Facility: Palo Verde
Date of Examination: 11/04/13
Examination Level: RO ☑ SRO ☐
Operating Test Number: ______

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, D	[RO A-1] Calculate a dilution for a power ascension. K/A: 2.1.37 Knowledge of procedures, guidelines, or limitations associated with reactivity management. Importance Rating: 4.3
Conduct of Operations	R, M	[RO A-2] Determine faults and required actions in Reactor Coolant System cooldown rate data. K/A: 2.1.32 Ability to explain and apply system limits and precautions. Importance Rating: 3.8
Equipment Control	R, N	[RO A-3] Determine and evaluate total identified RCS leakage in accordance with 40ST-9RC05, Manual Calculation of RCS Water Inventory. K/A: 2.2.12 Knowledge of surveillance procedures. Importance Rating: 3.7
Radiation Control	R, D	[RO A-4] Determine entry requirements for HRA in the RCA. K/A: 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions. Importance Rating: 3.5
Emergency Procedures/Plan	N/A	N/A

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Palo Verde
Examination Level: RO ☐ SRO ☑
Date of Examination: 11/04/13
Operating Test Number: ______

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, D	[SRO A-1] Review 40DP-9OP06, Ops Department Repetitive Task Program, Appendix EC003, interpret data, take actions and determine appropriate Technical Specification LCO condition. K/A: 2.1.20 Ability to interpret and execute procedure steps. Importance Rating: 4.6
Conduct of Operations	R, N	[SRO A-2] Ensure crew compliance with Fatigue Rule program. K/A: 2.1.5 Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc. Importance Rating: 3.9
Equipment Control	R, M	[SRO A-3] Ensure compliance with Technical Specifications with regards to MSIVs. K/A: 2.2.22 Knowledge of limiting conditions for operations and safety limits. Importance Rating: 4.1
Radiation Control	R, M	[SRO A-4] Calculate dose, whose permission is needed to complete the task, and the required area posting. K/A: 2.3.13 Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. Importance Rating: 3.8
Emergency Procedures/Plan	R, N	[SRO A-5] Classify an event. K/A: 2.4.41 Knowledge of the emergency action level thresholds and classifications. Importance Rating: 4.6

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

JPM BASIS INFORMATION

TASK:	1270057402 Direct Power Ascension Above 20%.						
TASK STANDARD:	Boron concentration required for a power ascension from 40% to 60% has been calculated using 40OP-9ZZ05 Appendix N, Power Change Worksheet, to be 34-35 ppm and Boron OAP parameters have been entered into Boron OAP screen shot per the answer key.						
K/A:	2.1.37	K/A RATING:	RO:	4.3	SRO:	4.6	
10 CFR 55:	41.1 / 43.6						
APPLICABLE POSITION(S):	RO	VALIDATION TIME:	30 minutes				
REFERENCES:	40OP-9ZZ05, Power Operations, Appendix N, Power Change Worksheet Core Data Book, Unit 2, Cycle 18						
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR		PLANT		OTHER	X	

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***Yes***

APPROVAL

Developed By: Joe Allison Date: 03/10/1999

Revised By: Adam Rasmussen Date: 10/16/2013

Technical Review ______________ Operations Approval ______________

Training Approval ______________

EVALUATION

Examinee Name: ______________ Date: ______________

Evaluator Name: ______________

Time to complete: Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # _____________*
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   N/A

2. **SPECIAL TOOLS/EQUIPMENT:**
   - 40OP-9ZZ05, Appendix N, Revision 137 available
   - Core Data Book Unit 2 Cycle 18, Revision 0 available

   NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.
   - Blank hard copy of Boron OAP screen shot
   - Calculator
   - Pen and Paper

3. **JPM PERFORMANCE:**
   MALFUNCTIONS, OVERRIDES, etc. **during** JPM: N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANT JPMs ONLY:

- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE** any equipment.
- o Inform the Control Room staff of any discovered deficiencies.
- o Comply with the REP. If it is not possible to enter an area, it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- o You may use any source of information normally available.

INITIAL CONDITIONS:

Given the following conditions in Unit 2 Cycle 18:

- **Reactor is critical at 40% power, BOL, 4 EFPD**
- **Power ascension to 60% is planned from midnight to noon on 11/10/13. Current date and time is 11/09/13 2330.**
- **RCS Cold leg temperature for the power ascension is on program and will remain "On Program" (currently at 561.4°F).**
- **Assume equilibrium Xenon**
- **Reactor Engineering has provided the following information:**

Parameter	Initial	Final
[Iodine]	40%	48.65%
[Xenon]	67.7%	66.4%
Xenon Reactivity (pcm)	-1791	-1765
Reg CEA Position (inches)	150	150
PSCEA Position (inches)	150	150
Boron worth (pcm/ppm)	-7.25	-7.25

- **Tave is 573°F**
- **RCS pressure is 2250 psia**
- **Pressurizer level is 50%**
- **VCT Level is 40%**
- **RCS Boron Concentration is 1200 ppm**
- **RWT Boron concentration is 4200 ppm**
- **Power Change Worksheet program is NOT available**

INITIATING CUE:

You are directed to:

1. **Manually determine the change in boron required for the power ascension using 40OP-9ZZ05, Power Operations, Appendix N, Power Change Worksheet, Step 2.5.**

AND

2. **Fill in the parameters needed to complete the Boration/Dilution calculation using the Boron OAP screenshot provided.**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME:

	STEP	CUE	STANDARD
1.	Step 2.5: **IF** using the Manual Power Change Worksheet, **THEN** complete the worksheet while observing the following guidelines: • Signs must be inserted correctly for program to work properly. • Final data is inserted in first column; initial data is entered in second column. This will help to ensure the equations are executed correctly.	**Evaluator NOTE:** **ONLY** steps marked with asterisk (*) in **STANDARD** are required to meet the **CRITICAL STEP**. **ANSWER KEY** may be used for convenience in evaluation.	Examinee completed FIRST portion of Manual Power Change Worksheet as follows: • Circled Unit 2 • Entered EFPD as 4 • Entered Date: 11/09/13 • Final Date: 11/10/13 • Final Time: 1200 • Final Iodine Conc: 48.65 • Initial Date: 11/10/13 • Initial Time: 0000 • Initial RCS Boron: 1200(ppm) • Initial Iodine Conc: 40

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	Step 2.5 (continued): **IF** using the Manual Power Change Worksheet, **THEN** complete the worksheet while observing the following guidelines: • Signs must be inserted correctly for program to work properly. • Final data is inserted in first column, initial data is entered in second column. This will help to ensure the equations are executed correctly.	**Evaluator NOTE:** **ONLY** steps marked with asterisk (*) in **STANDARD** are required to meet the **CRITICAL STEP**. **ANSWER KEY** may be used for convenience in evaluation. **CORRECT SIGNS ARE REQUIRED.**	Examinee completed FOLLOWING TABLE portions of Manual Power Change Worksheet as follows: • Final Xenon Conc from Xenon OAP: 66.4(%) • (*) Final Xenon Reactivity: **-1765(pcm)** • Final Power Level: 60(%) • (*) Final Power Defect (from Table 2.1.1 of Core Data Book): **-815(pcm)** • Initial Xenon Conc from Xenon OAP: 67.7(%) • (*) Initial Xenon Reactivity: **-1791(pcm)** • Initial Power Level: 40(%) • (*) Initial Power Defect (from Table 2.1.1 of Core Data Book): **-538(pcm)** • (*) delta rho (xenon): **+26(pcm) pcm(1)** • (*) delta rho (power): **-277(pcm) pcm(2)**

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
3. *	Step 2.5 (continued): **IF** using the Manual Power Change Worksheet, **THEN** complete the worksheet while observing the following guidelines: • Signs must be inserted correctly for program to work properly. • Final data is inserted in first column, initial data is entered in second column. This will help to ensure the equations are executed correctly.	**Evaluator NOTE:** **ONLY** steps marked with asterisk (*) in **STANDARD** are required to meet the **CRITICAL STEP**. **ANSWER KEY** may be used for convenience in evaluation. **CORRECT SIGNS ARE REQUIRED.**	Examinee completed FOLLOWING TABLE portions of Manual Power Change Worksheet as follows: • Final RCS T-cold: On Program • Final Temperature Defect: N/A – On Program • Final Reg CEA Position: 150(in) • (*) Final Reg CEA worth: **0(pcm)** • Final PLCEA/PSCEA Position: 150(in) • (*) Final PLCEA/PSCEA worth: **0(pcm)** • Initial RCS T-cold: 561.4°F • Initial Temperature Defect: N/A – On Program • Initial Reg CEA Position: 150(in) • (*) Initial Reg CEA worth: **0(pcm)** • Initial PLCEA/PSCEA Position: 150(in) • (*) Initial PLCEA/PSCEA worth: **0(pcm)** • *delta rho (temp): **0(pcm) pcm(3)** • *delta rho (reg CEA): **0 (pcm) pcm(4)** • *delta rho (PLCEA/PSCEA): **0(pcm) pcm(5)**

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
4. *	Step 2.5 (continued): **IF** using the Manual Power Change Worksheet, **THEN** complete the worksheet while observing the following guidelines: • Signs must be inserted correctly for program to work properly. • Final data is inserted in first column, initial data is entered in second column. This will help to ensure the equations are executed correctly.	**Evaluator NOTE:** **ONLY** steps marked with asterisk (*) in **STANDARD** are required to meet the **CRITICAL STEP**. **ANSWER KEY** may be used for convenience in evaluation. **CORRECT SIGNS ARE REQUIRED.**	Examinee completed FOLLOWING TABLE portions of Manual Power Change Worksheet as follows: • (*) Net Reactivity Change During the Power Change: pcm(1) + pcm(2) + pcm(3) + pcm(4) + pcm(5): **-251 net pcm(total)** • (*) Boron reactivity change required due to net pcm change: **251 delta rho boron (pcm)**

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
5. *	Step 2.5 (continued): **IF** using the Manual Power Change Worksheet, **THEN** complete the worksheet while observing the following guidelines: • Signs must be inserted correctly for program to work properly. • Final data is inserted in first column, initial data is entered in second column. This will help to ensure the equations are executed correctly.	**Evaluator NOTE:** **ONLY** steps marked with asterisk (*) in **STANDARD** are required to meet the **CRITICAL STEP**. **ANSWER KEY** may be used for convenience in evaluation. **CORRECT SIGNS ARE REQUIRED.**	Examinee completed FOLLOWING TABLE portions of Manual Power Change Worksheet as follows: • (*) Delta ppm Boron is delta rho boron (pcm) divided by boron worth **(BORON WORTH IS GIVEN IN INITIATING CUE)**: **251** pcm divided by **-7.51** pcm/ppm equals **-34.6** ppm boron **Evaluator NOTE:** **-34 ppm boron to -35 ppm boron are acceptable answers (from rounding)**

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
6. *	Record data on the blank BORON OAP input sheet.	**Evaluator NOTE:** **ALL** data is required to be entered.	Examinee input the following data into BORON OAP sheet: Tave: **573 degrees F.** RCS pressure: **2250 psia.** Pressurizer level: **50%.** VCT Level: **40%.** Current Boron Conc: **1200 ppm.** Target Boron Conc: **1165.4 ppm.** RWT Boron Conc: **4200 ppm.** **Evaluator NOTE:** **1165-1166 ppm is ACCEPTABLE for Target Boron Conc value.**
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

Given the following conditions in Unit 2 Cycle 18:

- Reactor is critical at 40% power, BOL, 4 EFPD
- Power ascension to 60% is planned from midnight to noon on 11/10/13. Current date and time is 11/09/13 2330.
- RCS Cold leg temperature for the power ascension is on program and will remain "On Program" (currently at 561.4°F).
- Assume equilibrium Xenon
- Reactor Engineering has provided the following information:

Parameter	Initial	Final
[Iodine]	40%	48.65%
[Xenon]	67.7%	66.4%
Xenon Reactivity (pcm)	-1791	-1765
Reg CEA Position (inches)	150	150
PSCEA Position (inches)	150	150
Boron worth (pcm/ppm)	-7.25	-7.25

- Tave is 573°F
- RCS pressure is 2250 psia
- Pressurizer level is 50%
- VCT Level is 40%
- RCS Boron Concentration is 1200 ppm
- RWT Boron concentration is 4200 ppm
- Power Change Worksheet program is NOT available

INITIATING CUE:

You are directed to:

1. Manually determine the change in boron required for the power ascension using 40OP-9ZZ05, Power Operations, Appendix N, Power Change Worksheet, Step 2.5.

AND

2. Fill in the parameters needed to complete the Boration/Dilution calculation using the Boron OAP screenshot provided.

APPLICANT

2013 NRC RO A-1 KEY - DO NOT GIVE TO EXAMINEE

Manual Power Change Worksheet

Unit 1 2 3 (circle one) EFPD: 4 Date: 11/9/13

	Final Conditions (projected)		Initial Conditions			
Date	11/10/13		11/10/13			
Time	1200		0000			
RCS Boron (Sample ppm)			1200ppm			
Iodine Conc (Xenon OAP)	48.65%		40%			
Xenon Conc From Xenon OAP	66.4%		67.7%		delta rho (xenon)	
* Xenon Reactivity	-1765 pcm	minus	-1791 pcm	equals	+26	pcm(1)
Reactivity Xenon OAP using appropriate history and projected ramp input						
Power Level (JSCALOR)	60%		40%		delta rho (power)	
* Power Defect	-815 pcm	minus	-538 pcm	equals	-277	pcm(2)
Table 2.1.1 of Core Data Book						
RCS T-cold (RCTCAVG)	ON PROGRAM		ON PROGRAM		delta rho (temp)	
* Temperature Defect	pcm	minus	pcm	equals	Ø *	pcm(3)
Tables 4.2.1 thru 4.2.9 of core data book. Defect not applicable if temperature is on program.						
Reg CEA Position	150 in		150 in		delta rho (reg CEA)	
* Reg CEA worth	pcm	minus	pcm	equals	Ø *	pcm(4)
Tables 2.8.1 thru 2.10.3 of Core Data Book						
PSCEA Position	150 in		150 in		delta rho (PSCEA)	
* PSCEA worth	pcm	minus	pcm	equals	Ø *	pcm(5)
Tables 2.11.1 thru 2.13.3 of Core Data Book						

*DENOTES CRITICAL STEP

2013 NRC RO A-1 KEY - DO NOT GIVE TO EXAMINEE

Manual Power Change Worksheet

* Net Reactivity Change During the Power Change. pcm(1) + pcm(2) + pcm(3) + pcm(4) + pcm(5) (keep signs correct)	-251	net pcm(total)
* Boron reactivity change required due to net pcm change: Delta rho Boron is equal to the mathematically opposite of the net pcm(total) delta rho boron (pcm) = (-) net pcm (total)	251	delta rho boron (pcm)
* Delta ppm Boron is delta rho boron (pcm) divided by boron worth. (Tables 2.3.1 thru 2.3.9 of Core Data Book) 251 pcm divided by -7.25 pcm/ppm equals -34.6 ppm boron (delta rho boron) (boron worth) (-34 to -35 ACCEPTABLE)		
Delta gallons Boration/Dilution (Use the BORON OAP) (circle)	BORON OAP SHEET	gallons (boration/ dilution) (circle)

Performed by Reactor Operator /Date 11/9/13

Verified by ______________________________ /Date__________

*DENOTES CRITICAL STEP

Boration/Dilution Calculations

Input Data

RCS Avg Temp (deg F)	573
RCS Pressure (psia)	2250
Pressurizer Level (%)	50
VCT Level (%)	40
Current Boron Conc (ppm)	1200
Target Boron Conc (ppm)	1165.4 NOTE
RWT Boron Conc (ppm)	4200

Calculation Results

Requested boron change requires:

gallons of

NOTE: 1165-1166 ppm ACCEPTABLE FOR TARGET BORON CONC VALUE

TABLE 2.1.1

POWER DEFECT VS BURNUP

POWER LEVEL (%)
POWER DEFECT (PCM)

BURNUP (EFPD)	20	40	60	80	100
0	-268	-536	-812	-1096	-1389
4	-268	-538	-815	-1099	-1394
13	-268	-539	-816	-1103	-1400
25	-268	-538	-817	-1105	-1403
50	-268	-540	-821	-1112	-1415
100	-274	-555	-846	-1150	-1468
150	-288	-584	-894	-1216	-1557
200	-307	-622	-953	-1298	-1663
250	-328	-666	-1021	-1391	-1782
300	-352	-713	-1093	-1490	-1908
350	-377	-764	-1171	-1594	-2040
400	-403	-817	-1250	-1701	-2175
450	-429	-871	-1331	-1809	-2314
492	-451	-916	-1399	-1901	-2431

PLANT CONDTITIONS
0.0% to 100.0 % POWER
BOC through 492.0 EFPD
Variable Tcold Temperature Effects Included At All Power Levels

REFERENCE SOURCE OF DATA
NA-02-C18-2011-029

JPM BASIS INFORMATION

TASK:	1270010401 Operate the plant during a plant heatup from cold shutdown to hot standby.						
TASK STANDARD:	Examinee has determined that improper heatup rate limit was used from PTLR and the Technical Specification heatup rate limit has been exceeded						
K/A:	2.1.18	K/A RATING:	RO:	3.6	SRO:	3.8	
K/A:	2.1.25	K/A RATING:	RO:	3.9	SRO:	4.2	
10 CFR 55:	41.10 / 43.5 / 45.2 / 45.6 /45.12 / 45.13						
APPLICABLE POSITION(S):	RO	VALIDATION TIME:	30 minutes				
REFERENCES:	40ST-9RC01, RCS and Pressurizer Heatup and Cooldown Rates RCS Pressure and Temperature Limits Report – TRM, Appendix TA Technical Specifications						
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR		PLANT		OTHER	X	

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Jordan Johnston Date: 05/01/2008

Revised By: Adam Rasmussen Date: 10/16/2013

Technical Review ____________ Operations Approval ____________

Training Approval ____________

EVALUATION

Examinee Name: ____________ Date: ______

Evaluator Name: ____________

Time to complete: Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. SIMULATOR SETUP:
N/A

2. SPECIAL TOOLS/EQUIPMENT:
- 40ST-9RC01, RCS and Pressurizer Heatup and Cooldown Rates, Revision 17
- Completed copy of 40ST-9RC01, Appendix A Data Sheet
- RCS Pressure and Temperature Limits Report (PTLR) – TRM, Appendix TA, Revision 52
- Technical Specifications

NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM
- Calculator
- Pen and Paper

3. JPM PERFORMANCE:

MALFUNCTIONS, OVERRIDES, etc. **during** JPM: N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANT JPMs ONLY:
- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE** any equipment.
- o Inform the Control Room staff of any discovered deficiencies.
- o Comply with the REP. If it is not possible to enter an area, it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:
- o You may use any source of information normally available.

INITIAL CONDITIONS:

- **Unit 1 has performed a HEATUP to Mode 3**
- **RC01 Excel spreadsheet is unavailable**
- **40ST-9RC01, RCS and Pressurizer Heatup and Cooldown Rates, Appendix A – Manual RCS/Pressurizer Temperature/Pressure Data Sheet has been completed**

INITIATING CUE:

The CRS directs you to review the data sheet for accuracy referencing 40ST-9RC01 and the Pressure and Temperature Limits Report (PTLR):

1. **List non-clerical errors found (if any):**
2. **List limits or guidelines exceeded (if any):**
3. **If limits/guidelines were exceeded, list what action should have been taken:**
4. **Did a Technical Specification violation occur?**

YES -OR- NO (CIRCLE ONE)

RECORD ANSWERS ON THIS SHEET

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Determines that improper Allowable Heatup Rate was recorded on data sheet **(100°F/hr vice 75°F/hr)**		Examinee annotated that the wrong allowable heatup rate limit was used

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
2.	Determines that at 0115 a math error resulted in wrong Change in T_{cold} **(318°F - 293°F = 25°F NOT 15°F)**		Examinee annotated that **Change in T_{cold}** value at **0115** was **25°F, NOT 15°F**

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
3. *	Determines that a limit/guideline was exceeded		Examinee annotated that the 75°F/hr heatup rate limit was exceeded **Evaluator NOTE:** **Satisfactory performance must include:** **15 minute equivalent heatup rate limit** **OR** **75°F/hr rolling hour heatup rate limit** **OR** **90% of allowable heatup rate limit was exceeded at ~0100**

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
4. *	Determines that the heatup rate was required to be reduced	**Evaluator NOTE:** Examinee may also list the actions required for Tech Spec 3.4.3 limit being exceeded – which is to restore parameters to within limits within 30 minutes. This will meet the **STANDARD** for this **STEP**.	Examinee annotated that the heatup rate should have been **REDUCED or STOPPED**.

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
5. *	Determines that a Technical Specification violation **DID** occur		Examinee answered **YES** **Evaluator NOTE:** LCO 3.4.3 CONDITION A is applicable.
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- **Unit 1 has performed a HEATUP to Mode 3**
- **RC01 Excel spreadsheet is unavailable**
- **40ST-9RC01, RCS and Pressurizer Heatup and Cooldown Rates, Appendix A – Manual RCS/Pressurizer Temperature/Pressure Data Sheet has been completed**

INITIATING CUE:

The CRS directs you to review the data sheet for accuracy referencing 40ST-9RC01 and the Pressure and Temperature Limits Report (PTLR):

1. **List non-clerical errors found (if any):**

2. **List limits or guidelines exceeded (if any):**

3. **If limits/guidelines were exceeded, list what action should have been taken:**

4. **Did a Technical Specification violation occur?**

YES -OR- NO **(CIRCLE ONE)**

RECORD ANSWERS ON THIS SHEET

APPLICANT

APPLICANT

INITIAL CONDITIONS:

- **Unit 1 has performed a HEATUP to Mode 3**
- **RC01 Excel spreadsheet is unavailable**
- **40ST-9RC01, RCS and Pressurizer Heatup and Cooldown Rates, Appendix A – Manual RCS/Pressurizer Temperature/Pressure Data Sheet has been completed**

INITIATING CUE:

The CRS directs you to review the data sheet for accuracy referencing 40ST-9RC01 and the Pressure and Temperature Limits Report (PTLR):

1. **List non-clerical errors found (if any):**

2. **List limits or guidelines exceeded (if any):**

3. **If limits/guidelines were exceeded, list what action should have been taken:**

4. **Did a Technical Specification violation occur?**

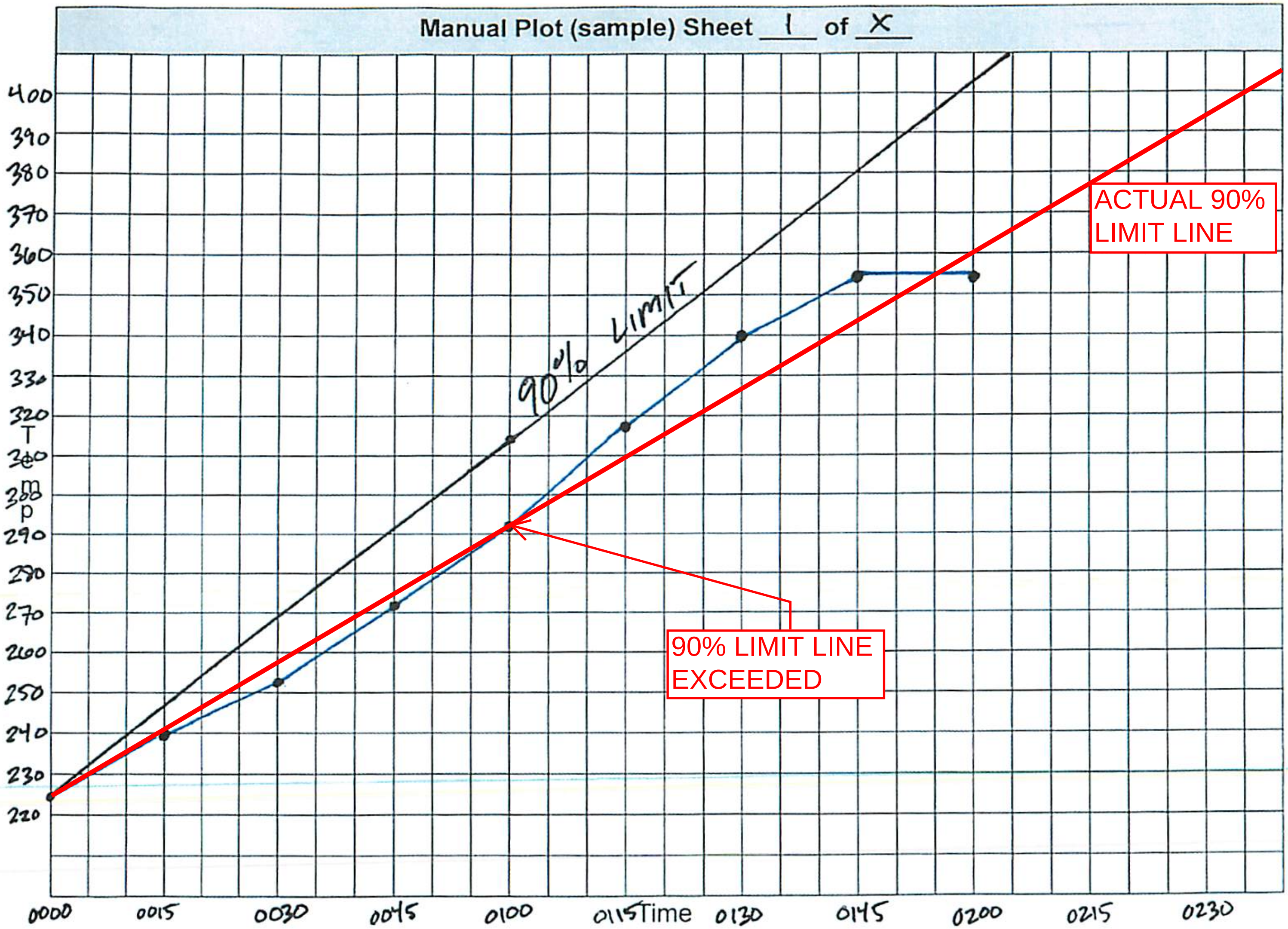
YES -OR- NO (CIRCLE ONE)

RECORD ANSWERS ON THIS SHEET

APPLICANT

ANSWER KEY

Manual Plot (sample) Sheet 1 of X



End of Appendix A

ANSWER KEY

ANSWER KEY

Manual RCS and PZR heatup and Cooldown Rates (sample)				Date: TODAY		Page 1 of X			
RCS Data									
Time	0000	0015	0030	0045	0100	0115	0130	0145	0200
PZR Pressure	750	750	750	750	800	850	900	950	950
Next Transition (Temp or condition) (Note 1)	MODE 3	MODE 3	MODE 3	MODE 3	MODE 3	MODE 3	MODE 3	MODE 2	MODE 2
RCS T_{cold}	225	240	253	272	293	318	340	355	355
Previous T_{cold}	N/A	225	240	253	272	293	318	340	355
Change in T_{cold} (°F per 15 min, maintaining sign)	N/A	15	13	19	21	15	22	15	0
Change in T_{cold} X 4 = Rate of change per hour	N/A	60	52	76	84	60	88	60	0
Allowable Heatup Cooldown Rate	100	100	100	100	100	100	100	100	100
Comment Reference Number								NOTE 2	
Initials	L	L	L	L	L	L	L	L	L

Heatup Rate Limit/ Guidelines exceeded

Math Error: Should be 25°F

Heatup Rate Limit should be 75°F/hr

Note 1: Enter Temp in cell or note transition condition in comment section with Comment Reference Number

Comments: NOTE 2: TRANSITIONED TO MODE 3 L

ANSWER KEY

RCS and Pressurizer Heatup and Cooldown Rates	40ST-9RC01	Revision 17

Procedure Preparer: Mark D. Myers

Procedure Owner: Randy Merryman

Procedure Usage Requirements		Sections
Continuous Use:	Refer To 01DP-0AP09, Procedure and Work Instruction Use and Adherence.	ALL

CONTENTS

APPENDICES

1.0 PURPOSE AND SCOPE

1.1 Purpose

1.1.1 This procedure monitors Reactor Coolant System (RCS) and Pressurizer (PZR) temperature and pressure so that Technical Specification temperature and pressure limits are NOT exceeded during primary system heatup/cooldown.

1.1.2 This procedure monitors PZR spray temperature differential and logs spray cycles.

1.2 Scope

1.2.1 General

1.2.1.1 This procedure applies to all primary system heatups and cooldowns.

1.2.1.2 This procedure provides monitoring of Main Spray Valves during operation with less than four RCPs in operation.

1.2.1.3 This procedure provides monitoring of Auxilliary Spray Valves.

1.2.1.4 This procedure applies to hydrostatic testing.

1.2.2 Technical Specification requirements

- LCO 3.4.3, RCS Pressure and Temperature (P/T) Limits
- SR 3.4.3.1, Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates within limits specified in the Pressure and Temperature Limits Report (PTLR) (PTLR is located in the TRM Appendix TA)
- Applicability: At all times; except when reactor vessel head is fully detensioned such that the RCS cannot be pressurized
- Frequency: at least once per 30 minutes during system heatup, cooldown, and inservice leak and hydrostatic testing operations

1.2.3 Technical Requirements Manual (TRM) requirements (PZR)

- T3.4.102, Pressurizer Heatup and Cooldown Limits
- TSR 3.4.102.1, Verify that pressurizer heatup and cooldown rates are within the specified limits
- Applicability - At all times

- Frequency: at least once per 30 minutes during PZR heatup and cooldown operations

1.2.4 Technical Requirements Manual (TRM) requirements (Sprays)

- T3.4.102, Pressurizer Heatup and Cooldown Limits
- TSR 3.4.102.2, The spray water temperature differential shall be determined for use.
- Applicability - At all times
- Frequency: Each cycle of main spray when less than 4 reactor coolant pumps are operating and for each cycle of auxiliary spray operation.

End of Section 1.0

2.0 RESPONSIBILITIES

2.1 Operations is responsible for performance of this procedure.

End of Section 2.0

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Precautions

3.1.1 The pressurizer spray nozzle and portions of the spray piping are exposed to pressurizer steam under some low bypass flow conditions when less than four RCPs are operating. This may subject the spray nozzle and portions of the spray piping to severe thermal transients. The use of main spray with less than four RCPs operating should be minimized.

3.1.2 The maximum PZR heatup/cooldown rate is 200°F/Hr.

3.2 Limitations

3.2.1 Temperature “drift” of plus or minus 10°F from a stable condition that occurs over the span of a 12 hour shift does NOT necessarily need to be monitored using this surveillance test. If the plant is maneuvering from one stable condition to another, regardless of the time span or magnitude of the temperature change, then that condition change shall be monitored using this surveillance test.

3.2.2 The RCS heatup/cooldown limits of PTLR Tables TA2-3 or TA2-4 are NOT applicable when the reactor vessel head is fully detensioned such that the Reactor Coolant System cannot be pressurized.

3.2.3 The limits specified within this procedure do NOT apply during the performance of Emergency Operating Procedures (EOPs) unless the EOP in use directs that these limits apply.

3.2.4 If an Emergency Operating Procedure has been used to perform a plant cooldown or operate pressurizer spray valves, the appendices used to record spray cycles and or cooldown rates would be attached to this procedure and a test log entry would be made.

3.2.5 When using the P/T curve in PTLR Figure TA2-1 or TA2-2, the acceptable operating space is to the right of the respective limit lines. Do NOT attempt to interpolate between the limit lines.

End of Section 3.0

4.0 DEFINITIONS

4.1 **Heatup/cooldown** — an intentional temperature change which maneuvers the plant from one stable configuration to another, regardless of the time required to make the change.

4.2 **PTLR** — The PTLR is the site specific document that provides the reactor vessel pressure and temperature limits, including heatup and cooldown rates, for the current reactor vessel fluence period. These pressure and temperature limits shall be determined for each fluence period in accordance with Specification 5.6.9.

End of Section 4.0

5.0 PREREQUISITES AND INITIAL CONDITIONS

5.1 Prerequisites

5.1.1 None

5.2 Initial Conditions

___ 5.2.1 This procedure is the current revision and includes all effective Temporary Approved Procedure Actions (TAPAs).

___ 5.2.2 Section 2.0, Responsibilities, has been read and understood.

___ 5.2.3 Section 3.0, Precautions and Limitations, has been read and understood.

___ 5.2.4 Initial plant status information has been recorded in the table below:

Plant Status	
Unit (Circle) 1 2 3	Date:
MODE (circle) 3 4 5 6	

___ 5.2.5 Permission to perform this test is granted by the SM/CRS.

Signature ________________________ Date ____________
(SM/CRS)

End of Section 5.0

6.0 INSTRUCTIONS

___ 6.1 Ensure an STWO has been generated for the performance of this procedure.

ⓘ

NOTE

___ The instrument selected for monitoring the heatup/cooldown under the stated condition should be used throughout that condition to ensure consistency of data.

___ 6.2 **IF** Reactor Coolant Pumps (RCPs) are in operation,
THEN identify the lowest reading T_{cold} indicator, on the loop with an operating RCP, is to be used for data collection.

Indicator Used (Check)	Indicator
	RCA-TI-115, REAC COOLANT LOOP 1B TEMP
	RCB-TI-125, REAC COOLANT LOOP 2A TEMP
	QSPDS point for T_{cold} (Page 211)
	QSPDS point for T_{cold} (Page 221)
	QSPDS point for T_{cold} (Page 312
	PMS point RCT115, RC COLD LEG 1B TEMP
	PMS point RCT125, RC COLD LEG 2A TEMP

NOTE

___ The instrument selected for monitoring the heatup/cooldown under the stated condition should be used throughout that condition to ensure consistency of data.

___ 6.3 **IF** BOTH of the following conditions exist:

- ____ Shutdown Cooling (SDC) is in operation
- ____ RCPs are secured

THEN identify the SDC Heat Exchanger Outlet temperature indicator, from operating the SDC train, is to be used for data collection.

Indicator Used (Check)	Indicator
	HX TO LOOPS TT-351Y (on SIA-TR-351)
	HX TO LOOPS TT-352Y (on SIB-TR-352)

NOTE

___ The instrument selected for monitoring the heatup/cooldown under the stated condition should be used throughout that condition to ensure consistency of data.

___ 6.4 **IF** PZR pressure is greater than 750 psia,
THEN identify the PZR pressure indicator to be used for data collection.

Indicator Used (Check)	Indicator
	PRZR PRESSURE PT-102A (on RCA-PI-102A)
	PRZR PRESSURE PT-102B (on RCB-PI-102B)
	PRZR PRESSURE PT-102C (on RCC-PI-102C)
	PRZR PRESSURE PT-102D (on RCD-PI-102D)
	PMS point RCP102A, PZR WIDE RNGE PRESS CH A
	PMS point RCP102B, PZR WIDE RNGE PRESS CH B
	PMS point RCP102C, PZR WIDE RNGE PRESS CH C
	PMS point RCP102D, PZR WIDE RNGE PRESS CH D
	QSPDS point for PZR pressure (Page 211)
	QSPDS point for PZR pressure (Page 221)

NOTE

___ The instrument selected for monitoring the heatup/cooldown under the stated condition should be used throughout that condition to ensure consistency of data.

___ 6.5 **IF** PZR pressure is less than 750 psia,
THEN identify the PZR pressure indicator to be used for data collection.

Indicator Used (Check)	Indicator
	RCA-PI-103, PRESSURIZER PRESSURE
	RCA-PI-103, PRESSURIZER PRESSURE
	RCC-PI-105, PRESSURIZER PRESSURE
	RCD-PI-106, PRESSURIZER PRESSURE
	PMS point RCP102A, PZR WIDE RNGE PRESS CH A
	PMS point RCP102B, PZR WIDE RNGE PRESS CH B
	PMS point RCP102C, PZR WIDE RNGE PRESS CH C
	PMS point RCP102D, PZR WIDE RNGE PRESS CH D
	QSPDS point for PZR pressure (Page 211)
	QSPDS point for PZR pressure (Page 221)

NOTE

___ The instrument/parameter selected for monitoring the heatup/cooldown under the stated condition should be used throughout that condition to ensure consistency of data.

___ 6.6 **IF** performing a PZR heatup/cooldown,
THEN identify which PZR temperature indicator/parameter is to be used for data collection.

Indicator Used (Check)	Indicator
	TEMPERATURE TE-101 (on RCN-TI-101)
	PMS point RCT101, PZR TEMP
	PZR T_{sat} from PZR pressure using Steam Tables

NOTE

___ If main sprays are open when the first RCP is secured and then subsequently closed this would NOT count as a cycle. A subsequent open/close cycle would count as the first cycle.

___ 6.7 **IF** BOTH of the following conditions exist:

_____ • Less than 4 RCPs are running

_____ • Any main spray valve is cycled

THEN perform Appendix B - Pressurizer Main Spray Cycle Log.

___ 6.8 **IF** auxiliary spray valves are cycled,
THEN perform Appendix C - Pressurizer Auxiliary Spray Cycle Log. ⓘ

ⓘ

NOTE

___ In an Excel spreadsheet the locations of cells are given using a grid system. Capitol letters are used along the top axis and numbers are used along the left side axis. As an example the limit for a heatup/cooldown is entered in the merged cells I3 and I4.

___ 6.9 Perform the following to validate the Operations Personal Computer:

___ 6.9.1 Open H:\OPS\COMMON\RC01\RC01.rev 5. ⓘ

___ 6.9.2 Select the Options button located next to the phrase “Macros have been disabled”.

___ 6.9.3 Select “Enable this content”.

___ 6.9.4 Select “OK”.

___ 6.9.5 Select the tab labeled “RCS”.

___ 6.9.6 Select the button labeled “Reset” twice.

___ 6.9.7 Insert ONE of the following in cells labeled “Limit =” located at I3-I4:

- ___ • -100
- ___ • (100)

___ 6.9.8 Ensure the button labeled “Cooldown” located at I8 is selected.

___ 6.9.9 Enter a “Start” time of 01:00.

___ 6.9.10 Enter the following information into the RCS Chart:

Time	0100	0115	0130	0145	0200	0215	0230	0245	0300	0315	0330	0345
PZR Press	500	500	500	500	500	500	500	500	500	500	500	500
RCS T_c (°F)	400	390	400	380	360	320	350	300	249	300	250	199

___ 6.9.11 Obtain a printout by selecting the “Print” button located at P4.

___ 6.9.12 Compare the printout with the RCS test case results Appendix D - RCS PZR Test Case Data.

Performance Acceptance Criteria
All calculated entries for “Change T_c (°F/15 min)”, “Previous T_c”, and “Rate T_c (°F/Hr)”, and alarms printed on the automated test are the same as those in the “Test Case Data”.
Performance Criteria MET? (Circle Result) Yes / No

___ 6.9.13 Select the tab labeled “PZR”.

___ 6.9.14 Select the button labeled “Reset” twice.

___ 6.9.15 Insert ONE of the following in the merged cells labeled “Limit =” located at A2:

- ___ • -200
- ___ • (200)

___ 6.9.16 Enter a “Start” time of 23:45.

___ 6.9.17 Enter the following information into the PZR Chart:

Time	2345	0000	0015	0030	0045	0100	0115	0130	0145	0200	0215	0230
PZR Temp (°F)	500	480	500	450	500	400	299	250	200	150	50	50

___ 6.9.18 Obtain a printout by selecting the "Print" button located at E2-F2.

___ 6.9.19 Compare the printout with the PZR test case results Appendix D - RCS PZR Test Case Data.

Performance Acceptance Criteria

All calculated entries for "Change T_{PZR} (°F/15 min)", "Previous T" and "Rate T_{PZR} (°F/Hr)" printed on the automated test are the same as those in the "Pressurizer Test Case Data".

Performance Criteria MET? (Circle Result) Yes / No

___ 6.10 **IF** ANY of the following conditions exist:

_____ • RCS Test Data is NOT SAT

_____ • PZR Test Data is NOT SAT

THEN GO TO Appendix A - Manual RCS/Pressurizer Temperature/Pressure Data Sheet.

NOTE

___ A Technical Specification violation occurs only when the "rolling hourly" heatup/cooldown rate is exceeded.

___ 6.11 **IF** the spreadsheet indicates that the 15 minute equivalent maximum hourly rate is exceeded,
THEN perform the following:

___ 6.11.1 Reduce the heatup/cooldown rate sufficiently so that the rolling hourly rate will NOT be exceeded.

___ 6.11.2 Maintain the reduced heatup/cooldown rate over the remaining 15 minute intervals in that rolling hour so that the rolling hourly rate over the next hour will NOT be exceeded.

NOTE

___ A Technical Specification violation occurs only when the "rolling hourly" heatup/cooldown rate is exceeded.

___ 6.12 **IF** the spreadsheet indicates that the 50% of maximum allowable hourly rate is exceeded in a 15 minute period,
THEN perform the following:

___ 6.12.1 Stop the heatup/cooldown.

___ 6.12.2 Maintain temperature and pressure for the remaining 15 minute intervals in the rolling hour.

___ 6.13 Complete Appendix E - Backup Data Log, in parallel with performance of computer program.

___ 6.14 GO TO the appropriate step(s) for the evolution(s) to be performed. ⓘ

Heatup		**Cooldown**	
RCS	PZR	RCS	PZR
Step 6.15	Step 6.16	Step 6.17	Step 6.18

___ 6.15 Perform the following for a RCS heatup:

___ 6.15.1 Ensure the RCS tab is selected.

___ 6.15.2 Select the button labeled "Reset" twice.

___ 6.15.3 Ensure the Heatup button is selected.

___ 6.15.4 Perform the following:

NOTE

___ Table TA2-3, RCS Heatup P/T Limits through 32 EFPY is equivalent to Figure TA2-1, RCS Heatup Limits through 32 EFPY.

___ 6.15.4.1 Select the most limiting heatup rate allowed from ALL of the following: (located in the TRM Appendix TA)

- ___ Table TA2-1, RCS Heatup and Cooldown Rate Limits
- ___ Table TA2-3, RCS Heatup P/T Limits through 32 EFPY
  OR
  Figure TA2-1, RCS Heatup Limits through 32 EFPY

___ 6.15.4.2 Record the most limiting heatup rate.

____

___ 6.15.5 Enter the most limiting heatup rate allowed, as a positive number, in the merged cells labeled “Limit =” located at I3-I4.

NOTE

___ The same instrument should be used throughout the heatup except when transitioning from one limit to another or from one condition to another.

___ 6.15.6 Record BOTH of the following:

- ___ T_c instrument number being used for RCS heatup from Step 6.2 or Step 6.3

  ____

- ___ Pressure instrument number being used for RCS heatup from Step 6.4 or Step 6.5

  ____

___ 6.15.7 Select Reset Chart Low scale value as directed by the SM/CRS.

___ 6.15.8 Perform the following:

___ 6.15.8.1 Monitor the scale on the RCS Chart tab.

___ 6.15.8.2 Adjust Reset Chart Low scale value as directed by the SM/CRS.

___ 6.15.9 Enter the start time of commencement of heatup using hh:mm format.

___ 6.15.10 Record PZR Press.

___ 6.15.11 Record RCS T_c.

___ 6.15.12 Record data every 15 minutes.

___ 6.16 Perform the following for a PZR heatup:

___ 6.16.1 Ensure the PZR tab is selected.

___ 6.16.2 Select the button labeled “Reset” twice.

___ 6.16.3 Ensure 200 is inserted, as a positive number, in the cell labeled “Limit =” located at A2.

NOTE

___ The same instrument should be used throughout the heatup except when transitioning from one limit to another or from one condition to another.

___ 6.16.4 **IF** a T_{PZR} instrument is available,
THEN record T_{PZR} instrument number being used for PZR heatup from Step 6.6.

____

NOTE

___ The same parameter should be used throughout the heatup except when transitioning from one limit to another or from one condition to another.

___ 6.16.5 **IF** a T_{PZR} instrument is NOT available,
THEN determine PZR T_{sat} from PZR pressure using Steam Tables.

NOTE

___ The same instrument should be used throughout the heatup except when transitioning from one limit to another or from one condition to another.

___ 6.16.6 Record PZR Pressure instrument number being used for the PZR heatup from Step 6.4 or Step 6.5.

____

___ 6.16.7 Select Reset Chart Low scale value as directed by the SM/CRS.

___ 6.16.8 Perform the following:

___ 6.16.8.1 Monitor the scale on the PZR Chart tab.

___ 6.16.8.2 Adjust Reset Chart Low scale value as directed by the SM/CRS.

___ 6.16.9 Enter the start time of commencement of heatup using hh:mm format.

___ 6.16.10 Record PZR Temp.

___ 6.16.11 Record data every 15 minutes.

___ 6.17 Perform the following for a RCS cooldown:

___ 6.17.1 Ensure the RCS tab is selected.

___ 6.17.2 Select the button labeled “Reset” twice.

___ 6.17.3 Ensure the Cooldown radio button is selected.

___ 6.17.4 Perform the following:

NOTE

___ Table TA2-4, RCS Cooldown P/T Limits through 32 EFPY is equivalent to Figure TA2-2, RCS Cooldown Limits through 32 EFPY.

___ 6.17.4.1 Select the most limiting cooldown rate allowed from ALL of the following: (located in the TRM Appendix TA)

___ • Table TA2-1, RCS Heatup and Cooldown Rate Limits

___ • Table TA2-4, RCS Cooldown P/T Limits through 32 EFPY
OR
Figure TA2-2, RCS Cooldown Limits through 32 EFPY

___ 6.17.4.2 Record the most limiting cooldown rate.

____

___ 6.17.5 Enter the most limiting cooldown rate allowed, as a negative number, in the cell labeled “Limit =” located at I3-I4.

NOTE

___ The same instrument should be used throughout the cooldown except when transitioning from one limit to another or from one condition to another.

___ 6.17.6 Record BOTH of the following:

___ • T_c instrument number being used for the RCS cooldown from Step 6.2 or Step 6.3

____

___ • Pressure instrument number being used for the RCS cooldown from Step 6.4 or Step 6.5

____

___ 6.17.7 Select Reset Chart Low scale value as directed by the SM/CRS.

___ 6.17.8 Perform the following:

___ 6.17.8.1 Monitor the scale on the RCS Chart tab.

___ 6.17.8.2 Adjust Reset Chart Low scale value as directed by the SM/CRS.

___ 6.17.9 Enter the start time of commencement of cooldown using hh:mm format.

___ 6.17.10 Record PZR Press.

___ 6.17.11 Record RCS T_c.

___ 6.17.12 Record data every 15 minutes.

___ 6.18 Perform the following for a PZR cooldown:

___ 6.18.1 Ensure the PZR tab is selected.

___ 6.18.2 Select the button labeled “Reset” twice.

___ 6.18.3 Ensure ONE of the following is inserted in the merged cells labeled “Limit =” located at A2.

___ • -200

___ • (200)

NOTE

___ The same instrument should be used throughout the cooldown except when transitioning from one limit to another or from one condition to another.

___ 6.18.4 **IF** a T_{PZR} instrument is available,
THEN record T_{PZR} instrument number being used for PZR cooldown from Step 6.6.

____

NOTE

___ The same parameter should be used throughout the cooldown except when transitioning from one limit to another or from one condition to another.

___ 6.18.5 **IF** a T_{PZR} instrument is NOT available,
THEN determine PZR T_{sat} from PZR pressure using Steam Tables.

NOTE

___ The same instrument should be used throughout the cooldown except when transitioning from one limit to another or from one condition to another.

___ 6.18.6 Record PZR Pressure instrument number being used for the PZR cooldown from Step 6.4 or Step 6.5.

____

___ 6.18.7 Select Reset Chart Low scale value as directed by the SM/CRS.

___ 6.18.8 Perform the following:

___ 6.18.8.1 Monitor the scale on the PZR Chart tab.

___ 6.18.8.2 Adjust Reset Chart Low scale value as directed by the SM/CRS.

___ 6.18.9 Enter the start time of commencement of cooldown using hh:mm format.

___ 6.18.10 Record PZR Temp.

___ 6.18.11 Record data every 15 minutes.

NOTE

___ The RCO1 spreadsheet requires the final data collection just prior to a transition point.

___ 6.19 **IF** ANY of the following conditions exist:

- ____ • The heatup/cooldown is complete
- ____ • The first RCP is started
- ____ • The last RCP is stopped
- ____ • Heatup rate limit is changed
- ____ • Cooldown rate limit is changed
- ____ • An instrument used for tracking heatup/cooldown is changed

THEN perform the following:

___ 6.19.1 Record a final set of data.

___ 6.19.2 Verify that all information on the spreadsheet is complete.

___ 6.19.3 Obtain a printout of ALL of the following that are in use:

- ___ • RCS Table
- ___ • RCS Chart
- ___ • PZR Table
- ___ • PZR Chart

___ 6.19.4 Perform the following:

___ 6.19.4.1 Ensure the performer's signature and date appears on each printout.

___ 6.19.4.2 Ensure the SM/CRS reviews each completed printout.

___ 6.19.5 Record in the surveillance test log BOTH of the following:

- ___ • Time
- ___ • Reason for change

___ 6.20 **IF** three hours of data collection has been completed,
THEN perform the following:

___ 6.20.1 Record a final set of data.

___ 6.20.2 Verify that all information on the spreadsheet is complete.

___ 6.20.3 Obtain a printout of ALL of the following that are in use:

- ___ RCS Table
- ___ RCS Chart
- ___ PZR Table
- ___ PZR Chart

___ 6.20.4 Perform the following:

___ 6.20.4.1 Ensure the performer's signature and date appears on each printout.

___ 6.20.4.2 Ensure the SM/CRS reviews each completed printout.

___ 6.21 **IF** a heatup/cooldown is still in progress,
THEN GO TO the appropriate step(s) for the evolution(s) in progress.

Heatup		Cooldown	
RCS	PZR	RCS	PZR
Step 6.15	Step 6.16	Step 6.17	Step 6.18

___ 6.22 Exit the RCS spreadsheet.

___ 6.23 Attach all printed tables and charts to this procedure.

End of Section 6.0

7.0 RESTORATION

___ 7.1 None

End of Section 7.0

8.0 CONTINGENCIES

___ 8.1 **IF** RCS temperature and pressure limits are exceeded,
THEN ensure compliance with LCO 3.4.3, RCS Pressure and Temperature (P/T) Limits.

___ 8.2 **IF** PZR heatup/cooldown limits are exceeded,
THEN ensure compliance with T3.4.102, Pressurizer Heatup and Cooldown Limits.

___ 8.3 **IF** instrumentation becomes inoperable or degraded in any manner,
THEN notify the SM/CRS to determine if Event Classification is required per EP-0901, Classifications.

End of Section 8.0

9.0 REFERENCES

9.1 Implementing References

9.1.1 EP-0901, Classifications

9.2 Developmental References

9.2.1 Developmental References are listed in the Basis Document.

ⓘ

End of Section 9.0

Appendix A - Manual RCS/Pressurizer Temperature/Pressure Data Sheet

___ A.1 GO TO the appropriate step(s) for the evolution(s) to be performed.

Heatup		Cooldown	
RCS	PZR	RCS	PZR
Step A.2	Step A.3	Step A.4	Step A.5

___ A.2 Perform the following for a RCS heatup:

NOTE

___ Table TA2-3, RCS Heatup P/T Limits through 32 EFPY is equivalent to Figure TA2-1, RCS Heatup Limits through 32 EFPY.

___ A.2.1 Select the most limiting heatup rate allowed from ALL of the following: (located in the TRM Appendix TA)

_____ • Table TA2-1, RCS Heatup and Cooldown Rate Limits

_____ • Table TA2-3, RCS Heatup P/T Limits through 32 EFPY
OR
Figure TA2-1, RCS Heatup Limits through 32 EFPY

___ A.2.2 Record the most limiting heatup rate in the RCS section of the Data Sheet under Allowable Heatup Cooldown Rate.

NOTE

___ The same instrument should be used throughout the heatup except when transitioning from one limit to another or from one condition to another.

___ A.2.3 Record BOTH of the following:

_____ • T_c instrument number being used for the heatup

____

_____ • Pressure instrument number being used for the heatup

____

___ A.2.4 Enter the start time of commencement of heatup.

___ A.2.5 Enter time in 15 minutes increments across the rest of the table.

___ A.2.6 Ensure PZR Press is entered.

___ A.2.7 Ensure Next Transition is entered.

___ A.2.8 Ensure RCS T_{cold} is entered.

___ A.2.9 **IF** this is the first use of this table,
THEN enter NA in ALL of the following:

- ____ Previous T_{cold}
- ____ Change in T_{cold}
- ____ Change in T_{cold} X 4

___ A.2.10 **IF** this is NOT the first use of the table,
THEN complete BOTH of the following:

- ____ Change in T_{cold}
- ____ Change in T_{cold} X 4

___ A.2.11 **IF** this is NOT the first use of the table,
THEN ensure Previous T_{cold} is entered.

___ A.2.12 Complete BOTH of the following every 15 minutes:

- ____ Data entry
- ____ Calculations

___ A.3 Perform the following for a PZR heatup:

___ A.3.1 Enter 200 in the PZR section of the Data Sheet under Allowable Heatup Cooldown Rate.

NOTE

___ The same instrument should be used throughout the heatup except when transitioning from one limit to another or from one condition to another.

___ A.3.2 Record BOTH of the following:

- _____ T_{PZR} instrument number being used for the heatup

  ____

- _____ Pressure instrument number being used for the heatup

  ____

___ A.3.3 Enter the start time of commencement of heatup.

___ A.3.4 Enter time in 15 minutes increments across the rest of the table.

___ A.3.5 Ensure PZR Press is entered.

___ A.3.6 Ensure PZR Temp is entered.

___ A.3.7 **IF** this is the first use of this table,
THEN enter NA in ALL of the following:

- _____ Previous PZR Temp
- _____ Change in PZR temp
- _____ Change in PZR temp X 4

___ A.3.8 **IF** this is NOT the first use of the table,
THEN complete BOTH of the following:

- _____ Change in PZR temp
- _____ Change in PZR temp X 4

___ A.3.9 **IF** this is NOT the first use of the table,
THEN ensure PZR Temp is entered.

___ A.3.10 Complete BOTH of the following every 15 minutes:

- ____ • Data entry
- ____ • Calculations

___ A.4 Perform the following for a RCS cooldown:

NOTE

___ Table TA2-4, RCS Cooldown P/T Limits through 32 EFPY is equivalent to Figure TA2-2, RCS Cooldown Limits through 32 EFPY.

___ A.4.1 Select the most limiting cooldown rate allowed from ALL of the following: (located in the TRM Appendix TA)

- ____ Table TA2-1, RCS Heatup and Cooldown Rate Limits
- ____ Table TA2-4, RCS Cooldown P/T Limits through 32 EFPY
  OR
  Figure TA2-2, RCS Cooldown Limits through 32 EFPY

___ A.4.2 Record the most limiting cooldown rate in the RCS section of the Data Sheet under Allowable Heatup Cooldown Rate.

NOTE

___ The same instrument should be used throughout the cooldown except when transitioning from one limit to another or from one condition to another.

___ A.4.3 Record BOTH of the following:

- ____ T_c instrument number being used for the cooldown

  ____

- ____ Pressure instrument number being used for the cooldown

  ____

___ A.4.4 Enter the start time of commencement of cooldown.

___ A.4.5 Enter time in 15 minutes increments across the rest of the table.

___ A.4.6 Ensure PZR Press is entered.

___ A.4.7 Ensure Next Transition is entered.

___ A.4.8 Ensure RCS T_{cold} is entered.

___ A.4.9 **IF** this is the first use of this table,
THEN enter NA in ALL of the following:

- ____ Previous T_{cold}
- ____ Change in T_{cold}
- ____ Change in T_{cold} X 4

___ A.4.10 **IF** this is NOT the first use of the table,
THEN complete BOTH of the following:

- ____ Change in T_{cold}
- ____ Change in T_{cold} X 4

___ A.4.11 **IF** this is NOT the first use of the table,
THEN ensure Previous T_{cold} is entered.

___ A.4.12 Complete BOTH of the following every 15 minutes:

- ____ Data entry
- ____ Calculations

___ A.5 Perform the following for a PZR cooldown:

___ A.5.1 Enter 200 in the PZR section of the Data Sheet under Allowable Heatup Cooldown Rate.

NOTE

___ The same instrument should be used throughout the cooldown except when transitioning from one limit to another or from one condition to another.

___ A.5.2 Record BOTH of the following:

- ____ T_{PZR} instrument number being used for the cooldown

  ____

- ____ Pressure instrument number being used for the cooldown

  ____

___ A.5.3 Enter the start time of commencement of cooldown.

___ A.5.4 Enter time in 15 minutes increments across the rest of the table.

___ A.5.5 Ensure PZR Press is entered.

___ A.5.6 Ensure PZR Temp is entered.

___ A.5.7 **IF** this is the first use of this table,
THEN enter NA in ALL of the following:

- ____ Previous PZR Temp
- ____ Change in PZR temp
- ____ Change in PZR temp X 4

___ A.5.8 **IF** this is NOT the first use of the table,
THEN complete BOTH of the following:

- ____ • Change in PZR temp
- ____ • Change in PZR temp X 4

___ A.5.9 **IF** this is NOT the first use of the table,
THEN ensure PZR Temp is entered.

___ A.5.10 Complete BOTH of the following every 15 minutes:

- ____ • Data entry
- ____ • Calculations

___ A.6 Perform the following to plot temp versus time:

___ A.6.1 Obtain ANY of the following:

- ____ • Manual Plot page from this appendix
- ____ • Graph paper

___ A.6.2 Add BOTH of the following to the graph:

- ____ • Start time and times along bottom axis
- ____ • Starting temperature and temperatures along left axis

___ A.6.3 Establish a 90% limit line based on BOTH of the following:

- ____ • Start time
- ____ • The allowed heatup cooldown rate.

___ A.6.4 Plot temp versus time during the heatup cooldown.

___ A.6.5 Monitor heatup cooldown versus 90% limit line to ensure 90% limit line is NOT exceeded.

___ A.7 **IF** ANY of the following conditions exist:

____ • The heatup/cooldown is complete

____ • The first RCP is started

____ • The last RCP is stopped

____ • The heatup rate limit is changed

____ • The cooldown rate limit is changed

____ • An instrument used for tracking heatup/cooldown rate is changed

THEN <u>perform</u> the following:

___ A.7.1 <u>Record</u> a final set of data.

___ A.7.2 <u>Verify</u> all information on the table are complete.

___ A.7.3 <u>Verify</u> all calculations on the table have been completed accurately.

___ A.7.4 <u>Perform</u> the following:

____ A.7.4.1 <u>Ensure</u> the performer's signature and date appears on each table.

____ A.7.4.2 <u>Ensure</u> the SM/CRS reviews each completed spreadsheet.

___ A.7.5 <u>Record</u> in the test log BOTH of the following:

____ • Time

____ • Reason for change

___ A.8 **IF** Two hours of data collection has elapsed,
THEN perform the following:

___ A.8.1 Record a final set of data.

___ A.8.2 Verify all information on the table are complete.

___ A.8.3 Verify all calculations on the table have been completed accurately.

___ A.8.4 Perform the following:

____ A.8.4.1 Verify NO heatup/cooldown rates were exceeded.

____ A.8.4.2 Record on each table that NO heatup/cooldown rates were exceeded.

____ A.8.4.3 Sign and date each table.

___ A.8.5 Perform the following:

____ A.8.5.1 Ensure the performer's signature and date appears on each table.

____ A.8.5.2 Ensure the SM/CRS reviews each completed spreadsheet.

___ A.8.6 Record in the test log BOTH of the following:

____ • Time

____ • Reason for change

___ A.9 **IF** a heatup/cooldown is still in progress,
THEN GO TO the appropriate step(s) for the evolution(s) in progress.

Heatup		**Cooldown**	
RCS	PZR	RCS	PZR
Step A.2	Step A.3	Step A.4	Step A.5

___ A.10 Attach all copies of table and Manual Plot to this procedure.

Manual RCS and PZR heatup and Cooldown Rates (sample)				**Date:**		**Page ____ of ___**			
RCS Data									
Time									
PZR Pressure									
Next Transition (Temp or condition) (Note 1)									
RCS T_{cold}									
Previous T_{cold}									
Change in T_{cold} (°F per 15 min, maintaining sign)									
Change in T_{cold} X 4 = Rate of change per hour									
Allowable Heatup Cooldown Rate									
Comment Reference Number									
Initials									
Note 1: Enter Temp in cell or note transition condition in comment section with Comment Reference Number									
Comments:									

Manual RCS and PZR heatup and Cooldown Rates (sample)			**Date:**			**Page ____ of ___**		
PZR Data								
Time								
PZR Pressure								
PZR Temp								
Previous PZR temp								
Change in PZR Temp (°F per 15 min, maintaining sign)								
Change in PZR temp X 4 = Rate of change per hour								
Allowable Heatup Cooldown Rate								
Comment Reference Number								
Initials								
Comments:								

Manual Plot (sample) Sheet ____ of ____

Time

Temp

End of Appendix A

Appendix B - Pressurizer Main Spray Cycle Log

ⓘ

___ B.1 **IF** TEMPERATURE TE-101, is NOT available,
THEN determine PZR T_{sat} from PZR pressure using Steam Tables.

___ B.2 **IF** main spray valves are opened,
THEN perform the following:

___ B.2.1 Record Cycle Number

___ B.2.2 Record ALL the following in the table:

- ____ Date
- ____ Time
- ____ SPRAY LOOP 1A TE-103 (green pen) OR PMS point RCT103, Cold Leg 1A Spray Temp
- ____ SPRAY LOOP 1B TE-104 (red pen) OR PMS point RCT104, Cold Leg 1B Spray Temp
- ____ TEMPERATURE TE-101 (green pen) OR PMS point RCT101, PZR Temp
- ____ Initial PZR T_{SAT}
- ____ PZR Initial Level
- ____ Number of running charging pumps

___ B.2.3 **WHEN** ANY of the following conditions exist:

- ____ 15 minutes has elapsed
- ____ Spray valves are closed

THEN perform the following:

____ B.2.3.1 Record ALL of the following:

- ___ Final PZR T_{SAT}
- ___ Spray Duration
- ___ PZR Final Level
- ___ Initials

____B.2.3.2 **IF** Spray valves remain open,
THEN GO TO Step B.2.2.

___ B.3 **IF** the table of this appendix is filled up,
THEN obtain copies to complete logging the main spray valve cycles.

Cycle Number	Date	Time	SPRAY LOOP 1A TEMP	SPRAY LOOP 1B TEMP	PZR TEMP	Initial PZR T_{sat}	Final PZR T_{sat}	Spray Duration	PZR Initial Level	PZR Final Level	Number of Running Chging Pumps	Initials

End of Appendix B

Appendix C - Pressurizer Auxiliary Spray Cycle Log

ⓘ

___ C.1 **IF** TEMPERATURE TE-101, is NOT available,
THEN determine PZR T_{sat} from PZR pressure using Steam Tables.

___ C.2 **IF** auxiliary spray valves are opened,
THEN perform the following:

___ C.2.1 Record Cycle Number

___ C.2.2 Record ALL the following in the table:

- ____ Date
- ____ Time
- ____ Regen HX Outlet Temp CHN-TI-229 OR PMS point CHT229, Shell Outlt Temp
- ____ TEMPERATURE TE-101 (green pen) OR PMS point RCT101, PZR Temp
- ____ Initial PZR T_{SAT}
- ____ PZR Initial Level
- ____ Number of running charging pumps

___ C.2.3 **WHEN** ANY of the following conditions exist:

- ____ 15 minutes has elapsed
- ____ Spray valves are closed

THEN perform the following:

____ C.2.3.1 Record ALL of the following:

- ___ Final PZR T_{SAT}
- ___ Spray Duration
- ___ PZR Final Level
- ___ Initials

____ C.2.3.2 **IF** Spray valves remain open,
THEN GO TO Step C.2.2.

___ C.3 **IF** the table of this appendix is filled up,
THEN obtain copies to complete logging the auxiliary spray valve cycles.

Cycle Number	Date	Time	Regen HX Temp	PZR Temp	Initial PZR T_{sat}	Final PZR T_{sat}	Spray Duration	PZR Initial Level	PZR Final Level	Number of Running Chging Pumps	Initials

End of Appendix C

Appendix D - RCS PZR Test Case Data

RCS

C/D	
Tc	**Rate**
80 - 92	30
92 - 100	50
100 - 221	100
>221	**100**

Pressure Limits:

For a cool down see table TA2-4 in TRM appendix TA

Limit = **(100)** (° F/Hr)

○ Heatup

◉ Cooldown

Present: **Tc** 199 · **Press** 500

Next Transition @: Tc 165 · **Press**

Rev 5 **RCS Data**

Reset Chart Low scale value

STOP		Start										
	TIME	0100	0115	0130	0145	0200	0215	0230	0245	0300	0315	0330	0345
Cooldown	**PZR Press**	500	500	500	500	500	500	500	500	500	500	500	500
	RCS Tc (° F)	400	390	400	380	360	320	350	300	249	300	250	199
Maintain Current RCS Temp/Press for remaining 15 min intervals in that rolling hour.	**Previous Tc** (° F)	----	400	390	400	380	360	320	350	300	249	300	250
	Change Tc (° F/15 min)	Pos = H/U	(10)	10	(20)	(20)	(40)	30	(50)	(51)	51	(50)	(51)
	Rate Tc (° F/Hr)	(Neg) = C/D	(40)	40	(80)	(80)	(160)	120	(200)	(204)	204	(200)	(204)

			15 min interval > 25% of H/U C/D Limit?									
(° F/15 min)	**(25)**						YES Slow Down!		YES Slow Down!	YES Slow Down!		YES Slow Down!	YES Slow Down!

		15 min interval > 50 % of H/U C/D Limit?									
90% limit	**(22.5)**										
50% limit	**(50.0)**							**YES STOP !**			**YES STOP !**

PZR

PZR Data

H/U C/D Limit = (200) ($^oF/Hr$) Pos = H/U (Neg) = C/D

Reset Chart Low scale value (0100 through 0215)

TIME	Start 2345	0000	0015	0030	0045	0100	0115	0130	0145	0200	0215	0230
PZR Temp (^oF)	500	480	500	450	500	400	299	250	200	150	50	50
Previous T (^oF)		500	480	500	450	500	400	299	250	200	150	50
Change Tpzr (^oF/15 min)	Pos = H/U	(20)	20	(50)	50	(100)	(101)	(49)	(50)	(50)	(100)	
Rate Tpzr ($^oF/Hr$)	(Neg) = C/D	(80)	80	(200)	200	(400)	(404)	(196)	(200)	(200)	(400)	

15 min interval > 50 % of H/U C/D Limit?
YES
STOP !

End of Appendix D

Appendix E - Backup Data Log

ⓘ

___ E.1 This appendix contains the Data Log used as a backup to the data inserted in the spreadsheet.

___ E.2 **IF** BOTH of the following conditions exist:

_____ • The Backup Data Log is filled up

_____ • The heatup or cooldown is still in progress

THEN obtain additional copies of the Backup Data Log.

Time	PZR Pressure	RCS T_c	PZR Temp
	Record Instrument Used:	Record Instrument Used:	Record Instrument Used:

End of Appendix E

Palo Verde
Nuclear Generating Station

Electronic Procedure Change Record

Procedure No.: (1) 40ST-9RC01	Revision No.: (2) 17	Category: (3) 1	Expedite? (4) No

Title: (5) RCS and Pressurizer Heatup and Cooldown Rates

Procedure Action: (6)	Full Basis Check? (7)	NAD Review: (8)	PRG Review: (9)	MRL Update? (10)
Major	Yes	No	No	No

EOP? (11)	Dry Cask? (12)	Decommissioning Doc? (13)	Level of Use: (14)
No	No	No	Continuous

AD Review: (15)	10CFR50.59/72.48 Required? (16) No	50.59/72.48 Doc Number:

Per Section 2.3.3 of 93DP-0LC17 Rev 7 an ST is considered a maintenance procedure. Per Section 2.3.1 of 93DP-0LC17 Rev 7 a maintenance activity does not require a 50.59 Screening as long as there is no "change to the SSC design, performance, operation or control (e.g., changes to acceptance criteria, torque values, types of consumable materials like gaskets, elastomers, lubricants, fan belts, and chemicals, operational configuration like energized/de-energized, manual/auto, filled/empty, etc.)".
The changes to this procedure were due to the upgrade under the NATM replacement project and do not change change to the SSC design, performance, operation or control therefore no 50.59 Screening is required.

Text does not automatically roll to continuation page. AD Review - Continuation (17) ☐ Yes

Applicability Determination performed by: (18) Myers, Mark D(ZW3145) Digitally signed by Myers, Mark D(ZW3145) DN: cn=Myers, Mark D(ZW3145) Reason: I performed the AD. Date: 2012.08.16 12:05:27 -07'00'

Is Environmental Screening Required?:	Env. Reg./Permit Review req'd? (Use 91DP-0EN02, App. A)	If "Yes" send 91DP-0EN02, Appendix A to Environmental (21)
(19) ☑ No (done) ☐ Yes	☑ No (20) ☐ Yes	
	Screening performed by:	Scrn Log Number:

Procedure Preparer: (22) Myers, Mark D(ZW3145) Digitally signed by Myers, Mark D(ZW3145) DN: cn=Myers, Mark D(ZW3145) Reason: Procedure is ready for review and approval Date: 2012.08.16 12:05:56 -07'00'	IQR Approval Recommendation: (23) Koppelman, Kenneth L(ZW1571) Digitally signed by Koppelman, Kenneth L(ZW1571) DN: cn=Koppelman, Kenneth L(ZW1571) Reason: I have reviewed this document Date: 2012.08.16 12:53:28 -07'00'
NAD Concurs (if required): (24)	PRG Concurs (if required): (25)
Approval: (26) Merryman, Randall S(Z65894) Digitally signed by Merryman, Randall S(Z65894) DN: cn=Merryman, Randall S(Z65894) Reason: I am approving this document Date: 2012.08.29 10:21:06 -07'00'	Effective Date (Time Optional): (27) 09/05/2012

Summary of Change (include list of all PCRs incorporated): (28)

PCR 3509091 (Driver) - Moved information to align with spreadsheet
PCR 3507898 - Clarified information about use of Main and Aux Spray
PCR 3540706 - Updated test case data sheet to match spreadsheet
PCR 3648222 - Updated references to TRM, use of tables and graphs in the TRM, and cross references
PCR 4206849 - Deleted obsolete information and unapproved information

Text does not automatically roll to continuation page. Change Summary - Continuation (29) ☐ Yes

Appendix A - Manual RCS/Pressurizer Temperature/Pressure Data Sheet

A.1 GO TO the appropriate step(s) for the evolution(s) to be performed.

Heatup		**Cooldown**	
RCS	PZR	RCS	PZR
Step A.2	Step A.3	Step A.4	Step A.5

A.2 Perform the following for a RCS heatup:

> **NOTE**
>
> Table TA2-3, RCS Heatup P/T Limits through 32 EFPY is equivalent to Figure TA2-1, RCS Heatup Limits through 32 EFPY.

A.2.1 Select the most limiting heatup rate allowed from ALL of the following: (located in the TRM Appendix TA)

- Table TA2-1, RCS Heatup and Cooldown Rate Limits
- N/A Table TA2-3, RCS Heatup P/T Limits through 32 EFPY
  OR
  Figure TA2-1, RCS Heatup Limits through 32 EFPY

A.2.2 Record the most limiting heatup rate in the RCS section of the Data Sheet under Allowable Heatup Cooldown Rate.

> **NOTE**
>
> The same instrument should be used throughout the heatup except when transitioning from one limit to another or from one condition to another.

A.2.3 Record BOTH of the following:

- T_c instrument number being used for the heatup

  RCA-TI-115

- Pressure instrument number being used for the heatup

  QSPDS Page 211

L A.2.4 Enter the start time of commencement of heatup.

L A.2.5 Enter time in 15 minutes increments across the rest of the table.

L A.2.6 Ensure PZR Press is entered.

L A.2.7 Ensure Next Transition is entered.

L A.2.8 Ensure RCS T_{cold} is entered.

L A.2.9 **IF** this is the first use of this table,
THEN enter NA in ALL of the following:

- L Previous T_{cold}
- L Change in T_{cold}
- L Change in T_{cold} X 4

N/A A.2.10 **IF** this is NOT the first use of the table,
THEN complete BOTH of the following:

- N/A Change in T_{cold}
- ↓ Change in T_{cold} X 4

N/A A.2.11 **IF** this is NOT the first use of the table,
THEN ensure Previous T_{cold} is entered.

L A.2.12 Complete BOTH of the following every 15 minutes:

- L Data entry
- L Calculations

N/A A.3 Perform the following for a PZR heatup:

N/A A.3.1 Enter 200 in the PZR section of the Data Sheet under Allowable Heatup Cooldown Rate.

NOTE

___ The same instrument should be used throughout the heatup except when transitioning from one limit to another or from one condition to another.

___ A.3.2 Record BOTH of the following:

- N/A • T_{PZR} instrument number being used for the heatup

  ____

- ___ • Pressure instrument number being used for the heatup

  ____

N/A A.3.3 Enter the start time of commencement of heatup.

___ A.3.4 Enter time in 15 minutes increments across the rest of the table.

___ A.3.5 Ensure PZR Press is entered.

___ A.3.6 Ensure PZR Temp is entered.

___ A.3.7 **IF** this is the first use of this table, **THEN** enter NA in ALL of the following:

- N/A • Previous PZR Temp
- ___ • Change in PZR temp
- ___ • Change in PZR temp X 4

N/A A.3.8 **IF** this is NOT the first use of the table, **THEN** complete BOTH of the following:

- N/A • Change in PZR temp
- ___ • Change in PZR temp X 4

N/A A.3.9 **IF** this is NOT the first use of the table, **THEN** ensure PZR Temp is entered.

N/A A.3.10 Complete BOTH of the following every 15 minutes:

- N/A • Data entry
- ↓ • Calculations

N/A A.4 Perform the following for a RCS cooldown:

> **NOTE**
>
> ___ Table TA2-4, RCS Cooldown P/T Limits through 32 EFPY is equivalent to Figure TA2-2, RCS Cooldown Limits through 32 EFPY.

N/A A.4.1 Select the most limiting cooldown rate allowed from ALL of the following: (located in the TRM Appendix TA)

- N/A • Table TA2-1, RCS Heatup and Cooldown Rate Limits
- ___ • Table TA2-4, RCS Cooldown P/T Limits through 32 EFPY
OR
Figure TA2-2, RCS Cooldown Limits through 32 EFPY

N/A A.4.2 Record the most limiting cooldown rate in the RCS section of the Data Sheet under Allowable Heatup Cooldown Rate.

> **NOTE**
>
> N/A The same instrument should be used throughout the cooldown except when transitioning from one limit to another or from one condition to another.

N/A A.4.3 Record BOTH of the following:

- N/A • T_c instrument number being used for the cooldown

  ____

- ___ • Pressure instrument number being used for the cooldown

  ____

N/A A.4.4 Enter the start time of commencement of cooldown.

___ A.4.5 Enter time in 15 minutes increments across the rest of the table.

___ A.4.6 Ensure PZR Press is entered.

___ A.4.7 Ensure Next Transition is entered.

___ A.4.8 Ensure RCS T_{cold} is entered.

N/A A.4.9 **IF** this is the first use of this table, **THEN** enter NA in ALL of the following:

- N/A • Previous T_{cold}
- ↓ • Change in T_{cold}
- ↓ • Change in T_{cold} X 4

N/A A.4.10 **IF** this is NOT the first use of the table, **THEN** complete BOTH of the following:

- N/A • Change in T_{cold}
- ↓ • Change in T_{cold} X 4

N/A A.4.11 **IF** this is NOT the first use of the table, **THEN** ensure Previous T_{cold} is entered.

N/A A.4.12 Complete BOTH of the following every 15 minutes:

- N/A • Data entry
- ↓ • Calculations

N/A A.5 Perform the following for a PZR cooldown:

N/A A.5.1 Enter 200 in the PZR section of the Data Sheet under Allowable Heatup Cooldown Rate.

> **NOTE**
>
> ___ The same instrument should be used throughout the cooldown except when transitioning from one limit to another or from one condition to another.

___ A.5.2 Record BOTH of the following:

- N/A • T_{PZR} instrument number being used for the cooldown

  ____

- ___ • Pressure instrument number being used for the cooldown

  ____

N/A A.5.3 Enter the start time of commencement of cooldown.

___ A.5.4 Enter time in 15 minutes increments across the rest of the table.

___ A.5.5 Ensure PZR Press is entered.

___ A.5.6 Ensure PZR Temp is entered.

___ A.5.7 IF this is the first use of this table,
THEN enter NA in ALL of the following:

- N/A • Previous PZR Temp
- ___ • Change in PZR temp
- ___ • Change in PZR temp X 4

N/A A.5.8 **IF** this is NOT the first use of the table, **THEN** complete BOTH of the following:

- N/A • Change in PZR temp
- ↓ • Change in PZR temp X 4

N/A A.5.9 **IF** this is NOT the first use of the table, **THEN** ensure PZR Temp is entered.

N/A A.5.10 Complete BOTH of the following every 15 minutes:

- N/A • Data entry
- ↓ • Calculations

✓ A.6 Perform the following to plot temp versus time:

✓ A.6.1 Obtain ANY of the following:

- ✓ • Manual Plot page from this appendix
- N/A • Graph paper

✓ A.6.2 Add BOTH of the following to the graph:

- ✓ • Start time and times along bottom axis
- ✓ • Starting temperature and temperatures along left axis

✓ A.6.3 Establish a 90% limit line based on BOTH of the following:

- ✓ • Start time
- ✓ • The allowed heatup cooldown rate.

✓ A.6.4 Plot temp versus time during the heatup cooldown.

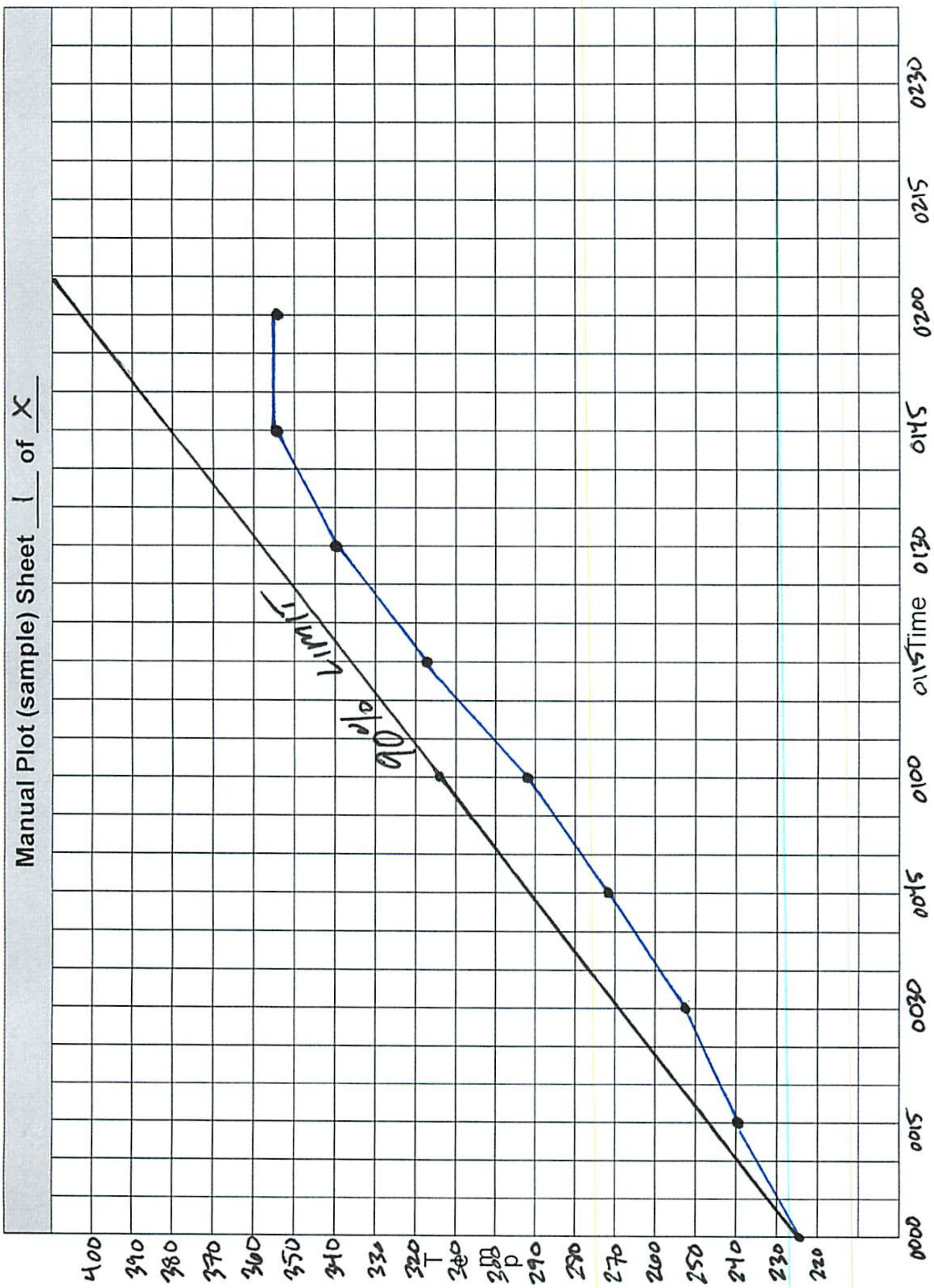
✓ A.6.5 Monitor heatup cooldown versus 90% limit line to ensure 90% limit line is NOT exceeded.

L

Manual RCS and PZR heatup and Cooldown Rates (sample)	**Date:** TODAY			**Page** 1 **of** X					
RCS Data									
Time	0000	0015	0030	0045	0100	0115	0130	0145	0200
PZR Pressure	750	750	750	750	800	850	900	950	950
Next Transition (Temp or condition) (Note 1)	MODE 3	MODE 3	MODE 3	MODE 3	MODE 3	MODE 3	MODE 3	MODE 2	MODE 2
RCS T_{cold}	225	240	253	272	293	318	340	355	355
Previous T_{cold}	N/A	225	240	253	272	293	318	340	355
Change in T_{cold} (°F per 15 min, maintaining sign)	N/A	15	13	19	21	15	22	15	0
Change in T_{cold} X 4 = Rate of change per hour	N/A	60	52	76	84	60	88	60	0
Allowable Heatup Cooldown Rate	100	100	100	100	100	100	100	100	100
Comment Reference Number								NOTE 2	
Initials	L	L	L	L	L	L	L	L	L

Note 1: Enter Temp in cell or note transition condition in comment section with Comment Reference Number

Comments: NOTE 2: TRANSITIONED TO MODE 3 L



End of Appendix A

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

APPLICABILITY: At all times; except when reactor vessel head is fully detensioned such that the RCS cannot be pressurized.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Required Action A.2 shall be completed whenever this Condition is entered. ---------------------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameter(s) to within limits. AND A.2 Determine RCS is acceptable for continued operation.	30 minutes 72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5 with RCS pressure < 500 psia.	6 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ---------NOTE--------- Required Action C.2 shall be completed whenever this Condition is entered. ---------------------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1 Initiate action to restore parameter(s) to within limits. AND C.2 Determine RCS is acceptable for continued operation.	Immediately Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	-----------------NOTE-------------------- Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. --- Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates within limits specified in the PTLR.	In accordance with the Surveillance Frequency Control Program

Technical Requirements Manual

APPENDIX TA

REACTOR COOLANT SYSTEM PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

Palo Verde Nuclear Generating Station Units 1, 2, and 3

Summary of PTLR:
This reactor coolant system pressure and temperature limits report (PTLR) has been prepared in accordance with the reporting requirements of Technical Specification 5.6.9. NRC letter dated March 16, 2001, accepted report CE NPSD-683-A, Rev. 6, which provides the methodology for developing this PTLR. Application of CE NPSD-683 to PVNGS is documented in report WCAP-16835, Rev. 0.

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TA1.0 Reactor Coolant System Pressure and Temperature Limits Report (PTLR)

This Pressure and Temperature Limits Report (PTLR) has been prepared in accordance with the requirements of Technical Specification (TS) 5.6.9. The following TSs are addressed in this report:

- TS 3.4.3, RCS Pressure and Temperature Limits;
- TS 3.4.6, RCS Loops - Mode 4;
- TS 3.4.7, RCS Loops - Mode 5, Loops Filled;
- TS 3.4.11, Pressurizer Safety Valves - Mode 4; and
- TS 3.4.13, Low Temperature Overpressure Protection System.

TA2.0 Operating Limits

Parametric limits for the above LCOs were developed using NRC-approved methods specified in Technical Specification 5.6.9 (Ref. 1). Application of the methodology approved for developing P/T limits, i.e., report CE NPSD-683-A (Ref. 2), to the Palo Verde Nuclear Generating Station is detailed in WCAP-16835 (Ref. 3).

The initial PTLR was submitted to the NRC along with the Technical Specification (TS) amendment request to relocate P/T limits to the PTLR (Ref. 4). The NRC approved the relocation of the P/T limits from TS to the PTLR in amendment no. 178 (Ref. 5). Subsequent changes to the PTLR are controlled in accordance with TS 5.6.9b and 10 CFR 50.59, and the PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period and for any revision or supplement thereto as required by TS 5.6.9c.

The pressure-temperature limit curves comply with Appendix G to 10 CFR Part 50 requirements that the temperature of the closure head flange and vessel flange regions must be at least 120°F higher than the limiting RTNDT for these regions. This RTNDT limit applies during normal operation, including heatup and cooldown, when the core is not critical and the vessel pressure exceeds 625 psia, (20% of the pre-service hydrostatic test pressure of 3125 psia).

Refer to the Technical Specifications for LCOs and surveillance requirements applicable to RCS pressure and temperature limits. Specific TS LCO limits relocated from the Technical Specifications into this PTLR are given below.

(continued)

TA2.1 RCS Pressure and Temperature Limits (LCO 3.4.3)

RCS heatup and cooldown rates for Units 1, 2 and 3 through 32 EFPY shall be equal to or less than the values shown in Table TA2-1. Limiting RCS temperature requirements through 32 EFPY are specified in Table TA2-2. The RCS pressure and temperature for vessel head boltup, inservice hydrostatic and leak testing through 32 EFPY shall be limited as specified on Figure TA2-1 (or Table TA2-3) for RCS heatup, and Figure TA2-2 (or Table TA2-4) for RCS cooldown. A gradual change in reactor coolant system temperature of ±10°F in any 1-hour period is the maximum permitted during inservice hydrostatic and leak testing.

TA2.2 RCS Loops - Mode 4 (LCO 3.4.6)

The LTOP enable temperature for RCS heatup and cooldown through 32 EFPY is 221°F as specified in Table TA2-2.

TA2.3 RCS Loops - Mode 5, Loops Filled (LCO 3.4.7)

The LTOP enable temperature for RCS heatup and cooldown through 32 EFPY is 221°F as specified in Table TA2-2.

TA2.4 Pressurizer Safety Valves - Mode 4 (LCO 3.4.11)

The LTOP enable temperature for RCS heatup and cooldown through 32 EFPY is 221°F as specified in Table TA2-2.

TA2.5 Low Temperature Overpressure Protection System (LCO 3.4.13)

The LTOP enable temperature for RCS heatup and cooldown through 32 EFPY is 221°F as specified in Table TA2-2.

(continued)

Table TA2-1
PVNGS Units 1, 2 and 3
RCS Heatup and Cooldown Rate Limits through 32 EFPY
(Formerly TS Table 3.4.3-1)

Indicated RCS Cold Leg Temperature (°F)[1]	Heatup Rate (°F/hr)	Cooldown Rate (°F/hr)
80° to ≤ 92°	≤ 75	≤ 30
> 92° to ≤ 100°	≤ 75	≤ 50
> 100° to ≤221°	≤ 75	≤ 100
> 221°	≤ 75	≤ 100
(1) Corrected for instrument uncertainty.		

Table TA2-2
PVNGS Units 1, 2 and 3
Limiting RCS Temperatures through 32 EFPY

Requirement	RCS Temperature[1]
Minimum Boltup Temperature	80°F
Minimum Hydrostatic Test Temperature	181.4°F
Lowest Service Temperature	153.2°F
Minimum Flange Limit (Hydrostatic Test)	163.2°F
Minimum Flange Limit (Normal Operation)	193.2°F
LTOP Heatup and Cooldown Enable Temperature	221°F
(1) Corrected for instrument uncertainty.	

(continued)

Table TA2-3
PVNGS Unit 1, 2 and 3
RCS Heatup P/T Limits through 32 EFPY

Indicated Temperature (°F)[(1)]	Pressure Isothermal (psia)	Indicated RCS Pressure (psia)[(1)] @ Heatup Rate						Hydrostatic Test[(2)] (psia)
		@10°F/hr	@20°F/hr	@30°F/hr	@40°F/hr	@50°F/hr	@75°F/hr	
80	680.6	680.6	680.6	671.1	650.2	622.2	602.2	954.4
83.2	690.2	690.2	690.2	676.2	650.2	622.2	602.2	967.2
93.2	727.2	727.2	705.2	676.2	650.2	622.2	602.2	1016.2
103.2	772.2	772.2	710.2	676.2	650.2	622.2	602.2	1075.2
113.2	826.2	826.2	735.2	681.2	650.2	622.2	602.2	1148.2
123.2	893.2	893.2	778.2	700.2	653.2	622.2	602.2	1237.2
133.2	974.2	974.2	839.2	738.2	672.2	627.2	602.2	1346.2
143.2	1074.2	1074.2	918.2	790.2	705.2	645.2	602.2	1478.2
153.2	1195.2	1195.2	1018.2	862.2	754.2	676.2	604.2	1640.2
163.2	1344.2	1335.2	1142.2	954.2	819.2	721.2	617.2	1838.2
171.5	1494.8	1467.5	1269.5	1049.0	889.9	772.8	638.0	2039.1
172.1	1507.0	1478.3	1279.9	1057.0	896.0	777.3	598.0	2053.6
173.2	1525.2	1494.2	1295.2	1068.2	904.2	783.2	600.2	2080.2
183.2	1747.2	1689.2	1484.2	1213.2	1014.2	865.2	637.2	2375.2
186.7	1841.7	1772.5	1565.4	1275.5	1062.2	902.0	655.4	2500.0
193.2	2017.2	1927.2	1716.2	1391.2	1151.2	970.2	689.2	
203.2	2347.2	2217.2	1998.2	1610.2	1320.2	1101.2	757.2	
207.0	2500.0	2351.5	2129.3	1713.2	1399.2	1162.4	790.6	
211.2		2500.0	2274.2	1827.0	1486.6	1230.0	827.6	
213.2			2343.2	1881.2	1528.2	1262.2	845.2	
213.2			2327.2	1865.2	1512.2	1246.2	829.2	
217.3			2500.0	1998.9	1616.3	1327.8	874.7	
223.2				2191.2	1766.2	1445.2	940.2	
230.8				2500.0	2008.6	1634.4	1045.8	
233.2					2085.2	1694.2	1079.2	
243.2					2474.2	2000.2	1250.2	
243.7					2500.0	2018.8	1260.8	
253.2						2372.2	1461.2	
256.0						2500.0	1533.4	
263.2							1719.2	
273.2							2034.2	
283.2							2418.2	
284.9							2500.0	

(1) Corrected for instrument uncertainty and for RCS pressure and elevation effects.

(2) A gradual change in reactor coolant system temperature of ±10°F in any 1-hour period is the maximum permitted during inservice hydrostatic and leak testing.

(continued)

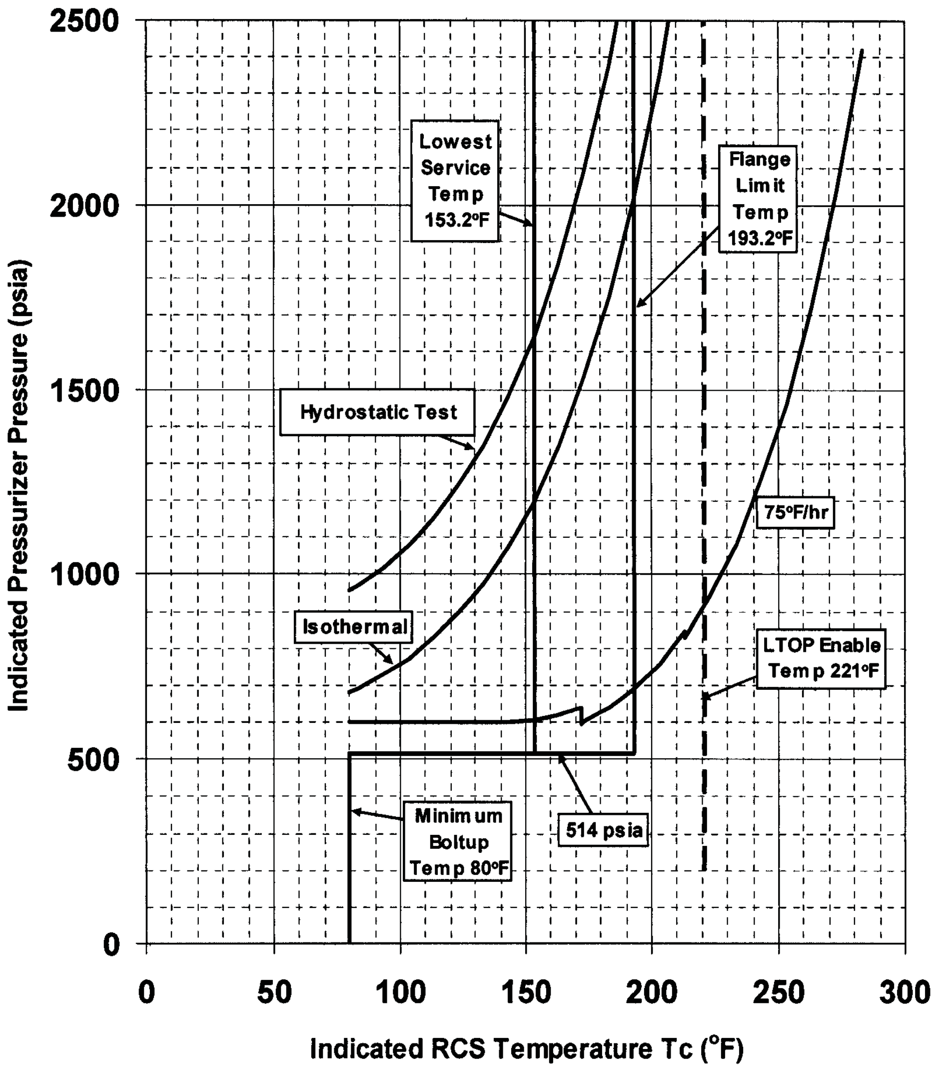
Table TA2-4
PVNGS Unit 1, 2 and 3
RCS Cooldown P/T Limits through 32 EFPY

Indicated Temperature (°F)[1]	Indicated RCS Pressure (psia)[1] @ Cooldown Rate							
	Isothermal	@10°F/hr	@20°F/hr	@30°F/hr	@40°F/hr	@50°F/hr	@75°F/hr	@100°F/hr
80	680.6	612.3	589.0	527.1	469.5	416.6	329.2	237.6
83.2	690.2	623.2	601.2	541.2	485.2	433.2	329.2	272.2
90.9	718.6	655.4	638.0	583.4	533.5	492.2	402.8	372.6
91.3	720.1	657.2	598.0	585.7	536.1	495.4	406.8	378.1
93.2	727.2	665.2	607.2	596.2	548.2	510.2	425.2	403.2
99.6	756.1	698.0	644.5	638.0	597.1	559.7	501.1	493.2
99.9	757.5	699.6	646.3	598.0	599.4	562.1	504.7	497.5
103.2	772.2	716.2	665.2	619.2	624.2	587.2	543.2	543.2
104.7	780.4	725.6	676.1	631.3	638.0	604.8	565.0	565.0
104.9	781.6	727.0	677.7	633.1	598.0	607.3	568.2	568.2
107.6	795.8	743.4	696.7	654.2	622.1	638.0	606.3	606.3
107.8	796.8	744.4	698.0	655.6	623.6	598.0	608.7	608.7
109.8	807.8	757.0	712.6	671.9	642.1	621.6	638.0	638.0
109.9	808.5	757.9	713.6	673.0	643.4	623.2	598.0	598.0
113.2	826.2	778.2	737.2	699.2	673.2	661.2	645.2	645.2
123.2	893.2	854.2	823.2	798.2	781.2	776.2	776.2	776.2
133.2	974.2	947.2	929.2	918.2	918.2	918.2	918.2	918.2
143.2	1074.2	1060.2	1057.2	1057.2	1057.2	1057.2	1057.2	1057.2
153.2	1195.2	1195.2	1195.2	1195.2	1195.2	1195.2	1195.2	1195.2
163.2	1344.2	1344.2	1344.2	1344.2	1344.2	1344.2	1344.2	1344.2
173.2	1525.2	1525.2	1525.2	1525.2	1525.2	1525.2	1525.2	1525.2
183.2	1747.2	1747.2	1747.2	1747.2	1747.2	1747.2	1747.2	1747.2
193.2	2017.2	2017.2	2017.2	2017.2	2017.2	2017.2	2017.2	2017.2
203.2	2347.2	2347.2	2347.2	2347.2	2347.2	2347.2	2347.2	2347.2
207.1	2500.0	2500.0	2500.0	2500.0	2500.0	2500.0	2500.0	2500.0

(1) Corrected for instrument uncertainty and for RCS pressure and elevation effects.

