Controlling PZR heaters</li><li>• Controlling charging and/or HPSI flow once power is restored.</li></ul>		
<b>Termination criteria: 4160v Vital bus 2A4 is energized or at the discretion of the lead examiner.</b>		

Op-Test No.: 2017		Scenario # 3	Event No: 8
Event Description: 2CV-1026-2 and 2CV-1076-2 do not respond to EFAS signal.			
Time	Position	Applicant's Actions or Behavior	
	ANY	Recognize 2CV-1026-2 is not cycling based on SG level.	
	ANY	Recognize 2CV-1076-2 is not cycling based on SG level.	
<b>Examiner Note: This action should be completed during SPTAs if it is not recognized until the Functional recovery procedure the crew should use steps to restore feedwater from 2P-7A to prevent water hammering the SG feed ring.</b>			
	BOP	Update 2CV-1026-2 and 2CV-1076 not opening as required then operate both valve to restore SG levels.	
<b>Critical Task: Restore Feedwater prior to both SG levels reaching 70" wide range.</b>			
<b>Termination criteria: When 2CV-1026-2, or 2CV-1039-1 open or at the discretion of the lead examiner.</b>			

Facility: ANO-2	Scenario No.: 4 (Modified)	Op-Test No.: 2017-1	
Examiners:	Operators:		
Initial Conditions: ~4% MOL; RED Train Maintenance Week.			
<p>Turnover: ~4%. 260 EFPD. EOOS indicates 'Minimal Risk'. RED Train Maintenance Week. Steam Bypass valve in auto local setpoint of 1000 psia. Reactor power was reduced to ~4% for Turbine CV EH leak repair and DEFAS cabinet repair. Power is being maintained at 3 to 5%.</p> <p>Evolution scheduled: Shift loop 1 Service Water return from the Emergency Cooling Pond (ECP) to the Lake Dardanelle.</p>			
Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP) N (SRO)	Shift Loop 1 Service Water return from the Emergency Cooling Pond (ECP) to the Lake Dardanelle. <b>OP-2104.029, Service Water System Operations</b>
2	CV4816	C (ATC) C (SRO)	Letdown flow control valve 2CV-4816 will fail closed. <b>OP-2203.012L, Annunciator 2K12 Corrective Action</b> <b>OP-2104.002, Chemical and Volume Control.</b>
3	XSG2PT10411	I (BOP) I (SRO) TS (SRO)	2PT-1041-1 SG-A pressure detector fails low. <b>OP-2203.012D, Annunciator 2K04 Corrective Action</b> <b>OP-2105.001, CPC/CEAC Operations</b>
4	DI_C40_S72B ESFCIAS1 K04-C01 K07-C01	C(BOP) C(ATC) C(SRO) TS(SRO)	Inadvertent Containment Isolation Actuation Signal (CIAS) on the Green Train. <b>OP-2203.039, Inadvertent CIAS</b>
5	RCP2P32DUPP RCP2P32DMID	C (ATC) C (SRO)	Two seals on 'D' RCP fail <b>OP-2203.025, RCP Emergencies</b>
6	RCP2P32DLOW RCLOCATCD	M (ALL)	Third 'D' RCP seal fails and a 180 gpm RCS leak starts. <b>OP-2202.001, SPTAs,</b> <b>OP-2202.003, Loss of Coolant Accident</b>
7	CVC2P36ASIAS CVC2P36CSIAS CVC2P36LOLVL	C (ATC) C (SRO)	Backup Charging pumps fail to start on low level or SIAS <b>OP-2202.010, Standard Attachments.</b>
8	SIS2P89ASS	C (BOP) C (SRO)	2P-89A High Pressure Safety Injection (HPSI) pump shaft shear. <b>OP-2202.010, Standard Attachments.</b>
End Point	RCS cooldown commenced IAW the LOCA EOP.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Target Quantitative Attributes (Section D.5.d)	Actual Attributes
Malfunctions after EOP entry (1-2)	2
Abnormal Events (2-4)	4
Major Transients (1-2)	1
EOPs entered requiring substantive actions (1-2)	1
EOP contingencies requiring substantive actions (0-1)	0
Critical Tasks (2-3)	3

Critical Task	Justification	
Component Cooling Water (CCW) to RCPs must be restored within 10 minutes of the loss of cooling water.	Exceeding operating limits has the potential to degrade the RCS pressure boundary. RCPs should be maintained in an available condition for last-resort use if needed.  If RCPs are allowed to operate for 10 minutes without CCW flow. OP-1015.050 requires RCPs not meeting operating limits to be secured within 10 minutes.	<ul style="list-style-type: none"> <li>• 1015.050 Time Critical Operation action program, Attachment C</li> <li>• CE EPGB Simulator CTs: CT-23, Trip any RCP exceeding operating limits (LOCA-04)</li> <li>• AOP OP-2203.039 Inadvertent CIAS.</li> </ul>
Commence an RCS cooldown within 30 minutes of entry into OP-2202.003, LOCA EOP.	Cooling down and depressurizing the RCS removes decay heat and lowers the DP at the break, slowing the leak rate and reducing makeup volume required. SDC entry conditions are also required for long-term cooling.	<ul style="list-style-type: none"> <li>• CE EPGB Simulator CTs: CT-20, Cool down and depressurize RCS (LOCA-09)</li> <li>• CR-ANO-2-2010-948, Critical task criteria</li> </ul>
'D' RCP must be secured within 10 min of the reactor trip.	The out-of-limits condition could result in shaft seal damage, and then shaft seal failure could result in increased RCS leakage out the seal to the containment atmosphere, which would worsen the event severity.	<ul style="list-style-type: none"> <li>• 1015.050 Time Critical Operation action program, Attachment C</li> <li>• CE EPGB Simulator CTs: CT-23, Trip any RCP exceeding operating limits.</li> <li>• CR-ANO-2-2010-948, Critical task criteria</li> </ul>

### Scenario #4 Objectives

- 1) Evaluate individual ability to shift Service Water returns.
- 2) Evaluate individual response to a failure a letdown flow control valve.
- 3) Evaluate individual response to a failure of Steam Generator pressure transmitter.
- 4) Evaluate individual response to a failure of a Containment Isolation Actuation Isolation signal.
- 5) Evaluate individual response to Reactor Coolant Pump seal failures.
- 6) Evaluate individual and crews ability to mitigate a Loss of Coolant Accident.
- 7) Evaluate individual ability to monitor operation of Engineered Safety Features equipment and respond to Back up Charging pumps fail to start on low level or SIAS.
- 8) Evaluate individual ability to monitor operation of Engineered Safety Features equipment and respond to a High Pressure Safety Injection pump Shaft Shear.

### SCENARIO #4 NARRATIVE

Simulator session begins with the plant at ~4% power. [Site OE: CR-ANO-2-2016-1993 EH Leak causes power reduction and manual turbine trip. ICES # 323174]

When the crew has completed their control room walk down and brief, the BOP will shift Loop 1 Service Water return from the ECP to Lake Dardanelle using OP-2104.029 Service Water System Operations.

After the BOP has shifted the Loop 1 Service Water returns from the ECP to Lake Dardanelle, the letdown flow control valve 2CV-4816 will fail closed. The ATC will recognize that the flow control valve has failed closed and use the Annunciator Corrective action and Chemical Volume control procedure to shift letdown flow control valve and restore letdown. [Site OE: CR-ANO-2-2014-347, 2CV-4816 would not respond to an open command from the control room.]

When letdown has been placed back in service or when cued by lead examiner, the 'A' Steam Generator pressure safety channel pressure instrument, 2PT-1041-1, will fail low. This will trip one of the four PPS channels for low SG pressure trip. Alarms for RPS channel trip/pre-trip, MSIS pre-trip and channel 'A' operator insert (2C03) trip and pre-trip light will be lit. The SRO will refer to the ACA 2203.012D and enter tech specs 3.3.1.1, 3.3.2.1, 3.3.3.5, and 3.3.3.6. The BOP will place Channel 'A' PPS in bypass for point 11 SG pressure low, point 19 SG1 delta-P high, and point 20 SG2 delta-P. The crew will have one hour to place these points in bypass before exceeding the tech spec LCO. [Site OE: CR-ANO-2-1988-0025, CR-ANO-2-1994-398, Steam Generator pressure transmitter failed low.]

**SCENARIO #4 NARRATIVE (continued)**

When the appropriate Tech spec has been entered and 'A' PPS channel is placed in bypass and cued by lead examiner; An Inadvertent Containment Isolation will occur on the green train causing the green train CCW to RCPs valve and the Main Chilled water to containment valves to close. The SRO will enter Inadvertent CIAS AOP, OP 2203.039. The crew should restore Component Cooling Water (CCW) to RCPs. The SRO will enter Tech Spec 3.6.3.1 for the overridden Containment Isolation valve. The ATC will cycle charging pump to control pressurizer level. The crew should minimize CEA movement due to the loss of cooling. The BOP will start all containment coolers and align Service Water to maintain Containment temperature and pressure in the required band. The SRO should call for maintenance assistance to correct inadvertent green train Containment isolation. [Industry OE: SEN 268 Invalid Safety Injection with Failure to Reset, Site OE: CR-ANO-2-2013-005 Inadvertent SIAS, CCAS, And CIAS.]