(continued)

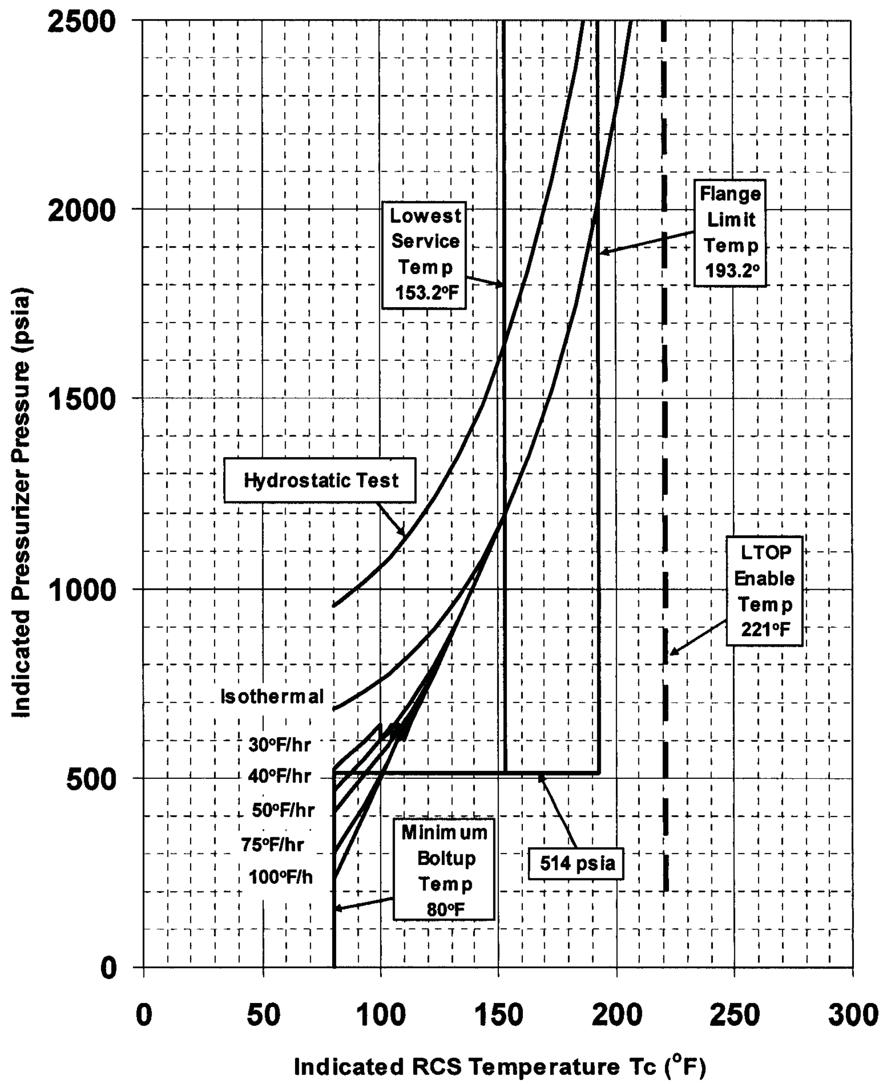
Figure TA2-1
PVNGS Units 1, 2 and 3
RCS Heatup Limits[(1)(2)] through 32 EFPY
(Formerly TS Figure TS 3.4.3-2)



(1) Corrected for instrument uncertainty and for RCS pressure and elevation effects.
(2) A gradual change in reactor coolant system temperature of ±10°F in any 1-hour period is the maximum permitted during inservice hydrostatic and leak testing.

(continued)

Figure TA2-2
PVNGS Units 1, 2 and 3
RCS Cooldown Limits[(1)(2)] through 32 EFPY
(Formerly TS Figure TS 3.4.3-2)



(1) Corrected for instrument uncertainty and for RCS pressure and elevation effects.
(2) A gradual change in reactor coolant system temperature of ±10°F in any 1-hour period is the maximum permitted during inservice hydrostatic and leak testing.

(continued)

JPM BASIS INFORMATION

TASK:	1280010801 Perform Surveillance Test						
TASK STANDARD:	Total RCS Leakrate has been calculated using the data provided to be 1.27 - 1.5 gpm						
K/A:	2.2.12		K/A RATING:	RO:	3.7	SRO:	4.1
10 CFR 55:	41.10 / 45.13						
APPLICABLE POSITION(S):	RO		VALIDATION TIME:	30 minutes			
REFERENCES:	40ST-9RC05, Manual Calculation of RCS Water Inventory Balance 3.4.14.1 Steam Tables						
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR		PLANT		OTHER	X	

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Adam Rasmussen Date: 10/17/2013

Revised By: N/A Date: ______

Technical Review ______ Operations Approval ______

Training Approval ______

EVALUATION

Examinee Name: ______ Date: ______

Evaluator Name: ______

Time to complete: Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   N/A
2. **SPECIAL TOOLS/EQUIPMENT:**
   - 40ST-9RC05, Manual Calculation of RCS Water Inventory Balance 3.4.14.1, Revision 32
   - Completed copy of 40ST-9RC05 (completed up to and including step 8.6)
   - Completed copy of 40ST-9RC05, Appendix A, Manual Logging of Plant Parameters Using Control Board Instruments

   NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM
   - Calculator
   - Steam Tables
   - Pen and Paper
3. **JPM PERFORMANCE:**
   MALFUNCTIONS, OVERRIDES, etc. **during** JPM: N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANT JPMs ONLY:

- Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE** any equipment.
- Inform the Control Room staff of any discovered deficiencies.
- Comply with the REP. If it is not possible to enter an area, it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- You may use any source of information normally available.

INITIAL CONDITIONS:

- **You are a Reactor Operator on Unit 1**
- **The validity of a new leak rate determination algorithm is to be tested**
- **The plant computer is currently unavailable**
- **Prerequisites and procedure steps in 40ST-9RC05, Manual Calculation of RCS Water Inventory Balance, have been completed up to and including step 8.6**
- **Data was collected manually per Appendix A (see attached Data Sheet)**
- **TSCCR #3881280 was written for connecting system leakage for a packing leak on the letdown flow control valve 110P which is in service. The leakrate is 0.2 gpm.**
- **This is NOT the first leakrate performance for the current month**

INITIATING CUE:

- **The CRS directs you to continue performance of 40ST-9RC05, Manual Calculation of RCS Water Inventory Balance, UP TO AND INCLUDING STEP 8.12**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate any valves.

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Step 8.7.1 Initial VCT Volume calculation 3. Calculate Initial VCT Volume	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee calculated Initial VCT Volume: **358 ft^3 - 359 ft^3**

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	Step 8.7.1 4. Convert Volume (ft^3 to gallons)	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee converted Initial VCT Volume: **2661 gal – 2670 gal**

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
3. *	Step 8.7.2 Final VCT Volume calculation 3. Calculate Final VCT Volume	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee calculated Final VCT Volume: **347 ft^3 – 348 ft^3**

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
4. *	Step 8.7.2 4. Convert Volume (ft^3 to gallons)	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee converted Final VCT Volume: **2579 gal – 2587 gal**

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
5. *	Step 8.7.3 Determine the change in VCT volume	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee determined change in VCT Volume: **74 gal – 91 gal**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
6. *	Step 8.8.1 Initial PZR Volume Calculation 3. Calculate Initial PZR Volume	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee calculated Initial PZR Volume: **896 ft^3 - 897 ft^3**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
7. *	Step 8.8.1 4. Convert Volume (ft^3 to gallons)	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee converted Initial PZR Volume: **3980 gal – 3986 gal**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
8. *	Step 8.8.2 Final PZR Volume Calculation 3. Calculate Final PZR Volume	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee calculated Final PZR Volume: **867 ft^3 – 868 ft^3**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
9. *	Step 8.8.2 4. Convert Volume (ft^3 to gallons)	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee converted Final PZR Volume: **3852 gal – 3857 gal**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
10. *	Step 8.8.3 Determine the change in PZR volume	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee determined change in PZR Volume: **123 gal – 134 gal**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
11. *	Step 8.8.4 Compensate for change in PZR level	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee determined COMPENSATED change in PZR Volume: **102 gal – 112 gal**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
12. *	Step 8.9 Calculate the elapsed time	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee determined elapsed time: **120 minutes**
SAT / UNSAT **Comments (required for UNSAT):**			

Evaluator NOTE: Regarding Step 8.10, due to the fact that RCS temperatures did not change, RCS volume did not change.

	STEP	CUE	STANDARD
13. *	Step 8.11.2 Determine the Total System Leakrate	**Evaluator Note:** See **ANSWER KEY** for **ACCEPTABLE** range	Examinee determined Total System Leakrate: **1.47 gpm – 1.7 gpm**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
14. *	Step 8.12.3 Determine the Total RCS Leakrate	**Evaluator Note:** **0.2 gpm** packing leakage from letdown flow control valve 110P as Connecting System Leakage is given in **INITIAL CONDITIONS.** See **ANSWER KEY** for **ACCEPTABLE** range **IF Requested CUE:** If examinee inquires about re-qualifying the known leak rate, report that the known leak rate **HAS** been **re-qualified** and the TSCCR **HAS** been **updated**. **Information CUE:** "Another Reactor Operator will complete the remainder of this ST"	Examinee determined Total System Leakrate: **1.27 gpm – 1.5 gpm**
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- **You are a Reactor Operator on Unit 1**
- **The validity of a new leak rate determination algorithm is to be tested**
- **The plant computer is currently unavailable**
- **Prerequisites and procedure steps in 40ST-9RC05, Manual Calculation of RCS Water Inventory Balance, have been completed up to and including step 8.6**
- **Data was collected manually per Appendix A (see attached Data Sheet)**
- **TSCCR #3881280 was written for connecting system leakage for a packing leak on the letdown flow control valve 110P which is in service. The leakrate is 0.2 gpm.**
- **This is NOT the first leakrate performance for the current month**

INITIATING CUE:

- **The CRS directs you to continue performance of 40ST-9RC05, Manual Calculation of RCS Water Inventory Balance,** *UP TO AND INCLUDING STEP 8.12*

APPLICANT

8.7 Calculate the VCT Volume change. (CRDR #930395.06)

8.7.1 Initial VCT Volume calculation.

JR 1. Record Initial VCT Level 54 %
(Appendix A or operator logs)

JR 2. Record Initial VCT Temperature 104 °F
(Appendix A or operator logs)

JR 3. Calculate Initial VCT Volume

Percent VCT Level	x	Volume per percent	+	VCT Volume below 0%	=	Initial VCT Volume
54 %	x	5.4289 ft^3 /%	+	65.38 ft^3	=	358.54 ft^3

NOTE:
359 upper
–
358 Lower
ACCEPTABLE

JR 4. Convert Volume in ft^3 to volume in standard (STP) gallons.

$$\text{Initial VCT Volume (gal)} = \frac{\text{Initial VCT Volume } (ft^3)}{\text{Specific Volume of Liquid at Initial VCT temp. from ASME Steam Tables (Saturated Liquid)} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

359
–
358

$$= \frac{358.54\ (ft^3)}{0.016145 \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

= 2665.97 gal (Initial)

NOTE: 2661 gal through 2670 gal ACCEPTABLE

ANSWER KEY

8.7.2 Final VCT Volume calculation.

fR 1. Record final VCT level 52 %
(Appendix A or operator logs)

tR 2. Record final VCT temperature 106 °F
(Appendix A or operator logs)

fR 3. Calculate Final VCT Volume

Percent VCT Level	x	Volume per percent	+	VCT Volume below 0%	=	Final VCT Volume
52 %	x	5.4289 ft^3 /%	+	65.38 ft^3	=	347.68 ft^3

NOTE:
348 upper – 347 lower
ACCEPTABLE

fR 4. Convert Volume in ft^3 to volume in standard (STP) gallons.

$$\text{Final VCT Volume (gal)} = \frac{\text{Final VCT Volume } (ft^3)}{\text{Specific Volume of Liquid at Final VCT temp. from ASME Steam Tables (Saturated Liquid)} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \frac{347.68\ (ft^3)}{0.016152 \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

348 – 347

$$= 2584.12 \text{ gal (Final)}$$

NOTE: 2587 gal – 2579 gal ACCEPTABLE

8.7.3 Determine the change in VCT volume in gallons (standard).

Gallons in VCT (Initial)	-	Gallons in VCT (Final)	=	Change in VCT Volume
2665.97 Gallons (Initial)	-	2584.12 Gallons (Final)	=	81.85 Gallons

NOTE: 91 gal – 74 gal ACCEPTABLE

ANSWER KEY

ANSWER KEY

8.8 Calculate the PZR Volume Change. This section may be used at 2250 ±50 psia pressurizer pressure only. Otherwise, pressurizer level shall be readjusted to the same level for initial and final readings. Also pressurizer level shall be between 10 and 95%. (CRDR #930395.06)

8.8.1 Initial PZR Volume Calculation.

1. Record Initial PZR level 51.6 %
(Appendix A or operator logs)

2. Record Initial PZR pressure 2260 psia
(Appendix A or operator logs)

3. Calculate Initial PZR Volume by performing the following: (This equation takes into consideration the non-linearity of volume change between 0 and 10%)

Percent PZR Level	-	Volume Correction	x	Volume per percent	+	PZR Volume below 10%	=	Initial PZR Volume
(51.6 %	-	10%)	x	18.0358 ft^3 /%	+	145.94 ft^3	=	896.23 ft^3

NOTE: 897 upper – 896 lower ACCEPTABLE

4. Convert Volume in ft^3 to Volume in standard (STP) gallons.

$$\text{Initial PZR Volume (gal)} = \frac{\text{Initial PZR Volume } (ft^3)}{\text{Specific Volume of Liquid at Initial PZR press. from ASME Steam Tables. (Saturated Liquid)} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

897 – 896

$$= \frac{896.23\ (ft^3)}{0.02702 \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

= 3981.89 gal (Initial)

NOTE: 3980 gal through 3986 gal ACCEPTABLE

ANSWER KEY

ANSWER KEY

8.8.2 Final PZR Volume Calculation.

JR 1. Record Final PZR level 50.0 %
(Appendix A or operator logs)

JR 2. Record Final PZR pressure 2260 psia
(Appendix A or operator logs)

JR 3. Calculate Final PZR Volume by performing the following: (This equation takes into consideration the non-linearity of volume change between 0 and 10%)

Percent PZR Level	-	Volume Correction	x	Volume per percent	+	PZR Volume below 10%	=	Final PZR Volume
(50.0 %	-	10%)	x	18.0358 ft^3 /%	+	145.94 ft^3	=	867.37 ft^3

NOTE: 868 upper – 867 lower ACCEPTABLE

JR 4. Convert Volume in ft^3 to volume in standard (STP) gallons.

$$\text{Final PZR Volume (gal)} = \frac{\text{Final PZR Volume } (ft^3)}{\text{Specific Volume of Liquid at Final PZR press. from ASME Steam Tables. (Saturated Liquid)} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

868
867

$$= \frac{867.37 \ (ft^3)}{0.02702 \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

= 3853.67 gal (Final)

NOTE: 3852 gal – 3857 gal ACCEPTABLE

ANSWER KEY

JR **NOTE**

If final gallons are more than initial gallons, the gallon amount will be a negative number. Be sure to carry the sign with the amount for final calculations.

8.8.3 Determine the change in Pressurizer volume in gallons (standard).

Gallons in PZR (Initial)	-	Gallons in PZR (Final)	=	Change in PZR Volume
3981.89	-	3853.67	=	128.22
Gallons (Initial)		Gallons (Final)		Gallons

NOTE: 123gal – 134 gal ACCEPTABLE

JR **NOTE**

If the pressurizer level has increased or decreased during this test, the steam that has condensed or water that has vaporized during the level change causes an error in the leakage calculation. The correction factors below will compensate for this error.

8.8.4 Compensate for the change in PZR level due to Steam/Water conversion. The following symbols are used in the calculation:

dV_{PZR} - Change in PZR Volume from previous section.

JR 1. With the PZR at 2250 ±50 psia, and if level changed during the test, perform the following.

Compensated Volume = Change in PZR Volume from step 8.8.3 (gal) x .83

Compensated Volume = dV_{PZR} (128.22 gal) x .83

Compensated Volume = 106.42 gal

NOTE: 102gal – 112gal ACCEPTABLE

____ 2. With the PZR at other than 2250 ±50 psia, the level shall be adjusted to the same value as the initial value of level. Pressurizer level is inaccurate at pressures other than approximately 2250 psia.

ANSWER KEY

8.9 Calculate the elapsed time.

JR 1. Record the Initial Time 0 minutes (Appendix A or operator logs)

JR 2. Record the Final Time 120 minutes (Appendix A or operator logs)

JR 3. Calculate:

Final time - Initial Time = Elapsed time

120 (Final) - 0 (Initial) = 120 minutes.

8.10 Calculate RCS Volume Change.

If T_{hot} is off-scale low, the T_{cold} initial and final readings shall be adjusted to the same values. This eliminates the need for the calculation in this section.

8.10.1 Calculate the initial average T_{ave} for Loop 1.

JR 1. Record loop 1 T_h 620 °F

JR 2. Record loop 1a and 1b T_c

T_{c1a} 564 °F

T_{c1b} 564 °F

JR 3. Calculate Average $T_c = \frac{T_{c1a} + T_{c1b}}{2} =$ 564 °F

JR 4. Calculate initial loop 1 T_{ave}

$$\frac{T_h\ 620\ ^oF + T_{c\ ave}\ 564\ ^oF}{2} = 592\ ^oF$$

ANSWER KEY

8.10.2 Calculate the initial average T_{ave} for Loop 2.

JR 1. Record loop 2 T_h 620 °F

JR 2. Record loop 2a and 2b T_c.

T_{c2a} 564 °F

T_{c2b} 564 °F

JR 3. Calculate Average $T_c = \frac{T_{c2a} + T_{c2b}}{2} = $ 564 °F

JR 4. Calculate initial loop 2 T_{ave}

$$\frac{T_h\ 620\ ^oF + T_{c\ ave}\ 564\ ^oF}{2} = 592\ ^oF$$

8.10.3 Calculate Average of both initial T_{ave}'s

$$T_{ave} = \frac{T_{ave1} + T_{ave2}}{2} = 592\ ^oF$$

8.10.4 Calculate the final average T_{ave} for Loop 1.

JR 1. Record loop 1 T_h 620 °F

JR 2. Record loop 1a and 1b T_c

T_{c1a} 564 °F

T_{c1b} 564 °F

JR 3. Calculate Average $T_c = \frac{T_{c1a} + T_{c1b}}{2} = $ 564 °F

JR 4. Calculate final loop 1 T_{ave}

$$\frac{T_h\ 620\ ^oF + T_{c\ ave}\ 564\ ^oF}{2} = 592\ ^oF$$

8.10.5 Calculate the final average T_{ave} for Loop 2.

JR 1. Record loop 2 T_h 620 °F

JR 2. Record loop 2a and 2b T_c.

T_{c2a} 564 °F

T_{c2b} 564 °F

JR 3. Calculate Average $T_c = \frac{T_{c2a} + T_{c2b}}{2} =$ 564 ^oF

JR 4. Calculate final loop 2 T_{ave}

$$\frac{T_h \, 620 \, ^oF + T_{c\,ave} \, 564 \, ^oF}{2} = 592 \, ^oF$$

8.10.6 Calculate Average of both final T_{ave}'s

$$T_{ave} = \frac{T_{ave1} + T_{ave2}}{2} = 592 \, ^oF$$

8.10.7 Initial RCS Volume Calculation

AR 1. Record Initial RCS Average T_{ave} 592 °F

AR 2. Record Initial PZR Pressure 2260 psia

AR 3. Calculate Initial Volume in standard (STP) gallon

$$\text{Initial RCS Volume (gal)} = \frac{13{,}351\ (ft^3)}{\text{Specific Volume of Liquid at Initial temperature from ASME Steam Tables} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \frac{13{,}351\ (ft^3)}{0.02328 \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

= 68847.13 gal. (Initial RCS Volume)

NOTE: BECAUSE RCS T_{AVE} DID NOT CHANGE FROM INITIAL TO FINAL TIME, THERE IS NO RCS VOLUME CHANGE => THESE ARE NON-CRITICAL STEPS.

8.10.8 Final RCS Volume Calculation

JR 1. Record Final RCS average T_{ave} 592 °F

JR 2. Record Final PZR Pressure 2260 psia

JR 3. Calculate Final Volume in standard (STP) gallons.

$$\text{Final RCS Volume (gal)} = \frac{13{,}351\ (\text{ft}^3)}{\text{Specific Volume of Liquid at Final temperature from ASME Steam Tables} \left(\frac{\text{ft}^3}{\text{lbm}}\right) \times 8.33 \left(\frac{\text{lbm}}{\text{gal}}\right)}$$

$$= \frac{13{,}351\ (\text{ft}^3)}{0.02328 \left(\frac{\text{ft}^3}{\text{lbm}}\right) \times 8.33 \left(\frac{\text{lbm}}{\text{gal}}\right)}$$

= 68847.13 gal. (Final RCS Volume) NON-CRITICAL STEP

8.10.9 Determine the change in RCS volume in gallons (standard).

Gallons in RCS (Initial)	-	Gallons in RCS (Final)	=	Change in RCS Volume
68847.13	-	68847.13	=	Ø
Gallons (Initial)		Gallons (Final)		Gallons

ANSWER KEY

ANSWER KEY

8.11 Determine and evaluate Total System Leakrate by performing the following steps:

8.11.1 Calculate the Total System Leakage using the information obtained earlier in this procedure by adding the following together:

- Change in VCT volume
- Change in PZR volume
- Change in RCS volume

JR

NOTE

If the RCS cooled down during the test, the results will be negative gallons. Be sure to carry the sign with the number of gallons for final calculations.

Total System Leakage = Change in VCT Volume + Change in PZR Volume + Change in RCS Volume

= 81.85 ~~74~~ 91 gal + 106.42 ~~102~~ 112 gal + Ø gal

= 188.27 ~~176~~ 203 gal

JR 8.11.2 Determine the Total System Leakrate by dividing Total System Leakage by the Elapsed Time.

Total System Leakage ÷ Elapsed Time = Total System Leakrate

188.27 ~~176~~ 203 gal ÷ 120 min = 1.57 gpm

NOTE: 1.47 gpm – 1.7 gpm ACCEPTABLE

ANSWER KEY

8.12 Determine and evaluate Total RCS Leakrate by performing the following steps:

8.12.1 **IF** any leakage identified on a TSCCR is documented as charging pump leakage,
AND the associated charging pump has been rebuilt since performance of the last RCS water inventory balance,
THEN evaluate the leakage identified against the rebuilt charging pump (i.e. close the TSCCR or revaluate the actual charging pump leakage)

8.12.2 **IF** any leakage has been identified in a TSSCR on a connecting system for the current RC05 alignment,
AND the connecting system leakage would affect the RC05 calculation,
THEN perform the following:

8.12.2.1 **IF** this performance of RC05 is the first leakrate performance in the current month,
THEN perform the following:

N/A 1. Re-quantify all known leak rate(s) that are documented on a TSCCR.

2. Update the TSCCR.

fn 8.12.2.2 Record the total known leak rate(s) 0.2 gpm.

fn 8.12.2.3 Record TSCCR number(s) TSCCR#3881280

fn 8.12.3 Subtract the total of the leakrates from un-isolable leaks that have been found and measured in connecting systems, recorded in step 8.12.2.2, from the Total System Leakrate obtained from step 8.11.2.

Total RCS Leakrate = Total System Leakrate (from step 8.11.2) - RCS Connecting System Leakrate (Total)

= 1.57 gpm - 0.2 gpm

= 1.37 gpm NOTE: 1.27gpm – 1.5gpm ACCEPTABLE

fn 8.12.4 **IF** the connecting system Leak Rate is greater than 0.3 gpm,
THEN initiate corrective action to repair the leak(s).

ANOTHER RO WILL COMPLETE ST

END OF JPM

ANSWER KEY

3.0 DEFINITIONS AND ABBREVIATIONS

3.1 Steady State is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows. (Bases 3.4.14.1)

4.0 MEASURING, TEST AND SAFETY EQUIPMENT

4.1 None

5.0 LIMITATIONS AND PRECAUTIONS

5.1 Do not change the valve lineup in the RCS or CVCS during this measurement.

5.2 Normally letdown flow should not be diverted to the Pre-Holdup Ion Exchanger during this leakrate calculation. If letdown is diverted, it must be returned to the VCT and the Gas Stripper level must be maintained constant during the diversion. The operator should understand that performance of diversion activities during the leakrate calculation may adversely affect the results if there are any significant leaks in the diversion pathway or level deviations in the Gas Stripper.

5.3 Do not pump down the RDT during this measurement.

5.4 T_{ave} shall be within ± 1.0°F between initial and final readings.

5.5 RDT in-leakage may mask actual RCS leakage. RDT in-leakage must be evaluated to determine if it is from the RCS.

5.6 EDT in-leakage may mask actual RCS leakage. EDT in-leakage is accounted for as follows:

1. It must be identified as coming from the RCS or RCS interconnecting system.
2. It must be quantified and tracked with a TSCCR.

6.0 PERSONNEL INDOCTRINATION

6.1 Normally one Reactor Operator will be required to complete this procedure.

6.2 This procedure will take approximately three hours to complete.

6.3 All surveillance testing activities shall be performed, documented and routed in accordance with 73DP-9ZZ14, Surveillance Testing.

6.4 Leakage in the Charging, Letdown, Seal Injection, purification and other connecting systems will show up in the total leakrate figure in this test. Since these systems are not part of the RCS, any sources of leakage within these systems (packing glands, valve body leaks, etc.) that can be found and measured, may be subtracted from the total leakage rate prior to calculating identified and unidentified leakage rates. (IIR #300038.03)

6.5 FSAR accident analysis assumptions used an RCS steam generator tube leakrate calculated at accident conditions. To ensure consistency of methodology, the steam generator tube leakrate acceptance criteria has been corrected for density changes (0.708 gpm calculated at standard temperature and pressure conditions equates to 150 gallons per day at RCS accident conditions).

6.6 Performance of this procedure in its entirety may not be required if all acceptance criteria are met without determination and evaluation of individual leakrate categories.

6.7 Declare the appropriate Emergency Classification per EPIP-01, Satellite Technical Support Center Actions, when exceeding EPIP-99 Appendix A EALs 1-6, 1-7, 4-1.

6.8 The manual equations within this surveillance are the bases for the ERFDADS linear regression RCS Leakrate calculation. Any changes to these equations shall be cross reviewed by OCS for their impact on the ERFDADS calculation. (CRDR 980809.03)

7.0 PREREQUISITES

- 7.1 The Shift Manager/CRS has given his permission to perform this test.
- 7.2 This copy of the procedure is the current revision.
- 7.3 The Definitions and Abbreviations, Section 3.0, the Limitations and Precautions, Section 5.0 and Personnel Indoctrination, Section 6.0 have been read and understood.
- 7.4 The CVCS is stabilized in the normal system lineup with pressurizer level control system in operation.
- 7.5 The VCT is filled to near the top of the operating band (about 44%) as indicated on CHN-LI-226.
- 7.6 The RDT is pumped down sufficiently to allow time to perform this test without having to pump it again. Instructions for pumping down this tanks is contained in 40OP-9CH01, CVCS Normal Operations.
- 7.7 The reactor drain pumps are off and remain off during the test.
- 7.8 Chemistry will **not** sample the RCS or CVCS during this performance.
- 7.9 The following Sample Isolation Valves are closed;

____ SSA-UV-203	____ SSB-UV-200
____ SSA-UV-204	____ SSB-UV-201
____ SSA-UV-205	____ SSB-UV-202

8.0 INSTRUCTIONS

8.1 Ensure makeup to the RCS is disabled by performing the following steps:

JR 1. Place CH-FIC-210X in manual with zero output.

JR 2. Place CH-FIC-210Y in manual with zero output.

JR 3. Place CHN-HS-527 in the CLOSED position.

JR 4. Ensure that CHN-UV-527, MAKEUP TO CHRG PMPS (VCT BYPASS) VLV indicates closed.

JR 5. Place CHN-HS-210, Makeup Mode Select Switch in MANUAL.

8.2 Indicate which charging pumps are running:

JR CHA-P01

___ CHB-P01

JR CHE-P01

8.3 **IF** the CRS desires to isolate potential leakage through CHNUV500, **THEN** perform **ONE** of the following:

N/A 8.3.1 **IF** CHN-UV-500, Letdown to VCT/PRE-HU IOX will be isolated, **THEN** perform **BOTH** of the following:

JR **NOTE**

When CHN-V721 is closed, then CHN-HS-500 must be in VCT Reset to prevent isolation of the letdown line (lifting CHN-PSV-354)

N/A 1. Place CHN-HS-500, CHN-UV-500 Letdown to VCT/PRE-HU IOX Selector to the VCT RESET position.

2. Close CHN-V721, LETDOWN TO PREHOLDUP IX.

N/A 8.3.2 **IF** CHN-UV-500, Letdown to VCT/PRE-HU IOX will be failed, **THEN** close the local instrument air isolation valve to CHN-UV-500, Letdown to VCT/PRE-HU IOX.

NOTE

When this test is being performed with shutdown cooling in service, T_{cold} instrumentation and LPSI Heat Exchanger discharge temperature shall be used to reestablish the same temperatures between initial and final readings, prior to taking final readings. T_{hot} is off scale low and T_{ave} will not be calculated.

NOTE

The plant computer is the preferred method for gathering data for better accuracy.

8.4 **IF** the plant computer is available, PRINT FUNCTION UNAVAILABLE
THEN perform the following steps to gather plant data.

N/A 1. Set up the operator logs (Appendix A contains suggested points to monitor) to print out every five minutes. Leave them running until acceptable results have been obtained.

2. Select readings at least two hours apart that have the same power level to within two tenths of one percent and as close to the same RCS temperatures as possible (within ±1.0° F).

3. Pressurizer level shall be between 10 and 95% as volumetric values are not linear below 10% and above 95%.

4. Pressurizer level shall be the same within two tenths of one percent, if this test is being performed at other than 2250 ±50 psia pressurizer pressure.

5. **IF** shutdown cooling is in service,
THEN ensure LPSI Heat Exchanger discharge temperatures are as close as possible to initial readings.

6. **WHEN** the data has been gathered,
THEN use the selected readings to complete a manual calculation starting at step 8.7.

8.5 **IF** the plant computer is **not** available,
THEN gather plant data manually using Appendix A - Manual Logging of Plant Parameters Using Control Board Instruments.

8.6 Direct Chemistry to perform 75RM-9EF01, Determination of Primary-to-Secondary Leakrate, and forward the completed procedure to the Control Room.

3 gallons-per-day Total Primary-to-Secondary Leakrate

0.002 gpm Total Primary-to-Secondary Leakrate

Acceptance Criteria: Total Primary to Secondary Leakrate is less than 150 gallon-per-day.

Acceptance Criteria Satisfied: Yes / No ________ (Init)

8.7 Calculate the VCT Volume change. (CRDR #930395.06)

8.7.1 Initial VCT Volume calculation.

____ 1. Record Initial VCT Level ________________%
(Appendix A or operator logs)

____ 2. Record Initial VCT Temperature ____________ °F
(Appendix A or operator logs)

____ 3. Calculate Initial VCT Volume

Percent VCT Level	x	Volume per percent	+	VCT Volume below 0%	=	Initial VCT Volume
__________%	x	5.4289 ft^3 /%	+	65.38 ft^3	=	__________ ft^3

____ 4. Convert Volume in ft^3 to volume in standard (STP) gallons.

$$\text{Initial VCT Volume (gal)} = \frac{\text{Initial VCT Volume } (ft^3)}{\begin{array}{l}\text{Specific Volume of Liquid}\\ \text{at Initial VCT temp.}\\ \text{from ASME Steam Tables}\\ \text{(Saturated Liquid)}\end{array} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \frac{\_\_\_\_\_\_\_\_\_\_ \; (ft^3)}{\_\_\_\_\_\_\_\_\_\_ \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \_\_\_\_\_\_\_\_\_\_ \text{ gal (Initial)}$$

8.7.2 Final VCT Volume calculation.

____ 1. Record final VCT level ______________%
(Appendix A or operator logs)

____ 2. Record final VCT temperature ________________ °F
(Appendix A or operator logs)

____ 3. Calculate Final VCT Volume

Percent VCT Level	x	Volume per percent	+	VCT Volume below 0%	=	Final VCT Volume
___________%	x	$5.4289\ ft^3/\%$	+	$65.38\ ft^3$	=	___________ ft^3

____ 4. Convert Volume in ft^3 to volume in standard (STP) gallons.

$$\text{Final VCT Volume (gal)} = \frac{\text{Final VCT Volume } (ft^3)}{\text{Specific Volume of Liquid at Final VCT temp. from ASME Steam Tables (Saturated Liquid)} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \frac{\_\_\_\_\_\_\_\_\_\_\ (ft^3)}{\_\_\_\_\_\_\_\_\_\_ \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

= ____________ gal (Final)

8.7.3 Determine the change in VCT volume in gallons (standard).

Gallons in VCT (Initial)	-	Gallons in VCT (Final)	=	Change in VCT Volume
________________ Gallons (Initial)	-	________________ Gallons (Final)	=	________________ Gallons

8.8 Calculate the PZR Volume Change. This section may be used at 2250 ±50 psia pressurizer pressure only. Otherwise, pressurizer level shall be readjusted to the same level for initial and final readings. Also pressurizer level shall be between 10 and 95%. (CRDR #930395.06)

8.8.1 Initial PZR Volume Calculation.

____ 1. Record Initial PZR level ____________%
(Appendix A or operator logs)

____ 2. Record Initial PZR pressure ________________ psia
(Appendix A or operator logs)

____ 3. Calculate Initial PZR Volume by performing the following: (This equation takes into consideration the non-linearity of volume change between 0 and 10%)

Percent PZR Level	-	Volume Correction	x	Volume per percent	+	PZR Volume below 10%	=	Initial PZR Volume
(________%	-	10%)	x	18.0358 ft^3 /%	+	145.94 ft^3	=	____________ ft^3

____ 4. Convert Volume in ft^3 to Volume in standard (STP) gallons.

$$\text{Initial PZR Volume (gal)} = \frac{\text{Initial PZR Volume } (ft^3)}{\begin{array}{l}\text{Specific Volume of Liquid}\\ \text{at Initial PZR press.}\\ \text{from ASME Steam Tables.}\\ \text{(Saturated Liquid)}\end{array} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \frac{\_\_\_\_\_\_\_\_\_\_\_ \ (ft^3)}{\_\_\_\_\_\_\_\_\_\_\_ \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \_\_\_\_\_\_\_\_\_\_\_\_ \text{ gal (Initial)}$$

8.8.2 Final PZR Volume Calculation.

____ 1. Record Final PZR level ___________%
(Appendix A or operator logs)

____ 2. Record Final PZR pressure ______________ psia
(Appendix A or operator logs)

____ 3. Calculate Final PZR Volume by performing the following: (This equation takes into consideration the non-linearity of volume change between 0 and 10%)

Percent PZR Level	-	Volume Correction	x	Volume per percent	+	PZR Volume below 10%	=	Final PZR Volume
(________%	-	10%)	x	18.0358 ft^3 /%	+	145.94 ft^3	=	___________ ft^3

____ 4. Convert Volume in ft^3 to volume in standard (STP) gallons.

$$\text{Final PZR Volume (gal)} = \frac{\text{Final PZR Volume } (ft^3)}{\text{Specific Volume of Liquid at Final PZR press. from ASME Steam Tables. (Saturated Liquid)} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \frac{\_\_\_\_\_\_\_\_\_\_\ (ft^3)}{\_\_\_\_\_\_\_\_\_\_\ \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \_\_\_\_\_\_\_\_\_\_\ \text{gal (Final)}$$

NOTE

If final gallons are more than initial gallons, the gallon amount will be a negative number. Be sure to carry the sign with the amount for final calculations.

8.8.3 Determine the change in Pressurizer volume in gallons (standard).

Gallons in PZR (Initial)	-	Gallons in PZR (Final)	=	Change in PZR Volume
________ Gallons (Initial)	-	________ Gallons (Final)	=	________ Gallons

NOTE

If the pressurizer level has increased or decreased during this test, the steam that has condensed or water that has vaporized during the level change causes an error in the leakage calculation. The correction factors below will compensate for this error.

8.8.4 Compensate for the change in PZR level due to Steam/Water conversion. The following symbols are used in the calculation:

dV_{PZR} - Change in PZR Volume from previous section.

____ 1. With the PZR at 2250 ±50 psia, and if level changed during the test, perform the following.

Compensated Volume = Change in PZR Volume from step 8.8.3 (gal) x .83

Compensated Volume = dV_{PZR} (_________ gal) x .83

Compensated Volume = ___________ gal

____ 2. With the PZR at other than 2250 ±50 psia, the level shall be adjusted to the same value as the initial value of level. Pressurizer level is inaccurate at pressures other than approximately 2250 psia.

8.9 Calculate the elapsed time.

____ 1. Record the Initial Time ____________ minutes (Appendix A or operator logs)

____ 2. Record the Final Time ____________ minutes (Appendix A or operator logs)

____ 3. Calculate:

Final time - Initial Time = Elapsed time

________ (Final) - ________ (Initial) = __________ minutes.

8.10 Calculate RCS Volume Change.

If T_{hot} is off-scale low, the T_{cold} initial and final readings shall be adjusted to the same values. This eliminates the need for the calculation in this section.

8.10.1 Calculate the initial average T_{ave} for Loop 1.

____ 1. Record loop 1 T_h _____________ °F

____ 2. Record loop 1a and 1b T_c

T_{c1a} _____________ °F

T_{c1b} _____________ °F

____ 3. Calculate Average $T_c = \frac{T_{c1a} + T_{c1b}}{2} = \_\_\_\_\_\_\_\_\_ {}^oF$

____ 4. Calculate initial loop 1 T_{ave}

$$\frac{T_h \qquad {}^oF + T_{c\ ave} \qquad {}^oF}{2} = \_\_\_\_\_\_\_\_\_ {}^oF$$

8.10.2 Calculate the initial average T_{ave} for Loop 2.

____ 1. Record loop 2 T_h ____________ °F

____ 2. Record loop 2a and 2b T_c.

T_{c2a} ____________ °F

T_{c2b} ____________ °F

____ 3. Calculate Average $T_c = \frac{T_{c2a} + T_{c2b}}{2} = $ ________ ^oF

____ 4. Calculate initial loop 2 T_{ave}

$$\frac{T_h \qquad {}^oF \; + \; T_{c\ ave} \qquad {}^oF}{2} = \underline{\qquad\qquad} {}^oF$$

8.10.3 Calculate Average of both initial T_{ave}'s

$$T_{ave} = \frac{T_{ave1} + T_{ave2}}{2} = \underline{\qquad\qquad} {}^oF$$

8.10.4 Calculate the final average T_{ave} for Loop 1.

____ 1. Record loop 1 T_h ____________ °F

____ 2. Record loop 1a and 1b T_c

T_{c1a} ____________ °F

T_{c1b} ____________ °F

____ 3. Calculate Average $T_c = \frac{T_{c1a} + T_{c1b}}{2} = $ ________ ^oF

____ 4. Calculate final loop 1 T_{ave}

$$\frac{T_h \qquad {}^oF \; + \; T_{c\ ave} \qquad {}^oF}{2} = \underline{\qquad\qquad} {}^oF$$

8.10.5 Calculate the final average T_{ave} for Loop 2.

____ 1. Record loop 2 T_h ____________ °F

____ 2. Record loop 2a and 2b T_c.

T_{c2a} ____________ °F

T_{c2b} ____________ °F

____ 3. Calculate Average $T_c = \frac{T_{c2a} + T_{c2b}}{2}$ = ________ ^oF

____ 4. Calculate final loop 2 T_{ave}

$$\frac{T_h \qquad {}^oF \; + \; T_{c\ ave} \qquad {}^oF}{2} = \_\_\_\_\_\_\_\_ {}^oF$$

8.10.6 Calculate Average of both final T_{ave}'s

$$T_{ave} = \frac{T_{ave1} + T_{ave2}}{2} = \_\_\_\_\_\_\_\_ {}^oF$$

8.10.7 Initial RCS Volume Calculation

____ 1. Record Initial RCS Average T_{ave} __________ °F

____ 2. Record Initial PZR Pressure __________ psia

____ 3. Calculate Initial Volume in standard (STP) gallon

$$\text{Initial RCS Volume (gal)} = \frac{13{,}351\ (ft^3)}{\text{Specific Volume of Liquid at Initial temperature from ASME Steam Tables.} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \frac{13{,}351\ (ft^3)}{\_\_\_\_\_\_\_\_\_\_ \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

= ____________ gal. (Initial RCS Volume)

8.10.8 Final RCS Volume Calculation

____ 1. Record Final RCS average T_{ave} __________ °F

____ 2. Record Final PZR Pressure _________ psia

____ 3. Calculate Final Volume in standard (STP) gallons.

$$\text{Final RCS Volume (gal)} = \frac{13{,}351\ (ft^3)}{\text{Specific Volume of Liquid at Final temperature from ASME Steam Tables.} \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

$$= \frac{13{,}351\ (ft^3)}{\_\_\_\_\_\_\_\_ \left(\frac{ft^3}{lbm}\right) \times 8.33 \left(\frac{lbm}{gal}\right)}$$

= __________ gal. (Final RCS Volume)

8.10.9 Determine the change in RCS volume in gallons (standard).

Gallons in RCS (Initial)	-	Gallons in RCS (Final)	=	Change in RCS Volume
____________	-	____________	=	____________
Gallons (Initial)		Gallons (Final)		Gallons

8.11 Determine and evaluate Total System Leakrate by performing the following steps:

8.11.1 Calculate the Total System Leakage using the information obtained earlier in this procedure by adding the following together:

- Change in VCT volume
- Change in PZR volume
- Change in RCS volume

NOTE

If the RCS cooled down during the test, the results will be negative gallons. Be sure to carry the sign with the number of gallons for final calculations.

Total System Leakage = Change in VCT Volume + Change in PZR Volume + Change in RCS Volume

= ____________ gal + ____________ gal + ____________ gal

= ____________ gal

____ 8.11.2 Determine the Total System Leakrate by dividing Total System Leakage by the Elapsed Time.

Total System Leakage ÷ Elapsed Time = Total System Leakrate

_____________ gal ÷ _____________ min = _____________ gpm

8.12 Determine and evaluate Total RCS Leakrate by performing the following steps:

8.12.1 **IF** any leakage identified on a TSCCR is documented as charging pump leakage,
AND the associated charging pump has been rebuilt since performance of the last RCS water inventory balance,
THEN evaluate the leakage identified against the rebuilt charging pump (i.e. close the TSCCR or revaluate the actual charging pump leakage)

8.12.2 **IF** any leakage has been identified in a TSSCR on a connecting system for the current RC05 alignment,
AND the connecting system leakage would affect the RC05 calculation,
THEN perform the following:

8.12.2.1 **IF** this performance of RC05 is the first leakrate performance in the current month,
THEN perform the following:

____ 1. Re-quantify all known leak rate(s) that are documented on a TSCCR.

____ 2. Update the TSCCR.

____ 8.12.2.2 Record the total known leak rate(s) __________ gpm.

____ 8.12.2.3 Record TSCCR number(s) ______________________

____ 8.12.3 Subtract the total of the leakrates from un-isolable leaks that have been found and measured in connecting systems, recorded in step 8.12.2.2, from the Total System Leakrate obtained from step 8.11.2.

Total RCS Leakrate	=	Total System Leakrate (from step 8.11.2)	-	RCS Connecting System Leakrate (Total)
	=	________________ gpm	-	________________ gpm
	=	________________ gpm		

____ 8.12.4 **IF** the connecting system Leak Rate is greater than 0.3 gpm,
THEN initiate corrective action to repair the leak(s).

Appendix A - Manual Logging of Plant Parameters Using Control Board Instruments

JR 1. Record the initial data on the data sheet. Maintain T_{ave}, pressurizer level, pressurizer pressure, and reactor power as constant as possible while taking readings.

N/A 2. If this test is being performed with shutdown cooling in service, record LPSI Heat Exchanger discharge temperature on each operating shutdown cooling train (below) and all four T_{cold} indications (data sheet). Mark T_{hot} readings as N.A. (Appendix A). Do not change the Shutdown Cooling flow or temperature.

SIA-TT-351Y (SIA-TR-351) _________°F

SIB-TT-352Y (SIB-TR-352) _________°F

3. After about two hours:

JR 4. Verify or reestablish the same temperatures as recorded on the data sheet, preferably within 0.5°F and in all cases within ±1.0° F. If parameters require readjustment, ensure the plant has stabilized prior to taking final readings.

JR 5. Better accuracy will be obtained if the pressurizer level and pressure are at the same values as when the initial readings were taken. Verify or adjust as necessary, pressurizer pressure and level to the desired values, if possible.

N/A 6. If pressurizer pressure is outside the 2250 ±50 psia band, reestablish the same pressurizer level as recorded in the initial data within two tenths of one percent.

N/A 7. With shutdown cooling in service, reestablish, as close as possible, the same LPSI Heat Exchanger discharge temperatures (recorded above) and Tcold readings (data sheet) as the initial readings. Record LPSI Heat Exchanger discharge temperatures below.

SIA-TT-351Y (SIA-TR-351) _________ °F

SIB-TT-352Y (SIA-TR-352) _________ °F

JR 8. Record the final data on the data sheet.

9. **WHEN** all the data has been recorded,
THEN begin leakrate calculation at step 8.7.

Data Sheet

(Where a choice is available, circle the instrument used)

Parameter	Instrument ID	Initial Value	Final Value
Time	N/A	0330	0530
Containment Temperature	RMNTJR1, pts 21, 22, 23, 24, 25, or Computer pts HCT-39, 40, 41	109.1	111.0
RCS T_{hot} Loop 1	TT-112HA, TT-112HB or RCT111X	620	620
RCS T_{cold} Loop 1a	TT-112CA, TT-112CC or RCT111Y	564	564
RCS T_{cold} Loop 1b	TT-112CB, TT-112CD or TI-115	564	564
RCS T_{hot} Loop 2	TT-122HA, TT-122HB or RCT121X	620	620
RCS T_{cold} Loop 2a	TT-122CA, TT-122CC or TI-125	564	564
RCS T_{cold} Loop 2b	TT-122CB, TT-122CD or RCT121Y	564	564
PZR Pressure	RCN-PR-100X/100Y RCA-PI-103 (between 750-1500 use PI-102A/B/C or D)	2260	2260
PZR Temperature	RCN-TI-101	654	654
PZR Level	RCA-LI-110X or RCB-LI-110Y	51.6	50.0
SDCHX A Outlet Temp	SIT-303X	N/A	N/A
SDCHX B Outlet Temp	SIT-303Y	N/A	N/A
VCT Temperature	CHN-TI-225	104	106
VCT Pressure	CHN-PI-225	17	16
VCT Level	CHN-LI-226 or CHN-LI-227	54	52
RDT Temperature	CHN-TI-268	114	115
RDT Pressure	CHN-PI-268 or CHN-PI-268A	12.1	12.1
RDT Level	CHN-LI-268	60	60

(Where a choice is available, circle the instrument used)

Parameter	Instrument ID	Initial Value	Final Value
EDT Temperature	CHN-TI-269 (trending only)	100	99
EDT Pressure	CHN-PI-251 (trending only)	1.7	1.5
EDT Level	CHN-LI-251 (trending only)	36	35
SIT 1 (2A) Pressure	SIN-PI-312	607	607
SIT 1 (2A) Level	SIN-LI-312 See Note #1	40	39
SIT 2 (2B) Pressure	SIN-PI-322	614	613
SIT 2 (2B) Level	SIN-LI-322 See Note #1	50	49
SIT 3 (1A) Pressure	SIN-PI-332	611	611
SIT 3 (1A) Level	SIN-LI-332 See Note #1	43	42
SIT 4 (1B) Pressure	SIN-PI-342	609	608
SIT 4 (1B) Level	SIN-LI-342 See Note #1	50	49
Reactor Power Level	SEA-JR-1A, 1B, 1C or 1D JSCALOR, NKBDELT	100.12	99.86

Remarks:

Completed by

Signature

TODAY

Date

N/A **Note #1 -** If a SIT NR level instrument is inoperable, use SIT WR level instruments SIL-311 for SIT 1, SIL-321 for SIT 2, SIL-331 for SIT 3 or SIL-341 for SIT 4. Convert the WR level value to a NR value for inputing into the computer or manual calculation using the following conversion;

$$\frac{WR - 73.9}{0.127} = NR$$

JPM BASIS INFORMATION

TASK:	1290020301 Conduct On Shift Operations IAW Conduct of Shift Operations 1290010301 Implement verification of plant activities						
TASK STANDARD:	Correct REP Task and RCA entry requirements determined						
K/A:	2.3.7	K/A RATING:	RO:	3.5	SRO:	3.6	
10 CFR 55:	41.12 / 45.10						
APPLICABLE POSITION(S):	RO	VALIDATION TIME:	10 minutes				
REFERENCES:	NGW01, Initial Radiation Worker Practices						
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR		PLANT		OTHER	X	

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Jim Ledford Date: 07/13/2009

Revised By: Adam Rasmussen Date: 10/16/2013

Technical Review ____________ Operations Approval ____________

Training Approval ____________

EVALUATION

Examinee Name: ____________ Date: ________

Evaluator Name: ____________

Time to complete: Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # _____________*
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   N/A
2. **SPECIAL TOOLS/EQUIPMENT:**
   - REP 9-1002, Revision 1
   - Routine LPSI B Quarterly Survey Map with LPSI B Pump area posted as HRA

   NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM
   - Pen and Paper
3. **JPM PERFORMANCE:**
   - MALFUNCTIONS, OVERRIDES, etc. **during** JPM:
     N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE**any equipment.
- o Inform the control room staff of any discovered deficiencies.
- o Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- o You may use any source of information normally available.

INITIAL CONDITIONS:

- **A visual inspection of LPSI B pump is required to be performed to verify boric acid buildup below the discharge flange**
- **Contamination Areas will NOT be entered**
- **System will NOT be opened**
- **You have been directed to inspect the LPSI B pump area**

INITIATING CUE:

- **Using the survey map and REP provided, determine the following (record answers in space provided):**
- **REP Task for inspection:**
- **Dosimetry required:**
- **EPD Dose Alarm:**
- **EPD Dose Rate Alarm:**
- **Protective Clothing required:**
- **Required RP coverage (if any):**
- **Required RP briefing and/or authorization:**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME: [ ]

	STEP	CUE	STANDARD
1. *	Examinee determines appropriate REP Task		Examinee determined **TASK 2**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
2. *	Examinee determines appropriate Dosimetry Requirements		Examinee determined an **EPD and TLD** are required
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
3. *	Examinee determines appropriate EPD Dose Alarm		Examinee determined **15 mRem** is the correct Dose Alarm
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
4. *	Examinee determines appropriate EPD Dose Rate Alarm		Examinee determined **200 mRem** is the correct Dose Rate Alarm

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
5. *	Examinee determines appropriate Protective Clothing	**IF Requested CUE:** **"There will be no work performed at a Contaminated Area boundary."**	Examinee determined **NO PCs**

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
6. *	Examinee determines appropriate RP coverage		Examinee determined **Intermittent**

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
7. *	Examinee determines appropriate RP briefing and/or authorization		Examinee determined that a formal RP brief is required for a HRA entry
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- A visual inspection of LPSI B pump is required to be performed to verify boric acid buildup below the discharge flange
- Contamination Areas will NOT be entered
- System will NOT be opened
- You have been directed to inspect the LPSI B pump area

INITIATING CUE:

Using the survey map and REP provided, determine the following (record answers in space provided):

REP Task for inspection:	
Dosimetry required:	
EPD Dose Alarm:	
EPD Dose Rate Alarm;	
Protective Clothing required:	
Required RP coverage (if any):	
Required RP briefing and/or authorization:	

APPLICANT

ANSWER KEY

INITIAL CONDITIONS:

- A visual inspection of LPSI B pump is required to be performed to verify boric acid buildup below the discharge flange
- Contamination Areas will NOT be entered
- The system will NOT be opened
- You have been directed to inspect the LPSI B pump area

INITIATING CUE:

Using the survey map and REP provided, determine the following (record answers in space provided):

REP Task for inspection:	TASK 2
Dosimetry required:	EPD and TLD
EPD Dose Alarm:	15 mRem
EPD Dose Rate Alarm;	200 mRem/hr
Protective Clothing required:	Not Required
Required RP coverage (if any):	Intermittent
Required RP briefing and/or authorization:	A formal RP Brief is REQUIRED for entry into HRA

ANSWER KEY

VSDS Standard Map Survey Report

Survey 1-M-2XXXXXX-X

General Information

Title: LPSI B Quarterly

Survey Date/Time: XX/XX/20XX 10:28

Lead Surveyor: Warren Potter

Survey Type: Routine

Work Order/Task #: 4023XXX

Counted By:

REP: 9-1009 Rev 1

Rx % Pwr: 100%

Status: Approved by: Larry Burton, XX/XX/20XX

Ready for Review by: Allen Malely, XX/XX/20XX

Dose Rate (DR) Object Prefixes/Suffixes

Dose Rates with Prefixes:
* = Contact
+ = 30cm

Dose Rates with No Prefixes:
Gen Area

Default Prefixes:
HS = Hot Spot

Default Suffixes:
"n" = Neutron
"b" = Beta
"c" = Corrected

Postings Legend

CA=Contaminated Area

HRA RPHP=High Radiation Area

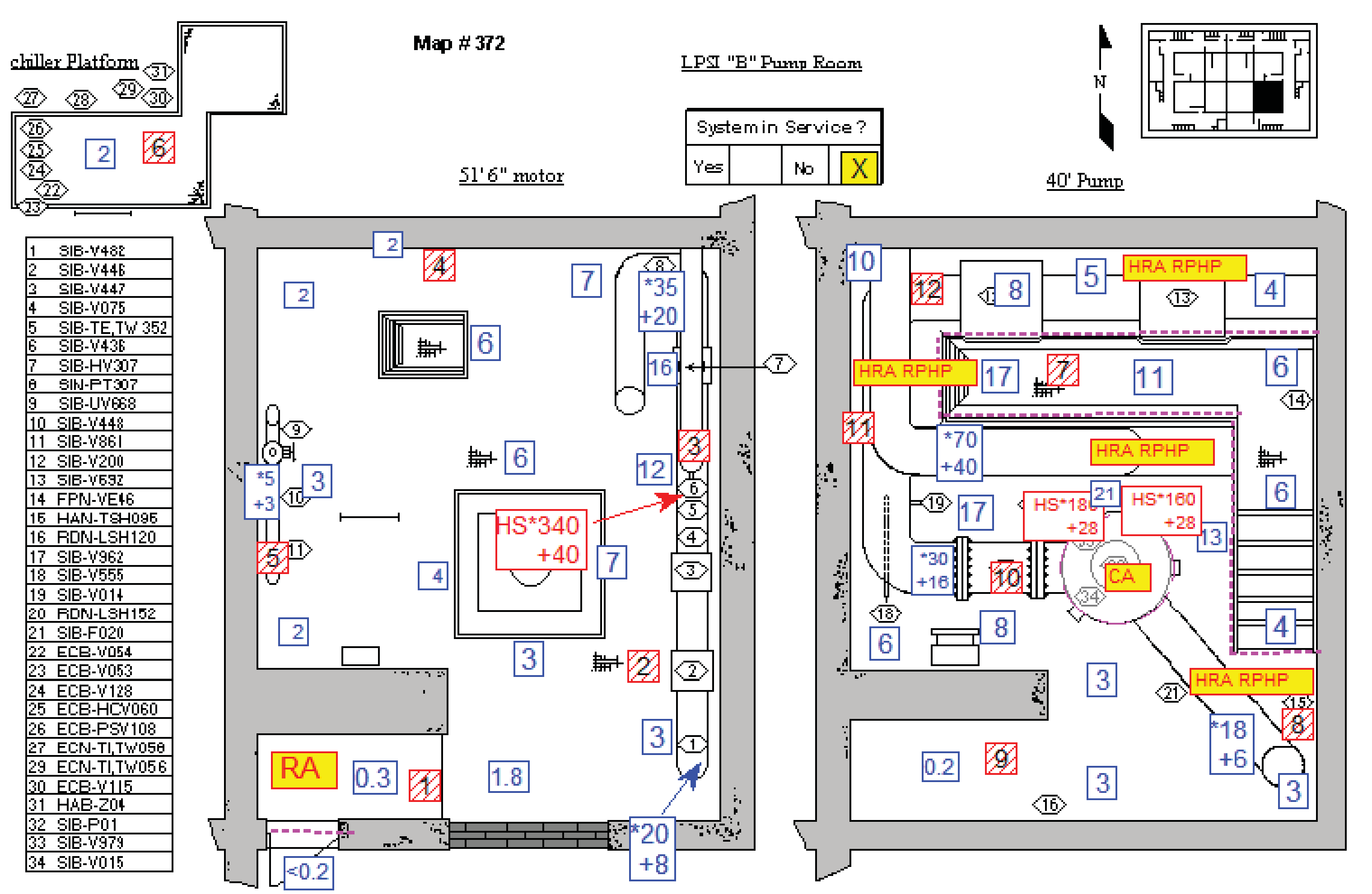
RA=Radiation Area

Instruments Used

#	Instrument Model	Instrument Serial #	Inst Type	Probe Model	Probe Serial #	Probe Type	Calibration Date/Time	Efficiency		
								β/γ	β	α
1	40GL	14449	D	INTERNAL	N/A	D	9/12/20XX	N/A	N/A	N/A
2	RM20	11160	C	HP-260	N/A	C	11/24/20XX	N/A	N/A	N/A

VSDS Standard Map Survey Report

A040 | LPSI B Room | Auxiliary	Survey #: 1-M-2XXXXXXX-X	Date/Time: XX/XX/20XX 10:28



Comments:

Type: Routine

Symbol Legend (for example only)

Dose Rate: *150 Contact; + 75 30 cm; 20 General Area
Drip Bag
HS-50 Hot Spot
RCA Posting
15 Air Sample
15 Smear 15 Direct Frisk 0 RM 15 Wipe

RWP #: 9-1009 Rev 0
Reactor Power = 100%

Unless otherwise noted, dose rates in mRem/hr.

Lead Surveyor: Warren Potter	Status: Approved by: Larry Burton, XX/XX/20XX
Location Code: Auxiliary	Bldg/Area Name: A040
Location Description: LPSI B Room	

VSDS Standard Map Survey Report

Data Point Details

Survey #: 1-M-2XXXXXXX-X

Map: A040 | LPSI B Room | Auxiliary

#	Type	Inst.	Value	Units	Position	Notes
DR	γ	N/A	0.3	mRem/hr		
DR	γ	N/A	1.8	mRem/hr		
DR	γ	N/A N/A	* 20 + 8	mRem/hr mRem/hr		
DR	γ HS	N/A N/A	HS * 340 + 40	mRem/hr mRem/hr	underside of line	
DR	γ	N/A N/A	* 35 + 20	mRem/hr mRem/hr		
DR	γ	N/A	7	mRem/hr		
DR	γ	N/A	6	mRem/hr		
DR	γ	N/A	2	mRem/hr		
DR	γ	N/A	17	mRem/hr		
DR	γ	N/A	11	mRem/hr		
DR	γ	N/A	4	mRem/hr	HRA Boundary	
DR	γ	N/A N/A	* 18 + 6	mRem/hr mRem/hr	* on overhead line	
DR	γ	N/A N/A	* 70 + 40	mRem/hr mRem/hr	upper pipe	
DR	γ	N/A	0.2	mRem/hr		
DR	γ	N/A	13	mRem/hr		
DR	γ HS	N/A N/A	HS * 180 + 28	mRem/hr mRem/hr	cyclone seperator	
DR	γ	N/A	8	mRem/hr		
DR	γ	N/A	3	mRem/hr		
DR	γ	N/A	4	mRem/hr		
DR	γ	N/A	8	mRem/hr		
DR	γ	N/A	4	mRem/hr		
DR	γ	N/A	6	mRem/hr		
DR	γ	N/A	<0.2	mRem/hr	RA Boundary	
DR	γ HS	N/A N/A	HS * 160 + 28	mRem/hr mRem/hr	upper cyclone seperator	
DR	γ	N/A	3	mRem/hr		
DR	γ	N/A	3	mRem/hr		
DR	γ	N/A	2	mRem/hr		
DR	γ	N/A N/A	* 5 + 3	mRem/hr mRem/hr		
DR	γ	N/A	7	mRem/hr		
DR	γ	N/A	12	mRem/hr		
DR	γ	N/A	16	mRem/hr		
DR	γ	N/A	6	mRem/hr		
DR	γ	N/A	2	mRem/hr		
DR	γ	N/A	2	mRem/hr		
DR	γ	N/A	3	mRem/hr		
DR	γ	N/A	3	mRem/hr		
DR	γ	N/A	6	mRem/hr		
DR	γ	N/A	5	mRem/hr		
DR	γ	N/A	10	mRem/hr		
DR	γ	N/A	6	mRem/hr		
DR	γ	N/A	17	mRem/hr		
DR	γ	N/A	21	mRem/hr		

Image File: LPSI B Rm 40'-51'

VSDS Standard Map Survey Report

Data Point Details

Survey #: 1-M-2XXXXXXX-X

Map: A040 | LPSI B Room | Auxiliary

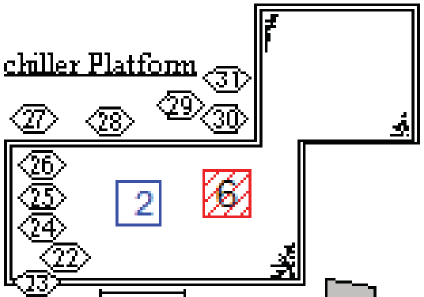
#	Type	Inst.	Value	Units	Position	Notes
DR	γ	N/A	* 30	mRem/hr		
		N/A	+ 16	mRem/hr		
DR	γ	N/A	3	mRem/hr		
1	Wipe		β/γ <1000	dpm/smear		
2	Wipe		β/γ <1000	dpm/smear		
3	Wipe		β/γ <1000	dpm/smear		
4	Wipe		β/γ <1000	dpm/smear		
5	Wipe		β/γ <1000	dpm/smear		
6	Wipe		β/γ <1000	dpm/smear		
7	Wipe		β/γ <1000	dpm/smear		
8	Wipe		β/γ <1000	dpm/smear		
9	Wipe		β/γ <1000	dpm/smear		
10	Wipe		β/γ <1000	dpm/smear		
11	Wipe		β/γ <1000	dpm/smear		
12	Wipe		β/γ <1000	dpm/smear		
	Text		X			
	Posting		RA			
	Posting		HRA RPHP			
	Posting		HRA RPHP			
	Posting		HRA RPHP			
	Posting		HRA RPHP			
	Posting		CA			

Comments:

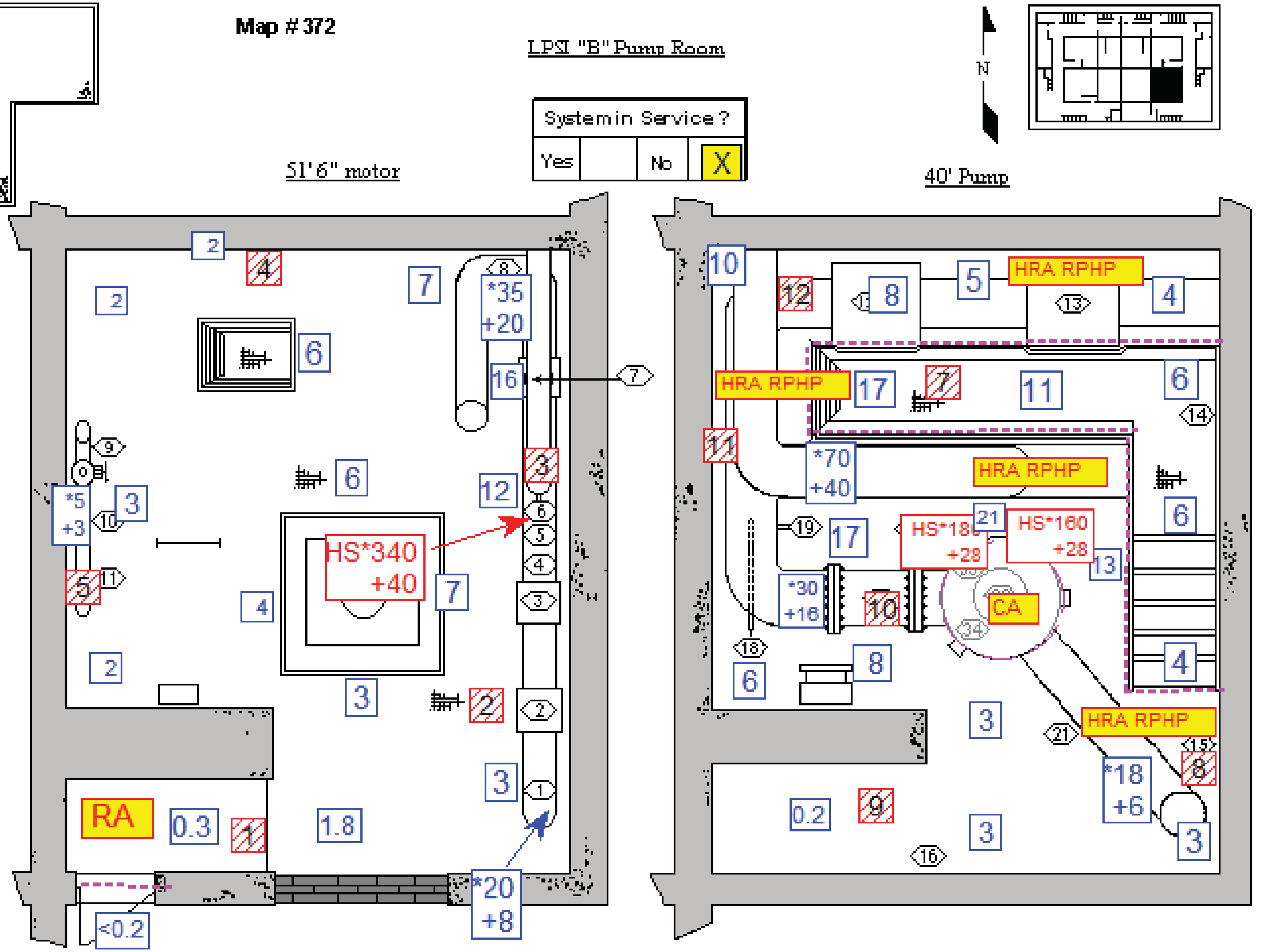
LAS taken on floors, walls and equipment up to 6' above floor.

VSDS Standard Map Survey Report

A040 | LPSI B Room | Auxiliary	Survey #: 1-M-2XXXXXXX-X	Date/Time: XX/XX/20XX 10:28



1	SIB-V462
2	SIB-V446
3	SIB-V447
4	SIB-V075
5	SIB-TE,TW 352
6	SIB-V436
7	SIB-HV307
8	SIN-PT307
9	SIB-UV668
10	SIB-V448
11	SIB-V861
12	SIB-V200
13	SIB-V632
14	FPN-VE46
15	HAN-TSH095
16	RDN-LSH120
17	SIB-V962
18	SIB-V555
19	SIB-V014
20	RDN-LSH152
21	SIB-F020
22	ECB-V054
23	ECB-V053
24	ECB-V128
25	ECB-HCV060
26	ECB-PSV108
27	ECN-TI,TW058
29	ECN-TI,TW056
30	ECB-V115
31	HAB-Z04
32	SIB-P01
33	SIB-V979
34	SIB-V015



REP#: 9-1002	**Revision: 01**	**Effective Date & Time: 9/5-2012 @ 1145**

Description of variance:

RP leader to provide direction for attaching hose(s) or directly inserting hose(s) into floor drains for draining/flushing contaminated systems.

Evaluation Summary (include survey numbers as appropriate)**:**

All three tasks provide direction to "Securely connect drain/flush hoses at floor drain". Some drain/flush evolutions use fittings attached to floor drain covers, some use floor drain boxes. There are other drain/flush evolutions are better met by inserting the contaminated drain/flush hose directly into the drain. This variance gives the flexibility to the RP Leader to evaluate the radiological conditions and determine the best approach to the drain/flush evolution.

Limitations / Applicability:

Use for ALL TASKS.

Approval RPDL required for Medium Risk REPs Manager, Radiation Protection required For High Risk REPs	Signature	Date & Time

Palo Verde Nuclear Generating Station
Arizona Public Service Co.

RADIOLOGICAL EXPOSURE PERMIT

REP Title: OPERATIONS ROUTINE SHIFT TASKS — **REP Number:** 9-1002 Rev. 01

Comments: Perform routine operational tasks to include: Tours, Inspections, Tagging, Valve Lineups, Flushing, Venting and Draining.

REP Type: Job Specific	**REP Status:** ACTIVE	**Begin Date:** 6/1/2012	**Close On Date:**
Prepared By: ROBARGE, RANDY D	**Work Group Leader:**		
Estimate Dose: 950.00	**Estimate Hours:** 4,600.00	**Actual Dose:**	**Actual Hours:**

Locations

Buildings	Elevations	Rooms
All RCAs except Containment.	ALL	"See Specific Task for Location"

Radiological Conditions

Description	Value	Unit
N/A		

Tasks

Task	Area	Description
1	RA	RA - OPS TASKS - Includes contaminated system venting, drain...
2	HRA	HRA - OPS TASKS - Includes contaminated system venting, drai...
3	LHRA	LHRA - OPS TASKS - Includes contaminated system venting, dra...

RA Radiation Area — HRA High Radiation Area — LHRA Locked High Radiation Area

Additional Instructions

Instructions 1: Contact RP prior to each RCA entry and review current radiological survey data for work area prior to entry.
No kneeling or sitting without RP authorization in the RCA.
Stand by in low dose "Cold Area" when not actively involved in job.

Instructions 2: Notify RP prior to contaminated system or insulation removal.
Follow RP direction in applying engineered controls to limit generation of airborne radioactivity.
Do not remove Tools, Equipment or Materials from contaminated areas (CAs) without RP Authorization.

Instructions 3: If unable to self-monitor the electronic dosimeter RP will assume exposure monitoring for that individual.
For RP authorized work at CA boundaries, a lab coat and gloves may be worn.
Radiation Worker's PC requirements may be modified with RP Leader authorization.

Approvals

Approver Title	Name	Date
Section Leader	WAGNER, MARTHA M	06/01/2012
Technician	ROBARGE, RANDY D	06/01/2012

Attachments

9-1002 01 Briefing check list.pdf
9-1002 01 REP Planning.pdf
9-1002 01 dose estimate work sheet.pdf
9-1002 01.TED.pdf

Palo Verde Nuclear Generating Station

RADIATION EXPOSURE PERMIT

Task Number One	REP Number: 9-1002 Rev.: 01

Task Description: RA - OPS TASKS - Includes contaminated system venting, draining and flushing.
TO INCLUDE:
- Routine walk downs.
- Hose connects and disconnects.
- Hot spot flushing and monitoring.

Radiological Risk:	Time Alarm (HH:MM):	Min. Avail. Dose (mRem):
	13:00	10
Estimated Dose:	**Estimated Hours:**	**Chirp Rate:**
650.00	3,400.00	0.1 mrem

Areas Allowed for Entry (Area Status: RA)

Radiation Area:	High Radiation Area:	Locked High Radiation Area:
YES	NO	NO

Electronic Dosimeter Alarm Setpoints

Dose Alarm Setpoint (mRem):	Dose Rate Alarm Setpoint (mRem/Hr):
10	75

Authorization List

Authorization Required:	Authorization Expires:
NO	NO

Requirements

Requirement Groups	Requirement Descriptions
PROTECTIVE AND MONITORING (PC, Respiratory, Dosimetry)	Other: - Face shield when required by RP
	RP Authorized Work At CA Boundaries - Lab Coat & Gloves
	Wet Work - Wet Set
	HCA / HPCA Entry - Double Set
	Dosimetry - EPD/TLD
	CA Entry - Full Set
RP COVERAGE	CONTINUOUS - - At system opening
	INTERMITTENT - - As authorized by RP
RP Notifications	Notify RP prior to removing or exposing previously un-surveyed components.
	Notify RP prior to contaminated system opening.

Additional Instructions

Prerequisites:

- 24 hour decay time required prior to venting/draining any system containing circulated RCS water.
- Notify RP prior to and upon completion of connecting/disconnecting drain/vent lines to/from contaminated systems - RP authorization is required.

General:

- Securely connect drain/flush hoses at floor drain.
- Ensure when attaching hoses to contaminated system that the hose being used is red and when connecting to a clean system the hose is blue.
- Ensure when connecting a blue hose to a contaminated floor drain that the white end of the whip is attached to the blue hose and the purple end is connected to the floor drain box.

RP Hold Points:

- Notify RP prior to venting and draining contaminated systems.
- Notify RP prior to disconnecting the contaminated system hoses.
- STOP WORK; notify RPTL for evaluation prior to continuing work if working Area Dose Rates are > 50 mRem/hr.

Attachments

N/A

Palo Verde Nuclear Generating Station

RADIATION EXPOSURE PERMIT

Task Number Two	REP Number: 9-1002 Rev.: 01

Task Description: HRA - OPS TASKS - Includes contaminated system venting, draining and flushing.
TO INCLUDE:
• Routine walk downs.
• Hose connect and disconnect.
• Venting and draining.
• Hot spot flushing and monitoring.

Radiological Risk:	Time Alarm (HH:MM):	Min. Avail. Dose (mRem):
	13:00	15
Estimated Dose:	**Estimated Hours:**	**Chirp Rate:**
250.00	1,175.00	0.1 mrem

Areas Allowed for Entry (Area Status: HRA)

Radiation Area:	High Radiation Area:	Locked High Radiation Area:
YES	YES	NO

Electronic Dosimeter Alarm Setpoints

Dose Alarm Setpoint (mRem):	Dose Rate Alarm Setpoint (mRem/Hr):
15	200

Authorization List

Authorization Required:	Authorization Expires:
NO	NO

Requirements

Requirement Groups	Requirement Descriptions
PROTECTIVE AND MONITORING (PC, Respiratory, Dosimetry)	Wet Work - Wet Set
	HCA / HPCA Entry - Double Set
	Other: - Face shield when required by RP
	RP Authorized Work At CA Boundaries - Lab Coat & Gloves
	Dosimetry - EPD/TLD
	CA Entry - Full Set
RP COVERAGE	INTERMITTENT - - As authorized by RP
	CONTINUOUS - - At system opening
RP Notifications	Notify RP prior to removing or exposing previously un-surveyed components.
	Notify RP prior to contaminated system opening.
RP TECH SPEC BRIEFING REQUIRED	PRIOR TO ENTRY INTO POSTED HRA

Additional Instructions

Prerequisites:

• 24 hour decay time required prior to venting/draining any system containing circulated RCS water.
• Notify RP prior to and upon completion of connecting/disconnecting drain/vent lines to/from contaminated systems - RP authorization is required.

General:

• Securely connect drain/flush hoses at floor drain.
• Ensure when attaching hoses to contaminated system that the hose being used is red and when connecting to a clean system the hose is blue.
• Ensure when connecting a blue hose to a contaminated floor drain that the white end of the whip is attached to the blue hose and the purple end is connected to the floor drain box.
• Anticipated job exposure of > 0.100 man-Rem, requires RP Leader concurrence.

RP Hold Points:

• Notify RP prior to venting and draining contaminated systems.
• Notify RP prior to disconnecting the contaminated system hoses.
• STOP WORK; notify RPTL for evaluation prior to continuing work if working Area Dose Rates are > 150 mRem/hr.

Palo Verde Nuclear Generating Station

RADIATION EXPOSURE PERMIT

Task Number Two	REP Number: 9-1002 Rev.: 01

Attachments
N/A

Palo Verde Nuclear Generating Station

RADIATION EXPOSURE PERMIT

Task Number Three	REP Number: 9-1002 Rev.: 01

Task Description: LHRA - OPS TASKS - Includes contaminated system venting, draining and flushing.
TO INCLUDE:
• Routine walk downs.
• Hose connect and disconnect.
• Venting and draining.
• Hot spot flushing and monitoring.

Radiological Risk:	Time Alarm (HH:MM):	Min. Avail. Dose (mRem):
	13:00	20
Estimated Dose:	**Estimated Hours:**	**Chirp Rate:**
50.00	25.00	1 mrem

Areas Allowed for Entry (Area Status: LHRA)

Radiation Area:	High Radiation Area:	Locked High Radiation Area:
YES	YES	YES

Electronic Dosimeter Alarm Setpoints

Dose Alarm Setpoint (mRem):	Dose Rate Alarm Setpoint (mRem/Hr):
20	300

Authorization List

Authorization Required:	Authorization Expires:
YES	NO

Requirements

Requirement Groups	Requirement Descriptions
PROTECTIVE AND MONITORING (PC, Respiratory, Dosimetry)	Dosimetry - EPD/TLD
	Other: - Face shield when required by RP
	HCA / HPCA Entry - Double Set
	CA Entry - Full Set
	Wet Work - Wet Set
	RP Authorized Work At CA Boundaries - Lab Coat & Gloves
REP PRE-JOB BRIEFING	REP Briefing Required
RP COVERAGE	INTERMITTENT - - As authorized by RP
	CONTINUOUS - - At system opening
RP Notifications	Notify RP prior to contaminated system opening.
	Notify RP prior to removing or exposing previously un-surveyed components.
RP TECH SPEC BRIEFING REQUIRED	PRIOR TO ENTRY INTO POSTED LHRA

Additional Instructions

Prerequisites:

• 24 hour decay time required prior to venting/draining any system containing circulated RCS water.
• Notify RP prior to and upon completion of connecting/disconnecting drain/vent lines to/from contaminated systems - RP authorization is required.

General:

• Securely connect drain/flush hoses at floor drain.
• Ensure when attaching hoses to contaminated system that the hose being used is red and when connecting to a clean system the hose is blue.
• Ensure when connecting a blue hose to a contaminated floor drain that the white end of the whip is attached to the blue hose and the purple end is connected to the floor drain box.
• Anticipated job exposure of > 0.100 man-Rem, requires RP Leader concurrence.

RADIATION EXPOSURE PERMIT

Task Number Three	REP Number: 9-1002 Rev.: 01

RP Hold Points:

- Notify RP prior to venting and draining contaminated systems.
- Notify RP prior to disconnecting the contaminated system hoses.
- STOP WORK; notify RPTL for evaluation prior to continuing work if working Area Dose Rates are > 240 mRem/hr.

Attachments
N/A

2013 NRC SRO A-1
PVNGS JOB PERFORMANCE MEASURE

JPM BASIS INFORMATION

TASK:	1290190102, Ensure Compliance with Tech Spec 1290600302, Ensure Performance of Operations Repetitive tasks								
TASK STANDARD:	Errors have been identified, EC Train 'A' has been declared INOPERABLE, and LCO 3.7.10 Condition 'A' has been determined to be required to be entered.								
K/A:	2.1.25		K/A RATING:	RO:	3.9	SRO:	4.2		
K/A:	2.1.20		K/A RATING:	RO:	4.6	SRO:	4.6		
10 CFR 55:	41.10 / 43.5 / 45.2 / 45.12 / 45.6								
APPLICABLE POSITION(S):		SRO	VALIDATION TIME:		10 minutes				
REFERENCES:	40DP-9OP06, Operations Department Repetitive Task Program								
SUGGESTED TESTING ENVIRONMENT:			SIMULATOR		PLANT		OTHER	X	

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Alan Malley Date: 08/09/2007

Revised By: Adam Rasmussen Date: 10/10/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ____________________________________ Date: ____________

Evaluator Name: ____________________________________

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   N/A
2. **SPECIAL TOOLS/EQUIPMENT:**

- Attached copy of 40DP-9OP06, Appendix EC003 available. This JPM was written using Revision 121 of 40DP-9OP06, Operations Department Repetitive Task Program, Appendix EC003.

NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.

- Copy of Appendix EC003 should be completed up to step 16.0 with the following values:
  - 1.0 inch change (decrease) in surge tank level
  - 225 minute elapsed time duration (incorrect value – actual 205 minute)
  - 1.0 °F change in temperature
  - Total leak rate (incorrect value – actual 0.550 gph) of 0.501 gph
  - Step calculating change in level switching beginning and ending levels so result is a calculated INCREASE in level of 1.0 inch.
  - Adjusted leak rate (incorrect value – actual 0.650 gph) of 0 gph
- Technical Specifications
- Calculator
- Pen and Paper

3. **JPM PERFORMANCE:**

- MALFUNCTIONS, OVERRIDES, etc. **<u>during</u>** JPM: N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

<u>IN-PLANTJPMs ONLY:</u>

- Operation of in-plant equipment is to be **<u>SIMULATED ONLY, DO NOT OPERATE</u>**any equipment.
- Inform the control room staff of any discovered deficiencies.
- Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **<u>NOT</u>** enter contaminated, airborne, or high radiation areas.

<u>ALL JPMs:</u>

- You may use any source of information normally available.

<u>INITIAL CONDITIONS</u>:

- **You are the Control Room Supervisor in Unit 3**
- **Operations Repetitive task Appendix EC003, is in progress, performed up to Step 17.0**
- **Mode 1 – 100% power**

<u>INITIATING CUE</u>:

Your task is to:

1. **Identify errors (Non-clerical, not typos)**
2. **List the required actions, if any**
3. **Determine any applicable LCO and ACTIONS, if any (Do NOT list any cascaded Tech Specs)**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Evaluates data from Appendix EC003 and Independently verifies Adjusted leak rate.		Examinee reviews the data and <u>determines an error in the elapsed time duration calculated</u>. (should be 205 min **NOT** 225 min) ***Note to Examiner: At step 11.0*** ***1350 – 1025 = 205 min*** ***This changes step 12.0 result to 0.550 gph (error carried forward)***

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	Evaluates data from Appendix EC003 and Independently verifies Adjusted leak rate.		Examinee reviews the data and <u>determines that the Adjusted leak rate is incorrect</u>. (should be 0.650 gph) ***Note to Examiner: The error occurred at step 10.0 where a level increase was calculated vs a level decrease. This resulted in misapplication of step 14.0.*** ***0.550 gph + 0.1 gph = 0.650 gph***

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
3. *	Determines Adjusted leak is ≥ 0.63gph.		Examinee reviews the data and determines that the leak rate **exceeds 0.63 gph** and requires actions. (listed below in following steps)

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
4. *	Take Required actions for leak rate > .63 gph. • Declare 'A' Train EC inoperable		Examinee declares 'A' Train EC **INOPERABLE**.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
5.	Initiate a PVAR for HVAC to quantify and investigate the leak rate.	**Information CUE:** **Another operator will generate a PVAR.**	Examinee determines requirement for **PVAR**.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
6.	Notify the System or Component Engineer.	**Information CUE:** **The System or Component Engineer has been informed.**	Examinee determines requirement to call one of the Engineers to report the results of the task performance.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
7. *	Determines any applicable LCO and applicable actions.		Examinee determines that entry into **LCO 3.7.10 Condition A: Action A.1 Restore EC train to OPERABLE status in 72 hours** is required.

SAT / UNSAT

Comments (required for UNSAT):

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

ANSWER KEY

Error 1:	Elapsed time duration calculated at step 11.0 is wrong. Should be **205 min NOT 225 min**. This causes step 12.0 to be **0.550 gph NOT 0.501 gph** (error carried forward).
Error 2:	Adjusted leak rate is wrong at step 15.0 (Due to error at step 10.0 – switched beginning and ending tank levels). Should be **0.650 gph NOT 0 gph**
Action(s) to be taken:	1. Declare Train 'A' EC **INOPERABLE** 2. Initiate a PVAR for HVAC to quantify and investigate the leak rate 3. Notify the System or Component Engineer **EXAMINER NOTE: Actions 2 and 3 are NOT required for satisfactory completion of this JPM (Examinee may just state perform Step 16.2)**
LCO and Action:	LCO 3.7.10 Condition 'A' Action: A.1 Restore EC train to OPERABLE status in 72 hours.

ANSWER KEY

APPLICANT

INITIAL CONDITIONS:

- **You are the Control Room Supervisor in Unit 3**
- **Operations Repetitive task Appendix EC003, is in progress, performed up to Step 17.0**
- **Mode 1 – 100% power**

INITIATING CUE:

Your task is to:

1. **Identify errors (Non-clerical, not typos)**
2. **List the required actions, if any**
3. **Determine any applicable LCO and ACTIONS, if any (Do NOT list cascaded Tech Specs)**

Errors:	
Action(s) to be taken:	
LCO and Condition:	

APPLICANT

Appendix EC003 - "A" Train Essential Chilled Water System Leak Test

Task #	Level of Use	Frequency	MODE	Unit (circle)
EC003	Continuous	Quarterly	All	1 2 3

Procedure Required	References	
40OP-9EC01	EC DBM table 6 CRDR 1-8-0510	CRAI 3131561 CRAI 2985204

Purpose

L

NOTE

This PM Task should not be performed following Essential Chiller Operation until EC temperature stabilizes at room temperature, approximately 48 hours following EC Operation.

The purpose of this test is twofold

- To verify that the Essential Chilled Water system leak rate will meet the requirements of the EC system Design Basis.
- To verify the wet reference leg to ECELIS0021 is filled and indicating level correctly.

Prerequisites

L 1. The Essential Chilled Water expansion tank level is greater than 21 inches.

L 2. The train to be tested is aligned for standby operation per 40OP-9EC01, Essential Chilled Water Train A (EC).

L 3. Ensure the required safety systems of the opposite train are operable if the plant is in Modes 1 through 4. This test does not remove essential chilled water from service, but it is recommended that this train not be tested while the other train is inoperable during Modes 1 through 4.

L 4. The Shift Manager/CRS has given permission to perform this test.

Instructions

L

NOTE

By only using the Chilled Water Circulating Pump and not the chiller package while performing this leak rate, quantifying the leak rate will be much more accurate.

L 1.0 Start the Chilled Water Circulating Pump per 40OP-9EC01, Essential Chilled Water Train "A" (EC).

L

NOTE

During leak rate testing, ensure that nothing is done to the EC system to affect system inventory, i. e., venting, sampling, chem add, etc.

L 2.0 **WHEN** the EC system has been running for at least 20 minutes and is in stable operation, i.e., pressure and temperature, per 40OP-9EC01, Essential Chilled Water Train "A" (EC):
THEN isolate **ALL** makeup to EC "A" System by performing **BOTH** of the following:

2.1 Isolate auto make-up by closing **ONE** of the following:

L ECA-V039, Expansion Tank Level Control Valve Inlet Isolation Valve

N/A ECA-V040, Expansion Tank Level Control Valve Outlet Isolation Valve

L 2.2 Ensure ECA-V174, Essential Chill Water Expansion Tank ECA-T01 Level Control Bypass Valve, is closed.

N/A 3.0 **IF** any of the valves in step 2.0 are suspected of leaking by,
THEN isolate makeup to EC "A" System by ensuring **BOTH** the following valves are closed:

N/A DWN-V380, Isolation Valve for Ess. Chilled Water Expansion Tank, T01, A Train

↓ CT-V056, Condensate Supply

L 4.0 Verify Sightglass indication by performing the following

L 4.1 Open ECA-V240, Expansion Tank Sightglass Upper Isolation.

L 4.2 Open ECA-V242, Expansion Tank Sightglass Lower Isolation.

L 4.3 Check Open LG-19 Gage Glass Upper Isolation Valve.

L 4.4 Check Open LG-19 Gage Glass Lower Isolation Valve.

L 4.5 Check Open LG-19 Upper Line Isolation Valve.

L 4.6 Check Open LG-19 Lower Line Isolation Valve.

L 4.7 Check LIS-21 is indicating the same level as the local sight glass. The difference should be less than or equal to 2 inches between LIS-21 and the sightglass.

L

NOTE

LIS-21 indication troubleshooting does not have to be completed before the Essential Chilled Water System Leak Test is performed.

L 4.8 **IF** the difference between indications is greater than 2 inches,
THEN write a PVAR for I&C to troubleshoot the indication.

5.0 Record the following data:

21.75 EC Expansion Tank level, from ECN-LG-19, EC Expansion Tank "A" Sightglass, (Est. to the nearest 1/32 inch (0.03125 inches))

1025 Time Expansion Tank level was recorded (to the nearest minute)

56 EC pump discharge temperature (ERFDADS point ECT11)

L 5.1 Close ECA-V240, Expansion Tank Sightglass Upper Isolation.

Initial Positioner L (Init)

Independent Verification fR (Init)

L 5.2 Close ECA-V242, Expansion Tank Sightglass Lower Isolation.

Initial Positioner L (Init)

Independent Verification fR (Init)

L 6.0 **WHEN** the makeup source is isolated,
THEN monitor Expansion tank level at least once per hour.

N/A 7.0 **IF** less than 2 hours has elapsed,
AND Expansion Tank level is less than 17 inches,
THEN GO TO step 9.0 and restore the system.

L 8.0 **WHEN** a minimum of two hours has elapsed
(Do **not** exceed a maximum test duration of four hours.),
THEN perform the following:

L 8.1 Open ECA-V240, Expansion Tank Sightglass Upper Isolation.

L 8.2 Open ECA-V242, Expansion Tank Sightglass Lower Isolation.

8.3 Record the following data:

20.75 EC Expansion Tank level, from ECN-LG-19, EC Expansion Tank "A" Sightglass, (Est. to the nearest 1/32 inch (0.03125 inches))

1350 Time Expansion Tank level was recorded (to the nearest minute)

57 EC pump discharge temperature (ERFDADS point ECT11)

9.0 Restore the System

L 9.1 Ensure **ALL** of the following valves are open.

NAME	FIRST VRFD	SCND VRFD
ECA-V039, Expansion Tank Level Control Valve Inlet Isolation Valve	L	fR
ECA-V040, Expansion Tank Level Control Valve Outlet Isolation Valve	L	fR
DWN-V380, Isolation Valve for Ess. Chilled Water Expansion Tank, T01, A Train	L	fR
CT-V056, Condensate Supply	L	fR

ANSWER KEY (DO NOT GIVE TO EXAMINEE)

L 9.2 Ensure **ALL** of the following valves are closed.

NAME	FIRST VRFD	SCND VRFD
ECA-V240, Expansion Tank Sightglass Upper Isolation	L	JR
ECA-V242, Expansion Tank Sightglass Lower Isolation	L	JR

L 9.3 Stop the Chilled Water Circulating Pump per 40OP-9EC01, Essential Chilled Water Train "A" (EC).

N/A 9.4 **IF** less than 2 hours has elapsed,
AND "A" Train Essential Chilled Water System Leak Test has been terminated,
THEN perform the following:

N/A 9.4.1 Declare this train of EC Inoperable.

9.4.2 Initiate a PVAR for HVAC to quantify and investigate the system leak rate.

9.4.3 Notify the System or Component Engineer.

L 10.0 Calculate the change in expansion tank level by performing the following calculation:

21.75 (Ending Expansion Tank Level) minus 20.75 (Beginning Expansion Tank Level) equals +1.0 inches (Change in Expansion Tank Level, L_c)

Operator switched "Ending Expansion Tank Level" with "Beginning Expansion Tank Level" falsely identifying a 1 inch increase in level.

L 11.0 Calculate the elapsed time duration in minutes by performing the following:

1350 (Time of Ending Expansion Tank Level) minus 1025 (Time of Beginning Expansion Tank Level) equals 225 minutes (Elapsed time in minutes)

Operator calculated wrong elapsed time by 20 minutes. Elapsed time should be 205 minutes.

L 12.0 Using the values determined in the previous two steps perform the following calculation to determine the total gallons per hour leak rate from the EC system.

$$\frac{1\ \ \Delta \text{ level in. (absolute value)}}{225\ \ \Delta \text{ time min.}} \times \frac{60 \text{ min.}}{1 \text{ hr.}} \times \frac{1.88 \text{ gal.}}{1 \text{ in.}} = 0.501 \text{ gph (Total leakrate)}$$

L 13.0 Using the temperatures recorded in steps 5.0 and 8.3, perform the following calculation to determine the total system temperature change during the test performance.

57 °F (Ending Temp from step 8.3) minus 56 °F (Beginning Temp from step 5.0) equals 1 °F (Change in System Temp)

Elapsed time error carried forward. Total leakrate calculated should be 0.550 gph.

ANSWER KEY (DO NOT GIVE TO EXAMINEE)

ANSWER KEY (DO NOT GIVE TO EXAMINEE)

L **14.0 Evaluation of Data:**

IF change in Expansion tank level: (Step 10.0)	**AND change in system temp is:**	**THEN perform the following action:**
Level lowers by greater than or equal to 0.25 inches	greater than or equal to 1.0°F but less than or equal to 9.0°F	Add 0.10 gph to the leak rate in step 12.0 and record as adjusted leak rate.
$L_c \geq -0.25$ inches	greater than 9.0°F	**GO TO** Step 16.1
Level changes by less than ±0.25 inches	greater than or equal to 1.0°F but less than or equal to 9.0°F	Multiply the temperature change by 0.07 and record as the adjusted leak rate.
$-0.25 > L_c < +0.25$ inches	greater than 9.0°F	**GO TO** Step 16.1
Level rises by greater than or equal to 0.25 but less than 0.75 inches	greater than or equal to 1.0°F but less than 4.0°F	Record adjusted leak rate as 0.0
	greater than or equal to 4.0°F but less than or equal to 9.0°F	Record adjusted leak rate as 0.4
$0.25 \leq L_c < 0.75$ inches	greater than 9.0°F	**GO TO** Step 16.1
Level rises by greater than or equal to 0.75 inches	greater than or equal to 1.0°F but less than or equal to 9.0°F	Record adjusted leak rate as 0.0
$L_c \geq 0.75$ inches	greater than 9.0°F	**GO TO** Step 16.1

Should have used this.

Incorrectly used this due to miscalculating a rising level.

15.0 Adjusted leak rate: Ø gph. (initial) L

Adjusted leakrate should be 0.650 gph.

15.1 Independently verify the adjusted leak rate.
(sign) [signature]

16.0 Actions:

N/A 16.1 **IF** the temperature change was greater [...] **THEN** immediately contact the System [...]gineer for direction.

N/A 16.2 **IF** the adjusted leakrate is ≥ 0.63 gph, **THEN** perform the following:

This step is now applicable. EC is Inoperable.

N/A 1. Declare this train of EC Inoperable.

2. Initiate a PVAR for HVAC to quantify and investigate the system leak rate.

3. Notify the System or Component Engineer.

ANSWER KEY (DO NOT GIVE TO EXAMINEE)

ANSWER KEY (DO NOT GIVE TO EXAMINEE)

L 17.0 Send a copy of the recorded data, including Unit performed in, to the Essential Chilled Water System Engineer, Station 7512.

TASK RESULTS: (CIRCLE ONE) SAT / UNSAT / NOT PERFORMED / PARTIAL

REMARKS: NONE

PERFORMED BY Larry Burton DATE TODAY

ANSWER KEY (DO NOT GIVE TO EXAMINEE)

Appendix EC003 - "A" Train Essential Chilled Water System Leak Test

Task #	Level of Use	Frequency	MODE	Unit (circle)
EC003	Continuous	Quarterly	All	1 2 3
Procedure Required		**References**		
40OP-9EC01		EC DBM table 6 CRDR 1-8-0510	CRAI 3131561 CRAI 2985204	

Purpose

L ------------------------------------- **NOTE** -------------------------------------

This PM Task should not be performed following Essential Chiller Operation until EC temperature stabilizes at room temperature, approximately 48 hours following EC Operation.

The purpose of this test is twofold

- To verify that the Essential Chilled Water system leak rate will meet the requirements of the EC system Design Basis.
- To verify the wet reference leg to ECELIS0021 is filled and indicating level correctly.

Prerequisites

L 1. The Essential Chilled Water expansion tank level is greater than 21 inches.

L 2. The train to be tested is aligned for standby operation per 40OP-9EC01, Essential Chilled Water Train A (EC).

L 3. Ensure the required safety systems of the opposite train are operable if the plant is in Modes 1 through 4. This test does not remove essential chilled water from service, but it is recommended that this train not be tested while the other train is inoperable during Modes 1 through 4.

L 4. The Shift Manager/CRS has given permission to perform this test.

Instructions

L------------------------------------- **NOTE** -------------------------------------

By only using the Chilled Water Circulating Pump and not the chiller package while performing this leak rate, quantifying the leak rate will be much more accurate.

L 1.0 Start the Chilled Water Circulating Pump per 40OP-9EC01, Essential Chilled Water Train "A" (EC).

L

NOTE

During leak rate testing, ensure that nothing is done to the EC system to affect system inventory, i. e., venting, sampling, chem add, etc.

L 2.0 **WHEN** the EC system has been running for at least 20 minutes and is in stable operation, i.e., pressure and temperature, per 40OP-9EC01, Essential Chilled Water Train "A" (EC):
THEN isolate **ALL** makeup to EC "A" System by performing **BOTH** of the following:

2.1 Isolate auto make-up by closing **ONE** of the following:

L ECA-V039, Expansion Tank Level Control Valve Inlet Isolation Valve

N/A ECA-V040, Expansion Tank Level Control Valve Outlet Isolation Valve

L 2.2 Ensure ECA-V174, Essential Chill Water Expansion Tank ECA-T01 Level Control Bypass Valve, is closed.

N/A 3.0 **IF** any of the valves in step 2.0 are suspected of leaking by,
THEN isolate makeup to EC "A" System by ensuring **BOTH** the following valves are closed:

N/A DWN-V380, Isolation Valve for Ess. Chilled Water Expansion Tank, T01, A Train

↓ CT-V056, Condensate Supply

L 4.0 Verify Sightglass indication by performing the following

L 4.1 Open ECA-V240, Expansion Tank Sightglass Upper Isolation.

L 4.2 Open ECA-V242, Expansion Tank Sightglass Lower Isolation.

L 4.3 Check Open LG-19 Gage Glass Upper Isolation Valve.

L 4.4 Check Open LG-19 Gage Glass Lower Isolation Valve.

L 4.5 Check Open LG-19 Upper Line Isolation Valve.

L 4.6 Check Open LG-19 Lower Line Isolation Valve.

L 4.7 Check LIS-21 is indicating the same level as the local sight glass. The difference should be less than or equal to 2 inches between LIS-21 and the sightglass.

L

NOTE

LIS-21 indication troubleshooting does not have to be completed before the Essential Chilled Water System Leak Test is performed.

L 4.8 **IF** the difference between indications is greater than 2 inches,
THEN write a PVAR for I&C to troubleshoot the indication.

5.0 Record the following data:

21.75 EC Expansion Tank level, from ECN-LG-19, EC Expansion Tank "A" Sightglass, (Est. to the nearest 1/32 inch (0.03125 inches))

1025 Time Expansion Tank level was recorded (to the nearest minute)

56 EC pump discharge temperature (ERFDADS point ECT11)

L 5.1 Close ECA-V240, Expansion Tank Sightglass Upper Isolation.

Initial Positioner L (Init)

Independent Verification fR (Init)

L 5.2 Close ECA-V242, Expansion Tank Sightglass Lower Isolation.

Initial Positioner L (Init)

Independent Verification fR (Init)

L 6.0 **WHEN** the makeup source is isolated,
THEN monitor Expansion tank level at least once per hour.

N/A 7.0 **IF** less than 2 hours has elapsed,
AND Expansion Tank level is less than 17 inches,
THEN GO TO step 9.0 and restore the system.

L 8.0 **WHEN** a minimum of two hours has elapsed
(Do **not** exceed a maximum test duration of four hours.),
THEN perform the following:

L 8.1 Open ECA-V240, Expansion Tank Sightglass Upper Isolation.

L 8.2 Open ECA-V242, Expansion Tank Sightglass Lower Isolation.

8.3 Record the following data:

20.75 EC Expansion Tank level, from ECN-LG-19, EC Expansion Tank "A" Sightglass, (Est. to the nearest 1/32 inch (0.03125 inches))

1350 Time Expansion Tank level was recorded (to the nearest minute)

57 EC pump discharge temperature (ERFDADS point ECT11)

9.0 Restore the System

L 9.1 Ensure **ALL** of the following valves are open.

NAME	FIRST VRFD	SCND VRFD
ECA-V039, Expansion Tank Level Control Valve Inlet Isolation Valve	L	fR
ECA-V040, Expansion Tank Level Control Valve Outlet Isolation Valve	L	fR
DWN-V380, Isolation Valve for Ess. Chilled Water Expansion Tank, T01, A Train	L	fR
CT-V056, Condensate Supply	L	fR

L 9.2 Ensure **ALL** of the following valves are closed.

NAME	FIRST VRFD	SCND VRFD
ECA-V240, Expansion Tank Sightglass Upper Isolation	L	JR
ECA-V242, Expansion Tank Sightglass Lower Isolation	L	JR

L 9.3 Stop the Chilled Water Circulating Pump per 40OP-9EC01, Essential Chilled Water Train "A" (EC).

N/A 9.4 **IF** less than 2 hours has elapsed,
AND "A" Train Essential Chilled Water System Leak Test has been terminated,
THEN perform the following:

N/A 9.4.1 Declare this train of EC Inoperable.

9.4.2 Initiate a PVAR for HVAC to quantify and investigate the system leak rate.

9.4.3 Notify the System or Component Engineer.

L 10.0 Calculate the change in expansion tank level by performing the following calculation:

21.75	-	20.75	=	+1.0 inches
(Ending Expansion Tank Level)	minus	(Beginning Expansion Tank Level)	equals	(Change in Expansion Tank Level, L_c)

L 11.0 Calculate the elapsed time duration in minutes by performing the following:

1350	-	1025	=	225 minutes
(Time of Ending Expansion Tank Level)	minus	(Time of Beginning Expansion Tank Level)	equals	(Elapsed time in minutes)

L 12.0 Using the values determined in the previous two steps perform the following calculation to determine the total gallons per hour leak rate from the EC system:

$$\frac{1 \ \Delta \text{ level in. (absolute value)}}{225 \ \Delta \text{ time min.}} \ \mathbf{x} \ \frac{60 \text{ min.}}{1 \text{ hr.}} \ \mathbf{x} \ \frac{1.88 \text{ gal.}}{1 \text{ in.}} = 0.501 \text{ gph}$$

times times Total leakrate

L 13.0 Using the temperatures recorded in steps 5.0 and 8.3, perform the following calculation to determine the total system temperature change during the test performance.

57 °F	-	56 °F	=	1 °F
(Ending Temp from step 8.3)	minus	(Beginning Temp from step 5.0)	equals	(Change in System Temp)

L **14.0 Evaluation of Data:**

IF change in Expansion tank level: (Step 10.0)	**AND change in system temp is:**	**THEN** perform **the following action:**
Level lowers by greater than or equal to 0.25 inches	greater than or equal to 1.0°F but less than or equal to 9.0°F	Add 0.10 gph to the leak rate in step 12.0 and record as adjusted leak rate.
$L_c \geq -0.25$ inches	greater than 9.0°F	**GO TO** Step 16.1
Level changes by less than ±0.25 inches	greater than or equal to 1.0°F but less than or equal to 9.0°F	Multiply the temperature change by 0.07 and record as the adjusted leak rate.
$-0.25 > L_c < +0.25$ inches	greater than 9.0°F	**GO TO** Step 16.1
Level rises by greater than or equal to 0.25 but less than 0.75 inches	greater than or equal to 1.0°F but less than 4.0°F	Record adjusted leak rate as 0.0
	greater than or equal to 4.0°F but less than or equal to 9.0°F	Record adjusted leak rate as 0.4
$0.25 \leq L_c < 0.75$ inches	greater than 9.0°F	**GO TO** Step 16.1
Level rises by greater than or equal to 0.75 inches	greater than or equal to 1.0°F but less than or equal to 9.0°F	Record adjusted leak rate as 0.0
$L_c \geq 0.75$ inches	greater than 9.0°F	**GO TO** Step 16.1

15.0 Adjusted leak rate: Ø gph. (initial) L

15.1 Independently verify the adjusted leak rate.
(sign)

16.0 Actions:

N/A 16.1 **IF** the temperature change was greater than 9 degrees,
THEN immediately contact the System or Component Engineer for direction.

N/A 16.2 **IF** the adjusted leakrate is $\geq$ 0.63 gph,
THEN perform the following:

N/A 1. Declare this train of EC Inoperable.

2. Initiate a PVAR for HVAC to quantify and investigate the system leak rate.

3. Notify the System or Component Engineer.

L 17.0 Send a copy of the recorded data, including Unit performed in, to the Essential Chilled Water System Engineer, Station 7512.

TASK RESULTS: (CIRCLE ONE) SAT / UNSAT / NOT PERFORMED / PARTIAL

REMARKS: NONE

PERFORMED BY Larry Burton DATE TODAY

2013 NRC SRO A-2
PVNGS JOB PERFORMANCE MEASURE

JPM BASIS INFORMATION

TASK:	1290020301 Conduct of Shift Operations						
TASK STANDARD:	Determined which Reactor Operator(s) is(are) available to take the shift without exceeding Fatigue Rule requirements AND determined which Reactor Operator(s) have exceeded Fatigue Rule requirements.						
K/A:	2.1.5	K/A RATING:	RO:	2.9	SRO:	3.9	
10 CFR 55:	41.10 / 43.5 / 45.12						
APPLICABLE POSITION(S):	SRO	VALIDATION TIME:	20 minutes				
REFERENCES:	01DP-0AP17, Managing Personnel Fatigue 10 CFR Part 26 Subpart I						
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR		PLANT		OTHER	X	

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Adam Rasmussen Date: 10/10/2013

Revised By: N/A Date: N/A

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ______________________________ Date: ____________

Evaluator Name: ______________________________

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # _____________*

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   N/A
2. **SPECIAL TOOLS/EQUIPMENT:**
   - 01DP-0AP17, Managing Personnel Fatigue, available
   - JPM was written using Revision 07 of 01DP-0AP17, Managing Personnel Fatigue

   NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.
   - PVNGS Standards and Expectations, Rev 6 available
   - Calculator
   - Pen and Paper
3. **JPM PERFORMANCE:**
   - MALFUNCTIONS, OVERRIDES, etc. **<u>during</u>** JPM:
     N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

<u>IN-PLANTJPMs ONLY:</u>
- Operation of in-plant equipment is to be **<u>SIMULATED ONLY, DO NOT OPERATE</u>**any equipment.
- Inform the control room staff of any discovered deficiencies.
- Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **<u>NOT</u>** enter contaminated, airborne, or high radiation areas.

<u>ALL JPMs:</u>
- You may use any source of information normally available.

INITIAL CONDITIONS:

- **You are the CRS on Unit 1 on night shift**
- **A Reactor Operator just called in on short notice PTO for tomorrow (Tuesday dayshift)**
- **This will put the manning at below minimum allowed**
- **EmCenter Fatigue Management software is not available while a software patch is being installed**
- **You have accumulated the previous week's work hours of four Reactor Operators (located on following page)**
- **All four Reactor Operators have averaged 3 days off per week in the previous 5 week period**
- **Assume all hours are day shift non-outage hours**

INITIATING CUE:

You have been directed to:

1. **Determine which of the following Reactor Operators (if any) can be called in to fill the vacant position for 12 hours.**
2. **Determine if any of the operators have exceeded the Fatigue Rule requirements during the past week.**

Provide your answers in the spaces below.

Operator #1 CAN / CANNOT fill the position on Tuesday for 12 hours. (CIRCLE ONE)
Operator #2 CAN / CANNOT fill the position on Tuesday for 12 hours. (CIRCLE ONE)
Operator #3 CAN / CANNOT fill the position on Tuesday for 12 hours. (CIRCLE ONE)
Operator #4 CAN / CANNOT fill the position on Tuesday for 12 hours. (CIRCLE ONE)
Have any of the operators exceeded the Fatigue Rule requirements during the past week? If yes, which operator(s)? **YES / NO (CIRCLE ONE) If YES: Reactor Operator(s) (CIRCLE)** **#1 #2 #3 #4**

Continued on next page

	Reactor Operator #1 Schedule	Reactor Operator #2 Schedule	Reactor Operator #3 Schedule	Reactor Operator #4 Schedule
Saturday 10/24/2010	Off	Off	Off	On Shift – 12 hours
Sunday 10/25/2010	Off	On Shift – 12 hours	Off	Off
Monday 10/26/2010	On Shift – 12 hours	Off	On Shift – 12 hours	Off
Tuesday 10/27/2010	Off	Off	On Shift – 12 hours	On Shift – 12 hours
Wednesday 10/28/2010	Tagging Office – 10 hours	On Shift – 12 hours	On Shift – 12 hours	On Shift – 12 hours
Thursday 10/29/2010	Tagging Office – 10 hours	On Shift – 12 hours	On Shift – 12 hours	On Shift – 12 hours
Friday 10/30/2010	Tagging Office – 10 hours (Called out for emergent work)	On Shift – 12 hours	Participated in Unannounced E-Plan Drill – 8 hours	On Shift – 12 hours
Saturday 10/31/2010	On Shift – 12 hours	On Shift – 12 hours	Off	On Shift – 12 hours
Sunday 11/01/2010	Tagging Office – 10 hours (Called out for emergent work)	Off	On Shift – 12 hours	On Shift – 14 hours (Called in early for pre-shift briefing for special evolution)
Monday 11/02/2010	Just In Time Training (JITT) for upcoming plant shutdown – 10 hours	On Shift – 14.5 hours (held over 2.5 hours due to his relief being late)	Off	Off
Tuesday 11/03/2010	Operator needed to work this day 12 hours			

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate any valves.

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Examinee reviews the work schedule for Reactor Operator #1 to determine if that operator can be called in to fill the position on Tuesday.	**EVALUATOR NOTE:** Operator #1 cannot because he would exceed 72 hours in a 7 day period.	Examinee determined that Operator #1 **CANNOT** be called in to fill the position for Tuesday.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
2. *	Examinee reviews the work schedule for Reactor Operator #2 to determine if that operator can be called in to fill the position on Tuesday.	**EVALUATOR NOTE:** Operator #2 cannot because he would exceed the following: 72 hours in a 7 day period 26 hours in a 48 hour period	Examinee determined that Operator #2 **CANNOT** be called in to fill the position for Tuesday.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
3. *	Examinee reviews the work schedule for Reactor Operator #3 to determine if that operator can be called in to fill the position on Tuesday.		Examinee determined that Operator #3 **CAN** be called in to fill the position for Tuesday.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
4. *	Examinee reviews the work schedule for Reactor Operator #4 to determine if that operator can be called in to fill the position on Tuesday.	**EVALUATOR NOTE:** Operator #4 cannot because he would exceed 72 hours in a 7 day period.	Examinee determined that Operator #4 **CANNOT** be called in to fill the position for Tuesday.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
5. *	Examinee reviews the work schedule for Reactor Operators to determine if any operator has exceeded the Fatigue Rule requirements.		Examinee determined that Operator #4 **HAS** exceeded the requirements for Fatigue Rule due to working **74 hours in a 7 day period.**
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- You are the CRS on Unit 1 on night shift
- A Reactor Operator just called in on short notice PTO for tomorrow (Tuesday dayshift)
- This will put the manning at below minimum allowed
- EmpCenter Fatigue Management software is not available while a software patch is being installed
- You have accumulated the previous week's work hours of four Reactor Operators (located on following page)
- All four Reactor Operators have averaged 3 days off per week in the previous 5 week period
- Assume all hours are day shift non-outage hours

INITIATING CUE:

You have been directed to:

1. Determine which of the following Reactor Operators (if any) can be called in to fill the vacant position for 12 hours.
2. Determine if any of the operators have exceeded the Fatigue Rule requirements during the past week.

Provide your answers in the spaces below:

Operator #1 CAN / CANNOT fill the position on Tuesday for 12 hours.	(CIRCLE ONE)
Operator #2 CAN / CANNOT fill the position on Tuesday for 12 hours.	(CIRCLE ONE)
Operator #3 CAN / CANNOT fill the position on Tuesday for 12 hours.	(CIRCLE ONE)
Operator #4 CAN / CANNOT fill the position on Tuesday for 12 hours.	(CIRCLE ONE)
Have any of the operators exceeded the Fatigue Rule requirements during the past week? If yes, which operator(s)? YES / NO (CIRCLE ONE) If YES: Reactor Operator(s) (CIRCLE) #1 #2 #3 #4	

Continued on next page

APPLICANT

	Reactor Operator #1 Schedule	Reactor Operator #2 Schedule	Reactor Operator #3 Schedule	Reactor Operator #4 Schedule
Saturday 10/24/2010	Off	Off	Off	On Shift – 12 hours
Sunday 10/25/2010	Off	On Shift – 12 hours	Off	Off
Monday 10/26/2010	On Shift – 12 hours	Off	On Shift – 12 hours	Off
Tuesday 10/27/2010	Off	Off	On Shift – 12 hours	On Shift – 12 hours
Wednesday 10/28/2010	Tagging Office – 10 hours	On Shift – 12 hours	On Shift – 12 hours	On Shift – 12 hours
Thursday 10/29/2010	Tagging Office – 10 hours	On Shift – 12 hours	On Shift – 12 hours	On Shift – 12 hours
Friday 10/30/2010	Tagging Office – 10 hours (Called out for emergent work)	On Shift – 12 hours	Participated in Unannounced E-Plan Drill – 8 hours	On Shift – 12 hours
Saturday 10/31/2010	On Shift – 12 hours	On Shift – 12 hours	Off	On Shift – 12 hours
Sunday 11/01/2010	Tagging Office – 10 hours (Called out for emergent work)	Off	On Shift – 12 hours	On Shift – 14 hours (Called in early for pre-shift briefing for special evolution)
Monday 11/02/2010	Just In Time Training (JITT) for upcoming plant shutdown – 10 hours	On Shift – 14.5 hours (held over 2.5 hours due to his relief being late)	Off	Off
Tuesday 11/03/2010	**Operator needed to work this day 12 hours**			

APPLICANT

MANAGING PERSONNEL FATIGUE	01DP-0AP17	Revision 7

Procedure Usage Requirements		Sections
Information Use:	• Refer To 01DP-0AP09, Procedure and Work Instruction Use and Adherence.	All

TABLE OF CONTENTS

APPENDICES

1.0 PURPOSE AND SCOPE

1.1 Purpose

The purpose of this procedure is to identify the requirements of and provide instruction in establishing the administration and interpretation of the Palo Verde Nuclear Generating Station (PVNGS) Fatigue Management Program in accordance with 10 CFR Part 26 Subpart I, NRC Regulatory Guide 5.73, "Fatigue Management for Nuclear Power Plant Personnel" and NEI 06-11 "Managing Personnel Fatigue at Nuclear Power Reactor Sites", and procedure 01DP-0EM10, Fitness For Duty Program.

1.2 Scope

Fatigue management requirements apply to all employees, contractors and vendors who:

- Hold unescorted access to the Protected Areas of PVNGS.
- Are required to physically report to the Technical Support Center (TSC) or the Emergency Operations Facility (EOF) in accordance with the PVNGS Emergency Plan and Emergency Plan Implementing Procedures.

Work hour controls apply only to PVNGS employees, contractors and vendors who perform or direct covered work.

Average work hour requirements per 10CFR 26.205(d)(7) apply.

End of Section

2.0 RESPONSIBILITIES

2.1 Appropriate Senior Management such as Palo Verde Nuclear Executives, Vice Presidents, General Managers, and Plant Managers

is responsible for:

- Reviewing site staffing levels on an annual basis to ensure individual work hours are managed with the objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of successive shifts.
- Senior Management may review event details and issues with workgroup leader and/or workgroup individual(s) when a fatigue deviation has occurred.

2.2 Operations Shift Manager

is responsible for:

- Determining that a work hour waiver is necessary to mitigate or prevent a condition adverse to safety.
- Also responsible for the requirements in Section 2.5, PVNGS Section Leaders / PV Operations Shift Managers.

2.3 Security Operations Section Leader

is responsible for:

- Determining that a waiver is necessary to maintain site security.
- Notifying the Department Leader, Security Operations whenever a waiver is issued for on-shift security personnel.
- Also responsible for the requirements in Section 2.5, PVNGS Section Leaders / Team Leaders / Operations Shift Managers.

2.4 PVNGS Department Leaders

are responsible for:

- Providing guidelines for overtime selection process, including those required by the union contract, and the fitness-for-duty requirements outlined in this guide and in the PVNGS Fitness For Duty Program, if needed.
- Communicating the requirements to appropriate personnel within his/her department.
- Evaluating department staffing levels on an annual basis to ensure individual work hours are managed with the objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of successive shifts.
- Work Group Leadership representation in Fatigue Management Task Force Meetings, Fatigue Software Meetings and Industry Benchmarking.

2.5 PVNGS Section Leaders / Team Leaders / Operations Shift Managers

are responsible for:

- Evaluating eligibility of work hours each 15 days for each individual or defined group under their responsibility during the outage and document in the Corrective Action Program.
- Workgroup to generate PVARs for potential 10 CFR Part 26, Subpart I violations reported in software and provide notification to workgroup fatigue administrator. Refer to Section 3.13, Reporting Software Deviation Guidance for more information on reporting fatigue deviations.
- A review of fatigue software deviation reports on a periodic basis. (This will provide an opportunity to identify, evaluate and correct keying errors).
- Work hour keying corrections requested after work hour time sheet closings are completed shall be performed by a site fatigue administrator. (These corrections are tracked in the site fatigue Key Performance Indicator Metrics (KPIM)).
- Evaluating assigned workgroup schedules in the fatigue software when transitioning to online/outage schedules.
- Ensuring schedule changes are keyed into fatigue software prior to work hours being conducted.
- Work Group Leadership representation in Fatigue Management Task Force Meetings, Fatigue Software Meetings and Industry Benchmarking.

In addition, PVNGS Section Leaders of an individual who will be issued a waiver to exceed the work hour limit or who is being assessed for fatigue are responsible for:

- Ensuring a face-to-face fatigue assessment is performed within (4) four hours prior to beginning work and documenting of waiver in the Fatigue Software.
- Evaluating the employee's performance and continued fitness-for-duty while working under a waiver.
- If evaluating for the issuance of a waiver and the individual's section leader or department leader is not on-site, this responsibility may be performed by any department leader or section leader who is qualified to oversee the work to be performed by the individual.
- Ensuring individual work schedules are developed to prevent impairment from fatigue. This includes evaluating the duration, frequency and sequencing of the hours that are worked by each individual.

2.6 Each employee (PVNGS, contractor or vendor)

is responsible for (this is inclusive of the above listed positions):

- Evaluating his/her personal fitness to work based on impairment from fatigue.
- Managing his/her work hours consistent with the objective of preventing impairment from fatigue.
- Making a self-declaration of fatigue and discussing his/her concerns with supervision or management in cases when he/she feels his/her performance may be impaired.
- Verifying his/her work hours are correctly documented in fatigue software prior to conducting work, knowing that hours paid may be different, if the individual is a "covered worker".
- Being aware of the total hours worked in the previous 14 days and notifying management if work hour limits will be exceeded if asked to work additional hours, if the individual is a "covered worker".
- Closely monitor their hours worked and notify their Leader if their current or proposed work schedule will cause a rule violation.
- Verify compliance of work hours prior to working. (The fatigue management software is the recommended method of verification; however other methods as appropriate may be used if the software is not accessible. Work hours should be entered into software upon return of accessibility).

- If a potential deviation is received while verifying compliance, work hours must be adjusted; or a waiver generated as applicable in Section 3.6.1, Granting Waivers (Work hour adjustments and potential waivers should be communicated to the workgroup leader).
- Monitoring and reporting concerns related to other individual's fitness to work based on observed or perceived impairment from fatigue (i.e., behavioral observation program).

2.7 PVNGS Nuclear Training Director

is responsible for:

- Ensuring training and examination requirements in 10 CFR Part 26.203(c) are satisfied.

2.8 Nuclear Security Division Programs Department Leader

is responsible for:

- The requirements contained in Section 3.10, Records and Section 3.11, Reporting of this procedure.
- Ensuring a review is performed at least once per year, such that the entire year is reviewed, to evaluate the effectiveness of the control of work hours.
- Reviewing the performance of the station in adhering to work schedules for covered work groups.
- Maintaining a record of the shift schedules and shift cycles used for at least the past 3 years for those individuals who are subject to work hour controls. If legal proceedings are ongoing, records may be required longer than 3 years.

2.9 PVNGS Nuclear Assurance Director

is responsible to:

- Assess overtime control in accordance with 10 CFR Part 26.

2.10 PVNGS Work Management / Outage Control Manager

is responsible for:

- Ensuring that the site's scope determination is in alignment with the risk-significance of activities and systems, structures and components (SSCs) and does not encourage the assignment of excessive work hours.

2.11 Substance Abuse Expert (SAE)

is responsible for:

- Evaluating individuals who have violated the substance abuse provisions of the FFD policy and make recommendations concerning education, treatment, return to duty, follow-up drug and alcohol testing, and aftercare.
- Protecting public health and safety and the common defense and security by professionally evaluating the individual and recommending appropriate education/treatment, follow-up tests, and aftercare.
- The requirements contained in Section 3.7.6, Substance Abuse Expert (SAE) of this procedure.

2.12 Qualified Fatigue Assessors

are responsible for:

- Being trained and qualified to perform fatigue assessments in accordance with Section 3.7.6.1.
- Continuing Training Annually in accordance with Section 3.7.6.1.
- Performing face-to-face fatigue assessments within four (4) hours prior to the individual beginning to perform work under a waiver.
- Only supervisors and FFD Program personnel who have completed PVNGS Fatigue Assessor training may conduct a fatigue assessment.
- The requirements in Section 3.7.7 of this procedure.

2.13 Software Users

are responsible for:

- Applicable to general user roles and delegated roles.
- Keying of work hours to maintain schedule adherence and rule compliance into fatigue software prior to work hours being conducted and prior to time sheets closing.
- Knowledge of requirements for keying work hours for personnel within his/her department or assigned work group (s) to maintain fatigue rule compliance.
- Monitoring and evaluating personnel work hours for fatigue rule compliance within his/her department or assigned work group(s).
- Software training as deemed necessary by management or Fatigue Program Owner.
- Notification to leaders or noncompliance issues related to fatigue rule management.

2.14 Fatigue Administrators

are responsible for:

- Training as deemed necessary by management or Fatigue Program Owner.
- Knowledge of requirements for keying work hours for personnel to maintain fatigue rule compliance. This includes, but may not be limited to:
    - Creating schedule cycles and templates.
    - Assigning schedule cycles and templates.
    - Evaluating assigned schedules when transitioning to online/outage periods.
    - Editing time sheets, including closed time sheet periods.
    - Approving hours edited in closed time sheet periods.
    - Knowledge in generation of waivers in the software within 4 hours prior to deviation period of waiver.
- Reviewing fatigue software deviation reports frequently.
- Reviewing Lessons Learned and Operating Experience, as communicated by Fatigue Program members or posted to Fitness For Duty web site.
- Work hour keying corrections requested after work hour time sheet closings are completed.
- Notification to applicable work group members and Fatigue Program Owner when fatigue deviations are identified and when corrective action documents are generated.
- Participation in Fatigue Management Task Force Meetings, Fatigue Software Meetings and Industry benchmarking.
- Participation in testing, verifying or administering fatigue management applications and/or training as deemed necessary by management or Fatigue Program Owner.
- Recording/Tracking key performance indicator metric data for monthly reporting.

End of Section

3.0 PROCEDURE

NOTE

FFD Policy Statement can be found in 01DP-0EM10 and FFD Website: http://pvonline/ffd/Pages/default.aspx

3.1 Individuals Subject to Fatigue Management and Work Hour Controls

3.1.1 Individuals Subject to Fatigue Management

3.1.1.1 Fatigue management requirements apply to all employees, contractors and vendors who; (a) hold unescorted access to the Protected Areas of PVNGS, or (b) are required to physically report to the Technical Support Center (TSC) or Emergency Operating Facility (EOF) in accordance with the PVNGS Emergency Plan and Emergency Plan Implementing Procedures.

3.1.1.2 To ensure personnel are fit for duty, individuals and leaders can use the specific work hour control limits (while not required) as a reasonable basis for work scheduling of personnel that are not subject to work hour controls.

3.1.1.3 Those individuals who do not have unescorted access to the PA, or do not report to the TSC or EOF for the Emergency Plan are not subject to fatigue management.

3.1.1.4 Work hour controls apply only to PVNGS employees, contractors and vendors who perform or direct covered work.

3.1.1.5 All hours worked at PVNGS (with the exception of unscheduled work hours for the purpose of participating in unannounced E-Plan drills and declared emergencies as defined in the PVNGS Emergency Plan and shift turnover time as described in Section 3.3.2, Shift Turnover) must be counted toward the work hour limitations specified in 10 CFR Part 26, Subpart I, for covered employees. Refer to steps 3.1.1.6 and 3.1.2.1. This includes onsite and offsite training requirements.

3.1.1.6 Any individual who performs or directs covered work within any of the following job categories is a covered individual subject to work hour controls:

- Operating or on-site directing of the operation of systems and components that a risk-informed evaluation process has shown to be significant to public health and safety.
- Maintenance activities and on-site directing of Maintenance activities such as modification, surveillance, post-maintenance testing, and corrective and preventive maintenance of SSCs that a risk-informed evaluation process has shown to be significant to public health and safety. This includes maintenance as well as projects personnel.
- Performing Radiation Protection or Chemistry duties required as a member of the on-site emergency response organization minimum shift complement as defined in the PVNGS Emergency Plan.
- Performing the duties of a Fire Team Advisor, who is responsible for understanding the effects of fire and fire suppression on safe shutdown capability.
- Performing security duties as an armed security force officer, alarm station operator, response team leader, guard, on shift team leaders or on shift section leaders hereinafter referred to as Members of the Security Force (MSF).

3.1.1.7 Covered individuals which work activities on both risk-significant and non-risk-significant systems, structures and components (SSCs) contribute to personnel fatigue; therefore, all work hours are considered in the accumulated time related to work hour limitations.

3.1.2 Work Hour Controls for Non-Covered Individuals

NOTE

At times, a predictive maintenance activity requires starting or stopping a piece of equipment. The worker starting or stopping the equipment would be performing covered work under the operating category; however, the predictive maintenance activity may/may not be considered covered work. This determination is made by the fatigue task force as using Appendix E, Fatigue Management Covered vs. Non-Covered of this procedure.

3.1.2.1 Work hour controls do not apply to the following individuals and activities:

- Maintenance activities on systems, structure and components that are off-site.
- For information on medical evaluations or off site evaluations, please refer to the FFD web site Fatigue OE in the document library at http://pvonline/ffd/Pages/defualt.apsx
- Quality control and quality assurance activities.
- Predictive maintenance activities that do not result in a change of condition or state of a structure, system, or component (SSC) are excluded from covered maintenance activities such as, non-destructive examination (NDE), thermography, vibration analysis, data collection and analysis. Activities may include but are not limited to excavation, scaffolding, coating and insulation. Complete Appendix E - Covered vs. Non-Covered Work of this procedure and submit to the Fatigue Task Force by clicking submit at the bottom of the form.
- Fabrication of pieces or parts of systems, structures, or components (SSC) performed in shops or external facilities are not subject to the work hour controls specified by this procedure providing that:

    a.) The work instruction clearly separates fabrication activities from any installation or maintenance activities.

b.) Installation or maintenance activities include verification of the fabricated SSC performance/design characteristics by post maintenance testing, design validation testing, surveillance tests, receipt inspection or other methods that provide additional confidence that fabrication was acceptable.

- Contractor/vendors, who are not granted unescorted access (i.e, the individual is escorted), conducting work on a risk-significant system, structure, or component on-site.
- Emergency Response Personnel who are not part of the on-site minimum shift complement.

3.1.3 Directing

3.1.3.1 For the purposes of compliance with the FFD rule, directing only applies to operations and maintenance activities, however, is not limited to Operations and Maintenance departments (Example: Engineers conducting surveillance testing on covered equipment in the capacity of conducting or directing covered Operations or Maintenance work on risk significant SSCs).

3.1.3.2 Directing means the exercise of control over a work activity by an individual who is directly involved in the execution of the work activity and is ultimately responsible for the correct performance of that work activity.

3.1.3.3 Considerations should include all of the following when determining if an individual is directing an operation or maintenance activity. If the answer is "YES" to each of these questions, the individual is directing:

- Is the individual on-site?
- Is the individual the first line leader/foreman?
- Is the individual directly involved in the execution of the work activity?
- Is the individual making technical decisions for that activity without subsequent technical review?
- Is the individual ultimately responsible for the correct performance of that work activity? (For the purpose of this guide, ultimately refers to first level of leadership accountability for the performance of the task.)

3.1.3.4 The following tasks are examples generally considered NOT directing:

NOTE

Position alone should not be the deciding factor. For example a Shift Manager is a second level leader but, in practice and as defined in 10CFR Part 26, has the authority to direct covered activities. Careful analysis, evaluating all the criteria, should occur prior to determining applicability or exclusion.

- Engineering tasks with exception to surveillance testing on risk significant SSCs.
- Supervision in the plant of the maintenance on a non-covered SSC.
- Supervision at the second level supervision.
- Conducting Work Control Center documentation activities.
- Writing a work procedure.
- Preparing a work or modification package.
- Review by senior management of work plans.
- Training of personnel during which time the trainee is not operating or performing maintenance activities including risk significant SSCs.
- Providing recommendations from vendors and engineers on test performance, component and system operation, or other similar technical inputs.
- Review and approval of documents.
- Technical Staff providing only recommendation to control room staff.

3.2 Work Hours Scheduling

NOTE

If doubt exists as to the duration of a break period for an individual transitioning between schedules, transitioning onto a shift, transitioning between covered groups or into a covered group, or unplanned outages, the work group leader should revert to the conservative number of hours or days for a break.

3.2.1 Schedule Guidance

3.2.1.1 When establishing schedules the following should be applied consistent with the performance objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of successive shifts:

- Duration of scheduled work period (not to exceed 12 hours).
- Duration of break period.
- Consistent start times for work periods (e.g. 6 or 7 a.m.).
- Considerations of start times that are consistent with circadian factors.
- Consistent stop times for work periods.
- Consistent rotation (e.g., if working a 5-week shift rotation, the scheduled work days and days off are repeated every five weeks).
- Stable 24-hour shift rotation (e.g., 3 X 8's, 2 X 12's, 2 X 10's with four hours un-staffed).
- The impact of backward shift rotation (rotation of the start of the shift from days to night to swings).
- Rotating schedules provide suitable transition between shifts (days/nights, days/swings/nights), 8-hour shift rotations rotate forward or provide more than 24 hours between work periods to adjust circadian rhythm; 12-hour shift rotations provide 34 hours off during day/night transitions.
- Long range predictability is a key aspect of fatigue mitigation.
- Circadian factors - fixed vs. rotating shifts.
- Training requirements.
- Vacation scheduling.
- Impact of unscheduled overtime.

3.2.1.2 Staffing levels should be sufficient so that on average (over non-outage periods) schedules for the covered individuals can be maintained based on vacation and emergent training demand without relying on excessive work hours.

3.2.1.3 It is expected and allowed that normal variation in the vacation demand and training demand may occasionally require additional work hours to be used. This includes onsite and offsite training requirements.

3.2.1.4 Management is responsible for understanding the total vacation, onsite and offsite training, and work loads, and for maintaining sufficient staff to get the work done.

3.2.2 Transitioning Between Schedules

3.2.2.1 Individuals may change shift schedules during the outage shift cycle or the online averaging period.

3.2.2.2 Leaders should verify the average duration of the shifts worked and to be worked during a period of not more than six weeks that encompasses the schedule transition to determine the applicable online averaging work hour requirement.

3.2.2.3 If the average shift duration is not more than 9 hours, then the work hour requirements for 8-hour shift schedules would apply.

3.2.2.4 If the average shift duration is more than 9 hours but not more than 11 hours then the work hour requirements for a 10-hour shift would apply.

3.2.2.5 If the average shift duration is more than 11 hours then the work hour requirements for a 12-hour shift would apply.

3.2.3 Transitioning Onto a Shift

3.2.3.1 Individuals may be non-shift workers, but will occasionally be assigned shift duties. One example is non-shift SROs that will stand proficiency watches. Another situation where the individual joins the shift after the shift cycle has started. These individuals may not have been doing covered work prior to joining the shift.

3.2.3.2 If an individual begins or resumes performing any covered work during the outage calculation or online averaging period, the leader shall include in the calculation of the individual's work hours all work hours worked, including hours worked performing duties that are not covered work and control the individual's work hours in accordance with the following requirements:

- Except as permitted by waivers and exceptions, leaders shall ensure that any individual's work hours do not exceed the following limits;
- 16 work hours in any 24-hour period
- 26 work hours in any 48-hour period
- 72 work hours in any 7-day period

3.2.3.3 Except as permitted by waivers and exceptions, ensure that individuals have the applicable online averaging time off and the following breaks:

- A 10-hour break between successive work periods, or an 8-hour break between successive work periods when a break of less than 10 hours is necessary to accommodate a crew's scheduled transition between work schedules or shifts. As such, an 8-hour break between successive work periods should only be utilized in very rare cases and with documented management approval prior to occurrence. (Reference CRAI 3660441.)
- A continuous 34-hour break in any 9-calendar day period.

NOTE

To establish consistency, shift holdover times may be recorded at a minimum of 15 minute increments. This has been established and approved by Fatigue Rule Task Force for PVNGS Security Division and PVNGS Operations.

3.2.3.4 If an individual joins a shift after the start of an outage shift cycle or online averaging period, they shall meet the applicable work hour requirements going forward and for the shift from which they transitioned.

3.2.4 Transitioning Between Covered Groups or Into a Covered Group

3.2.4.1 If an individual begins or resumes performing covered work during the outage calculation or online averaging period, the leader shall include in the calculation of the individual's work hours all work hours worked, including hours worked performing duties that are not covered and control the individual's work hours under the requirements of their covered work group.

- Ceiling and Break limits always apply.
- A minimum of one day off in the preceding 7-day period is acceptable to begin or resume covered duties, working an 8-hour shift schedule, and are transitioning (1) from non-covered group to covered group or (2) from covered group to another covered group using more stringent work hour rules.
- A minimum of two days off in the preceding 7-day period is acceptable to begin or resume covered duties, working 10 or 12-hour shift schedule, and are transitioning (1) from non-covered group to covered group or (2) from covered group to another covered group using more stringent work hour rules.
- A minimum of two days off in the preceding 7-day period is acceptable for operators at a multiunit site with one or more units in an outage, if the operators have been working outage hours on 10 or 12-hour shifts before they transition to a operating unit as members of the minimum shift compliment.

3.2.4.2 In cases of off-site work, such as assisting another utility or on an assignment at INPO, it is permissible to "zero" out an individual's time in the fatigue management software and annotate it as a comment.

3.2.4.3 When the individual transitions to another covered group, they shall meet the applicable work hour requirements for the group from the time they enter the new group going forward.

3.2.5 Unplanned Outages

3.2.5.1 Unplanned outages can impact PVNGS' ability to demonstrate compliance with the normal operations online averaging requirements.

3.2.5.2 Online averaging restrictions are applicable during normal operations. During an outage, days off are required on a day basis and not on an average basis (e.g., 1 day off per week for maintenance workers and 3 or 4 days off every non-rolling 15 day period for the remainder of the covered individuals).

3.2.5.3 When entering an unplanned outage, PVNGS shall be considered to be in compliance with the rule if the schedule for the online averaging period would have provided for the required average work hours. See Section 3.3.6, “Control of Work Hours During an Outage” for additional information.

3.2.5.4 During the first 60 days of an unplanned security system outage or increased threat condition, the non-outage online averaging and outage day off and all additional work hour restrictions are not applicable.

3.2.6 Reset from Deviations

3.2.6.1 Deviations of the requirements from the rule sometimes occur as the result of administrative errors or unforeseen circumstances.

3.2.6.2 A person is considered "reset" from a deviation, whether under a waiver or otherwise, when the following occurs:

- they are less than the minimum hour requirements 16/24, 26/48, 72/7 days,
- have had at least 10 hours off since last at work,
- ensure that actions are in place to comply with the outage MDO requirements for their current shift cycle.
- ensure that actions are in place to comply with the 54-hour averaging limit by the end of the averaging period.

3.2.6.3 A Palo Verde Action Request (PVAR) shall be generated to document software overrides and deviations from the rule requirements to ensure reportability impacts and corrective actions are addressed.

End of Section

3.3 Managing Hours Worked

This section addresses what the expectations are relative to the work hour limits and what records are needed to document compliance.

Management and covered individuals should be equally responsible for properly managing work hours in fatigue software prior to the work being conducted.

3.3.1 Calculating Hours Worked

3.3.1.1 The concepts for this section are:

- Work hour limits and the associated calculation and tracking of work hours conducted, on behalf of the licensee (PVNGS), apply to the individuals who perform or direct covered work.
- PVNGS shall establish the accounting practices to be used in monitoring hours worked. In many cases this will parallel the established system for compensation. However the accounting practices may be different from record keeping for payroll purposes. Work periods should be rounded consistently.
- Work hour records should show the number of hours worked each calendar day. Work period start and stop times should be recorded and documented in a consistent manner within Fatigue Management Software.

3.3.1.2 PVNGS leaders shall calculate the work hours of covered individuals subject to this section as the amount of time the individuals perform duties.

3.3.1.3 The calculated work hours shall include all time performing duties, conducted on behalf of the licensee (PVNGS), including all within-shift break times and rest periods during which there are no reasonable opportunities or accommodations appropriate for restorative sleep.

3.3.1.4 Work hours are calculated as the amount of time an individual performs any duties, conducted on behalf of the licensee (PVNGS), including but not limited to the following:

- All within-shift break times and rest periods during which there is no reasonable opportunity or accommodations appropriate for restorative sleep (e.g., a nap);
- Shift holdovers to cover for late arrivals of incoming shift members;
- Early arrivals of individuals for required meetings, training, or pre-shift briefings for special evolutions (these activities are not considered shift turnover activities); and
- Holdovers for interviews needed for event investigations.

3.3.1.5 For the purposes of calculating the average number of hours worked, the duration of the shift cycle shall not exceed 6 weeks and may be of a shorter duration, at a minimum of 7 days.

3.3.1.6 To ensure an individual's work hour limits are not exceeded, the following guidance should be used:

- The periods of 24-hours, 48-hours, and 7-days are considered rolling time periods. Rolling means the period is not re-zeroed, or the clock reset following a day off or after obtaining authorization to exceed the limits. The 24-hours, 48-hours, and 7-days periods do not restart after a day off, the periods continue to roll.

- For purposes of calculation of scheduled time, 168 hours is substituted for the 7 day requirement. It may be possible to exceed 72 hours in 168 hours and remain within the regulatory limit of 72 hours in 7 days. Such instances, will be evaluated on a case basis.

    - If the 168 hours is substituted for the 7 day requirement, then a software override shall be completed and a manual verification performed by fatigue administrator and a PVAR generated for documentation. (Reference PVAR 3543760 for additional information.)

- Hours worked should be evaluated to determine if any limit will be exceeded based on the work schedule by picking a future time (T) on the work schedule and asking, "how many hours will have been worked during the T-24 hours, T-48 hours, or T-168 hours (T-7days)" (i.e., a backwards look at the number of hours that have or will have been worked based on a time in the future.)

- If a work hour limit will be exceeded, it shall be identified before the hours are worked. To determine if the average hours worked requirements will be met (before working the additional hours.)

- The period is not re-zeroed, or the "clock reset" following a day off or after obtaining authorization to exceed the limits.

3.3.1.7 If an individual who normally works a 12-hour shift schedule Monday through Thursday is requested to work additional hours from 0700 to 1900 on Friday, the following should be considered prior to working the additional hours:

- To determine if more than 16 hours in any 24-hour period will be exceeded, review all hours worked during the 24-hour period prior to the stop time on Friday as reflected in the request to work additional hours.
- To determine if more than 26 hours in any 48-hour period will be exceeded, review all hours worked during the 48-hour period prior to the stop time on Friday as reflected in the request to work additional hours.
- To determine if more than 72 hours in any 7-day period will be exceeded, review all hours worked during the 7-day period prior to the stop time on Friday (i.e., T-168 hours) as reflected in the request to work additional hours.
- To determine if a 10-hour break has been taken, review the break period(s) between the last day of work before Friday and 0700 on Friday.
- To determine if a break of at least 34 consecutive hours has been taken, review the break period(s) during the last 9 days prior to the stop time on Friday.
- Determine if the online averaging for current shift cycle is impacted, depending on average shift length and work group.

3.3.1.8 Within-Shift Breaks and Rest Periods:

- Only that portion of a break or rest period during which there is a reasonable opportunity and accommodation for restorative sleep (e.g., a nap of at least 30 minutes) may be excluded.
- Time spent at lunch, although non-productive work may not be excluded from the work hour calculations.
- Any other break time allowed during the scheduled work day that does not allow opportunity or accommodations for restorative sleep (e.g., a nap) is included in the work hour calculation.

3.3.1.9 Paid Time Not Included in the Work Hour Calculations:

- Pay for hours not worked - Only actual hours worked are included in the work hour calculations. Examples of paid hours not worked are:
    - Personal Time Off (PTO) - this is time away from work and is not included in the work hour calculation.
    - Short Term/Long Term Disability (STD/LTD) - this is time away from work and is not included in the work hour calculation.
    - Leave of Absence - this is time away from work and is not included in the work hour calculation.
    - Holiday pay - this may be either time away from work or at work. If the time is at work, then only the actual hours worked are included in the work hour calculation.
    - Jury Duty - this is time away from work, and it is not included in the work hour calculation.
- Declared Plant Emergencies as defined in the PVNGS Emergency Plan.
- Unannounced emergency preparedness exercises and drills may be excluded from the calculation of an individual's work hours the time the individual works unscheduled work hours, above the normal scheduled work hours, for the purpose of participating in the actual conduct of an unannounced emergency preparedness exercise or drill. If an individual is on a day off, it is still considered a day off.

3.3.1.10 Call-in work period:

- A call-in is considered an addition to the normal work schedule.
- The applicable work hour restrictions shall be maintained such as maximum work hours and minimum breaks inclusive of the call in period.

3.3.1.11 The work hours can be accounted for using three different methods depending on timing and circumstances of the call-in period.

- The call-in hours can be considered a separate work period. Using this method, only the hours worked for PVNGS will be counted. The method requires a 10-hour break before the call-in period and after the call-in period.
- The call-in hours can be considered an extension to the preceding or succeeding work period. Using this method, the intervening hours of the extended work period must be counted.
- A waiver can be processed when not meeting the required 10-hour break between successive work periods if justified in accordance with Section 3.6, Waivers.

3.3.2 Shift Turnover

3.3.2.1 Leaders may exclude either oncoming or off going shift turnover, but not both, from the calculation of an individual's break times between successive work periods.

3.3.2.2 Shift turnover includes only those activities that are necessary to safely transfer information and responsibilities between two or more individuals between shifts.

3.3.2.3 Shift turnover activities may include, but are not limited to, discussions of the status of plant equipment, and the status of ongoing activities, such as extended tests of safety systems and components.

3.3.2.4 Turnovers for leaders may be more extensive than for workers and therefore may be longer.

3.3.2.5 Turnovers scheduled for 30 minutes may sometimes be completed in 20 minutes. It is not necessary to adjust schedules to reflect actual relief time as long as it is completed in the window.

3.3.2.6 Activities that may not be excluded from work hours calculations also include, but are not limited to:

- shift holdovers to cover for late arrivals of incoming shift members.
- early arrivals of individuals for meetings.
- early arrivals of individuals who begin work on behalf of the licensee. (Example: Answering email)
- just-in time training, or pre-shift briefings for special evolutions.
- and holdovers for interviews needed for event investigations.

3.3.3 Incidental Duties Performed Off-Site

3.3.3.1 Leaders may exclude from the calculation of an individual's work hours unscheduled work performed off-site (e.g., technical assistance provided by telephone from an individual's home) provided the total duration of the work, which is required by the leader, does not exceed a nominal 30 minutes during any single break period.

3.3.3.2 For the purposes of compliance with the minimum break requirements and the online averaging requirements, such duties do not constitute work periods or work shifts.

3.3.3.3 After hours study time not required by the licensee may be excluded from work hour controls.

3.3.3.4 When considering work hour extensions for individuals performing covered work, all hours worked by the individual shall be included.

Example 1 - If an individual has performed 15 hours of non-covered work, and the individual is needed to perform additional covered work that extends beyond 16 hours in a 24 hour period, then a waiver to exceed the work hour limits shall be approved prior to the individual exceeding the 16 hour limit. On the other hand, if the individual has performed 14 hours of covered work, and is needed to perform additional non-covered work, then the programmatic approvals of this document do not apply. However, the additional work hours are included in consideration of any other limits if the individual subsequently performs covered work.

3.3.4 Work Hour Controls During Normal Operations

3.3.4.1 During normal operations, leaders shall control the work hours of covered individuals as follows:

- 16 work hours in any 24-hour period.
- 26 work hours in any 48-hour period.
- 72 work hours in any 7-day period.

3.3.4.2 Leaders shall ensure that individuals have, at a minimum, the rest breaks specified below. A break is defined as an interval of time that falls between successive work periods, during which the individual does not perform any duties for PVNGS other than one period of shift turnover at either the beginning or end of a shift but not both. Except as permitted by waivers and exceptions, leaders shall ensure that individuals have, at a minimum:

- A 10-hour break between successive work periods, or an 8-hour break between successive work periods when a break of less than 10 hours is necessary to accommodate a crew's scheduled transition between work schedules or shifts. As such, an 8-hour break between successive work periods should only be utilized in very rare cases and with documented management approval prior to occurrence. (Reference CRAI 3660441 for additional information.)
- A 34-hour break in any 9-calendar day period.

3.3.4.3 Rolling Period

- The averaging period starts "rolling" after a work history for a covered worker has been established equal to the length of the averaging period.
- Security weekly averaging period is Sunday 00:00 through Saturday 00:00 hours.
- All other work groups weekly averaging period is Monday 00:00 through Sunday 00:00 hours.
- All work hours are attributed to the day the shift begins.

3.3.4.4 Calculating the Average

- While the calculation of the average work hours worked occurs at the end of the averaging period, there is a need to be continually calculating the average looking forward to identify potential exeedances of the limit so that work hours can be adjusted or, as appropriate, waivers can be prepared in advance of exceeding the limit.
- (6 week period) One simple method is to add up the work hours from the previous five weeks and subtract from 324 giving the worker the maximum amount of hours that can be worked the upcoming week.
- (5 week period) One simple method is to add up the work hours from the previous four weeks and subtract from 270 giving the worker the maximum amount of hours that can be worked the upcoming week.

3.3.4.5 Beginning a Rolling Averaging Period

- In the case of a worker who has not been performing on-line covered work and will be transitioning to on-line covered work, there are two options for setting up the schedule to start the averaging period:
  - The schedule established for the worker for the initial averaging period (e.g. initial 6 weeks) can be set up as a fixed period which averages 54 hours or less. The first week after this (e.g. 7th week worked) is the start of the rolling schedule.
  - The number of weeks in the averaging period for the worker is equal to the averaging period are calculated to establish the history needed to begin rolling.

3.3.4.6 Partial Averaging Periods

- Partial averaging periods occur when a worker will not be working a full averaging period.
- If less than a full week, then only Ceiling Limits (16/24, 26/48, 72/7) and Break Limits (10 hour break, 34/9) apply.
- If greater than one full week but less than a full averaging period, then the worker must limit the average work hours to 54-hours per week or less averaged over the partial averaging period.

3.3.5 Workers Eligible to Work Outage Hours

3.3.5.1 10 CFR 26 Subpart I defines outages as the reactor unit is disconnected from the electrical grid. Also, 10 CFR 26 Subpart I uses the term “working on outage activities.” However, 10 CFR 26 Subpart I does not define the term “working on outage activities.” Therefore, this section provides a description for outage activities.

3.3.5.2 10 CFR 26 Subpart I has different requirements during outage periods than during normal (online) operations.

3.3.5.3 The differing requirements acknowledge the unique and temporary nature of outage activities while requiring hour limitations and work day breaks.

3.3.5.4 Workers that are eligible to work outage hours shall meet the following criteria:

- covered workers at multiple unit sites with one unit in an outage that are working on outage activities are eligible.
- covered workers at a multiple unit site that work on both outage activities and operating unit activities are eligible.
- covered workers, due to Emergency Response Organization, Fire Team Advisor, or Security duties, at a multi unit sites with a unit in an outage are eligible.

3.3.5.5 Minimum shift complement for licensed operators (SRO/RO) in the on-line unit are not eligible for outage work hour controls.

3.3.5.6 Eligibility should be established on an individual or defined group basis.

3.3.5.7 Eligibility (criteria of Step 3.3.5.4) should be evaluated each 15 days for each individual or defined group during the outage and documented in the Corrective Action Program (CAP). See Section 2.5, PVNGS Section Leaders / Team Leaders / Operations Shift Managers.

- Workgroup generates a PVAR for potential 10 CFR Part 26, Subpart I violations reported in software and provide notification to workgroup fatigue administrator. Refer to Section 3.13, Reporting Software Deviation Guidance for more information on reporting fatigue deviations.

3.3.5.8 Return to on-line work hour limitations starts a new online averaging rolling period.

3.3.5.9 Covered Workers that may be affected by outage work hour limitations:

Example 1 – A maintenance or operations worker at a multi-unit site that has responsibilities for outage activities. Members of the operating unit(s) minimum shift compliment of licensed operators (SRO/RO) are not eligible for outage work hour limitations. Those operators may perform duties in the outage unit, however they are limited by non-outage work hour controls.

Example 2 – A licensed operator (SRO/RO) at a multi-unit site with responsibilities for activities on the operating unit(s), outage unit, and common systems, who is not a member of the minimum shift complement for an operating unit(s) is eligible for outage work-hour limitations.

Example 3 – A licensed operator at a multi-unit site who is performing activities on the outage unit and is following outage work-hour requirements who is assigned to activities on an operating unit, except if the operator is to be a member of the minimum licensed operator shift complement for an operating unit.

The operator who is on outage work-hour limitations should not provide relief to the licensed operator at the controls or the senior operator in the control room for an operating unit, unless another licensed operator who has been on non-outage work hours is not immediately available and the operator has had 2 days off in the preceding 7-day period.

If the operator who has been working outage work hours and has had 2 days off in the preceding 7-day period and no other operator who has had 2 days off is immediately available, an operator who has been working outage hours may provide short-term relief (up to 2 hours) to the operator at the controls or the senior operator in the control room without a waiver or long term relief (more than 2 hours) under a waiver of the MDO requirement that is applicable to the shift schedule (i.e. 8, 10, or 12-hour shifts) for personnel assigned to the operating unit.

3.3.6 Control of Work Hours During an Outage

3.3.6.1 During an outage, leaders shall control the work hours of covered individuals who are considered outage workers as follows:

a. Except as permitted by waivers and exceptions, leaders shall ensure that any individual's work hours do not exceed the following limits:

b. 16 work hours in any 24-hour period.

c. 26 work hours in any 48-hour period.

d. 72 work hours in any 7-day period.

e. Leaders shall ensure that individuals have, at a minimum, the rest breaks specified below. A break is defined as an interval of time that falls between successive work periods, during which the individual does not perform any duties for PVNGS other than one period of shift turnover at either the beginning or end of a shift but not both. Except as permitted by waivers and exceptions, leaders shall ensure that individuals have, at a minimum,

- A 10-hour break between successive work periods, or an 8-hour break between successive work periods when a break of less than 10 hours is necessary to accommodate a crew's scheduled transition between work schedules or shifts. As such, an 8-hour break between successive work periods should only be utilized in very rare cases and with documented management approval prior to occurrence. (Reference CRAI 3660441.)
- A 34 hour break in any 9-calendar day period.
- Outage Minimum Day Off (MDO) requirements apply along with a non-rolling 15-day cycle period. Outage rule duration not to exceed 60 days from outage start date. (See Table 1.)

Table 1: Covered Worker Outage Minimum Days Off Table

Covered Worker	***8 hour shift Days off**	***10 hour shift Days off**	***12 hour shift Days off**
Maintenance	1 day off per week	1 day off per week	1 day off per week
Operations, RP, Chemistry, Fire Team Advisor	3 days off in each successive (i.e., non-rolling) 15 day period	3 days off in each successive (i.e., non-rolling) 15 day period	3 days off in each successive (i.e., non-rolling) 15 day period
Security	4 days off in each successive (i.e., non-rolling) 15 day period	4 days off in each successive (i.e., non-rolling) 15 day period	4 days off in each successive (i.e., non-rolling) 15 day period

*Leaders have the option of leaving workers on normal work hour restrictions during outage periods.

3.3.6.2 During the first 60 days of a unit outage leaders shall ensure that individuals have, at a minimum, the number of days off specified above table. For the purposes of breaks, a day off is defined as a calendar day in which an individual does not start a work shift.

3.3.6.3 The 60-day periods may be extended for each individual in 7-day increments for each non-overlapping 7-day period in which the individual has worked not more than 48 hours during the unit or security system outage or increased threat condition, as applicable.

3.3.6.4 During the first 60 days of an unplanned security system outage or increased threat condition, the online maximum average work hours or the outage minimum days off restrictions are not applicable. The 60 day period is defined by the start of the outage date, not the employee's starting work date.

End of Section

3.4 Personnel Actions

3.4.1 Personnel Action Requirements

3.4.1.1 Individuals that exhibit chronic self-declaration that they are not fit for duty as a result of fatigue should be considered for referral to the Employee Assistance Program or Substance Abuse Expert.

3.4.1.2 Individuals that exhibit chronic self-declaration that they are not fit for duty as a result of fatigue may be subject to disciplinary action.

3.4.1.3 Facts to be considered in assessing disciplinary action shall include the employee's job assignment and past work record.

3.4.1.4 Personnel are required to be fit for duty and getting sufficient rest is required to ensure a person is not subject to fatigue.

3.4.1.5 Persons who make choices that result in less than the sleep necessary for that person to remain alert and avoid fatigue are not meeting their obligation per this rule.

3.4.1.6 The refusal on the part of an individual to submit to a fatigue assessment shall subject the individual to disciplinary action and possible removal from unescorted access.

3.4.1.7 Personnel subject to the fatigue assessments who refuse to be assessed will be considered fatigued and unable to perform their duties.

3.4.1.8 Time away from work for fatigue management recovery shall be classified as paid time off (if available), or non-paid time or subject to any other benefit program.

3.4.1.9 All pay practices shall comply with the Fair Labor Standards Act (FLSA).

End of Section

3.5 Exceptions

NOTE

NRC clarification states that an additional allowance for tactical exercise support of one day prior to actual evaluation period and one day after actual evaluation period may be exempted (i.e., normally NRC Evaluated Exercises are conducted Tuesday through Thursday, meaning the exception would apply Monday through Friday and would not include Saturday or Sunday).

3.5.1 PVNGS may use the following exceptions to work hour controls:

3.5.1.1 Force-on-force tactical exercises

For the purposes of compliance with the online averaging requirements, PVNGS may exclude shifts worked by security personnel during the actual conduct of force-on-force tactical exercises evaluated by the NRC when calculating the individual's hours worked.

3.5.1.2 Common defense and security

PVNGS need not meet the work hour requirements when informed in writing by the NRC that these requirements, or any subset thereof, are waived for security personnel in order to assure the common defense and security, for the duration of the period defined by the NRC.

3.5.1.3 Plant emergencies & unannounced E-Plan drills

PVNGS need not meet work hour scheduling and work hour control requirements during the following:

- Unannounced E-Plan exercises or drills.
- Declared emergencies, as defined in the PVNGS Emergency Plan.

3.5.1.4 Medical evaluations or off site evaluations

Information on medical evaluations or off site evaluations, refer to the FFD web site Fatigue OE in the document library at http://pvonline/ffd/Pages/default.aspx.

End of Section

3.6 Waivers

3.6.1 Granting Waivers

NOTE

If the fatigue management software is inoperable, then a waiver assessment is generated electronically using the Fatigue Assessment Tool on the FFD website.

NOTE

Each requesting supervisor is responsible for ensuring a waiver to exceed working hour limits is authorized prior to allowing an individual to exceed these limits.

3.6.1.1 PVNGS Vice-President, General Manager, Plant Manager, Operations Shift Manager, or the Security Operations Section Leader may grant a waiver of the work hour controls.

3.6.1.2 In order to grant a waiver, PVNGS shall meet the following requirements:

- An operations shift manager determines that the waiver is necessary to mitigate or prevent a condition adverse to safety, or a Security Operations Section Leader determines that the waiver is necessary to maintain site security, or a site senior-level manager with requisite signature authority makes either determination. Reference Definitions 4.2 “Adverse to Safety” and 4.3 “Adverse to Security”.

- A leader conducts face-to-face fatigue assessment and determines that there is reasonable assurance that the individual will be able to safely and competently perform his or her duties during the additional work period for which the waiver will be granted. The leader performing the assessment shall be trained in accordance with the requirements of 10 CFR 26.29 and 26.203(c) and shall be qualified to oversee the work to be performed by the individual.

- If there is no leader on site who is qualified to direct the work, the assessment may be performed by a leader who is qualified to provide oversight of the work to be performed by the individual. The leader can be a second level leader or a department leader in the chain of command.

- At a minimum, the assessment must address the potential for acute and cumulative fatigue considering the individual's work history for at least the past 14 days, the potential for circadian degradations in alertness and performance considering the time of day for which the waiver will be granted, the potential for fatigue-related degradations in alertness and performance to affect risk-significant functions, and whether any controls and conditions must be established under which the individual will be permitted to perform work

3.6.1.3 To the extent practicable, PVNGS shall rely upon the granting of waivers only to address circumstances that could not have been reasonably controlled.

3.6.1.4 Leaders shall ensure that the timing of the required face-to-face leader assessment supports a valid assessment of the potential for worker fatigue during the time the individual will be performing work under the waiver.

3.6.1.5 Leaders may not perform the face-to-face assessment more than (4) four hours before the individual begins performing any work under the waiver.

3.6.1.6 Leaders shall document the basis for individual waivers.

3.6.1.7 The documented basis for a waiver must include a description of the circumstances that necessitate the waiver, a statement of the scope of work and time period for which the waiver is approved, and the basis for the required determinations.

3.6.2 Wavier Requirements

NOTE

Waivers are initiated within 4 hours of the deviation period starting by using the Fatigue Management Software waiver process (EMP CTR). In employee fatigue timesheet a create waiver link is located in the Exceptions tab.

NOTE

If the fatigue management software is inoperable, then a waiver assessment is generated electronically using the Fatigue Assessment Tool on the FFD website.

3.6.2.1 Waivers are only applicable to covered workers.

3.6.2.2 Waivers are granted by a PVNGS Vice-President, General Manager, Plant Manager, Operations Shift Manager, or the Security Operations Section Leader.

NOTE

Each requesting supervisor is responsible for ensuring a waiver to exceed working hour limits is authorized prior to allowing an individual to exceed these limits.

3.6.2.3 The process for granting waivers includes the following:

- Identification by the job leader that a waiver is needed.
- Name of the individual for which a waiver is to be requested.
- Date and time the request is initiated.
- Limits for which a waiver is required.
- Date and time waiver would start.
- Duration of the waiver requested. For example, how many hours beyond 16.
- Description of the work to be performed. This should be in adequate detail to support the leader's (Operations or Security Operations Section Leader) fatigue assessment.
- Circumstances that caused the job extension.
- Identify that the waiver is required to address conditions that are adverse to security or safety.
- Review by the Operations Shift Manager or Security Operations Section Leader for applicability.
- Senior level management approval shall be submitted to the PV Fatigue@apsc.com and will be added to waiver for retention by fatigue management task force.
- Create a waiver using the fatigue management software links provided in the exception tab of individuals timesheet. If the fatigue management software is inoperable, refer to Section Section 3.13, Reporting Software Deviation Guidance.
- Leader's fatigue assessment in the waiver shall be completed within 4 hours before start of waiver period.
- Work history: Review the auto populated 14 day work history to ensure accuracy in work hour keying.
- Close Out: Document the waiver approver per Section 3.6.2.2 of Waiver Requirements.

3.7 Fatigue Assessments

NOTE

If Fatigue Assessment Tool on the FFD website is unavailable, then the Program Owner needs to be contacted for further recommendation.

- All For Cause, Post Event, Self Declaration and Follow Up fatigue assessments will be generated electronically using the Fatigue Assessment Tool on the FFD website. Upon clicking the SAVE button, an electronic copy is automatically routed to the Substance Abuse Expert and a Fatigue Administrator for review and retention.
- All waiver assessments shall be conducted in accordance with Section 3.6, Waivers.

NOTE

Fatigue assessments are to performed by individuals who are trained and qualified. Fatigue assessments should be handled as confidential in accordance with procedure 84DP-0RM32, Handling of Proprietary, Confidential and Highly Confidential Information.

- Fatigue assessments are documented in the Corrective Action Program by Fatigue Task Force members, excluding confidential information, which is kept on file with the Fitness For Duty Department.

3.7.1 For Cause Assessments:

a. In addition to any other type of determination of fitness which may be required, a fatigue assessment shall be conducted in response to an observed condition of impaired individual alertness creating reasonable suspicion that an individual is not fit to safely and competently perform their duties for any part of a work shift because of fatigue.

b. In the case of a For Cause fatigue assessment, the individual who observed the impaired alertness may not conduct the fatigue assessment. The fatigue assessment must be performed face-to-face with the individual whose alertness may be impaired.

c. Drug and alcohol results must be negative, a face-to-face determination of fitness, and a fatigue assessment must be satisfactorily completed before the individual may be authorized to return to performing any duties that require them to have UAA/UA.

d. Complete Appendix B - Fatigue Assessment Exemption form if there is a reason to believe that the observed condition is not due to fatigue, and therefore a fatigue assessment is not required.

e. If an individual is returned to duty following a break of less than 10 hours in duration, the individual shall be reassessed for fatigue. Refer to Section 3.7.5, Follow-Up Assessments.

3.7.2 Self-Declaration Assessments:

a. A fatigue assessment shall be conducted in response to an individual's self-declaration to his or her supervisor that he or she is not fit to safely and competently perform his or her duties for any part of a working shift because of fatigue, except if, following the self-declaration, PVNGS management permits or requires the individual to take a break of at least 10 hours before the individual returns to duty.

b. Individuals making a self-declaration of fatigue shall be removed, as soon as practicable, from duty and required to complete an Appendix A, Fatigue Assessment Tool.

c. If an individual is returned to duty following a break of less than 10 hours in duration, the individual shall be reassessed for fatigue. Refer to Section 3.7.5, Fatigue Assessments Follow Up.

3.7.3 Self-Declarations Requirements:

3.7.3.1 It is the responsibility of each individual to communicate a clear self-declaration of fatigue to their leader. Any individual who holds unescorted access can self-declare.

3.7.3.2 A Self-Declaration may be verbally initiated, when necessary, by using the following statement:

3.7.3.3 "By the requirements of 10 CFR Part 26, I believe I am too fatigued to perform the duties assigned to me and would like to make a self-declaration of fatigue."

3.7.3.4 A casual statement to a leader or co-worker that an individual is fatigued, is not a self-declaration.

3.7.3.5 The process shall leave no confusion that a declaration was made and when it was made.

3.7.3.6 A fatigue assessment is not needed if the leader agrees with the individual and provides a rest break if at least 10-hours.

3.7.3.7 Once an individual has made a verbal self-declaration, the individual shall be removed from duty as soon as practical.

3.7.3.8 Self-declarations of fatigue should be encouraged to facilitate a healthy Safety Conscious Work Environment. Although self-declarations may ultimately result in personnel action(s) or being sent home for a break, it is better to remove an individual from duty than sacrifice personnel safety due to the potential for a fatigue-related incident.

3.7.3.9 Individuals are required to be fit-for-duty. Getting sufficient rest is required to ensure an individual is not subject to fatigue.

3.7.3.10 Individuals who make choices that result in less than adequate sleep to remain alert and avoid fatigue are not meeting their obligations under the Fitness-For-Duty Program.

3.7.3.11 If an individual is performing or being assessed for work under a waiver and makes a self-declaration of fatigue, the leader shall, as soon as practicable, stop the individual from performing any covered work.

a. A self-declaration fatigue assessment shall be performed as soon as possible.

b. The individual may continue performing covered work if required under other regulations (e.g., meet minimum licensed operator staffing).

c. If the individual must continue performing the covered work until relieved, then leader shall take immediate action to relieve the individual.

3.7.3.12 Following the self-declaration or relief from performing the covered work, as applicable, the leader:

- May reassign the individual to duties other than covered work, but only if the results of a fatigue assessment indicate the individual is fit to safely and competently perform those other duties.

- May permit or require the individual to take a break of at least 10 hours before the individual returns to performing any covered work.

3.7.4 Post Event Assessments

NOTE

In the case of a Post Event fatigue assessment, fatigue assessment shall be completed anytime a Post Event drug and alcohol test is collected. If no drug and alcohol test is collected, then no fatigue assessment shall be necessary.

a. A fatigue assessment shall be performed in response to events requiring post-event drug and alcohol testing.

b. Necessary medical treatment shall not be delayed in order to conduct a fatigue assessment.

c. In the case of a post event fatigue assessment, the individual who conducts the fatigue assessment shall not have;

- Performed or directed (on-site) the work activities during which the event occurred.
- Performed, within 24 hours before the event occurred, a fatigue assessment of the individuals who were performing or directing (on-site) the work activities during which the event occurred; and
- Evaluated or approved a waiver for any of the individuals who were performing or directing (on-site) the work activities during which the event occurred, if the event occurred while such individuals were performing work under a waiver.

3.7.5 Follow-Up Assessments:

a. If a fatigue assessment was performed for cause or in response to a self declaration, AND the individual is returned to duty following a break of less than 10 hours in duration, the individual shall be reassessed for fatigue as well as the need to implement controls and conditions before permitting the individual to resume performing any duties.

3.7.6 Substance Abuse Expert (SAE)

3.7.6.1 Substance Abuse Expert training and credential criteria is outlined in procedure 01DP-0EM10, Fitness For Duty Program.

3.7.6.2 The SAE shall evaluate individuals who have violated the substance abuse provisions of the FFD policy and make recommendations concerning education, treatment, return to duty, follow-up drug and alcohol testing, and aftercare.

a. The SAE is not an advocate for the licensee or other entity, or the individual.

3.7.6.3 The SAE's function is to protect public health and safety and the common defense and security by professionally evaluating the individual and recommending appropriate education/treatment, follow-up tests, and aftercare.

3.7.6.4 The SAE is authorized to make determinations of fitness in at least the following three circumstances:

- When potentially disqualifying FFD information has been identified regarding an individual who has applied for access authorization.
- When an individual has violated the substance abuse provisions of the FFD policy.
- When an individual may be impaired by alcohol, prescription or over-the-counter medications, or illegal drugs.

3.7.6.5 After determining the best recommendation for assisting the individual, the SAE shall serve as a referral source to assist the individual's entry into an education and/or treatment program.

3.7.6.6 To prevent the appearance of a conflict of interest, the SAE may not refer an individual requiring assistance to his or her private practice or to a person or organization from whom the SAE receives payment or in which the SAE has financial interest. The SAE is precluded from making referrals to entities with whom the SAE is financially associated.

3.7.6.7 There are four exceptions to the prohibitions mentioned above. The SAE may refer an individual to any of the following providers for assistance, regardless of his or her relationship with them:

- A public agency (e.g., treatment facility) operated by a state, county or municipality.
- A person or organization under contract to the licensee or other entity to provide alcohol or drug treatment and/or education services.
- The sole source of therapeutically appropriate treatment under the individual's health insurance program.
- The sole source of therapeutically appropriate treatment reasonably available to the individual.

3.7.7 Qualified Fatigue Assessors

NOTE

Substance Abuse Expert Certification meets the training qualification for Fatigue Assessor, as the SAE has adequate knowledge and training to recognize fatigue. The SAE shall be familiar with the fatigue assessment software for conducting fatigue assessments electronically and must review this software before completing the assessment. If the SAE identifies changes in the software, then the SAE should contact a qualified assessor for a software briefing.

3.7.7.1 Only SWMS qualified fatigue assessors shall conduct face-to-face assessments. A SWMS qualified assessor shall have successfully completed and maintains current of the following required training:

- Classroom course LDX10,
- JQC - LDX15-XX-001 and
- ELM CBT LDX15.

3.7.7.2 Individuals being assessed shall provide complete and accurate information that may be required to address the required factors.

3.7.7.3 The fatigue assessor shall limit inquiries of the individual to information necessary to assess the required factors and review the individual's performance, if applicable.

3.7.7.4 Fatigue assessments shall not conclude an individual is fit-for-duty solely based on the fact that the individual's work hours have not exceeded any of the work hour limits or that the individual has had the minimum breaks or minimum days off, as applicable.

3.7.7.5 The qualified fatigue assessor may deem necessary to override the automated conditions of the assessment results by clicking the assessor override box shown in Appendix A, Section VI. Status Decision of Override and by clicking the appropriate assessor decision, and finally the assessor shall document the circumstances and conditions implemented in the comment box provided in Section VI. Status of Override.

3.7.7.6 Following a fatigue assessment, the leader shall determine and implement the controls and conditions, if any, which are necessary to permit the individual to resume the performance of their duties for PVNGS, including the need for a break.

3.7.7.7 Individuals sent home in lieu of or as a result of a fatigue assessment should be evaluated to determine if alternate transportation is appropriate. Personnel safety should be considered in any decision to send someone home due to fatigue.

3.7.7.8 Qualified Fatigue Assessors shall document the circumstances that necessitated the fatigue assessment and any controls and conditions that were implemented.

3.7.8 Assessment Process

3.7.8.1 A fatigue assessment evaluates an individual's ability to perform any assigned duties within the scope of the fitness-for-duty program.

3.7.8.2 It applies to all individuals with unescorted access.

3.7.8.3 When a contract/vendor employee is subjected to fatigue assessment, APS/PVNGS management/supervision shall notify contract/vendor company leadership.

3.7.8.4 The process for conducting a fatigue assessment includes the following steps:

3.7.8.5 Identification of condition requiring a fatigue assessment:

- Name of the individual.
- Date and time.
- Type of evaluation: For-Cause, Self-declaration, Post-event, Follow-up.
- Narrative supporting the type of evaluation.
- For Cause - description of observed behavior.
- Self-declaration - description of current job duties, time in a duty status, and scheduled end of tour.
- Post-event - describe the event and the individual's involvement.
- Follow-up - length of rest period, reason for early return, and expected duties.
- Name, date, time, signature of individual completing this section.
- Fatigue assessments are documented in the Corrective Action Program (CAP) by Fatigue Task Force members, excluding confidential information, which is kept on file with the Fitness-For-Duty Department.

3.7.8.6 All For Cause, Post Event, Self Declaration and Follow Up fatigue assessments will be generated electronically using the Fatigue Assessment Tool on the FFD website.

3.7.9 Conflict Resolution

NOTE

If the individual was determined to be fit-for-duty and disagrees with this finding, the individual's leader needs to consider the impact of the individual working under distress. The individual's leader should contact his/her management to discuss options and trending.

3.7.9.1 All applicable individuals have the right to self-declare. Self-declaration of fatigue should be encouraged and respected.

3.7.9.2 If an individual disagrees with the results of a fatigue assessment, then the individual may request a second assessment by another trained, qualified and independent assessor.

3.7.9.3 The individual may also pursue other management and oversight paths for resolution.

End of Section

3.8 Training and Examination

3.8.1 Training

3.8.1.1 Employees and contractors of PVNGS should be made aware of the trustworthiness and reliability requirements for unescorted access to the protected area, the importance of being fit for duty, understand the potential consequences of working while fatigued, and work in compliance with the station FFD policy.

3.8.1.2 The level of training shall meet the requirements of 10 CFR 26 Subpart I.

3.8.2 Examination

3.8.2.1 Workers should be able to:

- Demonstrate knowledge of the basic fatigue management requirements for workers.
- Recognize the personal, public health, and safety hazards associated with fatigue.
- Discuss the company fitness-for-duty program.
- Discuss individual roles and responsibilities under the company fitness-for-duty program.
- Demonstrate knowledge of the contributors to worker fatigue, circadian variations in alertness and performance, indications and risk factors for common sleep disorders, shift work strategies for obtaining adequate rest, and the effective use of fatigue counter measures.
- Demonstrate understanding of identifying symptoms of worker fatigue and contributors to decreased alertness in the workplace.
- Demonstrate understanding of fatigue management techniques.
- Discuss the methods used to implement the company fitness-for-duty program.
- Discuss the consequences of not following the company fitness-for-duty program.
- Discuss individual and company rights regarding the company fitness-for-duty program.

End of Section

3.9 Reviews

3.9.1 Review Requirements

3.9.1.1 The appropriate senior management/designee identified in Step 2.1 shall evaluate the effectiveness of the control of work hours of individuals who are subject to this program.

3.9.1.2 If any plant or security system outages or increased threat conditions occurred since the most recent review, PVNGS shall include in the subsequent review an evaluation of the control of work hours during the outages or increased threat conditions.

3.9.1.3 The Nuclear Security Division Programs Department Leader/designee shall ensure a review is performed at least once per year, such that the entire year is reviewed, to evaluate the effectiveness of the control of work hours.

3.9.1.4 The Nuclear Security Division Programs Department Leader/designee shall ensure the review is completed within 30 days of the end of the review period.

3.9.1.5 The PVNGS review period is from January 01 to December 31 of each calendar year; with the report to be completed no later than January 30th of the following year.

3.9.1.6 Review the actual work hours and worker performance of covered individuals for consistency with the work hours scheduling requirement objective of preventing impairment from fatigue due to duration, frequency, and sequencing of hours worked.

3.9.1.7 The review should be based on information in, but not limited to, the corrective action program.

3.9.1.8 At a minimum, this review should address:

- Individuals whose actual hours worked during the review period exceeded an average of 54 hours per week in any averaging period of up to 6 weeks.
- Individuals whose actual hours worked during the review period exceeded an average of 54 hours per week in any shift cycle while the individuals work hours were subject to the non-outage day off requirements such as during MDO-TRANS 7.
- Individuals who were granted more than one waiver during the review period.
- Individuals who were assessed for fatigue during the review period.

3.9.1.9 Review individuals' hours worked and the waivers under which work was performed to evaluate staffing adequacy for all jobs subject to the work hour controls.

3.9.1.10 Review performance of the station in adhering to work schedules for covered work groups: evaluate whether or not the schedule is effectively being implemented. The following should be considered, as a minimum:

- Is the schedule being adhered to?
- Are the changes understood and reasonably consistent with a properly managed schedule?
- Does the overtime utilized support efficient utilization of resources?
- Are the available resources properly aligned with the scheduled work load?
- Is unplanned work or outages indicative that other corrective actions are necessary?
- Does the overtime utilized support staff size as appropriate for the schedule and work?

3.9.1.11 Document the methods used to conduct these reviews and the results of the reviews.

3.9.1.12 Record, trend, and correct, under the corrective action program, any problems identified in maintaining control of work hours consistent with the specific requirements and performance objectives of the rule.

End of Section

3.10 Records

3.10.1 Record Requirements

3.10.1.1 The Department Leader, Nuclear Security Programs shall retain the following records for at least (3) three years or until the completion of all related legal proceedings, whichever is longer:

- Records of work hours for individuals who are subject to the work hour controls
- Records of shift schedules and shift cycles of individuals who are subject to the work hour controls
- The documentation of waivers including the basis for granting the waivers
- The documentation of work hour reviews
- The documentation of fatigue assessments

3.10.1.2 Shift schedules, shift cycles and actual hours worked will be retained in the software.

3.10.1.3 The software will also contain information on waivers and fatigue assessments necessary for reporting.

3.10.1.4 The Department Leader, Nuclear Security Programs shall maintain fatigue assessment records for covered individuals for three (3) years. These records shall include:

- The conditions under which each fatigue assessment was conducted (i.e., self-declaration, for cause, post-event, follow-up) and pre-waivers.
- Documentation of whether or not the individual was working on outage activities at the time of the self-declaration or condition resulting in the fatigue assessment.
- The category of duties the individual was performing, if the individual was performing covered work at the time of the self-declaration or condition resulting in the fatigue assessment.
- The management actions, if any, resulting from each fatigue assessment.

End of Section

3.11 Reporting

3.11.1 Reporting Requirements

3.11.1.1 The Department Leader, Nuclear Security Programs shall provide a summary of all instances during the previous calendar year in which PVNGS waived the work hour controls specified in 10 CFR 26.205(d)(1) through (d)(5)(i) for individuals described in 10 CFR 26.4(a) to the Director, Nuclear Regulatory Affairs. The summary shall include:

- The summary shall include only those waivers under which work was performed.
- The conditions under which each fatigue assessment was conducted (i.e., self-declaration, for cause, post-event, follow-up).
- A statement whether or not the individual was working on outage activities at the time of the self-declaration or condition resulting in the fatigue assessment.
- The category of duties the individual was performing, if the individual was performing the duties described in 10 CFR 26.4(a)(1) through (a)(5) at the time of the self-declaration or condition resulting in the fatigue assessment.
- The management actions, if any, resulting from each fatigue-assessment.

3.11.1.2 If it was necessary to waive more than one work hour control during any single extended work period, the summary of instances shall include each of the work hour controls that were waived during the period.

3.11.1.3 For each category of individuals specified in 10 CFR 26.4(a), PVNGS shall report:

- The number of instances in which each work hour control specified in 10 CFR 26.205(d)(1)(i) through (d)(1)(iii), (d)(2)(i) and (d)(2)(ii), and (d)(3)(i) through (d)(3)(v) was waived for individuals not working on outage activities.
- The number of instances in which each work hour control specified in 10 CFR 26.205(d)(1)(i) through (d)(1)(iii), (d)(2)(i) and (d)(2)(ii), (d)(3)(i) through (d)(3)(v), and (d)(4) and (d)(5)(i) was waived for individuals working on outage activities.
- A summary that shows the distribution of waiver use among the individuals within each category of individuals identified in 10 CFR 26.4(a) (e.g., a table that shows the number of individuals that received only one waiver during the reporting period, the number of individuals that received a total of two waivers during the reporting period, etc.).
- A summary of corrective actions, if any, resulting from the analyses of these data, including fatigue assessments.

3.11.1.4 Reports related to fatigue management can be integrated into the overall FFD report and can be submitted electronically.

3.11.2 Special Report Requirements

3.11.2.1 10 CFR 26.719(b) specifies 24-hour reports for significant FFD policy violations or programmatic failures, which can include fatigue (subpart I) issues. The PVNGS Event Reporting Manual provides examples of the type of violations and failures that should be reported.

3.11.2.2 10 CFR 26.719(d) provides that for less significant indicators of programmatic weaknesses, such instances shall be entered into the corrective action program.

End of Section

3.12 Audits

3.12.1 Audit Requirements

3.12.1.1 The PVNGS Nuclear Assurance Director/designee shall audit the management of worker fatigue as required by § 26.41.

3.12.1.2 Audits shall focus on the effectiveness of the FFD program element, Fatigue Management, and shall be conducted by individuals who are qualified in the subject(s) being audited.

3.12.1.3 The individuals performing the audit of the program shall be independent from both the subject FFD program's management and from personnel who are directly responsible for implementing the FFD program.

3.12.1.4 The result of the audits, along with any recommendations, shall be documented and reported to senior site management.

3.12.1.5 Each audit report shall identify conditions that are adverse to the proper performance of the FFD program, the cause of the condition(s), and, when appropriate, recommended corrective actions.

3.12.1.6 Review of audit findings shall require corrective actions, including re-auditing of the deficient areas where indicated, to preclude, within reason, repetition of the condition.

3.12.1.7 The resolution of the audit findings and corrective actions shall be documented.

3.12.1.8 Audits shall be conducted each (24) twenty four months in accordance with the PVNGS audit program.

End of Section

3.13 Reporting Software Deviation Guidance

3.13.1 Software deviations are to be addressed immediately for Fatigue Rule compliance issues.

3.13.2 Software deviations are identified as a RED notification displayed in the time sheet or schedule screens.

3.13.3 During a current work hour period, software work hour corrections due to a keying error does not require a corrective action document.

3.13.4 During a historical work hour period, software work hour corrections due to a keying error is performed by a Fatigue Administrator and tracked on Key Performance Indicator Metrics (KPIM).

3.13.4.1 Corrective action documents are generated monthly by a Fatigue Administrator assigned by the Fatigue Program Owner.

3.13.5 If a deviation cannot be corrected immediately, refer to Appendix C, Action Matrix for Reporting Fatigue Deviations and report the deviation for further evaluation.

3.13.6 Short Cycle deviations require a manual software override.

3.13.6.1 A corrective action document shall be generated by the Fatigue Administrator and the corrective action document number annotated in the software comment section in the override entry.

3.13.7 Non covered work period deviations require a manual software override.

3.13.7.1 Overrides are performed by a Fatigue Administrator.

3.13.7.2 A corrective action document shall be generated by a Fatigue Administrator and the corrective action document number is annotated in the software comment section in the override entry.

3.13.8 MWH 72/168 work period deviations in compliance with MWH 72/7 require a manual software override.

3.13.8.1 Overrides are performed by a Fatigue Administrator.

3.13.8.2 A corrective action document is generated by a Fatigue Administrator and the corrective action document number is annotated in the software comment section in the override entry.

3.13.9 Waivers granted, per Section 3.6.1, Granting Waivers require workgroups to generate a corrective action document to track software deviation(s) and waiver(s) issued.

3.13.9.1 Refer to Appendix C, Action Matrix for Reporting Fatigue Deviations.

3.13.10 Corrective action documents generated should be communicated to the Fatigue Administrators for tracking purposes.

3.13.10.1 Questions can be e-mailed to PVFatigue@apsc.com.

End of Section

3.14 Reporting Fatigue Software Late Entries Guidance

3.14.1 On a weekly basis, fatigue work hour time sheets are closed (locked down) for the previous week's work hours.

3.14.1.1 Only the Fatigue Administrators are authorized to edit work hour time sheets during a closed period.

3.14.1.2 Refer to Appendix D, Action Matrix for Reporting Late Entries.

3.14.2 Software keying errors that need to be corrected during a closed time sheet period may be communicated to a general e-mail in box at PVFatigue@apsc.com.

3.14.2.1 Fatigue Administrators review and complete requests.

3.14.3 If the corrections are "positive" in nature (adding work hours to an approved schedule) then the Fatigue Administrator shall document in the Fatigue Key Performance Indicator (KPIM) tracking log.

3.14.3.1 An example of a correction that is "positive" in nature would be an employee scheduled not to work, a correction would be required if the employee did work.

3.14.3.2 An example of a correction that is not "positive" in nature would be an employee scheduled to work, a correction would be required if the employee did not work.

3.14.4 Corrective action documents for "positive" late entries are generated monthly be a Fatigue Administrator assigned by the Fatigue Program Owner.

3.14.5 "Positive" late entries meeting the criteria for Performance Error Precursor (Criteria P3) are assigned to the work group the employee was working in during the time of the event.

3.14.5.1 Error precursors are generated monthly by a Fatigue Administrator assigned by the Fatigue Program Owner.

3.14.5.2 Questions may be e-mailed to PVFatigue@apsc.com.

End of Section

4.0 DEFINITIONS

4.1 **Acute fatigue -** fatigue from causes (e.g., restricted sleep, sustained wakefulness, task demands) occurring within the past 24 hours.

4.2 **Adverse to Safety** - Unforeseen conditions which, in the informed opinion of the duty Shift Manager, could jeopardize the safety of the public, station, personnel, or environment. Waivers are considered appropriate if required to mitigate conditions adverse to safety. If rule compliance would result in the following type conditions, it would be appropriate to consider using the waiver process:

- Violate other NRC requirements such as minimum on-site staffing.
- Jeopardize the industrial or radiological safety of the public or plant personnel.
- Delay recovery from a challenge to a safety system function.
- Delay in recovering from actual or potential loss of reactor core cooling capability during outages.
- Cause a forced Reactor shutdown, power reduction, or similar action as a result of exceeding a time limit for a Technical Specifications Limiting Condition for Operation.
- Result in an increase to an Orange or Red Risk Management Action Level per the Maintenance Rule.
- Cause or prevent mitigation of an environmental permit violation.
- Compromise the ability to maintain the site secure from the actions of malicious groups or persons.
- Force undue risk to on-site or off-site station personnel as a consequence of an external event (e.g., security, fire, severe weather).

4.3 **Adverse to Security** - If compliance with the work hour requirement will cause a violation of other NRC requirements, such as the PVNGS Security Plan, Training & Qualification Plan, Safeguards Contingency Plan, & ISFSI Security Program, or if the delay in the recovery of failed security equipment that is necessary for maintaining plant security will occur.

Example 1: Required number of Armed Responders for a security shift.

4.4 **Alertness -** the ability to remain awake and sustain attention.

4.5 **Averaging period** - The duration consisting of rolling weeks over which the 54 hour average is calculated and may or may not be consistent with standard shift schedules but never exceed 6 weeks.

4.6 **Break -** an interval of time that falls between successive work periods, during which the individual does not perform any duties for the licensee other than one period of shift turnover at either the beginning or end of a shift but not both. This means that one period of shift turnover can be considered as part of the break.

4.7 **Break Limits** - are defined as the following:

- Minimum Work Period Break: A 10 hour break between the previous week period or an 8- hour break between the previous work period when a break of less than 10 hours was necessary to accommodate a crew's scheduled transition between work schedules or shifts.
- Minimum 9 Day Break: A 34 hour break in the preceding 2/6 hour (9-day) period.

4.8 **Call-in -** being required to return to the site when not normally scheduled for work.

4.9 **Ceiling Limits** - are defined as the following:

- 16 hours in a 24-hour period
- 26 hours in a 48-hour period
- 72 hours in a 7 day period or 168 hours

4.10 **Circadian variation in alertness and performance** - the increases and decreases in alertness and cognitive/motor functioning caused by human physiological processes (e.g., body temperature, release of hormones) that vary on an approximately 24-hour cycle.

4.11 **Contractor/vendor (C/V)** - any company, or any individual not employed by a licensee who is providing work or services to a licensee, either by contract, purchase order, oral agreement, or other arrangement.

4.12 **Corrective Maintenance** - includes actions that restore by repair, overhaul, or replacement, the capability of a failed SSC to function within acceptance criteria.

4.13 **Covered individual** - an individual subject to work hour controls. Any individual granted unescorted access to a nuclear power plant's protected area that performs covered work.

4.14 **Covered SSC**- Systems, Structures, and Components (SSCs) that a Risk-Informed Evaluation Process has shown to be significant to public health and safety. The operational condition of the SSC is not relevant to the SSCs covered status.

4.15 **Covered work -** the following:

- Operating or on-site directing of the operation of systems and components that a risk-informed evaluation process has shown to be significant to public health and safety.
- Performing maintenance or on-site directing of the maintenance or quality inspections during and following maintenance on systems, structures and components (SSCs) that a risk-informed evaluation process has shown to be significant to public health and safety.
- Performing Radiation Protection or Chemistry duties required as a member of the on-site emergency response organization minimum shift complement.
- Performing the duties of a Fire Team Advisor Response member(s), who is responsible for understanding the effects of fire and fire suppression on safe shutdown capability.
- Performing security duties as an armed security force officer, alarm station operator, response team leader, or guard, hereinafter referred to as Members of the Security Force (MSF).

4.16 **Cumulative fatigue -** the increase in fatigue over consecutive sleep-wake periods resulting from inadequate rest.

4.17 **Day-off** - a calendar day in which an individual does not start a work shift.

4.18 **Deviation** - a departure from the requirements included in 10 CFR Part 26 Subpart I.

4.19 **Directing -** the exercise of control over a maintenance or operations covered work activity by an individual who is directly involved in the execution of the work activity, and either makes technical decisions for that activity without subsequent technical review, or is ultimately responsible for the correct performance of that work activity.

4.20 **Fatigue** - the degradation in an individual's cognitive and motor functioning resulting from inadequate rest.

4.21 **Fatigue Assessment** - An evaluation of individual's ability to perform any assigned duties within the scope of the fitness-for-duty rule. It is not limited to covered individuals.

4.22 **Incidental duties -** those work activities, required by the licensee, performed off-site.

4.23 **Increased threat condition** - an increase in protective measure level, relative to the lowest protective measure level applicable to the site during the previous 60 days, as promulgated by an NRC advisory.

4.24 **Maintenance -** the following on-site maintenance activities: Modification, surveillance, post-maintenance testing, and corrective and preventive maintenance of SSCs. Only maintenance activities that change the operational condition of the SSCs are included.

4.25 **Maximum Average Work Hours Alternative (On-line Averaging)** - the alternative approach to on-line minimum days off (MDO); a weekly maximum average of 54 hours worked, calculated based on a rolling averaging period of up to 6 weeks. This alternative is applicable to all Covered Worker classifications.