When the actions of inadvertent CIAS have been completed or at the lead examiners cue 'D' RCP seals will fail. The SRO should enter the RCP emergencies AOP, 2203.025 due to the first failed seal. The SRO will contact operations management and continue plant operation based on their recommendation. When the second seal fails the Crew should trip the reactor and secure 'D' RCP. The crew may also secure 'A' or 'B' RCP to balance RCS flows. [Time critical operator action per OP-1015.050 Time Critical Operator action program secure RCP exceeding operating limits] [Industry OE: SER 36-80 Byron Jackson Reactor Coolant Pump Seal Failure, SOER 82-5, RCP Seal Failures]

The Crew will implement Standard Post Trip Actions (SPTA) EOP, 2202.001. During SPTAs, the third seal on 'D' RCP will fail and a Loss of Coolant Accident will commence. The crew may actuate SIAS and CCAS due to the RCS leak. The crew will restore service water to Component Cooling water (CCW). The CRS should direct Steam Generator pressure be lowered using Auto Local control of the Steam Dump Bypass Control System (SDBCS) to maintain MTS as RCS pressure lowers. [PRA item # 9 restore service water to CCW] [Site OE: CR-ANO-2-2013-2254, SDBCS Master controller would not control in automatic]

The SRO will diagnose either an Excess RCS leakage and enter Excess RCS leakage AOP, 2203.016, or if SIAS is actuated diagnose Loss of Coolant Accident (LOCA). If Excess RCS is diagnosed the SRO should implement the floating step for leakage greater than 44 gpm then actuate SIAS and CCAS and re-diagnose LOCA. The ATC should recognize the backup charging pump fail to start on low level and SIAS. The ATC will start the backup charging pumps. The crew should determine that 2P-89A HPSI pump has degraded discharge pressure, and start 2P-89C. The ATC will commence cool down of the RCS and control RCS pressure to restore pressurizer level. The BOP will override Service Water to Component Cooling Water and Auxiliary Cooling Water. [Industry OE: SEN-220, SEN-216, & SEN-182, RCS leakage events.]

### Simulator Instructions for Scenario 4

Reset simulator to MOL ~4 % power.

Place MINIMAL RISK, Green Train Protected and RED Train Maintenance Week signs on 2C11.

Ensure the SDBCS master is in A/L with a setpoint of 1000 psi

Ensure both main feedwater pumps recirc valves are throttled to ~1gal/rpm

T5 =Reactor Trip

T6 = SIAS-2

Event No.	Malf. No.	Value/ Ramp Time	Event Description
1			Shift Loop 1 Service Water return from the Emergency Cooling Pond (ECP) to the Lake Dardanelle. <b>OP-2104.029, Service Water System Operations</b>
2	CV4816 Trigger = T1	0	Letdown flow control valve 2CV-4816 will fail closed. <b>OP-2203.012L, Annunciator 2K12 Corrective Action</b> <b>OP-2104.002, Chemical and Volume Control.</b>
3	XSG2PT10411 Trigger = T2	0	2PT-1041-1 SG-A pressure detector fails low. <b>OP-2203.012D, Annunciator 2K04 Corrective Action</b> <b>OP-2105.001, CPC/CEAC Operations</b>
4	DI_C40_S72B ESFCIAS1 K04-C01 K07-C01 Trigger = T3	active active ON ON	Inadvertent Containment Isolation Actuation Signal (CIAS) on the Green Train. <b>OP-2203.039, Inadvertent CIAS</b>
5	RCP2P32DUPP RCP2P32DMID Trigger = T4	100% 100%/ delay = 2 min.	Two seals on 'D' RCP fail <b>OP-2203.025, RCP Emergencies</b>
6	RCP2P32DLOW RCLOCATCD Trigger = T5	100%/ delay 2 min. 180 gpm/ delay 3 min.	Third 'D' RCP seal fails and a 180 gpm RCS leak starts. <b>OP-2202.001, SPTAs,</b> <b>OP-2202.003, Loss of Coolant Accident</b>
7	CVC2P36ASIAS CVC2P36CSIAS CVC2P36LOLVL	active	Backup Charging pumps fail to start on low level or SIAS <b>OP-2202.010, Standard Attachments.</b>
8	SIS2P89ASS Trigger = T6	Active / delay = 30 secs.	2P-89A High Pressure Safety Injection (HPSI) pump shaft shear. <b>OP-2202.010, Standard Attachments.</b>



Simulator Operator CUEs		
		Shift Loop 1 Service Water return from the Emergency Cooling Pond (ECP) to the Lake Dardanelle. <b>OP-2104.029, Service Water System Operations</b>
<b>Cue: If contacted as Chemistry to adjust chemical injection as necessary, then respond as requested.</b>		
Cued by lead examiner	Trigger T1	Letdown flow control valve 2CV-4816 will fail closed. <b>OP-2203.012L, Annunciator 2K12 Corrective Action</b> <b>OP-2104.002, Chemical and Volume Control.</b>
<b>Cue: When contacted as NLO, then report Rad monitor flow is zero gpm.</b> <b>Cue: If requested as a NLO to investigate 2CV-4816, then report that the positioner feedback arm has come loose and fallen off.</b> <b>Cue: If contacted as a NLO, then report 2CVC-139 is open.</b> <b>Cue: When contacted as NLO, then report Rad monitor flow is 1 gpm.</b> <b>Cue: When contacted as the WWM, then report that I&amp;C will start planning a work package to repair the control valve.</b>		
Cued by lead examiner	Trigger T2	2PT-1041-1 SG-A pressure detector fails low. <b>OP-2203.012D, Annunciator 2K04 Corrective Action</b> <b>OP-2105.001, CPC/CEAC Operations</b>
<b>Cue: When contacted as the WWM, then report that I &amp; C planner will begin planning work on failed Steam Generator pressure instrument.</b>		
Cued by lead examiner	Trigger T3	Inadvertent Containment Isolation Actuation Signal (CIAS) on the Green Train.
<b>Cue: If the contacted as the System Engineering or WMM center, then comply with the request to collect charging header nozzle data.</b> <b>Examiner Cue: If the applicant tries to assess 2C-39 ESFAS panel then inform the applicant that all the lights on 2C-39 are on.</b> <b>Cue: If the contacted as the WWM, then report that I&amp;C will start investigating the inadvertent CIAS</b> <b>Cue: If the contacted as the WWM to monitor CEDM coil temperatures, then report that I&amp;C will monitor CEDM coil temperatures.</b> <b>Cue: If the contacted as the System Engineering for assistance, then state you will start investigating the issues.</b>		

Cued by lead examiner	Trigger T4	'Two seals on 'D' RCP fail.
<b>Cue: If the contacted as Operations Management the acknowledge the information about the failed seal.</b>		
Reactor Trip	Trigger T5	Third 'D' RCP seal fails and a 180 gpm RCS leak starts.
<b>Cue: If contacted as the STA to report to the control room, acknowledge the request.</b> <b>Cue: If contacted as a NLO to perform Attachment 47 Field Operator Post Trip Actions, acknowledge request.</b> <b>Cue: When contacted as Chemistry, then report you will sample both S/G for activity.</b>		
SIAS	Trigger T6	2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.
<b>Cue: If contacted as NLO to investigate 2P-89A HPSI pump, then after 2 min. report the coupling for 2P-89A HPSI pump has failed.</b>		

Op-Test No.: 2017		Scenario #4	Event No.: 1
Event Description: Shift Loop 1 Service Water return from the Emergency Cooling Pond (ECP) to the Lake Dardanelle.			
Time	Position	Applicant's Actions or Behavior	
Cued by lead examiner	BOP	10.2.1 <b>NOTIFY</b> Chemistry to adjust chemical injection as necessary. 10.2.2 <b>ENSURE</b> Cooling Tower blowdown adjusted as desired using 2104.008, Circulating Water System Operation.	
<b>Cue: If contacted as Chemistry to adjust chemical injection as necessary, then respond as requested.</b>			
	BOP	10.2.3 <b>ENSURE</b> at least ONE of the following open to establish a return path: <ul style="list-style-type: none"> <li>Cooling Tower Makeup 2CV-1540 (2HS-1540)</li> <li>Squeeze valve 2CV-1460 using Cooling Tower Basin level controller (2LIC-1207A) (may be throttled)</li> </ul>	
	BOP	10.2.4 <b>IF</b> CCW/ACW in service, <b>THEN ENSURE</b> CCW/ACW Return Isol valves open: <ul style="list-style-type: none"> <li>Loop 1 CCW/ACW Return Isol 2CV-1543-1 (2HS-1543-1)</li> <li>Loop 2 CCW/ACW Return Isol 2CV-1542-2 (2HS-1542-2)</li> </ul>	
	BOP	10.2.5 <b>CLOSE</b> selected SW Return to ECP: <ul style="list-style-type: none"> <li>Loop 1 Emerg Pond RTN 2CV-1541-1 (2HS-1541-1)</li> <li>Loop 2 Emerg Pond RTN 2CV-1560-2 (2HS-1560-2)</li> </ul>	
	BOP	10.2.6 <b>WHEN</b> selected loop SW Return to ECP valve begins closing, <b>THEN ENSURE</b> associated SW Return to Lake valve begins opening: <ul style="list-style-type: none"> <li>SW Return Hdr #1 to Dardanelle (2CV-1481-1)</li> <li>SW Return Hdr #2 to Dardanelle (2CV-1480-2)</li> </ul>	

Op-Test No.: 2017			Scenario #4			Event No.: 1		
Event Description: Shift Loop 1 Service Water return from the Emergency Cooling Pond (ECP) to the Lake Dardanelle.								
Time		Position		Applicant's Actions or Behavior				
		BOP		10.2.7 <b>IF</b> Cooling Tower Basin level controller (2LIC-1207A) placed in MANUAL in step 10.1, <b>THEN PLACE</b> Cooling Tower Basin level controller in AUTO.				
		BOP		*10.2.8 <b>MONITOR</b> Cooling Tower Basin level (2LIC-1207A).  *10.2.9 <b>MONITOR</b> Main Chiller temperatures using OPS-B11, Inside AO Log.  *10.2.10 <b>MONITOR</b> Loop 2 CCW temperature (2TIS-5209 or T5209).				
Termination criteria: When Loop 1 Service Water returns is shifted or at lead examiner's discretion.								

Op-Test No.: 2017		Scenario #4	Event No.: 2
Event Description: Letdown flow control valve 2CV-4816 will fail closed.			
Time	Position	Applicant's Actions or Behavior	
Cued by lead examiner	ATC	Announce annunciators: 2K12-J1 RADMONITOR FLOW LO	
<b>Enter 2203.012L, Annunciator 2K12 Corrective action.</b>			
	ATC	2.1 <u>IF</u> due to intentional Operator action (i.e. plant cooldown Letdown isolated) OR expected system response (i.e. diverting), <u>THEN</u> no action required. <b>Examiner Note: Step 2.1 is N/A.</b>	
	ATC	Direct a NLO to check flow. 2.2 Locally check flow on 2FIS-4807. <b>Examiner Note: Step 2.2 is N/A due to pump trip.</b>	
<b>Cue: When contacted as NLO, then report Rad monitor flow is zero gpm.</b>			
<b>Cue: If requested as a NLO to investigate 2CV-4816, then report that the positioner feedback arm has come loose and fallen off.</b>			
	ATC	2.3 Verify letdown flow (2FIS-4801) greater than 28 gpm. Refer to Chemical and Volume Control (2104.002). <b>Examiner Note: ATC should recognize flow is less than 28 gpm and then determine it is because 2CV-4816 is closed.</b>	
	ATC	2.4 Verify L/D to Rad monitor (2CV-4804) open.	
	ATC	2.5 <u>IF</u> Letdown Flow controller (2HIC-4817) NOT controlling in AUTOMATIC, <u>THEN</u> perform the following:  2.5.1 Place Letdown Flow controller (2HIC-4817) in MANUAL. 2.5.2 Stabilize flow. <b>Examiner Note: Letdown flow controller is operating properly.</b>	
	ATC	2.6 <u>IF</u> EITHER Letdown Flow Control valve (2CV-4816 or 2CV-4817) faulty, <u>THEN</u> place other valve in service using Chemical and Volume Control (2104.002).	

Op-Test No.: 2017		Scenario #4	Event No.: 2
Event Description: Letdown flow control valve 2CV-4816 will fail closed.			
Time	Position	Applicant's Actions or Behavior	
Enter 2104.002, Chemical and Volume Control.			
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p><b>During operation with both Letdown Flow Control valves in service, Letdown flow and pressure oscillations may increase. (CR-ANO-2-2007-00013)</b></p>			
	ATC	9.7 Shifting Letdown Flow Control valves  9.7.1 Verify 2F-3A/B Inlet Isolation valve (2CVC-139) open. <b>Examiner Note: 2CVC-139 is normally maintained fully open.</b>	
Cue: If contacted as a NLO, then report 2CVC-139 is open.			
	ATC	9.7.2 Place Letdown Flow controller (2HIC-4817) in MANUAL IAW applicable steps of this procedure section.	
	ATC	9.4 Shifting Letdown Flow controller (2HIC-4817) from AUTOMATIC to MANUAL  9.4.1 At Letdown Flow controller (2HIC-4817) match MANUAL signal to AUTOMATIC signal. 9.4.2 At Letdown Flow controller (2HIC-4817) transfer controller from AUTOMATIC to MANUAL. *9.4.3 Adjust Letdown Flow controller (2HIC-4817) as needed until desired flow is achieved.	
	ATC	9.7.3 Isolate Letdown using Letdown Flow controller (2HIC-4817).	
	ATC	9.7.4 Place Letdown Flow controller (2HS-4817) to desired position: <ul style="list-style-type: none"> <li>• 2CV-4816</li> <li>• 2CV-4817</li> <li>• BOTH</li> </ul>	

Op-Test No.: 2017

Scenario #4

Event No.: 2

Event Description: Letdown flow control valve 2CV-4816 will fail closed.

Time	Position	Applicant's Actions or Behavior
	ATC	9.7.5 Place Letdown Pressure controller (2PIC-4812) in Manual IAW applicable steps of this procedure section.
	ATC	9.7.6 Using Letdown Pressure controller (2PIC-4812) verify selected Letdown Back Pressure Control valve(s) (2CV-4810/2CV-4811) fully open.
	ATC	9.7.7 Slowly raise Letdown flow using Letdown Flow controller (2HIC-4817).
	ATC	9.7.8 Using Letdown Pressure controller (2PIC-4812) slowly close 2CV-4810/2CV-4811 to establish desired backpressure: <ul style="list-style-type: none"> <li>• IF RCS pressure &lt; 450 psia, THEN maintain L/D backpressure (2PIC-4812) above saturation for letdown temperature (2TI-4820).</li> <li>• IF RCS pressure &gt; 450 psia, THEN maintain L/D backpressure at setpoint (normal setpoint is 350 psig).</li> </ul>
	ATC	9.7.9 WHEN letdown pressure at desired setpoint, THEN Letdown Pressure controller (2PIC-4812) may be placed in AUTO.
	ATC	9.7.10 Place Letdown Flow controller (2HIC-4817) in AUTO as desired IAW applicable steps of this procedure section.
	ATC	Direct a NLO to: 9.7.11 Establish 0.5 to 1.5 gpm flow through Rad Monitor Flow Indicator (2FIS-4807) IAW Letdown Line Radiation Monitor Flow Control section of this procedure.

**Cue: When contacted as NLO, then report Rad monitor flow is 1 gpm.**

### **NOTE**

**Attachment F should be performed when restoring Letdown after long shutdown or maintenance performed on flow control components. Test should also be performed if valve being placed in service has not been tested in the last 3 months; minimum setpoint has appeared to drift or is in question. (CR-2-2010-2459)**

Op-Test No.: 2017		Scenario #4	Event No.: 2
Event Description: Letdown flow control valve 2CV-4816 will fail closed.			
Time	Position	Applicant's Actions or Behavior	
	ATC	9.7.12 <u>IF</u> required, <u>THEN</u> perform Attachment F, Verification Of Minimum Letdown Flow.	
<b>Cue: When contacted as the WWM, then report that I&amp;C will start planning a work package to repair the control valve.</b>			
<b>Termination criteria: The alternate flow control valve has been placed in service or at lead examiner's discretion.</b>			



Op-Test No.: 2017		Scenario #4	Event No.: 3
Event Description: 2PT-1041-1 SG-A pressure detector fails low., Tech Spec for SRO			
Time	Position	Applicant's Actions or Behavior	
Cued by Lead Examiner	ANY	Announce annunciators: <ul style="list-style-type: none"> <li>• 2K04-A4 CH A RPS/ESF/PRETRIP/TRIP</li> <li>• 2K04-B3 PPS Channel TRIP</li> <li>• 2K04-E4 MSIS Pretrip.</li> </ul>	
	ANY	Report Low SG pressure pretrip/trip on PPS insert.	
<b>Enter 2203.012D, Annunciator 2K04 Corrective Action.</b>			
	ATC	Compare all four channels and report 2PT-1041-1 failed low.	
	SRO	<p><b><u>2K04-A4 CH A RPS/ESF/PRETRIP/TRIP applicable actions:</u></b></p> <p>2.1 Refer to PPS insert on 2C03 to determine cause.</p> <p>2.2 Compare all Channels to validate alarm.</p> <p>2.6 <u>IF</u> channel failed, <u>THEN</u> refer to Tech Specs 3.3.1.1, 3.3.2.1, 3.3.3.5, 3.3.3.6, and TRM 3.3.1.1.</p> <p><b><u>2K04-B3 PPS Channel TRIP applicable actions:</u></b></p> <p>2.1 Determine which RPS or ESFAS trips have occurred on PPS inserts.</p> <p>2.3 <u>IF</u> channel failed, <u>THEN</u> refer to Tech Specs 3.3.1.1 and 3.3.2.1 and TRM 3.3.1.1.</p>	

Op-Test No.: 2017		Scenario #4	Event No.: 3
Event Description: 2PT-1041-1 SG-A pressure detector fails low., Tech Spec for SRO			
Time	Position	Applicant's Actions or Behavior	
		<p><b><u>2K04-E4 PPS Channel TRIP applicable actions:</u></b></p> <p>2.1     <u>IF</u> testing in progress AND channel bypassed,           THEN no further action required.</p> <p>2.2     <u>IF</u> pressure reduction is a planned evolution (i.e., plant C/D),           <u>THEN</u> depress Low S/G Pressure Setpoint Reset pushbutton on Channel 1 PPS insert.</p> <p>2.3     <u>IF</u> channel failed,           <u>THEN</u> place in bypass using CPC/CEAC Operations (2105.001).</p> <p>2.4     Refer to the following Tech Specs:</p> <ul style="list-style-type: none"> <li>• 3.3.2.1</li> <li>• 3.3.3.5</li> <li>• 3.3.3.6</li> </ul>	
	SRO	<p>Direct BOP to bypass the associated functional units:</p> <ul style="list-style-type: none"> <li>• Steam Generator 1 Pressure - Low</li> <li>• Steam Generator 1 DP</li> <li>• Steam Generator 2 DP</li> </ul>	