4.26 **Minimum Day Off (MDO)** - A “day off” that must be taken in order to comply with the appropriate outage work hour control rules that requires days off.

4.27 **Nap or Restorative Sleep** - a brief opportunity and accommodations for restorative, uninterrupted sleep of at least one half hour in a designated area.

4.28 **Nominal** - the limited flexibility that is permitted in meeting a scheduled due date for completing a recurrent activity that is required under 10 CFR 26, such as the nominal 12-month frequency required for FFD refresher training. Completing a recurrent activity at a nominal frequency means that the activity may be completed within a period that is 25 percent longer or shorter than the period required in 10 CFR 26. The next scheduled due date would be no later than the current scheduled due date plus the required frequency for completing the activity.

4.29 **Off-site** - any area not considered on-site.

4.30 **On-site -** within the owner controlled area of the nuclear power plant.

4.31 **On-Line-Day** - a day when the unit is not in an outage when the shift starts.

4.32 **Outage Day** - A day when the unit is in an outage when the shift starts.

4.33 **Outage Worker** - a worker supporting outage activities that are not part of a multiunit minimum control room compliment required by the operating unit on the same site.

4.34 **Predictive Maintenance** - to monitor, diagnose, or trend SSC functional or condition indicators by observation, driven by the condition of the SSC or at specified intervals. Results indicate current and future functional ability or the nature of and schedule for planned maintenance not real-time operations. Examples of activities that may be excluded if they do not change the state or condition of the Covered SSCs include, but are not limited to, nondestructive examination (NDW), thermography, vibration analysis, and data collection and analysis.

4.35 **Preventive Maintenance** - includes actions that detect, preclude, or mitigate degradation of functional structures, systems, and components (SSC) to sustain or extend its useful life by controlling degradation and failures to an acceptable level.

4.36 **Qualified Assessor**- an individual who has completed appropriate training and has the Fatigue Assessor Qualification in SWMS.

4.37 **Quality Inspections** - for the purpose of determining covered individuals; those inspection/verification activities performed during and following maintenance on covered SSCs. Excluded are material and fuel receipt inspections and the directing of quality inspections.

4.38 **Risk informed evaluation process** - an evaluation based on a probabilistic risk analyses approach such as the Maintenance Rule (50.65(a)(4)) or other similar process.

4.39 **Risk Significant Systems** - Plant Systems, Structures, or Components (SSC) which have been ranked by an expert panel as being a risk to the safe operation or safe shutdown of the plant if the SSC is not operated, maintained, repaired or tested properly. Risk Significant SSC are identified in procedure 70DP-0MR01, Maintenance Rule.

4.40 **Security Personnel** - Armed security force officer, alarm station operator, response team leader, or watchman.

4.41 **Shift cycle -** a series of consecutive work shifts and days off that is planned by the licensee to repeat regularly, thereby constituting a continuous shift schedule. A shift cycle cannot exceed 6 weeks for the purposes of calculating days off. or averaging period. During outage rules shift cycles are 15-day fixed periods.

4.42 **Shift turnover** - only those activities that are necessary to safely transfer information and responsibilities between two or more individuals between shifts. Shift turnover activities may include, but are not limited to, discussions of the status of plant equipment, and the status of ongoing activities, such as extended tests of safety systems and components. Security personnel being issued armament/equipment prior to their shift and turning in armament/equipment at the end of their shift is an example of shift turnover.

4.43 **Tactical exercise** - a force-on-force simulation used to evaluate and demonstrate the capability to defend target sets against selected attributes and characteristics of an adversary. A force-on-force tactical exercise includes all key program elements of a station's protective strategy.

4.44 **Unit Outage -** The reactor unit is disconnected from the electrical grid.

4.45 **Work hours** - the amount of time an individual performs duties for the licensee. This includes all work hours, with the following exceptions: One period of shift turnover time, either at the end or beginning of the shift, but not both shall be excluded. Within-shift break and rest periods in which there is reasonable opportunity and accommodations for restorative sleep (e.g., a nap) may be excluded.Unscheduled work hours for the purpose of participating in an unannounced emergency preparedness exercises and drills may be excluded. Personal time in which an individual is on-site but is “off-duty” (i.e., before or after his/her normal scheduled work period in which activities are not being performed for the licensee) may be excluded. The individual may be reading the paper, using the on site fitness center, eating a meal, etc.

4.46 **Work Hour Controls -** The regulatory requirements in 10CFR 26.205. This includes online averaging and outage MDO work hour requirements for PVNGS.

End of Section

5.0 REFERENCES

5.1 Implementing References

5.1.1 None

5.2 Developmental References

5.2.1 10CFR Part 26, Subpart I, “Managing Fatigue”

5.2.2 NRC Regulatory Guide 5.73, “Fatigue Management for Nuclear Power Plant Personnel”

5.2.3 NEI 06-11, “Managing Personnel Fatigue at Nuclear Power Reactor Sites”

5.2.4 01DP-0EM10, “Fitness For Duty Program”

5.2.5 ADVERSE CRDR 4290206 / Pri 3 PCR 4298586 - Added Appendix E, Fatigue Management Covered vs. Non-Covered to provide guidance for identifying if a worker is a covered or non-covered worker.

5.2.6 ADVERSE CRDR 4290206 / CRAI 3660441 - Violation of 10CFR PART 26, Fatigue Rule Violation.

5.2.7 PVAR 3543760 -Fatigue Rule: 72 work in a 7 Day Period versus 72 work hours in a168 hour time frame. (Workforce Software Calculation)

End of Section

6.0 APPENDICES

6.1 Appendix A - Fatigue Assessment Tool

6.2 Appendix B - Fatigue Assessment Exemption

6.3 Appendix C - Action Matrix for Reporting Fatigue Deviations

6.4 Appendix D - Action Matrix for Reporting Late Entries

6.5 Appendix E - Fatigue Management Covered vs. Non-Covered

End of Section

7.0 SUMMARY OF CHANGES

Rev 07	Description

1) PCR 4345543 - Implement the Average 54 Rule change and other fatigue rules guidance throughout the procedure.
2) Step 1.2 added sentence, “Average work hour requirements per 10CFR 26.205(d)(7) apply
3) Step 2.1, 2.2, 2.3 and 2.5 revised titles
4) Step 2.5 bullet four added “shall” and replaced “are to”
5) Step 2.6 bullet four added verbiage, “in fatigue software prior to conducting work”
6) Step 2.13 bullet two removed, “Timely verification or” and added, “time sheets closing”
7) Added Note after step 3.0, FFD policy statement reference
8) Step 3.1.1.6 bullet two added, “on-site directing of maintenance activities.” Replaced “Health Physics” with “Radiation Protection” PCR 4416556
9) Step 3.2.2.1 added, verbiage “outage” and “online averaging period”
10) Step 3.2.2.2 deleted, “day off” and added, “online averaging work hour”
11) Step 3.2.2.3 deleted, “day off” and added, “work hour”
12) Steps 3.2.2.4 and 3.2.2.5 added “work hour”
13) Step 3.2.3.2 added, “outage calculation or online averaging period”
14) Step 3.2.3.3 removed “minimum days off” and added “online averaging time off”
15) Step 3.2.3.4 provided clarity, “If an individual joins a shift after the start of an outage shift cycle or online averaging period, they shall meet the applicable work hour requirements going forward and for the shift from which they transitioned”

Rev07	Description

16)Step 3.2.4.1 added, “outage calculation or online averaging period”

17)Step 3.2.4.1 added bullets to align with NEI-0611 MDO requirements for online and outage.

18)Removed step 3.2.4.3, 3.2.4.4 and 3.2.4.5

19)Step 3.2.4.3 replaced minimum days off with online averaging and added, “applicable work hours”

20)Step 3.2.5.1 replaced “day off requirements” with “online averaging”

21)Step 3.2.5.2 replaced, “average days off” with “online averaging restrictions”

22)Step 3.2.5.3 replaced “day off” with “work hours” and removed “Shift cycle” and replaced with, “online averaging” replaced “unexpected” with “unplanned”

23)Step 3.2.5.4 added “online averaging” and replaced with, “outage day off.” Also added, “all additional work hours”

24)Step 3.2.6.2 removed, “both of” and modified bullet two and three for clarity to include the new online averaging and bullet four added verbiage, “Ensure that actions are in place to comply with the 54-hour averaging limit by the end of the averaging period”

25)Step 3.3.3 was removed. Duplicate step 3.3.1.8. This will cause resequencing of numbering in new revision.

26)Step 3.3.1.5 removed “of days off” and replaced with “hours worked”

27)Step 3.3.1.6 removed “days off” and replaced with “hours worked” from bullet 5. Deleted “use one of the following methods and the following two bullets.

28)Step 3.3.1.7 bullet six removed minimum day(s) off) and replaced with “online averaging”

29)Step 3.3.1.10 bullet two added “and” removed “and minimum days off”

30)Step 3.3.3.2 removed “minimum day off” and replaced with “online averaging”

Rev 07	Description

31)Step 3.3.3.4 example two was removed.

32)Step 3.3.4 was removed as duplicate of step 3.3.1.9. This will cause resequencing of numbering in new revision.

33)Step 3.3.4.1 (3.3.6.1 previous revision) removed table

34)Steps 3.3.4.3, 3.3.4.4, 3.3.4.5, 3.3.4.6 added to procedure from NEI 06-11.

35)Step 3.3.5.2 deleted “days off”

36)Step 3.3.5.8 (3.3.7.8) removed shift cycle and “added online averaging rolling period”

37)Step 3.3.5.9 (3.3.7.9 Example 3 paragraph three was rewritten for clarity to support online averaging. NEI 06-11

38)Step 3.3.6.1 (3.3.8.1 added bullet, “Outage Minimum Day Off (MDO) requirements apply along with a non rolling 15-day cycle period. Outage rule duration not to exceed 60 days from outage start date.(see Table 1)

39)Deleted step 3.3.6.2 (3.3.8.2) example no longer needed. This will cause resequencing of numbering in new revision.

40)Step 3.3.6.4 replaced with verbiage from the NOTE and defined difference for online and outage.

41)Step 3.5.1.1 added “online averaging” and “worked hours” and removed “minimum days off”

42)PCR 4377579 step 3.6.1.1 removed, “PVNGS senior management such as”

43)Step 3.9.1.5 added January 30th per NEI 06-11 document

44)Step 3.9.1.8 bullet one changed to cycle period and bullet two add “MDO-TRANS7”

45)Added definitions to section 4.0

46)PCR 4416556 Step 4.15 replaced “Health Physics” with “Radiation Protection”

End of Section

Appendix A - Fatigue Assessment Tool

(Sample)

The electronic Fatigue Assessment Tool is located on the FFD website at http://pvonline/ffd/Pages/default.aspx. Upon clicking the SUBMIT button, an electronic copy is automatically routed to the SAE and a Fatigue Administrator for review and retention. Please save a PDF copy for your records.

FATIGUE ASSESSMENT TOOL

ASSESSOR'S STATUS DECISION

I. ASSESSMENT STARTUP

Individual's User ID: / Name: Dept: Date: Time:

Referring Supervisor User ID: / Name: Dept:

Current Plant Status: Select...

I. A. CONDITION REQUIRING FATIGUE ASSESSMENT *(Check One Primary Purpose)*

☐ **Waiver of Work-Hour Controls** (REMINDER: Conducted within 4 hours of the Waiver start time.)

NOTE:This is to be used only if the fatigue EMP CTR software is inoperable to generate the waiver.

☐ **Self-Declaration of Fatigue**

☐ **For Cause**

Observed Signs and/or Behavior(s) [List Primary Indicators]:

Observer: Select...

Observer's Name:

☐ **Post Event**

Description of Event:

Individual Involvement:

☐ **Follow-Up after <10-hour break from Self-Declaration of For-Cause Fatigue Assessment**

I. B. Qualified Assessor

I have verified that I am trained, qualified and allowed by procedures to conduct Fatigue Assessment.

Qualified Assessor:

☐

In Post-Event Assessment, I did not perform or direct on-site the work activities during which the event occurred, or evaluate or approve a waiver prior to the event, or perform a pre-event Fatigue Assessment of individual for any purpose.

II. FATIGUE SELF-ASSESSMENT

A. Current Job Position:

B. Description of Work Activity (What were you doing before assessment?)

C. Description of Planned Work Activity (What will you be doing after assessment?)

Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14

II. D. Rolling Work & Rest History

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1. Shift Assignment															
2. Hours Worked at Site															
3. Hours Worked at Other Job															
4. Total Hours Worked															
5. Total Off-Day Hours (24/Off-Day)															
6. Hours of Sleep Per "Day"															
7. Quality of Sleep															

8. Total hours of work in the last 24 hours	
9. Total hours of off-time in the last 24 hours	
10. Hours of sleep in the last 24 hours	
11. Quality of sleep in the last 24 hours	
12. How many times have you performed work under a waiver in the last 14 days.	
E= Excellent; G = Good F= Fair; P= Poor	

II E. Fatigue Scale

Directions: The following ten statements refer to how you have been feeling over the past week. For each statement, you can choose one out of five answer categories, varying from Never to Always. Please enter the answer that is applicable to you for each question. You must give an answer to each question.

	Never	Sometimes	Regularly	Often	Always	
1. I am bothered by fatigue.	1	2	3	4	5	
2. I get tired very quickly.	1	2	3	4	5	
3. I don't do much during my off-time.	1	2	3	4	5	
4. I have enough energy for everyday life.	1	2	3	4	5	
5. Physically, I feel exhausted.	1	2	3	4	5	
6. I have problems starting things.	1	2	3	4	5	
7. I have problems thinking clearly.	1	2	3	4	5	
8. I feel no desire to do anything.	1	2	3	4	5	
9. Mentally, I feel exhausted.	1	2	3	4	5	
10. When I am doing something, I can concentrate quite well.	1	2	3	4	5	
					Total Score:	

III. FACE-TO-FACE ASSESSMENT *[Review Sections I & II; Verify Completeness & Accuracy of Section II]*

A. JOB & TASK INFORMATION

If this information is not already provided, ask the following questions:

Does the work you were doing involve:

*** If completing for a waiver or a followup, include the work you were planning to do.**

1. Sedentary work with little or no opportunity to move around? Select...
2. Isolated work with little or no interaction with others? Select...
3. Repetitive tasks with little necessity to think? Select...
4. Continuous visual search or general watch keeping? Select...
5. Focused brain (cognitive) usage? Select...

B. WORK & REST HISTORY

Verify the work-hours information against company records, making sure that all hours spent at work are counted in item II.D.2 Then, ask these clarifying questions:

1. Do you have a second job? Select...
2. Outside of work, do you engage in anytime-intensive activities, other than exercise or aerobic sports, that require you to exert yourself-mentally, physically and/or cognitively-beyond your normal capacity to do so? Select...

Note: If B.1 or B.2 above was answered Yes, but there were no hours reported in item II.D.3, then redo items D.3 - D.5 in section II.

3. Is the amount of daily sleep you have gotten over the past seven days typical for you?

4. If No to #3, what is your typical daily sleep time? Select...

5. Are the quality ratings that you gave to your daily sleep over the past seven days typical for you? Select...

6. If No to #5, how do you typically rate the quality of your sleep? Select...

NOTES:

C. OBSERVED OR REPORTED SIGNS OF FATIGUE *(Check All That Apply, including Signs Observed During Face-To-Face Assessment)*

1. Verbal Signs

- [ ] More complaints about health, including lack of energy, backaches or headaches
- [ ] More irritability or impatience in voice
- [ ] Less talkative
- [ ] Difficulty listening or tracking conversations
- [ ] Difficulty speaking, including more difficulty conveying thoughts or articulating clearly

2. Physical Signs

- [ ] Red eyes
- [ ] Repeated yawning
- [ ] Dark circles under eyes, when not typical
- [ ] Fluttering eyelids or excessive blinking
- [ ] Increased staring or eye fixation, especially with blank look on face
- [ ] Dizziness
- [ ] Slowed body movements, including walking
- [ ] Muscle weakness: drooping eyelids; holding up head; unusual limping or listing
- [ ] Appearance more disheveled or disorganized
- [ ] Nodding off

3. Behavioral Signs

- [ ] Frequently Rubbing Eyes
- [ ] Listlessness or giddiness
- [ ] Less physical coordination, including eye-hand coordination
- [ ] Negativity
- [ ] Lack of enthusiasm; indifference
- [ ] Emotional flare-ups; short-tempered & irritable
- [ ] Anger or flustered response to the unexpected
- [ ] More interpersonal conflicts with coworkers or superiors
- [ ] Less focus or concentration on tasks
- [ ] Forgetfulness; poor short-term memory
- [ ] Poor problem solving or decision making; indecision
- [ ] Slower reaction/response time, including in verbal exchanges

- Lack of attentiveness and vigilance
- Neglect of procedures or tasks
- Tendency for risk-taking
- Failure to respond to external changes
- More absences

V. STATUS DECISION BY ASSESSOR TOOL

A. NO RESTRICTIONS. Assessor finds no fatigue impairment or circadian degradations in alertness and performance, and has reasonable assurance of safe and competent work performance. Individual may continue covered work without any restrictions.

B. OVERSIGHT RECOMMENDED. Assessor finds no fatigue impairment, and has reasonable assurance of safe and competent work performance. Individual may continue covered work. As a precaution against circadian degradations in alertness and performance, the following controls or conditions are recommended.

C. RESTRICTIONS REQUIRED: Individual is sufficiently fatigue-impaired to restrict covered work. After a __-minute break, individual may perform non-covered work. The following additional controls or conditions also are recommended.

D. NO FURTHER WORK ALLOWED. Individual is highly fatigue-impaired and must have a break of at least 10 hours during which he or she is expected to obtain 8-hours of restorative sleep and rest.

VI. STATUS DECISION BY ASSESSOR OVERRIDE

ASSESSOR OVERRIDE
Comments:

Recommendation and Decision:

End of Appendix

Appendix B - Fatigue Assessment Exemption

(SAMPLE)

Date of Occurrence:___________________________

10 CFR Part 26.211(1) For cause. In addition to any other test or determination of fitness that may be required under 26.31(c) and 26.77, a fatigue assessment must be conducted in response to an observed condition of impaired individual alertness creating a reasonable suspicion that an individual is not fit to safely and competently perform his or her duties, except if the condition is observed during an individual's break period. If the observed condition is impaired alertness with no other behaviors or physical conditions creating a reasonable suspicion of possible substance abuse, then the licensee need only conduct a fatigue assessment. If the licensee has reason to believe that the observed condition is not due to fatigue, the licensee need not conduct a fatigue assessment.

Employee Printed Name:_________________________
Employee Number:______________________________

I have not observed a condition of impaired individual alertness creating a reasonable suspicion that an individual is not fit to safely and competently perform his or her duties.

Observer Printed Name:__________________________

Observer Signature:_____________________________

End of Appendix

Appendix C - Action Matrix for Reporting Fatigue Deviations

(SAMPLE)

STEPS	ACTION	RESPONSIBLE	COMMENTS
Step 1:	Deviation identified	**Workgroup or Administrator**	If a deviation can be corrected on the spot (COTS), conduct corrections, no further actions are required.
Step 2:	PVAR generated describing deviation, known circumstances and personnel information available. 1. Disposition PVAR to Unit # receiving deviation as REVIEW EVALUATE to determine if deviation is accurate	**Workgroup or Administrator**	Screenshots are suggested for researching deviation scenario. (See PVAR Example).
Step 3:	If the violation is false, or is deemed as (in compliance with fatigue rule), with concurrence from the Fatigue Management Task Force, then the Evaluation CRDR can be closed.	**Workgroup or Administrator**	"In Compliance" can pertain to a deviation of MWH72/168, however in compliance with MWH72/7.
Step 4:	If the violation is true, workgroup needs to request reclassification of Evaluation CRDR to Adverse (14 days) and the following PRI 3 CRAI can be generated along with any additional actions to mitigate recurrence.	**Workgroup or Administrator**	Violation of procedure 01DP-0AP17 and 10 CFR Part 26, Subpart I.
Step 5:	1. PRI 3 CRAI assigned to workgroup (14 Days): -To schedule a meeting with Task Force Group to review violation. - To schedule a meeting with Sr. Mgmnt. to discuss violation. - To communicate fatigue event to workgroup leaders and personnel.	**Workgroup or Administrator**	Contact Fatigue Management Administrator at 82-2232 to coordinate and schedule meetings with Task Force and Senior Management.

Appendix C - Action Matrix for Reporting Fatigue Deviations

Examples of Verbiage for Generating a Corrective Action Mechanism

Title:	POTENTIAL 10 CFR PART 26 FATIGUE RULE VIOLATION IDENTIFIED IN SECURITY UNIT 9636
Description	POTENTIAL 10 CFR PART 26 FATIGUE RULE VIOLATION IDENTIFIED IN SECURITY UNIT 9636 for the minimum days off violation (MDO-ONL): for 12hr 00min of work in [09/29/10 0630-1830], 28 work days exceeds limit of (27 days on/15 days off) in [08/‘19/10 - 09/29/10] for SECURITY/12.0 hour shift. Excess is 1 day.
	- Use a copy of actual deviation verbiage from timesheet to describe deviation. - Include timesheet screenshot of software deviation report and attach to PVAR. It is important that the employee information can be identified in order to reach a conclusion of deviation status.
Suggested Disposition:	Disposition PVAR to Unit # receiving deviation(s) as REVIEW EVALUATE to determine if deviation is accurate.
Actions Taken:	COMPLETE AS APPLICABLE

End of Appendix

Appendix D - Action Matrix for Reporting Late Entries

(SAMPLE)

STEPS	ACTION	RESPONSIBLE	COMMENTS
Step 1:	A timesheet correction during a closed time period identified	**Workgroup**	
Step 2:	Communicate correction request to PVFatigue@apsc.com or Fatigue Administrator	**Workgroup**	Provide, clear precise details of employee and work hour changes needed.
Step 3:	Fatigue Administrator will make corrections in software and determine "positive" in nature, record as a Late Entry if yes.	**Fatigue Administrator**	
Step 4:	PVAR generated for summary of late entries each month to Unit 9632 - Review Evaluate- 30 days. PRI 4 CRAI generate to workgroup - 14 days to determine if positive entries were verified prior to late software entry.	**Unit 9632**	Late Entry report attached to PVAR (See PVAR Example).
Step 5:	Error Precursor (P3) assigned to workgroups reporting non-verified positive Late Entries.	**Unit 9632**	Violation of procedure 01DP-0AP17 for non-scheduled adherance/verification of work hours.
Step 6:	Monthly KPIM metrics updated to report any Late Entries recorded by workgroups (Departments).		

D - Action Matrix for Reporting Late Entries

(SAMPLE)

Examples of Verbiage for Generating a Corrective Action Mechanism

Title:	THERE WERE (11) "POSITIVE" FATIGUE RULE LATE ENTRIES MADE TO SOFTWARE FOR CORRECTIONS TO SCHEDULE AND TIMESHEET ERRORS IN AUGUST 2011.
Description:	THERE WERE (11) "POSITIVE" FATIGUE RULE LATE ENTRIES MADE TO SOFTWARE FOR CORRECTIONS TO SCHEDULE AND TIMESHEET ERRORS IN AUGUST 2011. (8)MAINTENANCE, (3) PROJECTS. Of these 11 total late entries, 9 were keying corrections and 2 were cycle scheduling errors. "Definition of positive entry is the addition of work hours to schedule after the time has past that has a potential impact to fatigue management rules."
	- Use summary information from Late Entries tracking log. - Include a tracking log report and attach to PVAR. It is important that the employee information can be identified.
Suggested Disposition:	Review Evaluate CRDR to Unit 9632 (30 Days) (Using PVAR Description) and assign PRI 4 CRAIs to Unit 9666, Unit 8505 and Unit 8547 (14 Days) for workgroups to determine if late entries were verified via software or "other identified method" prior to employee(s) working additional hours, per procedure 01DP-0AP17, Managing Personnel Fatigue. The workgroup is to document the determination(s) for each positive entry event in Actions Taken and close the CRAI. Unit 9632 will assign ERROR PRECURSOR (Criteria P3) to the workgroup(s) for any determined positive entries. The workgroup is responsible for identifying and generating any corrective actions required to mitigate recurrence.
Why did this happen:	Correct work hours not keyed into software prior to working the hours. Incorrect schedules keyed into software.
Requirement violated:	Potential violation of procedure 01DP-0AP17, Managing Personnel Fatigue.
Actions taken:	Late entries documented in KPIM monthly Fatigue Rule metrics. PVAR generated to Fatigue Group and CRAIs to workgroups where keying errors were recorded (Spreadsheet of positive entries in attached media).

End of Appendix

Appendix E - Fatigue Management Covered vs. Non-Covered

(SAMPLE)

Palo Verde
Nuclear Generating Station

Fatigue Management
Covered vs. Non-Covered

Page 1 of 1

Project Manager Name:	Worker's Unit Number:
Department Work is being Performed By:	
Description of Work being Performed:	
Are you doing maintenance or operations activities?	☐ Yes ☐ No
Are you doing work on or in close proximity* to a SSC (structures, systems, and components) that could adversely impact plant safety or power production or classified as High Risk per the Maintenance Rule? * Close proximity can be determined by contacting the Work Control SRO, or CRS/SM for that Unit.	☐ Yes ☐ No
Name:	Determination:
Does the worker have unescorted access?	☐ Yes ☐ No
Is the individual actively and directly involved in the execution of the work activity?	☐ Yes ☐ No
* If you answered NO to all of these questions, the worker is non-covered. * If you answered YES to any of these questions, further review by the Fatigue Task Force to be completed to determine if the work is covered or non-covered.	
Work may be performed prior to fatigue management determination, but it can only proceed assuming they are covered until determined otherwise.	
Form Completed By:	

PV-E1568 Ver. 1

By clicking the button below this form will automatically be sent to the Fatigue Management e-mail in box for review.

Send

End of Appendix

Palo Verde
Nuclear Generating Station

Electronic Procedure Change Record

Procedure No.: (1) 01DP-0AP17	Revision No.: (2) 007	Category: (3) 1	Expedite? (4) No

Title: (5) MANAGING PERSONNEL FATIGUE

Procedure Action: (6)	Full Basis Check? (7)	NAD Review: (8)	PRG Review: (9)	Upgraded Procedures: (10)
Major	No	No	No	No

EOP? (11)	Dry Cask? (12)	Decommissioning Doc? (13)
No	No	No

AD Review: (14)	10CFR50.59/72.48 Required? (15) No	50.59/72.48 Doc Number:

This procedure describes changes that are administrative in nature and do not establish an expanded definition of or alter the design of the facility, nor do they alter the method of operating or controlling the facility; therefore, per 93DP-0LC07-01 Rev. 0, Step 5.2.3, no further review is required.

Text does not automatically roll to continuation page. AD Review - Continuation (16) ☐ Yes

Applicability Determination performed by: (17) Crook, Christopher (Z03355) Digitally signed by Crook, Christopher (Z03355) DN: cn=Crook, Christopher (Z03355) Reason: I agree to specified portions of this document Date: 2013.05.30 09:26:46 -07'00'

Is Environmental Screening Required?:	Env. Reg./Permit Review req'd? (Use 91DP-0EN02, App. A)	If "Yes" send 91DP-0EN02, Appendix A to Environmental (20)
(18) ☑ No (done) ☐ Yes	☐ No (19) ☐ Yes Screening performed by:	Scrn Log Number:

Procedure Preparer: (21)	IQR Approval Recommendation: (22)
Crook, Christopher (Z03355) Digitally signed by Crook, Christopher (Z03355) DN: cn=Crook, Christopher (Z03355) Reason: I am the author of this document Date: 2013.06.06 09:02:18 -07'00'	Michael Mahoney Digitally signed by Michael Mahoney DN: cn=Michael Mahoney, o, ou, email, c=US Reason: I have reviewed this document Date: 2013.05.30 10:30:23 -07'00'
NAD Concurs (if required): (23)	PRG Concurs (if required): (24)
Approval: (25) Cosenza, Michael J(Z27806) Digitally signed by Cosenza, Michael J(Z27806) DN: cn=Cosenza, Michael J(Z27806) Reason: I am approving this document Date: 2013.06.06 11:43:18 -07'00'	Effective Date (Time Optional): (26) 06/09/2013

Summary of Change (include list of all PCRs incorporated): (27)

PCR 4345543 - Implement the Average 54 Rule change and other fatigue rules guidance throughout the procedure.
Step 1.2 added sentence, "Average work hour requirements per 10CFR 26.205(d)(7) apply
Added Note after step 1.2, FFD policy statement reference
Step 2.1, 2.2, 2.3 and 2.5 revised titles
Step 2.5 bullet four added "shall" and replaced "are to"
Step 2.6 bullet four added verbiage, "in fatigue software prior to conducting work"
Step 2.13 bullet two removed, "Timely verification or" and added, "time sheets closing"
Added Note after step 3.0, FFD policy statement reference

Text does not automatically roll to continuation page. Change Summary - Continuation (28) ☑ Yes

Electronic Procedure Change Record
Continuation Page

Step 3.1.1.6 bullet two added, "on-site directing of maintenance activities. Additionally, PCR 4416556 "Replaced "Health Physics" with "Radiation Protection"
Step 3.2.2.1 added, verbiage "outage" and "online averaging period"
Step 3.2.2.2 deleted, "day off" and added, "online averaging work hour"
Step 3.2.2.3 deleted, "day off" and added, "work hour"
Steps 3.2.2.4 and 3.2.2.5 added "work hour"
Step 3.2.3.2 added, "outage calculation or online averaging period"
Step 3.2.3.3 removed "minimum days off" and added "online averaging time off"
Step 3.2.3.4 provided clarity, "If an individual joins a shift after the start of an outage shift cycle or online averaging period, they shall meet the applicable work hour requirements going forward and for the shift from which they transitioned"
Step 3.2.4.1 added, "outage calculation or online averaging period"
Step 3.2.4.1 added bullets to align with NEI-0611 MDO requirements for online and outage.
Removed step 3.2.4.3, 3.2.4.4 and 3.2.4.5
Step 3.2.4.3 replaced minimum days off with online averaging and added, "applicable work hours"
Step 3.2.5.1 replaced "day off requirements" with "online averaging"
Step 3.2.5.2 replaced, "average days off" with "online averaging restrictions"
Step 3.2.5.3 replaced "day off" with "work hours" and removed "Shift cycle" and replaced with, "online averaging" replaced "unexpected" with "unplanned"
Step 3.2.5.4 added "online averaging" and replaced with, "outage day off." Also added, "all additional work hours"
Step 3.2.6.2 removed, "both of" and modified bullet two and three for clarity to include the new online averaging and bullet four added verbiage, "Ensure that actions are in place to comply with the 54-hour averaging limit by the end of the averaging period"
Step 3.3.3 was removed. Duplicate step 3.3.1.8. This will cause resequencing of numbering in new revision.
Step 3.3.1.5 removed "of days off" and replaced with "hours worked"
Step 3.3.1.6 removed "days off" and replaced with "hours worked" from bullet 5. Deleted "use one of the following methods and the following two bullets.
Step 3.3.1.7 bullet six removed minimum day(s) off) and replaced with "online averaging"
Step 3.3.1.10 bullet two added "and" removed "and minimum days off"
Step 3.3.3.2 removed "minimum day off" and replaced with "online averaging"
Step 3.3.3.4 example two was removed.
Step 3.3.4 was removed as duplicate of step 3.3.1.9. This will cause resequencing of numbering in new revision.
Step 3.3.4.1 (3.3.6.1 previous revision) removed table
Steps 3.3.4.3, 3.3.4.4, 3.3.4.5, 3.3.4.6 added to procedure
Step 3.3.5.2 deleted "days off"
Step 3.3.5.8 (3.3.7.8) removed shift cycle and "added online averaging rolling period"
Step 3.3.5.9 (3.3.7.9 Example 3 paragraph three was rewritten for clarity to support online averaging. NEI 06-11
Step 3.3.6.1 (3.3.8.1 added bullet, "Outage Minimum Day Off (MDO) requirements apply along with a non rolling 15-day cycle period. Outage rule duration not to exceed 60 days from outage start date.(see Table 1)
Deleted step 3.3.6.2 (3.3.8.2) example no longer needed. This will cause resequencing of numbering in new revision.
Step 3.3.6.4 replaced with verbiage from the NOTE and defined difference for online and outage.
Step 3.5.1.1 added "online averaging" and "worked hours" and removed "minimum days off"
PCR 4377579 step 3.6.1.1 removed, "PVNGS senior management such as"
Step 3.9.1.5 added January 30th per NEI 06-11 document
Step 3.9.1.8 bullet one changed to cycle period and bullet two add "MDO-TRANS7"
Added definitions to section 4.0
PCR 4416556 Step 4.15 replaced "Health Physics" with "Radiation Protection"

JPM BASIS INFORMATION

TASK:	1290190102, Ensure Compliance with Tech Spec						
TASK STANDARD:	Examinee has determined that LCO 3.7.2 Condition B must be entered at 0900; LCO 3.7.2 Condition C must be entered at 1100; LCO 3.7.2 Condition E and LCO 3.0.3 must be entered at 1300. Examinee has determined required actions for each Condition.						
K/A:	2.2.22	K/A RATING:	RO:	4.0	SRO:	4.7	
10 CFR 55:	41.5 / 43.2 / 45.2						
APPLICABLE POSITION(S):	SRO	VALIDATION TIME:	15 minutes				
REFERENCES:	Technical Specifications						
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR		PLANT		OTHER	X	

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Alan Malley Date: 08/09/2007

Revised By: Adam Rasmussen Date: 10/10/2013

Technical Review ____________ Operations Approval ____________

Training Approval ____________

EVALUATION

Examinee Name: ____________ Date: ________

Evaluator Name: ____________

Time to complete: ________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   N/A
2. **SPECIAL TOOLS/EQUIPMENT:**
   - Technical Specifications
   - Calculator
   - Pen and Paper
   - Attached WORKSHEET
   - Evaluator should have a copy of LCOs 3.7.2 and 3.0.3 for reference
3. **JPM PERFORMANCE:**
   - MALFUNCTIONS, OVERRIDES, etc. **during** JPM:
     N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE** any equipment.
- Inform the control room staff of any discovered deficiencies.
- Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- You may use any source of information normally available.

INITIAL CONDITIONS:

- **Unit 1 is in Mode 1**
- **A series of events associated with the Main Steam Isolation Valves (MSIVs) has occurred**
- **WORKSHEET (attached) provides a chronological order of conditions of MSIVs**

INITIATING CUE:

- **Your task is to evaluate MSIV status for the time line (attached) and determine what LCO(s), Condition(s), and Action(s) should have been applied for each time**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Determine LCO, Condition, and Action for Today at 0900.		Examinee entered LCO 3.7.2 Condition 'B' at 0900. Action: B.1 Restore one MSIV actuator train to OPERABLE status within 72 hours.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	Determine LCO, Condition, and Action for Today at 1100.		Examinee entered LCO 3.7.2 Condition 'C' at 1100. Action: C.1 Restore one MSIV actuator train to OPERABLE status within 48 hours.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
3. *	Determine LCO, Condition, and Action for Today at 1300.		Examinee entered LCO 3.7.2 Condition 'E' at 1300. Action: E.1 Declare each affected MSIV inoperable immediately. Examinee entered LCO 3.0.3. Action: Be in MODE 3 within 7 hours; be in MODE 5 within 37 hours.
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

ANSWER KEY

<table>
<tr><th>Time</th><th>MSIV #</th><th>Accumulator Train</th><th>Pressure</th><th>LCO, Condition, and Action</th></tr>
<tr><td rowspan="8">Today at 0900</td><td>170</td><td>A</td><td>4950</td><td rowspan="8">LCO 3.7.2 Condition ‘B’
Action: B.1 Restore one MSIV actuator train to OPERABLE status within 72 hours.

NOTE: Examinee may also list LCO 3.7.2 Condition ‘A’ since he/she will be tracking this time as well. This is not required for JPM to be SAT.</td></tr>
<tr><td>170</td><td>B</td><td>5100</td></tr>
<tr><td>180</td><td>A</td><td>5200</td></tr>
<tr><td>180</td><td>B</td><td>5050</td></tr>
<tr><td>171</td><td>A</td><td>5100</td></tr>
<tr><td>171</td><td>B</td><td>4975</td></tr>
<tr><td>181</td><td>A</td><td>5300</td></tr>
<tr><td>181</td><td>B</td><td>5250</td></tr>
<tr><td rowspan="8">Today at 1100</td><td>170</td><td>A</td><td>5300</td><td rowspan="8">LCO 3.7.2 Condition ‘C’
Action: C.1 Restore one MSIV actuator train to OPERABLE status within 48 hours.

NOTE: Examinee may also list LCO 3.7.2 Condition ‘A’ since he/she will be tracking this time as well. This is not required for JPM to be SAT.</td></tr>
<tr><td>170</td><td>B</td><td>5100</td></tr>
<tr><td>180</td><td>A</td><td>5200</td></tr>
<tr><td>180</td><td>B</td><td>4950</td></tr>
<tr><td>171</td><td>A</td><td>5100</td></tr>
<tr><td>171</td><td>B</td><td>4975</td></tr>
<tr><td>181</td><td>A</td><td>5300</td></tr>
<tr><td>181</td><td>B</td><td>5250</td></tr>
<tr><td rowspan="8">Today At 1300</td><td>170</td><td>A</td><td>4950</td><td rowspan="8">LCO 3.7.2 Condition ‘E’
Action: E.1 Declare each affected MSIV inoperable.
3 MSIVs INOPERABLE requires entry into LCO 3.0.3.
Action: Be in MODE 3 within 7 hours; be in MODE 5 within 37 hours.

NOTE: Examinee may also list LCO 3.7.2 Condition ‘A’, ‘B’, and ‘C’ since he/she will be tracking this time as well. This is not required for JPM to be SAT.</td></tr>
<tr><td>170</td><td>B</td><td>5050</td></tr>
<tr><td>180</td><td>A</td><td>5200</td></tr>
<tr><td>180</td><td>B</td><td>5200</td></tr>
<tr><td>171</td><td>A</td><td>5100</td></tr>
<tr><td>171</td><td>B</td><td>4975</td></tr>
<tr><td>181</td><td>A</td><td>5300</td></tr>
<tr><td>181</td><td>B</td><td>4950</td></tr>
</table>

ANSWER KEY

APPLICANT

INITIAL CONDITIONS:

- Unit 1 is in Mode 1
- A series of events associated with the Main Steam Isolation Valves (MSIVs) has occurred
- WORKSHEET (attached) provides a chronological order of conditions of MSIVs

INITIATING CUE:

- Your task is to evaluate MSIV status for the time line (attached) and determine what LCO(s), Condition(s), and Action(s) should have been applied for each time

Use WORKSHEET (attached) to record answers

APPLICANT

APPLICANT

Time	MSIV #	Accumulator Train	Pressure	LCO, Condition, and Action
Today at 0900	170	A	4950	
	170	B	5100	
	180	A	5200	
	180	B	5050	
	171	A	5100	
	171	B	4975	
	181	A	5300	
	181	B	5250	
Today at 1100	170	A	5300	
	170	B	5100	
	180	A	5200	
	180	B	4950	
	171	A	5100	
	171	B	4975	
	181	A	5300	
	181	B	5250	
Today At 1300	170	A	4950	
	170	B	5050	
	180	A	5200	
	180	B	5200	
	171	A	5100	
	171	B	4975	
	181	A	5300	
	181	B	4950	

APPLICANT

3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

LCO 3.0.1 LCOs shall be met during the MODES or other specified conditions in the Applicability, except as provided in LCO 3.0.2, LCO 3.0.7, and LCO 3.0.8.

LCO 3.0.2 Upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met, except as provided in LCO 3.0.5 and LCO 3.0.6.

If the LCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required, unless otherwise stated.

LCO 3.0.3 When an LCO is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within 1 hour to place the unit, as applicable, in:

a. MODE 3 within 7 hours;

b. MODE 5 within 37 hours.

Exceptions to this Specification are stated in the individual Specifications.

Where corrective measures are completed that permit operation in accordance with the LCO or ACTIONS, completion of the actions required by LCO 3.0.3 is not required.

LCO 3.0.3 is only applicable in MODES 1, 2, 3, and 4.

LCO 3.0.4 When an LCO is not met, entry into a MODE or other specified condition in the Applicability shall only be made:

a. When the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time;

(continued)

3.7 PLANT SYSTEMS

3.7.2 Main Steam Isolation Valves (MSIVs)

LCO 3.7.2 Four MSIVs and their associated actuator trains shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2, 3, and 4 except when all MSIVs are closed and deactivated.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One MSIV with a single actuator train inoperable.	A.1 Restore MSIV actuator train to OPERABLE status	7 days
B. Two MSIVs each with a single actuator train inoperable such that the inoperable trains are not in the same instrumentation train.	B.1 Restore one MSIV actuator train to OPERABLE status	72 hours
C. Two MSIVs each with a single actuator train inoperable and both inoperable actuator trains are in the same instrumentation train.	C.1 Restore one MSIV actuator train to OPERABLE status	48 hours
D. Two actuator trains for one MSIV inoperable.	D.1 Declare the affected MSIV inoperable.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Three or more MSIV actuator trains inoperable. OR Required Action and associated Completion Time of Condition A, B, or C not met.	E.1 Declare each affected MSIV inoperable.	Immediately
F. One MSIV inoperable in MODE 1.	F.1 Restore MSIV to OPERABLE status.	4 hours
G. Required Action and Associated Completion Time of Condition F not met.	G.1 Be in MODE 2.	6 hours
H. ---------NOTE--------- Separate Condition entry is allowed for each MSIV. ---------------------- One or more MSIVs inoperable in MODE 2, 3, or 4.	H.1 Close MSIV. AND H.2 Verify MSIV is closed.	4 hours Once per 7 days
I. Required Action and associated Completion Time of Condition H not met.	I.1 Be in MODE 3. AND I.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	-------------------NOTE-------------------- Not required to be performed prior to entry into MODE 3. --- Verify closure time of each MSIV is within limits with each actuator train on an actual or simulated actuation signal.	In accordance with the Inservice Testing Program

2013 NRC SRO A-4
PVNGS JOB PERFORMANCE MEASURE

JPM BASIS INFORMATION

TASK:	1290020301 Conduct On Shift Operations IAW Conduct of Shift Operations						
TASK STANDARD:	Determined total dose expected to be received, appropriate authorization authority for expected dose, and correct posting level requirement in accordance with Answer Key.						
K/A:	2.3.13	K/A RATING:	RO:	3.4	SRO:	3.8	
10 CFR 55:	41.12 / 43.4 / 45.9 / 45.10						
APPLICABLE POSITION(S):	SRO/RO	VALIDATION TIME:	15 minutes				
REFERENCES:	75DP-9RP01, Radiation Exposure and Access Control 75RP-0RP01, Radiological Posting and Labeling						
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR		PLANT		OTHER	X	

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Alan Malley Date: 05/18/2010

Revised By: Adam Rasmussen Date: 10/10/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ______________________________________ Date: _____________

Evaluator Name: ______________________________________

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # _____________*

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   N/A
2. **SPECIAL TOOLS/EQUIPMENT:**
   - Calculator
   - Pen and Paper
   - 75DP-9RP01, Radiation Exposure and Access Control, Revision 20 available
   - 75RP-0RP01, Radiological Posting and Labeling, Revision 30 available

   NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM
3. **JPM PERFORMANCE:**
   - MALFUNCTIONS, OVERRIDES, etc. **during** JPM: N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE**any equipment.
- Inform the control room staff of any discovered deficiencies.
- Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- You may use any source of information normally available.

INITIAL CONDITIONS:

- **Your total dose exposure this year is 1127 mrem**
- **Your 5 year cumulative exposure is 3200 mrem**
- **You have been directed to enter the Radiation Control Area (RCA) to perform a task that you are the only qualified person on site to perform**
- **Work area (including transit path) is in a 600 mrem/hr radiation field**
- **Highest accessible area radiation dose rate in the room is 1050 mrem/hr**
- **Task will take 2 hours 30 minutes**

INITIATING CUE:

- **What will your total annual dose be upon completion of this task?**
- **Whose permission is required to receive this amount of dose?**
- **What is the most restrictive posting expected in the area: Radiation area, High Radiation area, Locked High Radiation area, or Very High Radiation area?**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Determines total annual dose expected to be received after completion of this task		Examinee determined annual dose achieved will be 2627 mrem. 2.5 hr * 600 mrem/hr +1127 mrem = 2627 mrem **Evaluator NOTE:** **2627-2630 mrem is acceptable due to truncation or rounding.**

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	Determines required approval for expected yearly dose		Examinee determined ALARA Committee/Committee Chairman's approval is required.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
3. *	Determines expected most restrictive radiation posting in the area		Examinee determined most restrictive posting is **Locked High Radiation Area.**
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

ANSWER KEY

1. Total dose for the year upon completion of this task:	2627 - 2630 mrem
2. Permission required to receive this dose:	ALARA Committee/Committee Chairman
3. Most restrictive radiation posting expected in the area:	Locked High Radiation Area

ANSWER KEY

APPLICANT

INITIAL CONDITIONS:

- Your total dose exposure this year is 1127 mrem
- Your 5 year cumulative exposure is 3200 mrem
- You have been directed to enter the Radiation Control Area (RCA) to perform a task that you are the only qualified person on site to perform
- Work area (including transit path) is in a 600 mrem/hr radiation field
- Highest accessible area radiation dose rate in the room is 1050 mrem/hr
- Task will take 2 hours 30 minutes

INITIATING CUE:

- What will your total annual dose be upon completion of this task?
- Whose permission is required to receive this amount of dose?
- What is the most restrictive posting expected in the area: Radiation area, High Radiation area, Locked High Radiation area, or Very High Radiation area?

1. Total dose for the year upon completion of this task:	
2. Permission required to receive this dose:	
3. Most restrictive radiation posting expected in the area:	

Record your answers in the area provided above

APPLICANT

Information Use:	• The user reviews the procedure, as needed before using it to perform the task. • The user may complete the task from memory, however the user still is responsible for performing the activity in accordance with the procedure.	All

Table of Contents

1.0 PURPOSE and SCOPE

1.1 Purpose

This procedure provides administrative controls for working with or in the vicinity of radiation or radioactive materials within the Restricted Area to ensure that personnel radiation exposure is maintained as low as is reasonably achievable (ALARA). (RCTS2 002495-01, RG 8.8R3, RCTS2 010602-01, FSAR 12.3.1.2)

1.2 Scope

1.2.1 This procedure encompasses responsibilities for entering and exiting a Radiological Controlled Area (RCA), administrative exposure hold points, Radiation Exposure Permit (REP) generation, authorizing waivers of RCA access prerequisites, and requesting RCA access for visitors.

2.0 RESPONSIBILITIES

2.1 Individuals

Although Radiation Protection (RP) personnel oversee radiological controls within the station, each individual involved in work within the Restricted Area must remain constantly aware of potential radiological problems.

- Each individual's actions directly affect his/her exposure to radiation when working in the vicinity of radiation sources.

Each individual has the following responsibilities:

2.1.1 Not to loiter in Radiological Controlled Areas (RCA).

2.1.2 Not to move or adjust any Radiation Protection boundary, barrier or posting without the approval of Radiation Protection.

2.1.3 Remaining aware of their individual exposure status and ensuring they remain below their administrative exposure hold point (see Section 3.10, Radiation Exposure Limitations and Controls).

2.1.4 Complying fully with the instructions of RP personnel in all matters pertaining to radiation protection.

2.1.5 Complying with standard operating procedures, warning signs, and barriers that concern radiation/contamination control.

2.1.6 Reading the applicable Radiation Exposure Permit (REP) for their specific job or task and obeying all instructions and requirements (i.e., dosimetry and protective clothing requirements).

2.1.7 Correctly wearing designated dosimetry devices, protective clothing, and respiratory protection equipment as prescribed by procedures or instructions.

- RP Personnel may relieve individuals of the responsibility to Self Monitor dosimetry due to contamination control or when employing remote monitoring technologies.

2.1.8 Promptly notifying RP personnel of any known or suspected change in radiological conditions.

2.1.9 Ensuring activities do not create unnecessary radiological problems for others, and being alert for the possibility that activities of others may change the work area's radiological conditions.

2.1.10 Notifying RP supervision of any aspects of radiation protection that they believe are not being properly administered.

2.1.11 Promptly notifying RP personnel of any known or suspected overexposure, or lost or damaged dosimetry.

2.1.12 Reporting all open wounds to RP prior to entering the RCA and reporting any wounds or skin contamination received while in the RCA.

2.1.13 Notifying Dosimetry of any medical diagnosis or treatment involving the intake of radioactive pharmaceuticals (e.g., I-131, Tc-99m, Tl-201), medical treatments such as cobalt implantation, or close contact with a person who has undergone diagnosis / treatment involving the intake/ implantation of radioactive pharmaceuticals before entering the Restricted Area.

2.1.14 Not smoking, eating, drinking, chewing, or having possession of such items while in a RCA, unless authorized by RP Management.

2.1.15 Immediately leaving the affected area and contacting RP when an Area Radiation Monitor alarms.

2.1.16 Preventing the spread of contamination by contacting RP personnel for direction on the removal of tools, equipment, and/or trash from contaminated areas and following RP instructions for the disposition of these items.

2.1.17 Surveying for personal contamination when leaving a contaminated area or radiological control point, as directed by RP.

2.1.18 Ensuring that prior to removing tools and equipment from the RCA, those tools and equipment are surveyed by RP personnel, as applicable.

2.1.19 Notifying the supervisor and providing Dosimetry with a completed Appendix B, "Pre-Natal Dose Limit Statement" if a female decides to declare her pregnancy or her intent to become pregnant or she suspects she may be pregnant.

2.1.20 Providing bioassay samples for the purpose of detection of radionuclides when requested by RP personnel.

2.1.21 Notifying Dosimetry of any personal information changes such as name, address, department number, employer, etc., to allow updates of the dosimetry records.

2.1.22 Informing Dosimetry of any occupational exposure received at an offsite facility while an employee of PVNGS.

- See Appendix I - Supplemental Exposure Notification (CRAI 2977470)

2.1.23 Keeping RP informed of the nature of work being performed in the RCA and any of changes that should occur to the work scope.

2.1.24 Ensuring monitoring is performed as follows, or as directed by RP, if protective clothing is worn while working in an RCA.

- Whole body monitoring by PCM or equivalent (e.g., CM-11, FHZ380AB) is performed at approximately eight (8) hr intervals.
- Monitoring for hot particles when exiting an HPCA with a stay time not to exceed six (6) hours if an HPCA was entered

2.1.25 Obtaining an exit bioassay analysis count prior to terminating at PVNGS

2.1.26 Performing RCA access and egress via ARACS for those REPs which allow automated access.

2.2 Work Group Section Leaders

Work Group Section Leaders are responsible for planning and coordinating tasks to be performed within a RCA with RP. Other responsibilities include:

2.2.1 Evaluating each work order to determine the requirement for a REP, based upon system, location, and radiological conditions.

2.2.2 Providing work orders, as requested by RP, via electronic routing location code 360 for RP evaluation and REP assignment. (IIR 010301-01)

2.2.3 The exception to Step 2.2.2 will be those work orders determined to be emergent work.

- If the work order requires a REP, the planner should contact RP as soon as practicable to allow time for RP preparation.

2.2.4 High Profile / High Risk Activities (REP JHES Cat 1) require Work Group Leadership's (or designee) increased involvement in the REP Planning and REP ALARA Review processes. See 75RP-9RP02, Radiation Exposure Permits. (CRAI 3152607, 3152614, SOER 01-01 #3)

2.2.5 Ensuring that RP related steps, hold points, and comments resulting from work order reviews are incorporated into the work order or resolved in conjunction with RP.

2.2.6 Ensuring that employees under their supervision have completed required radiation protection training and are fully qualified for use of respiratory protection equipment, if applicable.

2.2.7 Ensuring their personnel are familiar with the task to be performed so that maximum task benefit is derived when worker exposure to radiation is involved.

2.2.8 Ensuring that workers assigned to the tasks have sufficient remaining exposure available to contribute significantly to the completion of the task and that requests for new administrative exposure hold points are submitted to RP in a timely manner with proper justification.

2.2.9 Coordinating the activities of their workers with those of other work groups to achieve maximum efficiency in the task as a whole and to minimize the potential for unnecessary exposure due to poor communications or lack of proper planning/scheduling.

2.2.10 Ensuring that workers under their supervision comply fully with RP personnel in matters pertaining to radiation protection and that they follow the specific instructions and requirements on the REP.

2.2.11 Routinely monitoring the activities of their personnel during job performance to ensure that proper radiological protection measures are being used.

- REP JHES Cat 1 activities require increased levels of work group supervisory oversight. (CRAI 3152616, SOER 01-01 #3)

2.2.12 Ensuring that parts, tools, and equipment necessary to perform the task are proper for the job, readily available, and have proper power sources available.

2.2.13 Developing man-Rem estimates for each job.

2.3 Radiation Protection Manager

The Radiation Protection Manager is responsible for:

2.3.1 Establishing the radiation exposure control procedures. (RCTS2 010553-01)

2.3.2 Ensuring the investigation of all actual or suspected personnel overexposures.

2.3.3 Approving requests for administrative exposure hold points above 2 rem/year.

2.4 Radiation Protection Department Leaders

Radiation Protection Department Leaders are responsible for approving requests for administrative exposure hold points above 1.5 rem/year.

2.5 ALARA Committee Chairman

The ALARA Committee Chairman is responsible for approving requests for administrative exposure hold points greater than 2500 mrem/yr up to 4000 mrem/yr and any new hold point which would allow an individual's cumulative lifetime exposure (in rem) to exceed the individual's age (in years).

2.6 Sr Vice President, Site Operations

The Sr Vice President, Site Operations is responsible for approving any administrative exposure hold points which would allow an individual to accumulate more than 10 rem in 5 years.

2.7 Radiation Protection

Radiation Protection sections, as applicable, are responsible for:

2.7.1 Controlling the initiation, revision, and termination of REPs.

2.7.2 Specifying REP requirements, such as the personnel dosimetry, protective clothing, and respiratory protection equipment requirements.

2.7.3 When necessary, issuing dosimetry to individuals as specified by the REP.

2.7.4 Relieving the Radworker of the responsibility to self-monitor dosimetry when the worker is unable to self-monitor.

2.7.5 Evaluating radiological conditions throughout the site.

2.7.6 Updating radiological postings and access control requirements.

2.7.7 Documenting (via manual records or by computer access control system) personnel access/egress into RCAs on those REPs which do not allow automated access via ARACS and when ARACS is not available.

2.8 Dosimetry

The Dosimetry Section is responsible for:

2.8.1 Providing, when necessary, TLDs to monitor an individual's exposure.

2.8.1.1 By issuing personnel record thermoluminescent dosimeters (TLDs) and performing a periodic change-out and evaluation of these record TLDs.

2.8.1.2 By providing special dosimetry to RP for issue to individuals.

2.8.2 Making available to site departments involved in radiological work, a periodic listing of the exposure to date for departmental personnel.

2.8.3 Performing whole body counts.

2.9 Operations Shift Manager

The Operations Shift Manager is responsible for ensuring that RP is informed of changes in plant conditions which are known to have significant impact on radiological conditions.

3.0 PROCEDURE

3.1 General

3.1.1 Administrative controls are placed on access to the RCA due to the proximity of direct sources of radiation and the possibility of entering areas that are contaminated or contain airborne radioactivity.

3.1.2 Computerized access control systems are used as tools to control personnel access to the RCA. The systems provide exposure data and user messages to assist RP personnel in this task. (QATS 390346-08, UFSAR 12.5.2.2.7)

3.1.2.1 When the computerized system(s) are available, their services may be used during the performance of this procedure.

3.1.2.2 When the computerized system(s) are not available, methods of control should be performed in accordance with guidance provided in the appropriate RP written instruction.

3.2 Personnel Radiation Dosimetry

3.2.1 The Radiation Protection requirements for issuing an individual a record TLD include:

- A current NRC Form 4 or
- A written signed statement from the individual indicating occupational exposure received during the current year and previous years.

3.2.2 The Radiation Protection requirements for unescorted access within an RCA include:

3.2.2.1 Successful completion of Radiological Work Practices (RWP) training.

3.2.2.2 Whole body count performed at PVNGS.

3.2.2.3 If necessary, the 3.2.2.1 and/or 3.2.2.2 RP requirement(s) for unescorted access may be waived with approval of the Radiation Protection Manager.

- Document the approval and any assigned restrictions on Appendix E, "Radiation Protection Requirement Waiver."

3.2.3 Personnel requiring entry into the Restricted Area who may be expected to receive radiation exposure in excess of 100 mrem/year DDE or 10% of the exposure limits specified in 10CFR20.1201(a) shall be issued a personnel dosimetry device. (RCTS2 010512-01, RG 8.4R0, RCTS2 041015-01, FSAR 12.5.3.3, RP 046012-01, 10CFR20.1502(a), ICR 00120 - ANI recommendation)

- Record TLDs are normally issued at the Dosimetry Office, and thereafter should be returned and picked up at the security entrance to the Restricted Area.

3.2.4 Personnel will obtain dosimetry (as specified on the REP) which shall be worn at all times within an RCA. (RCTS 010827-01, RCTS2 010523-01, RG 8.2R0, RCTS2 041026-01, FSAR 12.5.3.6)

- An approved exception to this requirement is when Special Dosimetry is issued that includes HEAD Dosimetry. With RP permission, Head Dosimetry may be hand carried by the Radworker to the job site.
- An approved exception to this requirement is during RCA egress when dosimetry is removed and surveyed.
- An approved exception to this requirement is when Protective Clothing is being doffed.

3.2.4.1 Self-indicating dosimeters (SID), such as an Electronic Personal Dosimeter (EPD), provides an individual's current exposure status in between record TLD evaluations.
(RCTS2 010679-01, RCTS2 041027-01, FSAR 12.5.3.6)

- The exposure information obtained from the SID is used for job exposure tracking and by departments for budgeting job exposure for their personnel.

3.2.4.2 RP may also require an alarming dosimeter or special dosimetry to be worn on certain jobs.

- Special dosimetry is used for monitoring the extremities, monitoring neutron radiation fields, or obtaining localized readings in an abnormal, varying, or non-uniform radiation environment.

3.2.4.3 DMC-2000 EPDs equipped with a PAM-1 (or equivalent) are:

- Required in High Radiation Areas when the workers ability to hear an alarm is impaired by high noise environment, hearing protection use, use of audio headset or personal hearing loss. (CRAI 3218552) (CRAI # 2817781)
- To be considered in Radiation Area in situations where a worker’s hearing is impaired (for instance while using audio headsets) based on plant conditions and the probability of radiological conditions changing during the work.
- RP Leader's authorization is required to deviate from these requirements on a case by case basis. (CRAI 3218533)

- In addition to having workers wear an external alarming device; the following additional dose control measures should be emphasized:

  More frequent monitoring of dosimetry,

  Reduced stay times in high noise/high radiation work areas. (ICR 00349 and ICR 00483)

3.2.5 Placement of dosimetry devices should be as follows:

3.2.5.1 Dosimetry devices (e.g., TLDs, SIDs) should normally be worn on the front of the body between the thigh and head, unless directed otherwise by RP.

3.2.5.2 TLDs should be worn on the outside of protective clothing when skin is exposed and shallow-dose equivalent is of concern (e.g., noble gas environment).

3.2.5.3 TLDs should be placed under the protective clothing if all skin is covered (i.e., full PCs plus respirator)

3.2.5.4 Special dosimetry shall be worn as specified on the REP.

- SIDs should be worn on the same approximate location of the body as the special dosimetry.

3.2.5.5 SIDs should be worn so that they are easily retrieved and read.

3.2.5.6 The neutron TLD should normally be worn face out on the front and center of the body between the thigh and the head.

- The neutron TLD should be held tightly to the body by either a pouch or belt, or by use of tape.

3.2.6 Personnel are responsible for the safekeeping of their dosimetry devices and shall not tamper with nor cause the dosimetry to be exposed to radiation except during the performance of work requirements. Examples include: do not pass dosimetry device (TLD or EPD) through the security x-ray and do not wear dosimetry following the administration of radiopharmaceuticals unless directed by Radiation Protection. (CRAI 3165248)

- Lost or damaged dosimetry shall be immediately reported to Radiation Protection and a report filed in accordance with 75RP-9ME23, "Lost or Damaged Dosimetry," by RP personnel.

3.2.6.1 Off-scale readings from SIDs shall be reported to RP personnel immediately for a dose evaluation.

3.2.6.2 If an individual's dosimeter alarms, the individual shall:

- Notify their co-workers.
- Immediately exit the area.
- Immediately report to RP.

3.2.7 When working in a contaminated area, dosimetry devices should be worn so as to prevent them from becoming contaminated.

- Dosimetry devices should be protected from contamination (both radiological and non-radiological) as much as practical, without interfering with the device's proper operation. Whirl pack or zip-lock bags are normally used for this purpose.

- When practical, dosimetry should not be covered up such that it cannot be seen and/or heard or impair self-monitoring of exposure by the worker.

- In the event that dosimetry is worn under protective clothing impairing the worker's ability to see and/or hear the dosimetry, RP Personnel shall assume responsibility for monitoring the worker's exposure. (ICR 00483 and ICR 00432)

3.2.8 Exposures received by personnel monitored by dosimetry devices, as outlined in this section, should be recorded under the applicable REP number. (RCTS2 009656-01, RG 8.10R1R 2.A)

3.2.9 Visitors entering the RCA should be issued dosimetry and be continuously escorted to ensure that radiological requirements are met.

3.2.10 For assistance in determining dosimetry and training requirements, exposure limits, etc. for Off Site Agencies assigned to PVNGS, consult Appendix H "Off Site Support Agency Radiological Determination Matrix". (CRAI 2853889 and ICR 450)

3.3 Dosimetry for Visitors

Issue, exchange, evaluate, and terminate Visitor dosimetry as follows:

3.3.1 Dosimetry Device - Use an EPD to monitor exposure.

3.3.2 Access Restrictions

- RCA entries - Must be escorted by a qualified radworker.
- Exposure allowed - 100 mrem TEDE per year.
- No entries allowed into the following areas:
  - High Radiation Area (HRA)
  - Locked High Radiation Area (LHRA)
  - Airborne Radioactivity Area (ARA)
  - Hot Particle Control Area (HPCA)
  - High Contamination Area (HCA)
- Contaminated Area (CA) entry - *Allowed if approved by an RP Department Leader and appropriate protective clothing dress-out instruction is provided prior to entering a contaminated area.*

3.3.3 Requesting RCA ACCESS

3.3.3.1 The requester shall ensure completion of Section A of Appendix F, "Visitor Request for RCA Access" and provide the completed form to the appropriate RP leader for approval.

3.3.3.2 The appropriate RP leader will complete Section B.

3.3.3.3 The Visitor and Escort will complete Section C.

3.3.4 Dosimetry Issue - (Section D of Appendix F)

3.3.4.1 Ensure the requirements in 3.3.3 have been completed.

3.3.4.2 Verify if a record TLD has been previously issued to the individual during the current year. (A computer access control system may be used to perform verification.)

- The name of the individual completing the verification shall be entered on the line provided in Appendix F, Part 2, line b.

3.3.4.3 If the following are met, issue an EPD:

- The individual was not issued a record TLD at PVNGS during the current year, and

- The individual's current year TEDE is less than 1800 mrem

  or

- RP management approval has been obtained for those individuals whose current year TEDE is greater than 1800 mrem and were not previously issued a record TLD at PVNGS during the year.

3.3.4.4 If the individual does not meet the items in 3.3.4.3, the visitor process cannot be used to allow entry into an RCA.

- If the individual was previously issued a record TLD at PVNGS during the current year, they must be issued another record TLD in accordance with 75RP-9ME21 “TLD Issue, Exchange and Termination” to enter an RCA.

3.3.4.5 Enter the appropriate information in Section D, “Dosimetry Device Issue and Results” of Appendix F for each RCA entry. (e.g., Issue Date, EPD Serial Number, RP Initials)

3.3.4.6 The visitor's escort is responsible for ensuring the visitor obtains an EPD prior to entering an RCA.

3.3.5 Documentation

Use Section D, "Dosimetry Device Issue and Results" of Appendix F to keep track of the visitor's RCA entries.

- The visitor's escort is responsible for maintaining possession of the paperwork and ensuring it is properly filled out for each RCA entry.

3.3.6 Exposure Evaluation

Evaluate the visitor's exposure after each RCA entry by:

- Recording the EPD exit reading on Appendix F, and
- Calculating the exposure received for the entry, and
- Calculating the "Accumulated Total Dose" (in mrem)
- Ensuring the "Accumulated Total Dose" remains below 100 mrem in a year.

3.3.6.1 Do not allow further RCA entries if they would cause the visitor's accumulated total dose to exceed 100 mrem in a year.

3.3.6.2 If the individual requires further RCA entries and does not have sufficient visitor exposure remaining, then issue the individual a TLD in accordance with 75RP-9ME21 "TLD Issue Exchange and Termination".

3.3.7 Reporting of Exposure

3.3.7.1 Forward the completed Appendix F to Dosimetry.

3.3.7.2 Reporting of visitor exposure is not required.

- If requested, a copy of Appendix F may be provided to the individual after it has been reviewed by Dosimetry.

3.4 Radiation Exposure Permits (REP)

3.4.1 General

3.4.1.1 REPs are the principal administrative means to manage radiation exposure received by personnel at PVNGS.
(RCTS2 010665-01, FSAR 12.5.3.2.C)

3.4.1.2 A REP should specify the job to be performed, the radiological conditions at the job location (except Standing REPs), the protective clothing, dosimetry and respiratory protection requirements for the job, the Reg. Guide 1.16 work classification for the job, and the date(s) and time that the REP is valid.
(RG 1.16, C.1.b.3)

- Additionally, any special instructions for completing the job in a radiologically safe manner should be specified on the REP.

3.4.1.3 An active REP shall be required for the following:

- Any job or task within a RCA.
  (RCTS2 010664-01, FSAR 12.5.3.2.C)
- Any use of radioactive sources which could result in significant exposures to individuals
  (RCTS 010913-01; RCTS2 010683-01, FSAR 12.5.3.7)

3.4.1.4 RP has the capability to expedite entries by individuals into RCAs should it become necessary to meet critical operational needs.

- This can be done by providing an RP technician to escort personnel in lieu of generating a new REP.

3.4.2 Initiating a REP

3.4.2.1 Personnel needing to perform work requiring a REP should provide the RP Operations ALARA Planning Section, with information pertaining to the work to be performed (e.g., component ID, location, scope of work, etc.).

3.4.2.2 The work group supervisor or designee may be required to supply a list of personnel authorized to enter on that REP.

3.4.2.3 Copies of REPs are posted or made available at the access point(s) to RCAs where work is to be performed. The original will be kept on file by RP while that REP is active.

3.4.3 Revising a REP

All revisions to REPs should be made by RP personnel, who should ensure all copies are revised.

3.4.4 Terminating a REP

3.4.4.1 When all work covered by the REP is completed, the originator should notify RP.

3.4.4.2 RP personnel should terminate all associated REPs and ensure all copies are removed.

3.4.4.3 When the expiration date of the REP has been reached, RP should terminate the REP unless requested by the originator to extend the REP.

3.4.4.4 RP may terminate the REP if they determine the radiological conditions at the job site have changed (or will change), or if the REP is improperly used (i.e., scope of the original job has changed).

3.5 Restricted Area Access and Egress

3.5.1 Personnel issued a TLD shall pick up and wear the TLD upon entering a Restricted Area. (RCTS2 010660-01, FSAR 12.5.3.2.A)

- Visitors without a designated TLD storage location should pick up their dosimetry at the Dosimetry Office during normal working hours or from RP at the applicable unit.

3.5.2 All personnel issued a TLD shall return their TLD to the designated storage location upon exiting a Restricted Area except as noted below. (CRAI 3165249)

3.5.2.1 Individuals whose work involves radioactive material outside of an established Restricted Area.

NOTE

The Emergency Plan exception is applicable for drills as well as an actual emergency.

3.5.2.2 Individuals required to exit a Restricted Area due to the Emergency Plan for:

- Assembly and Accountability, or
- Evacuation, or
- Emergency Plan assignment(s)

3.5.2.3 Security personnel while working in Protected Area Security Access Facilities and the Sally Ports. (CRAI 3391284)

3.5.3 All personnel exiting the Protected Area through the Security Building should be monitored by passing through a radiation portal monitor (if operable).

3.5.4 If the portal monitors alarms, the individual shall attempt monitoring a second time.

3.5.4.1 If a portal monitor alarms on the second monitoring attempt, the individual shall ensure RP Operations in Unit 2 is notified (with the exception of those individuals who have a valid "Portal Monitor Release" form) (RP ICR 00216, RP ICR 00219)

- When notified, RP will perform an evaluation of the situation and take the appropriate actions.(CRDR 2548498)
- The individual causing the alarm shall not exit the restricted area until receiving authorization from RP Leadership

3.6 Radiological Controlled Area Entry

3.6.1 Normal Unit RCA access is established at the 140' Access Control Area located adjacent to the Unit RP Island using an Access Control Turnstile, although other RCAs may exist within the Restricted Area.
(RCTS2 010661-01, FSAR 12.5.3.2.B, CRAI 2510316)

CAUTION

Minimize Unit RCA Entries from other than the 140’ Aux RP Control Point. (CRAI 3065824)

- Personnel who must enter a Unit RCA other than at the Aux. 140', must be approved by RP prior to entry.
- Personnel who must enter a non-unit RCA located inside or outside the permanent Restricted Area boundary (e.g., Service Bldg., LLRMSF, ISFSI) must be approved by RP prior to entry.

3.6.2 The RP requirements for unescorted entry into an RCA are:

- Have a TLD and SID,
- Up to date whole body count (WBC),
- RWP training is current,
- Read the appropriate REP,
- Received any associated Pre-Job Briefing, and
- Signed onto the appropriate REP via a REP Sign-in Sheet or electronic signature as applicable.

3.6.2.1 By signing the REP, individuals indicate they have read and understand the REP requirements and will comply with them.
(RCTS 010915-01)

3.6.2.2 Personnel should read their appropriate REP prior to each subsequent entry.

3.6.2.3 If necessary, the requirements for a WBC and/or RWP may be waived to allow an RCA entry with approval of the Radiation Protection Manager.

- Document the approval and any restrictions on Appendix E.

3.6.3 If there are any questions about the REP, radiological conditions of the work area, specific requirements set by RP, or if required by the REP, contact RP.

3.6.4 Personnel should obtain any protective clothing, additional dosimetry and/or respiratory protection equipment required by the REP.

3.7 Monitoring/Coverage of Radiological Work

3.7.1 Work group supervision (e.g., section leaders, team leaders) should routinely monitor the activities of their personnel during job performance to ensure that proper radiological protection measures are being used.

- Improper work practices should be immediately stopped and reported to RP personnel for an evaluation of any radiological impact.

3.7.2 RP personnel should monitor the performance of radiation workers periodically and correct improper work practices on the spot.

- Issuance of a Palo Verde Action Request (PVAR), see 01DP-0AP12 may also be necessary based on the severity of any violations.

3.7.3 Continuous surveillance by RP personnel may be necessary when potentially extreme radiological conditions exist in a work area.
(RCTS 039536-02, NRC IR 529/88-22-01, LER 2-88-011-01)

Examples of these types of conditions include, but are not limited to, the following:

a) High radiation levels *See section 3.9 for specific requirements.* (e.g., more than 1 rem/hr whole body, 5 rem/hr extremity, etc.)

b) High potential for uptakes of radioactivity, such as:

- High loose surface contamination levels (e.g., above 1.0E6 dpm/100 cm^2 βγ or 1000 dpm Alpha) or
- High particulate/iodine airborne radioactivity levels (e.g., 10 DAC or greater).

c) Radiological conditions which are unknown or may change significantly or rapidly due either to the nature of the work to be performed or the operation of plant systems, or as determined by RP.

3.7.3.1 Jobs requiring continuous surveillance should clearly identified on the applicable REP.

3.7.4 APS employees meeting the minimum RP experience requirements of Section 4.5.2 of ANSI/ANS 3.1 – 1978 may change a worker's REP and/or Task while in the RCA. (CRAI 3314054)

3.7.4.1 A second RP Technician meeting the minimum RP experience requirements of Section 4.5.2 of ANSI/ANS 3.1 – 1978 shall perform a peer check verifying:

- EPD display is in run mode and displays 0.0.
- DMC viewer software shows the dosimeter is in RUN mode and the correct REP and task are displayed.
- Document REP and/or task change in the appropriate log book.

3.8 Radiological Controlled Area Exit:

3.8.1 Personnel Monitoring at RCA Exits

All personnel exiting an RCA are required to be monitored by a contamination monitor (e.g., personnel contamination monitor- PCM) and all personnel exiting an RCA are required to be monitored by a radiation portal monitor, if operable.

- If the RCA does not have an operable PCM, then direct personnel to perform a whole body frisk and proceed to another location having an operable PCM for monitoring, as appropriate. (RP ICR 00097)
- If the area is an RCA only because of dose rates and there are no radioactive material storage containers or contamination sources in the area, contamination monitoring is not required.
- On a temporary basis, a satellite area posted as an RCA may be released from the need for contamination monitoring on each exit from the area. However, there must be no open contaminated areas or material, radiation protection coverage must be provided, and a sufficient survey of the area must be periodically performed (for example, each shift) to ensure no contamination is present.
- For satellite RCAs without installed PCMs or portal monitors, personnel perform a hand-and-foot frisk upon leaving the satellite RCA and proceed to the nearest PCM and portal monitor. Personnel leaving the ISFSI RCA are exempt from the hand-and-foot frisking requirement. These personnel need to be monitored at one of the unit RCA exits.
- Injured personnel may be exempted from all RCA egress monitoring based on evaluation. Injured personnel shall be monitored as soon as reasonable and practical using portable frisking equipment (ACT, 3072663).

3.8.2 Personnel Monitoring for Radioactive Material Transfer between RCAs (e.g., exiting through an RCA Yard gate)

Personnel involved in the transfer of radioactive material may perform a whole body frisk prior to exiting an RCA under the following conditions:

a) Personnel have not entered a Contaminated Area or have been monitored by a PCM upon exiting a Contaminated Area.

b) RP must observe the whole body frisk being performed.

c) Personnel are monitored by a PCM prior to exiting the receiving location's RCA.

- If the receiving location does not have an operable PCM, then ensure monitoring by a PCM occurs as soon as practicable after completion of the transfer. (RP ICR 00224)

3.8.3 Except for Security gun belts, tool belts should be removed prior to entering a PCM.

NOTE

Plant personnel should be reminded that all PCM alarms are to be treated as actual contamination alarms until proven otherwise by Radiation Protection.

3.8.4 If the PCM alarms, take the following actions, as appropriate:

PCM alarm during initial monitoring:

- If you receive a PCM alarm during the initial monitoring, notify RP and remain near the PCM.

3.8.5 Make applicable items to be removed from the RCA available for survey by RP personnel.

NOTE

Additional guidance on PCM alarm response is provided in 75DP-0RP02, "Radioactive Contamination Control."

3.8.6 If the RCA portal monitor alarms when exiting, the individual shall notify Radiation Protection.

- The RP representative will evaluate the situation and take the appropriate actions.

3.8.7 Except as specified in step 3.8.8 and 3.8.9, personnel should return all dosimetry other than their permanent whole body TLD to RP upon exiting an RCA. (QATS 391132-05)

3.8.8 Operations, Radiation Protection, Chemistry, Security, and Fire Protection (including roving firewatch) personnel may retain their dosimetry (e.g., EPD, Special dosimetry) provided:

- They are logged in on an appropriate REP and,
- The potential exists to need immediate access to an RCA and,
- They do not leave the permanent Restricted Area.

3.8.9 Personnel may retain their dosimetry for work in RCAs located outside of the permanent Restricted Area boundary (e.g., LLRMSF) provided:.

- They are logged in on an appropriate REP, and,
- The dosimetry is returned to the appropriate issue point when the work is completed (or prior to leaving the site for the day).

3.9 Special Area Access

NOTE

RP Personnel or personnel escorted by RP may be exempt from the REP issuance requirement during the performance of their assigned duties, provided they are otherwise following plant RP procedures for entry into High Radiation Areas.

3.9.1 High Radiation Area Access (RP 046013-01, 10CFR20.1601(a)(3))

3.9.1.1 Access into a High Radiation Area requires the issuance of a specific REP authorizing entry.
(RCTS2 010601-01, RCTS 011131-01, Tech Spec 5.7.1)

- RP shall ensure that an individual authorized access has sufficient remaining exposure to work in the area.
- Access into an HRA is **NOT Authorized** for individual's using Appendix F, "Visitor Access Request" (i.e., provided monitoring by EPD only).

3.9.1.2 Any individual or group permitted to enter a High Radiation Area shall be provided with, or accompanied by one or more of the following: (RCTS 011132-01, Tech Spec 5.7.1)

(a) Radiation dose rate meter.

(b) Alarming dosimeter (e.g. EPD) - Entry with an alarming dosimeter may be made after the dose rate levels in the area have been determined and personnel have been made aware of them by receiving a specific high radiation area briefing from RP personnel.

(c) An individual qualified in radiation protection procedures with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area and shall perform periodic radiation surveillance at the frequency specified in the REP.

3.9.2 <u>Locked High Radiation Area Access</u> (Tech Spec 5.7.2, RCTS2 010663-01)

In addition to the HRA requirements stated in 3.9.1.1 and 3.9.1.2 above, access to Locked High Radiation Areas (areas where radiation levels could result in an individual receiving a dose equivalent in excess of 1000 mrem in 1 hour), shall be controlled as follows:

3.9.2.1 Doors shall remain locked except during periods of access by personnel under an approved REP that shall specify the dose rate levels in the immediate work areas and the maximum allowable stay times for individuals in those areas.
(RCTS 010594-01, Tech Spec 5.7.2)

3.9.2.2 In lieu of the stay time specification of the REP, direct or remote (such as closed circuit TV cameras) continuous surveillance may be made by personnel qualified in radiation protection procedures to provide positive exposure control over the activities being performed within the area. (Tech Spec 5.7.2)

3.9.3 Very High Radiation Areas (RP 046014-01, 10CFR20.1602)

In addition to the HRA and LHRA requirements above, personnel access to a Very High Radiation Area (areas where radiation levels from sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads in 1 hour at 1 meter from any surface that the radiation penetrates) shall be controlled as follows:

3.9.3.1 Access shall be under a REP which is specific to the individual VHRA and requires continuous surveillance by RP.

3.9.3.2 Entry shall be authorized by an RP department leader.

3.9.3.3 The Operations Control Room Supervisor shall be contacted prior to entry into a VHRA.

3.9.4 Contaminated Area Access/Egress

Contaminated Area access and egress should be performed in accordance with the Radioactive Contamination Control procedure. Special clothing requirements should be determined by RP and should be specified on the REP. (RCTS2 010616-01, FSAR 12.5.1.3.B)

3.9.5 Airborne Radioactivity Area Access

Respiratory protection equipment should be determined by RP and specified on the REP. (RCTS2 010673-01, FSAR 12.5.3.5)

- 01DP-0IS08, "PVNGS Respiratory Protection Equipment Usage" provides additional guidance and restrictions.

3.9.6 Containment Building Access

After shutdown, the containment is accessible for limited periods of time and all access is controlled, using an Access Control Turnstile. Areas within the containment building should be surveyed by RP personnel to determine allowable working times and establish any special access requirements which may be necessary.
(RCTS2 010606-01, FSAR 12.3.2.2.2, CRAI 2510316)

3.10 Radiation Exposure Limitations and Controls

3.10.1 10CFR20.1201 Occupational Dose Limits (RP 046002-01, 10CFR20.1201(a))

3.10.1.1 Annual Occupational radiation dose to adults shall be limited to:

(a) 5 rem total effective dose equivalent (TEDE) or 50 rem total organ dose equivalent (TODE), whichever is more limiting and,

(b) 15 rem lens dose equivalent (lens of the eye) and,

(c) 50 rem shallow-dose equivalent (skin or any extremity).

3.10.1.2 Occupational dose limits authorized by 10CFR20.1201 shall be reduced by 1.25 rem TEDE and 12.5 rem shallow-dose equivalent for each quarter that occupational radiation exposure records are not available (i.e., no signed statement of previous occupational exposure or incomplete NRC Form 4).
(RP 046036-05, 10CFR20.2104(e)(1))

3.10.2 PVNGS Annual Exposure Goal

To keep exposures ALARA, PVNGS has established an annual exposure goal of 2 rem TEDE for each individual receiving occupational radiation exposure at PVNGS (not to exceed 10 rem TEDE in any 5 year period).

- The annual exposure may be increased up to 2.5 rem TEDE to accommodate occupational radiation exposure received at other licensed facilities within the current year.

3.10.3 Administrative Exposure Hold Points

To further maintain exposures ALARA, individuals are assigned an initial administrative exposure hold point of 1.5 rem/year TEDE.

- To ensure exposures are kept ALARA, management must approve requests for assignment of higher administrative hold points (see 3.11)

3.10.4 Exposure of Pregnant Women

3.10.4.1 **Declared Pregnant Woman**: Female radiation workers who choose to declare their pregnancy or suspect they might be pregnant should fill out and sign a "Pre-Natal Dose Limit Statement" (Appendix B), acknowledging their exposure limitation to 50 mrem per month during pregnancy and an exposure limitation to the embryo/fetus of 500 mrem for the entire gestation period. (RCTS2 010505-01, RG 8.13 R3, RP 046008-01, RP 046008-02, 10CFR20.1208(a) & (b))

(a) Fill out the top section of the "Pre-Natal Dose Limit Statement," read the block for "Declared Pregnant Woman," then sign the "Employee's Signature" line.

(b) Obtain the "Section Leader's Acknowledgement" signature.

- The female's direct supervisor should assign her tasks which ensure the dose restriction are adhered to.

(c) Deliver the "Pre-Natal Dose Limit Statement" to Dosimetry after signature by the supervisor. (ICR00130)

(d) Upon receipt of the Appendix B, Dosimetry will perform the following in order to establish baseline monitoring for the declared pregnant woman: (RP ICR 00232)

- Whole body count the individual
- Issue a new TLD and process the individual's current TLD (if they have been issued one)
- Establish a lower Administrative Exposure Hold Point

3.10.4.2 **Declared Fertile Woman:** Female radiation workers who choose to declare their intention to become pregnant (declared fertile woman) should fill out and sign a "Pre-Natal Dose Limit Statement" acknowledging their exposure limitation to 50 mrem per month.

(a) Fill out the top section of the "Pre-Natal Dose Limit Statement," read the block for "Declared Fertile Woman," then sign the "Employee's Signature" line.

(b) Obtain the "Section Leader's Acknowledgement" signature.

- The female's direct supervisor should assign her tasks which ensure the dose restriction are adhered to.

(c) Deliver the "Pre-Natal Dose Limit Statement" to Dosimetry after signature by the supervisor. (RP ICR 00130)

(d) Upon receipt of the Appendix B, Dosimetry will perform the following in order to establish baseline monitoring for the declared pregnant woman: (RP ICR 00232)

- Whole body count the individual
- Issue a new TLD and process the individual's current TLD (if they have been issued one)
- Establish a lower Administrative Exposure Hold Point

(e) Declared fertile women that become pregnant should declare their pregnancy acknowledging their exposure limitation for the gestation period in accordance with step 3.10.4.1, Declared Pregnant Woman.

(f) Declared fertile women whose status has not changed after six months should resubmit the "Pre-Natal Dose Limit Statement" in accordance with step 3.10.4.2, Declared Fertile Woman.

3.10.4.3 If the dose equivalent to the female radiation worker has exceeded 500 mrem or is within 50 mrem of the 500 mrem gestation limit, by the time she declares her pregnancy, then she may receive an additional 50 mrem during the remainder of her pregnancy. (RP 046008-04, 10CFR20.1208(d))

3.10.4.4 NRC Regulatory Guide 8.13 states any monthly dose of less than 0.1 rem may be considered as not a substantial variation above a uniform monthly dose rate and as such will not require licensee justification. (10CFR20.1208(b), ICR 00088, RG 8.13, C.5)

- If a monthly dose greater than 0.1 rem is received, then a justification for the exposure should be written.

3.10.4.5 If a female radiation worker no longer requires a pre-natal dose limit, she needs to inform Dosimetry, in writing, using the following method:

(a) Obtain a new Appendix B, “Pre-Natal Dose Limit Statement”

- Fill out the personnel information at the top of the form.
- Place signature in the section titled “Dose Limit Correction.”

(b) Obtain the “Section Leader’s Acknowledgement” signature.

(c) Deliver the "Pre-Natal Dose Limit Statement" to Dosimetry after signature by the supervisor.

(d) Upon receipt of the Appendix B informing a pre-natal dose limit is no longer required, Dosimetry will perform the following in order to close out dose monitoring for the embryo/fetus:

- Whole body count the individual
- Issue a new TLD and process the individual’s current TLD used to establish the baseline monitoring.
- Returned the individual to their normal administrative exposure hold point.

3.10.5 <u>Exposure of Visitors</u>

3.10.5.1 Visitors who have not been issued permanent dosimetry and who require entry into an RCA shall be limited to 100 mrem/ year TEDE at PVNGS.

3.10.5.2 Normally, visitors should enter the RCA using Standing REPs (SREPs), and enter only those areas and perform those functions permitted by those SREPs.

3.10.5.3 Refer to Section 3.3, “Dosimetry for Visitors” for additional information, requirements, and restrictions.

3.10.6 <u>Exposure of Minors</u>

No individual under 18 years of age should be permitted to receive occupational exposure to radiation or airborne radioactivity at PVNGS.
(RP 046007-01, 10-CFR20.1207, RCTS2 010506-01, RG 8.13)

3.11 Assignment of Higher Administrative Exposure Hold Points

3.11.1 Requests for a Higher Hold Point

3.11.1.1 Management approval is needed to obtain a higher hold point. Appendix A, "Request for a Higher Administrative Exposure Hold Point", is used to request the new hold point. These are available at the RP Island, Dosimetry office, or as an electronic form in the Palo Verde Site Specific Forms Menu under Radiation Protection.

- If the request is due to an individual exceeding an assigned hold point, RP management ensures a documented evaluation is performed for the cause.

3.11.1.2 The requesting supervisor completes the Originator section of the form, ensuring the ALARA concept is maintained within their department and the request for a higher individual administrative exposure hold point is warranted. (i.e., No other qualified personnel are available who have sufficient remaining exposure below their hold point.)

3.11.1.3 Submit Appendix A to RP for concurrence, (i.e., the job scope and radiological conditions warrant the new exposure hold point).

3.11.1.4 If concurrence is obtained from RP, the request is forwarded to Dosimetry. A Dosimetry technician performs a records search to obtain appropriate information necessary to complete the Dosimetry section of the form.

(a) All occupational exposure received at licensed facilities other than PVNGS during the current year should be verified unless an exception is authorized by the Radiation Protection Manager.

(b) The technician completing this section should sign and date in the designated space.

3.11.1.5 The requesting supervisor should route Appendix A to applicable management in the approval chain.

3.11.2 Approvals

3.11.2.1 The individual for whom the higher administrative exposure hold point is requested signs the request to verify all occupational exposure is accounted for in their PVNGS Dosimetry Records. (RCTS 040337-02, NRC IR 528/90-55-01 NCV)

NOTE

In the event that any management in the approval chain declines to sign the request, no further approval can be sought through other management.

3.11.2.2 In addition to the following approvals, any request for a higher administrative exposure hold point which would allow a worker's cumulative lifetime exposure (in rem) to exceed the worker's age (in years) are reviewed and approved by the ALARA Committee Chairman.

(a) For a Hold Point higher than 1500 mrem/year, RP Department Leader approval required.

(b) For a Hold point higher than 2000 mrem/year Radiation Protection Manager approval required.

(c) For a Hold Point higher than 2500 mrem/year up to 4000 mrem/year, the ALARA Committee review and approval is required (as signified by the signature of an ALARA Committee Chairman).

(d) For any Hold Point that would cause an individual's exposure to exceed 10 rem cumulative site exposure in 5 years the Sr Vice President, Site Operations approval is required.

3.11.2.3 The request is then returned to the Dosimetry Office for processing.

3.12 Personnel Overexposures

3.12.1 Personnel who exceed or suspect they have exceeded any exposure limit in 3.10.1.1, shall immediately report to the appropriate RP Department or the Dosimetry Office.

3.12.2 RP should obtain all pertinent information concerning the potential overexposure from the individual and initiate reporting in accordance with 90DP-0IP10, "Condition Reporting"

- The Radiation Protection Manager ensures the incident is investigated.

3.12.3 The individual should then be directed to the Dosimetry Office.

3.12.4 Dosimetry evaluates the individual's record TLD and restricts the individual from entering the RCA until the record TLD is reissued.

3.12.5 Any overexposure meeting the criteria of Appendix C, "Criteria for Reporting Personnel Overexposure to the USNRC", shall be reported as described in Appendix C.

3.12.6 Any report, as described in Appendix C, shall require a written report to be provided to the affected individuals(s) no later than the time of official written notification to the NRC. This report should be prepared in accordance with the Radiological Reports procedure. (RCTS 039454-01)

3.13 Radiation Protection Manager Review of Radworker Error

3.13.1 At the discretion of the Radiation Protection Manager review and resolution of Radworker Error (including inappropriate, unauthorized possession or use of contraband materials in the RCA) should include: (CRAI 3214174)

3.13.1.1 The affected Radworker's Director (and Site Coordinator for Non Utility Radworkers) and the Radiation Protection Manager meet, review and discuss the circumstances surrounding the Radworker Error.

3.13.1.2 The decision to lift the Radworker's RCA Access restriction is at the sole discretion of the Radiation Protection Manager.

3.14 Documentation

Turnover documents to NIRM in accordance with the appropriate NIRM Turnover Instruction(s).

4.0 DEFINITIONS and ABBREVIATIONS

4.1 Definitions

4.1.1 **Administrative Exposure Hold Point** - An administrative control measure used as an aid to maintain individual and collective doses ALARA and prevent exceeding regulatory dose limits.

4.1.2 **Annual Limit On Intake (ALI)** - Means the derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man that would result in a committed effective dose equivalent of 5 rems or a committed dose equivalent of 50 rems to any individual organ or tissue. (ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table 1, Columns 1 and 2, of Appendix B to 20.1001-20.2401).

4.1.3 **Automated Radiological Access Control System (ARACS)** - is a computer based system which utilizes worker information, REP data and TLD data to facilitate individual automated RCA access and egress transactions. (ICR 00114)

4.1.4 **Committed Dose Equivalent ($H_{T,50}$)** - Means the dose equivalent to organs or tissues of reference (T) that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

4.1.5 **Committed Effective Dose Equivalent ($H_{E,50}$)** - Is the sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues ($H_{E,50} = W_T\ H_{T,50}$).

4.1.6 **Declared Fertile Woman** - A woman who has voluntarily informed the licensee, in writing, of her intent to become pregnant.

4.1.7 **Declared Pregnant Woman** - A woman who has voluntarily informed the licensee, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant.

4.1.8 **Deep-Dose Equivalent (DDE)** - External whole-body exposure, the dose equivalent at a tissue depth of one centimeter (1000 mg/cm^2).

4.1.9 **Derived Air Concentration (DAC)** - Means the concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2,000 hours under conditions of light work (inhalation rate 1.2 cubic meters of air per hour), results in an intake of one ALI. DAC values are given in Table 1, Column 3, of Appendix B to 20.1001-20.2401.

4.1.10 **Emergent Work** - Work orders of a priority nature, not appearing on the approved work list.

4.1.11 **Electronic Personal Dosimeter (EPD)** - an electronic dosimetry device which provides convenient monitoring of accumulated exposure by workers in an RCA, and has the capability to alarm, both audibly and visibly, at preset dose and dose rate values. The EPD can function as both a SID and an alarming dosimeter.

4.1.12 **Electronic Signature** - A process within the computerized access control system to document an individual worker's acknowledgement that they have read and understand the REP. Answering "yes" to the computer screen prompt asking the individual "Have you read and understood the REP" constitutes the worker's "signature" of acknowledgement.

4.1.13 **Individual Qualified in Radiation Protection Procedures** - Individuals are considered qualified in radiation protection procedures when they are certified as capable of successfully accomplishing the following activities as required by federal regulations, license conditions, and facility procedures pertaining to radiation protection: (HPPOS-015)

1. Conducting and evaluating special and routine radiation, contamination and airborne radioactivity surveys.
2. Establishing protective barriers and posting appropriate radiological signs.
3. Establishing a means of limiting exposure rates and accumulated radiation doses, including the use of protective clothing and respiratory protection equipment.
4. Performing operability checks of radiation monitors and survey meters.
5. Recommending appropriate immediate actions in the event of a radiological problem, and performing necessary activities until the arrival of health physics personnel.
6. Conducting other routine radiological duties as required on backshifts or weekends.

4.1.14 **Lens Dose Equivalent (LDE)** - The external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm^2).

4.1.15 **Personnel Contamination Monitor** (PCM) - An instrument used to provide automatic WHOLE BODY MONITORING of personnel for external radioactive contamination.

4.1.16 **Radiation Exposure Permit (REP)** - An administrative control which describes a specific job or task within a Radiological Controlled Area, identifies radiological conditions, and specifies the radiation protection measures required for performance of a task.

4.1.17 **Radiological Controlled Area (RCA)** - Any area so posted, which features positive controls for the purpose of protecting personnel from radiation exposure and radioactive contamination.

4.1.18 **Restricted Area** - An area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure of radiation and radioactive materials. The restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area. At PVNGS, the permanent restricted area boundary coincides with the security protected area boundary. Satellite or temporary restricted areas may also need to be established outside the permanent restricted area.

4.1.19 **Self Indicating Dosimeter (SID)** - a dosimetry device used to monitor a worker's radiation exposure between TLD processing periods, which is easily read by the worker in the field. Examples consist of pocket ion chamber type and electronic personal dosimeter type.

4.1.20 **Shallow Dose Equivalent** (SDE) - applies to the external exposure of the skin of the whole body or the skin of an extremity and is taken as the dose equivalent at a tissue depth of 0.007 cm (7 mg/cm^2).

4.1.21 **Total Effective Dose Equivalent (TEDE)** - The sum of the effective dose equivalent, EDE, (for external exposures) and the committed effective dose equivalent, CEDE, (for internal exposure). (CRAI 3120698)
(This change to 10CFR20.1003, "Definitions," as documented in the Federal Register, Vol. 72, No. 232, Tuesday, December 4, 2007, delineates that Effective Dose Equivalent (EDE) may be substituted for Deep Dose Equivalent (DDE) for external exposures. While EDE is the primary quantity in the definition of TEDE for external exposures, licensees are required to use the DDE in place of EDE when measuring dose from external exposure unless the EDE is determined by a dosimetry method approved by the NRC.)

4.1.22 **Total Organ Dose Equivalent (TODE)** - The sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye.

4.1.23 **Visitor** - Individual who has been assigned a Visitor ACAD or badge from Security and requires an escort while in the Restricted Area.

4.1.24 **Visitor Escort** - An individual currently issued a TLD with an active status assigned to continuously escort a visitor in restricted areas and radiological controlled areas.

4.2 Abbreviations

4.2.1 **ACAD** - Automated Control Access Device.