Op-Test No.: 2017		Scenario #4	Event No.: 3
Event Description: 2PT-1041-1 SG-A pressure detector fails low., Tech Spec for SRO			
Time	Position	Applicant's Actions or Behavior	
	BOP	<p>Bypass the points 3, 4 and 5 on Channel B:</p> <p>11.1 Refer to Tech Spec 3.3.1.1, 3.3.2.1, 3.3.3.5, 3.3.3.6 and TRM 3.3.1.1.</p> <p>11.2 Circle channel and functional units (points) to be bypassed below:  Channel to be bypassed: <u>A</u> B C D  Points to be bypassed:  1 2 3 4 5 6 7 8 9 10 <u>11</u> 12 13 16 17 18 <u>19</u> <u>20</u></p> <p>11.3 Enter appropriate Tech Spec/TRM actions.</p> <p>11.4 Verify points to be bypassed <u>NOT</u> bypassed in ANY other channel.</p> <p>11.5 Place desired points in BYPASS for selected channel on 2C23.</p> <p><b>Examiner Note: SRO must enter LCO 3.3.1.1 action 2, 3.3.2.1 action 10, 3.3.3.5, and 3.3.3.6 action 1.</b></p>	
	ANY	<p>Annunciator 2K04-F3 PPS TEST/SECURITY will alarm while opening PPS door</p> <p>Annunciator 2K04-C3 PPS CHANNEL BYPASSED remains in alarm</p> <p>Verify correct channels in bypass.</p>	
	SRO	Contact work management.	
<p><b>Cue: When contacted as the WWM, then report that I &amp; C planner will begin planning work on failed Steam Generator pressure instrument.</b></p>			
<p><b>Termination Criteria: Affected channel parameters placed in bypass or at lead examiner's discretion.</b></p>			

Op-Test No.: 2017		Scenario #4	Event No.: 4
Event Description: Inadvertent Containment Isolation Actuation Signal (CIAS) on the Green Train. Tech Spec for SRO.			
Time	Position	Applicant's Actions or Behavior	
Cued by lead examiner	ANY	Announce alarms for CIAS ACT 2K04-C1 and 2K07-C1 and CCW DISCH FLOW LO 2K-11 A1, A3, A5, A7	
<b>Examiner note: CCW DISCH FLOW LO alarm is an entry criteria to both RCP emergencies and Inadvertent CIAS. The SRO may enter RCP emergencies to restore CCW to the RCPs but after restoration of CCW to the RCPs, the SRO should complete the actions in Inadvertent CIAS</b>			
<b>Enter and Implement AOP 2203.039, Inadvertent CIAS.</b>			
	SRO	*1. IF Reactor tripped, THEN verify 2202.001, Standard Post Trip Actions complete.  <b>Examiner note: The Reactor will not be tripped.</b>	
	SRO	2. Record start time. _____	
<b><u>NOTE</u></b>			
<b>A CIAS actuation will align RCP controlled bleedoff to the Quench tank, which could adversely affect seal performance.</b>			
	ANY	*3. Monitor RCP seals for proper performance.	
	ANY	4. Check CNTMT pressure has NOT exceeded 18.3 psia.	
	SRO	*5. IF CCW to RCPs can NOT be restored within 10 minutes, THEN perform the following:  <b>Examiner note: The SRO will pass by this step to restore CCW to the RCPs.</b>	
	ANY	6. Restore CCW to RCPs as follows: A. Check ALL Controlled Bleedoff temperatures less than 180°F.	

Op-Test No.: 2017		Scenario #4	Event No.: 4
Event Description: Inadvertent Containment Isolation Actuation Signal (CIAS) on the Green Train. Tech Spec for SRO.			
Time	Position	Applicant's Actions or Behavior	
<p style="text-align: center;"><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>• If an automatic containment isolation valve is overridden following an actuation, then TS 3.6.3.1 applies. If both valves in a single penetration are overridden, then TS 3.0.3 applies until administrative requirements can be completed for posting a dedicated operator.</li> <li>• Penetration 2P60 (CCW) is isolated by 2CV-5254-2 and 2CV-5255-1. Penetration 2P-52 (CCW) is isolated by 2CV-5236-1 and check valve 2CCW-38.</li> </ul>			
	BOP	<p>B. Restore CCW to RCPs as follows:</p> <ol style="list-style-type: none"> <li>1) Override and open RCP CCW Supply valve (2CV-5236-1).</li> <li>2) Override and open RCP CCW Return valve (2CV-5254-2).</li> <li>3) Override and open RCP CCW Return Header Isolation valve (2CV-5255-1).</li> </ol>	
<p><b>Critical Task: Component Cooling Water (CCW) to RCPs must be restored within 10 minutes of the loss of cooling water.</b></p>			
	SRO	<p>C. <u>IF</u> ANY of the following valves are overridden,</p> <ul style="list-style-type: none"> <li>• RCP CCW Supply (2CV-5236-1)</li> <li>• RCP CCW Return (2CV-5255-1)</li> <li>• RCP CCW Return (2CV-5254-2)</li> </ul> <p><u>THEN</u> refer to TS 3.6.3.1.</p> <p><b>Examiner note: The SRO must enter 3.6.3.1 for Containment Isolation Valves due to the CCW to RCP valves being overridden which renders the ability to close inoperable.</b></p>	

Op-Test No.: 2017		Scenario #4	Event No.: 4
Event Description: Inadvertent Containment Isolation Actuation Signal (CIAS) on the Green Train. Tech Spec for SRO.			
Time	Position	Applicant's Actions or Behavior	
	SRO	<p>D. <u>IF</u> BOTH of the following valves are overridden,</p> <ul style="list-style-type: none"> <li>• RCP CCW Supply (2CV-5254-2)</li> <li>• RCP CCW Return (2CV-5255-1)</li> </ul> <p>THEN refer to TS 3.0.3.</p> <p><b>Examiner note: TS 3.0.3 is not applicable.</b></p>	
	ANY	<p>*7. Check ALL RCP bearing and motor temperature annunciators clear:</p> <ul style="list-style-type: none"> <li>• "UPPER THRUST BRG METAL TEMP HI" (2K11-B1/B3/B5/B7).</li> <li>• "LOWER THRUST BRG METAL TEMP HI" (2K11-B2/B4/B6/B8).</li> <li>• "STATOR WDG TEMP HI" (2K11-A2/A4/A6/A8).</li> </ul>	
<p><b><u>NOTE</u></b></p> <p><b>The loss of Chilled Water to the CEDM coolers may raise the probability of a CEA dropping during movement.</b></p>			
	ANY	<p>*8. Minimize CEA movement.</p>	
	ATC	<p>*9. Maintain PZR Level within 5% of setpoint as follows:</p> <p>A. Cycle Charging pumps as needed.</p> <p>B. Record charging header data using 2202.010, Standard Attachment 44, Charging Header Data.</p>	
<p><b>Cue: If the contacted as the System Engineering or WMM center, then comply with the request to collect charging header nozzle data.</b></p>			
	ATC	<p>*10. Maintain VCT level 60 to 75%, refer to 2104.003, Chemical Addition.</p>	

Op-Test No.: 2017		Scenario #4	Event No.: 4
Event Description: Inadvertent Containment Isolation Actuation Signal (CIAS) on the Green Train. Tech Spec for SRO.			
Time	Position	Applicant's Actions or Behavior	
<b><u>NOTE</u></b>			
<b>CNTMT temperature and pressure may rise due to loss of Main Chilled Water.</b>			
	ANY	*11. Check CNTMT temperature and pressure stable.  <b>Examiner note: CNTMT temperature and pressure will be rising due to chilled water isolation.</b>	
	BOP	*11. IF CNTMT temperature OR pressure rising, THEN perform the following: A. Verify CNTMT Coolers aligned as follows:  1) ALL available CNTMT Cooling fans running: <ul style="list-style-type: none"> <li>• 2VSF-1A</li> <li>• 2VSF-1B</li> <li>• 2VSF-1C</li> <li>• 2VSF-1D</li> </ul> 2) BOTH SW Cooling Inlet valves open: <ul style="list-style-type: none"> <li>• 2CV-1511-1</li> <li>• 2CV-1510-2</li> </ul> 3) BOTH SW Cooling Outlet valves open: <ul style="list-style-type: none"> <li>• 2CV-1519-1</li> <li>• 2CV-1513-2</li> </ul>	
	ANY	B. Refer to TS 3.6.1.4 Internal Pressure, Air Temperature and Relative Humidity.	
	SRO	12. Reset CIAS on PPS panels as follows:  <b>Examiner note: CIAS inadvertently actuated thus can not be reset by the operators, they may attempt to reset CIAS but it will not reset.</b>	
<b>Examiner note: 2C-39 ESFAS panel is not fully modeled in the simulator. If the applicant tries to assess the status of the panel then give them the following cue.</b> <b>Examiner Cue: If the applicant tries to assess 2C-39 ESFAS panel then inform the applicant that all the lights on 2C-39 are on.</b>			

Op-Test No.: 2017		Scenario #4	Event No.: 4
Event Description: Inadvertent Containment Isolation Actuation Signal (CIAS) on the Green Train. Tech Spec for SRO.			
Time	Position	Applicant's Actions or Behavior	
<b>Cue: If the contacted as the WWM, then report that I&amp;C will start investigating the inadvertent CIAS</b>			
	SRO	12. IF CIAS actuation can NOT be reset, THEN GO TO Step 14.	
	SRO	14. IF CIAS actuation can NOT be reset, THEN perform the following:  A. Check Plant in Mode 1 or 2.	
	ANY	B. Minimize CEA movement.  C. Notify I&C to monitor CEDM coil temperatures.  D. IF I&C NOT available, THEN refer to 2105.009 Exhibit #2, CEA #01 Upper Gripper Coil Temperature Measurement to determine CEDM coil temperatures.  E. Contact System Engineer for assistance.  F. IF coil temperatures are projected to be >450°F for an extended period AND restoration of CEDM Cooling is NOT imminent, THEN commence a Plant Shutdown.  G. IF CEDM System Engineer NOT available, AND coil temperatures exceed 500°F, THEN perform the following: 1) Trip Reactor. 2) GO TO 2202.001, Standard Post Trip Actions.  H. WHEN CIAS has been reset, THEN continue with this procedure.	
<b>Cue: If the contacted as the WWM to monitor CEDM coil temperatures, then report that I&amp;C will monitor CEDM coil temperatures.</b>			
<b>Cue: If the contacted as the System Engineering for assistance, then state you will start investigating the issues.</b>			
<b>Termination Criteria: When Service water has been aligned to the CNTMT coolers or at the discretion of the lead examiner.</b>			



Op-Test No.: 2017		Scenario #4	Event No.: 5
Event Description: Two seals on 'D' RCP fail			
Time	Position	Applicant's Actions or Behavior	
Cued by lead examiner	ANY	Announce 2K-11 G-3 RCP bleedoff flow hi lo alarm.	
	ANY	Determine that 'D' RCP is the affected RCP and one seal is failed.	
<b>Enter 2203.025, RCP Emergencies.</b>			
	SRO	*1. <b>CHECK</b> the following criteria for EACH RCP satisfied:  D. Seal Stage $\Delta P$ greater than 50 psid.	
	SRO	<b>D. GO TO Step 6.</b>	
	ANY	*6. <b>CHECK</b> $\Delta P$ across EACH RCP Seal stage greater than 50 psid.	
	ANY	*6. <b>PERFORM</b> the following:  A. <b>IF ONLY ONE</b> stage failed, <b><u>THEN</u> PERFORM</b> the following: 1) <b>MONITOR</b> RCP Controlled Bleedoff flow and temperature.  2) <b>NOTIFY</b> Operations Management.  <b>Examiner note: The other second RCP seals will fail after a 2 minute delay.</b>	
<b>Cue: If the contacted as Operations Management acknowledge the information about the failed seal.</b>			

Op-Test No.: 2017		Scenario #4	Event No.: 5
Event Description: Two seals on 'D' RCP fail			
Time	Position	Applicant's Actions or Behavior	
	ANY	<p>B. <b>IF</b> TWO stages failed on ONE pump, <b>THEN PERFORM</b> the following:</p> <p>1) <b>IF</b> in Mode 1 OR 2, <b>THEN PERFORM</b> the following:</p> <p>a) Refer to applicable reactivity plan.</p> <p><b>Examiner note: Reactor power is low enough a down power is not required.</b></p>	
	ATC	<p>b) <b>COMMENCE</b> plant shutdown using EITHER of the following:</p> <ul style="list-style-type: none"> <li>2203.053, Rapid Power Reduction</li> <li>2102.004, Power Operations</li> </ul> <p><b>Examiner note: Reactor power is low enough a down power is not required the ATC should trip the reactor.</b></p>	
	ATC	<p>c) After reactor tripped, <b>STOP</b> ANY affected RCP.</p>	
<b>Critical Task: 'D' RCP must be secured within 10 min of the reactor trip.</b>			
	ATC	<p>d) <b>IF</b> only ONE RCP affected, <b>AND</b> desired to balance reactor coolant loop temperatures, <b>THEN ENSURE</b> ONE RCP secured in EACH loop.</p> <p>e) <b>IF</b> RCP 2P32A OR 2P32B stopped, <b>THEN ENSURE</b> associated PZR Spray valve in MANUAL and closed:</p> <ul style="list-style-type: none"> <li>2CV-4651</li> <li>2CV-4652</li> </ul>	
	ALL	<p>f) <b>GO TO</b> 2202.001, Standard Post Trip Actions.</p>	
<b>Termination Criteria: Event 6 will start after a time delay after a reactor trip.</b>			

Op-Test No.: 2017		Scenario #4	Event No.: 6, 7, & 8
Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.			
Time	Position	Applicant's Actions or Behavior	
<b>Enter EOP 2202.001, Standard Post Trip Actions.</b>			
	SRO	1. Notify Control Board Operators to perform the following: A. Monitor safety functions using Exhibit 7, CBO Reactor Trip Checklist. B. Perform post trip contingencies as required 2. Open Safety Function Tracking page.	
Reactivity control safety function	ATC	3. Check Reactivity Control established as follows: _____A. Reactor power lowering. B. Check startup rate is negative. _____C. ALL CEAs fully inserted by observing ANY of the following: 1) CEA Rod bottom lights illuminated. 2) CEAC 1 indicates ALL CEAs fully inserted. 3) CEAC 2 indicates ALL CEAs fully inserted.	
Vital Auxiliaries safety function	BOP	4. Check Maintenance of Vital Auxiliaries satisfied: A. Check Main Turbine tripped by BOTH of the following: <ul style="list-style-type: none"> <li>ALL Main Stop Valves closed.</li> <li>Generator megawatts indicate zero.</li> </ul> B. Generator Output breakers open. <b>(Generator output breakers will be closed due to plant alignment, should perform contingency to open them)</b>  <b>B. Open Generator Output breakers:</b> <ul style="list-style-type: none"> <li>5130</li> <li>5134</li> </ul>	

Op-Test No.: 2017

Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior
Vital Auxiliaries safety function	BOP	<p>C. Exciter Field Breaker open.</p> <p>D. Perform EITHER of the following as required:</p> <p>1) Check the following valves closed:</p> <ul style="list-style-type: none"> <li>MSR 2E-12A Steam Supply From SG A (2CV-0400)</li> <li>MSR 2E-12B Steam Supply From SG B (2CV-0460)</li> </ul> <p>2) No flow indicated on the following MSR second stage flow instruments:</p> <ul style="list-style-type: none"> <li>2FI-0402</li> <li>2FI-0462</li> </ul> <p>E. At least ONE 6900v AC bus energized.</p> <p>F. At least ONE 4160v Non-vital AC bus energized.</p> <p>G. BOTH 4160v Vital AC buses energized</p> <p>H. BOTH DGs secured.</p> <p>I. At least ONE 125v Vital DC bus energized:</p> <ul style="list-style-type: none"> <li>2D01 - SPDS point E2D01</li> <li>2D02 - SPDS point E2D02</li> </ul>
RCS Inventory Control Safety function	ATC	<p>5. Check RCS Inventory Control established as follows:</p> <p>A. PZR level:</p> <p>— • 10 to 80%.</p> <p>— • Trending to setpoint. <b>(Will not be met due to LOCA Event #6, perform contingency)</b></p> <p>— B. RCS MTS 30°F or greater.</p>

Op-Test No.: 2017		Scenario #4	Event No.: 6, 7, & 8
Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.			
Time	Position	Applicant's Actions or Behavior	
RCS Inventory Control Safety function	SRO	<p>Direct the following as necessary:</p> <p><b>A. Perform as necessary:</b></p> <p><b>1) IF SIAS actuated on PPS inserts, <u>THEN</u> GO TO Step 6.</b></p> <p><b>2) Verify PZR Level Control system restoring level to setpoint. (Not Met)</b></p> <p><b>Examiner Note: Applicant may recognize the backup charging pumps failed to start automatically and start them. If not they will be started by verifying actuated equipment in the LOCA EOP.</b></p>	
RCS Pressure Control Safety function	BOP	<p>6. Check RCS Pressure Control:</p> <p>— • 1800 to 2250 psia.</p> <p>— • Trending to setpoint. <b>(May not be met due to LOCA Event #6, perform contingency)</b></p> <p>• Normal PZR Spray and heaters controlling pressure.</p> <p>• Valid CNTMT Spray NOT in progress.</p>	

Op-Test No.: 2017	Scenario #4	Event No.: 6, 7, & 8
Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.		
Time	Position	Applicant's Actions or Behavior
RCS Pressure Control Safety function	SRO	Direct the following actions as necessary:  <b>6. Perform as necessary:</b> <b>A. IF RCS pressure lowers to less than 1400 psia, THEN trip ONE RCP in EACH loop.</b> <b>D. IF RCP 2P32A or 2P32B stopped, THEN verify associated PZR Spray valve in MANUAL and closed.</b> <ul style="list-style-type: none"> <li>• RCP A Spray Valve (2CV-4651)</li> <li>• RCP B Spray Valve (2CV-4652)</li> </ul> <b>E. IF ALL RCPs stopped AND RCS pressure control required, THEN initiate Aux spray using Attachment 48, RCS Pressure Control.</b> <b>F. IF RCS pressure lowers to 1650 psia or less, THEN perform the following:</b> <ol style="list-style-type: none"> <li>1) Verify SIAS actuated on PPS inserts.</li> <li>2) GO TO Step 7.</li> </ol> <b>G. Verify PZR Pressure Control system restoring pressure to setpoint.</b>
Core Heat Removal safety function.	ATC	<b>7. Check Core Heat Removal by forced circulation:</b> ____ A. At least ONE RCP running. ____ B. CCW flow aligned to RCPs. ____ C. Loop delta T less than 10°F. ____ D. RCS MTS 30°F or greater. ____ E. Check SW aligned to CCW. <b>(Not met)</b> ____ F. IF SIAS or MSIS actuated, THEN maintain SW header pressure greater than 85 psig.