4.2.2 **ARA** - Airborne Radioactivity Area

4.2.3 **ARACS** - Automated Radiological Access Control System

4.2.4 **CA** - Contaminated (Contamination) Area (CRAI 3373967)

4.2.5 **EPD** - Electronic Personal Dosimeter

4.2.6 **ISFSI** - Independent Spent Fuel Storage Installation

4.2.6 **HCA** - High Contamination Area

4.2.7 **HPCA** - Hot Particle Control Area

4.2.8 **HPPOS** - NRC Health Physics Position (from *NUREG/CR-5569*)

4.2.9 **HRA** - High Radiation Area

4.2.10 **JHES** - A job classification system which dictates required levels of RP management review and approval for REP's, based upon the radiological conditions and hazards associated with the job.

4.2.11 **LHRA** - Lock High Radiation Area

4.2.12 **LLRMSF** - Low Level Radioactive Material Storage Facility

4.2.13 **PCM** - Personnel Contamination Monitor

4.2.14 **RCA** - Radiological Controlled Area

4.2.15 **SID** - Self Indicating Dosimeter

4.2.16 **TEDE** - Total Effective Dose Equivalent

4.2.17 **VHRA** - Very High Radiation Area

4.2.18 **WBC** - Whole Body Count

5.0 REFERENCES

5.1 Implementing

5.1.1 01DP-0IS08, PVNGS Respiratory Protection Equipment Usage

5.1.2 01DP-0AP12, Palo Verde Action Request Processing

5.1.3 75DP-0RP02, Radioactive Contamination Control

5.1.4 75RP-9ME21, TLD Issue, Exchange and Termination

5.1.5 75RP-9ME23, Lost or Damaged Dosimetry

5.1.6 75RP-9RP09, Release of Vehicles, Equipment, and Material from Radiological Controlled Areas.

5.1.7 84DP-0RM31, Handling of Proprietary, Confidential and Highly Confidential Information.

5.1.8 75RP-9RP02, Radiation Exposure Permits.

5.2 Developmental

5.2.1 Title 10 Code of Federal Regulations Part 20, Standards for Protection Against Radiation.

5.2.2 USNRC Regulatory Guide 8.4, Direct-Reading and Indirect-Reading Pocket Dosimeters; Rev. 0, Feb 1973.

5.2.3 USNRC Regulatory Guide 8.8, Information Relevant to Ensuring That Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As is Reasonably Achievable, Rev. 3, June 1978.

5.2.4 USNRC Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure, Rev. 3, June 1999.

5.2.5 USNRC Regulatory Guide 8.36, Radiation Dose to the Embryo/Fetus, July 1992

5.2.6 USNRC I.E. Circular No. 81-07, Control of Radioactively Contaminated Material; May 1981.

5.2.7 PVNGS Updated Final Safety Analysis Report.

5.2.8 PVNGS Technical Specifications Units 1, 2, and 3.

5.2.9 IE Information Notice No. 86-107, "Entry Into PWR Cavity With Retractable Incore Detector Thimbles Withdrawn," Dec. 29, 1986.

5.2.10 INPO Significant Operating Experience Report (SOER) 85-3, "Excessive Personnel Radiation Exposures," April 30, 1985.

5.2.11 IE Information Notice No. 84-19, "Two Events Involving Unauthorized Entries Into PWR Reactor Cavities." March 21, 1984.

5.2.12 IE Information Notice No. 82-51, "Overexposure in PWR Cavities," December 21, 1982.

5.2.13 IE Circular No. 76-03, "Radiation Exposure in Reactor Cavities," September 13, 1976.

5.2.14 INPO 05-008, Rev 1, Guidelines for Radiological Protection at Nuclear Power Stations, January 2011.

5.2.15 Commitment Action Tracking System (CATS) Actions (Appendix D).

5.2.16 INPO Significant Event Report (SER) 88-37, "Personnel Radiation Overexposure Due To Work Generated Hot Spots," December 22, 1988.

5.2.17 American Nuclear Insurers (ANI) "Nuclear Insurance Inspection Report," Document #L060800.266, dated June 14, 2000

5.2.18 National Council on Radiation Protection and Measurements, "Limitations of Exposure to Ionizing Radiation," NCRP Report No. 16, 1993.

5.2.19 USNRC Regulatory Guide 8.38, Control of Access to High and Very High Radiation Areas in Nuclear Power Plants, May 2006.

5.2.20 USNRC NUREG-1736, “Consolidated Guidance: 10 CFR 20 – Standards for Protection Against Radiation,” October 2000

5.2.21 USNRC NUREG/CR-5569 ORNL/TM-12067, “Health Physics Positions Data Base,” May 1992

5.2.22 Site Integrated Business Plan CRAI 3084518, “Review recommendation #3 of SOER 01-01.”

6.0 SUMMARY OF CHANGES

Rev	Description
19	Replaced Appendix A due to error in form.
18	1.) Revised step 2.1.13 to notify Dosimetry if a worker is in contact with a person being treated with radioactive pharmaceuticals. (PCR 3520403) 2.) Revised step 3.2.6.2 to match dosimeter alarm instructions provided in training. (PCR 3519727, 3678394) 3.) Revised steps 3.3.2, 3.3.6, 3.3.6.1, 3.10.5.1 and Appendix F to limit a visitor's dose to 100 mrem/year. (PCR 3519724) 4.) Updated references to E-Plan documents in Appendix H. Updated additional references. (PCR 3510337) 5.) Updated job titles and training course titles throughout. (PCR 3509606) 6.) Revised step 3.3.2 to provide visitor instructions for CA entries. (PCR 3519725) 7.) Modified the instructions for RCA exit monitoring in step 3.8.1 to match guidance 8.) Removed Planned Special Exposure instructions, Planned Special Exposure procedure is cancelled. 9.) Reformatted procedure forms to match Technical Publishing form standards.

7.0 APPENDICES

Appendix A - Request for a Higher Administrative Exposure Hold Point
Appendix B - Pre-Natal Dose Limit Statement
Appendix C - Criteria for Reporting Personnel Overexposure to the USNRC
Appendix D - Commitment Action Tracking System
Appendix E - Radiation Protection Requirement Waiver
Appendix F - Visitor Request for RCA Access
Appendix G - Embryo / Fetus Dose Assessment
Appendix H - Off Site Support Agency Radiological Determination Matrix
Appendix I - Supplemental Exposure Notification

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Request for a Higher Administrative Exposure Hold Point

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ORIGINATOR

1. A higher Administrative Exposure Hold Point is requested for:

Name:	Social Security No.[1]:	HPID No.:

Exposure Hold Point Requested: ________________________ mrem for the year of _____________

2. No other qualified personnel are available who have sufficient exposure remaining below their hold point

Supervisor's Name:	Signature:	Extension:	Date:

3. Reasons for request (include REP No.)

RADIATION PROTECTION

RP Concurrence: Job scope and radiological conditions warrant the higher administrative exposure hold point.

Signature:____ Date: ____________________

DOSIMETRY

1. Radiation Exposure (mrem): ***(Fill in as applicable)***

EXPOSURE PERIOD	CURRENT EXPOSURE	EXPOSURE HOLD POINT	REMAINING EXPOSURE	ADDITIONAL INFORMATION	
CURRENT YEAR				☐ Record Dose ☐ Included estimate of________	☐ APS Dose = ________ ☐ Offsite Dose = ________
5 Year					
Lifetime[2]				Is exposure greater than age?	☐ Yes ☐ No

2. Dosimetry records search completed by:

* for assigning a hold point > 2500 mrem / year, all dose for current year must be record dose.

Name: Date:

APPROVALS

I have reviewed my exposure records at PVNGS Dosimetry and find them to be correct and complete.

(Radiation Worker):	Date:
(*Radiation Protection Department Leader:* for new hold point up to 2000 mrem)	Date:
Radiation Protection Manager: for new hold point up to 2500 mrem)	Date:
ALARA Committee Chairman * for new hold point up to 4000 mrem, or cumulative lifetime exposure will exceed worker's age in years	Date:
Sr V.P. Site Operations for new hold point that would cause worker to exceed 10 rem cumulative site exposure in 5 years)	Date:

RECORDS

1. New Administrative Exposure Hold Point assigned ______________________________ for a period of ____________

   Effective beginning: ____________________________________

2. Personnel Exposure file / RRAC System updated: ________________________________ Date: ________________

   RP Technician Signature

3. Form Distribution (a) **Original to:** Worker's Exposure File (b) **Copies to:** Dosimetry, Radiation Protection, Originator

[1]SSN use requires marking as CONFIDENTIAL, see 84DP-0RM32

[2]Lifetime exposures need not be obtained for individuals not participating in a planned special exposure program. (CRAI 3120700)

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Pre-Natal Dose Limit Statement

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Employee Name:	Social Security No.[1]:	Employee No.:
Telephone Extension:	HPID No.:	Employee Date of Birth:

I understand federal regulations 10 CFR 20.1208, “Dose equivalent to an embryo / fetus,“ contains the radiation exposure limits applicable to the embryo / fetus during the duration of the pregnancy.

Check One:

☐ **Declared Pregnant Woman**

I hereby notify APS of my preganacy and request that my allowable exposure be limited to 500 mrem for the duration of my pregnancy and 50 mrem per month.

I also request that, if my exposure at the time of declaration exceeds 500 mrem or is within 50 mrem of the 500 mrem gestation limit, my allowable exposure for the remainder of my pregnancy be limited to 50 mrem.

The estimated date of my conception is ________________ and my estimated due date is ____________ .

☐ **Declared Fertile Woman**

I hereby notify APS of my fertile female status and request that my allowable exposure for the next six months be limited to 50 mrem per month.

I understand that after six months my allowable exposure will be re-established to 1500 mrem per year unless I submit an updated Pre-Natal Dose Limit Statement.

As a Declared Preganat Woman / Declared Fertile Woman, I understand I am responsible for limiting my radiation exposure. I will also inform Dosimetry of any exposure to radiation I receive outside Palo Verde Nuclear Generating Station, while employed at the Palo Verde Nuclear Generating Station.

Employee's Signature:	Date:
Section Leader's Acknowledgement:	Date:

DOSE LIMIT CORRECTION

☐ I am informing Dosimetry that I no longer require a pre-natal dose limit.

I understand that my administrative hold point at Palo Verde Nuclear Generating Station will be reestablished to 1500 mrem per year.

Employee's Signature:	Date:
Section Leader's Acknowledgement:	Date:

DOSIMETRY - Initiate Baseline Monitoring When Pre-Natal Dose Limits Requested		**DOSIMETRY - Close Out Embryo / Fetus Monitoring** When Limits are No Longer Required	
(ICR 00282)			
☐ Whole Body Count Performed	______ Dosimetry Initial	☐ Whole Body Count Performed	______ Dosimetry Initial
☐ Individual's TLD processed	______ Dosimetry Initial	☐ Individual's TLD processed	______ Dosimetry Initial
☐ Establish lower Admin Exposure Hold Point	______ Dosimetry Initial	☐ Establish Normal Admin Exposure Hold Point	______ Dosimetry Initial
Dosimetry Senior RP Technician	Date	Dosimetry Senior RP Technician	Date

[1] SSN use requires marking as CONFIDENTIAL, see 84DP-0RM32

Criteria for Reporting Personnel Overexposure to the USNRC

NOTE

All reporting to the USNRC should be performed in accordance with 75DP-0RP04, Radiological Reports.

	TEDE	LDE	SDE
IMMEDIATE NOTIFICATION 10CFR20.2202(a)	25 rem	75 rem	250 rads
NOTIFICATION Within 24 HOURS 10CFR20.2202(b)	5 rem	15 rem	50 rem
WRITTEN REPORT Within 30 DAYS 10CFR20.2203	1. Any incident for which an IMMEDIATE NOTIFICATION or NOTIFICATION within 24 Hours is required. 2. 0.5 rem TEDE to an embryo/fetus. 3. 0.1 rem TEDE in one year to a member of the public.		

Commitment Action Tracking System

Partition	Commitment/ Action #		Procedure Step
IIR	010301	01	2.2.2
QATS	390346	08	3.1.2
QATS	391132	05	3.8.7
RCTS	010594	01	3.9.2.1
RCTS	010827	01	3.2.4
RCTS	010913	01	3.4.1.3
RCTS	010915	01	3.6.2.1
RCTS	011131	01	3.9.1.1
RCTS	011132	01	3.9.1.2
RCTS	039454	01	3.12.6
RCTS	039536	02	3.7.3
RCTS	040337	02	3.11.2.1
RCTS2	002495	01	1.1
RCTS2	009656	01	3.2.8
RCTS2	010505	01	3.10.4.1
RCTS2	010506	01	3.10.6
RCTS2	010512	01	3.2.3
RCTS2	010523	01	3.2.4
RCTS2	010553	01	2.3.1
RCTS2	010601	01	3.9.1.1
RCTS2	010602	01	1.1
RCTS2	010606	01	3.9.6
RCTS2	010616	01	3.9.4
RCTS2	010660	01	3.5.1
RCTS2	010661	01	3.6.1
RCTS2	010663	01	3.9.2
RCTS2	010664	01	3.4.1.3
RCTS2	010665	01	3.4.1.1
RCTS2	010673	01	3.9.5
RCTS2	010679	01	3.2.4.1
RCTS2	010683	01	3.4.1.3
RCTS2	041015	01	3.2.3
RCTS2	041026	01	3.2.4
RCTS2	041027	01	3.2.4.1
RP	046002	01	3.10.1
RP	046007	01	3.10.6
RP	046008	01	3.10.4.1
RP	046008	02	3.10.4.1, 3.10.4.4
RP	046008	04	3.10.4.3
RP	046012	01	3.2.3
RP	046013	01	3.9.1
RP	046014	01	3.9.3
RP	046036	05	3.10.1.2
CRAI	3314054		3.7.4
CRAI	3120698		4.1.21
CRAI	3120700		Appendix A

Partition	Commitment/ Action #	Procedure Step
CRAI	3373967	4.2.4
CRAI	3120700	App. A
CRAI	3120698	4.1.2.1
CRAI	3391284	3.5

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Radiation Protection Requirement Waiver

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Purpose: Radiation Protection has requirements in place to control unescorted access into a Radiological Controlled Area (RCA).

Two of these Radiation Protection requirements are:

1. A Whole Body Count (WBC), and
2. Successful completion of Radiation Worker training.

On a case by case basis, the Radiation Protection Manager may allow an individual unescorted access into an RCA without completing all of the required items. If needed, the WBC and/or RWT requirement(s) may be waived with approval from the Radiation Protection manager.

The approval and any assigned restriction are documented using this form.

Section A — Waiver Request

Name: First	Middle	Last
SSN[1]:	HPID #:	Job Title:
Employer:		Phone:

Waiver requested for: ☐ Whole Body Count ☐ Radiation Worker Training

Reason for request:

Requested by (Print)	Name:	Date:
	Dept.:	Ext.:

Section B — Approval and Restrictions

Approval to waive the requested RP requirement(s) is indicated below with the following restrictions assigned:

Whole Body Count - ☐ Yes ☐ No ☐ N/A | Radiation Worker Training - ☐ Yes ☐ No ☐ N/A

Assigned Restrictions: (check all that apply)

- ☐ Waiver expiration date: ______________________
- ☐ Allowed dose to be received during waiver period: ______________________ mrem
- ☐ Individual must be escorted within the RCA by a qualified radworker
- ☐ No entries into High Radiation Areas (i.e., HRA, LHRA, VHRA)
- ☐ No entries into Airborne Radioactivity Areas (ARA)
- ☐ No entries into Hot Particle Controlled Areas (HPCA)

Additional Restrictions:

Reason for Approving the Waiver:

Radiation Protection Manager:

Name:	Signature:	Date:

Individual's Acknowledgement of the assigned restrictions: - (must be signed prior to allowing unescorted RCA access)

Name:	Signature:	Date:

[1] SSN use requires marking as CONFIDENTIAL, see 84DP-0RM32

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Visitor Request for RCA Access

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Section A — Visitor Access Request

Part 1. Visitor Information			Date:
Name: First	Middle	Last	Jr., Sr.
Date of Birth:	Sex:	SSN[1] or ID #:	
Home Address: Street	City	State	Zip
Employer Name:		Employer Phone:	
Employer Address: Street	City	State	Zip

Part 2. Current Year Exposure History	Year:
a. Is the visitor's current year Total Effective Dose Equivalent greater than 1800 rem?	☐ Yes ☐ No
b. Has the visitor been monitored with a record TLD at PVNGS during the current year? (If "Yes" the individual cannot enter an RCA at PVNGS as a visitor, must be issued a record TLD.) Search verified by: ____________	☐ Yes ☐ No
c. Has the visitor been issued visitor dosimetry at PVNGS during the current year?	☐ Yes ☐ No

If all questions above are answered as "No", an RP Section Leader can approve the visitor's RCA access request.

If current year TEDE is greater than 1800 mrem, RP Department Leader approval is required to allow RCA access.

Part 3. RCA Entry Information RCA Entry Date(s) Requested - Beginning: ____________ Ending: ____________

Reason for Entry: (Include discussion of plant areas planned to be accessed, e.g., Aux 120', Fuel Bldg 140', etc.)

Will the visitor need to enter any Contaminated Areas (CA) while within an RCA? ☐ Yes ☐ No
(If "Yes" then RP Department Leader approval is required prior to allowing entry into CAs.)

Requested by (Print): Name	Dept.	Ext.	Date

Part 4. Visitor Acknowledgement

I have verified the information provided in Section A of this request is accurate.

Signature of Visitor:	Date

Section B — Approval for RCA Entry (Section A must be completed prior to approval.)

RP Section Leader: Visits of 1 day or less and all Part 2 answers are "No"

Name: Print	Signature	Date

RP Department Leader: Visits of greater than 1 day and/or TEDE is greater than 2500 mrem

Name: Print	Signature	Date

RP Department Leader: Approval for visitor to enter Contaminated Areas if needed

Name: Print	Signature	Date

[1] SSN use requires marking page 1 as CONFIDENTIAL, see 84DP-0RM32.

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Visitor Request for RCA Access

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Section C Visitor and Escort Acknowledgement

This section must be completed and signed by each visitor and escort prior to allowing entry into an RCA at PVNGS.
RCA Access Requirements:

1. Visitor shall be escorted by a qualified radworker at all times while within an RCA to ensure all radiological requirements are met.
2. Visitor shall be limited to 100 mrem TEDE per year at PVNGS.
3. Visitor shall not enter any High Radiation Areas (i.e., HRA, LHRA, and VHRA).
4. Visitor shall not enter any Airborne Radioactivity Areas (ARA).
5. Visitor shall not enter any High Contamination Areas (HCA) or Hot Particle Control Areas (HPCA).
6. Visitor shall not enter any Contaminated Areas (CA) without approval from an RP Department Leader.
7. Visitor shall not perform any task or activity which has not been approved by Radiation Protection.
8. Visitor shall wear the assigned dosimetry device at all times while within an RCA.
9. The visitor shall wear the dosimetry device on the front portion of the body between the waist and head.
10. If the visitor loses the assigned dosimetry device, immediately inform the escort and exit the RCA.
11. The visitor's dose shall be recorded after each RCA entry.
12. The visitor shall comply with all instructions given for their safety by their assigned escort and/or Radiation Protection personnel.
13. The visitor shall inform Dosimetry if they have had any recent medical treatment which involved radioactivity introduced into the body.

Part 1. Visitor Acknowledgement

Name: First	Middle	Last	Jr., Sr.

I acknowledge that I have read, understand, and will comply with the above RCA access requirements.

Signature of Visitor:	Date

Part 2. Escort Acknowledgement

Escort's HPID #:

Name: First	Middle	Last	Jr., Sr.

**I acknowledge that I have read, understand, and will comply with the above RCA access requirements.
In addition, if needed, I will ensure other escorts of this visitor are briefed and understand the requirements.**

Signature of Escort:	Date

Section D Dosimetry Device Issue and Results

Date Issue and Each Entry	**EPD Serial Number**	**RCA Access Authorization Verified By** RP Initials	**Radiation Exposure Permit** (REP)	**Visitor Dose** (mrem)	**Accumulated Total Dose** (mrem)	**RP or Escort Signature** Record "Visitor Dose" and calculate "Accumulated Total Dose" after each RCA entry

Send completed form to Dosimetry

Embryo/Fetus Dose Assessment

Regulatory Guide 8.36 clearly recognized that the calculation of prenatal radiation dose from internal radioactivity has many associated difficulties. When the regulatory guide was first published, it was expected that embryo/fetus dose assessments would evolve over the years, but little has been written since then. In ICRP 56, it states that embryo/fetus dose can be approximated by the dose to the uterus: i.e., the dose to the embryo/fetus due to internal activity in the mother can be estimated using the committed dose equivalent (CDE) to the uterus. For the primary radionuclides encountered at PVNGS, the uterine CDE is approximately equal to or less than the committed effective dose equivalent (CEDE) to the mother. Therefore, control of the mother's internal dose would provide the control of the embryo/fetus dose. Further, if an intake occurred that was estimated to be greater than 50 mrem, an outside expert in the field could be contacted.

The uptake of radionuclides by a pregnant worker, however, is a rare event. Site RP procedures are designed to minimize uptakes through engineering controls, decontamination, occupancy factors, and workplace airborne evaluations. Monitoring is required at 10% of the limit, i.e., if an individual is likely to exceed 50 mrem of internal dose to the embryo/fetus. As stated above, control of internal dose to the declared pregnant women (DPW), or declared fertile woman (DFW) will control the dose to the embryo/fetus. It has been concluded that DPWs and DFWs are NOT likely to exceed 10% of the limit. The following PVNGS historical information is provided to support that conclusion:

- No radworker has incurred 20 DAC-hours in a year since 1994. Onsite efforts have been directed to the reduction of internal exposure through workplace monitoring, engineering controls, and occupancy factors.

- Most intakes at PVNGS have followed the ingestion pathway. Therefore, an intake of 20 DAC-hrs would usually not approach 50 mrem CEDE and an embryo/fetus would not be expected to receive 50 mrem.

- DFWs and DPWs have less opportunity for uptake because they work in less hazardous and lower dose rate environments through general cooperation between the supervisor and the worker.

- Federal Guidance Report No. 11 shows that dose factor for the uterus is approximately equal to or less than the effective dose factor for the whole body for the radionuclides typically encountered at PVNGS.

- Internal exposure tracking is performed for all radworkers. Therefore, although it is not required monitoring, internal exposures to a DPW or DFW would be tracked.

To assess an internal activity at time of declaration, the DFW / DPW should be whole body counted at the time of declaration and their TLD should be processed. All subsequent intakes would be tracked and further external dose would be with a new TLD.

Embryo / Fetus Dose Assessment

From NRC Regulatory Guide 8.36, "Radiation Dose to the Embryo/Fetus," July 1992

C.2 – Simplified Method for Determining Embryo/Fetus Dose from Material Intakes

Based on these premises (uterus dose similar to fetal dose and the data in Revision 1 to NUREG/CR-5631 (Ref. 2)), a set of dose factors has been developed for use in calculating an embryo/fetus dose. Except for those radionuclides addressed in Revision 1 to NUREG/CR-5631 (Ref. 2), the dose factors presented in Appendix A to this guide represent the committed dose equivalent to the uterus per introduction of unit activity into the first transfer compartment (i.e., blood) of the woman.[1] For the radionuclides in Revision 1 to NUREG/CR-5631, the dose factors in Appendix A represent the maximum dose equivalent to the embryo/fetus for the gestation period from the introduction of unit activity into the first transfer compartment of the woman at any time during the gestation period.

- [1] The committed dose equivalent factors for the uterus presented in Appendix A were calculated based on the modeling employed during the development of the ICRP 30 (Ref. 3) data. It is recognized that the metabolism of the pregnant woman may not be adequately represented by the standard metabolic model. However, partly because of the lack of more definitive data, this modeling has been used for determining the dose commitment factors for the uterus that may be used for evaluating compliance with the embryo/fetus dose limit.

Off Site Support Agency Radiological Determination Matrix

Normal Operations

Situation	Badging	Limits	Part 19.12	Training
Off Site support agencies are at PVNGS but not entering the Restricted Area	N/A	Public Dose Limits 10CFR20.1301(a)(1) apply	N/A	After 7 days, complete training and obtain site badge.
Off Site Support agencies are at PVNGS entering the Restricted Area but not the RCA	N/A	Public Dose Limits 10CFR20.1301(a)(1) apply	If Occupational, 10CFR19.12 applies	After 7 days, complete training and obtain unescorted access.
Off Site Support agencies are at PVNGS entering the Restricted Area and the RCA	75DP-9RP01, Sections 3.2. and 3.3	PVNGS may classify these personnel as occupational workers. If so, the Occupational Dose Limits of 10CFR20.1201 apply	If Occupational, 10CFR19.12 applies	Escort, Complete Rad Worker Training or Waive Training

Emergencies

Situation	Badging	Limits	Part 19.12	Training	KI	Evacuation
Offsite support agencies are at PVNGS and not supporting an emergency in progress	N/A	Protective Action Guide for public EPA 400 Section 2.3, Table 2.1 apply	N/A	N/A	Responsibility of the State of Arizona	Evacuate the site with other non-essential personnel
Offsite support agencies are at PVNGS: Supporting an emergency in progress, Not entering the Restricted Area, AND there is no RAD release in progress	N/A	Emergency Worker Limits of EPA 400 Section 2.5, Table 2.2 apply	N/A	N/A	N/A	N/A
Offsite support agencies are at PVNGS supporting an emergency in progress when radiation exposure is likely.	E Plan section6.8.1. Emergency workers carry dosimeters in addition to TLDs. PVNGS may provide to other agencies if requested.	Emergency Worker Limits of EPA 400 Section 2.5, Table 2.2 apply	N/A	Briefing provided in form EP-0132, Emergency Worker Briefing	E Plan Section6.7.1.7.3. EC authorizes use of KI. PVNGS may provide to other agencies if requested.	N/A

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Supplemental Exposure Notification

Page 1 of 1

Name:	Employee ID:	HP ID:
Department:	Home Unit #:	Mail Station: Ext:
Date of Last Whole Body Count:	Type:	

Reason for Notice:

Leaders Name: Mail Station: Ext:

Expected Return Date:

I am aware that my access to the RCA will be suspended until I return to the Dosimetry Department and receive a Post Trip Whole Body Count. I am aware that I might be required to complete an exposure request for the purpose of ascertaining what, if any, exposure I may have received as a part of this trip. I am aware that if I am qualified for E-Plan that I may be delayed from responding in the event of a drill or actual emergency. I am also aware that if I fail to return to the Dosimetry Department within 30 days of the expected return date that a PVAR may be issued stating that I am not in compliance with 75DP-9RP01 "Radiation Exposure and Access Control".

Signature ____________________ Date __________

Action	Completed by:	Date:
Pre Trip Whole Body Count Performed		
Open Exception Entered into ARACS		
Post Trip Whole Body Count Performed		
Request Letter Signed (If Required)		
Open Exception Closed		

File active forms with WBC Operator, File completed forms in workers file.

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Electronic Procedure Change Record

Procedure No.: (1) 75DP-9RP01	Revision No.: (2) 19	Category: (3) 2	Expedite? (4) No

Title: (5) Radiation Exposure and Access Control

Procedure Action: (6)	Full Basis Check? (7)	NAD Review: (8)	PRG Review: (9)	MRL Update? (10)
Minor	No	No	No	No

EOP? (11)	Dry Cask? (12)	Decommissioning Doc? (13)	Level of Use: (14)
No	No	No	Information

AD Review: (15)	10CFR50.59/72.48 Required? (16) No	50.59/72.48 Doc Number:

In accordance with 93DP-0LC17, rev 6, step 2.2.11, this procedure action does not require further regulatory screening (i.e., 10CFR50.59) because it constitutes a change to the Radiation Protection Program which is governed by the more specific criteria contained in 10CFR20.

Text does not automatically roll to continuation page. AD Review - Continuation (17) ☐ Yes

Applicability Determination performed by: (18) David J. Heckman

Is Environmental Screening Required?: (19) ☑ No (done) ☐ Yes	Env. Reg./Permit Review req'd? (Use 91DP-0EN02, App. A) ☐ No (20) ☐ Yes Screening performed by:	If "Yes" send 91DP-0EN02, Appendix A to Environmental (21) Scrn Log Number:

Procedure Preparer: (22) Heckman, David J(Z00977) Digitally signed by Heckman, David J(Z00977) DN: cn=Heckman, David J(Z00977) Reason: I am the author of this document Date: 2012.10.10 15:37:40 -07'00'	IQR Approval Recommendation: (23) Drinovsky, Louis J(Z33699) Digitally signed by Drinovsky, Louis J(Z33699) DN: cn=Drinovsky, Louis J(Z33699) Reason: I have reviewed this document Date: 2012.10.10 15:41:18 -07'00'
NAD Concurs (if required): (24)	PRG Concurs (if required): (25)
Approval: (26) Gray, Thomas S(Z99610) Digitally signed by Gray, Thomas S(Z99610) DN: cn=Gray, Thomas S(Z99610) Reason: I am approving this document Date: 2012.10.11 09:05:29 -07'00'	Effective Date (Time Optional): (27) 10/12/2012

Summary of Change (include list of all PCRs incorporated): (28)
Replaced Appendix A Request for a Higher Administrative Exposure Hold Point due to error in form per PCR 4264009.

Text does not automatically roll to continuation page. Change Summary - Continuation (29) ☐ Yes

This provides the minimum requirements for the use of radiological signs, postings, labels, barriers and barricades.

NOTE: Steps which have supplementary information included in Appendix A are annotated with an asterisk.

Procedure Usage Requirements		Sections
Information Use:	• The user reviews the procedure, as needed before using it to perform the task. • The user may complete the task from memory, however the user still is responsible for performing the activity in accordance with the procedure.	All

Table of Contents

RP Tech Tools - Table of Contents

1.0 PURPOSE and SCOPE

1.1 Purpose *

The purpose of this procedure is to provide direction for the use of radiological warning signs, barricades, and labels. (10CFR19.12, RCTS2 011003-01)

1.2 Scope

This procedure applies to Radiation Protection (RP) department personnel performing radiological posting and labeling activities with the exception of the following:

- Labeling of radioactive sources (addressed in the source control procedure).

2.0 RESPONSIBILITIES

Radiation Protection is responsible for implementing the requirements of this procedure.

3.0 PROCEDURE

3.1 General

3.1.1 Radiological signs and labels shall use the conventional three-bladed radiation caution symbol which is to be magenta, or purple, or black on a yellow background. (10CFR20.1901(a), RP 046020-01)

3.1.1.1 Additional information may be provided on such signs or labels as appropriate to aid individuals in minimizing their exposure to radiation or radioactive material. (10CFR20.1901(c), RP 046020-03)

3.1.1.2 If possible, the radiological posting should be conspicuously displayed on all accessible sides, and be legible from outside the area.

3.1.1.3 If signs are attached to fire doors, use only postings made of non-combustible material and attached in accordance with methods approved by the responsible engineer.

3.1.2 Radiation Protection shall ensure radiological controlled areas are segregated and appropriately posted to limit radiation exposure to individuals.
(RCTS2 010617-01, FSAR 12.5.1.3.D)

3.1.3 Postings and barricades should not interfere with the safe access/egress of personnel, or the operation of plant equipment (e.g. barricades presenting a tripping hazard or affixed to plant components such that their operation could be compromised).

- Where practical, the rope should be placed approximately five feet above the floor (head high) at access/egress points. *
(RCTS 040029-01, IR 528/90-23-01 NOV)

3.1.4 Radiation Area, High Radiation Area, and Locked High Radiation Area postings are based upon measurements of deep-dose equivalent taken at 12 inches from the source. (10CFR20.1003)

3.1.4.1 "NEUTRON" postings should be provided for the following: *

- Any area in which the general area neutron dose rates are greater than or equal to 5 mrem/hr at 12 inches from the source.
- Containment when the reactor is critical.

3.1.5 Very High Radiation Area postings are based upon measurements of absorbed dose taken at 1 meter (~3.3') from the source. (10CFR20.1003) *

3.1.6 Gummed labels should not be used for area posting, but may be used for posting hot spots, radioactive material packages, and small potentially contaminated areas such as floor drains, temporary hoses, and drip catches.
(INPO 020023-04, INPO PE89 RP.9-1)

- Gummed labels are not permitted to have direct contact with the piping of reactor coolant systems, reactor auxiliary systems, or steam plant systems unless Chemical Use Permit approval has been obtained in accordance with the "Chemical Control Program."

3.1.7 Minimizing the Size of Posted Areas (ICR 00242, CRAI 2448517 , CRAI 3105486)

Barricades should be placed as close to the source of hazard as practical. The intent of the posting is to alert personnel to the presence of radiological hazards and to aid them in minimizing exposure. The circumstances of each case must be evaluated to ensure that posting practices do not detract from this intent by: (1) desensitizing personnel through over-posting; or (2) failing to sufficiently alert personnel to the presence and location of radiological hazards. Thus, these postings should warn individuals of specific radiological hazards in the immediate vicinity.*
(NRC IN 84-82, HPPOS-036, HPPOS-066, NUREG-1736 section 3.20.1902)

3.1.8 If higher posting criteria within shielding are accessible to any part of the whole body, the point of access must be appropriately barricaded and posted. (CRAI 2394384) (ICR 00498)

3.1.9 Temporary Shielding used to ensure inaccessibility of a LHRA should be posted “Warning, do not remove. High radiation levels may result”. (RG 8.38 1.6 (2))

3.1.10 Generate a PVAR and Notify Radiological Engineering if a Level II Alpha Area is upgraded to Level III Alpha Area. (CRAI 3672712)

3.1.11 **Deposting Instructions** (RCTS 038930-01, IR 528/89-25-01 NOV) *

3.1.11.1 When an area is deposted, document a survey that justifies the downgrade.

3.1.11.2 When surveys indicate a High Radiation Area no longer needs to be posted, obtain authorization from the cognizant RP Leader prior to deposting the area. (CRAI 2422781)

3.1.11.3 When surveys indicate a Locked High Radiation Area no longer needs to be posted, obtain authorization from the cognizant RP Leader prior to deposting the area (with the following exception).

- For areas posted as LHRAs due to the operation of an open air irradiator (e.g., Shepherd Panoramic Irradiator), the LHRA posting may be removed after completion of the irradiator operations and verification that the source is in the stored position.

3.1.11.4 When surveys indicate a Very High Radiation Area no longer needs to be posted, obtain authorization from the cognizant RP Department Leader prior to deposting the area.

Note:
Prior to deposting Level II or III Alpha Areas during on-going maintenance on systems or components that are not restored to as-built configuration, consider contacting Rad Engineering.

3.1.11.5 When surveys indicate a Level II or III Alpha area no longer needs to be posted, obtain authorization from the cognizant RP Leader prior to deposting the area.

3.1.11.6 For downgrading other radiological postings, inform the cognizant RP Leader.

3.1.11.7 Use Appendix B, "RCA Deposting Checklist" when deposting an RCA or a section of an RCA. (CRDR 3065824, CRAI 3122497)

- Appendix B should be retained and, if evolution goes beyond one shift, included as part of shiftly turnover until deposting is completed.

3.1.12 Metal wall plates and postings in containment shall only be affixed with an RTV approved for containment. (CRAI 3337829)

- The only approved RTV of use in containment is DOW Corning ® 732 Multi-purpose sealant-clear CUP #58.

3.2 Radiological Controlled Area Boundary (RCA)

Post areas meeting the following criteria with radiation warning sign(s) bearing the following words:

CAUTION
RADIOLOGICAL CONTROLLED AREA
RADIOACTIVE MATERIAL(S)
REP REQUIRED FOR ENTRY

3.2.1 Establish RCA boundaries such that dose at the boundary will be maintained at no greater than: (FSAR 12.5.1.3.D, RCTS2 010617-01) *

- 5 mrem deep-dose equivalent in any one hour, and
- 500 mrem deep-dose equivalent in one year (above background) as measured by area TLDs. *

3.2.2 Areas found to be the contaminated beyond the specified levels in step 3.4.2 and are located outside of established RCAs.

3.2.3 When establishing a new RCA boundary, notify the following:

- If outside the permanent Restricted Area (i.e., the Security Protected Area boundary), notify the Director, Radiation Protection.
- If inside the permanent Restricted Area boundary, notify the responsible RP Leader.

3.3 Radioactive Materials Posting *

Each area or room, located outside an RCA, in which material is used or stored in quantities exceeding ten times the quantities of such material specified in Appendix C to 10CFR20, shall be conspicuously posted with radiation warning sign(s) bearing the following words: (10CFR20.1902.e, RP 046021-05)

CAUTION, RADIOACTIVE MATERIAL(S)
or
DANGER, RADIOACTIVE MATERIAL(S)

3.4 Contaminated (Contamination) Area Postings * (FSAR 12.5.3.4, RCTS2 041016-01, CRAI 3373972)

NOTE

Contaminated areas may be identified from routine/job surveys, or as a result of surveys performed to investigate personnel contamination events or reports of leakage.

3.4.1 When accessible areas are found to be contaminated beyond specified levels, they shall be roped off (i.e. barricaded), posted appropriately, and decontaminated as soon as practical. (FSAR 12.5.3.4)

3.4.2 PVNGS levels for contamination control are:

- ≥ 1000 dpm/100 cm² Beta-Gamma
- ≥ 20 dpm/100 cm² Alpha

3.4.3 Examples of appropriate postings for contaminated areas are:

- Contaminated Area
- **Level II Alpha Area**
- **Level III Alpha Area**
- **Alpha frisking/monitoring required upon exit**
- High Contamination Area
- Internal Contamination
- Hot Particle Control Area

3.4.4 Additional information which should be included on the posting(s) to help make individuals aware of the radiological hazards present.
The following signs, labels, or inserts – may be used to identify areas with the following types and levels of contamination:
(CRAI 3672712)

- **High Contamination**
  - ➔ ≥ 100,000 dpm/100 cm² Beta-Gamma
  - ➔ More than one discrete particle found with activity ≥ 100,000 dpm

- **Level II Alpha Area:** $\geq$ 20 dpm/100 cm2 α AND a β-γ:α ratio <30,000:1.*

- **Level III Alpha Area:** $\geq$200 dpm/100 cm2 α AND a β-γ:α ratio <300:1.*

- **Alpha frisking/monitoring required upon exit**:
  - For Level III Alpha Areas with β-γ:α ratio < 50:1.*
  - This posting need not comply with the requirements of section 3.1.1 or 3.1.2.

- "**Hot Particles**" or "**Hot Particle Control Area**" signs, labels, or inserts -used to identify areas or containers which have hot particles with activities ≥ 500,000 dpm.

3.4.5 **Floor Drain Posting** - Floor drains located inside an RCA, which go to the radioactive drain system but are not in areas which meet contaminated area defined limits, may be labeled as "INTERNAL CONTAMINATION", or equivalent. (QATS 390038-01, CRDR 210223-05)

3.5 Airborne Radioactivity Area Posting *

Post areas meeting the following criteria with radiation warning sign(s) bearing the following words: (10CFR20.1902.d, RP 046021-04, FSAR 12.5.3.5, RCTS2 041019-01)

CAUTION, AIRBORNE RADIOACTIVITY AREA
or
DANGER, AIRBORNE RADIOACTIVITY AREA

- An area with airborne radioactivity ≥ 1.0 Derived Air Concentration (DAC), or
- Where airborne radioactivity is ≥ 0.3 DAC and an individual's presence within the area without respiratory protection equipment could result in that individual receiving ≥ 12 DAC-hours in a week.

3.5.1 When basing the Airborne Radioactivity Area posting on DAC-hours, DAC values for submersion dose nuclides shall be excluded.

3.5.2 The insert "RESPIRATORY PROTECTION REQUIRED" may be used (if conditions warrant) to inform workers of the need for additional protective equipment. (NRC IR 528/87-17-03, RCTS 037999-01) *

3.6 Cold Area Posting (NRC IR 528/89-15-M06, RCTS 038623-01) *

Cold Area(s) should be posted when the workers have to standby in a Radiation, or High Radiation area, and exit from the area is impractical. (INPO 05-008 V.C.III.3.a)

- These postings need not comply with the requirements of section 3.1.1 or 3.1.2.

3.7 Hot Spot Posting (NRC IR 528/89-15-M06, RCTS 038623-01) *

When Hot Spots are identified they should be posted on or near the source with a radiation warning sign(s) or label(s) which displays the words "HOT SPOT."

3.7.1 To provide additional information to workers, the hot spot posting may indicate a dose rate range (e.g., 100 to 1000 mrem/hr, >1000 mrem/hr).

3.7.2 When several hot spots exist within close proximity to each other, it is permissible to post at the outer most hot spots indicating the conditions that exist between them rather than posting each individual hot spot.

3.7.3 The posting of Hot Spots is not necessary in the following areas:

- Inaccessible or where continuous RP coverage is required for entries
- High Radiation Area due to ALARA considerations
- Locked High Radiation Areas and Very High Radiation Areas

3.8 Radiation Area Posting

Areas found to be ≥ 5 mrem/hr and < 100 mrem/hr shall be conspicuously posted with radiation warning sign(s) bearing the following words:
(10CFR20.1902.a, RP 046021-01, FSAR 12.5.3.2.B, RCTS2 010662-01)

CAUTION, RADIATION AREA

3.9 High Radiation Area Posting *

Areas in which the intensity of radiation is ≥ 100 mrem/hr but < 1000 mrem/hr shall be barricaded and conspicuously posted as a high radiation area with radiation warning sign(s) bearing the following words: (10CFR20.1902.b, RP 046021-02, Tech Specs 5.7.1, RCTS 011131-01, FSAR 12.5.3.2.B, RCTS2 010662-01, 041014-01)

CAUTION, HIGH RADIATION AREA
or
DANGER, HIGH RADIATION AREA

3.10 Locked High Radiation Area Posting *

In addition to the posting and barricade requirements for High Radiation Areas listed in section 3.9 above, areas where the intensity of radiation is ≥ 1000 mrem/hr but less than 500 rads/hr should also contain the words "**Locked**" on the posting.
(Tech Specs 5.7.1, RCTS 011131, LER 3-88-005-01, RCTS 038602-01, NRC IR 530/88-25-01, RCTS 041217-01, 10 CFR 20.1901(c), RP 046 020-03)

Examples of acceptable wording to distinguish locked high radiation areas are:

CAUTION, LOCKED HIGH RADIATION AREA
or
DANGER, LOCKED HIGH RADIATION AREA

3.10.1 To ensure the posting is visible when the door or gate to the area is open, a Locked High Radiation Area posting should be placed across the passageway containing the door or gate which secures the area (with the following exceptions). *
(LER 1-89-021-00, RCTS 039649-02, NRC IR 530/88-31-M02, RCTS 039043-01)

- Containment personnel airlocks
- Rooms posted LHRA for open air irradiator operations

3.11 Very High Radiation Area Posting *

Areas found to be ≥ 500 rads/hr shall be barricaded and conspicuously posted with radiation warning sign(s) bearing the following words: (10CFR20.1902.c, RP 046021-03)

GRAVE DANGER

VERY HIGH RADIATION AREA

3.11.1 To ensure the posting is visible when the door or gate to the area is open, a Very High Radiation Area posting should be placed across the passageway containing the door or gate which secures the area (with the exception of the containment personnel airlocks).

3.12 Exceptions to Posting

3.12.1 Radiological posting is not required for rooms or areas that contain radioactive material for periods < 8 hours provided that the material is constantly attended by an individual who takes the precautions necessary to prevent personnel exposures in excess of PVNGS administrative hold points. (10CFR20.1903.a, RP 046022-01)

3.12.2 A room or area is not required to be posted for the presence of a sealed source provided that dose rates at 12" from the surface of the source container or housing do not exceed 5 mrem/hr deep-dose equivalent. (10CFR20.1903.c, RP 046022-03)

3.12.3 Radiological postings, except for the Radioactive Material(s) (RM) posting, are not required for rooms, areas, or equipment where exceptional measures are required to access them. The RM posting shall be posted where required regardless of accessibility (CRAI 3400311).

NOTE

Examples of how instructions may be provided to individuals are: RWP training, an REP, information signs, or briefings by RP personnel.

3.12.4 Contamination postings are not necessary for areas or components that are located in overheads or non-routinely accessible areas, or where individuals have received specific instructions to avoid. (Additional exceptions may be designated by the RP Ops Department Leader.) *

3.13 Labeling Containers (RP 046023-01, 10 CFR 20.1904(a))

NOTE

A stencil which depicts the standard three bladed radiation symbol and the words, "Caution, Radioactive Material", may be considered equivalent to a label provided the minimum information required by step 3.13.2 is indicated.

3.13.1 Unless exempted by section 3.14, each container of licensed material shall have a durable, visible label bearing the radiation symbol and the words: *

CAUTION, RADIOACTIVE MATERIAL

or

DANGER, RADIOACTIVE MATERIAL

- Certain conditions may exist when the addition of appropriate information to the label may necessitate some delay such as while a container is being filled or is in a high dose rate area. * (NUREG-1736, HPPOS-028)

3.13.2 The label must also provide sufficient information to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposure. * (RP 046023, 10 CFR 20.1904(a))

- At a minimum, labels shall include the maximum contact radiation level and the date the measurement was taken.
- Labels on containers of material removed from Level II or Level III Alpha Areas should be annotated as such. (ICR 00158, CRAI 3672712)

3.14 Exceptions to Labeling Requirements (RP 046024, 10 CFR 20.1905)

3.14.1 Radioactive Material labels are not required for:

3.14.1.1 Containers holding licensed material in quantities less than the quantities listed in Appendix C to 10CFR20 (RP 046024-01, 10CFR20.1905(a))

3.14.1.2 Containers holding licensed material in concentrations less than those specified in Table 3 of Appendix B to 10CFR20. (RP 046024-02, 10CFR20.1905(b))

3.14.1.3 Containers attended by an individual who takes the precautions necessary to prevent the exposure of individuals in excess of the limits established in 10 CFR 20. (RP 046024-03, 10CFR20.1905(c))

3.14.1.4 Containers when they are in transport and packaged and labeled in accordance with regulations of the Department of Transportation (DOT). (RP 046024-04, 10CFR20.1905(d))

3.14.1.5 Containers that are accessible only to individuals authorized to handle or use them, or to work in the vicinity of the containers, if the contents are identified to these individuals by a readily available written record. (RP 046024-05, 10CFR20.1905(e)) (ICR 00056)

- Examples of these type containers are containers in locations such as water-filled canals, storage vaults, or hot cells.
- The written record must be retained as long as the containers are in use for the purpose indicated on the record.

3.14.1.6 Installed equipment or components such as pumps, tanks, or piping. (RP 046024-06, 10CFR20.1905(f))

3.14.1.7 Containers of licensed material that meet the PVNGS conditional release requirements and are labeled with a conditional release label.

3.15 Labeling of Significant Dose Rate Items in the Spent Fuel Pool / Refuel Pool

Underwater storage of significant dose rate items in the Spent Fuel Pool (SFP) and Refuel Pool (RFP) represents a challenge in alerting workers to the potential radiological hazards from these items should they be brought to the surface.

3.15.1 Significant Dose Rate Item (SDRI) - Transient items that represent a high dose rate potential of $\geq$ 1000 mr/hr at 12” out of the water or $\geq$ 5000 mr/hr on contact under water and remain submerged for purposes of storage. Access control devices should be labeled. (CRAI 2643737)

Caution
Significant Dose Rate Items
Do Not Remove

RP Hold Point

- Transient items are those objects that may be repositioned or removed from their underwater location by an average worker without mechanical assistance.

4.0 DEFINITIONS and ABBREVIATIONS

4.1 Definitions

4.1.1 **Accessible** - An area is considered accessible to personnel when an individual can obtain access by means of existing structures, either permanent or temporary, which are designed to allow such access without additional safety equipment or access is provided on a frequent basis by means of a portable structure such as a scissors jack or manbasket. (CRDR 120468-08)

4.1.2 **Airborne Radioactivity Area** (ARA) - A room, enclosure, or area in which airborne radioactive materials, composed wholly or partly of licensed material, exist in concentrations in excess of the derived air concentrations (DACs) specified in 10CFR20, Appendix B, or to such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6% of the annual limit on intake (ALI) or 12 DAC-hours. (10 CFR 20.1902(d), RP 046021-04)

4.1.3 **Barrier –** A physical barrier, such as a chain link fence or fabricated wall, used to prevent unauthorized personnel access. Barriers used to control access should provide reasonable assurance that they secure the area against unauthorized access and cannot be easily circumvented.

- Determined circumvention of a physical barrier, with wire cutters or other tools, cannot be prevented absolutely. Such instances should be addressed with appropriate disciplinary action.

4.1.4 **Barricade** – Can be a rope, ribbon, or other firmly secured, conspicuous obstacle that (by itself or used with physical barriers such as existing walls or hand railings) completely surrounds the area and obstructs entry. (ICR 00488) (RG 8.38 - Section 2.4, HPPOS-234)

- Inadvertent entry is interpreted in this context to mean entry by an individual who is not paying sufficient attention to postings and who may walk into the area unless his or her attention is drawn to these postings.

4.1.5 **Cold Area** - A low dose rate area where workers can standby when exit from the room or area is impractical.

4.1.6 **Container** - Since there is no special definition of "container" in 10 CFR 20, the usual (dictionary) meaning of the term applies (i.e., a container is "a thing in which material is held or carried"). (NUREG-1736, HPPOS-028)

4.1.7 **Contaminated (Contamination) Area** (CA) - An area containing loose surface contamination ≥1000 dpm/100 cm² β-γ or ≥20 dpm/100 cm² α, activity. (CRAI 3373972)

4.1.8 **Deep-dose Equivalent** (H_d) - External whole-body exposure, the dose equivalent at a tissue depth of 1 cm (1000 mg/cm²).

4.1.9 **High Contamination Area** (HCA) - An area containing loose surface contamination ≥100,000 dpm/100 cm² β-γ, or with more than one discrete particle with ≥100,000 dpm activity.

4.1.10 **High Radiation Area** (HRA) - An area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 100 mrem in 1 hour at 12" from the radiation source or 12" from any surface that the radiation penetrates. (10 CFR 20.1902(b), RP 046021-02, 10 CFR 20.1003)

4.1.11 **Hot Particle Control Area** (HPCA) - An area where survey or monitoring indicates the presence of more than one hot particle with activity ≥ 500,000 dpm, or areas in which the work to be performed has a history or high probability of liberating hot particles of this activity.

4.1.12 **Hot Spot** - An accessible localized point with a contact radiation level which is 100 mrem/hr or greater and is greater than or equal to five times the radiation level 12" away from the point. (*INPO 05-008, III.C.3.b*)

4.1.13 **Key Verbs** (*ANSI N18.7-1976*)

Shall	Compliance is required
Should	Compliance is recommended
May	Permission (neither a requirement nor a recommendation)
Ensure	Verify that a specific condition (state, position, status, etc.) exists. If the condition does not exist, take the steps or action(s) that are necessary to establish the condition.

4.1.14 **Level II Alpha Area:** $\alpha \geq 20$ dpm/100 cm2 and a β-γ:α ratio < 30,000:1. (CRAI 3672712)

4.1.15 **Level III Alpha Area:** $\alpha \geq 200$ dpm/100 cm2 and a β-γ:α ratio < 300:1. (CRAI 3672712)

4.1.16 **Locked High Radiation Area** (LHRA) - Term used at PVNGS to describe a High Radiation Area where an individual could receive a dose equivalent in excess of 1,000 mrem in one hour at 12" from the source or 12" from any surface that the radiation penetrates.

4.1.17 **Posting** - The use of rope, signs, tape, or other barricades erected to inform personnel of radiological hazards within a controlled area.

4.1.18 **Radiation Area** (RA) - An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5 mrem in 1 hour at 12" from the radiation source or from any surface that the radiation penetrates. (10 CFR 20.1902(a), RP 046021-01, 10 CFR 20.1003)

4.1.19 **Radiological Controlled Area** (RCA) - Any area so posted which features positive controls for the purpose of protecting personnel from radiation exposure and radioactive contamination. (ACT 3033630)

4.1.20 **Radioactive Materials** (RM) - For purposes of posting, an area or room in which there is used or stored an amount of licensed material exceeding 10 times the quantity of such material specified in Appendix C to 10CFR20.
(10 CFR 20.1902(e), RP 046021-05)

4.1.21 **Very High Radiation Area** (VHRA) - An area, accessible to individuals, in which radiation levels from sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads (5 grays) in 1 hour at 1 meter from a radiation source or 1 meter from any surface that the radiation penetrates. (10 CFR20.1902(c), RP 046021-03, 10 CFR 20.1003)

4.2 Abbreviations

4.2.1 **HPPOS** - NRC Health Physics Positions from NUREG/CR-5569

4.2.2 **LLRMSF** - Low Level Radioactive Material Storage Facility

4.2.3 **OSGSF** - Old Steam Generator Storage Facility

5.0 REFERENCES

5.1 Implementing References

5.2 Developmental References

5.2.1 Title 10 Code of Federal Regulations, Parts 19 and 20

5.2.2 PVNGS Technical Specification 5.7, High Radiation Area

5.2.3 PVNGS UFSAR Chapter 12, sections 12.5.3.1 & 12.5.3.4

5.2.4 USNRC Regulatory Guide 8.38, Control of Access to High and Very High Radiation Areas in Nuclear Power Plants," May 2006 (ICR 00494)

5.2.5 USNRC NUREG-1736, "Consolidated Guidance: 10 CFR Part 20 - Standards for Protection Against Radiation," Publication date 10/1/2000

5.2.6 USNRC NUREG/CR-5569, "Health Physics Positions Data Base"
HPPOS-014, -036, -066, -210, -234, -242, and -245

5.2.7 USNRC Notice 84-82, "Guidance for Posting Radiation Areas," 11/19/84

5.2.8 INPO 05-008, "Guidelines for Radiological Protection at Nuclear Power Stations," December 2005

5.2.9 ANSI N18.7-1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants"

5.2.10 Letter # 218-00738-PWH "Control of Hot Particle Buffer Zones," 6/20/89

5.2.11 Letter # 222-01624-CJP, "Reevaluation of PVNGS Posting Requirements for Airborne Radioactivity Areas and Internal Dose Tracking," 5/4/95.

5.2.12 Letter # 218-01550-MDS/JBS, "CRDR 2-5-0165," 5/23/95

5.2.13 Letter # 115-02642-CJP, "LHRA Posting Strategy for Reactor Annulus Penetrations," 9/24/04.

5.2.14 Letter # 118-02231-JPB, "Reactor Vessel Annulus Posting in Consideration of Containment Cleanliness Restrictions in Modes 1-4," 5/11/07.

5.2.15 OED 2006-16, "Review of SOER 01-1 and SOER 95-1 Recommendations", December 2006.

5.2.16 EPRI 1019500, EPRI Alpha Monitoring Guidelines for Operating Nuclear Power Stations, December 2009.

5.2.17 Commitment Action Tracking System (CATS) Actions

Partition	Commitment Number	Action or CRAI Number	Procedure Section	Reference
CRAI	2422781		3.1.9.1	
CRAI	2418838		App A, # 26	CRDR 2409630
CRAI	2448517		3.1.7	CRDR 2417609
CRAI	2643737		App A, #24, 3.15.1	CRDR 2642822
CRAI	2810538		App A, #12.C	CRDR 2808100
CRAI	2394384		3.1.8	
CRAI	3105486		3.1.7	CRDR 3105482
CRAI	3122497		3.1.10.6, App B	CRDR 3065824
CRAI	3337829		3.1.11	CRDR 3325151
CRAI	3373972		3.4, 4.1.7	CRDR 3366795
CRAI	3400311		3.12.3	CRDR 3395711
CRDR	120468	08	4.1.1	
CRDR	210223	05	3.4.5	
CRDR	96Q002	01	App A - 3.12.4	
CRDR	96Q056	01	App A - 3.12.4	
CRDR	3611293	3672712	3.1.10, 3.4.4, 3.13.2, 4.1.14 4.1.15	
INPO	020021	08	App A - 3.6, 3.7	INPO PE89 RP.1-1
INPO	020022	09	App A - 3.6, 3.7	INPO PE89 RP.4-2
INPO	020023	04	3.1.6	INPO PE89 RP.9-1
INPO	040002	07	App A - 3.6, 3.7	INPO PE89 RP.1-1
QATS	390038	01	3.4.5	
RCTS	011131	01	3.9, 3.10	Tech Spec 5.7
RCTS	037999	01	3.5.2, App A	IR 528/87-17-03
RCTS	038602	01	3.10	LER 3-88-005-01
RCTS	038623	01	3.6, 3.7, App A	IR 528/89-15-M06
RCTS	038930	01	3.1.8, App A	NOV 528/89-25-01
RCTS	039043	01	3.10.1, App A	IR 530/88-31-M02
RCTS	039649	02	3.10.1, App A	LER 1-89-021.00
RCTS	040029	01	3.1.3, App A	NOV 528/90-23-01
RCTS	041217	01	3.10	IR 530/88-25-01
RCTS2	010617	01	3.1.2, 3.2.1	FSAR 12.5.1.3.D
RCTS2	010662	01	3.8, 3.9	FSAR 12.5.3.2.B

Commitment Action or Procedure

Partition	Number	CRAI Number	Section	Reference
RCTS2	011003	01	1.1, App A	10 CFR 19.12
RCTS2	041014	01	3.9	FSAR 12.5.2.3.B
RCTS2	041016	01	3.4, App A	FSAR 12.5.3.4
RCTS2	041019	01	3.5	FSAR 12.5.3.5
RP	046020	01	3.1.1	10 CFR 20.1901(a)
RP	046020	03	3.1.1.1, 3.10	10 CFR 20.1901(c)
RP	046021	01	3.8, 4.1.15	10 CFR 20.1902(a)
RP	046021	02	3.9, 4.1.9	10 CFR 20.1902(b)
RP	046021	03	3.11, 4.1.18	10 CFR 20.1902(c)
RP	046021	04	3.5, 4.1.2, App A	10 CFR 20.1902(d)
RP	046021	05	3.3, 4.1.17	10 CFR 20.1902(e)
RP	046022	01	3.12.1	10 CFR 20.1903(a)
RP	046022	03	3.12.2	10 CFR 20.1901(c)
RP	046023	01	3.13, 3.13.2	10 CFR 20.1904(a)
RP	046024		3.14	10 CFR 20.1905
RP	046024	01	3.14.1.1	10 CFR 20.1905(a)
RP	046024	02	3.14.1.2	10 CFR 20.1905(b)
RP	046024	03	3.14.1.3	10 CFR 20.1905(c)
RP	046024	04	3.14.1.4	10 CFR 20.1905(d)
RP	046024	05	3.14.1.5	10 CFR 20.1905(e)
RP	046024	06	3.14.1.6	10 CFR 20.1905(f)

6.0 Appendices

Appendix A - Procedure Bases, Action Bases, & RP Tech Tools

Appendix B - RCA Deposting Checklist

7.0 Summary of Changes

Rev	Description
29	1.) 4.1.17 edited to allow the RCA posting to be used outside the protected area and to eliminate conflict with other procedures. (ACT 3033630)
	2.) "Area Staged" throughout procedure changed simply to "staged" to clarify that only the word "staged" is required on postings. (ACT 3143405)
	3.) 3.9 edited to clarify management expectation for posting of HRA verses regulatory position. (ACT 3208265)
	4.) 3.4 and 4.1.7 changed to clarify that the terms Contaminated and Contamination are equivalent in regard to their use for posting and area. (CRAI 3373972)
	5.) 3.12.3 edited to clarify that an RM posting is not excepted due to inaccessibility. (CRAI 3400311)
30	1.) Incorporated EPRI 1019500 guidance for Level II and III Alpha Areas including PCRs 3909183 and 3909408 into the following steps: 3.1.10, 3.1.11.4, 3.4.3, 3.4.4, 3.13.2, 4.1.14, 4.1.9, 4.1.15.
	2.) Incorporated PCR 3581415 instructions from NO 09-013 for posting cavity ladder in Tech Tool 33.
	3.) Incorporated PCR 3509218 to include RCA location and survey number on RCA deposting checklist.

Procedure Bases / Action Bases

Procedure Bases

10CFR19.12 Instructions To Workers.

All individuals who in the course of employment are likely to receive in a year an occupational dose in excess of 100 mrem shall be kept informed of the storage, transfer, or use of radiation and/or radioactive material.

A basic method of making workers aware of radioactive materials and radiation in an area is the use of boundaries, postings, and barricades.

Radiological boundaries should be established and signs should be posted conspicuously identifying the type of radiological concern. Workers are provided training to familiarize them with radiological boundaries and postings.

10CFR20.1902 Posting Requirements

This section identifies specific boundary and posting requirements for areas identified:

Radiation Area	High Radiation Area	Very High Radiation Area
Radioactive Material(s)	Airborne Radioactivity Area	

PVNGS meets or exceeds each of those requirements as identified in this procedure with the following exception:

10CFR20.1601(c) allows licensees to apply to the Commission for alternative methods for controlling access to high radiation areas. An alternate method approved for PVNGS is identified in PVNGS Technical Specifications, Section 5.7.

Additionally, posting of contaminated areas is not specifically addressed in 10CFR20. However, individuals who work in an RCA receive instructions, in accordance with 10CFR19.12, on radioactive contamination controls commensurate with the potential hazard. Instructions are provided through training, radiation exposure permits, information signs, and briefings by RP personnel. Routine contamination surveys performed are intended to evaluate egress and high personnel contact areas within the facility. When identified, these areas are posted to inform the workers of the condition. More detailed (job) surveys are performed for overheads, non-routinely accessible areas, components, fittings, valves, etc., prior to planned work which is expected to place individuals in contact with such areas and equipment. If contamination is found, appropriate posting and/or instructions will be provided to the worker to inform them of the contaminated area. RP's philosophy is to base contamination control measures relative to the risk of exposure.

Procedure Bases / Action Bases

Procedure Bases (continued)

PVNGS Technical Specifications, Section 5.7

This section of the Technical Specification is the "alternate method for controlling access to high radiation areas" as discussed in 10 CFR 20.1601(c). The requirements in this section are based on the wording found in USNRC Regulatory Guide 8.38, section 2.4, "Alternate Methods for Access Control."

Section 5.7.1 requires high radiation areas to be "barricaded and conspicuously posted."

PVNGS UFSAR Section 12.5

Radiological controlled areas are segregated and appropriately posted to limit radiation exposure.

This section identifies specific areas which require boundaries and posting and states that such areas shall meet the requirements of 10CFR20.

Action Bases

1.1 In addition to the implementation of 10CFR20.1601 and Technical Specification 5.7, this procedure is instrumental for compliance with 10CFR19.12 Instruction to Workers, which says in part, "All individuals who in the course of employment are likely to receive in a year an occupational dose in excess of 100 mrem shall be kept informed of the storage, transfer, or use of radiation and/or radioactive material."
(10 CFR 19.12, RCTS2 011003-01)

3.1.3 The posting of the access to the high radiation area should physically obstruct an individual from inadvertently entering a high radiation area. Use of a head high posting is an attempt to force personnel to observe required postings.
(RCTS 040029-01)

3.1.4.1 The posting of "NEUTRON" is an added precaution to ensure that neutron exposure is appropriately monitored.

Procedure Bases / Action Bases

Action Bases (continued)

3.1.5
3.11 For very high doses received at high dose rates, units of absorbed dose (e.g., rads and grays) are appropriate, rather than units of dose equivalent (e.g., rems and sieverts). Rem is defined as the product of the dose in "rads" and the "quality factor." However, quality factors vary widely depending on the end point of interest. In RP work, the rem is defined using the quality factor for cancer as the end point of concern, which is a stochastic effect. In cases of high, acute exposures, such as in an accident, the end point of concern in not cancer but deterministic effects, commonly known as "radiation sickness." The quality factors for such effects may be substantially different from those for cancer, and the calculated dose equivalent in rem may, therefore, not be a valid measure (NUREG-1736, 10/01/2000)

3.1.7 IAW NUREG 1736, *Posting the entrances to a very large room or building is inappropriate if most of the area is not a radiation area and only discrete areas or individual rooms actually meet the criteria for a radiation area. If discrete areas or rooms within a large area or building can be reasonably posted to alert individuals to radiation areas, these discrete areas or rooms should be posted individually.*

Licensees may establish controls, such as posting, at locations beyond the immediate boundaries of an area to take advantage of natural or existing barriers. For example, it may be appropriate for a licensee to post a reactor containment as a High Radiation Area even though only certain areas of containment are High Radiation Areas. In such a circumstance, the licensee would have to maintain administrative controls (i.e., controlling personnel access and keeping the entrance locked) as though the entire containment were a High Radiation Area.

3.1.10 The intent is to ensure an appropriate level of RP supervision and management is notified. (RCTS 038930-01, NRC IR 528/89-25-01 NOV)

3.2.1 10CFR20.1902(e) provides additional requirements for radiological posting. It requires each area or room in which licensed material is used or stored (in greater than 10 times Appendix C quantities) to be posted "Caution, Radioactive Material(s)." Due to the controls placed on materials exiting the RCA and the amounts of radioactive material present in the majority of areas within the RCA, it has been deemed appropriate to include "Caution, Radioactive Material(s)" as part of the RCA posting.

Second Bullet - The 500 mrem dose criteria takes into account that an individual, working for 40 hours per week and 50 weeks per year within the restricted area, does not exceed the required annual monitoring requirement of 500 mrem (10 % of the 10 CFR 20.1201 limits) as specified in 10 CFR 20.1502. For purposes of ALARA, it is the intent to limit exposure well within the occupational monitoring requirement and also within the 100 mrem annual public limit (10 CFR 20.1301). Maintaining the RCA boundary **dose rate** at or less than 0.25 mrem/hr deep-dose equivalent will ensure the annual average dose (above background as measured by area TLDs) will be less than the 500 mrem in one year monitoring criteria.

3.3 Any areas outside of the RCA need to be posted separately should they contain greater than 10 times Appendix C quantities of radioactive material. Through this posting, personnel are alerted to the presence of radioactive material. These controls assist with the Palo Verde's requirement to allow the release or disposal of licensed radioactive material only through approved methods.

3.4 Because there are numerous potential sources of contamination throughout the plant (leakage from valves, pumps, etc.), and, one cannot predict when leakage will occur, PVNGS uses various means to identify contaminated areas. One is routine surveys in high traffic areas and other accessible travel routes, others are:

- Pre-job or job coverage surveys.
- Surveys conducted as a result of individuals who report leaks observed within an RCA. (During their radiation worker training, individuals are instructed that while in an RCA, they are acting as the "eyes and ears" of the plant staff and to report any leaks or potential radiological problems they discover.)
- Investigation surveys performed as part of the evaluation conducted after a personnel contamination event occurs.

When identified, contaminated areas are properly posted to warn individuals in accordance with the licensing bases listed below.

UFSAR paragraph 12.5.3.4 - Contamination Control states the following:

> "Areas found contaminated beyond specified limits are roped off or otherwise delineated with a physical barrier, posted appropriately, and decontaminated as soon as practical" (UFSAR 12.5.3.4, RCTS2 041016) and,
>
> "Surveys are performed as discussed in paragraph 12.5.3.1, to determine contamination levels."

Procedure Bases / Action Bases

Action Bases (continued)

UFSAR paragraph 12.5.3.1 - Radiation and Contamination Surveys states:

"Radiation protection personnel normally perform routine radiation and contamination surveys of accessible areas of the units" (RCTS2 041013) and,

"Surveys related to specific activities may be performed if necessary prior to, during, or after activities that would be expected to produce additional significant radiation exposure to individuals."

3.4.4 **EPRI** 1019500, "EPRI Alpha Monitoring Guidelines for Operating Nuclear Power Stations," December 2009. EPRI recommends characterizing areas in the plant and assigning three levels of alpha contamination controls. EPRI defines those areas this way:

Level I Alpha - Minimal (Low alpha contamination): the relative abundance of alpha contamination is minimal. Internal exposure from the alpha emitters is not likely to exceed 10% of the total internal dose. Action Levels are recommended to verify the low abundance of alpha emitters when high contamination or high airborne radioactivity is present.

Level II Alpha - Significant (Medium alpha contamination): the relative abundance of alpha contamination is significant. Alpha emitters are likely to contribute more than 10% of the internal dose and airborne radioactivity levels expressed as DAC fractions. Contamination survey action levels are intended to alert radiation safety personnel of the presence of alpha emitters. When significant levels of alpha contamination are identified, additional smears are counted to adequately evaluate the magnitude and extent of alpha contamination in the area. Air sampling action levels are intended to demonstrate compliance with the requirement for posting airborne radioactivity areas. Air samples are counted for alpha whenever the total airborne radioactive material is likely to exceed the derived air concentrations specified in Appendix B to 10 CFR Part 20, or when an individual may receive an intake in excess of 0.6% ALI or 12 DAC hours in a week.

Level III Alpha - Elevated (High alpha contamination): the relative abundance of alpha contamination is elevated. Internal exposure from the alpha emitters is likely to exceed 90% of the total internal dose based on the inhalation retention model. Most smears and all air samples should be counted for alpha contamination. Use of Personal Air Samplers as internal dosimeters is recommended. Also, alpha frisking of personnel is recommended when the β-γ:α ratio is below 50-to-1.

EPRI further suggests using action levels based on area contamination and α:b/g DAC-fraction ratios when characterizing alpha areas. The following table lists EPRI recommendations and shows how PVNGS has chosen to implement them:

	Level I Areas* (Minimal)	**Level II Areas** (Significant)	**Level III Areas** (Elevated)
EPRI β-γ:α Activity Ratio	>30,000	30,000-300	<300
PVNGS	> 30,000 OR <20dpm/100cm2α	≤ 30,000:1 AND, ≥ 20 dpm/100cm2α	< 300:1 AND, ≥ 200 dpm/100cm2α
EPRI (α : β-γ) DAC-Fraction Ratio	(<0.1)	(0.1 – 10)	(>10)
PVNGS	(<0.1)	(0.1 – 10)	(>10)

*Level I Alpha Areas are included in the RP Program as a tracking and trending tool but have no associated actions relative to posting or surveillance. For this reason Level I is only included in guidance documents for characterization and job planning at PVNGS.

To enhance planning for alpha contamination work, PVNGS characterizes both systems and components according to the EPRI area recommendations; however, there are no associated posting or direct frisking requirements.

3.5 The intent of the regulation regarding Airborne Radioactivity Area posting is to post at the more limiting of the 1 DAC or 12 DAC-hr criteria. The 1 DAC criteria is relatively straight forward. The 12 DAC-hr criteria, however, being based on the potential for an individual to be present in an area of relatively low levels of airborne radioactivity (<1 DAC) without respiratory protection equipment for periods long enough to receive 12 DAC-hours in a week, is a little more difficult to implement. At PVNGS, we assume 40 hours as the longest practical period of time in a week that an individual would have cause to remain in one area <1 DAC but having the potential to result in that individual receiving 12 DAC-hours. Based upon this assumption, the lowest level of airborne radioactivity that we concern ourselves with is 0.3 DAC (12 DAC-hours¸ 40 hours = 0.3 DAC). Once we have determined the potential for airborne radioactivity between 0.3 DAC and 1 DAC to exist, our options are to: 1) verify that the area will not be occupied long enough to result in an internal exposure 12 DAC-hours in a week or, 2) obtain back-up air samples to verify that the airborne condition is not of sufficient duration as to result in an internal exposure 12 DAC-hours in a week or, 3) post because options 1 and 2 cannot be verified. Obviously, option 2 is the optimum choice in that it is feasible to implement and prevents unwarranted postings which can desensitize workers to actual airborne hazards. (10 CFR 20.1902(d), RP 046021-04)

3.5.2 As a result of NRC Inspection Report 50-528/87-17, one listed corrective action included: (RCTS 037999-01)

> …enhancing postings in the RCA, particularly with regard to differentiating between "airborne" and "respiratory protection required" postings;…

Procedure Bases / Action Bases

Action Bases (continued)

3.6 Posting of cold areas is an ALARA tool, particularly for areas like containment where egress and re-entry could impact task completion due to RP and security controls. (RCTS 038623-01, INPO 020021-08, INPO 020022-09, INPO 04002-07)

3.7 Hot spot posting, combined with radiation and high radiation area postings, provide adequate information for individual workers to utilize time and distance primarily to reduce their radiation exposure. Hot spot posting has become a standard industry practice. (RCTS 038623-01, INPO 020021-08, INPO 020022-09, INPO 04002-07)

3.9 PVNGS Technical Specifications 5.7.1 requires high radiation areas to be barricaded.

3.10 There is no NRC requirement for a Locked High Radiation Area (LHRA) posting. Initially, PVNGS only had the high radiation area posting and areas greater than 1000 mrem were to be maintained locked. Due to personnel not recognizing the requirements to keep these areas locked, the specific posting of LHRA was developed. (NRC IR 530/88-25-01, RCTS 041217-01, LER 3-88-005-01, RCTS 038602-01)

10 CFR 20.1901(c) allows additional information, as appropriate, to be provided on or near required warning signs. Placing the word "Locked" on High Radiation Area postings will provide additional information concerning the radiation hazard within the area and a reminder that PVNGS Technical Specifications 5.7.2 requires these areas to be locked or guarded to prevent unauthorized entry.

3.10.1 Posting the sign on the outside and inside of the gate provides assurance that personnel remain aware of a LHRA with the gate open or closed.
(NRC IR 530/88-31-M02, RCTS 039043-01, LER 1-89-021-00, RCTS 039649-02)

3.12.4 Posting for contamination in overheads and other non-routinely accessible areas (e.g., valve yokes, pump glands) is not normally required as these areas do not represent a significant health physics problem and the RP Program addresses each of these issues separately. Workers receive training on how to identify potentially contaminated areas and have the responsibility to avoid these areas when discovered and inform RP. Workers also receive training and instructions to contact RP prior to accessing such areas. (CRDR 96Q056-01, CRDR 96Q002-01, Ltr 218-01550-MDS/JBS)

Procedure Bases / Action Bases

Action Bases (continued)

3.13.1 The purpose of labeling radioactive material is to ensure adequate information is available to the workers to enable them to handle radioactive materials safely and minimize their exposure. There are times when labeling may be delayed as stated in NUREG-1736, "Consolidated Guidance: 10 CFR 20 - Standards for Protection Against Radiation," section 3.20.1904:

> "In general, a container should be labeled when the radioactive material is added to it. However, the NRC acknowledges that certain conditions may exist where the addition of appropriate information to the label may necessitate some delay. For example, dose rate information may not be added until the container is filled, or the final dose rate information may not be added until the container can be moved to a low-background area for measurement."

3.13.2 10 CFR 20.1904, "Labeling Containers," requires a Caution-Radioactive Materials label be attached to containers of licensed material, unless exempted by 20.1905. Furthermore, the label must provide sufficient information to permit individuals handling, or working in the vicinity of, the containers to avoid or minimize exposure.

At Palo Verde, sufficient information is defined as the maximum contact dose rate and the date the measurements were taken. Additional information on the DATA labels is used for tracking and inventory purposes and is not required for compliance with 20.1904.

RP Tech Tools

Purpose: These "Tech Tools" provide RP personnel with additional information that may be utilized in the performance of their duties. These tools do not contain instructions used to implement regulatory or license based requirements.

The information presents RP Management expectations for the consistent use of radiological postings, inserts, placards, labels, and other informational and/or notice signs to inform personnel of radiological conditions at PVNGS.

1. **Enclosure of Posted Areas**
Radiological controlled areas that do not have structural entries (e.g., doors, gates, etc.) should be segregated by enclosing the area with boundaries of magenta and yellow rope, ribbon, or tape. Where practical, radiological hazard tape may be used to further define the boundaries of contaminated areas (e.g., on the floor, around pump skids, etc.).

2. **Securing Radiological Boundaries**
Where practical, stanchions or other suitable devices should be used to secure radiological boundaries. Tape should not be used to permanently secure boundaries.

3. **Attaching Postings to Doors or Gates**
With the exception of Locked High Radiation Areas, Very High Radiation Areas, Radioactive Material(s) areas, and yard gates, postings should only be attached to a door or gate when the door or gate is equipped with a self closing device. For fire doors, use only postings made of non-combustible material and attached in accordance with methods approved by the responsible engineer.

4. **Cumulative Dose Rate Considerations**
Post areas which contain a mix of penetrating radiation (e.g., gamma-neutron) based on the cumulative dose rates in the area..

5. **Posting Expansion / Upgrade Notifications**
When surveys indicate an area needs to be expanded or the posting needs to be increased, modify the postings as necessary and inform the RP Leader responsible for that area as soon as possible.

6. **ALARA Considerations**
The placement of radiation warning signs should be performed in a manner to maintain exposures As Low As Reasonably Achievable (ALARA).

7. **RCA Boundary Posting Considerations**
Maintaining RCA boundary *dose rates* at < 0.25 mrem/hr ensures compliance with the **dose** criteria in step 3.2.1. When a *dose rate* greater than or equal to 0.25 mrem/hr DDE (considered a 12" measurement) is encountered outside of posted RCA boundaries, additional evaluations are necessary to ensure the 500 mrem dose in one year criteria is met.

RP Tech Tools *(Continued)*

8. **Posting of Externally Contaminated Drains in Clean Areas**
Floor drains located in clean areas having external contamination meeting the criteria of CA, HCA, and/or HPCA should be posted with the applicable radiation warning signs.

9. **Drip Catch Posting**
Drip catches, used to collect radioactive liquids in clean areas, may be posted with tape which has a yellow background and a magenta, purple, or black radiation symbol and the words "INTERNAL CONTAMINATION" or the equivalent, instead of the CA, HCA, and/or HPCA signs.

10. **Posting "Level II Alpha Area":**
May be used in addition to CA or HCA postings.
$\alpha \geq$ 20 dpm/100 cm2 and a β-γ:α ratio < 30,000:1.

11. **Posting "Level III Alpha Area":**
May be used in addition to CA or HCA postings.
$\alpha \geq$200 dpm/100 cm2 and a β-γ:α ratio <300:1.

12 **Alpha frisking/monitoring required upon exit**":
May be used in addition to CA or HCA postings.
For Level III Alpha Areas with β-γ:α ratio <50:1.

13. **"BUFFER ZONE" Posting**
The area between the inner and outer step off pads of an HPCA should be roped off and posted with a radiological sign(s) with the words "CAUTION or DANGER" containing an insert which states "BUFFER ZONE."

14. **Historical Hot Spot Posting**

A. Historical Hot Spot postings are used to identify a Hot Spot that no longer meets the criteria for labeling as a Hot Spot, but is tracked for several fuel cycles to determine the effectiveness of source term reduction techniques. (see *Figure 1*)

Figure 1

RP Tech Tools *(Continued)*

15. LHRA / VHRA Posting Considerations

A. Locked High Radiation Area (see *Figure 2*) and Very High Radiation Area postings should be attached to the outside of the door or gate, which secures the posted area.

- For fire doors, use only postings made of non-combustible material and attached in accordance with methods approved by the responsible engineer.

  Example: One method (shown on the left) is to hang the posting from approved hardware attached to metal hasps as part of the existing Fire Door identification placard hardware (screw).

Figure 2

B. To provide a reminder to the workers about the requirements to enter a Lock High Radiation Area, additional signs (*such as those shown in Figure 2 above*) may be posted at the boundary.

RP Tech Tools (*Continued*)

C. Reactor annulus penetrations following shutdown (ICR 00407, CRAI 2810538)

- The reactor vessel annulus loop penetrations and the adjacent areas are not considered to be accessible whenever Reactor Coolant System temperature is >190ºF.
- Radiological postings associated with the Reactor Vessel Annulus Loop Penetrations should be established in Mode 5 and are required to be established as part of the Mode 5 to Mode 6 Radiation Protection Mode Change Checklist.
- The annulus area is normally safe for access after cooldown to 190ºF. Flashing lights and postings may be used; however, barricades or physical barriers should be constructed at the annulus penetrations as soon as safety conditions allow. Exposed piping temperatures will still be about 150°F and caution should be taken when establishing postings/barricades or physical barriers.
- Extended RCS cool downs should be considered for time estimation purposes to access these areas during non-standard refueling outage shutdown scenarios.
- Access to the annulus must be properly posted LHRA and barricaded or have a properly identified physical RP barrier installed to render the area inaccessible prior to fuel movement or ICI retraction.

16. <u>HRA Posting Considerations</u>

A. The HRA boundary / barricade should be placed at approximately 75 mr/hr but reasonably positioned based on room/area size, accessibility, and practicality of barricade construction.

- Additionally, the boundary / barricade should encompass all components that may become HRA contributors (e.g., a pipe adjacent to an HRA with dose rates near HRA criteria, or that are increasing).

B. To provide additional warning to workers, a unique placard for posting HRAs, (which stands out and cannot be mistaken for any other radiological posting) may be used for posting HRA barricades. (see Figure 3 below)

If possible, the access point(s) to HRAs should be provided with head high barricades with an HRA posting (see Figure 4).

Figure 3

Figure 4

<u>RP Tech Tools</u> *(Continued)*

16. <u>HRA Posting Considerations</u> (*continued*)

D. If possible, HRAs barricades should be provide with an RP stop sign. (see *Figure 4* and *Figure 5*). At a minimum, the access points should have one.

Figure 5

E. An "RP HOLD POINT" insert should be used in each HRA placard. (see *Figure 6*)

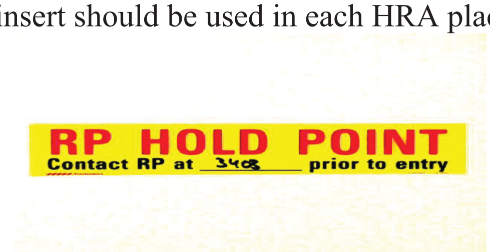


Figure 6

RP Tech Tools *(Continued)*

16. HRA Posting Considerations (*continued*)

F. Slightly smaller ultra violet (UV) resistant HRA signs (See *Figure 7*) may be used. Some appropriate uses of this sign are in areas where tight clearances or direct sunlight make the use of the larger signs impractical. Several examples of such areas are all outside areas and the following areas during outages: (ICR 00443)

a. Containment

- i. Steam Generator Bay Entrances and 80’ and 100’
- ii. Ladder at each pump bay going down from the 117’
- iii. Cavity entrance at 140’
- iv. Elevator access to 90’
- v. Pressurizer Access at 100’, 120’, and 146’
- vi. 100E Valve Cubicle on the 120’

b. Aux Building

- i. 51’6” access to 40’ LPSI
- ii. 51’6” access to 40’ Containment Spray

Figure 7

RP Tech Tools *(Continued)*

17. **Posting of Areas with Fluctuating Dose Rates** (see *Figure 8 below*)

Areas which have historically exhibited the potential for fluctuating dose rates due to system operation may be posted with a white on pink background stop sign shaped sign which state: Dose rates may fluctuate significantly in this area due to system operation.

18. **Posting of Sumps Outside an RCA** (see *Figure 9 below*)

Sumps located outside an RCA may be posted with a Radioactive Materials posting to notify workers to contact RP prior to removing any systems related material.

19. **Posting for Significant Radiological Evolutions in Progress** (see *Figure 10 below*)

This posting may be utilized to provide additional access control over areas when significant radiological evolutions are in progress.

20 **Posting of RP Barriers**

Barriers (e.g. fencing) which are utilized to prevent access to or reduce dose rates from a source of radiation, should be posted with radiation warning signs bearing the following words: RP Barrier Do Not Remove

21. **Posting of Temporary Shielding** (see Figure 11 below)

Installed Temporary Shielding may be posted with radiation warning signs bearing the following words: Warning Do Not Remove High Radiation Levels May Result.

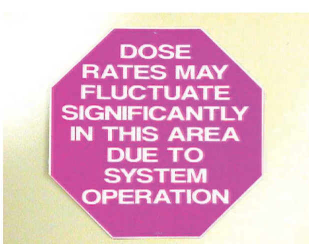


Figure 8

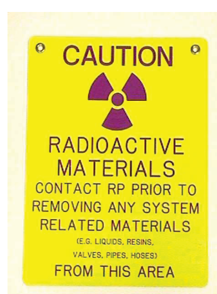


Figure 9

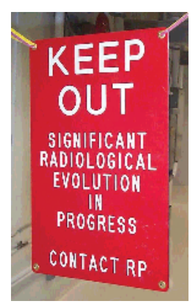


Figure 10

Figure 11

RP Tech Tools *(Continued)*

22. Posting of Exits from Turbine Building, Cold Lab, Blowdown Demin Area, and Chem Waste Neutralizing Tank Area (see *Figure 12 below*)

To remind workers who may be moving liquids or components (that may contain licensed material) to contact RP for labeling and/or escort requirements, use informative notice signs at exits from designated areas located outside of an RCA.

Exits from designated areas may be posted with magenta lettering on a yellow background sign similar to the sign shown in *Figure 12* below.

23. Posting of Overhead Areas within an RCA (see *Figure 13 below)*

Overhead areas within an RCA may be posted with a white on blue background sign stating: Notify RP Prior to Any Work Above 6 Feet in the Overhead Areas

24. Use of the area "STAGED" posting covers:

Prior to the start of a particular job, "Staged" posting covers may be used to inform workers that an area is being set up to support a planned work evolution.

Figure 12

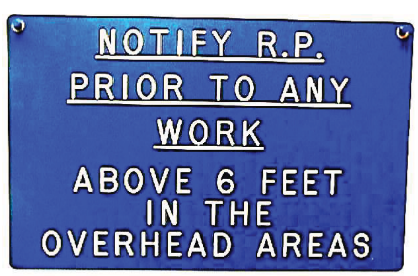


Figure 13

RP Tech Tools *(Continued)*

25. **Posting Areas Where Residual Soil Contamination is Suspected** (see *Figure 14*)

In instances where minor traces of radioactive contamination may be remaining in the ground (due to previous system leakage), a sign with magenta lettering on yellow background may be posted stating the equivalent of the following:

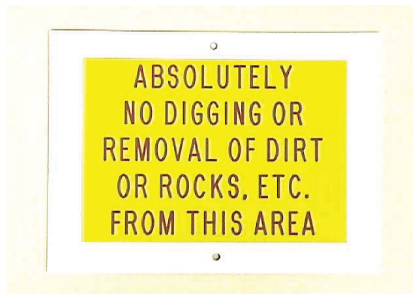


Figure 14

26. **Use of the "RP HOLD POINT" insert** (see *Figure 15*)

Use the "RP HOLD POINT" insert for the following postings / situations:

- High Radiation Area (*to ensure a briefing is conducted*)
- Hot Particle Control Area (*to ensure Hot Particle checks are performed*)
- Airborne Radioactivity Area (*to ensure DAC-HR tracking is performed*)
- Newly Accessible areas while being surveyed
- As directed by the RP Leader on shift. (*as needed*)

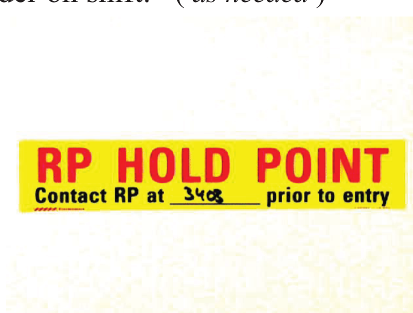


Figure 15

RP Tech Tools *(Continued)*

27. **Posting SDRI Locking Devices** (see *Figure 16*)

Use the yellow and magenta "SIGNIFICANT DOSE RATE ITEMS, RP HOLD Point" placard to identify locking devices for transient items that represent a high dose rate potential of greater than or equal to 1000 mr/hr at 12" out of the water or 5000 mr/hr on contact under water and are to remain submerged for purposes of storage. (NRC HPPOS-245,)

28. **Labeling Significant Dose Rate Items** (see *Figure 17*)

Use the yellow and magenta "SIGNIFICANT DOSE RATE ITEMS," placard to identify transient items, submerged for purposes of storage, that represent a high dose rate potential of greater than or equal to 1000 mr/hr at 12" out of the water or 5000 mr/hr on contact under water.

29. **Posting of areas affected by Peroxide Injection evolutions** (see *Figure 18*)

Areas which will be significantly affected by Peroxide Injection evolutions should be posted with yellow and black "KEEP OUT Peroxide Injection in Progress" lamacoid signs in addition to appropriate radiological posting (e.g. LHRA, HRA) prior to the initiation of injection and remain so posted until depost is authorized by the cognizant RP Section Leader. These signs are to be posted at the entrance to the following areas and any other area deemed appropriate by the cognizant RP Section Leader.

a. LPSI and Containment Spray Pump Rooms of the affected train
b. 40' Aux SI Pipe Chase of the affected train.
c. 70'-87' Aux Penetration Room of the affected train.
d. 88' Aux Pipe Chase.
e. 70' Aux SDHX Room of the affected train.
f. 51'6" Vertical Pipe Chase of the affected train.
g. Below 117' Inside Bio Shield of Containment of the affected train
h. 80' and 90' elevations of Containment of the affected train.

Figure 16

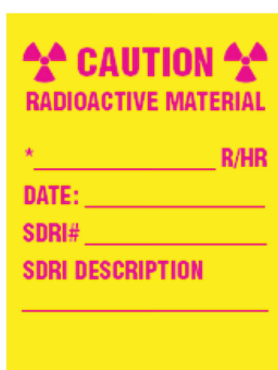


Figure 17

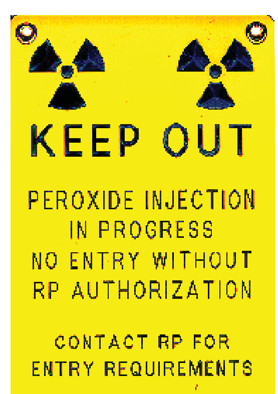


Figure 18

RP Tech Tools *(Continued)*

30. Radioactive Material Labeling Considerations

A. Use of "DATA Labels"

DATA Label - Term used for a radioactive material label used at PVNGS which has the standard radiation symbol and phrasing - Caution Radioactive Materials, with spaces for contact and 12 inch dose rates and the date surveyed. Spaces may also be provided for additional descriptive information (e.g., contamination levels, description, remarks, Hot Particles, Alpha, etc.).

1. The outermost container should bear a Data Label.
2. When the contents of the container are not easily viewed, the contents of the container should be listed on the Data Label.
3. The radiological data on the label should properly communicate the level of hazard to a worker. (For example, beta/gamma and or Alpha contamination levels (Level II or III Alpha), description, remarks, Hot Particles, etc.).

B. Use of "ALERT Labels"

ALERT Label - Term used for a radioactive material label used at PVNGS which only has the standard radiation symbol and the words:

CAUTION, RADIOACTIVE MATERIAL
or
DANGER, RADIOACTIVE MATERIAL

1. Alert labels which have been annotated with the required minimum information can be used in lieu of Data Labels when the containers are too small to attach a Data Label.
2. Alert labels with the required minimal information may be temporarily used in lieu of Data Labels but should be replaced by a Data Label as soon as practical.
3. Alert labels may be used in conjunction with Data labels to maximize the awareness to the presence of radioactive material.
4. When the final dose rate information is not available, Alert labels may be placed on containers to alert workers to the presence of radioactive material during the following times:
   - While a container is being filled (e.g., trash / laundry container, etc.)
   - While in high dose rate areas until the container can be moved to a low background area for measurement.

RP Tech Tools *(Continued)*

31. Criteria for Updating Radioactive Material Data Labels (CRAI #2418838)

A. Radioactive Data Labels should be updated using the following criteria:

- Whenever a label is found with a date greater than two years old
- Whenever the contact dose rates increased by 5 mr/hr or 20 % (*whichever is larger*)
- Whenever the data on the label is illegible.

B. The expectation for updating a Data Label consists of the following:

- Perform contact dose rate survey,
- Perform a 12" dose rate survey,
- Complete and affix a new Data Label with the new survey information

C. Inform the cognizant RP Leader when a Data Label has been found that is greater than two years old (i.e., it has been longer than two years since a survey has been performed).

- This will allow the RP Leader the opportunity to ascertain the status of the material.

D. Exceptions to updating Data Labels are:

- Radioactive Waste in storage inside permanent plant structures.
- Radioactive Materials within posted LHRAs (*for ALARA considerations*)
- Radioactive Materials stored in the LLRMSF.
- Radioactive Materials stored in the OSGSF (ICR 00335).
- Radioactive Materials stored within "hard sided containers" in DAWPS and Unit 1 Decon / Laundry Facility.

  (1) Hard sided means constructed of materials that are not easily ripped, torn, or punctured such as steel, aluminum, thick plexiglass, etc.)

RP Tech Tools *(Continued)*

32. Posting of Ion Exchanger and Filter Vaults (see Figure 18 below) (ACT #3021451)

Installed Shield Plugs for Ion Exchanger and Filter Vaults may be posted with radiation warning signs bearing the following words: Warning Do Not Remove High Radiation Levels May Result. (OED 2006-16)

Figure 18

33. Posting of the 114’ to 98’ Reactor Cavity Ladder

The Upper Guide Structure Lift Rig ladder, when located on the Core Support Barrel stand does not provide access into the 98’ lower reactor cavity as the ladder terminates approximately 7 ft above the 98’ elevation. Control the 114’ to 98’ reactor cavity ladder as a physical barrier by installing a barrier device, attached to the ladder with bolts, nuts and fail-safe wire attachments for foreign material exclusion (FME) control using hand tools for installation. Attach an “RP Barrier – Do Not Remove” sign to the ladder at the 114’ ladder access.

RCA Deposting Checklist (CRDR 3065824, CRAI 3122497)

1. Location of RCA to be Deposted. ____________________

2. Depositing survey number. ____________________

3. Obtain RP Department Leader or Director permission prior to deposting. ____________
Name of RPL

4. If area being deposted is part of one of the permanent RCAs at PVNGS, notify and brief:

Organization	*Phone Number*	*Person Contacted (last name)*
Security Headquarters	(6473, 6475)	____________
Fire Protection Operations	(1612)	____________
Responsible Control Room (U-1 for non-unit RCAs)	(X203, X205)	____________

5. Incremental (over more than one shift) Deposting of an RCA:

- Deposting of an RCA should be performed in a single shift whenever possible. Justification for exceeding one shift should be documented in RP Desk Log.
- Large areas that must be incrementally surveyed for release should be properly posted when an RP representative is not present.
- Staged postings should not be used for incremental release of an RCA.
- Hand-drawn information signs require the authorization of the responsible RP Leader.

6. Provide notification of completed deposting or shiftly status of incremental deposting to the following:

Organization	*Phone Number*	*Person Contacted (last name)*
Security Headquarters	(6473, 6475)	____________
Fire Protection Operations	(1612)	____________
Responsible Control Room	(X203, X205)	____________

7. Obtain RP Department Leader or Director confirmation upon completion. ____________
Name of RPL

Palo Verde
Nuclear Generating Station

Electronic Procedure Change Record

Procedure No.: (1)	Revision No.: (2)	Category: (3)	Expedite? (4)
75RP-0RP01	30	2	No

Title: (5) Radiological Posting and Labeling

Procedure Action: (6)	Full Basis Check? (7)	NAD Review: (8)	PRG Review: (9)	MRL Update? (10)
Minor	Yes	No	No	No

EOP? (11)	Dry Cask? (12)	Decommissioning Doc? (13)	Level of Use: (14)
No	No	No	Information

AD Review: (15) | 10CFR50.59/72.48 Required? (16) No | 50.59/72.48 Doc Number:

In accordance with 93DP-0LC17, rev 6, step 2.2.11, this procedure action does not require further regulatory screening (i.e., 10CFR50.59) because it constitutes a change to the Radiation Protection Program which is governed by the more specific criteria contained in 10CFR20.