Op-Test No.: 2017		Scenario #4	Event No.: 6, 7, & 8
Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.			
Time	Position	Applicant's Actions or Behavior	
	SRO	<b>Direct the contingency for step 7. E</b>  <b>E. IF CCW available, THEN restore SW to CCW, refer to 2202.010 Exhibit 5, CCW/ACW/SW Alignment.</b>	
<b>Perform 2202.010, Exhibit 5 (CCW/ACW/SW Alignment)</b>			
	BOP	1. IF SW suction <u>NOT</u> aligned to lake, <u>THEN</u> RETURN TO procedure in effect.	
	BOP	2. IF SW <u>NOT</u> aligned to CCW <u>AND</u> CCW available, <u>THEN</u> perform the following: A. IF RCP seal temperatures less than 180°F, <u>THEN</u> restore SW to CCW by performing the following: 1). Override and open at least ONE SW to CCW/ACW Return valve: <ul style="list-style-type: none"> <li>• 2CV-1543-1</li> <li>• 2CV-1542-2</li> </ul>	
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Supplying ACW flow and CCW cooling from a single SW pump may result in low SW header pressure.</p>			
	BOP	2). Override and throttle open at least ONE SW to CCW /Main Chillers Supply valve: <ul style="list-style-type: none"> <li>• 2CV-1530-1</li> <li>• 2CV-1531-2</li> </ul> 3). Maintain SW header pressure greater than 85 psig.	
<b>EOP 2202.001, Standard Post Trip Actions.</b>			

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Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior
RCS Heat Removal Safety Function	BOP/ATC	<p>8. Check RCS Heat Removal:</p> <p>A. Check SG available by BOTH of the following:</p> <ul style="list-style-type: none"> <li>At least ONE SG level 10 to 90%.</li> <li>FW maintaining SG level</li> </ul> <p>B. Check MFW in RTO (<b>MFW will not be in Reactor Trip Override (RTO) due to steam generator levels being at setpoint, and the contingencies are satisfied if steam generator levels are controlling near the setpoint</b>)</p> <p>C. Check Feedwater line intact by the following:</p> <ul style="list-style-type: none"> <li>SG level stable or rising.</li> <li>NO unexplained step changes or erratic FW flow.</li> <li>NO unexplained step changes or erratic Condensate flow.</li> </ul> <p>D. Check RCS T<sub>C</sub> 540°F to 555°F</p> <p>E. Check SG pressure 950 to 1050 psia.</p> <p>F. <u>IF</u> MSIVs open, <u>AND</u> desired, <u>THEN</u> place SDBCS Master Controller in Auto/Local with setpoint of 960 psia using 2105.008 Exhibit 3, SDBCS Emergency Operation.</p> <p><b>Examiner Note: Due to the RCS mass loss the crew may lower the SDBCS setpoint to gain additional margin to saturation.</b></p>
<b>Perform 2105.008, Exhibit 3 (SDBCS Emergency Operation)</b>		
	BOP/ATC	<p>1.0 IF BOTH MSIV's closed, THEN GO TO step 5.0.</p> <p><b>Examiner Note: This step is NA.</b></p>



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Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior
Exhibit 3	BOP/ATC	2.0 Perform the following to determine availability of SDBCS valves:  2.1 <u>IF</u> the following conditions satisfied, <u>THEN</u> SDBCS Master controller (2PIC-0300) available:  <ul style="list-style-type: none"><li>• SDBCS controlling S/G pressure at setpoint in automatic</li><li>• EMERGENCY OFF (2K02-A14) annunciator clear</li><li>• Instrument air available</li><li>• <u>IF</u> using Turbine Bypass valves, <u>THEN</u> CONDENSER INTERLOCK (2K02-B14) clear</li></ul> 2.2 <u>IF</u> the following conditions satisfied, <u>THEN</u> SDBCS Downstream ADV/Turbine Bypass valves available:  <ul style="list-style-type: none"><li>• Instrument air available</li><li>• EMERGENCY OFF (2K02-A14) annunciator clear</li><li>• Power available to selected controllers/valves</li><li>• <u>IF</u> using Turbine Bypass valves, <u>THEN</u> CONDENSER INTERLOCK (2K02-B14) clear</li></ul>
<p style="text-align: center;"><b><u>NOTE</u></b></p> <ul style="list-style-type: none"><li>• The SDBCS Master controller cannot be set less than 650 psi.</li><li>• Computer points FR1030 and FR1130 can be useful to monitor steam flow.</li></ul>		

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Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior	
Exhibit 3	BOP/ATC	3.0	<u>IF</u> SDBCS Master controller (2PIC-0300) available per step 2.0 <u>AND</u> use desired, <u>THEN</u> perform the following:
		3.1	Place permissive handswitch for desired SDBCS Downstream ADV/Turbine Bypass valves in MANUAL: <ul style="list-style-type: none"> <li>• 2CV-0301 Permissive (2HS-0301)</li> <li>• 2CV-0302 Permissive (2HS-0302)</li> <li>• 2CV-0303 Permissive (2HS-0303)</li> <li>• 2CV-0306 Permissive (2HS-0306)</li> <li>• 2CV-0305 Permissive (2HS-0305)</li> </ul>
		3.2	Verify SDBCS Master controller (2PIC-0300) in LOCAL using R/L button.
		3.3	Adjust SDBCS Master controller (2PIC-0300) to desired setpoint
		<b>EOP 2202.001, Standard Post Trip Actions.</b>	

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Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior
Containment Safety Function	ANY	<p>9. Check CNTMT parameters:</p> <p>A. Temperature and Pressure:</p> <ul style="list-style-type: none"> <li>• Temperature less than 140°F.</li> <li>• Pressure less than 16 psia.</li> </ul> <p>B. Check CNTMT Spray pumps secured.</p> <p>C. NO CNTMT radiation alarms or unexplained rise in activity:</p> <p>1) CAMS alarms:</p> <ul style="list-style-type: none"> <li>• "CNTMT PART/GAS RAD HI/LO" annunciator (2K10-B6) clear.</li> </ul> <p>2) RCS leakage alarms:</p> <ul style="list-style-type: none"> <li>• "AREA RADIATION HI/LO" annunciator (2K11-B10) clear. <b>(Not met due to LOCA Event #6)</b></li> <li>• "PROC LIQUID RADIATION HI/LO" annunciator (2K11-C10) clear.</li> </ul> <p>3) Check the following radiation monitors trend stable: <b>(Not met due to LOCA Event #6)</b></p> <ul style="list-style-type: none"> <li>• CNTMT Area</li> <li>• CAMS</li> <li>• Process Liquid</li> </ul> <p>D. NO secondary system radiation alarms or unexplained rise in activity:</p> <p>1) "SEC SYS RADIATION HI" annunciator (2K11-A10) clear.</p> <p>2) Secondary Systems Radiation monitors trend stable:</p> <ul style="list-style-type: none"> <li>• Main Steam lines</li> <li>• SG Sample</li> <li>• Condenser Off Gas</li> </ul>

Op-Test No.: 2017		Scenario #4	Event No.: 6, 7, & 8
Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.			
Time	Position	Applicant's Actions or Behavior	
	SRO	10. Notify STA to report to control room. 11. Direct NLOs to perform 2202.010 Attachment 47, Field Operator Post Trip Actions. 12. Verify Reactor trip announced on Plant page. 13. Notify SM to refer to Technical Specifications and 1903.010, Emergency Action Level Classification.	
<b>Cue: If contacted as the STA to report to the control room, acknowledge the request.</b> <b>Cue: If contacted as a NLO to perform Attachment 47 Field Operator Post Trip Actions, acknowledge request.</b>			
	SRO	14. Direct control board operators to acknowledge ALL annunciators and announce ALL critical alarms.	
	SRO	15. Check ALL safety function acceptance criteria satisfied. <b>(All safety functions are not satisfied, perform contingency)</b> 15. <u>IF ANY</u> safety function acceptance criteria <u>NOT</u> satisfied, <u>THEN</u> perform the following: A. Notify control room staff of safety functions <u>NOT</u> satisfied. B. GO TO Exhibit 8, Diagnostic Actions.	
<b>Diagnose Loss of Coolant Accident EOP 2202.003 or Excess RCS leakage AOP 2203.016 depending if SIAS is actuated.</b>			
	SRO	If Excess RCS leakage is diagnosed, Enter and perform floating step # 9	
	SRO	■ 9. IF RCS leakage greater than 44 gpm AND in Mode 3, 4, OR 5, THEN perform the following:	
	ATC/BOP	B. Actuate SIAS. C. Actuate CCAS.	

Op-Test No.: 2017		Scenario #4	Event No.: 6, 7, & 8
Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.			
Time	Position	Applicant's Actions or Behavior	
	SRO	D. GO TO 2202.010 Exhibit 8, Diagnostic Actions.	
<b>Examiner note: The SRO may discuss Tech Spec 3.4.6.2 for RCS leakage.</b>			
<b>Enter and implement Loss of Coolant Accident EOP 2202.003</b>			
	SRO	<p>* 1. Confirm diagnosis of LOCA as follows:</p> <p>A. Check SFSC acceptance criteria satisfied every 15 minutes. <b>(Normally performed by the STA)</b></p> <p>B. IF CCW in service to provide SG Sample Cooler cooling, THEN perform the following:</p> <p>1) Verify SG Sample valves open.</p> <ul style="list-style-type: none"> <li>• 2CV-5852-2</li> <li>• 2CV-5859-2</li> <li>• 2CV-5850</li> <li>• 2CV-5858</li> </ul> <p>2) Notify Chemistry to sample SGs for activity.</p> <p>C. IF SGs indicate primary to secondary leakage within TS limits, THEN continue with this procedure using SG with lowest leak rate for cooldown.</p>	
<b>Cue: When contacted as Chemistry, then report you will sample both S/G for activity.</b>			
	SRO	* 2. Notify SM to refer to Technical Specifications and 1903.010, Emergency Action Level Classification.	
	SRO	3. Open Placekeeping Page.	
	SRO	4. Record present time: Time _____	
	ANY	5. Verify SIAS and CCAS actuated on PPS inserts.	

Op-Test No.: 2017		Scenario #4	Event No.: 6, 7, & 8
Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.			
Time	Position	Applicant's Actions or Behavior	
	SRO	6. Notify Control Board Operators to perform the following:  A. Monitor floating steps.  B. Verify actuated ESFAS components using 2202.010, Exhibit 9, ESFAS Actuation.	
<b>Examiner Note: The crew may implement the floating step for Cooldown which is on page 44.</b>			
<b>2202.010, Exhibit 9, ESFAS Actuation</b>			

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Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior
Exhibit 9 ESFAS actuation.	BOP/ATC	<p>*1.0 IF any abnormalities noted for affected ESFAS actuation, <u>THEN</u> notify CRS.</p> <p>2.0 IF SIAS, <u>THEN</u> verify the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Red Train RWT Outlet (2CV-5630-1) open.</li> <li><input type="checkbox"/> Red Train HPSI Pump in service with proper discharge pressure and flow. <b>(Will be running without proper discharge pressure and 2P-89C should be started)</b></li> <li><input type="checkbox"/> Red Train HPSI Injection MOVs open.</li> <li><input type="checkbox"/> Red Train Service Water Pump in service with proper discharge pressure.</li> <li><input type="checkbox"/> Red Train LPSI Pump (2P60A) in service with proper discharge pressure and flow.</li> <li><input type="checkbox"/> Red Train LPSI Injection MOVs open.</li> <li><input type="checkbox"/> Green Train RWT Outlet (2CV-5631-2) open.</li> <li><input type="checkbox"/> Green Train HPSI Pump in service with proper discharge pressure and flow.</li> <li><input type="checkbox"/> Green Train HPSI Injection MOVs open.</li> <li><input type="checkbox"/> Green Train Service Water Pump in service with proper discharge pressure.</li> <li><input type="checkbox"/> Green Train LPSI Pump (2P60B) in service with proper discharge pressure and flow.</li> <li><input type="checkbox"/> Green Train LPSI Injection MOVs open.</li> <li><input type="checkbox"/> Available Charging Pumps in service with proper discharge pressure and flow. <b>(Backup Charging pumps will not be running and should be started)</b></li> <li><input type="checkbox"/> Service Water Outlet Valves open for #1 and #2 EDGs.</li> </ul> <p>3.0 IF CCAS, <u>THEN</u> verify the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Red Train CNTMT Coolers in service.</li> <li><input type="checkbox"/> Service Water aligned to Red Train CNTMT Coolers.</li> <li><input type="checkbox"/> Red Train Bypass Dampers open.</li> <li><input type="checkbox"/> Green Train CNTMT Coolers in service.</li> <li><input type="checkbox"/> Service Water aligned to Green Train CNTMT Coolers.</li> <li><input type="checkbox"/> Green Train Bypass Dampers open.</li> </ul>

**Cue: If contacted as NLO to investigate 2P-89A HPSI pump, then after 2 min. report the coupling for 2P-89A HPSI pump has failed.**

Op-Test No.: 2017

Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior
Exhibit 9 ESFAS actuation	BOP	<p>4.0 IF CSAS, THEN verify the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Red Train CSS Pump (2P35A) in service with proper discharge pressure and flow.</li> <li><input type="checkbox"/> Red Train CSS Header Isolation (2CV-5612-1) open.</li> <li><input type="checkbox"/> Green Train CSS Pump (2P35B) in service with proper discharge pressure and flow.</li> <li><input type="checkbox"/> Green Train CSS Header Isolation (2CV-5613-2) open.</li> <li><input type="checkbox"/> Main Feedwater Block valves closed.</li> <li><input type="checkbox"/> MSIVs closed.</li> <li><input type="checkbox"/> Main Feed pumps tripped.</li> <li><input type="checkbox"/> Condensate pumps secured.</li> <li><input type="checkbox"/> Heater Drain pumps secured.</li> </ul> <p>5.0 IF MSIS, THEN verify the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> MSIVs closed.</li> <li><input type="checkbox"/> Main Feedwater Block valves closed.</li> <li><input type="checkbox"/> Red Train Service Water Pump in service with proper discharge pressure.</li> <li><input type="checkbox"/> Green Train Service Water Pump in service with proper discharge pressure.</li> <li><input type="checkbox"/> Main Feed pumps tripped.</li> <li><input type="checkbox"/> Condensate pumps secured.</li> <li><input type="checkbox"/> Heater Drain pumps secured.</li> </ul>
		<b>Loss of Coolant Accident EOP 2202.003</b>
	ANY	<p>*7. Verify the following for any operating RCP:</p> <ul style="list-style-type: none"> <li>A. CSAS NOT actuated.</li> <li>B. Proper seal staging.</li> </ul>
	ANY	■8. Check CCW aligned to RCPs.
	ANY	■9. Check RCS pressure greater than 1400 psia. <b>(May not be met, if not met perform contingency if required)</b>



Op-Test No.: 2017

Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior
	ANY	<p>■9. Perform the following:</p> <p>A. IF RCS pressure less than 1400 psia, THEN perform the following:</p> <ol style="list-style-type: none"> <li>1) Verify maximum of ONE RCP running in EACH loop.</li> <li>2) IF RCP 2P32A or 2P32B stopped, THEN verify associated PZR Spray valve in MANUAL and closed.</li> </ol> <p>B. IF NPSH requirements violated OR RCS MTS less than 30°F, THEN perform the following:</p> <ol style="list-style-type: none"> <li>1) Stop ALL RCPs.</li> <li>2) Verify BOTH PZR Spray valves in MANUAL and closed.</li> </ol>
	ANY	<p>■10. Restore ESF/Non-ESF systems post-SIAS using 2202.010 Attachment 51, Post ESFAS Actuation System Restoration.</p>
2202.010 Standard Attachments, Attachment 51, Post ESFAS Actuation System Restoration.		
	BOP	<ol style="list-style-type: none"> <li>1. Verify at least ONE SW pump running on EACH loop.</li> </ol>
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Operation of loaded DG without Service Water for greater than three minutes may cause engine damage.</p>		

Op-Test No.: 2017		Scenario #4	Event No.: 6, 7, & 8
Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.			
Time	Position	Applicant's Actions or Behavior	
	ANY	2. IF ANY EDG in operation, <u>THEN</u> perform the following: A. Check running EDG SW Outlet valve open: <ul style="list-style-type: none"> <li>2DG-1 SW Outlet (2CV-1503-1)</li> <li>2DG-2 SW Outlet (2CV-1504-2)</li> </ul> B. IF running EDG Service Water valve did <u>NOT</u> open automatically, <u>THEN</u> open valve with Control Room handswitch.	
	ANY	C. IF SW Outlet valve can <u>NOT</u> be opened from Control Room, <u>THEN</u> locally perform the following for the affected DG:  <b>Examiner Note: This step is NA</b>	
<b><u>NOTE</u></b> <b>Manual operator for 2CV-1504-2 located in locked box near valve.</b>			
	ANY	3. Verify SW pump suction aligned to Lake.	
<b>Examiner Note: Steps 4 and 5 are NA.</b>			
	ANY	*6. IF BOTH 4160v Vital buses 2A3 <u>AND</u> 2A4 energized from offsite power, <u>THEN</u> start SW pumps as needed to maintain SW header pressure.	
<b>Examiner Note: Steps 7, 8, and 9 are NA</b>			
	ANY	*10. Maintain Service Water header pressure greater than 85 psig while performing the following using 2202.010 Exhibit 5, CCW/ACW/SW Alignment: <ul style="list-style-type: none"> <li>A. IF Loop 2 CCW available, <u>THEN</u> restore Service Water to Component Cooling Water. <b>(Already restored)</b></li> <li>B. Restore Service Water to Auxiliary Cooling Water.</li> </ul>	
<b>Perform 2202.010, Exhibit 5 (CCW/ACW/SW Alignment)</b>			

Op-Test No.: 2017		Scenario #4	Event No.: 6, 7, & 8
Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.			
Time	Position	Applicant's Actions or Behavior	
<b>Examiner Note: Steps 1, 2, and 3 are NA.</b>			
	ANY	4. IF SW NOT aligned to ACW, THEN perform the following: A. Verify at least ONE SW to CCW/ACW Return valve open: <ul style="list-style-type: none"> <li>• 2CV-1543-1</li> <li>• 2CV-1542-2</li> </ul> B. Override and throttle open ACW Supply valves: <ul style="list-style-type: none"> <li>• 2CV-1425-1</li> <li>• 2CV-1427-2</li> </ul> C. Maintain SW header pressure greater than 85 psig.	
<b>Loss of Coolant Accident EOP 2202.003</b>			
		■11. IF Circ Water flow lost to the Main Condenser, <u>THEN</u> perform the following: <b>Examiner Note: This step is NA</b>	
	ANY	*12. Verify Safety Injection flow to RCS as follows: A. Check total HPSI flow acceptable using 2202.010 Exhibit 2, HPSI Flow Curve. B. Check total LPSI flow acceptable using 2202.010 Exhibit 3, LPSI Flow Curve.	
	ANY	■13. Check SG levels greater than 22.2%.	
<b><u>NOTE</u></b>			
<b>A rise in SG level when feeding with Emergency Feedwater Pump 2P7B is confirmation of 2P7B feed capability.</b>			
	BOP	14. Align feedwater as follows: A. Verify EFW pump 2P7B capable of feeding intact SG using 2202.010 Attachment 46, Establishing EFW Flow.	