Text does not automatically roll to continuation page. AD Review - Continuation (17) ☐ Yes

Applicability Determination performed by: (18) David J. Heckman

Is Environmental Screening Required?: (19) ☑ No (done) ☐ Yes

Env. Reg./Permit Review req'd? (Use 91DP-0EN02, App. A) ☑ No (20) ☐ Yes

Screening performed by:

If "Yes" send 91DP-0EN02, Appendix A to Environmental (21)

Scrn Log Number:

Procedure Preparer: (22)
Heckman, David J(Z00977)
Digitally signed by Heckman, David J(Z00977)
DN: cn=Heckman, David J(Z00977)
Reason: I am the author of this document
Date: 2012.02.15 17:07:00 -07'00'

IQR Approval Recommendation: (23)
Gray, Thomas S(Z99610)
Digitally signed by Gray, Thomas S(Z99610)
DN: cn=Gray, Thomas S(Z99610)
Reason: I have reviewed this document
Date: 2012.02.15 17:13:12 -07'00'

NAD Concurs (if required): (24)

PRG Concurs (if required): (25)

Approval: (26)
Gray, Thomas S(Z99610)
Digitally signed by Gray, Thomas S(Z99610)
DN: cn=Gray, Thomas S(Z99610)
Reason: I am approving this document
Date: 2012.02.15 17:13:31 -07'00'

Effective Date (Time Optional): (27)
02/21/2012

Summary of Change (include list of all PCRs incorporated): (28)

Incorporated EPRI 1019500 guidance for Level II and III Alpha Areas including PCRs 3909183 and 3909408 into the following steps: 3.1.10, 3.1.11.4, 3.4.3, 3.4.4, 3.13.2, 4.1.14, 4.1.9, 4.1.15.
Incorporated PCR 3581415 instructions from NO 09-013 for posting cavity ladder in Tech Tool 33.
Incorporated PCR 3509218 to include RCA location and survey number on RCA deposting checklist.

Text does not automatically roll to continuation page. Change Summary - Continuation (29) ☐ Yes

2013 NRC SRO A-5
PVNGS JOB PERFORMANCE MEASURE

JPM BASIS INFORMATION

TASK:	1240100202 Classify events requiring emergency plan implementation							
TASK STANDARD:	Alert (HA4.2) has been declared within 15 minutes of acknowledging INITIATING CUE. NAN FORM EP-0541 has been completed within 14 minutes of event classification.							
K/A:	2.4.40		K/A RATING:	RO:	2.7	SRO:	4.5	
10 CFR 55:	41.10 / 43.5 / 45.11							
APPLICABLE POSITION(S):		SRO	VALIDATION TIME:		10 minutes			
REFERENCES:	EP-0900, Emergency Response Organization Position Checklists; EP-0901, Classifications; EP-0902, Notifications; EP0905, Protective Actions; EP-0802 A, Cold EAL Table							
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR		PLANT		OTHER	X		

JPM TYPE

Time Critical? *(Yes/No)* ***Yes*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Adam Rasmussen Date: 10/09/2013

Revised By: N/A Date: ______________

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ______________________________ Date: ____________

Evaluator Name: ______________________________

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   N/A
2. **SPECIAL TOOLS/EQUIPMENT:**
   - Calculator
   - Pen and Paper
   - EP-0801A/0802A, Hot and Cold EAL Tables, Revision 0 available
   - EP-0900, ERO Position Checklists, Revision 4 available
   - EP-0901, Classifications, Revision 2 available
   - EP-0902, Notifications, Revision 3 available
   - Blank FORM EP-0541 AB, PV NAN Emergency Message Form available

   NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM
3. **JPM PERFORMANCE:**
   - MALFUNCTIONS, OVERRIDES, etc. **during** JPM: N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE** any equipment.
- Inform the control room staff of any discovered deficiencies.
- Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- You may use any source of information normally available.

INITIAL CONDITIONS:

- **Unit 1 is in a refueling outage and has just finished unloading all fuel from the RCS to the Spent Fuel Pool**
- **Spent Fuel Pool Cooling has been lost**
- **Spent Fuel Pool temperature is currently 160°F and rising at 20°F/hr**
- **Cooling is expected to be recovered in 2 hours**
- **The NRC has just reported that a 747 airliner is in unauthorized airspace and is being tracked by Luke AFB on a direct heading with PVNGS 200 miles out with an airspeed of 500 mph**
- **The communication has been authenticated and validated**
- **The authentication code is "Whiskey-Tango"**

INITIATING CUE:

- **You are to perform the duties of the Emergency Coordinator – STSC until relieved**
- **Assume the STA concurs with your E-Plan implementations**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate any valves.

JPM START TIME:

	STEP	CUE	STANDARD
1.	Enter EP-0901, Classifications to classify the event		Examinee referred to the EAL charts to determine the classification. **CLASSIFICATION** **Start Time: __________** **Evaluator NOTE:** **Begins when examinee receives and acknowledges INITIATING CUE**

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	Determines classification from EP-0802A, Cold EAL Table		Examinee determined the classification is an **ALERT** based on EAL **HA4.2** **End Time: __________** **Classification Time: _________** **(End Time – Start Time must be < 15 minutes to be SAT)** **NOTIFICATION** **Start Time: ______________**

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
3. *	Enters EP-0902 to make notification	**If Requested CUE:** **If examinee requests Area Operator report:** **"I am the Area Operator"** **Information CUE:** **Examinee should be given ERFDADS MET data along with INITIATING CUE**	Examinee completed FORM EP-0541 and handed to the STSC communicator. The form must contain the following information to be **SAT**: • Step 2 – **ALERT**, date and time, Status code [**HA4.2**] • Step 3 – ERFDADS data and Authenticator Code (Authenticator Code is contained in the **INITIAL CONDITIONS**) • Step 4 - No Radioactive release is in progress • Step 5 - PAR is **NONE** • Step 6 signed with time and date
		Information CUE: **After examinee hands EP-0541 to communicator report:** **"This concludes the JPM"**	**End Time: __________** **Notification Time: _________** **(End Time – Start Time must be < 14 minutes to be SAT, giving communicator 1 minute for notifications)**

SAT / UNSAT

Comments (required for UNSAT):

JPM STOP TIME: ______

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- Unit 1 is in a refueling outage and has just finished unloading all fuel from the RCS to the Spent Fuel Pool
- Spent Fuel Pool Cooling has been lost
- Spent Fuel Pool temperature is currently 160°F and rising at 20°F/hr
- Cooling is expected to be recovered in 2 hours
- The NRC has just reported that a 747 airliner is in unauthorized airspace and is being tracked by Luke AFB on a direct heading with PVNGS 200 miles out with an airspeed of 500 mph
- The communication has been authenticated and validated
- The authentication code is "Whiskey -Tango"

INITIATING CUE:

- You are to perform the duties of the Emergency Coordinator – STSC until relieved
- Assume the STA concurs with your E-Plan implementations

THIS IS A TIME CRITICAL JPM

APPLICANT

PALO VERDE NAN EMERGENCY MESSAGE FORM

1. (check one) ☑ This is a drill ☐ This is an actual event

2. This is Palo Verde Nuclear Generating Station Notification of a(n) (Check highest applicable classification level for event notifications) (Check Event Termination for terminating event)

☐ UNUSUAL EVENT ☑ ALERT ☐ SITE AREA EMERGENCY ☐ GENERAL EMERGENCY

Declared at CURRENT TIME (time) on XX / XX / XX (MM/DD/YY) EAL: HA4.2 (driving current classification only)

☐ EVENT TERMINATION AT ________ (time) ___/___/___ (MM/DD/YY)

3. The wind speed is 22 (35 foot elevation - 15 min avg) MPH from 320 (35 foot elevation - 15 min avg) degrees

Authenticator Code WHISKY TANGO

This is the ☐ STSC Comm. ☐ NAN Comm (Check one)

4. ☑ There is NO radioactive release due to this event.
   ☐ A radioactive release is occurring which does NOT exceed federally approved limits due to this event.
   ☐ A radioactive release is occurring that exceeds federally approved limits due to this event.

5. The following action is recommended:
   ☑ There are NO PROTECTIVE ACTIONS required.
   ☐ Shelter 2-mile radius
   ☐ Evacuate 2-mile radius and 5-miles in sectors ________
   ☐ Evacuate 2-mile radius and 10-miles in sectors ________
   ☐ Recommend consideration of KI as a protective measure for emergency workers and general public
   ☐ Other ________

6. Approval EXAMINEE SIGNATURE (EC/EOD signature) CURRENT TIME AND DATE (time) ___/___/___ (MM/DD/YY)

7. ☐ Independent review completed (If time permits while still meeting 15 minutes reporting requirement) (Checked by EC/EOD qualified person)

8.

Responding Agency	Alternate Link	Time	Message Rec'd
Maricopa County Sheriff's Office (24 hrs./day)	NAN Radio B/U **or** 9-602-876-1030		
AZ Department of Public Safety (24 hrs./day)	NAN Radio B/U **or** 9-602-223-2209		
Maricopa County Dept. of Emergency Mgmt.	NAN Radio B/U **or** 9-602-273-1411		
Buckeye Police Dept. (24 hrs/day)	NAN Radio B/U **or** 9-623-386-4421		
AZ Radiation Regulatory Agency	NAN Radio B/U **or** 9-602-255-4845		
AZ Division of Emergency Mgmt.	NAN Radio B/U **or** 9-602-244-0504		

COLD INITIATING CONDITIONS – MODES 5 – 6 – DEFUELED

RADIOLOGICAL (EFFLUENTS; RAD LEVELS) | SYSTEM MALFUNCTIONS (RX and CORE; AC / DC POWER; HEAT REMOVAL; COMMUNICATIONS) | HAZARDS (NATURAL / DESTRUCTIVE; FIRE / EXPLOSION; TOXIC / FLAMMABLE; SECURITY; CR EVACUATION; EC DISCRETION)

GENERAL EMERGENCY

EFFLUENTS

RG1 - Off-site dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mrem TEDE or 5000 mrem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on **ANY** of the following radiation monitors greater than the value for 15 minutes or longer:
   - Plant Vent RU-144 CH-1 >1.04E+00 uCi/cc
   - Fuel Building RU-146 CH-2 >3.50E+01 uCi/cc

OR

2. Dose assessment using actual meteorology indicates doses greater than 1000 mrem TEDE OR 5000 mrem thyroid CDE at OR beyond the site boundary.

OR

3. Field survey results indicate closed window dose rates greater than 1000 mR/hr expected to continue for 60 minutes or longer; or analyses of field survey samples indicate thyroid CDE greater than 5000 mrem for one hour of inhalation, at or beyond site boundary.

RX and CORE

CG1 - Loss of RCS inventory affecting fuel clad integrity with containment challenged. **Modes 5 & 6**

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

1. a. RCS level less than 99 ft. 7 in. for 30 minutes or longer.

AND

b. **ANY** of the following
- CONTAINMENT CLOSURE not established.
- 4.5% H_2 inside containment.
- UNPLANNED rise in containment pressure.

OR

2. a. RCS level cannot be monitored with core uncovery indicated by **ANY** of the following for 30 minutes or longer.
- Erratic source range monitor indication
- RU-33 greater than 10,000 mR/hr
- UNPLANNED level rise in **ANY** of the following:
  - Containment Sumps
  - Reactor Cavity Sump
  - Refueling Water Tank
  - CVCS Holdup Tank
  - Reactor Drain Tank
  - ESF Sump

AND

b. **ANY** of the following
- CONTAINMENT CLOSURE not established.
- 4.5% H_2 inside containment.
- UNPLANNED rise in containment pressure.

SECURITY

HG1 - HOSTILE ACTION resulting in loss of physical control of the facility.

1. A HOSTILE ACTION has occurred such that plant personnel are unable, either remotely or locally, to operate equipment required to maintain safety functions.

OR

2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool.

EC DISCRETION

HG2 - Other conditions exist which in the judgment of the EC warrant declaration of a General Emergency.

1. Other conditions exist which in the judgment of the EC indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels off-site for more than the immediate site area.

SITE AREA EMERGENCY

EFFLUENTS

RS1 - Off-site dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mrem TEDE or 500 mrem Thyroid CDE for the actual or projected duration of the release

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on **ANY** of the following radiation monitors greater than the value for 15 minutes or longer:
   - Plant Vent RU-144 CH-1 >1.04E-01 uCi/cc
   - Fuel Building RU-146 CH-1 >3.50E+00 uCi/cc

OR

2. Dose assessment using actual meteorology indicates doses greater than 100 mrem TEDE OR 500 mrem thyroid CDE at OR beyond the site boundary.

OR

3. Field survey results indicate closed window dose rates greater than 100 mR/hr expected to continue for 60 minutes or longer; or analyses of field survey samples indicate thyroid CDE greater than 500 mrem for one hour of inhalation, at or beyond the site boundary.

RX and CORE

CS1 - Loss of RCS inventory affecting core decay heat removal capability. **Modes 5 & 6**

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

1. With CONTAINMENT CLOSURE not established, RCS level less than 101 ft 4 in. resulting in loss of SDC

OR

2. With CONTAINMENT CLOSURE established, RCS level less than 99 ft. 7 in.

OR

3. RCS level cannot be monitored for 30 minutes or longer with a loss of RCS inventory as indicated by **ANY** of the following:
- Erratic Source Range Monitor Indication
- RU-33 greater than 10,000 mR/hr
- UNPLANNED level rise in **ANY** of the following:
  - Containment Sumps
  - Reactor Cavity Sump
  - Refueling Water Tank
  - CVCS Holdup Tank
  - Reactor Drain Tank
  - ESF Sump

SECURITY

HS4 - HOSTILE ACTION within the PROTECTED AREA.

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Team.

CR EVACUATION

HS2 - Control room evacuation has been initiated and plant control cannot be established.

1. a. Control Room evacuation has been initiated.

AND

b. Control of the plant cannot be established at the Remote Shutdown Panel within 15 minutes.

EC DISCRETION

HS3 - Other conditions exist which in the judgment of the EC warrant declaration of a Site Area Emergency

1. Other conditions exist which in the judgment of the EC indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

ALERT

EFFLUENTS

RA1 - **ANY** release of gaseous radioactivity to the environment greater than 20 times the ODCM for 15 minutes or longer

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

1. VALID reading on **ANY** of the following radiation monitors greater than the value for 15 minutes or longer:
- Plant Vent RU-143 CH-1 >1.22E-02 uCi/cc
- Fuel Bldg RU-146 CH-1 >1.13E-01 uCi/cc

OR

2. Confirmed sample analyses for gaseous releases indicates concentrations or release rates greater than 20 times the ODCM Section 3.0 limits for 15 minutes or longer.

RAD LEVELS

RA2 - Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel

Note: This EAL does not apply to the cask loading pit during cask loading operations.

1. A water level drop in the reactor refueling cavity, spent fuel pool, cask loading pit, or fuel transfer canal that will result in uncovering irradiated fuel.

OR

2. A VALID High Alarm on **ANY** of the following due to damage to irradiated fuel or loss of water level:
- RU-16 Containment Operating Level Area
- RU-17 Incore Instrument Area
- RU-19 New Fuel Area
- RU-31 Spent Fuel Pool Area
- RU-33 Refueling Machine Area
- RU-143 Plant Vent
- RU-145 Fuel Building Vent

RA3 - Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions

1. Dose rate greater than 15 mR/hr in the Control Room Area OR Secondary Alarm Station.

RX and CORE

CA1 - Loss of RCS inventory. **Modes 5 & 6**

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

1. Inability to restore and maintain RCS level greater than 101 ft 4 in

OR

2. RCS level cannot be monitored for 15 minutes or longer with a loss of inventory as indicated by an unexplained level rise in **ANY** of the following:
- Containment Sumps
- Reactor Cavity Sump
- Refueling Water Tank
- CVCS Holdup Tank
- Reactor Drain Tank
- ESF Sump

AC / DC POWER

CA3 - Loss of **all** Off-site and **all** On-Site AC power to emergency busses for 15 minutes or longer.

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

1. Loss of **all** Off-Site and **all** On-Site AC Power to PBA-S03 and PBB-S04 for 15 minutes or longer.

HEAT REMOVAL

CA4 - Inability to maintain plant in cold shutdown. **Modes 5 & 6**

Note: The EC must remain alert to events or conditions that lead to the conclusion that exceeding the Threshold is IMMINENT. If, in the judgment of the EC, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded.

1. An UNPLANNED event results in RCS temperature greater than 210 °F for greater than the specified duration on table.

RCS Reheat Duration Threshold		
RCS	Containment Closure	Duration
Not Intact or RCS Reduced Inventory (< 111ft.)	Not Established	0 minutes
	Established	20 minutes *
Intact and not in RCS Reduced Inventory	N/A	60 minutes *

* If SDC is in operation within this time frame and RCS temperature is being reduced, the Threshold is not applicable

OR

2. An UNPLANNED event results in RCS pressure rise greater than 10 psi due to a loss of SDC. (This Threshold does not apply in Solid Plant conditions.)

NATURAL / DESTRUCTIVE

HA1 - Natural or destructive phenomena affecting VITAL AREAS.

1. a. Seismic event greater than Operating Basis Earthquake (OBE) as indicated by **ANY** Force Balance Accelerometer reading greater than 0.10g.

AND

b. Earthquake confirmed by **ANY** of the following:
- Earthquake felt in plant
- National Earthquake Center
- Control Room indication of degraded performance of systems required for the safe shutdown of the plant

OR

2. Tornado touching down or high winds reaching 100 mph resulting in VISIBLE DAMAGE to **ANY** POWER BLOCK structure OR Control Room indication of degraded performance of safety systems.

OR

3. Internal flooding in **ANY** POWER BLOCK structure resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment OR Control Room indication of degraded performance of those safety systems.

OR

4. Vehicle crash resulting in VISIBLE DAMAGE to **ANY** POWER BLOCK structure OR Control Room indication of degraded performance of safety systems.

FIRE / EXPLOSION

HA2 - FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.

1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to **ANY** POWER BLOCK structure or Control Room indication of degraded performance of safety systems

TOXIC / FLAMMABLE

HA3 - Access to a VITAL AREA is prohibited due to release of toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

1. Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

SECURITY

HA4 - HOSTILE ACTION within the Owner Controlled Area or airborne attack threat.

1. A HOSTILE ACTION is occurring or has occurred within the Owner Controlled Area as reported by the Security Team.

OR

2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site.

OR

3. A HOSTILE ACTION directed toward the ISFSI.

CR EVACUATION

HA5 - Control Room evacuation has been initiated.

1. Control Room evacuation is required by:
   40AO-9ZZ18, Shutdown Outside Control Room

   OR

   40AO-9ZZ19, Control Room Fire.

EC DISCRETION

HA6 - Other conditions exist which in the judgment of the EC warrant declaration of an Alert.

1. Other conditions exist which in the judgment of the EC indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

UNUSUAL EVENT

EFFLUENTS

RU1 – **ANY** release of gaseous radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown

1. VALID reading on **ANY** of the following radiation monitors greater than the value for 60 minutes or longer:
- Plant Vent RU-143 CH-1 >1.22E-03 uCi/cc
- Fuel Building RU-145 CH-1 >1.13E-02 uCi/cc

OR

2. Confirmed sample analyses for gaseous releases indicates concentrations or release rates greater than 2 times the ODCM Section 3 limits for 60 minutes or longer.

RAD LEVELS

RU2 – UNPLANNED rise in plant radiation levels

1. a. A VALID Alert Alarm on **ANY** of the following:
- RU-16 Containment Operating Level Area
- RU-17 Incore Instrument Area
- RU-19 New Fuel Area
- RU-31 Spent Fuel Pool Area
- RU-33 Refueling Machine Area

AND

b. UNPLANNED water level drop in the reactor refueling cavity, fuel transfer canal, cask loading pit, or spent fuel pool as indicated by **ANY** of the following:
- Visual observation
- SFP LEVEL HI – LOW (EO204A) on PCN-E02
- RWLIS
- Pressurizer level

OR

2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels.

*Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

RX and CORE

CU1 - RCS Leakage **Mode 5**

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

1. RCS leakage results in Lower Mode Safety Function Status Check Acceptance Criteria for Inventory Control **not** Satisfied for 15 minutes or longer.

CU2 - UNPLANNED Loss of RCS inventory **Mode 6**

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

1. UNPLANNED RCS level drop as indicated by either of the following:
- RCS water level drop below the Reactor Vessel flange for 15 minutes or longer when the RCS level band is established above the Reactor Vessel flange.
- RCS water level drop below the RCS level band for 15 minutes or longer when operating in Reduced Inventory per 40OP-9ZZ16.

OR

2. RCS level cannot be monitored concurrent with a loss of RCS inventory as indicated by an unexplained level rise in **ANY** of the following:
- Containment Sumps
- Reactor Cavity Sump
- ESF Sump
- Refueling Water Tank
- CVCS Holdup Tank
- Reactor Drain Tank

AC / DC POWER

CU3 - AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that **ANY** additional single failure would result in station blackout. **Modes 5 & 6**

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

1. a. AC power capability to PBA-S03 and PBB-S04 reduced to a single power source for 15 minutes or longer.

AND

b. **ANY** additional single power source failure will result in station blackout.

CU7 - Loss of required DC power for 15 minutes or longer. **Modes 5 & 6**

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

1. Less than 112 VDC for 15 minutes or longer on Train A (PKA-M41 and PKC-M43) or Train B (PKB-M42 and PKD-M44) as required by Technical Specifications for monitoring and control of decay heat removal.

HEAT REMOVAL

CU4 - UNPLANNED loss of decay heat removal capability with irradiated fuel in the reactor vessel. **Modes 5 & 6**

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

1. UNPLANNED event results in RCS temperature exceeding 210 °F.

OR

2. Loss of **all** RCS temperature and RCS level indication for 15 minutes or longer.

CU8 - Inadvertent Criticality. **Modes 5 & 6**

1. UNPLANNED sustained source range count rise observed on nuclear instrumentation.

COMMUNICATIONS

CU6 - Loss of **all** On-site or Off-site communications capabilities

1. Loss of **all** of the following on-site communication methods affecting the ability to perform routine operations:
- PBX
- Plant Page System
- Two-Way Radio

OR

2. Loss of **all** of the following off-site communication methods affecting the ability to perform offsite notifications:
- PBX
- FTS
- Cellular Phones

NATURAL / DESTRUCTIVE

HU1 - Natural or destructive phenomena affecting the PROTECTED AREA.

1. Seismic event identified by **ANY** 2 of the following:
- VALID Seismic Event alarm
- Earthquake felt in plant
- National Earthquake Center

OR

2. Tornado touching down within the PROTECTED AREA or high winds reaching 100 mph.

OR

3. Internal flooding in the POWER BLOCK that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode.

OR

4. Main Turbine failure resulting in casing penetration or damage to turbine or Main Generator seals.

ISFSI

E-HU1 - Damage to a loaded cask CONFINEMENT BOUNDARY

1. Damage to a loaded cask CONFINEMENT BOUNDARY.

FIRE / EXPLOSION

HU2 - FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Note: The EC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the duration has exceeded, or will likely exceed the applicable time.

1. FIRE in the POWER BLOCK or Turbine Building not extinguished within 15 minutes of a FIRE alarm or Control Room notification.

OR

2. EXPLOSION within the PROTECTED AREA.

TOXIC / FLAMMABLE

HU3 - Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.

OR

2. Report by local, county or state officials for evacuation or sheltering of site personnel based on an off-site event.

SECURITY

HU4 - Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant.

1. A SECURITY CONDITION that does NOT involve a HOSTILE ACTION as reported by the Security Team.

OR

2. A credible PVNGS security threat notification.

OR

3. A validated notification from NRC providing information of an aircraft threat.

EC DISCRETION

HU5 - Other conditions exist which in the judgment of the EC warrant declaration of a UE

1. Other conditions exist which in the judgment of the EC indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs.

Definitions

CONTAINMENT CLOSURE: The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release in Mode 6.

CONFINEMENT BOUNDARY: The dry storage cask barriers between areas containing radioactive substances and the environment.

EXPLOSION: A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

FAULTED: in a steam generator, the existence of secondary side leakage that results in an uncontrolled drop in steam generator pressure or the steam generator being completely depressurized

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute FIRES. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTILE ACTION: An act toward a NPP or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILEs, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur.

LEAKAGE shall be:

a. Identified LEAKAGE
   1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;
   2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE; or
   3. Reactor Coolant System (RCS) LEAKAGE through a steam generator (SG) to the Secondary System (primary to secondary LEAKAGE).

b. Unidentified LEAKAGE
   All LEAKAGE that is not identified LEAKAGE;

c. Pressure Boundary LEAKAGE
   LEAKAGE (except primary to secondary LEAKAGE) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall.

NORMAL PLANT OPERATIONS: Activities at the plant site, excluding the Water Reclamation Facility, associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from NORMAL PLANT OPERATIONS.

POWER BLOCK: Structures, systems or components listed below that contain equipment necessary for safe operation and/or shutdown of the reactor.

A. Containment
B. Auxiliary Building
C. Refueling Water Tank (RWT)
D. Diesel Generator Building
E. Diesel Generator Fuel Oil Storage Tanks
F. Fuel Building
G. Spray Pond
H. Condensate Storage Tank (CST)
I. Control Building
J. Corridor Building
K. MSSS

PROTECTED AREA: The area which encompasses all controlled areas within the security PROTECTED AREA fence.

RUPTURED: in a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

UNISOLABLE: A breach or leak that cannot be isolated from the Control Room.

UNPLANNED: A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

VALID: An indication, report, or condition, is considered to be VALID when it is verified by (1) an instrument channel check, (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed.

VISIBLE DAMAGE: Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of the affected structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

VITAL AREAS: Areas, within the PROTECTED AREA, that contains equipment vital to the operations of the plant.

Revision 0
10/01/09

Today's Date and Time

METEOROLOGICAL DATA TOWER (RG)

Unit X Mode 1

		10 SECOND AVERAGE DATA	15 MINUTE AVERAGE DATA	1 HOUR AVERAGE DATA
WIND SPEED 200 FT LEVEL (WS200)	MI/HR	23	23	17
WIND SPEED 35 FT LEVEL (WS35)	MI/HR	22	22	15
WIND DIRECTION 200 FT LEVEL (WD200)	DEGREES	319	320	320
WIND DIRECTION 35 FT LEVEL (WD35)	DEGREES	319	320	320
STD DEVEIATION IN WIND DIRECTION	DEGREES		0.0	
DELTA TEMPERATURE (ΔT)	°F	-O.99	-O.99	-O.99
ATMOSPHERIC STABILITY CLASS (ASC)			D	
TEMPERATURE (T)	°F	84.62	84.57	84.57
DEW POINT (D)	°F	80	80	80

PALO VERDE NAN EMERGENCY MESSAGE FORM

1. (check one) ☑ This is a drill ☐ This is an actual event

2. This is Palo Verde Nuclear Generating Station Notification of a(n) (Check highest applicable classification level for event notifications) (Check Event Termination for terminating event)

☐ UNUSUAL EVENT ☑ ALERT ☐ SITE AREA EMERGENCY ☐ GENERAL EMERGENCY

Declared at ____________ (time) on ___/___/___ (MM/DD/YY) EAL: HA4.2 (driving current classification only)

☐ EVENT TERMINATION AT ____________ (time) ___/___/___ (MM/DD/YY)

3. The wind speed is 22 (35 foot elevation - 15 min avg) MPH from 320 (35 foot elevation - 15 min avg) degrees

Authenticator Code WHISKY TANGO

This is the ☐ STSC Comm. ☐ NAN Comm (Check one)

4. ☑ There is NO radioactive release due to this event.
   ☐ A radioactive release is occurring which does NOT exceed federally approved limits due to this event.
   ☐ A radioactive release is occurring that exceeds federally approved limits due to this event.

5. The following action is recommended:
   ☑ There are NO PROTECTIVE ACTIONS required.
   ☐ Shelter 2-mile radius
   ☐ Evacuate 2-mile radius and 5-miles in sectors ____________
   ☐ Evacuate 2-mile radius and 10-miles in sectors ____________
   ☐ Recommend consideration of KI as a protective measure for emergency workers and general public
   ☐ Other ____________

6. Approval ____________ (EC/EOD signature) ____________ (time) ___/___/___ (MM/DD/YY)

7. ☐ Independent review completed (If time permits while still meeting 15 minutes reporting requirement) (Checked by EC/EOD qualified person)

8.

Responding Agency	Alternate Link	Time	Message Rec'd
Maricopa County Sheriff's Office (24 hrs./day)	NAN Radio B/U **or** 9-602-876-1030		
AZ Department of Public Safety (24 hrs./day)	NAN Radio B/U **or** 9-602-223-2209		
Maricopa County Dept. of Emergency Mgmt.	NAN Radio B/U **or** 9-602-273-1411		
Buckeye Police Dept. (24 hrs/day)	NAN Radio B/U **or** 9-623-386-4421		
AZ Radiation Regulatory Agency	NAN Radio B/U **or** 9-602-255-4845		
AZ Division of Emergency Mgmt.	NAN Radio B/U **or** 9-602-244-0504		

Facility: PVNGS Date of Examination: 11/04/13
Exam Level: RO ☑ SRO-I ☐ SRO-U ☐ Operating Test No.: ______

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. [S-1] Throttle HPSI, Restore HPSI Flow In Response to Degrading Condition (K/A: 3.2 006 A4.07)	A, EN, N, L, S	2
b. [S-2] SG Level Reduction (K/A: 3.4 035 A2.01)	D, L, S	4P
c. [S-3] Fill a SIT (K/A: 3.3 006 A1.13)	P, S	3
d. [S-4] Respond to a Loss of Nuclear Cooling Water (K/A: 3.8 008 A2.07)	D, A, S	8
e. [S-5] Transfer 13.8 kV buses (K/A: 3.6 062 A4.01)	A, D, S	6
f. [S-6] Calibration of Control Channel NI - 40OP-9NI01 (K/A: 3.7 015 A4.02)	N, S	7
g. [S-7] Emergency Borate Using HPSI (K/A: 4.2 024 AK3.02)	A, D, L, S	1
h. [S-8] Respond to Containment Sump Trouble Excessive Runtime Alarm (K/A: 3.5 103 A4.01)	D, L, S	5
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. [P-1] Start AFN Locally (K/A: 3.4 061 A2.03)	A, D, E, L	4S
j. [P-2] X-tie EW Train B to SFP cooling (K/A: 3.8 033 A2.02)	D, E, R	8
k. [P-3] Line Up OW Sumps During SGTR (K/A: 4.2 037 AK3.06)	D, E	3

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 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	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: PVNGS
Exam Level: RO ☐ SRO-I ☑ SRO-U ☐
Date of Examination: 11/04/13
Operating Test No.: ______

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. [S-1] Throttle HPSI, Restore HPSI Flow In Response to Degrading Condition (K/A: 3.2 006 A4.07)	A, EN, N, L, S	2
b. [S-2] SG Level Reduction (K/A: 3.4 035 A2.01)	D, L, S	4P
c. [S-3] Fill a SIT (K/A: 3.3 006 A1.13)	P, S	3
d. [S-4] Respond to a Loss of Nuclear Cooling Water (K/A: 3.8 008 A2.07)	D, A, S	8
e. [S-5] Transfer 13.8 kV buses (K/A: 3.6 062 A4.01)	A, D, S	6
f. [S-6] Calibration of Control Channel NI - 40OP-9NI01 (K/A: 3.7 015 A4.02)	N, S	7
g. [S-9] CEA Operability Checks - 40ST-9SF01 (K/A: 3.1 001 A2.11)	A, N, L, S	1
h.		

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. [P-1] Start AFN Locally (K/A: 3.4 061 A2.03)	A, D, E, L	4S
j. [P-2] X-tie EW Train B to SFP cooling (K/A: 3.8 033 A2.02)	D, E, R	8
k. [P-3] Line Up OW Sumps During SGTR (K/A: 4.2 037 AK3.06)	D, E	3

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 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	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: PVNGS
Exam Level: RO ☐ SRO-I ☐ SRO-U ☑

Date of Examination: 11/04/13
Operating Test No.:

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. [S-1] Throttle HPSI, Restore HPSI Flow In Response to Degrading Condition (K/A: 3.2 006 A4.07)	A, EN, N, L, S	2
b. [S-2] SG Level Reduction (K/A: 3.4 035 A2.01)	D, L, S	4P
c. [S-9] CEA Operability Checks - 40ST-9SF01 (K/A: 3.1 001 A2.11)	A, N, L, S	1
d.		
e.		
f.		
g.		
h.		
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. [P-1] Start AFN Locally (K/A: 3.4 061 A2.03)	A, D, E, L	4S
j. [P-2] X-tie EW Train B to SFP cooling (K/A: 3.8 033 A2.02)	D, E, R	8
k.		

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 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	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

JPM BASIS INFORMATION

TASK:	1240050201 Implement SGTR instructions and contingencies							
TASK STANDARD:	LPSI Pumps have been secured, LPSI Injection Valves have been closed, Containment Spray Pump(s) have been secured, and adequate HPSI flow has been established to the RCS during a Steam Generator Tube Rupture event							
K/A:	3.2 006 A4.07	K/A RATING:	RO:	4.4	SRO:	4.4		
10 CFR 55:	41.7 / 45.5 / 45.8							
APPLICABLE POSITION(S):	SRO/RO	VALIDATION TIME:	10 minutes					
REFERENCES:	40EP-9EO04, Steam Generator Tube Rupture 40EP-9EO10, Standard Appendices, Appendix 2							
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR	X	PLANT		OTHER			

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***Yes***
PRA/SRA related? *(Yes/No)* ***Yes***

APPROVAL

Developed By: Adam Rasmussen Date: 10/17/2013

Revised By: **N/A** Date: ____________

Technical Review ____________________ Operations Approval ____________________

Training Approval ____________________

EVALUATION

Examinee Name: ______________________________ Date: ____________

Evaluator Name: ______________________________

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.*

1. SIMULATOR SETUP:

- IC#: 141 **-OR-**
- IC#: 20

- SCENARIOS, MALFUNCTIONS, OVERRIDES,etc. for Setup:

COMMAND/COMMUNICATION	DESCRIPTION
mfTH06A f:50	Steam Generator #1 Tube Rupture
cmCPSI01SIAP02_6 k:1	86 Lockout of SIA-P02, HPSI A Pump
cmCPSI01SIBP02_6 k:2	86 Lockout of SIB-P02, HPSI B Pump

- SPECIAL INSTRUCTIONS:
  1. **IF** IC 141 is used, reset to **IC 141** , GO TO **RUN**, acknowledge alarms, **THEN** proceed to **Step 7**
  2. **IF** IC 141 is **NOT** used, reset to IC 20, GO TO **RUN**
  3. Insert malfunction mfTH06A f:50
  4. Trip the reactor and initiate SIAS/CIAS
  5. Perform SPTAs
  6. Perform 40EP-9EO04, SGTR Procedure, up through **Step 18**
  7. Run scenario file **2013 NRC S-1.scn** from exam flash drive
  8. GO TO **FREEZE**
  9. Provide **INITIATING CUE**
  10. GO TO **RUN**
- REQUIRED CONDITIONS:
  - SGTR in progress on SG#1
  - SGTR procedure performed through Step 18
  - HPSI throttle criteria is met
- SIMULATOR EVALUATION PRE-CHECK
  - ❑ Correct IC
  - ❑ Alarm Silence Off
  - ❑ Procedures available, page checked, and clean
  - ❑ For JPMs administered during transients, another instructor available to control plant parameters.

Verified by: N/A Date: ____________________

(NA if Simulator setup not required)

2. SPECIAL TOOLS/EQUIPMENT:

- 40EP-9EO04, Steam Generator Tube Rupture, Revision 28 available.
- 40EP-9EO10, Standard Appendices, Appendix 2, Revision 78 available.

NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.

3. JPM PERFORMANCE:

- MALFUNCTIONS, OVERRIDES, etc. **during** JPM

STEP	COMMAND/COMMUNICATION	DESCRIPTION
5 **AFTER** first Containment Spray Pump is secured **AND** **WHEN** directed by evaluator, INSERT **KEY 1 OR KEY 2**	**INSERT KEY 1 – HPSI A TRIP** **OR** **INSERT KEY 2 – HPSI B TRIP** **ONLY TRIP HPSI PUMP BEING USED TO MAINTAIN PZR LEVEL!!!**	An 86 lockout will occur on HPSI Pump A or HPSI Pump B (whichever is being used to maintain PZR level).

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE**any equipment.
- o Inform the control room staff of any discovered deficiencies.
- o Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- o You may use any source of information normally available.

INITIAL CONDITIONS:

- **A Steam Generator Tube Rupture has occurred on Steam Generator #1**
- **The Reactor has been tripped**
- **SIAS and CIAS have been manually initiated**
- **SPTAs have been performed**
- **40EP-9EO04, Steam Generator Tube Rupture, has been entered and Steps 1-18 have been or are in the process of being completed**
- **Another Reactor Operator is maintaining the intact Steam Generator 45-60% NR**
- **Another Reactor Operator is controlling RCS pressure and addressing depressurization**

INITIATING CUE:

- **The CRS directs you to perform Steps 19-23 of 40EP-9EO04, Steam Generator Tube Rupture**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME:

	STEP	CUE	STANDARD
1. *	**Step 19** **IF** at least one HPSI Pump is operating, **AND ALL** of the following conditions exist: • RCS is 24°F or more subcooled • Pressurizer level is greater than 10% and NOT lowering • The unisolated Steam Generator is available for RCS heat removal with level being maintained within or being restored to 45 - 60% NR • RVLMS indicates RVUH level is 16% or more **THEN** throttle HPSI flow or stop the HPSI Pumps one pump at a time.	Evaluator **NOTE**: **INITIAL CONDITIONS** specify that the intact SG is being maintained within 45-65% NR. **Information CUE:** **IF** examinee attempts to observe SG#2 status on Board B06 **THEN** report: "SG#2 is intact and level is being restored and maintained within band." **Evaluator NOTE:** **ANY** combination of the throttling of HPSI injection valves with the securing of HPSI pumps performed is **ACCEPTABLE** to meet the Critical Step **AS LONG AS** PZR level is stabilized. **SOME** HPSI injection will be required to maintain PZR level. Two-handed operation is allowed when throttling valves. **If Requested CUE:** If examinee requests for Pressurizer level band, report the CRS directs a band >10%	Examinee verifies: • RCS is ≥24°F subcooled using ERFDADS or QSPDS • Pressurizer level is ≥10% and NOT lowering using ERFDADS or B02 or B04 instrumentation • The unisolated SG is available for RCS heat removal with level being maintained within 45-65% NR • RVLMS indicates RVUH level is ≥16% on QSPDS display **THEN** Rotates HPSI A injection valve handswitches SIA-HS-637/647/617/627 to the **JOG OPEN** position to override valves, then to the **JOG CLOSE** position until valve position indication indicates 0% **OR** until PZR level stabilizes. **OR** Rotates HPSI B injection valve handswitches SIB-HS-636/646/616/626 to the **JOG OPEN** position to override valves, then to the **JOG CLOSE** position until valve position indication indicates 0% **OR** until PZR level stabilizes. **OR** Rotates SIA-HS-1 to the **START** position to override HPSI Pump A, then to the **STOP** position to secure HPSI Pump A. **OR** Rotates SIB-HS-2 to the **START** position to override HPSI Pump B, then to the **STOP** position to secure HPSI Pump B.

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
2.	**Step 20** **IF** any of the Safety Injection throttle criteria can **NOT** be maintained, **THEN** <u>perform</u> the following: a. <u>Raise</u> HPSI flow b. <u>Start</u> HPSI pumps as needed	**Evaluator NOTE:** At **THIS** time, throttle criteria is met.	Examinee <u>acknowledges</u> step by circling or initialing procedure
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
3. *	**Step 21** **IF** pressurizer pressure is greater than 220 psia, **AND** is being controlled, **THEN** <u>perform</u> the following: a. <u>Stop</u> the LPSI Pumps b. <u>Close</u> the LPSI Injection Valves	**Evaluator NOTE:** Pressurizer pressure is greater than 220 psia.	Examinee <u>verifies</u> pressurizer pressure is greater than 220 psia, **THEN** <u>performs</u> the following (in any order): Rotates SIA-HS-3 to the START position to override LPSI Pump A, then to the STOP position to secure LPSI Pump A. **AND** Rotates SIB-HS-4 to the START position to override LPSI Pump B, then to the STOP position to secure LPSI Pump B. **AND** Rotates LPSI A injection valve handswitches SIA-HS-635/645 to the **JOG OPEN** position to override valves, then to the **JOG CLOSE** position until valve position indication indicates 0%. **AND** Rotates HPSI B injection valve handswitches SIB-HS-615/625 to the **JOG OPEN** position to override valves, then to the **JOG CLOSE** position until valve position indication indicates 0%.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
4.	**Step 22** **IF** pressurizer pressure can **NOT** be maintained above 220 psia, **AND** the LPSI Pump(s) have been stopped, **THEN** perform the following: a. Start available LPSI Pumps b. Open the LPSI Injection Valves		Examinee acknowledges step by circling or initialing procedure
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
5. *	**Step 23** Stop the Containment Spray Pumps.	**Evaluator NOTE:** **AFTER** examinee secures **FIRST** Containment Spray pump and acknowledges alarm, have DRIVER insert **KEY 1 OR KEY 2 (86 lockout on HPSI Pump being used to maintain PZR level)**. **ALTERNATE PATH**	Examinee rotates SIA-HS-5 to the **START** position to override CS Pump A, then to the **STOP** position to secure CS Pump A. **AND/OR** Rotates SIB-HS-6 to the **START** position to override CS Pump B, then to the **STOP** position to secure CS Pump B.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
6. *	Examinee acknowledges SESS alarm for HPSI A or B Pump trip and readdresses HPSI throttle criteria.	**Information CUE:** **AFTER** adequate HPSI flow is established **OR** pressurizer level stabilizes **OR** when deemed appropriate by evaluator: "Another Reactor Operator will perform the remainder of the procedure."	Examinee acknowledges pressurizer level lowering and **STARTS** HPSI Pump A or B by rotating SIA-HS-1 or SIB-HS-2 to the **START** position (**ONLY** if previously stopped). **AND** **OPENS** HPSI A or B throttle valves using handswitches SIA-HS-637/647/617/627 or SIB-HS-636/646/616/626 until adequate HPSI flow is established per Standard Appendix 2, HPSI DELIVERY CURVE **OR** until pressurizer level stabilizes or begins to increase.
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- A Steam Generator Tube Rupture has occurred on Steam Generator #1
- The Reactor has been tripped
- SIAS and CIAS have been manually initiated
- SPTAs have been performed
- 40EP-9EO04, Steam Generator Tube Rupture, has been entered and Steps 1-18 have been or are in the process of being completed
- Another Reactor Operator is maintaining the intact Steam Generator 45-60% NR
- Another Reactor Operator is controlling RCS pressure and addressing depressurization

INITIATING CUE:

- The CRS directs you to perform Steps 19-23 of 40EP-9EO04, Steam Generator Tube Rupture

APPLICANT

INSTRUCTIONS | CONTINGENCY ACTIONS

CAUTION

Throttling HPSI injection valves will cause erosion damage to downstream piping.

* 19. **IF** at least one HPSI Pump is operating, **AND ALL** of the following conditions exist:

- RCS is 24°F or more subcooled
- Pressurizer level is greater than 10% and **NOT** lowering
- The unisolated Steam Generator is available for RCS heat removal with level being maintained within or being restored to 45 - 60% NR
- RVLMS indicates RVUH level is 16% or more

THEN throttle HPSI flow or stop the HPSI Pumps one pump at a time.

* 20. **IF** any of the Safety Injection throttle criteria can **NOT** be maintained, **THEN** perform the following:

a. Raise HPSI flow.

b. Start HPSI pumps as needed.

INSTRUCTIONS	CONTINGENCY ACTIONS
✱ 21. **IF** pressurizer pressure is greater than 220 psia, **AND** is being controlled, **THEN** perform the following: a. Stop the LPSI Pumps. b. Close the LPSI Injection Valves.	
✱ 22. **IF** pressurizer pressure can **NOT** be maintained above 220 psia, **AND** the LPSI Pump(s) have been stopped, **THEN** perform the following: a. Start available LPSI Pumps. b. Open LPSI Injection Valves.	
✱ 23. Stop the Containment Spray Pumps.	

JPM BASIS INFORMATION

TASK:	0010030401 Perform a SG 1 (2) high rate blowdown to the main condenser						
TASK STANDARD:	High rate blowdown system has been aligned to lower Steam Generator water level						
K/A:	3.4 035 A2.01	K/A RATING:	RO:	4.5	SRO:	4.6	
10 CFR 55:	41.5 / 435.5 / 45.3 / 45.5						
APPLICABLE POSITION(S):	SRO/RO	VALIDATION TIME:	20 minutes				
REFERENCES:	40EP-9EO10, Standard Appendices, Appendix 33						
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR	X	PLANT		OTHER		

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Alan Malley Date: 04/14/2009

Revised By: Adam Rasmussen Date: 10/17/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ________________________________ Date: ____________

Evaluator Name: ________________________________

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. SIMULATOR SETUP:

- IC#: 142 **-OR-**
- IC#: 20

- SCENARIOS, MALFUNCTIONS, OVERRIDES,etc. for Setup:

COMMAND/COMMUNICATION	DESCRIPTION
mfTH06A f:30	Steam Generator #1 Tube Rupture
cmAVWD06SGBUV500Q_4	SGB-UV-500Q seized closed (simulates hydraulic lock)
rfWD29 f:OPEN	SCN-HV-018B isolation valve open
rfWD30 f:OPEN	SCN-HV-018C isolation valve open

- SPECIAL INSTRUCTIONS:
  1. **IF** IC 142 is used, reset to **IC 142,** acknowledge alarms, **THEN** proceed to **Step 7**
  2. **IF** IC 142 is **NOT** used, reset to IC 20, GO TO **RUN**
  3. Insert malfunction mfTH06A f:30
  4. Trip the reactor and initiate SIAS/CIAS
  5. Perform SPTAs
  6. Perform 40EP-9EO04, SGTR Procedure, up through **Step 18**
  7. Run scenario file **2013 NRC S-2.scn** from exam flash drive
  8. **ENSURE** SG #1 water level is ~70% NR, GO TO **FREEZE**
  9. Provide **INITIATING CUE**
  10. GO TO **RUN**
- REQUIRED CONDITIONS:
  - SGTR in progress on SG#1
  - SGTR procedure performed through Step 18
  - SG #1 water level is >70% NR
- SIMULATOR EVALUATION PRE-CHECK
  - ❑ Correct IC
  - ❑ Alarm Silence Off
  - ❑ Procedures available, page checked, and clean
  - ❑ For JPMs administered during transients, another instructor available to control plant parameters.

Verified by: N/A Date: ____________________

(NA if Simulator setup not required)

2. SPECIAL TOOLS/EQUIPMENT:

- 40EP-9EO10, Standard Appendices, Appendix 33, Revision 78 available.

NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.

3. JPM PERFORMANCE:

- MALFUNCTIONS, OVERRIDES, etc. **during** JPM

STEP	COMMAND/COMMUNICATION	DESCRIPTION
6. When directed by examinee to open SGE-V293, SGE-V267, and SGE-VA33	DELETE cmAVWD06SGBUV500Q_4 **AFTER** the malfunction is DELETED, Examiner will report SGE-V293, SGE-V267, and SGE-VA33 are OPEN	DELETING the malfunction (which seizes 500Q closed) will allow the examinee to OPEN the valve

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE**any equipment.
- o Inform the control room staff of any discovered deficiencies.
- o Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- o You may use any source of information normally available.

INITIAL CONDITIONS:

- **Unit 1 is cooling down following a SGTR**
- **SG #1 NR level is approximately 70%**
- **Another Reactor Operator is maintaining the intact Steam Generator**
- **Another Reactor Operator is addressing RCS depressurization**
- **Area Operators have been briefed on applicable local valve operations (STEPS 5.1 and 6)**

INITIATING CUE:

- **The CRS directs you to reduce Steam Generator #1 level to 50% Narrow Range using Standard Appendix 33**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate any valves.

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Standard Appendix 33: 1. Place SCN-HS-1, SG 1 Blowdown Path Selector in "OFF"		Examinee places SCN-HS-1 in the "OFF" position

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	2. Ensure SGA-UV-500P, SG 1 Common Upstream Isolation, is open		Examinee rotates SGA-HS-500P to the "**CLOSED**" position and observes white "**OVERRIDE**" light illuminate, **THEN** rotates to the "**OPEN**" position and observes the red indicating light illuminate and green indicating light extinguish

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
3. *	3. <u>Ensure</u> SGE-HV-47, SG 1 Downcomer Blowdown Isolation, is closed		Examinee rotates SGN-HS-47 to the "**CLOSED**" position and observes red indicating light illuminate and green indicating light extinguish

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
4. *	4. <u>Ensure</u> that **ONE** of the following valves is open: • SGE-HV-43, SG 1 Hot Leg Isolation • SGE-HV-41, SG 1 Cold Leg Isolation	**If Requested CUE:** If examinee asks CRS which valve to use, ask for recommendation. Concur with recommendation. **Evaluator NOTE:** These valves take ~2 minutes stroke time	Examinee rotates SGN-HS-43 to the "**OPEN**" position and observes green indicating light illuminate and red indicating light extinguish **OR** Examinee rotates SGN-HS-41 to the "**OPEN**" position and observes green indicating light illuminate and red indicating light extinguish

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
5.	5. Check that SGB-UV-500Q is open		Examinee observes that SGB-UV-500Q is CLOSED and must take CONTINGENCY ACTIONS to OPEN the valve.

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
6. *	5.1 Perform the following to open SGB-UV-500Q: a. Direct an operator to perform the following: 1) Unlock and open SGE-V293, SGB-UV-500Q BYPASS HDR INLET ISOL VALVE 2) Open SGE-V267, SGB-UV-500Q BYPASS HDR OUTLET ISOL VALVE 3) Slowly open SGE-VA33, SGB-UV-500Q BYPASS HEADER THROTTLE VALVE	**Evaluator NOTE:** Simulator Driver ACTION is required at this time. **DIRECT driver to delete malfunction.** **Information CUE:** **AFTER** Driver action performed, report SGE-V293, SGE-V267, and SGE-VA33 have been opened.	Examinee directs an Area Operator to open SGE-V293, SGE-V267, and SGE-VA33

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
7. *	5.1 (Continued) b. <u>Open</u> SGB-UV-500Q, SG 1 Common Downstream Isolation		Examinee rotates SGA-HS-500Q to the "**CLOSED**" position and observes white "**OVERRIDE**" light illuminate, **THEN** rotates to the "**OPEN**" position and observes the red indicating light illuminate and green indicating light extinguish
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
8.	5.1 (Continued) c. <u>Direct</u> an operator to close **ALL** of the following valves: • SGE-V293 • SGE-V267 • SGE-VA33	**When requested CUE:** Report SGE-V293, SGE-V267, and SGE-VA33 have been closed.	Examinee directs Area Operator to close SGE-V293, SGE-V267, and SGE-VA33
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
9. *	6. Direct an operator to open **ALL** of the following valves: • SCN-V088, SCN-HV-018C OUTLET ISOLATION VALVE • SCN-V099, SCN-HV-018C INLET ISOLATION VALVE • SCN-V071, SCN-HV-018B OUTLET ISOLATION VALVE • SCN-V072, SCN-HV-018B INLET ISOLATION VALVE	**Evaluator NOTE:** **All valves have been positioned in the simulator setup** **When requested CUE:** Report SCN-V088, SCN-V099, SCN-V071, and SCN-V072 have been opened.	Examinee directs Area Operator open the following valves: • SCN-V088 • SCN-V099 • SCN-V071 • SCN-V072
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
10. *	7. Place SCN-HS-18, SG 1 Blowdown Rate Selector in "HIGH RATE"		Examinee places SCN-HS-18 in the "HIGH RATE" position
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
11. *	8. <u>Maintain</u> SG level by performing the following: a. <u>Place</u> SCN-HS-1, SG 1 Blowdown Path Selector in "COND" b. **WHEN** SG 1 reaches the desired level, **THEN** <u>place</u> SCN-HS-1, SG 1 Blowdown Path Selector in "OFF"	**Information CUE:** **AFTER** SCN-HS-1 has been placed in "COND" Inform Examinee: "Another operator will monitor SG level and secure blowdown at 50% NR." **This completes the JPM**	Examinee places SCN-HS-1 in the "COND" position
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- Unit 1 is cooling down following a SGTR
- SG #1 NR level is approximately 70%
- Another Reactor Operator is maintaining the intact Steam Generator
- Another Reactor Operator is addressing RCS depressurization
- Area Operators have been briefed on applicable local valve operations (STEPS 5.1 and 6)

INITIATING CUE:

- The CRS directs you to reduce Steam Generator #1 level to 50% Narrow Range using Standard Appendix 33

APPLICANT

Appendix 33,
Steam Generator 1 Level Reduction Checklist

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 1. Place SCN-HS-1, SG 1 Blowdown Path Selector in "OFF".	
____ 2. Ensure SGA-UV-500P, SG 1 Common Upstream Isolation, is open.	
____ 3. Ensure SGE-HV-47, SG 1 Downcomer Blowdown Isolation is closed.	
____ 4. Ensure that **ONE** of the following valves is open: • SGE-HV-43, SG 1 Hot Leg Isolation • SGE-HV-41, SG 1 Cold Leg Isolation	

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 5. Check that SGB-UV-500Q is open.	____ 5.1 Perform the following to open SGB-UV-500Q:

a. Direct an operator to perform the following:
(100' MSSS NW Corner)

1) Unlock and open SGE-V293, “SGB-UV-500Q BYPASS HDR INLET ISOL VALVE”

2) Open SGE-V267,“SGB-UV-500Q BYPASS HDR OUTLET ISOL VALVE”

3) Slowly open SGE-VA33, “SGB-UV-500Q BYPASS HEADER THROTTLE VALVE”

b. Open SGB-UV-500Q, SG 1 Common Downstream Isolation.

c. Direct an operator to close **ALL** of the following valves:

- SGE-V293
- SGE-V267
- SGE-VA33

INSTRUCTIONS	CONTINGENCY ACTIONS

____ 6. Direct an operator to open **ALL** of the following valves:
(100' Turbine Bldg between Heater Drain Tanks)

- SCN-V088, “SCN-HV-018C OUTLET ISOLATION VALVE” (S/G #1 HIGH RATE B/D TO CONDENSER)
- SCN-V099, “SCN-HV-018C INLET ISOLATION VALVE” (S/G #1 HIGH RATE B/D TO CONDENSER)
- SCN-V071, “SCN-HV-018B OUTLET ISOLATION VALVE” (S/G #1 ABNOR RATE B/D TO CONDENSER)
- SCN-V072, “SCN-HV-018B INLET ISOLATION VALVE” (S/G #1 ABNOR RATE B/D TO CONDENSER)

____ 7. Place SCN-HS-18, SG 1 Blowdown Rate Selector in “HIGH RATE”.

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 8. Maintain SG level by performing the following: a. Place SCN-HS-1, SG 1 Blowdown Path Selector in “COND”. b. **WHEN** SG I reaches the desired level, **THEN** place SCN-HS-1, SG 1 Blowdown Path Selector in “OFF”.	

End of Appendix

JPM BASIS INFORMATION

TASK:	0120020701Fill a Safety Injection Tank								
TASK STANDARD:	SIT 2B level has been raised by 5% NR								
K/A:	3.3 006 A1.13		K/A RATING:	RO:	4.4	SRO:	4.4		
10 CFR 55:	41.5 / 45.5								
APPLICABLE POSITION(S):	SRO/RO		VALIDATION TIME:	20 minutes					
REFERENCES:	40OP-9SI03, Safety Injection Tank Operations								
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR	X	PLANT		OTHER				

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Larry Burton Date: 09/09/2011

Revised By: Adam Rasmussen Date: 10/17/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ______________________________ Date: ____________

Evaluator Name: ______________________________

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. SIMULATOR SETUP:

- IC#: 143 **-OR-**
- Any AT POWER IC
- SCENARIOS, MALFUNCTIONS, OVERRIDES,etc. for Setup:

COMMAND/COMMUNICATION	DESCRIPTION
crMVSI01SIBUV667_9 f:5	Throttles SIB-UV-667
rfSI03 f:OPEN	Opens SIE-V463
rfSI02 f:100	Opens SIB-V219

- SPECIAL INSTRUCTIONS:
  1. **IF** IC 143 is used, reset to **IC 143,** acknowledge alarms, **THEN** proceed to **Step 8**
  2. **IF** IC 143 is **NOT** used, reset to IC 20, GO TO **RUN**
  3. INSERT malfunction mfSI04B f:100 (leak in SIT 2B)
  4. **WHEN** SIT 2B lowers to ~42-43%, **DELETE** malfunction mfSI04B
  5. TAKE GAA-HS-1, SIA-HS-629, and SIB-HS-622 handswitches to **OPEN** (N_2 to SIT 2B Isolation Valve handswitches)
  6. **WHEN** SIT 2B pressure is ~605 psig, TAKE GAA-HS-1, SIA-HS-629, and SIB-HS-622 handswitches to **CLOSE**
  7. INSERT the following remote functions:
     A. crMVSI01SIBUV667_9 f:5 – Throttles closed SIB-UV-667
     B. rfSI03 f:OPEN – Opens SIE-V463
     C. rfSI02 f:100 – Opens SIB-V219
  8. GO TO **RUN**, then RUN **2013 NRC S-3.scn** scenario file
  9. GO TO **FREEZE**
  10. Provide **INITIATING CUE**
  11. GO TO **RUN**
- REQUIRED CONDITIONS:
  - SIT 2B level at ~42% NR
  - SIT 2B pressure at ~605 psig
  - SIB-UV-667 is THROTTLED
  - SIE-V463 is OPEN
  - SIB-V219 is OPEN
  - Radio is staged and communications tested with Driver's Booth

- SIMULATOR EVALUATION PRE-CHECK
  - ❑ Correct IC
  - ❑ Alarm Silence Off
  - ❑ Procedures available, page checked, and clean
  - ❑ For JPMs administered during transients, another instructor available to control plant parameters.

Verified by: N/A Date: ____________________

(NA if Simulator setup not required)

2. SPECIAL TOOLS/EQUIPMENT:

- 40OP-9SI03, Safety Injection Tank Operations, Revision 35 available.
- This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.

3. JPM PERFORMANCE: NOTE: (*) denotes Driver REQUIRED action

- MALFUNCTIONS, OVERRIDES, etc. **during** JPM

STEP	COMMAND/COMMUNICATION	DESCRIPTION
8 *	**WHEN** directed to throttle open SIB-UV-667 INSERT **KEY 8** IRF crMVSI01SIBUV667_9 f:40 r:10 k:8 Inform Examiner ACTION completed	Throttles open SIB-UV-667 to achieve required flowrate from HPSI B
11 *	**WHEN** directed to throttle open SIB-V400 INSERT **KEY 11** IRF rfSI05 f:5 k:11 Inform Examiner ACTION completed	Throttles open SIB-V400. Examinee may direct adjustment of valve once SIT filling begins

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE**any equipment.
- o Inform the control room staff of any discovered deficiencies.
- o Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- o You may use any source of information normally available.

INITIAL CONDITIONS:

- **Level in SIT 2B has been lowering over the last 24 hours**
- **Engineering is developing a trouble shooting game-plan**
- **SIT 2B pressure has been lowered to accommodate filling**
- **HPSI pump "B" pre-start checks have been completed**
- **SIE-V463, SIT Fill and Drain Line Containment Isolation is OPEN with a dedicated operator assigned at the valve to close the valve if required**
- **SIB-V219, Mini Flow Recirc Orifice Bypass Valve is OPEN**
- **HPSI "B" has been declared INOPERABLE and unavailable**
- **SIB-UV-667, HPSI "B" to the RWT isolation valve has been throttled 9 turns OPEN**
- **The HPSI discharge header was vented during the previous shift**
- **SIE-V220, SIT "2B" Fill & Drain Header Manual Isol Valve has been verified open**
- **40OP-9SI03, Section 6.3 has been completed thru step 6.3.5.25**
- **Area Operators have been briefed and are standing by**

INITIATING CUE:

- **The CRS directs you to start HPSI pump "B" and fill the 2B SIT by 5% Narrow Range starting at step 6.3.5.26 of 40OP-9SI03 to maintain/restore normal level in SIT 2B**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME:

NOTE

When HPSI Pump B is started, it will be recircing to the RWT

CAUTION

HPSI pump operation between 85 and 225 gpm for greater than 1 hour will result in pump damage

	STEP	CUE	STANDARD
1. *	6.3.5.26 Start HPSI Pump B using SIB-HS-2, HPSI Pump B P02	**If requested CUE:** The Area Operator reports everyone is clear of the HPSI pump and switchgear.	Examinee rotates SIB-HS-2 to the **START** position and verifies **RED** light illuminates and **GREEN** light extinguishes

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
2.	6.3.5.27 Verify ALL of the following expected responses: • Discharge pressure is indicated on SIN-PI-309, HPSI HEADER B TO RC LOOPS PRESSURE • Motor run current less than 120 amps		Examinee verifies discharge pressure indicated on SIN-PI-309 and <120 motor run amps

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
3.	6.3.5.28 **IF** anomalous HPSI Pump indications are observed, **THEN** perform the following: a. Notify the CRS immediately b. Consider stopping HPSI Pump B c. Evaluate reason for anomalous indications		Examinee verifies there are no anomalous HPSI Pump indications
SAT / UNSAT **Comments (required for UNSAT):**			

NOTE

- When a HPSI pump is first started, some seal leakage is expected for a short duration
- During normal HPSI pump operation, a dripping seal is normally acceptable, a steady stream is indication of seal damage

	STEP	CUE	STANDARD
4.	6.3.5.29 Inspect HPSI Pump B seals for leakage	**When requested CUE:** Area Operator reports only a dripping seal with NO indication of unusual leakage at HPSI pump B.	Examinee directs Area Operator to inspect HPSI pump B seals for leakage
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
5.	6.3.5.30 **IF** leakage is discovered at the pump seals…		Examinee marks step as Not Applicable
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
6.	6.3.5.31 <u>Verify</u> that HAB-Z01, Aux. Bldg. HPSI Pump Room Ess. Air Control Unit has started by ONE of the following methods: • SEAS window 12L blue light at ESB-UA-2F is not on when status display button on ESB-UA-2D is depressed • Local observation that HAB-Z01 is running	**IF requested CUE:** Area Operator reports that HAB-Z01 is running.	Examinee verifies HAB-Z01 is running by using either SEAS window 12L or from Area Operator local report
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
7.	6.3.5.32 **IF** HAB-Z01 Aux. Bldg. HPSI Pump Room Ess. ACU did NOT start when HPSI pump B started…		Examinee marks step as Not Applicable
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
8. *	6.3.5.33 Throttle manually SIB-UV-667, HPSI B to the RWT Isolation Valve, to achieve a flow of 690 gpm maximum as indicated on SIN-FI-300	**Evaluator NOTE:** Driver action is **REQUIRED** (**Direct** DRIVER to perform **ACTION**). • Expected indication is for HPSI pump B discharge pressure to lower **If Requested CUE:** If examinee requests flow BEFORE driver action, report local flow is reading downscale. **Information CUE:** AFTER driver ACTION performed, report SIB-UV-667 has been throttled and local flow is reading 680 gpm on SIN-FI-300.	Examinee directs Area Operator to throttle open SIB-UV-667 to achieve a flow of 690 gpm at local flow indicator

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
9. *	6.3.5.34 Open SIA-UV-682 using SIA-HS-682, MISC DRAIN HEADER TO RWT VLV		Examinee rotates SIA-HS-682 to the **OPEN** position observing the **RED** indicating light illuminate and **GREEN** indicating light extinguish

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
10. *	6.3.5.35 Unlock SIB-V400, SIT Fill and Drain Isolation Valve HPSI Recirc, per 40AC-0ZZ06, Locked Valve, Breaker and Component Control	**Information CUE:** Area Operator reports SIB-V400 has been unlocked per 40AC-0ZZ06.	Examinee directs Area Operator to unlock SIB-V400
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
11. *	6.3.5.36 Throttle open SIB-V400, SIT Fill and Drain Isolation Valve HPSI Recirc, slowly to control SIT fill rate	**Evaluator NOTE:** Driver action is **REQUIRED** (**Direct** DRIVER to perform **ACTION**). **Information CUE:** AFTER driver ACTION performed, report SIB-V400 has been throttled open.	Examinee directs Area Operator to unlock SIB-V400
SAT / UNSAT **Comments (required for UNSAT):**			

NOTE

If a SIT Fill and Drain Manual Isolation Valve is closed to isolate an inoperable and open SIT Fill and Drain Air Operated Valve, opening the SIT Fill and Drain Manual Isolation Valve makes the associated SIT inoperable and LCO 3.5.1 or LCO 3.5.2 is applicable.

	STEP	CUE	STANDARD
12.	6.3.5.37 **IF** the SIT Fill & Drain Manual Isolation Valve for the SIT to be filled is closed, **THEN** open the SIT Fill & Drain Manual Isolation Valve for the SIT to be filled: • SIE-V220, SIT “2B” Fill & Drain Header Manual Isol Valve	**If requested CUE:** SIE-V220 has been verified open	Examinee marks step as Not Applicable **Evaluator NOTE:** Examinee may also direct Area Operator to verify SIE-V220 is open

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
13.	6.3.5.38 **IF** the unit is in MODE 1 through 4, **THEN** record initial SIT level		Examinee records current SIT level

SAT / UNSAT
Comments (required for UNSAT):

NOTE
Annunciator window 2B11A, SIT LVL HI-LO, alarms on SIT hi level at 63% NR level
Annunciator window 2B11B, SIT LVL HI-HI/LO-LO, alarms on SIT hi-hi level at 69% NR level

	STEP	CUE	STANDARD
14. *	6.3.5.39 Open the SIT Fill & Drain Valve for the SIT to be filled: • SIB-UV-621 using SIB-HS-621, SIT 2B FILL & DRAIN VLV		Examinee rotates SIB-HS-621 to the **OPEN** position and observes the **RED** light illuminate and **GREEN** light extinguish
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
15. *	6.3.5.40 Monitor level of the SIT being filled: **Narrow Range**: • SIN-LI-313 R) SIT 2B LEVEL, LT-323 **Wide Range:** • SIB-LI-311 R) SIT 2B LEVEL, LT-321	**AFTER** level has increased by ~5% and SIB-UV-621 is CLOSED, **Information CUE:** Another operator will complete the remaining actions	Examinee monitors SIT 2B level indication on SIN-LI-313and SIB-LI-311. Will close SIB-UV-621 after level has increased by ~5%.
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparedness organization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- **Level in SIT 2B has been lowering over the last 24 hours**
- **Engineering is developing a trouble shooting game-plan**
- **SIT 2B pressure has been lowered to accommodate filling**
- **HPSI pump "B" pre-start checks have been completed**
- **SIE-V463, SIT Fill and Drain Line Containment Isolation is OPEN with a dedicated operator assigned at the valve to close the valve if required**
- **SIB-V219, Mini Flow Recirc Orifice Bypass Valve is OPEN**
- **HPSI "B" has been declared INOPERABLE and unavailable**
- **SIB-UV-667, HPSI "B" to the RWT isolation valve has been throttled 9 turns OPEN**
- **The HPSI discharge header was vented during the previous shift**
- **SIE-V220, SIT "2B" Fill & Drain Header Manual Isol Valve has been verified open**
- **40OP-9SI03, Section 6.3 has been completed thru step 6.3.5.25**
- **Area Operators have been briefed and are standing by**

INITIATING CUE:

- **The CRS directs you to start HPSI pump "B" and fill the 2B SIT by 5% Narrow Range starting at step 6.3.5.26 of 40OP-9SI03 to maintain/restore normal level in SIT 2B**

APPLICANT

6.3 Filling the Safety Injection Tanks to Establish or Maintain Normal Level

6.3.1 Precautions

6.3.1.1 If a pump fails to develop or maintain expected discharge pressure, flow and/or motor current, then along with system valve alignment, gas or vapor binding of the pump should be among the items considered when determining the reason for anomalous indications.

6.3.1.2 Pump indications, such as pump amps, discharge pressure, and/or pump flow should be monitored upon pump start. Indications such as fluctuation of running current, less than expected running current, failure to develop discharge pressure, and/or failure to develop expected flow can indicate pump gas binding, pump cavitation, an isolated suction source, pump suction vortexing, etc..

6.3.2 Limitations

6.3.2.1 Maximum HPSI pump or motor bearing oil temperature is 180°F.

6.3.2.2 HPSI Motor Start Limitations:

- Frequent starting may result in serious damage to the motor on the HPSI pumps.
- If the motor is shutdown for greater than 1 hour, only two consecutive starts may be attempted, allowing the motor to coast to rest between starts.
- If the motor is shutdown for less than 1 hour, only one start may be attempted.
- Any time the motor windings are energized constitutes a start.
- If the above criteria have been met, an interval of 15 minutes with the motor running or 45 minutes with the motor shutdown must elapse prior to any additional starts.

6.3.2.3 Full load amps for the HPSI motor are as follows:

Unit	Full Load Amperage
1	120 amps
2 and 3	115 amps

6.3.2.4 HPSI flow limits are as follows:

Flow Rate	Time Limit
< 85 gpm	Operation Prohibited
85 gpm to 225 gpm	1 Hour Maximum
> 225 gpm	Continuous Operation Allowed
≥ 1130 gpm	No Operation Allowed

6.3.3 Prerequisites

JL 6.3.3.1 Safety Injection Tanks (SIT) and Reactor Coolant System (RCS) configuration support filling of the SIT.

ⓘ

6.3.4 Initial Conditions

JL 6.3.4.1 Section 5.0, Prerequisites and Initial Conditions, is complete.

JL 6.3.4.2 The Refueling Water Tank (RWT) contains sufficient volume for Safety Injection Tank (SIT) filling. Filling one empty SIT lowers RWT level by 2%.

NA 6.3.4.3 If the SIT Fill and Drain Manual Isolation Valve for the SIT(s) to be filled has been closed, then preparations for a containment entry have been made for opening the SIT Fill and Drain Manual Isolation Valve(s) for the SIT(s) being filled:

- SIE-V210, SIT "2A" Fill & Drain Header Manual Isol Valve
- SIE-V220, SIT "2B" Fill & Drain Header Manual Isol Valve
- SIE-V230, SIT "1A" Fill & Drain Header Manual Isol Valve
- SIE-V240, SIT "1B" Fill & Drain Header Manual Isol Valve

JL 6.3.4.4 Risk Management Action Level (RMAL) has been evaluated for HPSI B being inoperable and unavailable.

6.3.4.5 If venting of the SITs is anticipated, then ALL of the following have been notified that nitrogen will be released into Containment as a result of venting SITs:

- Radiation Protection
- Containment Coordinator, if the Containment Coordinator position is filled
- All personnel in Containment, if personnel are in Containment

> **NOTE**
>
> Venting the SITs with Power Access Purge in operation could cause the Power Access Purge supply dampers to close at 0.03 psig (1 inch water).

N/A 6.3.4.6 If the Containment Power Access Purge is in service, then the following has been performed:

N/A a. Radiation Protection concurrence has been obtained to shutdown the Containment Power Access Purge.

b. The Containment Power Access Purge has been removed from service per 40OP-9CP01, Containment Purge System.

6.3.4.7 The SM/CRS has granted permission to manipulate components controlled by 40AC-0ZZ06, Locked Valve, Breaker and Component Control: ⓘ

- SIE-V463, SIT Fill and Drain Line Isolation Valve
- SIB-V219, Mini Flow Recirc Orifice Bypass Valve
- SIB-UV-667, HPSI "B" to the RWT Isolation Valve
- SIB-V478, HPSI Discharge Isolation Valve
- SIB-V400, SIT Fill and Drain Isolation Valve HPSI Recirc

6.3.5 Instructions

JL 6.3.5.1 Notify Radiation Protection that a SIT will be filled to allow coordination of ZIP program walkdowns.

JL 6.3.5.2 **IF** the SIT is currently filled and pressurized **AND** requires level raised to maintain operability,
THEN GO TO Step 6.3.5.5.

NA 6.3.5.3 Ensure BOTH the Train A and Train B SI vent valves on the SIT(s) to be filled are closed:

SIT	Initial	Train A Valve	Initial	Train B Valve
1A		SIA-HS-607A		SIB-HS-633A
1B		SIA-HS-608A		SIB-HS-643A
2A		SIA-HS-605A		SIB-HS-613A
2B		SIA-HS-606A		SIB-HS-623A

NA 6.3.5.4 Ensure BOTH Train A/Train B SIT vent valves are de-energized:

- NA SIT Vent Valves Power Supply, using keyswitch SIA-HS-17A, SIT VENT VALVES POWER SUPPLY
- SIT Vent Valves Power Supply, using keyswitch SIB-HS-18A, SIT VENT VALVES POWER SUPPLY

JL 6.3.5.5 Ensure SIE-HV-661 is closed, using SIN-HS-661, COMBINED SIT & MISC DRN HDR TO RDT VLV.

JL 6.3.5.6 Ensure SIA-UV-682 is closed, using SIA-HS-682, MISC DRAIN HEADER TO RWT VLV.

NOTE

Venting on the HPSI discharge header is not necessary if venting has been completed within the previous 24 hours as long as no work or other evolutions took place that could introduce air/voids into the system.

NA 6.3.5.7 **IF** ANY of the following:

- NA The HPSI discharge header has NOT been vented in the past 24 hours.
- NA Work or evolutions have taken place that could introduce air/voids into the system.

THEN perform 40OP-9SI04, Safety Injection System Venting, section for Train B HPSI Header Venting for Pump Run, prior to starting HPSI Pump B.

6.3.5.8 Perform the following pre-start checks on HPSI Pump B:

a. Check D-Panel Breaker PHB-D3807, HPSI Pump 2 Motor Space Heater SIBP02H, closed.

b. Check the Motor Space Heater light is on at PHB-M3835, Space Htr Filament Xfmrs and Neon Lights Cubicle.

c. Ensure HPSI Pump and motor bearing oil levels are normal: ⓘ

Initial	Location
[initials]	Outboard motor bearing oil level
[initials]	Inboard motor bearing oil level
[initials]	Inboard pump bearing oil level
[initials]	Outboard pump bearing oil level

d. Ensure SIB-V402, HPSI Suction Isolation Valve, is open. (52' HPSI B Room)

JM 6.3.5.9 Perform the following to vent HPSI Pump B seal cavity: (40' HPSI B Room)

JM a. Throttle open SIB-V982, HPSI Pump SIB-P02 Seal Cavity Vent Valve.

JM b. **WHEN** a solid stream of water has been observed for 2 to 3 minutes, **THEN** close SIB-V982, HPSI Pump SIB-P02 Seal Cavity Vent Valve.

Signature OPERATOR 1 (Initial Performer) Date TODAY

JM c. Throttle open SIB-V983, HPSI Pump SIB-P02 Seal Cavity Vent Valve.

JM d. **WHEN** a solid stream of water has been observed for 2 to 3 minutes, **THEN** close SIB-V983, HPSI Pump SIB-P02 Seal Cavity Vent Valve.

Signature OPERATOR 1 (Initial Performer) Date TODAY

6.3.5.10 Perform an Independent Verification that SIB-V982, HPSI Pump SIB-P02 Seal Cavity Vent Valve, is closed.

Signature OPERATOR 2 (Independent Verifier) Date TODAY

6.3.5.11 Perform an Independent Verification that SIB-V983, HPSI Pump SIB-P02 Seal Cavity Vent Valve, is closed:

Signature OPERATOR 2 (Independent Verifier) Date TODAY

N/A 6.3.5.12 **IF** any air was observed while venting the seal cavity, **THEN** record the results of any air encountered during venting in the Access database located at V:\ECCS_Venting\SIVenting.mde or at \\fs-pv\common-v\ECCS_Venting.

N/A 6.3.5.13 **IF** the Access database is NOT available, **THEN** notify System Engineering of ALL of the following:

N/A
- Location of where the air was found
- Valve position while venting
- Amount of time to get an air free vent

6.3.5.14 **IF** a SIAS occurs during performance of this section, **THEN** perform ALL of the following:

a. Ensure the SIT fill and drain valves are closed.

b. Close SIB-V219, Mini Flow Recirc Orifice Bypass Valve. (40' HPSI B Room)

c. Open SIB-UV-667 using SIB-HS-667, HPSI PMP B TO RWT ISOL.

d. Close SIE-V463, SIT Fill and Drain Line Isolation Valve. (SW East Penn Room)

6.3.5.15 **IF** the unit is in MODES 1 through 4, **THEN** perform the following:

a. Insert a manual Containment Isolation SESS alarm.

> **NOTE**
>
> The dedicated operator for closing SIE-V463 is required until SIE-V463 is closed in Step 6.3.5.62.

b. Ensure a dedicated operator in continuous communication with the Control Room is assigned for closing SIE-V463 as required by 40DP-9OP19, Locked Valve, Breaker and Component Tracking.

6.3.5.16 Unlock SIE-V463, SIT Fill and Drain Line Containment Isolation Valve, per 40AC-0ZZ06, Locked Valve, Breaker and Component Control. (SW East Penn Room)

6.3.5.17 Open SIE-V463, SIT Fill and Drain Line Containment Isolation Valve.

6.3.5.18 Unlock SIB-V219, Mini Flow Recirc Orifice Bypass Valve, per 40AC-0ZZ06, Locked Valve, Breaker and Component Control. (40' HPSI B Room)

> **NOTE**
>
> Opening SIB-V219 renders HPSI B inoperable and unavailable.

6.3.5.19 Open SIB-V219, Mini Flow Recirc Orifice Bypass Valve.

6.3.5.20 **WHEN** SIB-V219 is open **AND** the unit is in MODES 1 through 4, **THEN** perform ALL of the following:

a. Notify the SM/CRS.

b. Insert a manual HPSI B SESS alarm.

6.3.5.21 Ensure SIB-UV-667, HPSI Pmp B to RWT Isol, is open.

6.3.5.22 Unlock SIB-UV-667, HPSI "B" to the RWT Isolation Valve, per 40AC-0ZZ06, Locked Valve, Breaker and Component Control. (40' HPSI B Room)

6.3.5.23 Throttle closed SIB-UV-667, HPSI "B" to the RWT Isolation Valve, to nine turns from open.

N/A 6.3.5.24 **IF** a HPSI Loop Injection Valve is known to leak **AND** the SM/CRS directs,
THEN perform the following:

N/A a. Unlock SIB-V478, HPSI Discharge Isolation Valve, per 40AC-0ZZ06, Locked Valve, Breaker and Component Control. (52' HPSI B Room)

b. Close SIB-V478, HPSI Discharge Isolation Valve.

c. Insert a manual HPSI B SESS alarm.

d. Notify the SM/CRS.

N/A 6.3.5.25 **IF** the HPSI discharge header is required to be vented by Step 6.3.5.7, **THEN** ensure 40OP-9SI04, Safety Injection System Venting, section for Train B HPSI Header Venting for Pump Run, has been completed.

NOTE

___ When HPSI Pump B is started, it will be recircing to the RWT.

CAUTION

___ HPSI pump operation between 85 and 225 gpm for greater than 1 hour will result in pump damage.

___ 6.3.5.26 Start HPSI Pump B using SIB-HS-2, HPSI PUMP B P02.

___ 6.3.5.27 Verify ALL of the following expected responses:

- ___ Discharge pressure is indicated on SIN-PI-309, HPSI HEADER B TO RC LOOPS PRESSURE
- ___ **Unit 1 Only**
  Motor run current less than 120 amps
- ___ **Unit 2 and Unit 3 Only**
  Motor run current less than 115 amps

___ 6.3.5.28 **IF** anomalous HPSI Pump indications are observed,
THEN perform the following:

ⓘ

___ a. Notify the CRS immediately.

___ b. Consider stopping HPSI Pump B.

___ c. Evaluate the reason for anomalous indications.

NOTE

- ___ When a HPSI pump is first started, some seal leakage is expected for a short duration.
- ___ During normal HPSI pump operation, a dripping seal is normally acceptable, a steady stream is indication of seal damage.

___ 6.3.5.29 Inspect HPSI Pump B seals for leakage.

___ 6.3.5.30 **IF** leakage is discovered at the pump seals,
THEN notify System Engineering.

___ 6.3.5.31 Verify that HAB-Z01, Aux. Bldg. HPSI Pump Room Ess. Air Control Unit, has started by ONE of the following methods:

- ___ SEAS window 12L blue light at ESB-UA-2F is not on when status display button on ESB-UA-2D is depressed
- ___ Local observation that HAB-Z01 is running

___ 6.3.5.32 **IF** HAB-Z01 Aux. Bldg. HPSI Pump Room Ess. Air Control Unit, did NOT start when HPSI Pump B started,
THEN notify the SM/CRS.

___ 6.3.5.33 Throttle manually SIB-UV-667, HPSI "B" to the RWT Isolation Valve, to achieve a flow of 690 gpm maximum as indicated in SIN-FI-300.

___ 6.3.5.34 Open SIA-UV-682 using SIA-HS-682, MISC DRAIN HEADER TO RWT VLV.

___ 6.3.5.35 Unlock SIB-V400, SIT Fill and Drain Isolation Valve HPSI Recirc, per 40AC-0ZZ06, Locked Valve, Breaker and Component Control.
(40' HPSI B Room, west wall)

___ 6.3.5.36 Throttle open SIB-V400, SIT Fill and Drain Isolation Valve HPSI Recirc, slowly to control SIT fill rate.

NOTE

___ If a SIT Fill and Drain Manual Isolation Valve is closed to isolate an inoperable and open SIT Fill and Drain Air Operated Valve, opening the SIT Fill and Drain Manual Isolation Valve makes the associated SIT inoperable and LCO 3.5.1 or LCO 3.5.2 is applicable.

___ 6.3.5.37 **IF** the SIT Fill & Drain Manual Isolation Valve for the SIT to be filled is closed,
THEN open the SIT Fill & Drain Manual Isolation Valve for the SIT to be filled:

ⓘ

- ___ SIE-V210, SIT "2A" Fill & Drain Header Manual Isol Valve (100' CNMT SE and E of SIT 2A)
- ___ SIE-V220, SIT "2B" Fill & Drain Header Manual Isol Valve (100' CNMT SW and W of SIT 2B)
- ___ SIE-V230, SIT "1A" Fill & Drain Header Manual Isol Valve (100' CNMT NW and N of SIT 1A)
- ___ SIE-V240, SIT "1B" Fill & Drain Header Manual Isol Valve (100' CNMT NW and S of SIT 1B)

___ 6.3.5.38 **IF** the unit is in MODES 1 through 4,
THEN record initial SIT level:

SIT	Indicator	Level
2A	SIN-LT-312	
2B	SIN-LT-322	
1A	SIN-LT-332	
1B	SIN-LT-342	

NOTE

___ • Annunciator window 2B11A, SIT LVL HI-LO, alarms on SIT hi level at 63% NR level.

___ • Annunciator window 2B11B, SIT LVL HI-HI/LO-LO, alarms on SIT hi-hi level at 69% NR level.

___ 6.3.5.39 Open the SIT Fill & Drain Valve for the SIT to be filled:

- ___ • SIB-UV-611 using SIB-HS-611, SIT 2A FILL & DRAIN VLV
- ___ • SIB-UV-621 using SIB-HS-621, SIT 2B FILL & DRAIN VLV
- ___ • SIB-UV-631 using SIB-HS-631, SIT-1A FILL & DRAIN VLV
- ___ • SIB-UV-641 using SIB-HS-641, SIT 1B FILL & DRAIN VLV

___ 6.3.5.40 Monitor level of the SIT being filled:

ⓘ

Narrow Range SIT Level	
SIN-LI-313	L) SIT 2A LEVEL, LT-313
	R) SIT 2B LEVEL, LT-323
SIN-LI-333	L) SIT 1A LEVEL LT-333
	R) SIT 1B LEVEL LT-343

Wide Range SIT Level	
SIB-LI-311	L) SIT 2A LEVEL, LT-311
	R) SIT 2B LEVEL, LT-321
SIA-LI-331	L) SIT 1A LEVEL LT-331
	R) SIT 1B LEVEL LT-341

___ 6.3.5.41 **IF** SIT level indications are NOT tracking properly,
THEN perform the following:

___ a. Close the SIT Fill & Drain Valve opened in Step 6.3.5.39.

- ___ SIB-UV-611 using SIB-HS-611, SIT 2A Fill & Drain Vlv
- ___ SIB-UV-621 using SIB-HS-621, SIT 2B Fill & Drain Vlv
- ___ SIB-UV-631 using SIB-HS-631, SIT-1A Fill & Drain Vlv
- ___ SIB-UV-641 using SIB-HS-641, SIT 1B Fill & Drain Vlv

___ b. Notify the SM/CRS.

NOTE

___ • Annunciator window 2B12A, SIT PRESS HI-LO, alarms on SIT hi pressure of 620 psig.

___ • SR 3.5.1.3 requires SIT nitrogen cover pressure of 600 to 625 psig in MODES 1 and 2, and MODES 3 and 4 with Pressurizer pressure greater than or equal to 1837 psia.

___ • SR 3.5.2.3 requires SIT nitrogen cover pressure of 260 to 625 psig in MODES 3 and 4 with Pressurizer pressure less than 1837 psia.

___ 6.3.5.42 Monitor pressure of the SIT being filled:

Narrow Range SIT Pressure	
SIN-PI-312	L) SIT 2A PRESS, PT-312
	R) SIT 2B PRESS, PT-322
SIN-PI-332	L) SIT 1A PRESS, PT-332
	R) SIT 1B PRESS, PT-342

Wide Range SIT Pressure	
SIB-PI-311	L) SIT 2A PRESS, PT-311
	R) SIT 2B PRESS, PT-321
SIA-PI-331	L) SIT 1A PRESS, PT-331
	R) SIT 1B PRESS, PT-341

___ 6.3.5.43 **IF** pressure in the SIT being filled is at or approaching 620 psig, **THEN** perform the following to vent the SIT:

NOTE

When in MODES 1 through 4, the SIT vent valves may only be energized in order to maintain the following cover pressure:

___ • MODES 1 and 2, and MODES 3 and 4 with Pressurizer pressure greater than or equal to 1837 psia - 600 to 625 psig per SR 3.5.1.3

___ • MODES 3 and 4 with Pressurizer pressure less than 1837 psia - 260 to 625 psig per SR 3.5.2.3

___ a. Ensure that EITHER the Train A/Train B SIT vent valve is energized:

___ • SIT Vent Valves Power Supply, using keyswitch SIA-HS-17A, SIT VENT VALVES POWER SUPPLY

___ • SIT Vent Valves Power Supply, using keyswitch SIB-HS-18A, SIT VENT VALVES POWER SUPPLY

___ b. Open EITHER the Train A or Train B vent valve for the SIT to be vented:

SIT	Initial	Train A Valve	Initial	Train B Valve
1A		SIA-HS-607A		SIB-HS-633A
1B		SIA-HS-608A		SIB-HS-643A
2A		SIA-HS-605A		SIB-HS-613A
2B		SIA-HS-606A		SIB-HS-623A

___ c. **WHEN** the desired SIT pressure is obtained,
THEN close the vent valve opened in Step 6.2.3.2.

SIT	Initial	Train A Valve	Initial	Train B Valve
1A		SIA-HS-607A		SIB-HS-633A
1B		SIA-HS-608A		SIB-HS-643A
2A		SIA-HS-605A		SIB-HS-613A
2B		SIA-HS-606A		SIB-HS-623A

___ d. **WHEN** venting is complete **AND** the unit is in MODES 1 through 4,
THEN ensure BOTH Train A/Train B SIT vent valves are de-energized:

- ___ SIT Vent Valves Power Supply, using keyswitch SIA-HS-17A, SIT VENT VALVES POWER SUPPLY
- ___ SIT Vent Valves Power Supply, using keyswitch SIB-HS-18A, SIT VENT VALVES POWER SUPPLY

___ 6.3.5.44 **WHEN** the desired SIT level is reached,
THEN close the SIT Fill & Drain Valve opened in Step 6.3.5.39:

- ___ SIB-UV-611 using SIB-HS-611, SIT 2A FILL & DRAIN VLV
- ___ SIB-UV-621 using SIB-HS-621, SIT 2B FILL & DRAIN VLV
- ___ SIB-UV-631 using SIB-HS-631, SIT-1A FILL & DRAIN VLV
- ___ SIB-UV-641 using SIB-HS-641, SIT 1B FILL & DRAIN VLV

___ 6.3.5.45 **IF** any SIT Fill & Drain Manual Isolation Valve(s) was opened in Step 6.3.5.37 **AND** the SM/CRS directs,
THEN close the SIT Fill & Drain Manual Isolation Valve(s):

- ___ SIE-V210, SIT "2A" Fill & Drain Header Manual Isol Valve (100' CNMT SE and E of SIT 2A)
- ___ SIE-V220, SIT "2B" Fill & Drain Header Manual Isol Valve (100' CNMT SW and W of SIT 2B)
- ___ SIE-V230, SIT "1A" Fill & Drain Header Manual Isol Valve (100' CNMT NW and N of SIT 1A)
- ___ SIE-V240, SIT "1B" Fill & Drain Header Manual Isol Valve (100' CNMT NW and S of SIT 1B)

___ 6.3.5.46 **IF** the unit is in MODES 1 through 4,
THEN record final SIT level:

SIT	Indicator	Level
2A	SIN-LT-312	
2B	SIN-LT-322	
1A	SIN-LT-332	
1B	SIN-LT-342	

___ 6.3.5.47 **IF** another SIT is to be filled,
THEN repeat Steps 6.3.5.38 through 6.3.5.46.

___ 6.3.5.48 Close SIA-UV-682 using SIA-HS-682, MISC DRAIN HEADER TO RWT VLV.

___ 6.3.5.49 Stop HPSI Pump B using SIB-HS-2, HPSI PUMP B P02.

___ 6.3.5.50 Close SIB-V219, Mini Flow Recirc Orifice Bypass Valve. (40' HPSI "B" Room)

___ 6.3.5.51 Lock SIB-V219, Mini Flow Recirc Orifice Bypass Valve, in the closed position per 40AC-0ZZ06, Locked Valve, Breaker and Component Control.

___ 6.3.5.52 Perform an Independent Verification that SIB-V219, Mini Flow Recirc Orifice Bypass Valve, is locked in the closed position.

___ 6.3.5.53 Open SIB-UV-667 using SIB-HS-667, HPSI PMP B TO RWT ISOL.

___ 6.3.5.54 Lock the handwheel of SIB-UV-667, HPSI “B” to the RWT Isolation Valve, in the open position per 40AC-0ZZ06, Locked Valve, Breaker and Component Control. (40’ HPSI “B” Room)

___ 6.3.5.55 Perform an Independent Verification that SIB-UV-667, HPSI “B” to the RWT Isolation Valve, is locked in the open position.

___ 6.3.5.56 **IF** SIB-V478 was closed in Step 6.3.5.24,
THEN perform the following:

___ a. Open SIB-V478, HPSI Discharge Isolation Valve. (52’ HPSI “B” Room)

___ b. Lock SIB-V478, HPSI Discharge Isolation Valve, in the open position per 40AC-0ZZ06, Locked Valve, Breaker and Component Control.

___ c. Perform an Independent Verification that SIB-V478, HPSI Discharge Isolation Valve, is locked in the open position.

___ 6.3.5.57 **IF** the Unit is in MODES 1 through 4,
THEN remove the manual HPSI B SESS alarm.

___ 6.3.5.58 Notify the SM/CRS that HPSI Pump B is restored to OPERABLE.

___ 6.3.5.59 Close SIB-V400, SIT Fill and Drain Isolation Valve HPSI Recirc. (40’ HPSI “B” Room, west wall)

___ 6.3.5.60 Lock SIB-V400, SIT Fill and Drain Isolation Valve HPSI Recirc, in the closed position per 40AC-0ZZ06, Locked Valve, Breaker and Component Control.

___ 6.3.5.61 Perform an Independent Verification that SIB-V400, SIT Fill and Drain Isolation Valve HPSI Recirc, is locked in the closed position.

___ 6.3.5.62 Close SIE-V463, SIT Fill and Drain Line Containment Isolation Valve. (SW East Penn Room)

___ 6.3.5.63 Lock SIE-V463, SIT Fill and Drain Line Containment Isolation Valve, in the closed position per 40AC-0ZZ06, Locked Valve, Breaker and Component Control.

___ 6.3.5.64 Perform an Independent Verification that SIE-V463, SIT Fill and Drain Line Containment Isolation Valve, is locked in the closed position.

___ 6.3.5.65 **IF** the unit is in MODES 1 through 4,
THEN perform the following:

___ a. **IF** the Containment Isolation SESS alarm is not manually inserted for another component,
THEN remove the manual Containment Isolation SESS alarm.

___ b. Discontinue the dedicated operator assigned to SIE-V463, per 40DP-9OP19, Locked Valve, Breaker and Component Tracking.

___ c. Notify Chemistry of the initial and final SIT levels.

___ d. Notify Chemistry to perform 74ST-9SI01, Safety Injection Tank Boron Surveillance Test.

___ 6.3.5.66 **IF** directed by the SM/CRS,
THEN place the Containment Power Access Purge in service per 40OP-9CP01, Containment Purge System.

___ 6.3.5.67 **WHEN** HPSI Pump B has been shutdown for at least 5 minutes,
THEN verify that HAB-Z01, Aux. Bldg. HPSI Pump Room Ess. Air Control Unit, has automatically stopped by ONE of the following methods:

___ • SEAS window 12L blue light at ESB-UA-2F is on when the status display button on ESB-UA-2D is depressed

___ • Local observation that HAB-Z01 has stopped

___ 6.3.5.68 **IF** HAB-Z01 Aux. Bldg. HPSI Pump Room Ess. Air Control Unit, is still running,
THEN notify the SM/CRS.

___ 6.3.5.69 Notify Radiation Protection that venting will be performed on the HPSI System.

___ 6.3.5.70 **IF** SIT 1A was filled to makeup for leakage **AND** the Unit is in MODES 1 through 4,
THEN direct an Auxiliary Operator to perform Section 6.3.6, Instructions for Venting SI Header After Filling SIT 1A Due to Leakage While in MODES 1 though 4, to vent the header at the high point.

___ 6.3.5.71 **IF** SIT 1B was filled to makeup for leakage **AND** the Unit is in MODES 1 through 4,
THEN direct an Auxiliary Operator to perform Section 6.3.7, Instructions for Venting SI Header After Filling SIT 1B Due to Leakage While in MODES 1 though 4, to vent the header at the high point.

___ 6.3.5.72 **IF** SIT 2A was filled to makeup for leakage **AND** the Unit is in MODES 1 through 4,
THEN direct an Auxiliary Operator to perform Section 6.3.8, Instructions for Venting SI Header After Filling SIT 2A Due to Leakage While in MODES 1 though 4, to vent the header at the high point.

___ 6.3.5.73 **IF** SIT 2B was filled to makeup for leakage **AND** the Unit is in MODES 1 through 4,
THEN direct an Auxiliary Operator to perform Section 6.3.9, Instructions for Venting SI Header After Filling SIT 2B Due to Leakage While in MODES 1 though 4, to vent the header at the high point.

___ 6.3.5.74 Ensure restoration of components controlled by 40AC-0ZZ06, Locked Valve, Breaker and Component Control, is documented in 40DP-9OP19, Locked Valve, Breaker and Component Tracking.