Op-Test No.: 2017		Scenario #4	Event No.: 6, 7, & 8
Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.			
Time	Position	Applicant's Actions or Behavior	
	BOP	B. <u>IF</u> running, <u>THEN</u> stop EFW pump 2P7A by overriding and closing (2CV-0340-2).  C. Verify running MFW pump secured.  D. Verify ALL MFW Block valves closed.	
	ANY	15. Isolate LOCA as follows: A. Check for intact CCW system: <ul style="list-style-type: none"> <li>• "PROC LIQUID RADIATION HI/LO" annunciator (2K11-C10) clear.</li> <li>• CCW Surge Tanks level stable.</li> </ul> B. Verify RCS Sample Isolation valves closed: <ul style="list-style-type: none"> <li>• 2SV-5833-1</li> <li>• 2SV-5843-2</li> </ul> C. Check for intact CCW system: <ul style="list-style-type: none"> <li>• "PROC LIQUID RADIATION HI/LO" annunciator (2K11-C10) clear.</li> <li>• CCW Surge Tanks level stable.</li> </ul>	
	ANY	D. Verify non-actuated valve positions using 2202.010 Attachment 17, LOCA Isolation.  <b>Examiner note: The SRO may elect to prioritize this attachment to be performed later in the event.</b>	
	ANY	16. Check LOCA limited to CNTMT: <ul style="list-style-type: none"> <li>• CNTMT Sump level rising.</li> <li>• CNTMT temperature, dewpoint, and pressure greater than pre-LOCA values.</li> <li>• Aux Building area radiation levels stable.</li> <li>• Aux Building Sump level less than 53%.</li> <li>• Waste Tanks 2T20A and 2T20B levels stable.</li> </ul>	

Op-Test No.: 2017

Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior
	ANY	<p>■17. Check CNTMT isolation parameters:</p> <p>A. CNTMT pressure trend has NOT exceeded 18.3 psia.</p> <p>B. "CNTMT RADIATION HI" annunciator (2K10-A6) clear.</p>
	ANY	<p>■18. Check CNTMT pressure trend has NOT exceeded 23.3 psia.</p>
<p style="text-align: center;"><b><u>NOTE</u></b></p> <p><b>Continued CNTMT Spray operation may be desirable to reduce offsite doses from airborne activity in CNTMT.</b></p>		
	ANY	<p>*19. IF CNTMT Spray operating, THEN terminate CNTMT Spray as follows:</p> <p><b>Examiner note: CNTMT Spray should not be operating.</b></p>
	BOP	<p>20. Verify ALL available miscellaneous CNTMT Building ventilation operating using 2202.010 Exhibit 13, Miscellaneous Containment Building Ventilation.</p>
<p style="text-align: center;"><b>Perform 2202.010, Exhibit 13, Miscellaneous Containment Building Ventilation</b></p>		

Op-Test No.: 2017

Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior	
	BOP	1.0	Verify ALL available CNTMT Building Recirculation Fans in operation: <ul style="list-style-type: none"> <li>• 2VSF-31A</li> <li>• 2VSF-31B</li> <li>• 2VSF-31C</li> <li>• 2VSF-31D</li> </ul>
		2.0	Verify ALL available Reactor Cavity Cooling Fans in operation: <ul style="list-style-type: none"> <li>• 2VSF-34A</li> <li>• 2VSF-34B</li> </ul>
		3.0	Verify a maximum of three CEDM Shroud Cooling Units in operation: <ul style="list-style-type: none"> <li>• 2VSF-35A</li> <li>• 2VSF-35B</li> <li>• 2VSF-35C</li> <li>• 2VSF-35D</li> </ul>
<b>Loss of Coolant Accident EOP 2202.003</b>			
	ANY	■21.	Check ALL AC and Vital DC buses energized.
	ANY	■22.	Check IA pressure greater than 65 psig.
	ANY	23.	Check for isolated LOCA: <ul style="list-style-type: none"> <li>• RCS pressure controlled.</li> <li>• RCS leakage less than available Charging pump capacity.</li> </ul> <b>Examiner note: LOCA is not considered isolated.</b>
	SRO	23.	<b>IF LOCA NOT isolated, <u>THEN</u> GO TO Section 3, Unisolated LOCA.</b>

Op-Test No.: 2017

Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior
	SRO	<p>■1. Perform controlled cooldown to 275°F TC as follows:</p> <p>A. Check RCS TC greater than 275°F.</p>
	ATC	<p>B. Reset Low PZR Pressure and Low SG Pressure setpoints during cooldown and depressurization.</p> <p>C. Verify maximum of ONE RCP running in EACH loop.</p> <p>D. IF RCP 2P32A or 2P32B stopped, THEN verify associated PZR Spray valve in MANUAL and closed.</p> <p>E. Monitor cooldown rate as follows:</p> <ul style="list-style-type: none"> <li>Record RCS TC and PZR temperature using 2202.010 Attachment 8, RCS Cooldown Table.</li> <li>Plot RCS pressure versus RCS TC using 2202.010 Attachment 1, P-T Limits every 15 minutes.</li> </ul> <p>F. Initiate RCS cooldown using SDBCS bypass valves or ADVs.</p>
<p><b>Critical Task: Commence an RCS cooldown within 30 minutes of entry into OP-2202.003, LOCA EOP.</b></p>		

Op-Test No.: 2017

Scenario #4

Event No.: 6, 7, &amp; 8

Event Description: Third 'D' RCP seal fails and a 180 gpm RCS leak starts, Backup Charging pumps fail to start on low level or SIAS, and 2P-89A High Pressure Safety Injection (HPSI) pump shaft shear.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>G. Control S/G levels with EITHER of the following:</p> <ul style="list-style-type: none"><li>• EFW using 2202.010 Attachment 46, Establishing EFW Flow</li><li>• AFW using 2202.010 Attachment 52, Establishing AFW Flow</li></ul> <p>H. Secure running MFW pump.</p> <p>I. Close ALL MFW Block valves.</p> <p>J. Verify maximum of one condensate pump in service.</p> <p>K. Maintain condensate header pressure less than 700 psig using condensate pump recircs and MFW pump recircs.</p>
<b>Termination criteria: When a cooldown has been commenced or at the discretion of the lead examiner.</b>		



Facility: <u>Arkansas Nuclear One Unit 2</u>			Date of Exam: <u>02/13/2017</u>			Operating Test No.: <u>2017-1</u>											
A P P L I C A N T	E V E N T  T Y P E	Scenarios												T O T A L	M I N I M U M(*)		
		1			2 (spare)			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P				
															R	I	U
RO (1,3,5,8) <b>X</b> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX										*			0*	1	1	0
	NOR						4			1				1	1	1	1
	I/C						1,3,7			3,5,8		2,4,5,7		7	4	4	2
	MAJ						6			6,7		6		3	2	2	1
	TS													0	0	2	2
RO (2,4,6,7) <b>X</b> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX					4			3					1	1	1	0
	NOR											1		1	1	1	1
	I/C					2,5			2,4			3,4,8		5	4	4	2
	MAJ					6			6,7			6		3	2	2	1
	TS													0	0	2	2
RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U (1,2,3) <b>X</b>	RX													0	1	1	0
	NOR				4			1			1			2	1	1	1
	I/C				1,2,3,5,7			2,3,4,5,8			2,3,4,5,7,8			11	4	4	2
	MAJ				6			6,7			6			3	2	2	1
	TS				1,3			2,4			3,4			4	0	2	2
RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														2	2	1
	TS														0	2	2

Instructions:

- Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls" (ATC) and "balance-of-plant" (BOP) positions. Instant SROs (SRO-I) must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an SRO-I *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
- Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (\*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a one-for-one basis.
- Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.
- For licensees that use the ATC operator primarily for monitoring plant parameters, the chief examiner may place SRO-I applicants in either the ATC or BOP position to best evaluate the SRO-I in manipulating plant controls.

\*The reactivity event for scenario #4 has been replaced with an additional I/C malfunction.

Facility: Arkansas Nuclear One Unit 2 Date of Examination: 02/13/2017 Operating Test No.: 2017-1

Competencies	APPLICANTS															
	RO (1,3,5,8) X				RO (2,4,6,7) X				RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U (1,2,3) X				RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions		2,3, 5,6	3,4, 5,6, 7,8	2,4, 5,6, 7		1,3, 6,7	2,3, 4,6, 7	3,4, 6,8		1,2, 3,5, 6,7	2,3, 4,5, 6,7, 8	2,3, 4,5, 6,7, 8				
Comply With and Use Procedures (1)		2,4, 5,6	1,3, 5,6, 7	2,4, 5,6, 7		1,3, 4,6, 7	2,3, 4,6, 7	1,3, 4,6, 8		1,2, 3,4, 5,6	2,3, 4,6, 7	1,2, 3,4, 5,6, 7,8				
Operate Control Boards (2)		2,4, 5,6	1,3, 5,6, 7,8	2,4, 5,6, 7		1,3, 4,6, 7	2,3, 4,6	1,3, 4,6, 8		N/A	N/A	N/A				
Communicate and Interact		2,3, 4,5, 6	1,3, 4,5, 6,7, 8	2,4, 5,6, 7		1,3, 4,6, 7	2,3, 4,6, 7	1,3, 4,5, 6,8		1,2, 3,4, 5,6, 7	1,2, 3,4, 5,6, 7,8	1,2, 3,4, 5,6, 7,8				
Demonstrate Supervisory Ability (3)		N/A	N/A	N/A		N/A	N/A	N/A		1,2, 3,4, 5,6, 7	1,2, 3,4, 5,6, 7,8	1,2, 3,4, 5,6, 7,8				
Comply With and Use Tech. Specs. (3)		N/A	N/A	N/A		N/A	N/A	N/A		1,3	2,4	3,4				

Notes:

(1) Includes Technical Specification compliance for an RO.

(2) Optional for an SRO-U.

(3) Only applicable to SROs.

**Instructions:**

Check the applicants' license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant. (This includes all rating factors for each competency.) (Competency Rating factors as described on forms ES-303-1 and ES-303-3.)