JPM BASIS INFORMATION

TASK:	1250030401 Respond to a Loss of Nuclear Cooling Water							
TASK STANDARD:	Examinee has tripped the reactor, secured all RCPs, and isolated seal bleedoff.							
K/A:	3.8 008 A2.07		K/A RATING:	RO:	2.5	SRO:	2.8	
10 CFR 55:	41.5 / 43.5 / 45.3 / 45.13							
APPLICABLE POSITION(S):	RO		VALIDATION TIME:	10 minutes				
REFERENCES:	40AO-9ZZ03, Loss of Cooling Water Updated Final Safety Analysis Report							
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR	X	PLANT		OTHER			

JPM TYPE

Time Critical? *(Yes/No)* ***Yes*** Alternative Path? *(Yes/No)* ***Yes***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Alan Malley Date: 10/02/2003

Revised By: Adam Rasmussen Date: 10/17/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ______________________________ Date: ____________

Evaluator Name: ______________________________

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR #* ____________

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. SIMULATOR SETUP:

- IC#: 20 or any 100% power IC
- SCENARIOS, MALFUNCTIONS, OVERRIDES,etc. for Setup:

COMMAND/COMMUNICATION	DESCRIPTION
cmMVCC04NCBUV403_3	Spurious Nuclear Cooling containment isolation valve closure (NCB-UV-403)
cmMVCC04NCBUV403_6 d:12	Mechanical seizure of Nuclear Cooling containment isolation valve (NCB-UV-403)

- SPECIAL INSTRUCTIONS:
  - RESET to IC 20 or any 100% power IC
  - Go to **RUN**
  - RUN scenario file **2013 NRC S-4.scn**
  - WAIT **15 seconds**, acknowledge alarms
  - GOTO **FREEZE** (Make 0 SNAP if JPM will be repeated)
  - Give examinee **INITIATING CUE**
  - GOTO **RUN**
- REQUIRED CONDITIONS:
  - NCB-UV-403 is closed and seized
- SIMULATOR EVALUATION PRE-CHECK
  - ❑ Correct IC
  - ❑ Alarm Silence Off
  - ❑ Procedures available, page checked, and clean
  - ❑ For JPMs administered during transients, another instructor available to control plant parameters.

Verified by: ________________________ Date: ____________________

(NA if Simulator setup not required)

2. SPECIAL TOOLS/EQUIPMENT:

- 40AO-9ZZ03, Loss of Cooling Water, Revision 7

NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.

3. JPM PERFORMANCE:

- MALFUNCTIONS, OVERRIDES, etc. **during** JPM

STEP	COMMAND/COMMUNICATION	DESCRIPTION
N/A		No Driver actions

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE** any equipment.
- Inform the control room staff of any discovered deficiencies.
- Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- You may use any source of information normally available.

INITIAL CONDITIONS:

- **The plant is operating at 100% power and you have just received low flow alarms on NCW to the RCPs.**
- **The CRS has entered 40AO-9ZZ03, Loss of Cooling Water.**

INITIATING CUE:

- **The CRS directs you to perform the actions of section 4 of 40AO-9ZZ03, Nuclear Cooling Water.**

THIS IS A TIME Critical JPM.

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate any valves.

JPM START TIME:

	STEP	CUE	STANDARD
1.	Enter AOP Entry Time and Date: __________________		Examinee will note time. **START TIME:** ______________

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD

2.	**IF** seal injection is in service, **THEN** perform the following **within 10 minutes** of the initial loss:
	• Restore cooling water to all operating RCP(s).
	• **IF** cooling water cannot be restored, **THEN** perform the following:
	    • Ensure the Reactor is tripped.
	    • Stop all of the RCPs.
	    • Isolate controlled bleedoff.
	    • PERFORM the appropriate procedure for current plant conditions.
			Examinee determines Seal Injection is in service.

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
3.	**IF** seal injection is **NOT** in service…		Examinee determines seal injection is in service and step is N/A.
SAT / UNSAT /NA **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
4.	**IF no** Nuclear Cooling Water pumps are running…		Examinee determines that a NCW pump is operating and this step is N/A.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD

5.	**IF** at least one Nuclear Cooling Water pump is running,
	AND "NCWS PMPS DSCH HDR PRESS HI-LO" (7A07B) is in alarm due to low pressure,
	THEN perform the following:
	• Start the standby NC Pump.
	• Check that **no** NC system leaks exist by performing the following:
	  • Direct an operator(s) to walkdown NC system piping.
	  • Evaluate indications and alarms on the control boards.
			Examinee determines that operating NCW Pump is operating normally and no low discharge pressure alarm exists.
			
			Evaluator Note: Window 7A07B may be in alarm but the alarm would be a high alarm due to part of the system being isolated.

SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
6.	**IF ANY** of the NC Containment Isolation Valves have failed closed, **AND** there is **NOT** a valid CSAS signal present, **THEN** perform the following: • Open **ANY** closed isolation valves. • Evaluate Tech Spec 3.6.3, Containment Isolation Valves.	**If requested CUE:** If examinee requests an AO to manually open NCB-UV-403 respond, "The CRS has determined a containment entry can NOT be performed". **Information CUE:** If examinee communicates to CRS to evaluate Tech Spec 3.6.3, inform that CRS is evaluating the Tech Spec.	Examinee recognizes that valve **NCB-UV-403** has closed. Examinee will attempt to open by rotating NCB-HS-403 to the OPEN position. Examinee may contact AO to enter containment and open NCB-UV-403 locally. **ALTERNATE PATH**

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
7. *	**IF ANY** of the NC Containment Isolation Valves will **NOT** open, **THEN** perform the following: • Close all NC CTMT Isolation Valves. • Ensure that the Reactor is tripped. • Stop all of the RCPs. • Isolate seal bleedoff. • GO TO the appropriate procedure for the current plant conditions.	**IF requested CUE:** If examinee requests guidance from CRS respond "What actions do you recommend?" **Inform CUE:** Concur with any and all recommendations. **Inform CUE:** After the reactor is tripped, other ROs will perform the SPTAs. **Inform CUE:** After bleedoff is isolated, another operator will complete 40AO-9ZZ03 actions.	Examinee may request concurrence from CRS to perform contingency actions. Examinee closes remaining NCW CTMT isolation valves by rotating handswitches **NCA-HS-402** and **NCB-HS-401** to the **CLOSE** position. * Examinee trips the reactor by depressing reactor trip pushbuttons on **Board B05**. * Examinee trips ALL RCPs by rotating RCP handswitches **RCN-HS-1/2/3/4** to the **OFF** position. * Examinee isolates seal bleedoff by rotating handswitches **RCN-HS-430/431/432/433** to the **CLOSE** position. **STOP TIME: ______________** **Evaluator NOTE:** **CRITICAL STEPS** denoted by * JPM must be completed within **10 minutes** of time recorded in **STEP 1**.

SAT / UNSAT
Comments (required for UNSAT):

JPM STOP TIME:

NOTE:
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- **The plant is operating at 100% power and you have just received low flow alarms on NCW to the RCPs.**
- **The CRS has entered 40AO-9ZZ03, Loss of Cooling Water.**

INITIATING CUE:

- **The CRS directs you to perform the actions of section 4 of 40AO-9ZZ03, Nuclear Cooling Water.**

THIS IS A TIME Critical JPM

APPLICANT

4.0 NUCLEAR COOLING WATER

INSTRUCTIONS	CONTINGENCY ACTIONS

___ 1. Enter AOP Entry Time and Date:

____

___ 2. **IF** seal injection is in service, **THEN** perform the following **within 10 minutes** of the initial loss:

a. Restore cooling water to all operating RCP(s).

b. **IF** cooling water cannot be restored, **THEN** perform the following:

1) Ensure the Reactor is tripped.

2) Stop all of the RCPs.

3) Isolate controlled bleedoff.

4) PERFORM the appropriate procedure for current plant conditions.

4.0 NUCLEAR COOLING WATER

INSTRUCTIONS	CONTINGENCY ACTIONS
___ 3. **IF** seal injection is **NOT** in service, **THEN** perform the following **within three minutes** of the initial loss:	
a. Restore cooling water to all operating RCP(s).	
b. **IF** cooling water cannot be restored, **THEN** perform the following:	
1) Ensure the Reactor is tripped.	
2) Stop all of the RCPs.	
3) Isolate controlled bleedoff.	
4) PERFORM the appropriate procedure for current plant conditions.	

4.0 NUCLEAR COOLING WATER

INSTRUCTIONS	CONTINGENCY ACTIONS

___ 4. **IF no** Nuclear Cooling Water pumps are running, **THEN** perform the following:

a. **IF** at least one Nuclear Cooling Water pump is available, **THEN** start the Nuclear Cooling Water Pump.

b. **IF** electrical power must be restored to start a Nuclear Cooling Water Pump, **THEN** perform the following:

1) Place both NC Pump handswitches in “PULL TO LOCK”.

2) PERFORM 40AO-9ZZ12, Degraded Electrical Power.

4.0 NUCLEAR COOLING WATER

INSTRUCTIONS	CONTINGENCY ACTIONS
___ 5. **IF** at least one Nuclear Cooling Water pump is running, **AND** "NCWS PMPS DSCH HDR PRESS HI-LO" (7A07B) is in alarm due to low pressure, **THEN** perform the following:	
a. Start the standby NC Pump.	a.1 **IF** electrical power must be restored to start a NC Pump, **THEN** PERFORM 40AO-9ZZ12, Degraded Electrical Power.
b. Check that **no** NC system leaks exist by performing the following:	b.1 **IF** a leak exists outside containment, **THEN** isolate the leak.
1) Direct an operator(s) to walkdown NC system piping.	b.2 **IF** a leak outside containment can not be isolated, **AND** the CRS determines that NC should be shutdown, **THEN** ensure that both NC Pumps are stopped.
2) Evaluate indications and alarms on the control boards.	
	b.3 **IF** a leak exists inside containment, **THEN** perform the following:
	1) Close the NC CTMT Isolation Valves.
	2) Ensure that the Reactor is tripped.
	3) Stop all of the RCPs.
	4) Isolate seal bleedoff.
	5) GO TO the appropriate procedure for current plant conditions.

4.0 NUCLEAR COOLING WATER

INSTRUCTIONS	CONTINGENCY ACTIONS
___ 6. **IF ANY** of the NC Containment Isolation Valves have failed closed, **AND** there is **NOT** a valid CSAS signal present, **THEN** perform the following:	
a. Open **ANY** closed isolation valves.	a.1 **IF ANY** of the NC Containment Isolation Valves will **NOT** open, **THEN** perform the following: 1) Close all NC CTMT Isolation Valves. 2) Ensure that the Reactor is tripped. 3) Stop all of the RCPs. 4) Isolate seal bleedoff. 5) GO TO the appropriate procedure for the current plant conditions.
b. Evaluate Tech Spec 3.6.3, Containment Isolation Valves.	
___ 7. **IF** the NC system has been restored, **THEN** GO TO the appropriate procedure for current plant conditions.	

4.0 NUCLEAR COOLING WATER

INSTRUCTIONS | CONTINGENCY ACTIONS

___ 8. **IF ANY** RCPs are operating, **THEN** PERFORM 40AO-9ZZ04, Reactor Coolant Pump Emergencies.

___ 9. **IF** the CRS directs cross-connecting EW to NC, **AND** any leak in NC system piping will be isolated when cross-connected, **THEN** PERFORM Appendix A, Cross-connect EW to NC.

___ 10. **IF** a leak in the Nuclear Cooling Water System piping can **NOT** be isolated when cross-connecting EW and NC, **THEN** perform the following:

a. Ensure that the Reactor is tripped.

b. Stop all of the RCPs.

c. Isolate controlled bleedoff.

d. GO TO the appropriate procedure for the current plant conditions.

___ 11. **IF** letdown is isolated, **THEN** PERFORM 40AO-9ZZ05, Loss of Letdown.

4.0 NUCLEAR COOLING WATER

INSTRUCTIONS | CONTINGENCY ACTIONS

___ 12. Direct an operator to ensure that **ALL** of the following valves are closed to isolate steam to the Aux and Rad Waste Buildings:

- ASN-V016, "ASN-PCV-010 INLET ISOL VALVE"
- ASN-V017, "ASN-PCV-010 BYPASS VALVE"
- ASN-VY20, "ASN-PCV-010 BYPASS VALVE"

4.0 NUCLEAR COOLING WATER

INSTRUCTIONS | CONTINGENCY ACTIONS

___ 13. **IF** a NC Pump becomes available for operation,
AND Essential Cooling Water is **NOT** cross-connected with Nuclear Cooling Water,
THEN perform the following to start a NC Pump:

a. Ensure that both NC Pumps are in “PULL TO LOCK”.

b. Direct an operator to close **ONE** of the following discharge valves for the pump to be started:

- NCN-HCV-9, ““A” NCW PUMP NCN-P01A DISCHARGE ISOLATION VALVE”
- NCN-HCV-10, ““B” NCW PUMP NCN-P01B DISCHARGE ISOLATION VALVE”

c. Start **ONE** Nuclear Cooling Water Pump.

d. Direct the operator to fully open the discharge valve for the pump that was started.

4.0 NUCLEAR COOLING WATER

INSTRUCTIONS | CONTINGENCY ACTIONS

CAUTION

Stopping cooling water flow to operating RCPs may cause damage if not restored within three minutes without seal injection or 10 minutes with seal injection.

___ 14. **IF** a NC Pump becomes available for operation,
AND Essential Cooling Water is cross-connected with Nuclear Cooling Water,
THEN PERFORM **ONE** of the following:

- 40OP-9EW01, Essential Cooling Water System (EW) Train A, Section 9.0
- 40OP-9EW02, Essential Cooling Water System (EW) Train B, Section 9.0

4.0 NUCLEAR COOLING WATER

<u>INSTRUCTIONS</u>	<u>CONTINGENCY ACTIONS</u>
___ 15. **IF** Nuclear Cooling Water is restored, **AND** EW is supplying SFP cooling, **THEN** <u>PERFORM</u> **ONE** of the following as appropriate to restore NC to SFP Cooling: • 40OP-9EW01, <u>Essential Cooling Water System (EW) Train A</u>, Section 7.0 • 40OP-9EW02, <u>Essential Cooling Water System (EW) Train B</u>, Section 7.0	
___ 16. **WHEN** Nuclear Cooling Water is restored, **OR BOTH** of the following conditions exist: • The Reactor is shutdown, • All appropriate steps of this procedure have been completed, **THEN** <u>GO TO</u> the appropriate procedure for current plant conditions.	

End of Section 4.0

JPM BASIS INFORMATION

TASK:	0780031301, Transfer 13.8KV bus S01 From 13.8KV Bus S03 to the Unit Auxiliary Transformer MAN-X02							
TASK STANDARD:	NAN-S01 and NAN-S02 have been transferred to the Unit Auxiliary transformer and alternate supply breakers are open							
K/A:	3.6 062 A4.01		K/A RATING:	RO:	3.3	SRO:	3.1	
10 CFR 55:	41.7 / 45.5 / 45.8							
APPLICABLE POSITION(S):	RO		VALIDATION TIME:	10 minutes				
REFERENCES:	40OP-9NA03, 13.8 kV Electrical System 40AL-9RK1A, Panel B01A Alarm Responses							
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR	X	PLANT		OTHER			

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***Yes***
PRA/SRA related? *(Yes/No)* ***Yes***

APPROVAL

Developed By: Alan Malley Date: 10/22/2003

Revised By: Adam Rasmussen Date: 10/09/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ________________________________ Date: ____________

Evaluator Name: ________________________________

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. SIMULATOR SETUP:

- IC#: 145 **-OR-**
- IC#: 20

- SCENARIOS, MALFUNCTIONS, OVERRIDES,etc. for Setup:

COMMAND/COMMUNICATION	DESCRIPTION
cmBKED05NANS04B_1	Auto Trip logic failure for NAN-S02/S04 tie breaker

- SPECIAL INSTRUCTIONS:
  1. **IF** IC 145 is used, reset to **IC 145 THEN** proceed to **Step 4**
  2. **IF** IC 20 is used, reset to **IC 20**, GO TO **RUN**
  3. Transfer NAN-S01 and NAN-S02 to NAN-S03 and NAN-S04, respectively, per 40OP-9NA03, Sections 7.0 and 11.0
  4. Run scenario file **2013 NRC S-5.scn** from exam jump drive
  5. GO TO **FREEZE**
  6. Provide **INITIATING CUE**
  7. GO TO **RUN**
- REQUIRED CONDITIONS:
  1. NAN-S01 and NAN-S02 are energized from NAN-S03 and NAN-S04, respectively
- SIMULATOR EVALUATION PRE-CHECK
  - ❑ Correct IC
  - ❑ Alarm Silence Off
  - ❑ Procedures available, page checked, and clean
  - ❑ For JPMs administered during transients, another instructor available to control plant parameters.

Verified by: ________________________ Date: ____________________

(NA if Simulator setup not required)

2. SPECIAL TOOLS/EQUIPMENT:

- 40OP-9NA03, 13.8 kV Electrical System, Revision 35 available.
- 40AL-9RK1A, Panel B01A Alarm Responses, Revision 0 available.

NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.

3. JPM PERFORMANCE:

- MALFUNCTIONS, OVERRIDES, etc. **during** JPM

STEP	COMMAND/COMMUNICATION	DESCRIPTION
N/A		No driver action required

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE** any equipment.
- Inform the control room staff of any discovered deficiencies.
- Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- You may use any source of information normally available.

INITIAL CONDITIONS:

- **The Unit's 13.8 kV buses (NAN-S01 and NAN-S02) are being supplied from offsite power (startup transformers)**
- **NAN-S01 and NAN-S02 are to be transferred to the Unit Auxiliary Transformer**
- **All prerequisites have been performed**

INITIATING CUE:

- **The CRS directs you to transfer NAN-S01 and NAN-S02 to the Unit Auxiliary Transformer, MAN-X02, in accordance with 40OP-9NA03 sections 4.8 and 4.9**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate any valves.

JPM START TIME:

	STEP	CUE	STANDARD
1. *	40OP-9NA03 Step 4.8.3.1 Turn the Synchronizing Switch for NAN-S01 Supply breaker, NAN-SS-S01A, to "ON" and check for proper synchronization		Examinee retrieves synchronizing switch key and rotates NAN-SS-S01A to the "**ON**" position; Verifies proper synchronization indicated using MAN-EI-002I, MAN-EI-002R, and synchronizing scope at the 12 o'clock position.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	Step 4.8.3.2 Close the NAN-S01 Supply breaker NAN-S01A by turning handswitch NAN-HS-S01A to "CLOSE"		Examinee rotates NAN-HS-S01A to the "**CLOSE**" position; Verifies **RED** closed indication illuminates.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
3.	Step 4.8.3.3 <u>Check</u> NAN-S03-NAN-S01 Supply breaker, NAN-S03B, automatically opens when handswitch NAN-HS-S01A is released	**Evaluator NOTE:** GENERATING UNIT 1 OSCG OPERATED/TRBL (1B18C) is an expected alarm for this evolution.	Examinee verifies NAN-S03B is open by **GREEN** trip light being illuminated on **NAN-HS-S03B.**

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
4.	Step 4.8.3.4 <u>Check</u> NAN-S01 voltage is between 12.42 kV – 14.49 kV		Examinee verifies voltage is 12.42-14.49 kV on voltmeter NAN-EI-S01.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
5.	Step 4.8.3.5 Turn the Synchronizing Switch for NAN-S01 Supply breaker, NAN-SS-S01A, to "OFF"		Examinee retrieves synchronizing switch key and rotates NAN-SS-S01A to the "**OFF**" position.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
6.	Step 4.8.3.6 Perform the appropriate section of Appendix D if a related Startup Xfmr winding is supplying more than one unit		Examinee determines that the related Startup Transformer is not supplying more than one unit and did not perform Appendix D.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
7. *	Step 4.9.3.1 Turn the Synchronizing Switch for NAN-S02 Supply breaker, NAN-SS-S02A, to "ON" and check for proper synchronization		Examinee retrieves synchronizing switch key and rotates NAN-SS-S02A to the "**ON**" position; Verifies proper synchronization indicated using MAN-EI-002I, MAN-EI-002R, and synchronizing scope at the 12 o'clock position.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
8. *	Step 4.9.3.2 <u>Close</u> the NAN-S02 Supply breaker NAN-S02A by turning handswitch NAN-HS-S02A to "CLOSE"		Examinee rotates NAN-HS-S02A to the "**CLOSE**" position; Verifies **RED** closed indication illuminated.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
9. *	Step 4.9.3.3 <u>Check</u> NAN-S04-NAN-S02 Supply breaker, NAN-S04B, automatically opens when handswitch NAN-HS-S02A is released	**If Requested CUE:** **If examinee reports breaker did not open: "The CRS acknowledges NAN-S04B did not open."** **If examinee requests CRS direction: "The CRS asks for recommendations."** **-Concur with any recommendation**	Examinee verifies NAN-S04B did **NOT** open by **RED** close light being illuminated on **NAN-HS-S04B.** **ALTERNATE PATH**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
10.	Acknowledges B01 alarm and references 40AL-9RK1A, Panel B01A Alarm Responses, Window 1A18B.		Examinee acknowledges B01 Alarms and opens 40AL-9RK1A to Window 1A18B.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
11. *	40AL-9RK1A Window 1A18B: Step 2 **IF** transferring NAN-S01 or NAN-S02, 13.8KV Non-Class 1E Switchgear Buses, **THEN** perform the following: 2.1 Ensure incoming breaker control switch is in normal. 2.2 Ensure running breaker is tripped. 2.3 **IF** running breaker can NOT be tripped, **THEN** trip incoming breaker.	**Evaluator NOTE:** The running breaker did not trip, so examinee should perform Step 2.2. **If Requested CUE:** **If examinee requests to open NAN-S04B, "CRS directs you to open NAN-S04B."** **Information CUE:** **AFTER examinee opens NAN-S04B, "Another operator will initiate a PVAR, proceed with remainder of procedure."**	Examinee rotates NAN-HS-S04B to the "**TRIP**" position; Verifies **RED** close light extinguished and **GREEN** trip light illuminated; **Evaluator NOTE:** The examinee may perform this action without reference to the alarm response procedure. This is acceptable but not preferred.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
12.	40OP-9NA03 Step 4.9.3.4 Check NAN-S02 voltage is between 12.42 kV – 14.49 kV		Examinee verifies voltage is 12.42-14.49 kV on voltmeter NAN-EI-S02.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
13.	Step 4.9.3.5 Turn the Synchronizing Switch for NAN-S02 Supply breaker, NAN-SS-S02A, to “OFF”		Examinee retrieves synchronizing switch key and rotates NAN-SS-S02A to the “**OFF**” position.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
14.	Step 4.9.3.6 Perform the appropriate section of Appendix D if a related Startup Xfmr winding is supplying more than one unit	**Information CUE:** **This completes the JPM**	Examinee determines that the related Startup Transformer is not supplying more than one unit and did not perform Appendix D.
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- The Unit's 13.8 kV buses (NAN-S01 and NAN-S02) are being supplied from offsite power (startup transformers)
- NAN-S01 and NAN-S02 are to be transferred to the Unit Auxiliary Transformer
- All prerequisites have been performed

INITIATING CUE:

- The CRS directs you to transfer NAN-S01 and NAN-S02 to the Unit Auxiliary Transformer, MAN-X02, in accordance with 40OP-9NA03 sections 4.8 and 4.9

APPLICANT

4.8 Transferring NAN-S01 to the Unit Aux Xfmr

4.8.1 Personnel Indoctrination

1. It is not desirable to shift Xfmrs with an Emergency Diesel Generator paralleled with offsite power. The changing impedances that may occur while shifting Xfmrs could overload the Diesel Generator.

4.8.2 Prerequisites

1. NAN-S01 is energized.
2. NAN-S01A, 13.8 kV Supply Breaker from MAN-X02, is racked in.
3. Unit Auxiliary Xfmr MAN-X02 is energized per 40OP-9MB01, Main Generation and Excitation.
4. There are no Emergency Diesel Generators in any of the units paralleled with offsite power. (Emergency conditions may require this step to be N/A'd at the discretion of the CRS/SM.)

4.8.3 Instructions

____ 4.8.3.1 In the Control Room on B01, <u>turn</u> the Synchronizing Switch for NAN-S01 Supply breaker, NAN-SS-S01A, to "ON" and check for proper synchronization.

____ 4.8.3.2 <u>Close</u> the NAN-S01 Supply breaker NAN-S01A by turning handswitch NAN-HS-S01A to "CLOSE".

____ 4.8.3.3 <u>Check</u> NAN-S03-NAN-S01 Supply breaker, NAN-S03B, automatically opens when handswitch NAN-HS-S01A is released.

____ 4.8.3.4 <u>Check</u> NAN-S01 voltage is between 12.42 kV - 14.49 kV.

____ 4.8.3.5 <u>Turn</u> the Synchronizing Switch for NAN-S01 Supply breaker, NAN-SS-S01A, to "OFF".

____ 4.8.3.6 Perform the appropriate section of Appendix D - S/U Xfmr Winding Loading Guidance, if a related Startup Xfmr winding is supplying more than one unit:

- **Unit 1 only -**
  IF X03Z or X01Y are supplying more than one unit, **THEN** perform section 5.0 of Appendix D - S/U Xfmr Winding Loading Guidance.
- **Unit 2 only -**
  IF X01Z or X02Y are supplying more than one unit, **THEN** perform section 13.0 of Appendix D - S/U Xfmr Winding Loading Guidance.
- **Unit 3 only -**
  IF X02Z or X03Y are supplying more than one unit, **THEN** perform section 21.0 of Appendix D - S/U Xfmr Winding Loading Guidance

4.9 Transferring NAN-S02 to the Unit Aux Xfmr

4.9.1 Personnel Indoctrination

1. It is not desirable to shift Xfmrs with an Emergency Diesel Generator paralleled with offsite power. The changing impedances that may occur while shifting Xfmrs could overload the Diesel Generator.

4.9.2 Prerequisites

fr 1. NAN-S02 is energized.

fr 2. NAN-S02A, 13.8 kV Supply Breaker from MAN-X02 is racked in.

fr 3. Unit Auxiliary Xfmr MAN-X02 is energized per 40OP-9MB01, Main Generation and Excitation.

fr 4. There are no Emergency Diesel Generators in any of the units paralleled with offsite power. (Emergency conditions may require this step to be N/A'd at the discretion of the CRS/SM.)

4.9.3 Instructions

____ 4.9.3.1 In the Control Room on B01, turn the Synchronizing Switch for NAN-S02 Supply breaker, NAN-SS-S02A, to ON and check for proper synchronization.

____ 4.9.3.2 Close the NAN-S02 Supply breaker NAN-S02A by turning handswitch NAN-HS-S02A to CLOSE.

____ 4.9.3.3 Check NAN-S04-NAN-S02 Supply breaker, NAN-S04B, automatically opens when handswitch NAN-HS-S02A is released.

____ 4.9.3.4 Check NAN-S02 voltage is between 12.42 kV - 14.49 kV.

____ 4.9.3.5 Turn the Synchronizing Switch for NAN-S02 Supply breaker, NAN-SS-S02A, to OFF.

____ 4.9.3.6 Perform the appropriate section of Appendix D - S/U Xfmr Winding Loading Guidance, if a related Startup Xfmr winding is supplying more than one unit:

- **Unit 1 only -**
  IF X02Y or X01Z are supplying more than one unit, **THEN** perform section 7.0 of Appendix D - S/U Xfmr Winding Loading Guidance.

- **Unit 2 only -**
  IF X03Y or X02Z are supplying more than one unit, **THEN** perform section 15.0 of Appendix D - S/U Xfmr Winding Loading Guidance.

- **Unit 3 only -**
  IF X01Y or X03Z are supplying more than one unit, **THEN** perform section 23.0 of Appendix D - S/U Xfmr Winding Loading Guidance.

Alarm Index

1A18B
13.8KV PWR SOURCES PARALLELED

13.8 KV Power Sources Paralleled

Point ID	Description	Page
NAYS51	13.8KV Buses E-NAN-S01/S03 Sources Paralleled (Unit 1, 2 and 3 alarm)	123
NAYS52	13.8KV Buses E-NAN-S02/S04 Sources Paralleled (Unit 1, 2 and 3 alarm)	
NAYS45	13.8KV Bus 1E-NAN-S05 Sources Paralleled (Unit 1 alarm)	125
NAYS47	13.8KV Bus 1E-NAN-S06 Sources Paralleled (Unit 1 alarm)	
NAYS46	13.8KV Bus 2E-NAN-S05 Sources Paralleled (Unit 1 and 2 alarm)	
NAYS48	13.8KV Bus 2E-NAN-S06 Sources Paralleled (Unit 1 and 2 alarm)	
NAYS57	13.8KV Bus 3E-NAN-S05 Sources Paralleled (Unit 1 and 3 alarm)	
NAYS58	13.8KV Bus 3E-NAN-S06 Sources Paralleled (Unit 1 and 3 alarm)	

Response Section

1A18B

13.8KV PWR SOURCES PARALLELED

13.8 KV Power Sources Paralleled

Point ID	Description	Setpoint
NAYS51	13.8KV Buses E-NAN-S01/S03 Sources Paralleled (Unit 1, 2 and 3 alarm)	N/A
NAYS52	13.8KV Buses E-NAN-S02/S04 Sources Paralleled (Unit 1, 2 and 3 alarm)	N/A

AUTOMATIC ACTION

- None

OPERATOR ACTIONS

___ 1. Confirm bus transfer in progress.

___ 2. **IF** transferring NAN-S01 or NAN-S02, 13.8KV Non-Class 1E Switchgear Buses, **THEN** perform the following:

___ 2.1 Ensure incoming breaker control switch is in normal.

___ 2.2 Ensure running breaker is tripped.

___ 2.3 **IF** running breaker can NOT be tripped, **THEN** trip incoming breaker.

___ 3. **IF** the bus transfer scheme failed to operate as designed, **THEN** initiate a PVAR for troubleshooting and repair.

ⓘ

PROBABLE CAUSES

- Running breaker fails to automatically trip when incoming breaker control switch is returned to the normal position
- Incoming breaker control switch not returned to normal within required time after incoming breaker closure

REFERENCES

- 0X-E-NAB-0015, Elementary Diagram 13.8KV Non-Class 1E Power System 13.8KV Unit Bus NAN-S01 & S02 Bus Potential Xfmr
- 0X-E-ZZI-0004, Electrical Protection Database
- 0X-J-RKS-0001, Unit One/Two/Three Annunciator I/O Electronic Isolation List

JPM BASIS INFORMATION

TASK:	1220010401 Perform a control channel NI calibration						
TASK STANDARD:	Control Channel #1 has been calibrated to within ±2% of JSCALOR, the Feedwater Control System and Reactor Regulating System are using average Control Channel indication, and CEDMCS has been returned to Auto-Sequential						
K/A:	3.7 015 A4.02	K/A RATING:	RO:	3.9	SRO:	3.9	
10 CFR 55:	41.7 / 45.5 to 45.8						
APPLICABLE POSITION(S):	RO	VALIDATION TIME:	20 minutes				
REFERENCES:	40OP-9NI01, Control Channel NI Calibration						
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR	X	PLANT		OTHER		

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***Yes***

APPROVAL

Developed By: Adam Rasmussen Date: 10/09/2013

Revised By: N/A Date: ______________

Technical Review ________________________ Operations Approval ____________________________

Training Approval ________________________

EVALUATION

Examinee Name: ____ Date: _____________

Evaluator Name: ____

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # _____________
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.*

1. **SIMULATOR SETUP:**
   - IC#: 145 **-OR-**
   - IC#: 20

   - SCENARIOS, MALFUNCTIONS, OVERRIDES,etc. for Setup:

COMMAND/COMMUNICATION	DESCRIPTION
N/A	

   - SPECIAL INSTRUCTIONS:
     1. **IF** IC 145 is used, reset to **IC 145 THEN** proceed to **Step 4**
     2. **IF** IC 20 is used, reset to **IC 20**, GO TO **RUN**
     3. Adjust the **Control Gain** potentiometer on **Control Channel #1** in the Nuclear Instrumentation Start-Up and Control Drawer to **~3% LOWER** than **JSCALOR**
     4. GO TO **FREEZE**
     5. Provide **INITIATING CUE**
     6. GO TO **RUN**
   - REQUIRED CONDITIONS:
     1. Reactor Power Control Channel #1 reading ~3% LOWER than JSCALOR
   - SIMULATOR EVALUATION PRE-CHECK
     - ❑ Correct IC
     - ❑ Alarm Silence Off
     - ❑ Procedures available, page checked, and clean
     - ❑ For JPMs administered during transients, another instructor available to control plant parameters.

Verified by: ______________________ Date: ____________________

(NA if Simulator setup not required)

2. **SPECIAL TOOLS/EQUIPMENT:**
   - 40OP-9NI01, Control Channel NI Calibration, Revision 12 available

NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM

3. **JPM PERFORMANCE:**
   - MALFUNCTIONS, OVERRIDES, etc. **during** JPM

STEP	COMMAND/COMMUNICATION	DESCRIPTION
N/A		No driver action required

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE** any equipment.
- o Inform the control room staff of any discovered deficiencies.
- o Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- o You may use any source of information normally available.

INITIAL CONDITIONS:

- **Unit 1 is operating at 100% power**
- **Reactor Power Control Channel #1 is reading lower than JSCALOR**
- **The CRS has evaluated the impact of taking CEDMCS out of Auto-Sequential against the current Risk Management Action Level**

INITIATING CUE:

- **The CRS directs you to calibrate Reactor Power Control Channel #1 in accordance with 40OP-9NI01, Control Channel NI Calibration, Section 6.1 (Prerequisites and Initial Conditions are complete)**

INFORMATION FOR EVALUATOR'S USE:

- o An asterisk (*)denotes a Critical Step
- o At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- o Any step marked UNSAT requires comments.
- o If this is the first JPM of the set then ensure the examinee has been briefed.
- o Step sequence is not critical unless noted or will prevent achieving the task standard.
- o Notify the unit Shift Manager of in-plant JPM performance.
- o Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- o Locked valves may be involved. No attempt will be made to actually operate any valves.

JPM START TIME:

	STEP	CUE	STANDARD
1.	Step 6.1.1 Initial Condition: Section 5.0, Prerequisites and Initial Conditions are complete.	**Evaluator NOTE:** Prerequisites and Initial Conditions are completed per **INITIATING CUE.**	Examinee initials this step as being completed.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	Step 6.1.2 Ensure Control Element Drive Mechanism (CEDMCS) is in any mode other than AUTO	**If Requested CUE:** If examinee requests what mode to place CEDMCS, ask for recommendation. Concur with recommendation.	Examinee rotates CEDMCS Mode Select switch to any position that is **NOT AUTO SEQUENTIAL (AS).**

SAT / UNSAT

Comments (required for UNSAT):

NOTE
Performance of the following step will result in the actuation of alarm window 6A06A, FWCS PROCESS TRBL.

<table>
<tr><th></th><th>STEP</th><th>CUE</th><th>STANDARD</th></tr>
<tr><td>3. *</td><td>Step 6.1.3

Place Reactor Power Control Channel #1 in maintenance on the Feedwater Control System (FWCS) by performing the following:

• Select “XMTR_SEL_1” display function key on the left hand side of either FWCS display.
• Locate the Reactor Power module on the FWCS 1 Redundant Transmitter Logic Screen.
• Verify the Reactor Power Control Channel #2 (NI0002) value displayed represents the normal value for the current power.
• Select the white “1 MAINT” key in the upper right corner of the Reactor Power Module.
• Observe BOTH of the following:
  • The “1 MAINT” key changes from white to red.
  • The blue STAR is alongside Reactor Power Control Channel #2 (NI0002) indicating it is the selected input for reactor power.
• Verify the expected alarm for Reactor Power Control Channel #1 in maintenance is in alarm on the Process Alarm Manager Screen.</td><td></td><td>Examinee performs the following:

* Selects XMTR_SEL_1 display on FWCS display;

Verifies Reactor Power Control Channel #2 is reading the current reactor power;

Evaluator NOTE: JSCALOR can be read on CMC or PC at front of Control Room.

* Selects the white 1 MAINT key in the upper right corner of the Reactor Power Module;

Observes the 1 MAINT key changes to red and a blue STAR is alongside Reactor Power Control Channel #2;

Verifies the expected alarm for Control Channel #1 in maintenance on the Process Alarm Manager Screen.

(Only steps with an * are CRITICAL)</td></tr>
<tr><td colspan="4">SAT / UNSAT

Comments (required for UNSAT):</td></tr>
</table>

NOTE:
The DVM voltage going to zero when the “TEST PROBE” push-button is depressed indicates that all the other push-button inputs are disconnected.

	STEP	CUE	STANDARD

4. *
 	
See Note in Standard
	Step 6.1.4
	
	Place Reactor Power Control Channel #1 in maintenance on the Reactor Regulating System (RRS) by performing the following:
	• Locate the RRS Test Panel within SFN-C03R, NSSS Control Systems Cabinet behind RMN-B05.
	• Ensure the "TEST PROBE" push-button is depressed.
	• Verify the Test Panel Digital Voltage Meter (DVM) indicates zero volts.
	• Press the ϕN2 DVM push-button for Reactor Power Control Channel #2.
	• Check that the DVM value displayed represents the normal Control Channel value for the current power using the DVM Voltage vs Reactor Power TABLE
	• **IF** evaluation of the DVM display is complete, **THEN** press the "TEST PROBE" push-button to disconnect the DVM from the input.
	• **IF** the DVM value displayed is outside of the expected range for the current power, **THEN** perform **BOTH** of the following:
	    • Notify the SM/CRS.
	    • **WHEN** SM/CRS directs, THEN continue performing this section.
	• Position the ϕN Input Selector Switch to ϕN2 for Reactor Power Control Channel #2.
		IF Requested CUE:
		
		If examinee determines that DVM value displayed for Control Channel #2 is outside the expected range for the current power (not expected):
		
		Report "The Shift Manager directs you to continue performing this section."
		
		Evaluator NOTE:
		
		DVM value ±0.5 Volts is acceptable.
		
		RRS Test Panel is labeled 1JSFNC03R.
			Examinee performs the following:
			
			Ensures **TEST PROBE** push-button is depressed and verifies DVM panel indicates **0 Volts;**
			
			Presses the **ϕN2** DVM push-button and verifies DVM panel indicates **~8 Volts;**
			
			Presses the **TEST PROBE** push-button and verifies DVM panel indicates **0 Volts;**
			
			***** Positions the **ϕN Input Selector** Switch to **ϕN2** position.
			
			Evaluator NOTE:
			
			This step is only critical if procedure step 6.1.2 (JPM step 2) was NOT performed (i.e. CEDMCS Mode select switch is in AUTO).
			
			(Only steps with an ***** are **CRITICAL**)

SAT / UNSAT

Comments (required for UNSAT):

Evaluator NOTE:

DVM Voltage vs Reactor Power TABLE:

Reactor Power (%)	**0**	**25**	**50**	**75**	**100**
DVM Voltage (VDC)	**0**	**2**	**4**	**6**	**8**

	STEP	CUE	STANDARD
5.	Step 6.1.5 <u>Ensure</u> the Control Calibrate switch on Control Channel #1 in the Nuclear Instrumentation Start-Up and Control Drawer is in the "OPERATE" position.	**Evaluator NOTE:** The switches for Steps 6.1.5-6.1.7 are located at panel labeled: **NSSS RADIATION MONITORING CABINET 1J-SQN-C02**.	Examinee <u>ensures</u> the Control Calibrate switch on Control Channel #1 is in the **OPERATE** position (upper channel in cabinet).
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
6.	Step 6.1.6 <u>Ensure</u> the Output Select switch on Control Channel #1 in the Nuclear Instrumentation Start-Up and Control Drawer is in the "CAL SUM" position.		Examinee <u>ensures</u> the Output Select switch on Control Channel #1 is in the **CAL SUM** position.
SAT / UNSAT **Comments (required for UNSAT):**			

NOTE:
Unit 1 only: A screwdriver may be needed due to potentiometer design.
EVALUATOR NOTE: A screwdriver **IS NOT** needed for this procedure. The potentiometer installed in the simulator does **NOT** require one.

	STEP	CUE	STANDARD
7. *	Step 6.1.7 Adjust the Control Gain potentiometer on Control Channel #1 in the Nuclear Instrumentation Start-Up and Control Drawer as follows: • **IF** calorimetric power is equal to or greater than 30%, **THEN** adjust the Control Power meter indication using the Control Gain potentiometer to within 2% of calorimetric power.	**Evaluator NOTE:** Student may request radio communications with operator in Control Room. This may be simulated by evaluator. Evaluator will have to monitor analog meter at control cabinet and simulate reporting the corresponding digital meter reading from the Control Room. This will prevent examinee from excessive transit in and out of Control Room.	Examinee rotates Control Gain potentiometer on Control Channel #**1 to match Control Power** meter indication to calorimetric power. (within **2%** of **JSCALOR**) **Evaluator NOTE:** JSCALOR may be read at CMC or PC at front of Control Room.
SAT / UNSAT **Comments (required for UNSAT):**			

NOTE:
The DVM voltage going to zero when the "TEST PROBE" push-button is depressed indicates that all the other push-button inputs are disconnected.

	STEP	CUE	STANDARD

8. *	Step 6.1.8
	
	<u>Remove</u> Reactor Power Control Channel #1 from maintenance on the RRS by performing the following:
	• <u>Locate</u> the RRS Test Panel within SFN-C03R, NSSS Control Systems Cabinet behind RMN-B05.
	• <u>Ensure</u> the "TEST PROBE" push-button is depressed.
	• <u>Verify</u> the Test Panel Digital Voltage Meter (DVM) indicates zero volts.
	• <u>Press</u> the ϕN1 DVM push-button for Reactor Power Control Channel #1.
	• <u>Check</u> that the DVM value displayed represents the normal Control Channel value for the current power using the DVM Voltage vs Reactor Power TABLE
	• **IF** evaluation of the DVM display is complete, **THEN** <u>press</u> the "TEST PROBE" push-button to disconnect the DVM from the input.
	• **IF** the DVM value displayed is outside of the expected range for the current power, **THEN** <u>perform</u> **BOTH** of the following:
	  ◦ <u>Notify</u> the SM/CRS.
	  ◦ **WHEN** SM/CRS directs, **THEN** continue performing this section.
	• <u>Position</u> the ϕN Input Selector Switch to AVG for Reactor Power Control Channel Average.
		IF Requested CUE:
		
		If examinee determines that DVM value displayed for Control Channel #1 is outside the expected range for the current power (not expected):
		
		Report "The Shift Manager directs you to continue performing this section."
		
		Evaluator NOTE:
		
		DVM value ±0.5 Volts is acceptable.
		
		RRS Test Panel is labeled 1JSFNC03R.
		
		NOTE:
		
		Selecting AVERAGE while the **ϕN DEVIATION LED** is lit will generate an Auto Motion Inhibit (AMI).
			Examinee performs the following:
			
			<u>Ensures</u> **TEST PROBE** push-button is depressed and verifies DVM panel indicates **0 Volts;**
			
			<u>Presses</u> the **ϕN1** DVM push-button and verifies DVM panel indicates **~8 Volts;**
			
			<u>Presses</u> the **TEST PROBE** push-button and verifies DVM panel indicates **0 Volts;**
			
			* <u>Positions</u> the **ϕN Input Selector** Switch to **AVERAGE** position.
			
			(Only steps with an * are **CRITICAL**)

SAT / UNSAT

Comments (required for UNSAT):

Evaluator NOTE:

DVM Voltage vs Reactor Power TABLE:

Reactor Power (%)	**0**	**25**	**50**	**75**	**100**
DVM Voltage (VDC)	**0**	**2**	**4**	**6**	**8**

	STEP	CUE	STANDARD

9. *	Step 6.1.9
	
	<u>Remove</u> Reactor Power Control Channel #1 in maintenance on the Feedwater Control System (FWCS) by performing the following:
	
	• <u>Select</u> "XMTR_SEL_1" display function key on the left hand side of either FWCS display.
	• <u>Locate</u> the Reactor Power module on the FWCS 1 Redundant Transmitter Logic Screen.
	• <u>Verify</u> the Reactor Power Control Channel #1 value displayed represents the normal value for the current power.
	• <u>Select</u> "1 MAINT" key in the upper right corner of the Reactor Power Module.
	• <u>Observe</u> "1 MAINT" key changes from red to white.
	• <u>Select</u> the white SEL AVG key for Reactor Power Control Average
	• <u>Observe</u> BOTH of the following:
	    • White SEL AVG changes from white to green
	    • The blue STAR alongside Reactor Power Control Channel AVG is the selected input for reactor power
	• <u>Verify</u> the expected alarm for Reactor Power Control Channel #1 in maintenance is clear on the Process Alarm Manager Screen.
			Examinee performs the following:
			
			* <u>Selects</u> **XMTR_SEL_1** display on FWCS display;
			
			<u>Verifies</u> Reactor Power Control Channel #1 is reading the current reactor power;
			
			* <u>Selects</u> the white **1 MAINT** key in the upper right corner of the Reactor Power Module;
			
			<u>Observes</u> the **1 MAINT** key changes to **white**;
			
			*<u>Selects</u> **SEL AVG** key for Reactor Power Control Average;
			
			<u>Observes</u> SEL AVG changes from white to **green**, and a **blue STAR** is alongside Reactor Power Control Channel **AVG;**
			
			<u>Verifies</u> the expected alarm for Control Channel #1 in maintenance is clear on the Process Alarm Manager Screen.
			
			(Only steps with an * are **CRITICAL**)

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
10. *	Step 6.1.10 <u>Place</u> CEDMCS in the mode of operation as directed by the SM/CRS	**When Requested CUE:** "The CRS directs you to place CEDMCS in Auto-Sequential." **Information CUE** Once CEDMCS is in Auto-Sequential: "This completes the JPM."	Examinee rotates CEDMCS Mode Select switch to **AUTO SEQUENTIAL (AS).**
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME: [ ]

NOTE:
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- Unit 1 is operating at 100% power
- Reactor Power Control Channel #1 is reading lower than JSCALOR
- The CRS has evaluated the impact of taking CEDMCS out of Auto-Sequential against the current Risk Management Action Level

INITIATING CUE:

- The CRS directs you to calibrate Reactor Power Control Channel #1 in accordance with 40OP-9NI01, Control Channel NI Calibration, Section 6.1 (Prerequisites and Initial Conditions are complete)

APPLICANT

APPLICANT

INITIAL CONDITIONS:

- Unit 1 is operating at 100% power
- Reactor Power Control Channel #1 is reading lower than JSCALOR
- The CRS has evaluated the impact of taking CEDMCS out of Auto-Sequential against the current Risk Management Action Level

INITIATING CUE:

- The CRS directs you to calibrate Reactor Power Control Channel #1 in accordance with 40OP-9NI01, Control Channel NI Calibration, Section 6.1 (Prerequisites and Initial Conditions are complete)

APPLICANT

6.0 INSTRUCTIONS

6.1 Control Channel #1 Adjustment

JL 6.1.1 Initial Condition:Section 5.0, Prerequisites and Initial Conditions is complete.

___ 6.1.2 Ensure Control Element Drive Mechanism Control System (CEDMCS) is in any mode other than AUTO.

NOTE

___ Performance of the following step will result in the actuation of alarm window 6A06A, FWCS PROCESS TRBL.

___ 6.1.3 Place Reactor Power Control Channel #1 in maintenance on the Feedwater Control System (FWCS) by performing the following:

___ 6.1.3.1 Select "XMTR_SEL_1" display function key on the left hand side of either FWCS display.

___ 6.1.3.2 Locate the Reactor Power module on the FWCS 1 Redundant Transmitter Logic Screen.

___ 6.1.3.3 Verify the Reactor Power Control Channel #2 (NI0002) value displayed represents the normal value for the current power.

___ 6.1.3.4 Select the white "1 MAINT" key in the upper right corner of the Reactor Power Module.

___ 6.1.3.5 Observe BOTH of the following:

- ___ The "1 MAINT" key changes from white to red.
- ___ The blue STAR is alongside Reactor Power Control Channel #2 (NI0002) indicating it is the selected input for reactor power.

___ 6.1.3.6 Verify the expected alarm for Reactor Power Control Channel #1 in maintenance is in alarm on the Process Alarm Manager Screen.

___ 6.1.4 Place Reactor Power Control Channel #1 in maintenance on the Reactor Regulating System (RRS) by performing the following:

NOTE

___ The DVM voltage going to zero when the "TEST PROBE" push-button is depressed indicates that all the other push-button inputs are disconnected.

___ 6.1.4.1 Locate the RRS Test Panel within SFN-C03R, NSSS Control Systems Cabinet behind RMN-B05.

___ 6.1.4.2 Ensure the "TEST PROBE" push-button is depressed.

___ 6.1.4.3 Verify the Test Panel Digital Voltage Meter (DVM) indicates zero volts.

___ 6.1.4.4 Press the ΦN2 DVM push-button for Reactor Power Control Channel #2.

___ 6.1.4.5 Check that the DVM value displayed represents the normal Control Channel value for the current power using the Table below:

DVM Voltage vs Reactor Power

Reactor Power (%)	0	25	50	75	100
DVM Voltage (VDC)	0	2	4	6	8
Values are approximate and differ from unit to unit					

___ 6.1.4.6 **IF** evaluation of the DVM display is complete,
THEN press the "TEST PROBE" push-button to disconnect the DVM from the input.

___ 6.1.4.7 **IF** the DVM value displayed is outside of the expected range for the current power,
THEN perform BOTH of the following:

___ a. Notify the SM/CRS.

___ b. **WHEN** SM/CRS directs,
THEN continue performing this section.

___ 6.1.4.8 Position the ΦN Input Selector Switch to ΦN2 for Reactor Power Control Channel #2.

___ 6.1.5 Ensure the Control Calibrate switch on Control Channel #1 in the Nuclear Instrumentation Start-Up and Control Drawer is in the “OPERATE” position.

___ 6.1.6 Ensure the Output Select switch on Control Channel #1 in the Nuclear Instrumentation Start-Up and Control Drawer is in the “CAL SUM” position.

NOTE

___ Unit 1 only: A screwdriver may be needed due to potentiometer design.

___ 6.1.7 Adjust the Control Gain potentiometer on Control Channel #1 in the Nuclear Instrumentation Start-Up and Control Drawer as follows:

___ 6.1.7.1 **IF** calorimetric power is less than 30%,
THEN adjust the Control Power meter indication using the Control Gain potentiometer to within (-)0.5 to (+)2% of calorimetric power.

___ 6.1.7.2 **IF** calorimetric power is equal to or greater than 30%,
THEN adjust the Control Power meter indication using the Control Gain potentiometer to within 2% of calorimetric power.

___ 6.1.8 Remove Reactor Power Control Channel #1 from maintenance on the RRS by performing the following:

NOTE

___ The DVM voltage going to zero when the “TEST PROBE” push-button is depressed indicates that all the other push-button inputs are disconnected.

___ 6.1.8.1 Locate the RRS Test Panel within SFN-C03R, NSSS Control Systems Cabinet behind RMN-B05.

___ 6.1.8.2 Ensure the “TEST PROBE” push-button is depressed.

___ 6.1.8.3 Verify the DVM indicates zero volts.

___ 6.1.8.4 Press the ΦN1 DVM push-button for Reactor Power Control Channel #1.

___ 6.1.8.5 Check that the DVM value displayed represents the normal Control Channel value for the current power using the Table below:

DVM Voltage vs Reactor Power

Reactor Power (%)	0	25	50	75	100
DVM Voltage (VDC)	0	2	4	6	8
Values are approximate and differ from unit to unit					

___ 6.1.8.6 **IF** evaluation of the DVM display is complete,
THEN press the “TEST PROBE” push-button to disconnect the DVM from the input.

___ 6.1.8.7 **IF** the DVM value displayed is outside of the expected range for the current power,
THEN perform BOTH of the following:

___ a. Notify the results to the SM/CRS.

___ b. **WHEN** SM/CRS directs,
THEN continue performing this section.

NOTE

___ Selecting AVERAGE while the ΦN DEVIATION LED is lit will generate an Auto Motion Inhibit (AMI).

___ 6.1.8.8 Position the ΦN Input Selector Switch to AVG for Reactor Power Control Channel Average.

___ 6.1.9 Remove Reactor Power Control Channel #1 from maintenance on the FWCS by performing the following:

___ 6.1.9.1 Select “XMTR_SEL_1” display function key on the left hand side of either FWCS display.

___ 6.1.9.2 Locate the Reactor Power module on the FWCS 1 Redundant Transmitter Logic Screen.

___ 6.1.9.3 Verify the Control Channel #1 value displayed represents the normal value for the current power.

___ 6.1.9.4 Select "1 MAINT" in the upper right corner of the Reactor Power Module.

___ 6.1.9.5 Observe the "1 MAINT" key changes from red to white.

___ 6.1.9.6 Select the white SEL AVG key for Reactor Power Control Average.

___ 6.1.9.7 Observe BOTH of the following:

- ___ The white SEL AVG changes from white to green.
- ___ The blue STAR alongside Reactor Power Control Channel AVG indicating the average of the control channel inputs is the selected input for reactor power.

___ 6.1.9.8 Verify the expected alarm for Reactor Power Control Channel #1 in maintenance is clear on the Process Alarm Manager Screen.

___ 6.1.10 Place CEDMCS in the mode of operation as directed by the SM/CRS.

___ 6.1.11 **IF** CEDMCS has been restored to Auto-Sequential,
THEN ensure the Risk Management Action (RMAL) is evaluated by the SM/CRS. ⓘ

End of Section 6.1

JPM BASIS INFORMATION

TASK:	1250010301 Respond to a condition requiring emergency boration instructions and contingencies.						
TASK STANDARD:	Emergency boration of ≥75 gpm has been established using HPSI pump(s)						
K/A:	4.2 024 AK3.02	K/A RATING:	RO:	4.2	SRO:	4.4	
10 CFR 55:	41.5 / 41.10 / 45.6 / 45.13						
APPLICABLE POSITION(S):	RO	VALIDATION TIME:	23 minutes				
REFERENCES:	40AO-9ZZ01, Emergency Boration						
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR	X	PLANT		OTHER		

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***Yes***
PRA/SRA related? *(Yes/No)* ***Yes***

APPROVAL

Developed By: Tom Stahler Date: 04/15/03

Revised By: Adam Rasmussen Date: 10/11/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ______________________________ Date: ____________

Evaluator Name: ______________________________

Time to complete: __________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. SIMULATOR SETUP:

- IC#: 147 **-OR-**
- IC#: 4
- SCENARIOS, MALFUNCTIONS, OVERRIDES,etc. for Setup:

COMMAND/COMMUNICATION	DESCRIPTION
crB3CV06CHBP01_2 f:RACK_OUT	Rack out CCP B
crB3CV06CHEP01_2 f:RACK_OUT	Rack out CCP E
rfCV66A f:OPEN	**Opens air supply to CHE-HV532**
cmDPCV06CHAP01_6 e:"CH532"	CCP A trip **(Set to trigger on opening CHE-HV-532)**
crB2SI01SIBP02_4 f:RESET k:7	Resets 86 lockout on B HPSI Pump

- SPECIAL INSTRUCTIONS:
  1. **IF** IC 147 is used, reset to **IC 147 THEN** proceed to **Step 3**
  2. **IF** IC 4 is used, reset to **IC 4**, GO TO **RUN**
  3. Close CHE-HV-532 using **CHN-HS-532**
  4. Place handswitches for Charging Pumps E and B in Pull-To-Lock
  5. Run scenario file **2013 NRC S-7.scn** from exam flash drive
  6. Silence alarms, GO TO **FREEZE**
  7. Provide **INITIATING CUE**
  8. GO TO **RUN**
- REQUIRED CONDITIONS:
  1. Unit is in Mode 5
  2. Caution tags hanging for CS and LPSI mini-flow valves
  3. Caution tags hanging on Charging Pumps B and E
  4. CHE-HV-532 is **CLOSED**
- SIMULATOR EVALUATION PRE-CHECK
  - ❑ Correct IC
  - ❑ Alarm Silence Off
  - ❑ Procedures available, page checked, and clean
  - ❑ For JPMs administered during transients, another instructor available to control plant parameters.

Verified by: ______________________ Date: ____________________

(NA if Simulator setup not required)

2. SPECIAL TOOLS/EQUIPMENT:

- 40AO-9ZZ01, Emergency Boration, Revision 21 available

NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.

3. JPM PERFORMANCE:

- MALFUNCTIONS, OVERRIDES, etc. **during** JPM

STEP	COMMAND/COMMUNICATION	DESCRIPTION
7	**IF** Directed to reset 86 lockout on HPSI B Pump, INSERT **KEY 7**	Resets 86 lockout on HPSI B which is tripped for current plant conditions.

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE** any equipment.
- o Inform the control room staff of any discovered deficiencies.
- o Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- o You may use any source of information normally available.

INITIAL CONDITIONS:

- **The unit is in Mode 5 with ‘B’ LPSI on Shutdown Cooling**
- **The CRS has entered 40AO-9ZZ01, Emergency Boration due to inadequate shutdown margin**
- **Charging Pumps B and E are under permit and not available**
- **PC Cleanup is NOT recirculating the RWT**

INITIATING CUE:

- **The CRS directs you to line up and emergency borate the RCS in accordance with 40AO-9ZZ01, Section 3.0**

INFORMATION FOR EVALUATOR'S USE:

- o An asterisk (*)denotes a Critical Step
- o At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- o Any step marked UNSAT requires comments.
- o If this is the first JPM of the set then ensure the examinee has been briefed.
- o Step sequence is not critical unless noted or will prevent achieving the task standard.
- o Notify the unit Shift Manager of in-plant JPM performance.
- o Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- o Locked valves may be involved. No attempt will be made to actually operate any valves.

JPM START TIME:

	STEP	CUE	STANDARD
1.	Section 3.0 Step 1 Enter AOP Entry Time and Date		Examinee records current time and date.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
2.	Step 2 Check that **BOTH** of the following are available for Emergency Boration: • The RWT • At least one Charging Pump	**Evaluator NOTE:** Steps 3 and 4 are not applicable and examinee will mark "N/A"	Examinee determines that the RWT and Charging Pump A are both available.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
3.	Step 5 **IF** Charging Pump suction will be aligned thru CHE-HV-536, Gravity Feed to Charging Pumps Suction, **THEN** perform the following: a. Ensure that CHE-HV-532, RWT to Boric Acid Makeup Pumps, is open…	**Information CUE:** After the examinee reports that Charging Pump A has tripped: "The CRS has assigned another operator to investigate the charging pump trip. The CRS directs you to re-evaluate and establish Emergency Boration to the RCS." **If Requested CUE** If examinee directs Area Operator to investigate the charging pump trip report "Charging Pump A has an 86 lockout relay tripped."	Examinee rotates CHN-HS-532 to the OPEN position. **Evaluator NOTE:** Charging Pump A will trip when CHE-HV-532 is open. **ALTERNATE PATH**

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
4.	Step 2 (Examinee must return here) Re-evaluate Step 2. With no charging pumps available, must take Contingency Actions: 2.2 **IF** a HPSI Pump is available, **THEN** GO TO Section 4.0, HPSI PUMP.	**Information CUE:** **AFTER** examinee determines Section 4.0 is needed, give examinee 40AO-9ZZ01, Section 4.0 and report "The CRS directs using **B HPSI Pump**."	Examinee returns to Step 2 in Section 3.0 and determines that since a charging pump is not available, Section 4.0 must be entered.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
5.	Section 4.0 Step 1 Enter AOP Entry Time and Date		Examinee enters AOP Entry Time and Date.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
6.	Step 2 REFER TO Appendix F, Simplified Drawings for a basic flow view	**If Requested CUE:** If examinee requests Appendix F, give examinee Appendix F (provided).	Examine MAY refer to Appendix F.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
7.	Steps 3-5 Check the following: • HPSI Pump breaker is racked in • HPSI Pump lockout relay is reset • HPSI Pump UC fuses are "ON"	**If Requested CUES:** If examinee directs Area Operator to report status of HPSI B Pump breaker report: "HPSI B Pump breaker is **racked in**, the 86 lockout relay is **tripped,** the UC fuses are **ON**." If examinee directs Area Operator to reset HPSI B Pump 86 lockout, DIRECT Driver to insert **KEY 7** **AFTER** 86 lockout is reset (may be performed from Control Room by taking SIB-HS-2 to the CLOSE position), Area Operator Reports "the 86 lockout relay is **reset**." **Evaluator NOTE:** Step 6 is not applicable since HPSI B pump will be used	Examinee determines that HPSI B Pump breaker is racked in and the 86 lockout is tripped by one of the following: • White SEIS light • Brighter than normal green light indication on HS • Directing AO to report local indication **CONTINGENCY STEP 4.1:** Examinee directs AO to reset HPSI B Pump Breaker 86 lockout locally, **OR** Examinee resets 86 lockout from Control Room by rotating **SIB-HS-2** to the **CLOSE** position. Examinee determines that UC fuses are **ON** by one of the following: • Normal green light indication on HS • Directing AO to report local indication

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
8.	Step 7 **IF** HPSI Pump B will be used for emergency boration, **THEN** <u>perform</u> the following: <u>Ensure</u> all of the following valves are closed: • SIB-UV-668, LPSI Pump B Miniflow Recirc. • SIB-UV-665, CS Pump B Miniflow Recirc. • SIB-HV-609, HPSI Pump B Long Term Recirc Isolation. • Train 'B' HPSI Cold Leg Injection Valves: SIB-HS-616, SIB-HS-626, SIB-HS-636, and SIB-HS-646		Examinee rotates SIB-UV-665 to the CLOSE position and observes the GREEN indication illuminate and RED indication extinguish. Remaining valves are verified CLOSED
	<u>Ensure</u> ALL of the following valves are open: • CHB-HV-530, RWT to Train B Safety Injection. • SIB-UV-667, HPSI Pump B Miniflow recirc. • SIB-UV-659, Train B Pumps Combined Recirc.		Examinee verifies these valves are OPEN

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
9. *	Step 8 Start the appropriate HPSI Pump	**If Requested CUE:** If examinee directs Area Operator to verify personnel are standing clear, report "All personnel are standing clear of HPSI B pump and associated switchgear."	Examinee rotates SIB-HS-2, HPSI Pump B HS to the START position. Examinee verifies system response using any or all of the following (not all inclusive): • Green light at handswitch extinguished • Red light at handswitch illuminated • HPSI discharge pressure rising • Local verification

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
10. *	Step 9 Throttle open one of the HPSI Cold Leg Injection Valves as appropriate to obtain 75 gpm or more.	**Information CUE:** **WHEN flow ≥75gpm has been established** "Another Reactor Operator will complete the remaining actions."	Examinee throttles one of the HPSI Cold Leg Injection Valves by rotating one of the following handswitches to the **OPEN** position until **75 gpm or greater** flow indication is established: • **SIB-HS-616** • **SIB-HS-626** • **SIB-HS-636** • **SIB-HS-646** **Evaluator NOTE:** Approximately 50% valve position will give a flowrate of 75-100 gpm.

SAT / UNSAT

Comments (required for UNSAT):

JPM STOP TIME: ______

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- **The unit is in Mode 5 with 'B' LPSI on Shutdown Cooling**
- **The CRS has entered 40AO-9ZZ01, Emergency Boration due to inadequate shutdown margin**
- **Charging Pumps B and E are under permit and not available**
- **PC Cleanup is NOT recirculating the RWT**

INITIATING CUE:

- **The CRS directs you to line up and emergency borate the RCS in accordance with 40AO-9ZZ01, Section 3.0**

APPLICANT

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 1. Enter AOP Entry Time and Date: ________________	

---------- **NOTE** ----------

Appendix F, Simplified Drawings provides basic flow views for all flowpaths.

INSTRUCTIONS	CONTINGENCY ACTIONS
___2. Check that **BOTH** of the following are available for Emergency Boration: • The RWT • At least one Charging Pump	____2.1 **IF** the RWT is **NOT** available for emergency boration, **THEN** GO TO Appendix A, Aligning / Restoring SFP to Charging Pump Suction. ____2.2 **IF** a HPSI Pump is available, **THEN** GO TO Section 4.0, HPSI PUMP. ____2.3 **IF** a HPSI Pump is **NOT** available, **AND** RCS pressure is less than 220 psia, **THEN** GO TO Section 5.0, LPSI PUMP.
___3. **IF** RWT level is less than 73%, **OR** it is desired to use the Charging Pump Alternate Suction, **THEN** GO TO Appendix B, Aligning / Restoring Charging Pump Alternate Suction.	

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS
___4. **IF** a PC Cleanup Pump is recirculating the RWT, **THEN** check RWT level greater than 83%.	____4.1 **IF** RWT level is less than 83%, **THEN** GO TO Step 6.

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

___5. **IF** Charging Pump suction will be aligned thru CHE-HV-536, Gravity Feed to Charging Pumps Suction, **THEN** perform the following:

a. Ensure that CHE-HV-532, RWT to Boric Acid Makeup Pumps, is open.

b. Place CHN-HS-527, VCT Bypass to “CLOSE”.

c. Ensure CHN-FIC-210X, Reactor Makeup Water to VCT Flow Control, is in manual with 0% output.

d. Ensure the BAMPs are off.

e. Place CHN-HS-210, Makeup Mode Select Switch in “MANUAL”.

f. **IF** a PC Cleanup Pump is recirculating the RWT, **THEN** perform the following:

1) Ensure no more than two Charging Pumps are running.

2) Ensure the third Charging Pump handswitch is in PTL.

g. Open CHE-HV-536.

h. Close CHN-UV-501, Volume Control Tank Outlet.

i. GO TO Step 8.

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

___6. **IF** Charging Pump suction will be aligned through CHN-UV-514, Boric Acid Makeup to Charging Pumps,
AND a BAMP is available,
THEN perform the following:

a. Ensure that CHE-HV-532, RWT to Boric Acid Makeup Pumps, is open.

b. Place CHN-HS-527, VCT Bypass to “CLOSE”.

c. Ensure CHN-FIC-210X, Reactor Makeup Water to VCT Flow Control, is in manual with 0% output.

d. Ensure CHE-HV-536 is closed.

e. Open CHN-UV-514.

f. Close CHN-UV-510, BAMP Recirc to RWT.

g. Start a BAMP.

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

___7. **IF** Charging Pump suction will be aligned thru CHN-UV-514, Boric Acid Makeup to Charging Pumps, **AND** a BAMP is **NOT** available, **THEN** perform the following:

a. Ensure that CHE-HV-532, RWT to Boric Acid Makeup Pumps, is open.

b. Place CHN-HS-527, VCT Bypass to “CLOSE”.

c. Ensure CHN-FIC-210X, Reactor Makeup Water to VCT Flow Control, is in manual with 0% output.

d. Ensure CHE-HV-536, Gravity Feed to Charging Pumps Suction, is closed.

e. Ensure no more than two Charging Pumps are running.

f. Ensure the third Charging Pump handswitch is in PTL.

g. Direct an operator to open CHN-V164, Boric Acid Filter Bypass.
(120 ft. Filter Gallery Room)

(continue)

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS
___7. (continued)	
h. **IF** Fuel Pool Cleanup Pump A is being used for RWT transfer or cleanup, **THEN** direct an operator to perform the following:	
1) Stop "FUEL POOL CLEANUP PUMP A". (Local Control Panel PCN-E02, 120' Fuel Bldg)	
2) Close PCN-V043, "CLEANUP PMP A DISCH ISO". (100' FB Fuel Pool Clng, Cleanup Pumps & HX Room)	
(continue)	

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

___7. (continued)

i. **IF** Fuel Pool Cleanup Pump B is being used for RWT transfer or cleanup, **THEN** direct an operator to perform the following

1) Stop "FUEL POOL CLEANUP PUMP B". (Local Control Panel PCN-E02, 120' Fuel Bldg)

2) Close PCN-V059, "CLEANUP PMP B DISCH ISO" (100' FB Fuel Pool Clng, Cleanup Pumps & HX

j. Close CHN-UV-510, BAMP Recirc to RWT.

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

___7. (continued)

k. Direct an operator to open CHN-V144, SFP to BAMP Isolation Valve. (BAMP Room)

l. Direct an operator to open CHN-V753, BAMP Discharge to PC System Isolation Valve. (BAMP Room)

m. Open CHN-UV-514.

n. Place and hold CHN-HS-501, VCT Outlet to “CLOSE”.

o. Direct an operator to open NHN-M7208, CHN-UV-501. (120 ft. Aux Bldg Corridor)

p. **WHEN** NHN-M7208 is open, **THEN** release CHN-HS-501.

q. GO TO Step 8.

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

___8. **IF** the normal Charging Pump discharge path needs to be aligned,
THEN perform the following:

a. Ensure **BOTH** of the following valves are open:

- CHA-HV-524, Charging Pumps Discharge to Regen HX
- CHE-HV-239, Charging Line to RC Loop 2A Isolation

b. Ensure handswitch CHN-HS-240, Charging Line to RC Loop 2A Control Valve, is in the "OPEN MOD" position.

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

-- **NOTE** --

Seal injection and auxiliary spray are not available if charging discharge is aligned to the HPSI header.

___9. **IF** the normal charging path is **NOT** available,
THEN PERFORM **ONE** of the following to align the alternate charging discharge path:

- Appendix C, Charging Thru HPSI Cold Leg Injection via SIE-V508
- Appendix D, Charging Thru HPSI Hot Leg Injection via SIE-V509

___10. **IF one** Charging Pump is running,
THEN GO TO Step 15.

___11. **IF two** Charging Pumps are running,
THEN GO TO Step 17.

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS
___ 12. **IF ANY** of the following conditions exist: • RCS temperature is greater than 150°F • RCS pressure is greater than 150 psia **THEN** close **ONE** of the following: • Seal Injection Controllers • CHN-UV-231P, Seal Injection Heat Exchanger Inlet Valve • CHB-HV-255, RCP Seal Injection Header Supply Valve	
___ 13. Start one Charging Pump.	
___ 14. **IF** the normal charging discharge header is being used, **THEN** restore seal injection.	

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS
___ 15. **IF** It is desired to start the second Charging Pump **THEN** perform the following:	
a. **IF** Charging Pump suction is aligned through CHE-HV-536, Gravity Feed to Charging Pumps Suction, **AND** a PC Cleanup Pump is recirculating the RWT, **THEN** check RWT level greater than 92%.	a.1 **IF** RWT level is less than 92%, **THEN** direct an operator to perform the following to stop PC Cleanup of the RWT: 1) Stop the Fuel Pool Cleanup Pump that is recirculating the RWT. 2) Close the associated Discharge Isolation Valve: • PCN-V043, PCN-P02A Discharge Isolation Valve • PCN-V059, PCN-P02B Discharge Isolation Valve
b. **IF** Letdown is in service, **THEN** perform the following: 1) Check the setpoint on CHN-PIC-201, Letdown Backpressure Control is 220 psig or less. 2) Start the second Charging Pump.	b.1 **IF** Letdown Backpressure setpoint is greater than 220 psig, **THEN** PERFORM 40OP-9CH01, CVCS Normal Operations, Section 4.4, Switching Operating Order of Charging Pumps / Change the Number of Running Charging Pumps.
c. **IF** Letdown is **not** in service, **THEN** start the second Charging Pump.	

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS
___16. **IF** Charging Pump suction is aligned thru CHN-UV-514 with a BAMP running, **AND** It is desired to start the third Charging Pump, **THEN** perform the following:	
a. **IF** Letdown is in service, **THEN** perform the following: 1) Check the setpoint on CHN-PIC-201, Letdown Backpressure Control is 220 psig or less. 2) Start the third Charging Pump.	a.1 **IF** Letdown Backpressure setpoint is greater than 220 psig, **THEN** PERFORM 40OP-9CH01, CVCS Normal Operations, Section 4.4, Switching Operating Order of Charging Pumps / Change the Number of Running Charging Pumps.
b. **IF** Letdown is **not** in service, **THEN** start the third Charging Pump.	
___17. Direct Chemistry to sample the RCS for boron every 30 minutes.	
___18. **IF** a dilution path is suspected to exist, **THEN** PERFORM Appendix E, Checking Potential Dilution Paths.	

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS
___ 19. PERFORM **ANY** of the following to determine the Shutdown Margin: • 72ST-9RX14, Shutdown Margin - Modes 3, 4, and 5 • 40ST-9ZZM3, Operations Mode 3 Surveillance Logs • 40ST-9ZZM4, Operations Mode 4 Surveillance Logs • 40ST-9ZZM5, Operations Mode 5 Surveillance Logs • 74ST-9ZZ01, Refueling Boron Surveillance Test	
___ 20. **IF** adequate Shutdown Margin exists, **THEN** PERFORM 40OP-9CH01, CVCS Normal Operations, Section 4.4, Switching Operating Order of Charging Pumps / Change the Number of Running Charging Pumps, to place the charging pump(s) in the desired configuration.	

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

___21. **IF** adequate Shutdown Margin does **NOT** exist, **THEN** perform the following:

a. **IF** letdown is in service, **THEN** continue emergency boration.

b. **IF** letdown is **NOT** in service, **THEN** perform the following:

1) Trip the Reactor.

2) GO TO 40EP-9EO01, Standard Post Trip Actions.

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

___22. **IF** a PC Cleanup Pump is taking a suction from the RWT,
THEN direct an operator to perform the following:

a. **IF** Fuel Pool Cleanup Pump A is being used for RWT transfer or cleanup,
THEN perform the following:

1) Stop “FUEL POOL CLEANUP PUMP A”.
(Local Control Panel PCN-E02, 120' Fuel Bldg)

2) Close PCN-V043, “CLEANUP PMP A DISCH ISO”.
(100' FB Fuel Pool Clng, Cleanup Pumps & HX Room)

(continue)

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS
___22. (continued) b. **IF** Fuel Pool Cleanup Pump B is being used for RWT transfer or cleanup, **THEN** perform the following 1) Stop "FUEL POOL CLEANUP PUMP B". (Local Control Panel PCN-E02, 120' Fuel Bldg) 2) Close PCN-V059, "CLEANUP PMP B DISCH ISO" (100' FB Fuel Pool Clng, Cleanup Pumps & HX	
___23. **IF** Charging Pump suction is aligned to the RWT through CHE-HV-536, Gravity Feed to Charging Pumps Suction, **AND** it is desired to restore charging pump suction to the VCT, **THEN** perform the following: a. Open CHN-UV-501. b. Close CHE-HV-536.	

3.0 EMERGENCY BORATION

INSTRUCTIONS | CONTINGENCY ACTIONS

___24. **IF** CHN-UV-514 is open
AND it is desired to restore charging pump suction to the VCT
AND BOTH of the following conditions exist:

- Charging is aligned from the RWT
- Charging is aligned through a BAMP

THEN perform the following:

a. **IF** CHN-UV-501 is downpowered,
THEN direct an operator to close breaker NHN-M7208.

b. Ensure CHN-UV-501 is open.

c. Close CHN-UV-514.

d. Stop **ANY** running BAMP(s).

e. Ensure CHN-V164 is closed.

f. Place CHN-HS-510 in the Open/Auto position.

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

___25. **IF** CHN-UV-514 is open
AND it is desired to restore charging pump suction to the VCT
AND BOTH of the following conditions exist:

- Charging is aligned from the RWT
- BAMPs are bypassed

THEN perform the following:

a. **IF** CHN-UV-501 is downpowered,
THEN direct an operator to close breaker NHN-M7208. (120 ft. Aux Bldg Corridor)

b. Ensure CHN-UV-501 is open.

c. Close CHN-UV-514.

d. Close the following valves:

- CHN-V164
(120 ft. Filter Gallery Room)
- CHN-V144
(BAMP Room)
- CHN-V753
(BAMP Room)

e. Place CHN-HS-510 in the Open/Auto position.

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS
___26. **IF** the SFP was aligned to the Charging Pump suction through CHE-HV-536, **AND** it is desired to restore charging pump suction to the VCT **THEN** PERFORM Appendix A, Aligning / Restoring SFP to Charging Pump Suction, Step 12.	
___27. **IF** the SFP was aligned to the Charging Pump suction through CHN-UV-514, **AND** it is desired to restore charging pump suction to the VCT **THEN** PERFORM Appendix A, Aligning / Restoring SFP to Charging Pump Suction, Step 13.	
___28. **IF** the Charging Pump alternate RWT suction thru CHB-V327 was aligned, **THEN** PERFORM Appendix B, Aligning / Restoring Charging Pump Alternate Suction, Step 9.	

3.0 EMERGENCY BORATION

INSTRUCTIONS	CONTINGENCY ACTIONS

___29. **IF** the normal charging discharge path will be restored,
THEN PERFORM **ONE** of the following:

- Appendix C, Charging Thru HPSI Cold Leg Injection via SIE-V508, Step 10.
- Appendix D, Charging Thru HPSI Hot Leg Injection via SIE-V509, Step 10.

___30. **IF** Entry into any EOP or the Lower Mode Functional Recovery procedure is required,
THEN PERFORM the appropriate recovery procedure.

___31. **IF ANY** of the following are met:

- Shutdown Margin has been recovered
- RCS boron concentration meets the requirements of the current plant conditions

THEN GO TO the appropriate procedure for current plant conditions.

End of Section 3.0

4.0 HPSI PUMP

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 1. Enter AOP Entry Time and Date: ________________	
___ 2. REFER TO Appendix F, Simplified Drawings for a basic flow view.	
___ 3. Check that the HPSI Pump breaker is racked in.	___ 3.1 Rack in the HPSI Pump breaker.
___ 4. Check that the HPSI Pump lockout relay is reset.	___ 4.1 Reset the appropriate lockout relay.
___ 5. Check that the HPSI Pump UC fuses are “ON”.	___ 5.1 Place the appropriate UC fuses to the “ON” position.

4.0 HPSI PUMP

INSTRUCTIONS	CONTINGENCY ACTIONS

___ 6. **IF** HPSI Pump A will be used for emergency boration, **THEN** perform the following:

a. Ensure **ALL** of the following valves are closed:

- SIA-UV-669, LPSI Pump A Miniflow Recirc
- SIA-UV-664, CS Pump A Miniflow Recirc
- SIA-HV-604, HPSI Pump A Long Term Recirc Isolation
- Train A HPSI Cold Leg Injection Valves, SIA-UV-617/ 627/ 637/ 647

b. Ensure **ALL** of the following valves are open:

- CHA-HV-531, RWT to Train A Safety Injection
- SIA-UV-666, HPSI Pump A miniflow recirc
- SIA-UV-660, Train A Pumps Combined Recirc

4.0 HPSI PUMP

INSTRUCTIONS	CONTINGENCY ACTIONS

___ 7. **IF** HPSI Pump B will be used for emergency boration,
THEN perform the following:

a. Ensure **ALL** of the following valves are closed:

- SIB-UV-668, LPSI Pump B Miniflow Recirc
- SIB-UV-665, CS Pump B Miniflow Recirc
- SIB-HV-609, HPSI Pump B Long Term Recirc Isolation
- Train B HPSI Cold Leg Injection Valves, SIB-UV-616/ 626/ 636/ 646

b. Ensure **ALL** of the following valves are open:

- CHB-HV-530, RWT to Train B Safety Injection
- SIB-UV-667, HPSI Pump B miniflow recirc
- SIB-UV-659, Train B Pumps Combined Recirc

___ 8. Start the appropriate HPSI Pump.

4.0 HPSI PUMP

INSTRUCTIONS		CONTINGENCY ACTIONS
___ 9.	Throttle open **one** of the HPSI Cold Leg Injection Valves as appropriate to obtain 75 gpm or more.	
___ 10.	**IF** RCS pressure is preventing adequate HPSI injection flow, **THEN** depressurize the RCS.	
___ 11.	Perform the following to maintain RCS level and pressure: a. Adjust the HPSI Cold Leg Injection valve. b. **IF** SDC is in operation, **THEN** adjust the Miniflow Recirc valve on the operating SDC Pump.	
___ 12.	**IF** the HPSI Pump will be running for one hour or more, **THEN** adjust the appropriate HPSI Cold Leg Injection valve to maintain 225 gpm or more flow thru the HPSI Pump.	
___ 13.	Direct Chemistry to sample the RCS for boron every 30 minutes.	

4.0 HPSI PUMP

INSTRUCTIONS	CONTINGENCY ACTIONS

___ 14. **IF** a dilution path is suspected to exist,
THEN PERFORM Appendix E, Checking Potential Dilution Paths

___ 15. PERFORM **ANY** of the following to determine the Shutdown Margin:

- 72ST-9RX14, Shutdown Margin - Modes 3, 4, and 5
- 40ST-9ZZM3, Operations Mode 3 Surveillance Logs
- 40ST-9ZZM4, Operations Mode 4 Surveillance Logs
- 40ST-9ZZM5, Operations Mode 5 Surveillance Logs
- 74ST-9ZZ01, Refueling Boron Surveillance Test

4.0 HPSI PUMP

INSTRUCTIONS | CONTINGENCY ACTIONS

___ 16. **WHEN** adequate Shutdown Margin exists,
THEN perform the following:

a. Stop the HPSI Pump.

b. Close the HPSI Cold Leg Injection valve.

c. Align **ALL** of the following miniflow and combined recirc valves as directed by the CRS:

Train A

- SIA-UV-669
- SIA-UV-664
- SIA-UV-666
- SIA-UV-660

Train B

- SIB-UV-668
- SIB-UV-665
- SIB-UV-667
- SIB-UV-659

___ 17. **IF** the exit conditions listed in Sections 2.0 are met,
THEN GO TO the appropriate procedure for current plant conditions.

End of Section 4.0

Appendix F, Simplified Drawings

INSTRUCTIONS | CONTINGENCY ACTIONS

___ 1. REFER TO **ANY** of the following for Charging Pump Suction flow paths:

- Attachment F-1, Charging Pump Suction thru CHE-HV-536 (Section 3.0)
- Attachment F-2, Charging Pump Suction thru CHN-V164 and CHN-UV-514 no BAMPs Available (Section 3.0)
- Attachment F-3, Charging Pump Suction thru CHN-UV-514 BAMPS Available (Section 3.0)
- Attachment F-4, Charging Pump Alternate RWT Suction thru CHB-V327 (Appendix B)
- Attachment F-5, SFP to Charging Pump Suction Through CHE-HV-536 (Appendix A)
- Attachment F-6, SFP thru CHN-V164 and CHN-UV-514 (Appendix A)

Appendix F, Simplified Drawings

INSTRUCTIONS	CONTINGENCY ACTIONS

___ 2. REFER TO **ANY** of the following for Charging Pump Discharge flow paths:

- Attachment F-7, Normal Discharge Path
- Attachment F-8, Charging Pump thru HPSI Cold Leg Injection via SIE-V508 (Appendix C)
- Attachment F-9, Charging Pump thru HPSI Hot Leg Injection via SIE-V509 (Appendix D)

Appendix F, Simplified Drawings

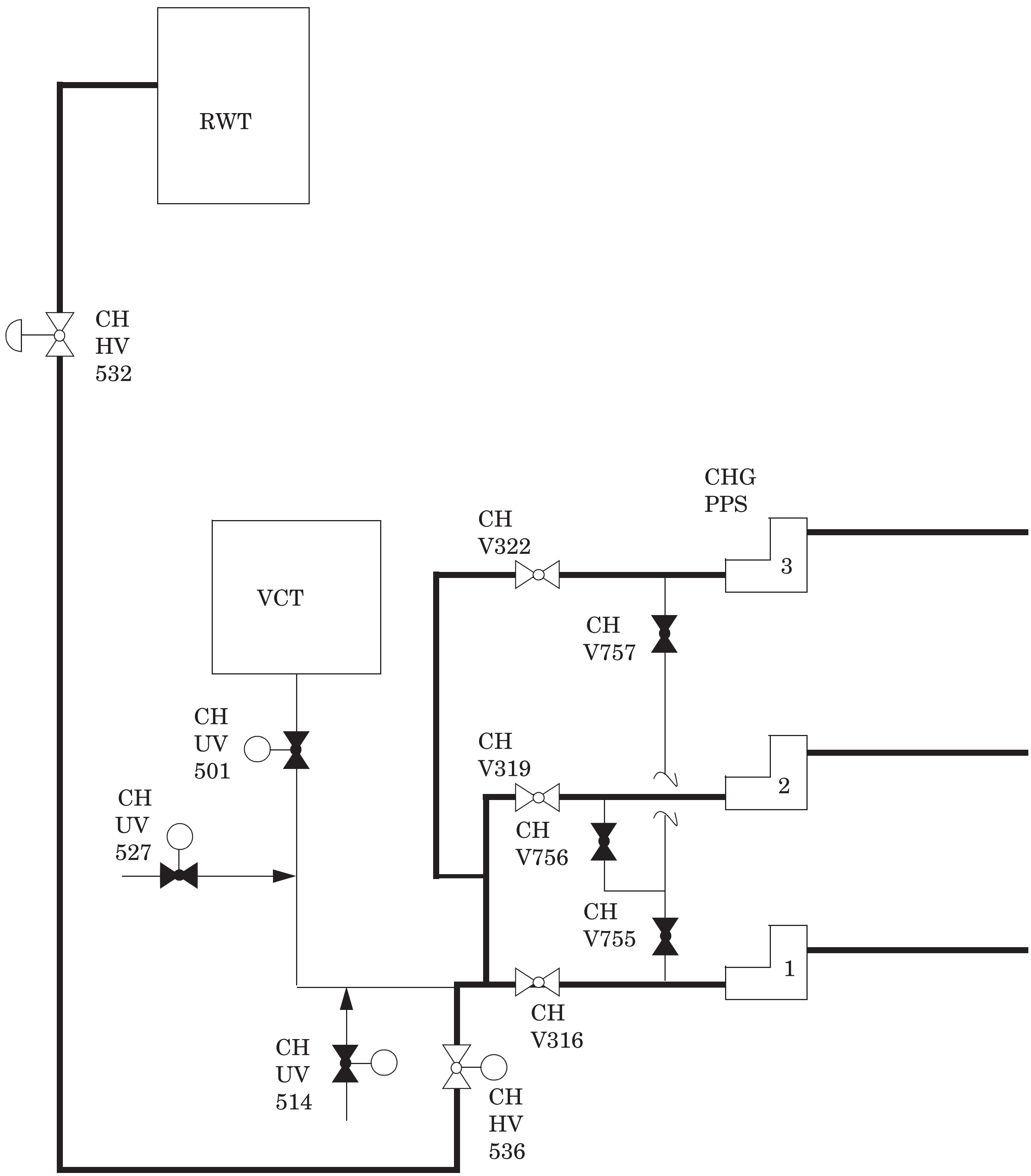
INSTRUCTIONS	CONTINGENCY ACTIONS

___ 3. REFER TO **ANY** of the following for SI Pump flow paths:

- Attachment F-10 HPSI Pump A (Section 4.0)
- Attachment F-11, HPSI Pump B (Section 4.0)
- Attachment F-12, LPSI Pump A with SDC Loop A in Service (Section 5.0)
- Attachment F-13, LPSI Pump A with SDC Loop B in Service (Section 5.0)
- Attachment F-14, LPSI Pump B with SDC Loop B in Service (Section 5.0)
- Attachment F-15, LPSI Pump B with SDC Loop A in Service (Section 5.0)

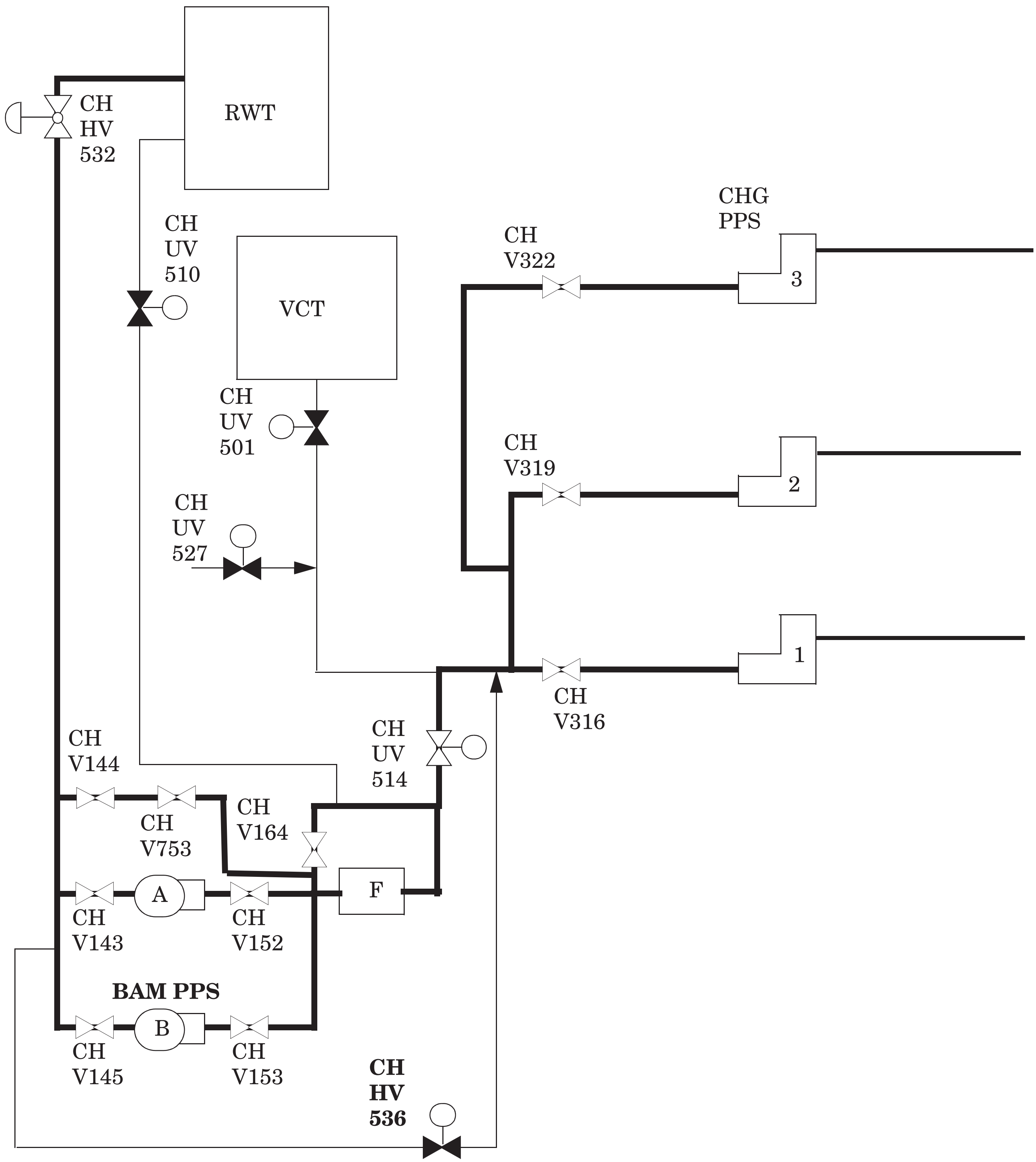
End of Appendix

Attachment F-1, Charging Pump Suction thru CHE-HV-536 Page 1 of 1

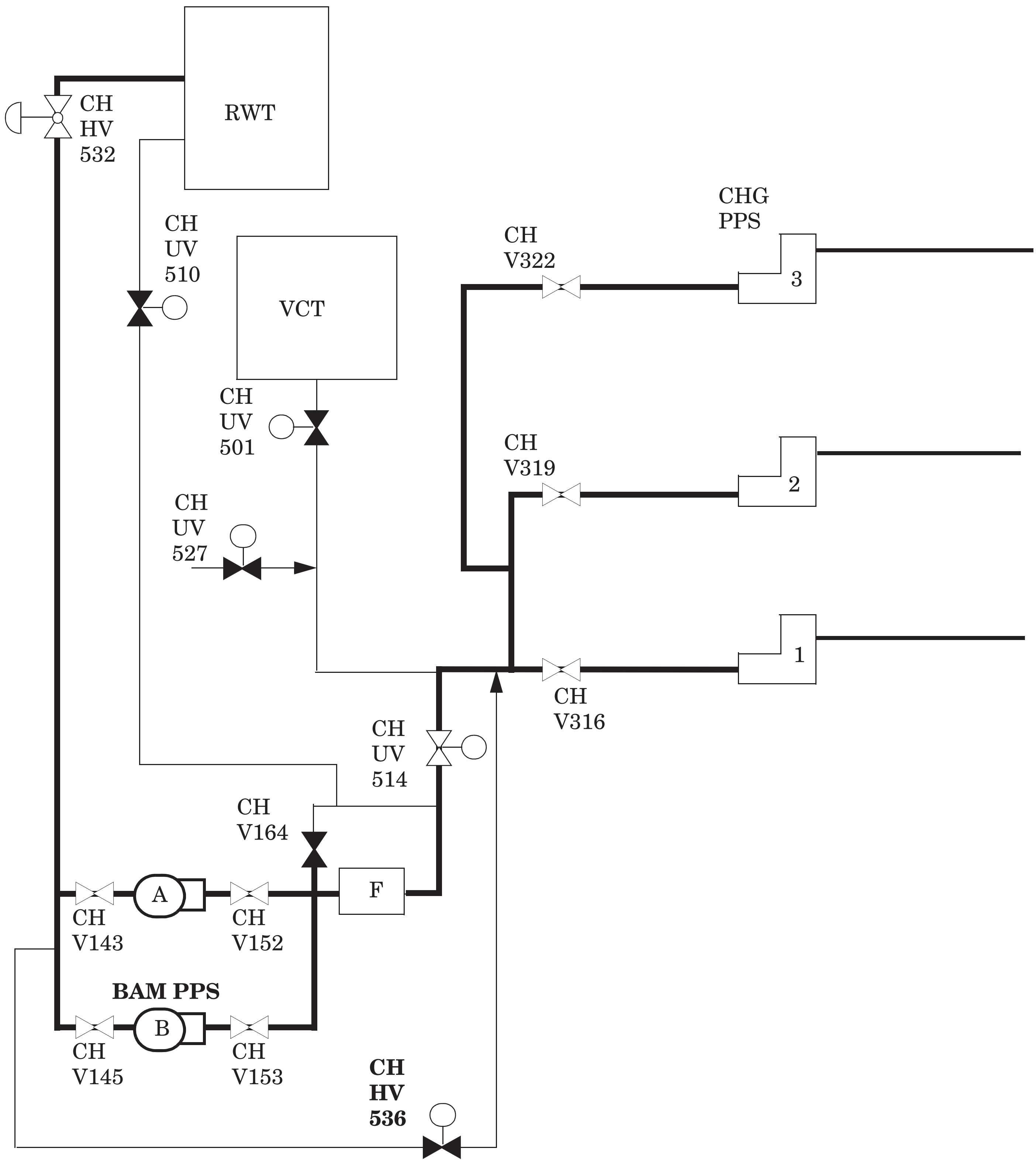


Attachment F-2: Charging Pump Suction thru CHN-V164 and CHN-UV-514 no BAMPs Available

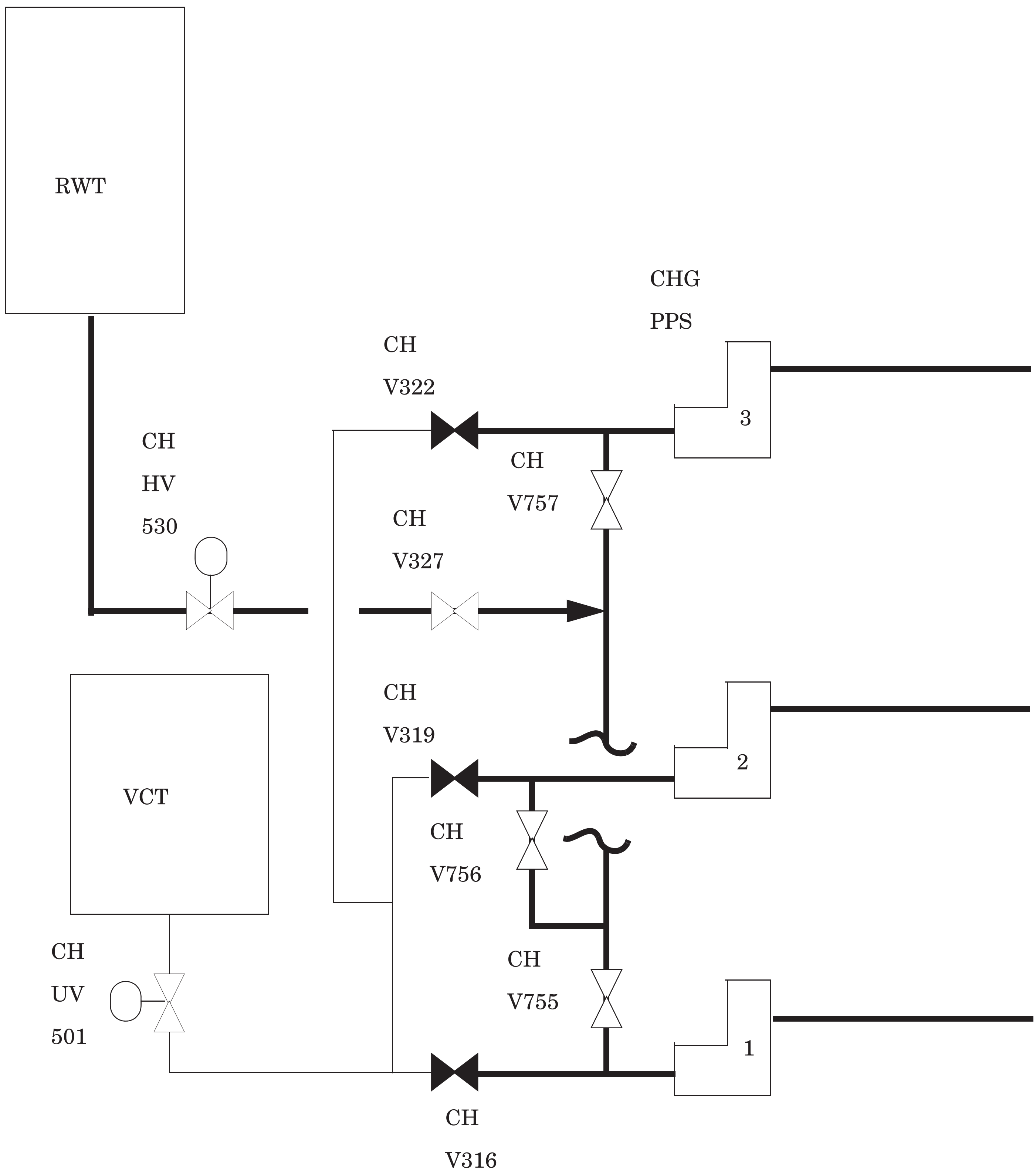
Page 1 of 1



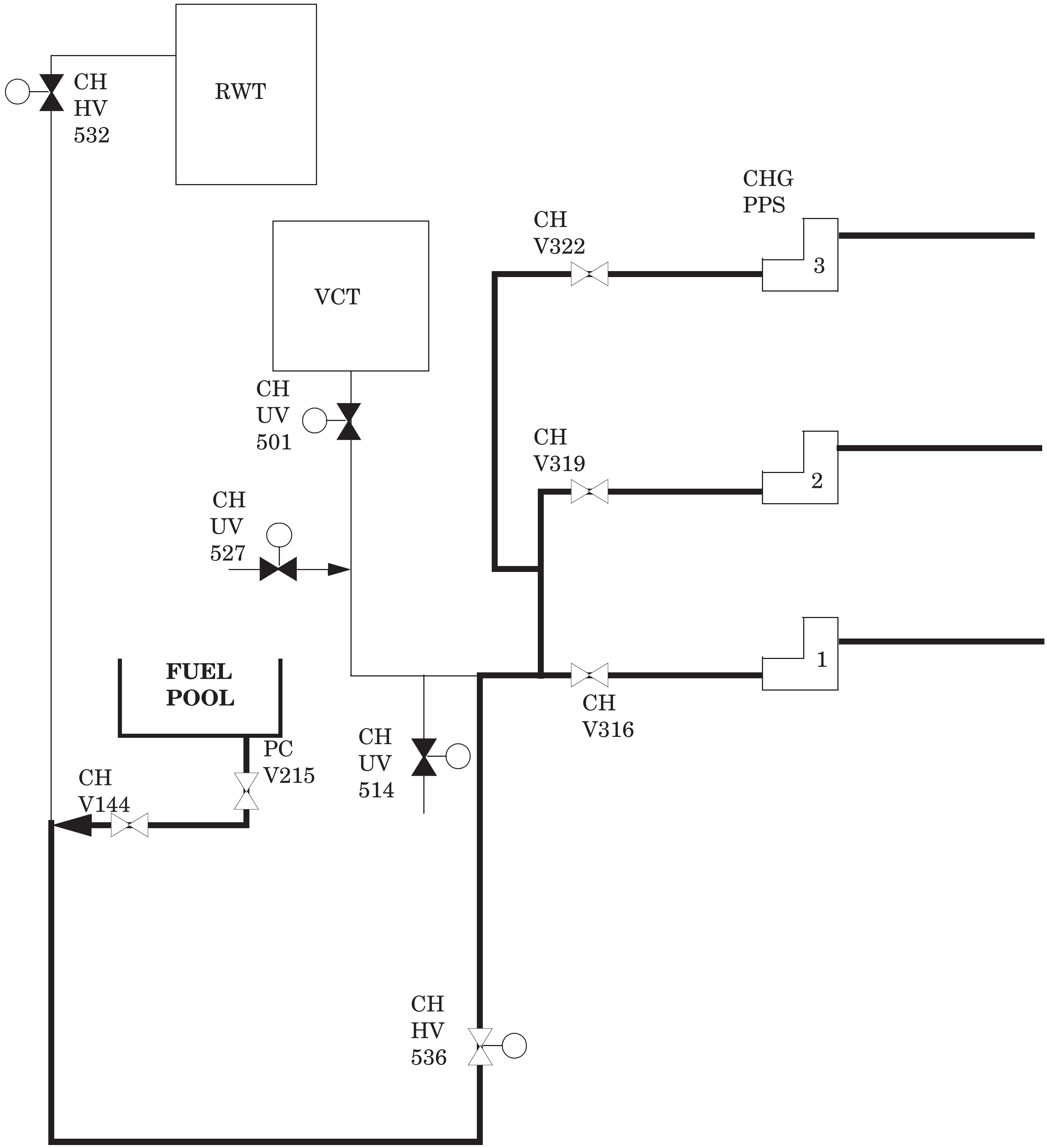
Attachment F-3: Charging Pump Suction thru CHN-UV-514 BAMPs Available



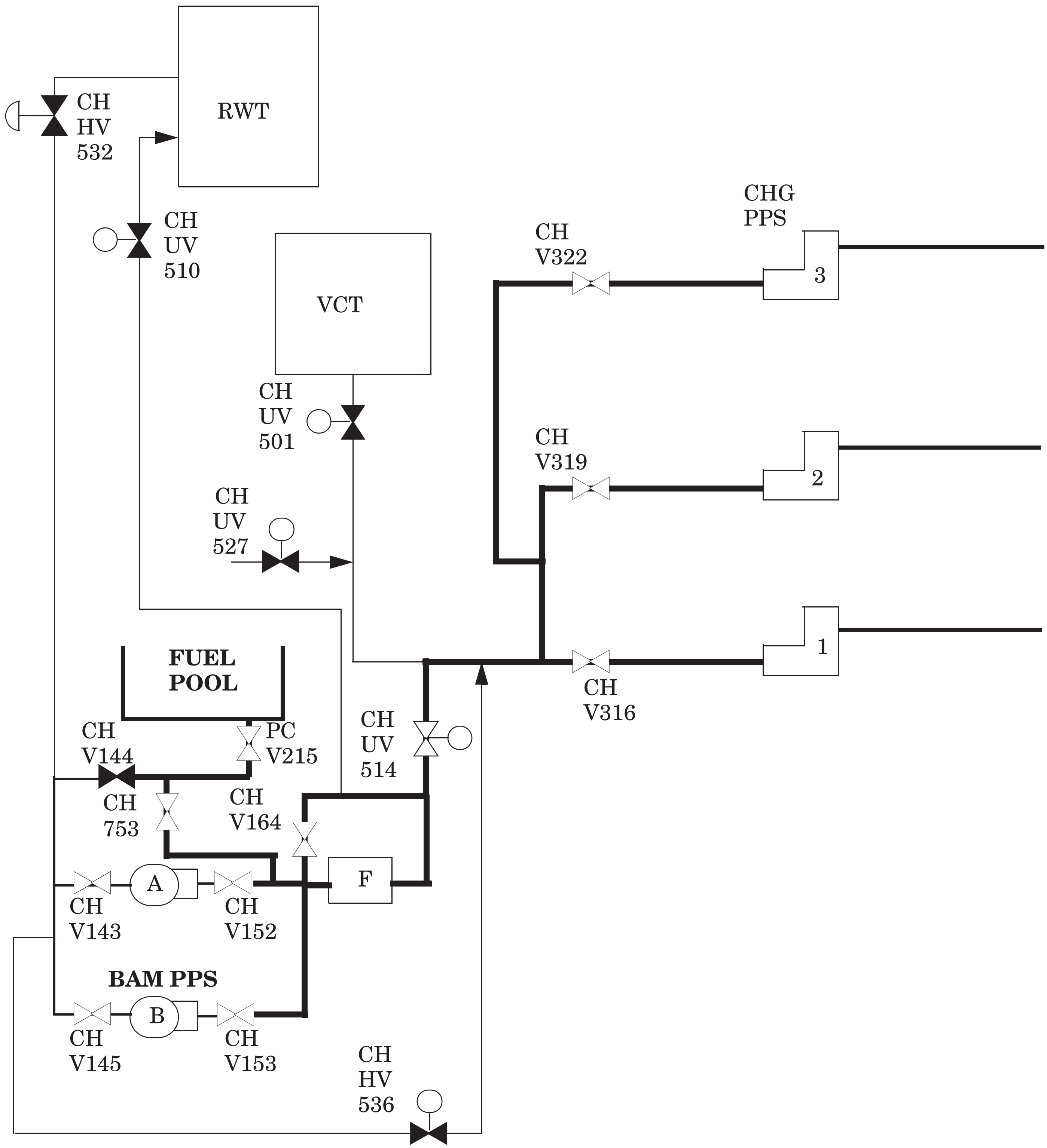
Attachment F-4: Charging Pump Alternate RWT Suction Thru CHB-V327 **Page 1 of 1**



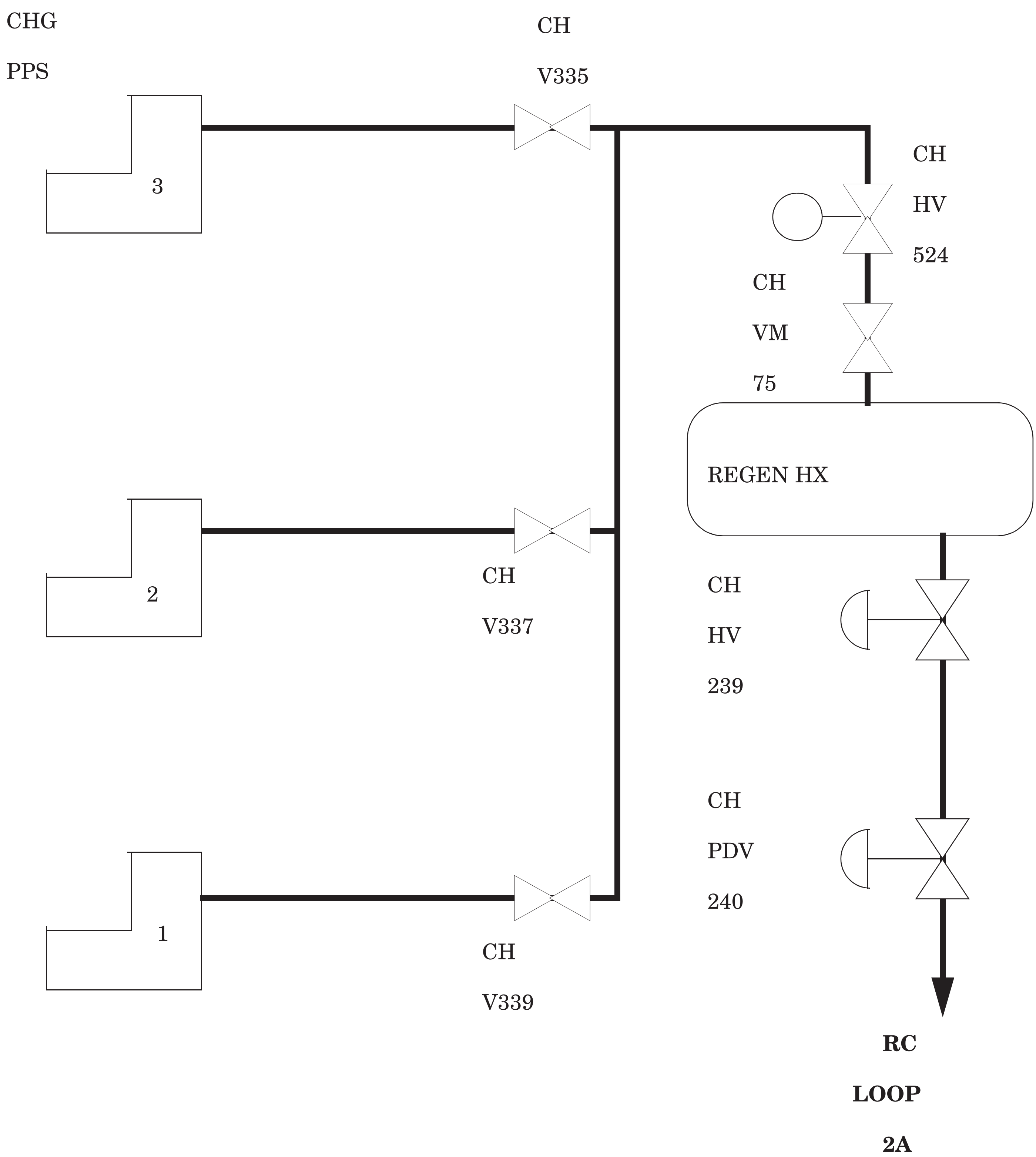
Attachment F-5: SFP to Charging Pump Suction Through CHE-HV-536



Attachment F-6: SFP thru CHN-V164 and CHN-UV-514 Page 1 of 1

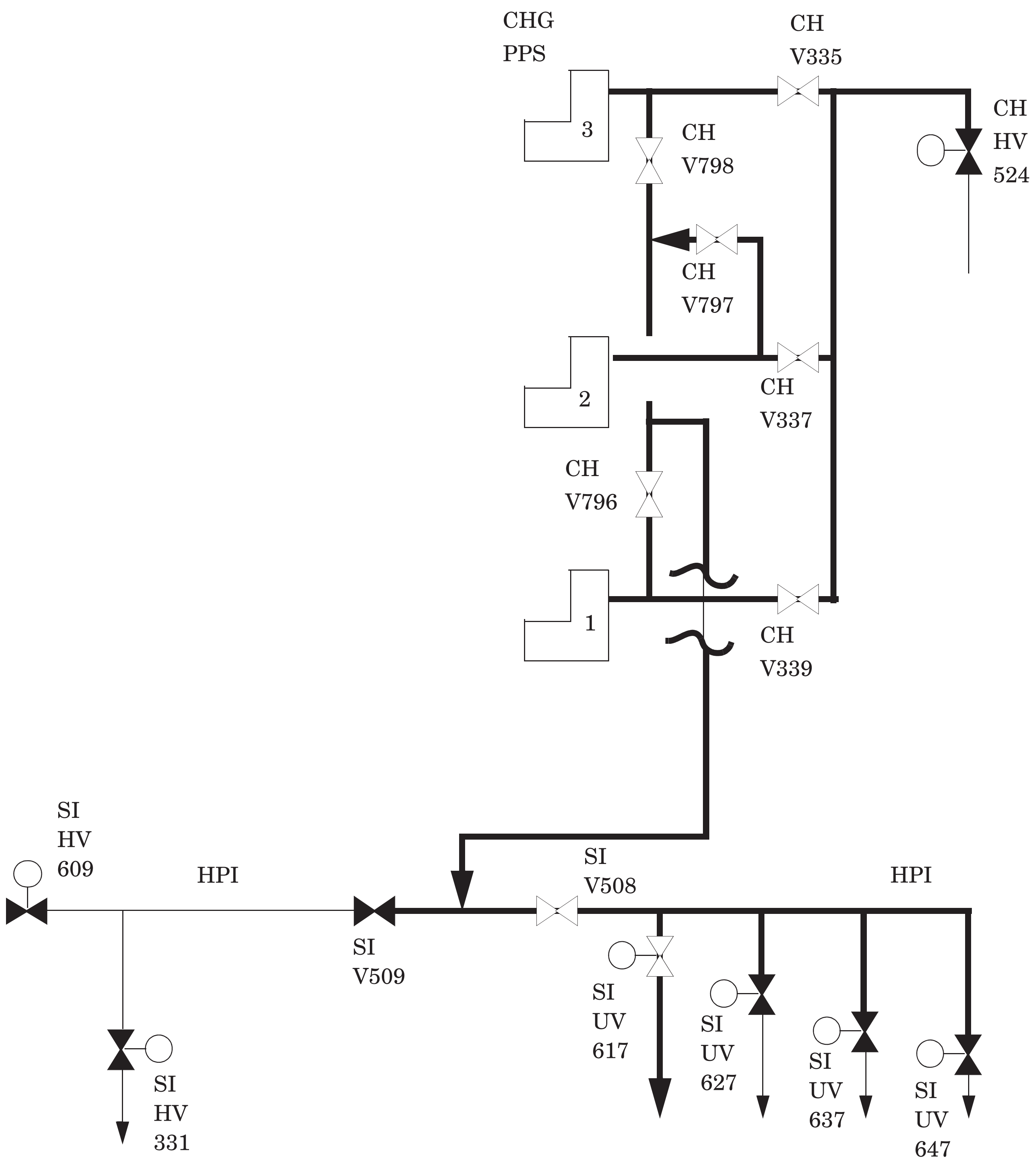


Attachment F-7: Normal Discharge Path

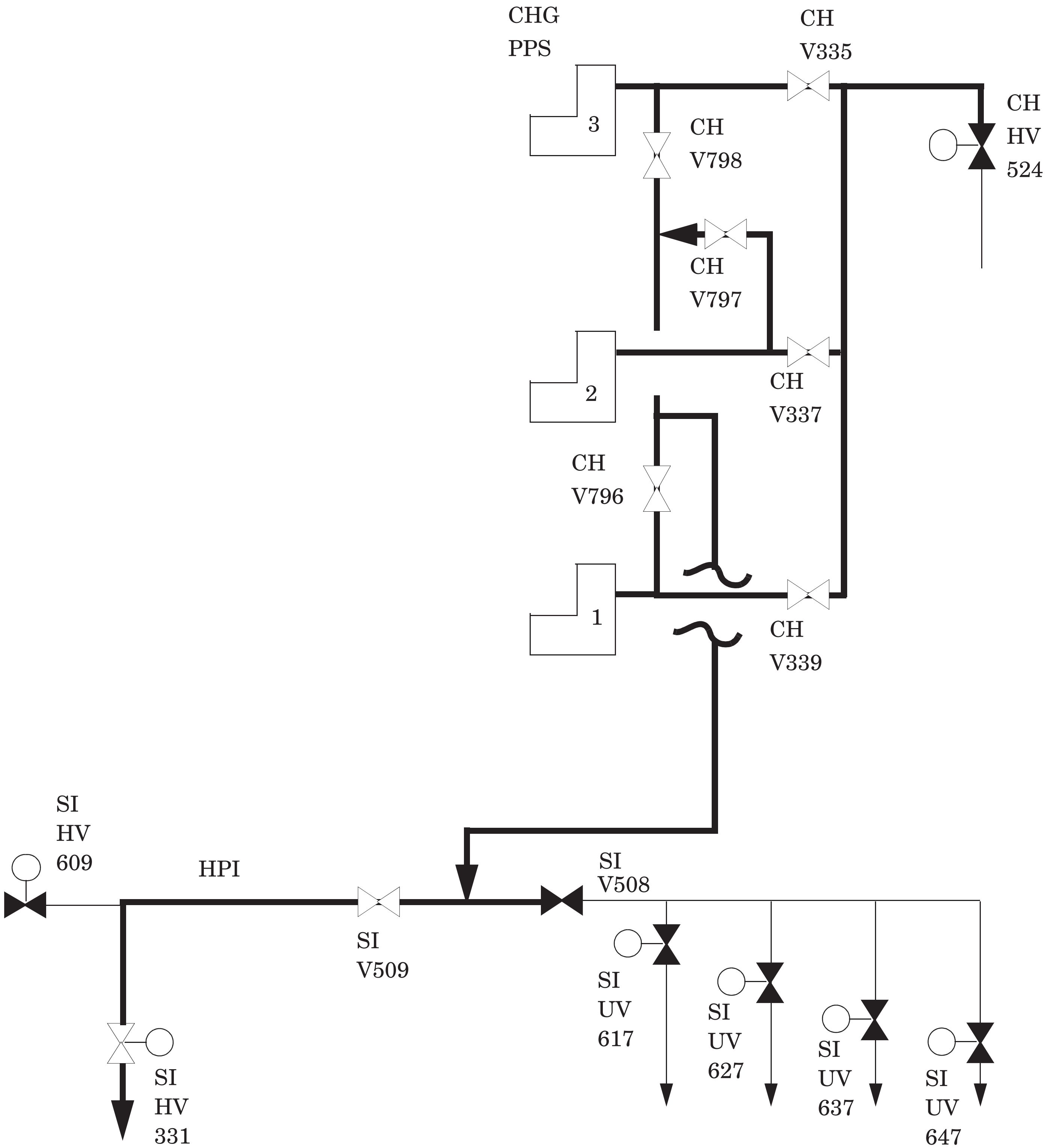


Attachment F-8: Charging Pump thru HPSI Cold Leg Injection via SIE-V508

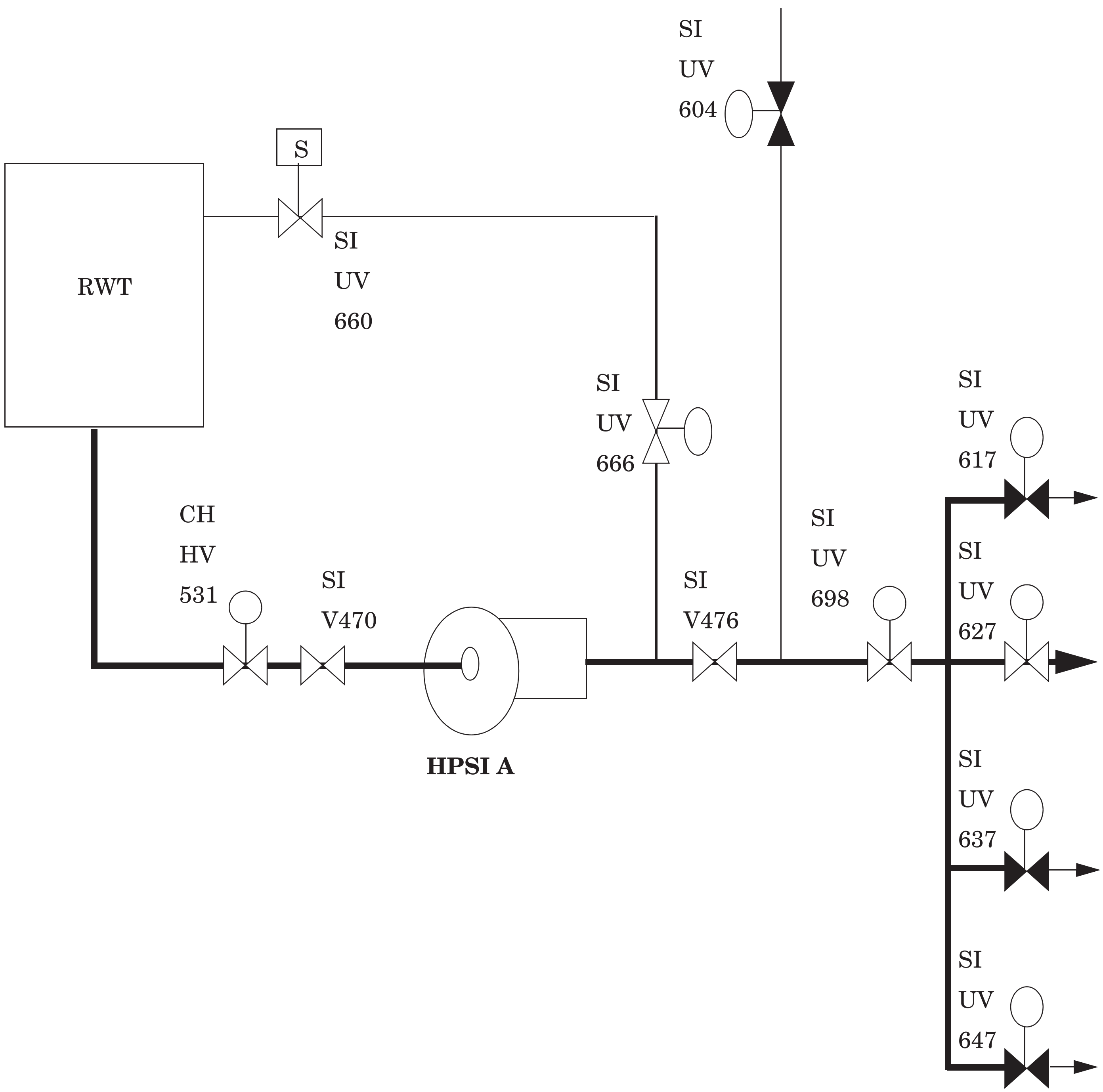
Page 1 of 1



Attachment F-9: Charging Pump thru HPSI Hot Leg Injection via SIE-V509 **Page 1 of 1**

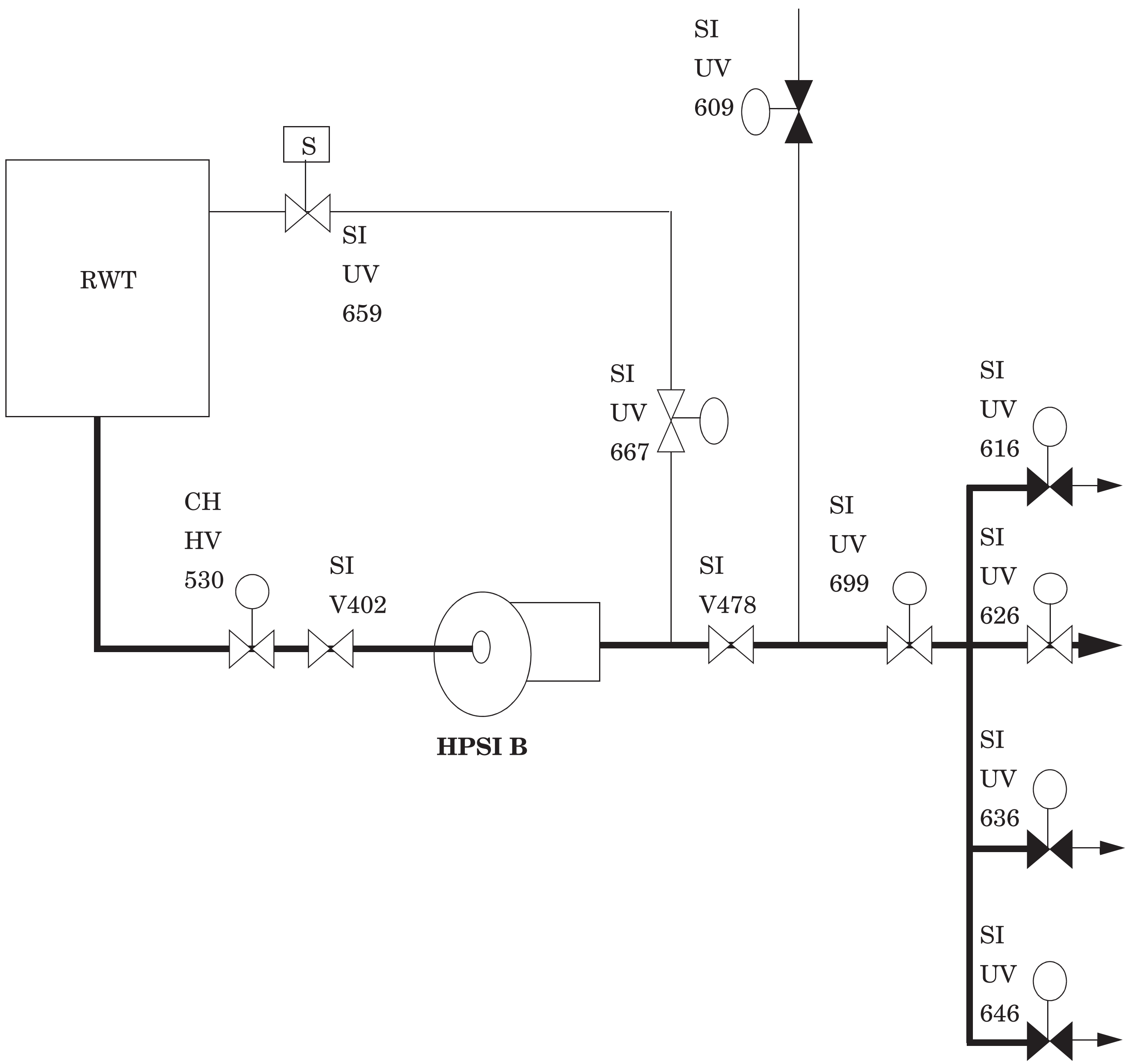


Attachment F-10: HPSI Pump A

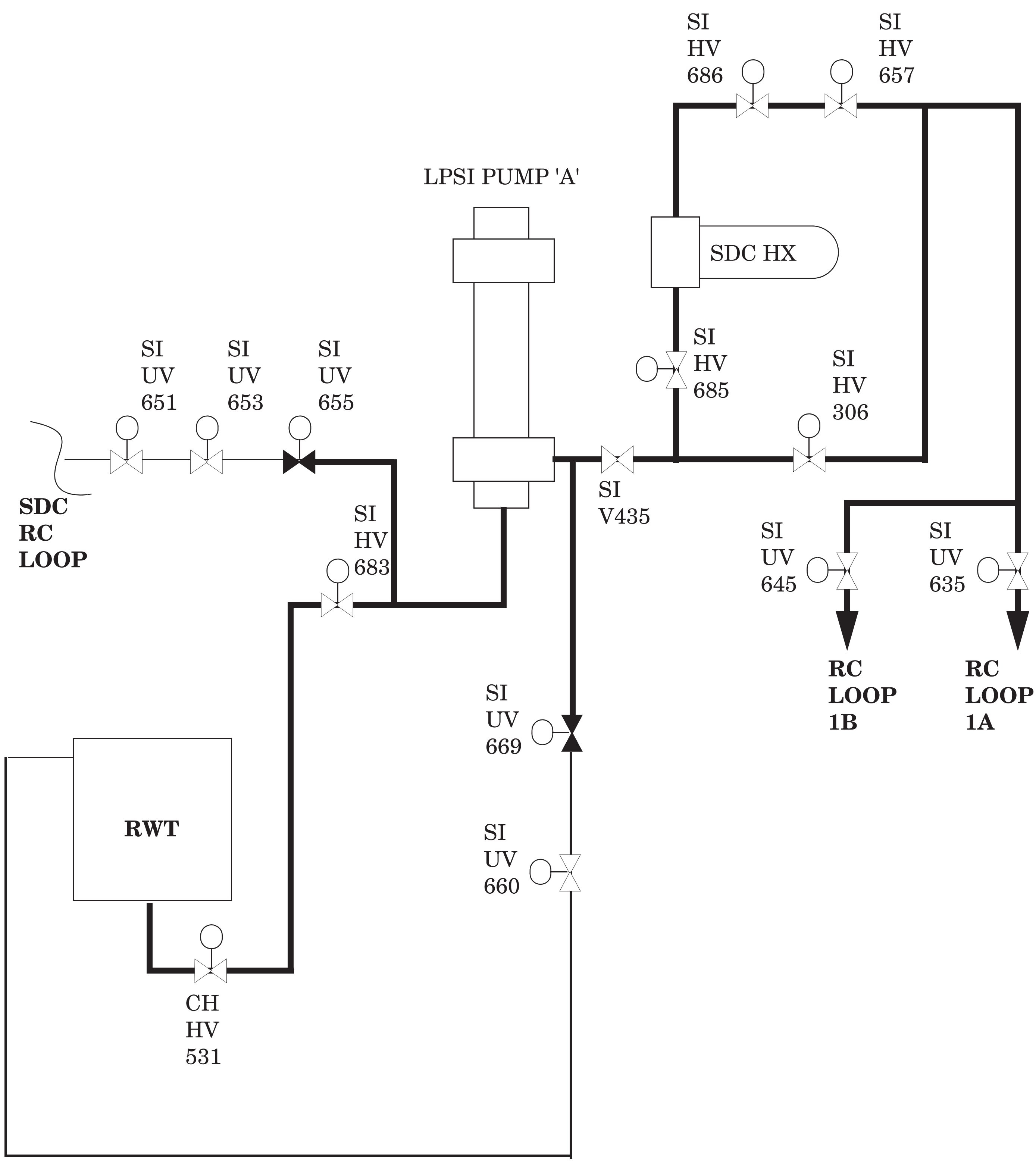


Attachment F-11: HPSI Pump B

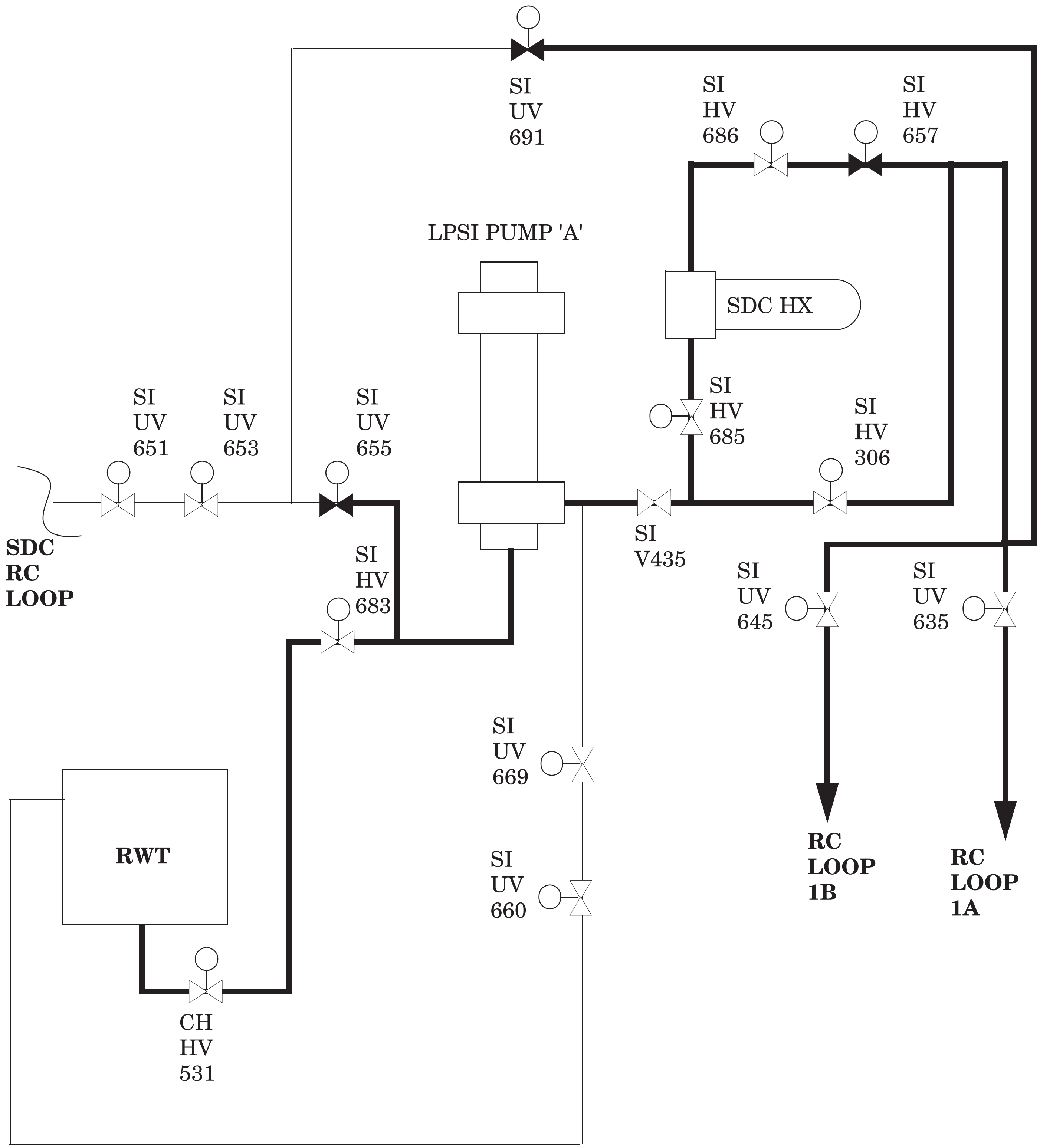
Page 1 of 1



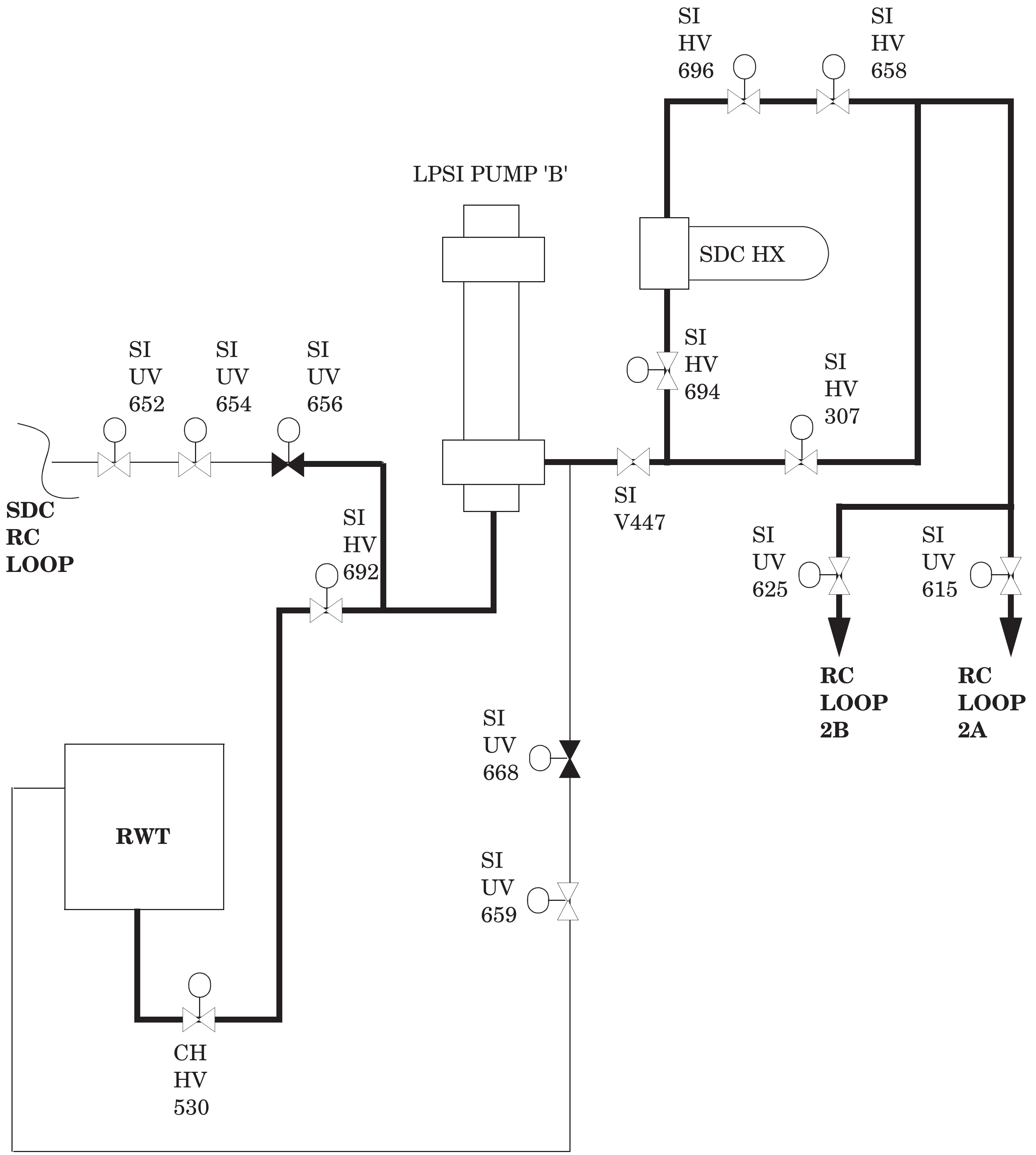
Attachment F-12: LPSI Pump A with SDC Loop A in Service



Attachment F-13: LPSI Pump A with SDC Loop B in Service

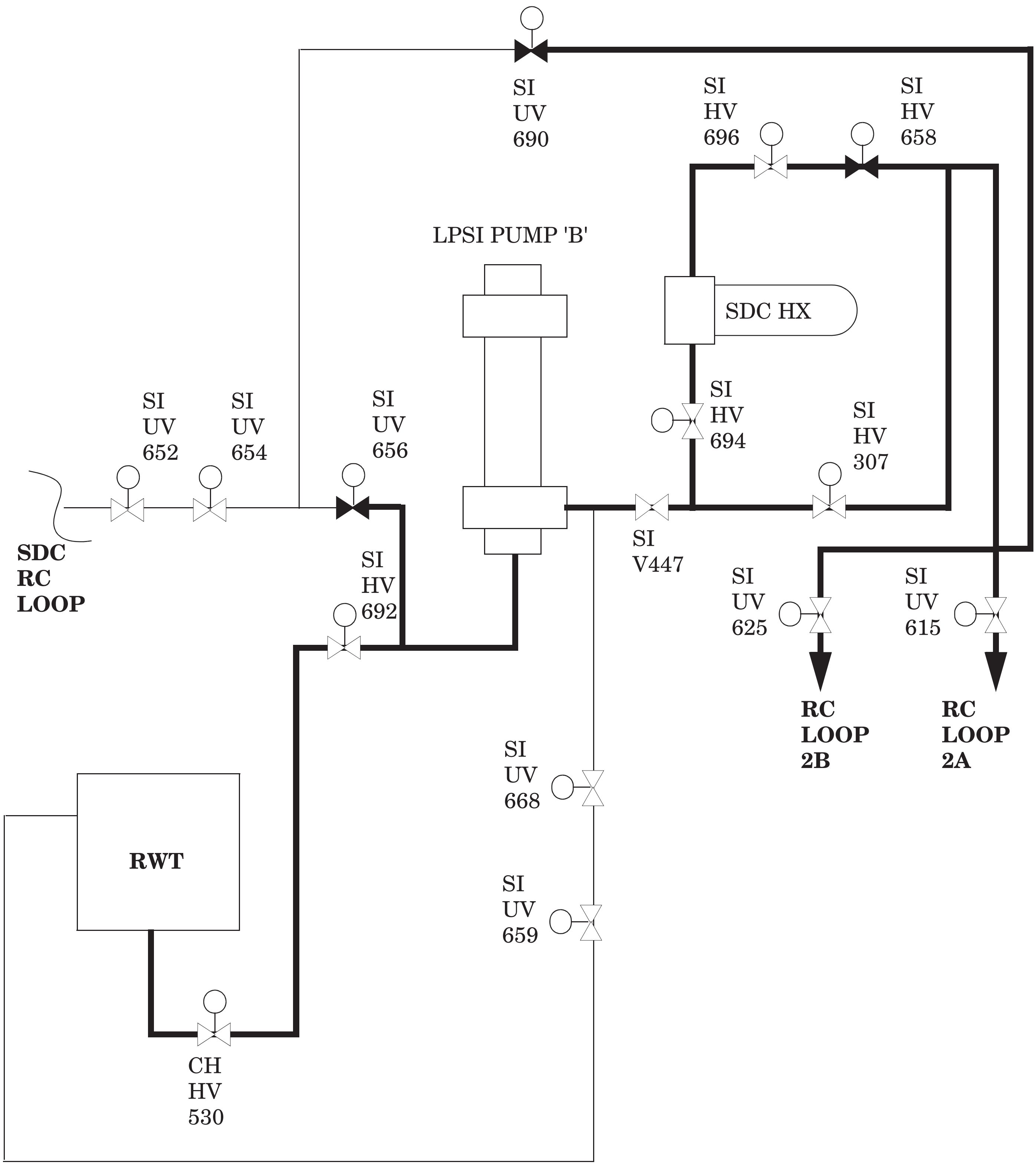


Attachment F-14: LPSI Pump B with SDC Loop B in Service



Attachment F-15: LPSI Pump B with SDC Loop A in Service

Page 1 of 1



2013 NRC S-8
PVNGS JOB PERFORMANCE MEASURE

JPM BASIS INFORMATION

TASK:	1260010301 Perform alarm response 1st priority actions (Containment Sump Trouble Excessive Runtime Alarm 40AL-9RK7B)							
TASK STANDARD:	Standby containment sump pump has been started and containment sump level has begun to lower.							
K/A:	3.5 103 A4.01		K/A RATING:	RO:	3.2	SRO:	3.3	
10 CFR 55:	41.7 / 45.5 to 45.8							
APPLICABLE POSITION(S):	RO		VALIDATION TIME:	10 minutes				
REFERENCES:	40AL-9RK7B, Panel B07B Alarm Responses							
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR	X	PLANT		OTHER			

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Alan Malley Date: 09/12/2005

Revised By: Adam Rasmussen Date: 10/11/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ________________________________ Date: __________

Evaluator Name: ________________________________

Time to complete: _________ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________ Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.*

1. SIMULATOR SETUP:

- IC#: 147 **-OR-**
- IC#: 4
- SCENARIOS, MALFUNCTIONS, OVERRIDES,etc. for Setup:

COMMAND/COMMUNICATION	DESCRIPTION
CMCPWD04RDNP02_5	Containment Radwaste East Sump Pump Fails to AUTO START
CMCPWD04RDNP03_1	CTMT RW West Sump pump sheared shaft.
mfTH07 f:66	Small LOCA at 66%. Run until sump pumps receive a high level AUTO START signal and **delete** the malfunction. Allow simulator to run long enough to receive the excess run time alarm, **THEN FREEZE.**

- SPECIAL INSTRUCTIONS:
  1. **IF** IC 147 is used, reset to **IC 147,** GO TO **FREEZE**, **THEN** proceed to **Step 6**
  2. **IF** IC 4 is used, reset to **IC 4**, GO TO **RUN,** insert **mfTH07 f:66**
  3. Close RDB-HS-24, CNMT Sumps Outside Isolation Valve, RUN scenario file **2013 NRC S-8.scn** from exam flash drive
  4. **AFTER** sump level is high enough to give an AUTO START signal to RW West sump pump and RW East sump pump (~43.5" level), **DELETE** malfunction **mfTH07**
  5. **MANUALLY INSERT** Reactor Cavity Sump Pump Excess Runtime alarm (7B03A), silence alarms, GO TO **FREEZE** (PT ID RDYS2 should be on RJ screen)
  6. Provide **INITIATING CUE**
  7. GO TO **RUN**
- REQUIRED CONDITIONS:
  1. Unit is in Mode 5
  2. Containment sump level has given an AUTO START signal to the RW West sump pump (running) and standby pump (RW East sump pump, not running)
  3. Running containment sump pump has sheared shaft, standby sump pump has failed to AUTO START, valve RDB-HS-24 is closed
  4. Reactor Cavity Sump Pump Excess Runtime alarm is in
- SIMULATOR EVALUATION PRE-CHECK
  - ☐ Correct IC
  - ☐ Alarm Silence Off
  - ☐ Procedures available, page checked, and clean
  - ☐ For JPMs administered during transients, another instructor available to control plant parameters.

Verified by: ________________________ Date: ____________________

(NA if Simulator setup not required)

2. SPECIAL TOOLS/EQUIPMENT:

- 40AL-9RK7B, Panel B07B Alarm Response, Revision 16 available.

NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.

3. JPM PERFORMANCE:

- MALFUNCTIONS, OVERRIDES, etc. **during** JPM

STEP	COMMAND/COMMUNICATION	DESCRIPTION
N/A		No driver action required

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE**any equipment.
- Inform the control room staff of any discovered deficiencies.
- Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- You may use any source of information normally available.

INITIAL CONDITIONS:

- **The crew is responding to an RCS leak.**

INITIATING CUE:

- **The CRS directs you to respond to the Board 7 alarm window 7B03A and take appropriate action.**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate any valves.

JPM START TIME:

	STEP	CUE	STANDARD
1.	Obtain procedure 40AL-9RK7B	**Information CUE:** Evaluator provides copy of entire alarm response for window 7B03A.	Examinee obtains 40AL-9RK7B and identifies Point ID RDYS2 in alarm window. **Evaluator NOTE:** RDYS2 may have scrolled out of view on RJ screen by this time, requiring examinee to diagnose alarming condition. Examinee determines Group C of window 7B03A is the applicable alarm group.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2.	First Priority Operator Action Step 1: <u>Check</u> **ANY** of the following sump levels on B07: • RDN-LI-10, Reactor Cavity sump level indicator • RDN-LI-410, Containment Radwaste sump level indicator		Examinee determines that a high level exists in <u>both</u> East and West radwaste sumps (RDN-LI-410) and that only the West Sump Pump is running.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
3. *	Step 2: <u>Ensure</u> **BOTH** of the following valves are open: • RDA-HS-23, CNMT Sumps Inside Isolation valve • RDB-HS-24, CNMT Sumps Outside Isolation valve		Examinee opens RDB-HS-24 by rotating handswitch to the **OPEN** position.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
4. *	Step 3: Start the related standby sump pump for the affected sump… **Containment Radwaste Sump East** RDN-HS-18, RDN-P02		Examinee starts East Containment Radwaste Sump pump by rotating RDN-HS-18 to the **START** position.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
5.	Step 4: Check sump level is decreasing. • RDN-LI-410, Containment Radwaste sump level indicator	**Information CUE:** **AFTER** sump level begins to lower, "Another operator will continue to observe sump levels and pump operation."	Examinee verifies level is lowering.
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparedness organization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- The crew is responding to an RCS leak.

INITIATING CUE:

- The CRS directs you to respond to the Board 7 alarm window 7B03A and take appropriate action.

APPLICANT

ANNUNCIATOR WINDOW INDEX

GROUP	PT. ID	POSSIBLE CAUSE	SETPOINT
A	RDLS13H	Reactor Cavity Sump Level Hi-Hi	37" (ind) 42" (act)
B	RDHS11	Reactor Cavity Sump Pump A Not-in-Auto	N/A
	RDHS12	Reactor Cavity Sump Pump B Not-in-Auto	N/A
C	RDYS1	Reactor Cavity Sump Pump Excess Runtime	6.5 min.
	RDYS2	Cntmt Radwaste Sump Pump West Excess Runtime	5.5 min.
	RDYS3	Cntmt Radwaste Sump Pump East Excess Runtime	5.5 min.
D	RDLS410	Cntmt Radwaste Sump East Level Hi-Hi/Lo-Lo	Hi-Hi 45.5"(ind) 52"(act)
	RDLS411	Cntmt Radwaste Sump West Level Hi-Hi/Lo-Lo	Lo-Lo 11.5"(ind) 18"(act)
E	RDLS10	Reactor Cavity Sump Excessive Leakage	60 gal/60 min.
F	RDHS17	Cntmt Radwaste Sump Pump West Not-in-Auto	N/A
	RDHS18	Cntmt Radwaste Sump Pump East Not-in-Auto	N/A

RESPONSE SECTION

GROUP A

PT. ID	POSSIBLE CAUSE	SETPOINT
RDLS13H	Reactor Cavity Sump Level Hi-Hi	37"ind (42"act)

AUTO ACTION

NOTE

RDN-LT-10 provides a signal to LC-10 which functions to start the lead pump at 34" indicated (39" actual), and to alarm to the control room in the event that rate of fill of the sump exceeds a preset rate limit.

The Hi-Hi provides a start signal to the second pump and backup start signal to the lead pump.

FIRST PRIORITY OPERATOR ACTION

_____ 1. Check the alarm on RDN-LI-10 level indicator on Panel B07.

SECOND PRIORITY OPERATOR ACTION

_____ 1. Investigate RDN-LT-10 and RDN-LC-10 for proper operation to control level in sump.

_____ 2. **IF** a valid alarm is received while Shutdown Cooling is in service **AND** there is an unplanned loss of RCS or Refueling Pool inventory, **THEN** concurrently perform 40EP-9EO11, Lower Mode Functional Recovery (RCTS 039748).

_____ 3. Check discharge valves RDN-V001 and RDN-V003 open on the reactor cavity sump.

_____ 4. Check for in-leakage and proper pump operation.

End of Response

RESPONSE SECTION

GROUP B

PT. ID	POSSIBLE CAUSE	SETPOINT
RDHS11	Reactor Cavity Sump Pump A Not-in-Auto	N/A
RDHS12	Reactor Cavity Sump Pump B Not-in-Auto	N/A

AUTO ACTION

None

FIRST PRIORITY OPERATOR ACTION

None

SECOND PRIORITY OPERATOR ACTION

____ 1. **WHEN** the condition which required the handswitch to be in an abnormal position is cleared,
THEN place RDN-HS-11 and/or RDN-HS-12, A/B reactor cavity sump pumps, in AUTO.

End of Response

RESPONSE SECTION

GROUP C

PT. ID	POSSIBLE CAUSE	SETPOINT
RDYS1	Reactor Cavity Sump Pump Excess Runtime	6.5 min
RDYS2	Cntmt Radwaste Sump Pump West Excess Runtime	5.5 min
RDYS3	Cntmt Radwaste Sump Pump East Excess Runtime	5.5 min

AUTO ACTION

None

FIRST PRIORITY OPERATOR ACTION

_____ 1. Check **ANY** of the following sump levels on B07:

- RDN-LI-10, Reactor Cavity sump level indicator
- RDN-LI-410 (left\right) Containment Radwaste sump level indicator

_____ 2. Ensure **BOTH** of the following valves are open:

- RDA-HS-23, CNMT Sumps Inside Isolation valve
- RDB-HS-24, CNMT Sumps Outside Isolation valve

_____ 3. Start the related standby sump pump for the affected sump.

Reactor Cavity Sump

- RDN-HS-11, Reactor Cavity Sump A
- RDN-HS-12, Reactor Cavity Sump B

Containment Radwaste Sump West And East

- RDN-HS-17, RDN-P03, Containment Radwaste Sump pump (West)
- RDN-HS-18, RDN-P02, Containment Radwaste Sump pump (East)

(Continued)

____ 4. Check sump level is decreasing.

- RDN-LI-10, Reactor Cavity sump level indicator
- RDN- LI-410 (left\right), Containment Radwaste sump level indicator (east\west)

____ 5. **IF** sump level is **NOT** decreasing,
THEN ensure **BOTH** pumps are running for the affected sump:

Reactor Cavity Sump

- RDN-HS-11, Reactor Cavity Sump A
- RDN-HS-12, Reactor Cavity Sump B

Containment Radwaste Sump West And East

- RDN-HS-17, RDN-P03, Containment Radwaste Sump pump (West)
- RDN-HS-18, RDN-P02, Containment Radwaste Sump pump (East)

SECOND PRIORITY OPERATOR ACTION

____ 1. **IF** a valid alarm is received while Shutdown Cooling is in service, **AND** there is an unplanned loss of RCS or Refueling Pool inventory, **THEN** concurrently perform 40EP-9EO11, Lower Mode Functional Recovery (RCTS 039748).

____ 2. **IF** the Reactor Cavity sump pumps are in alarm **AND** Containment is accessible,
THEN complete **ALL** of the following:

- Ensure RDN-V001, Reactor Cavity Sump pump RDN-P01A discharge valve, is open.
- Ensure RDN-V003, Reactor Cavity Sump pump RDN-P01B discharge valve, is open.
- Check Reactor Cavity Sump pumps RDN-P01A and RDN-P01B for proper operation.
- Investigate the Reactor Cavity Sump for excessive in-leakage.

(Continued)

____ 3. **IF** the Containment Radwaste sump pumps are in alarm **AND** Containment is accessible,
THEN complete **ALL** of the following:

- Ensure RDN-V089, RDN-P03, Containment Radwaste sump pump West discharge valve, is open.
- Ensure RDN-V092, RDN-P02, Containment Radwaste sump pump East discharge valve, is open.
- Check Containment Radwaste sump pump RDN-P02 and RDN-P03 for proper operation.
- Investigate the East and West Containment Radwaste sumps for excessive in-leakage.

NOTE

40ST-9RD01 does NOT maintain operability of the containment sump level and flow system when the window alarm is locked in. It only fulfills the monitoring requirements of UFSAR 5.2.5.5.

____ 4. **IF** alarm is Locked in,
THEN perform 40ST-9RD01, Containment Sump Hourly Check to monitor Containment Sump Inleakage.

____ 5. Perform independent verification on all applicable valves, breakers, and components manipulated by this alarm response in accordance with 02DP-0ZZ01, Verification of Plant Activities.

End of Response

RESPONSE SECTION

GROUP D

PT. ID	POSSIBLE CAUSE	SETPOINT
RDLS410	Cntmt Radwaste Sump East Level Hi-Hi/Lo-Lo	Hi Hi-45.5” ind, (52" act)
RDLS411	Cntmt Radwaste Sump West Level Hi-Hi/Lo-Lo	Lo Lo-11.5” ind, (18" act)

<u>AUTO ACTION</u>

NOTE

LT-19, for the west sump and LT-20 for the east sump normally will start the pump, through LC-19 and LC-20, at 43.5" indicated (50" actual) and stop the pump at 13.5" indicated (20" actual). Auto start of these pumps on Hi-Hi level is delayed for 3 minutes.

1. On a Lo-Lo level a back-up signal will be given to stop the pump.
2. On a Hi-Hi level a back-up signal will be given to start the pump.

<u>FIRST PRIORITY OPERATOR ACTION</u>

_____ 1. <u>Check</u> level on level indicator RDN-LI-410 (left\right).

_____ 2. <u>Check</u> containment isolation valves RDA-UV-23 and RDB-UV-24 are open by checking handswitches RDA-HS-23 and RDB-HS-24.

(Continued)

SECOND PRIORITY OPERATOR ACTION

_____ 1. Check RDN-LC-19 and RDN-LC-20 for proper operation.

Hi-Hi

_____ 2. **IF** a valid alarm is received while Shutdown Cooling is in service **AND** there is an unplanned loss of RCS or Refueling Pool inventory, **THEN** PERFORM 40EP-9EO11, Lower Mode Functional Recovery (RCTS 039748).

_____ 3. **IF** containment is accessible, **THEN** PERFORM **BOTH** of the following:

- Check discharge valves RDN-V089 and RDN-V092 open on the containment radwaste sumps.
- Check for in-leakage and proper pump operation.

NOTE

40ST-9RD01 does NOT maintain operability of the containment sump level and flow system when the window alarm is locked in. It only fulfills the monitoring requirements of UFSAR 5.2.5.5.

_____ 4. **IF** alarm is Locked in, **THEN** perform 40ST-9RD01, Containment Sump Hourly Check to monitor Containment Sump Inleakage.

_____ 5. Perform independent verification on all applicable valves, breakers, and components manipulated by this alarm response in accordance with 02DP-0ZZ01, Verification of Plant Activities.

End of Response

RESPONSE SECTION

GROUP E

PT. ID	POSSIBLE CAUSE	SETPOINT
RDLS10	Reactor Cavity Sump Excessive Leakage	60 Gal/60 min.

AUTO ACTION

NOTE

Receipt of this alarm indicates greater than or equal to 60 gallons of sump in leakage within a 60 minute time period.

FIRST PRIORITY OPERATOR ACTION

____ 1. Observe RD-LI-10 on B07 to verify Reactor Cavity Sump Level increase.

SECOND PRIORITY OPERATOR ACTION

____ 1. **IF** a valid alarm is received while Shutdown Cooling is in service **AND** there is an unplanned loss of RCS or Refueling Pool inventory, **THEN** concurrently perform 40EP-9EO11, Lower Mode Functional Recovery (RCTS 039748).

NOTE

Response to this condition may affect Technical Specification 3.4.14 RCS Operational Leakage and 3.4.15 RCS Pressure Isolation Valve (PIV) Leakage.

____ 2. Take action as directed by 40AO-9ZZ02, Excessive RCS Leakrate.

NOTE

40ST-9RD01 does NOT maintain operability of the containment sump level and flow system when the window alarm is locked in. It only fulfills the monitoring requirements of UFSAR 5.2.5.5.

____ 3. **IF** alarm is Locked in,
THEN perform 40ST-9RD01, Containment Sump Hourly Check to monitor Containment Sump Inleakage.

End of Response

RESPONSE SECTION

GROUP F

PT. ID	POSSIBLE CAUSE	SETPOINT
RDHS17	Cntmt Radwaste Sump Pump West Not-in-Auto	N/A
RDHS18	Cntmt Radwaste Sump Pump East Not-in-Auto	N/A

AUTO ACTION

None

FIRST PRIORITY OPERATOR ACTION

None

SECOND PRIORITY OPERATOR ACTION

____ 1. Place handswitch RDN-HS-17 and/or RDN-HS-18 in auto position when the condition which required the handswitch to be in an abnormal position is cleared on Panel B07.

End of Response

JPM BASIS INFORMATION

TASK:	1100040001 Perform CEA operability checks							
TASK STANDARD:	At least 1 CEA operability check has been made and the reactor has been manually tripped							
K/A:	3.1 001 A2.11		K/A RATING:	RO:	4.4	SRO:	4.7	
10 CFR 55:	41.5 / 43.5 / 45.3 / 45.13							
APPLICABLE POSITION(S):	SRO/RO		VALIDATION TIME:	10 minutes				
REFERENCES:	40ST-9SF01, CEA Operability Checks							
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR	X	PLANT		OTHER			

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***Yes***
PRA/SRA related? *(Yes/No)* ***Yes***

APPROVAL

Developed By: Adam Rasmussen Date: 10/09/2013

Revised By: **N/A** Date: ______

Technical Review ______ Operations Approval ______

Training Approval ______

EVALUATION

Examinee Name: ______ Date: ______

Evaluator Name: ______

Time to complete: ______ Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ______*

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   - IC#: 149 or IC 9 (Shutdown Group CEAs **FULLY WITHDRAWN)**
   - SCENARIOS, MALFUNCTIONS, OVERRIDES,etc. for Setup:

COMMAND/COMMUNICATION	DESCRIPTION
mfRD10B e:"INDIVIDUAL CEA 19 SELECT"	Inserts uncontrolled CEA withdrawal when CEA 19 is selected

- SPECIAL INSTRUCTIONS:
  1. **IF** IC 149 is used, reset to **IC 149 THEN** proceed to **Step 6**
  2. Reset to IC 9
  3. Ensure GROUP SELECT switch is selected to Group 3
  4. Ensure INDIVIDUAL CEA SELECT switch is on CEA 02
  5. Ensure MODE SELECT switch is on MS (Manual Sequential)
  6. Run scenario file **2013 NRC S-9.scn** from exam flash drive
  7. GO TO **FREEZE**
  8. Provide **INITIATING CUE**
  9. GO TO **RUN**
- REQUIRED CONDITIONS:
  - Unit is in MODE 3
  - Shutdown Group CEAs are **FULLY WITHDRAWN**
  - GROUP SELECT is on **Group 3**
  - INDIVIDUAL CEA SELECT is on **CEA 02**
  - MODE SELECT is on **MS**
- SIMULATOR EVALUATION PRE-CHECK
  - ❑ Correct IC
  - ❑ Alarm Silence Off
  - ❑ Procedures available, page checked, and clean
  - ❑ For JPMs administered during transients, another instructor available to control plant parameters.

Verified by: N/A Date: ____________________

(NA if Simulator setup not required)

2. **SPECIAL TOOLS/EQUIPMENT:**
   - 40ST-9SF01, CEA Operability Checks, Revision 31 available

NOTE: This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM

3. **JPM PERFORMANCE:**
   - MALFUNCTIONS, OVERRIDES, etc. **during** JPM

STEP	COMMAND/COMMUNICATION	DESCRIPTION
15	mfRD10B e:"INDIVIDUAL CEA 19 SELECT"	This will cause uncontrolled cea withdrawal when CEA 19 is selected. This is on an event trigger so Driver action is only to verify malfunction is in.

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE**any equipment.
- o Inform the control room staff of any discovered deficiencies.
- o Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- o You may use any source of information normally available.

INITIAL CONDITIONS:

- **Unit 1 has just finished a maintenance outage (no refueling) and is in MODE 3**
- **40ST-9SF01, CEA Operability Checks has expired**
- **Due to CEDMCS maintenance, the operability of all Groups 4 and 5 CEAs are to be verified**
- **The STA has verified that SDM requirements of LCO 3.1.2 will be maintained throughout the surveillance**
- **The Shutdown Groups were fully withdrawn at 0230 this morning**
- **A Reactivity Brief has been completed**

INITIATING CUE:

- **The CRS directs you to verify the operability of Groups 4 and 5 CEAs in accordance with Section 8.3 of 40ST-9SF01, CEA Operability Checks**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME:

NOTE:

Section 8.3 satisfies operability requirements for MODE 2 entry.

NOTE:

Any surveillance test or plant evolution (i.e. reactor trip) that moved CEAs greater than 5 inches in any one direction during the last 92 days may be used to meet the Acceptance Criteria of this procedure, in whole or in part, as applicable. Any activity used as credit shall be documented in the Surveillance Test Log. (Example: the complete performance of 77ST-9SB22, CEA Drop Time Test, would meet the requirements of this surveillance for all trippable CEA Groups).

	STEP	CUE	STANDARD
1.	**IF** the Unit is shutdown and this surveillance is not current, **THEN** verify the operability of all full strength CEAs prior to entering MODE 2 as follows: Step 8.3.1 Ensure the SDM requirements of LCO 3.1.2 are maintained	**If Requested CUE:** **If examinee requests SDM requirements, report that the STA has evaluated current SDM and the requirements of LCO 3.1.2 will be maintained throughout the surveillance** **Evaluator NOTE:** **This information is also found in the INITIAL CONDITIONS**	Examinee either refers to INITIAL CONDITIONS or requests SDM evaluation and either circles or initials step

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2.	Step 8.3.2 Ensure both Shutdown Groups have been fully withdrawn in accordance with 40OP-9ZZ03, Reactor Startup		Examinee verifies Shutdown Groups are fully withdrawn and initials step

SAT / UNSAT

Comments (required for UNSAT):

NOTE:
The timing for the next performance of this test shall start when the Shutdown Groups are pulled.

	STEP	CUE	STANDARD
3.	Step 8.3.3 Record **BOTH** the date **AND** time the Shutdown Groups are pulled for Reactor Startup	**Evaluator NOTE:** **This information is contained in the INITIAL CONDITIONS**	Examinee writes down today's date and 0230 for the time, then initials step

SAT / UNSAT
Comments (required for UNSAT):

NOTE:
The CEAs in Regulating Groups 4 and 5 will be exercised in the Manual Individual mode.

	STEP	CUE	STANDARD
4.	Step 8.3.4-8.3.7 At all times during CEA movement in this section, monitor at least the following parameters: • Rate of Change of Reactor Power • CEA individual and group positions • RCS temperature and Reactor Power • CEA positions and deviations	**Evaluator NOTE:** Parameter expected to be monitored by: • Startup Rate Instruments (B04) • CEAPDS Video Display, CEDMCS Control Panel, CEA Position Meter, CEA Group Position Meter (B04) • CPC Remote Operators Module (B05) • CEAC Remote Operators Module (B05)	Examinee circles or initials steps
CAUTION: An unintentional criticality could occur anytime CEAs are withdrawn.			
	Monitor **ALL** available nuclear instrumentation during CEA movement for indication of possible abnormalities **IF** the Reactor goes critical, **THEN** perform **BOTH** of the following steps simultaneously: • Manually trip the reactor • Initiate Emergency Boration **IF** a CEA drops, slips, or becomes misaligned > 6.6 inches between all other CEAs in its group, **THEN**: • Ensure the Rx remains subcritical • Restore the CEA per 40AO-9ZZ11, CEA Malfunctions		

SAT / UNSAT
Comments (required for UNSAT):

NOTE:

Step 8.3.8.1 - Step 8.3.8.8 are repetitive.

Each individual CEA will be exercised by first withdrawing and then inserting one CEA at a time, before exercising the next CEA.

The pulse counter will not start counting pulses until the Rod Bottom Light goes off.

EVALUATOR NOTE:

Only one CEA needs to be exercised before malfunction is inserted. Only one repetitive cycle is represented in this JPM.

	STEP	CUE	STANDARD
5.	Step 8.3.8 Exercise each Regulating Groups 4 and 5 CEA by performing **ALL** of the following (Use Appendix C for place keeping): Step 8.3.8.1 Select position indication for CEA to be exercised on all available CEAC Operator Module digital displays		Examinee ensures position indication is available for the CEA being exercised on all of the available CEAC Operator Module digital displays Initials Appendix C

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
6. *	Step 8.3.8.2 Place Group Select switch to group containing CEA to be exercised		Examinee references Appendix C and rotates Group Select switch to 4 Initials Appendix C

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
7. *	Step 8.3.8.3 Place Individual CEA Select switches to CEA to be exercised		Examinee rotates Individual Select switch to CEA 18 Initials Appendix C
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
8. *	Step 8.3.8.4 Place Mode Select switch to MI (manual individual) position		Examinee rotates Mode Select switch to the MI position Initials Appendix C
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
9.	Step 8.3.8.5 Ensure CEA to be exercised is at the LEL position	**Examiner NOTE:** **CEA is currently fully inserted**	Examinee verifies CEA is at the LEL position (via RBL, CEAC CRT, or CPCs) Initials Appendix C
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
10. *	Step 8.3.8.6 Withdraw the CEA being exercised to 6 inches withdrawn by the pulse counter indication		Examinee positions **WITHDRAW/INSERT** to the **WITHDRAW** position until **6** is indicated on pulse counter indication Initials Appendix C
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
11. *	Step 8.3.8.7 Insert the CEA being exercised to the LEL position		Examinee positions **WITHDRAW/INSERT** to the **INSERT** position until **0** is indicated on pulse counter indication Initials Appendix C

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
12.	Step 8.3.8.8 Record the results of the exercise test in Appendix C		Examinee circles **YES** for CEA in Appendix C

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
13.	Step 8.3.8.1-8.3.8.2 Ensure next CEA position indication is selected on CEACs and the Group Select switch is selected to the group containing the CEA to be exercised	**Examiner NOTE:** **The next CEA is in the same group so Group Select switch should not be positioned**	Examinee ensures CEACs displays appropriate CEA position for next CEA Initials Appendix C

SAT / UNSAT
Comments (required for UNSAT):

	STEP	CUE	STANDARD
14. *	Step 8.3.8.3 Place Individual CEA Select switches to next CEA to be exercised. (CEA 19)	**Examiner NOTE:** **When next CEA is selected, this will trigger uncontrolled outward CEA motion. CEAs will begin outward motion in sequence beginning with Group 1 CEAs.**	Examinee rotates Individual Select switches to CEA 19 Recognizes uncontrolled OUTWARD CEA motion **ALTERNATE PATH**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
15. *	Examinee trips the Reactor	**Evaluator NOTE:** **Examinee may recommend entering CEA Malfunctions ONEP** **If Requested CUE:** **If examinee recommends taking the Mode Select switch to Standby, direct him/her to place Mode Select switch in Standby.** **Evaluator NOTE:** **Placing Mode Select switch to Standby will have no effect on the malfunction** **If Requested CUE:** **If examinee recommends tripping the reactor, direct him/her to trip the reactor.**	Examinee presses Manual Reactor Trip pushbuttons **Evaluator NOTE:** Not ALL Manual Reactor Trip pushbuttons are required to be depressed to meet the standard, **BUT** the reactor must be **TRIPPED**.
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- **Unit 1 has just finished a maintenance outage (no refueling) and is in MODE 3**
- **40ST-9SF01, CEA Operability Checks has expired**
- **Due to CEDMCS maintenance, the operability of all Groups 4 and 5 CEAs are to be verified**
- **The STA has verified that SDM requirements of LCO 3.1.2 will be maintained throughout the surveillance**
- **The Shutdown Groups were fully withdrawn at 0230 this morning**
- **A Reactivity Brief has been completed**

INITIATING CUE:

- **The CRS directs you to verify the operability of Groups 4 and 5 CEAs in accordance with Section 8.3 of 40ST-9SF01, CEA Operability Checks**

APPLICANT

NOTE

Section 8.3 satisfies operability requirements for MODE 2 entry.

NOTE

Any surveillance test or plant evolution (i.e. reactor trip) that moved CEAs greater than 5 inches in any one direction during the last 92 days may be used to meet the Acceptance Criteria of this procedure, in whole or in part, as applicable. Any activity used as credit shall be documented in the Surveillance Test Log. (Example: the complete performance of 77ST-9SB22, CEA Drop Time Test, would meet the requirements of this surveillance for all trippable CEA Groups.)

8.3 Performance on Reactor Startup with 40ST-9SF01 expired

IF the Unit is shutdown and this surveillance is not current,
THEN verify the operability of all full strength CEAs prior to entering MODE 2 as follows:

____ 8.3.1 Ensure the SDM requirements of LCO 3.1.2 are maintained (Ref. 72ST-9RX14, Shutdown Margin - Modes 3, 4, and 5).

____ 8.3.2 Ensure both Shutdown Groups have been fully withdrawn in accordance with 40OP-9ZZ03, Reactor Startup.

NOTE

The timing for the next performance of this test shall start when the Shutdown Groups are pulled.

____ 8.3.3 Record **BOTH** the date **AND** time the Shutdown Groups are pulled for a Reactor Startup.

Date ____________________ Time____________

--------------------------------------- **<u>NOTE</u>** ---------------------------------------

The CEAs in Regulating Groups 4 and 5 will be exercised in the Manual Individual mode.

____ 8.3.4 At all times during CEA movement in this section, <u>monitor</u> at least the following parameters: [ref: 2.2.1]

- Rate of Change of Reactor Power (Startup Rate Instruments)
- CEA individual and group positions (CEAPDS Video Display, CEDMCS Control Panel, CEA Position Meter, CEA Group Position Meter)
- RCS temperature and Reactor power (CPC Remote Operators Module)
- CEA positions and deviations (CEAC Remote Operators Module)

<u>CAUTION</u>

An unintentional criticality could occur anytime CEAs are withdrawn.

____ 8.3.5 <u>Monitor</u> **ALL** available nuclear instrumentation during CEA movement for indication of possible abnormalities.

____ 8.3.6 **IF** the Reactor goes critical,
THEN <u>perform</u> **BOTH** of the following steps <u>simultaneously</u>:

____ 1. <u>Manually trip</u> the reactor and <u>proceed</u> to 40EP-9EO01, Standard Post Trip Actions.

____ 2. <u>Initiate</u> Emergency Boration per 40AO-9ZZ01, Emergency Boration.

____ 8.3.7 **IF** a CEA drops, slips, or becomes misaligned resulting in a CEA deviation of greater than 6.6 inches between any CEA and all the other CEAs in its group,
THEN <u>ensure</u> the Reactor remains subcritical
AND <u>restore</u> the CEA per 40AO-9ZZ11, CEA Malfunctions.

-- **NOTE** --

Step 8.3.8.1 - Step 8.3.8.8 are repetitive.
Each individual CEA will be exercised by first withdrawing and then inserting one CEA at a time, before exercising the next CEA.

-- **NOTE** --

The pulse counter will not start counting pulses until the Rod Bottom Light goes off.

____ 8.3.8 Exercise each Regulating Groups 4 and 5 CEA by performing **ALL** of the following (Use Appendix C for place keeping):

8.3.8.1 Select position indication for CEA to be exercised on all available CEAC Operator Module digital displays.

8.3.8.2 Place Group Select switch to group containing CEA to be exercised.

8.3.8.3 Place Individual CEA Select switches to CEA to be exercised.

8.3.8.4 Place Mode Select switch to MI (manual individual) position.

8.3.8.5 Ensure CEA to be exercised is at the LEL position.

8.3.8.6 Withdraw the CEA being exercised to 6 inches withdrawn by the pulse counter indication.

8.3.8.7 Insert the CEA being exercised to the LEL position.

8.3.8.8 Record the results of the exercise test in Appendix C.

____ 8.3.9 Record **BOTH** date and time that Regulating Groups 1, 2, and 3 were withdrawn $\geq$ 5 inches for a reactor startup.

Date ____________________ Time____________

____ 8.3.10 GO TO Section 8.4 for evaluation of Acceptance Criteria.

8.4 Acceptance Criteria Evaluation

8.4.1 Check that one of the applicable conditions listed below are met and N/A the conditions not used.

____ (Section 8.1) All full strength CEAs have been determined to be operable by movement of at least five inches in any one direction while operating at power.
REFER TO Appendix A - CEA Exercising at Power.

____ (Section 8.2) All full strength CEAs have been determined to be operable by movement of at least five inches in any one direction during the performance of a Reactor Startup (40ST-9SF01 is current).

____ (Section 8.3) All full strength CEAs have been determined to be operable by movement of at least five inches in any one direction while shutdown prior to entering MODE 2. (40ST-9SF01 has expired).
REFER TO Appendix C - CEA Exercising on Reactor Startup with 40ST-9SF01 Expired.

ACCEPTANCE CRITERIA - Full strength CEA freedom of movement (trippability) has been verified under one of the above conditions by verifying movement of each individual full strength CEA at least 5 inches.

ACCEPTANCE CRITERIA met (circle one) YES / NO __________ (INIT)

____ 8.4.2 IF acceptance criteria are not met,
THEN perform Section 10.0 CONTINGENCIES

Appendix C - CEA Exercising on Reactor Startup with 40ST-9SF01 Expired

Note: CEA position from CEACs may be used if SFN-JI-17 is not available for any or all CEAs; however, **BOTH** initial **AND** final CEA positions must be determined from the same source.

Note: The pulse counter will not start counting pulses until the Rod Bottom light goes off.

CEA	GROUP	CEA selected on CEACs	Group Select Switch selected to group containing CEA	Individual CEA Selection Switches Correctly Positioned	Mode Select Switch in MI	CEA is at LEL	Withdraw CEA (≥5 inches)	Insert CEA to LEL	CEA Exercise Satisfactory?
		Step 8.3.8.1	Step 8.3.8.2	Step 8.3.8.3	Step 8.3.8.4	Step 8.3.8.5	Step 8.3.8.6	Step 8.3.8.7	
		(initial)	(initial)	(initial)	(initial)	(initial)	(initial)	(initial)	(circle)
18	4								YES / NO
19	4								YES / NO
20	4								YES / NO
21	4								YES / NO
86	4								YES / NO
87	4								YES / NO
88	4								YES / NO
89	4								YES / NO
14	5								YES / NO
15	5								YES / NO
16	5								YES / NO
17	5								YES / NO

2013 NRC P-1
PVNGS JOB PERFORMANCE MEASURE

JPM BASIS INFORMATION

TASK:	1240023901 Perform local operation of AFN-P01								
TASK STANDARD:	Non-Essential Auxiliary Feed Pump has been manually started locally								
K/A:	3.4 061 A2.03		K/A RATING:	RO:	3.1	SRO:	3.4		
10 CFR 55:	41.5 / 43.5 / 45.3 / 45.13								
APPLICABLE POSITION(S):	SRO/RO		VALIDATION TIME:	10 minutes					
REFERENCES:	40EP-9EO10, Standard Appendices, Appendix 41								
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR		PLANT	X	OTHER				

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***Yes***
PRA/SRA related? *(Yes/No)* ***Yes***

APPROVAL

Developed By: Mike Selland Date: 09/12/2006

Revised By: Adam Rasmussen Date: 10/16/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ______________________ Date: ____________

Evaluator Name: ______________________

Time to complete: Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   N/A

2. **SPECIAL TOOLS/EQUIPMENT:**

   - 40EP-9EO10, Standard Appendices, Appendix 41, Revision 78 available
   - This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.

3. **JPM PERFORMANCE:**

   - MALFUNCTIONS, OVERRIDES, etc. **during** JPM:
     N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE**any equipment.
- Inform the control room staff of any discovered deficiencies.
- Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- You may use any source of information normally available.

INITIAL CONDITIONS:

- **A Loss of All Feedwater event has occurred.**
- **125 VDC control power has been lost to breaker PBA-S03S.**

INITIATING CUE:

- **The CRS directs you to perform a LOCAL MANUAL start of the Non-Essential Auxiliary Feed Pump, AFN-P01 per 40EP-9EO10, Standard Appendices, Appendix 41, Attachment 41-A.**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME:

	STEP	CUE	STANDARD
1.	Step 1: Check that the closing spring indicator for breaker PBA-S03S, "AUX FEEDWATER PUMP M-AFN-P01"indicates "CHGD".	**IF Requested CUE:** **IF** examinee requests status of lights on the panel front, report **"There are no lights illuminated on the panel front."** **Information CUE:** **AFTER** examinee locates PBA-S03S, provide examinee with breaker pictures **(Attached)** **WHEN** examinee observes the charging spring indicator, report **"Closing springs DO NOT indicate charged."**	**Evaluator NOTE: Examinee SIMULATES opening the cubicle. Examinee will explain operation of components inside the cubicle.** Examinee simulates observing the closing spring indicator **Evaluator NOTE: Charging spring indicator is located in the middle left side of cubicle.** **Because the springs are not charged, examinee must take contingency actions** **ALTERNATE PATH**

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	Contingency Step 1.1: Perform the following: a. Obtain **ALL** of the following equipment from FPN-C02, "EMERGENCY EQUIPMENT CABINET." • Ratchet • Extension • 5/8 inch socket	**Information CUE:** **AFTER** examinee locates FPN-C02, report **"You have obtained the required equipment."**	Examinee simulates obtaining equipment from FPN-C02. **Evaluator NOTE: FPN-C02 is located on the 100' level of the Control Building in the "B" Switchgear Room**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
3.	b. Open RRA, 125 VDC control power breaker.	**Information CUE:** **AFTER** examinee indicates where the control power breaker is located on the pictures provided, report **"The control power breaker is open."**	Examinee simulates opening the control power breaker (RRA) **Evaluator NOTE: The control power breaker is located inside the breaker cubicle, top right-hand side.**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
4. *	c. Manually charge the closing springs by ratcheting the hexed charging stud counter-clockwise to obtain a "CHGD" indication on the closing spring indicator.	**Information CUE:** **AFTER** examinee indicates where the hexed charging stud is located and simulates rotation, report **"The closing spring indicator indicates 'CHGD.'"**	Examinee simulates manually charging the closing spring by pointing out the closing spring driving stud and indicating that he/she would rotate the stud in the counter-clockwise direction
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
5.	d. Close RRA, 125 VDC control power breaker	**Information CUE:** **AFTER** examinee indicates where the control power breaker is located on the pictures provided, report **"The control power breaker is closed."**	Examinee simulates closing the control power breaker (RRA) **Evaluator NOTE: The control power breaker is located inside the breaker cubicle, top right-hand side.**
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
6. *	Step 2: Press the "MANUAL CLOSE" plunger for the breaker.	**Information CUE:** **AFTER** examinee indicates where the Manual Close plunger is located, report **"The Manual Close plunger for breaker PBA-S03S has been pressed in."**	Examinee simulates pressing the manual close push-button to close PBA-S03S.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
7.	Step 3: Check that the mechanical breaker indication shows "CLOSED."	**Information CUE:** **WHEN** examinee observes the mechanical breaker indication, report **"PBA-S03A mechanical breaker indication indicates CLOSED."**	Examinee simulates verifying PBA-S03S closed by observing closed flag on breaker (breaker position indicator).
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
8.	Step 4: Inform the responsible operator that this attachment is complete.	**Information CUE:** **"Control Room is informed of completion of Attachment 41-A"**	Examinee simulates informing the Control Room that Attachment 41-A has been completed.
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- A Loss of All Feedwater event has occurred.
- 125 VDC control power has been lost to breaker PBA-S03S.

INITIATING CUE:

- The CRS directs you to perform a LOCAL MANUAL start of the Non-Essential Auxiliary Feed Pump, AFN-P01 per 40EP-9EO10, Standard Appendices, Appendix 41, Attachment 41-A.

APPLICANT

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 1. Check that the closing spring indicator for breaker PBA-S03S, "AUX FEEDWATER PUMP M-AFN-P01" indicates "CHGD".	____ 1.1 Perform the following: a. Obtain **ALL** of the following equipment from FPN-C02, "EMERGENCY EQUIPMENT CABINET". • Ratchet • Extension • 5/8 inch socket b. Open RRA, 125Vdc control power breaker. c. Manually charge the closing springs by ratcheting the hexed charging stud counter-clockwise to obtain a "CHGD" indication on the closing spring indicator. d. Close RRA, 125Vdc control power breaker.
____ 2. Press the "MANUAL CLOSE" plunger for the breaker.	
____ 3. Check that the mechanical breaker indication shows "CLOSED".	
____ 4. Inform the responsible operator that this attachment is complete.	

End of Attachment

JPM BASIS INFORMATION

TASK:	1240070004 Perform Auxiliary Operator Actions Per 40EP-9EO07, Loss Of Offsite Power							
TASK STANDARD:	Train B EW cooling has been established to Spent Fuel Pool Cooling							
K/A:	3.8 033 A2.02	K/A RATING:	RO:	2.7	SRO:	3.0		
10 CFR 55:	41.5 / 43.5 / 45.3 / 45.13							
APPLICABLE POSITION(S):	SRO/RO	VALIDATION TIME:	15 minutes					
REFERENCES:	40EP-9EO10, Standard Appendices, Appendix 64, Attachment 64-B							
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR		PLANT	X	OTHER			

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Mike Selland Date: 03/09/2006

Revised By: Adam Rasmussen Date: 10/16/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ______________________________ Date: ____________

Evaluator Name: ______________________________

Time to complete: Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # ____________*
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**

N/A

2. **SPECIAL TOOLS/EQUIPMENT:**
   - 40EP-9EO10, Standard Appendices, Appendix 64, Revision 78 available
   - This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.
3. **JPM PERFORMANCE:**
   - MALFUNCTIONS, OVERRIDES, etc. **during** JPM:
     N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE**any equipment.
- o Inform the control room staff of any discovered deficiencies.
- o Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- o You may use any source of information normally available.

INITIAL CONDITIONS:

- **The plant has experienced a Loss of Offsite Power and recovery of the switchyard is not expected soon.**
- **The Control Room is currently performing steps from the Loss of Offsite Power EOP.**
- **It has been determined that Train B Essential Cooling Water (EW) will be aligned to Spent Fuel Pool Cooling.**
- **Another operator has been briefed and stationed at Essential Chiller B to perform required actions.**

INITIATING CUE:

- **The CRS directs you to perform the Area 3 actions from Attachment 64-B of Standard Appendix 64 to align Train B EW to Spent Fuel Pool Cooling.**
- **Permission is granted to break 40AC-0ZZ06 locks as required.**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate <u>any</u> valves.

JPM START TIME:

	STEP	CUE	STANDARD
1.	Step 1: Ensure Spray Pond Pump B is operating.	**Information CUE:** **"Spray Pond Pump B is running."**	Examinee simulates calling the Control Room to verify Spray Pond Pump B operation.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
2.	Step 2: Ensure Essential Cooling Water Pump B is operating.	**Information CUE:** **"EW Pump B is running."**	Examinee simulates calling the Control Room to verify EW Pump B operation.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
3. *	Step 3: Close NCB-HCV-265, "NC WATER OUTLET OF FP HXB."	**Information CUE:** **AFTER examinee simulates rotating valve in clockwise direction:** **"NCB-HCV-265 has been rotated in the clockwise direction and has stopped moving."** **Use pointing device to simulate "CLOSED" indication on side of valve.**	Examinee simulates rotating NCB-HCV-265 in the clockwise direction. **Evaluator NOTE:** Valve is located in Fuel Bldg. 100' at PC Heat Exchanger B.
SAT / UNSAT **Comments (required for UNSAT):**			

NOTE: Special stem locks may be installed on certain individual valves in addition to the locks addressed in 40AC-0ZZ06. The stem locking devices may require loosening before valves are manipulated.			
	STEP	**CUE**	**STANDARD**
4.	Step 4: a. Close NCB-HCV-245, "NC ISOLATION TO SFP HEAT EXCHANGER." b. Close NCB-HCV-259, "NC ISOLATION FROM SFP HEAT EXCHANGER." c. Unlock and open EWB-HCV-68, "EW ISOLATION FROM SFP HEAT EXCHANGER." d. Unlock and open EWB-HCV-134, "EW ISOLATION TO SFP HEAT EXCHANGER."	**Information CUE:** • **Another operator has completed Step 4:** • **NCB-HCV-245 is CLOSED** • **NCB-HCV-259 is CLOSED** • **EWB-HCV-68 is OPEN** • **EWB-HCV-134 is OPEN**	Examinee acknowledges communication and initials Step 4 complete. **Evaluator NOTE:** Valves are located in EW Heat Exchanger B Room. Steps simulated by another operator to reduce excessive transit between locations.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	**CUE**	**STANDARD**
5.	Step 5: Direct an operator to perform the following to override and open EWB-PCV-174, "REFRIGERANT HEAD PRESSURE CONTROL VALVE": Turn the Pilot Bypass Stem in the fully counter clockwise position.	**Information CUE:** **"Another operator has overridden and opened EWB-PCV-174."**	Examinee simulates calling another operator or Control Room to have EWB-PCV-174 opened.
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
6. *	Step 6: Place NCN-FI-257, "FUEL POOL HEAT EXCH B NCWS OUTLET FLOW" into service by performing the following:		Examinee simulates placing flow meter in service. ALL steps must be performed and in the order listed to meet STANDARD. **Evaluator NOTE:** Valve is in Fuel Bldg 100 ft at PC Heat Exchanger B outlet.
	a. Ensure the local equalizing valve is open.	**Information CUE:** **"Equalizing valve has been rotated counter-clockwise"**	Examinee simulates rotating equalizing valve counter-clockwise.
	b. Open NCB-V113, "ROOT VLV TO FI 257."	**"NCB-V113 has been rotated counter-clockwise and has stopped moving."**	Examinee simulates rotating NCB-V113 counter- clockwise.
	c. Open NCB-V114, "ROOT VLV TO FI 257."	**"NCB-V114 has been rotated counter-clockwise and has stopped moving."**	Examinee simulates rotating NCB-V114 counter-clockwise.
	d. Open the local low side isolation valve, "manifold low press iso valve."	**"Local low side isolation has been rotated in the counter-clockwise direction and has stopped moving."**	Examinee simulates rotating local low side isolation valve counter-clockwise.
	e. Close the equalizing valve.	**"Equalizing valve has been rotated clockwise and has stopped moving."**	Examinee simulates rotating equalizing valve clockwise.
	f. Slowly open the local high side isolation valve "manifold high press iso valve."	**"Local high side isolation valve has been rotated counter-clockwise and has stopped moving."**	Examinee simulates rotating local high side isolation valve counter-clockwise.
	g. Verify NCN-FI-257 comes on scale.	**IF Requested CUE:** • **IF steps followed correctly: Point to 1300 gpm on NCN-FI-257 using pointing device.**	Examinee simulates reading NCN-FI-257.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
7. *	Step 7: Adjust NCB-HCV-265, "NC WATER OUTLET OF FP HX B" to obtain 1400-2400 gpm.	**Information CUE:** **After examinee simulates rotating valve counter-clockwise:** **Using pointing device, point to NCN-FI-257 rising to 1700 gpm.** **Information CUE:** **AFTER simulated flow adjusted: "Another operator will complete the remainder of Attachment 64-B."** **END OF JPM**	Examinee simulates rotating NCB-HCV-265 in the counter-clockwise direction while checking flow on NCN-FI-257. **Evaluator NOTE:** Valve is in Fuel Bldg 100 ft at PC Heat Exchanger B outlet.

SAT / UNSAT

Comments (required for UNSAT):

JPM STOP TIME:

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- The plant has experienced a Loss of Offsite Power and recovery of the switchyard is not expected soon.
- The Control Room is currently performing steps from the Loss of Offsite Power EOP.
- It has been determined that Train B Essential Cooling Water (EW) will be aligned to Spent Fuel Pool Cooling.
- Another operator has been briefed and stationed at Essential Chiller B to perform required actions.

INITIATING CUE:

- The CRS directs you to perform the Area 3 actions from Attachment 64-B of Standard Appendix 64 to align Train B EW to Spent Fuel Pool Cooling.
- Permission is granted to break 40AC-0ZZ06 locks as required.

APPLICANT

INSTRUCTIONS | CONTINGENCY ACTIONS

NOTE

Adjusting flow through the individual components may require additional throttling during the performance of this attachment to achieve the target flow range.

____ 1. Ensure Spray Pond Pump B is operating.

____ 2. Ensure Essential Cooling Water Pump B is operating.

____ 3. Close NCB-HCV-265, “NC WATER OUTLET OF FP HX B”. (Fuel Bldg. 100' at PC Heat Exchanger B)

INSTRUCTIONS | CONTINGENCY ACTIONS

NOTE

Special stem locks may be installed on certain individual valves in addition to the locks addressed in 40AC-0ZZ06. The stem locking devices may require loosening before valves are manipulated.

____ 4. Perform the following:
(EW Heat Exchanger B Room)

a. Close NCB-HCV-245, "NC ISOLATION TO SFP HEAT EXCHANGER".

b. Close NCB-HCV-259, "NC ISOLATION FROM SFP HEAT EXCHANGER".

c. Unlock and open EWB-HCV-68, "EW ISOLATION FROM SFP HEAT EXCHANGER".

d. Unlock and open EWB-HCV-134, "EW ISOLATION TO SFP HEAT EXCHANGER".

____ 5. Direct an operator to perform the following to override and open EWB-PCV-174 "REFRIGERANT HEAD PRESSURE CONTROL VALVE":
(B EC Chiller Rm, 74' Cont Bldg)

a. Turn the Pilot Bypass Stem in the fully counter clockwise position.

INSTRUCTIONS

CONTINGENCY ACTIONS

____ 6. Place NCN-FI-257, “FUEL POOL HEAT EXCH B NCWS OUTLET FLOW”, into service by performing the following: (FPHX B, 100' Fuel Bldg)

a. Ensure the local equalizing valve is open.

b. Open NCB-V113, “ROOT VLV TO FI 257”.

c. Open NCB-V114, “ROOT VLV TO FI 257”.

d. Open the local low side Isolation valve.

e. Close the equalizing valve.

f. Slowly open the local high side Isolation valve.

g. Verify NCN-FI-257 comes on scale.

____ 7. Adjust NCB-HCV-265, “NC WATER OUTLET OF FP HX B” to obtain 1400 – 2400 gpm. (Fuel Bldg. 100' at PC Heat Exchanger B)

INSTRUCTIONS	CONTINGENCY ACTIONS

____ 8. **IF** the Shutdown Cooling Heat Exchanger is accessible, **THEN** unlock and adjust EWB-HCV-54, “SDCHX B OUTLET ISOLATION” to obtain 15,400 – 15,600 gpm (EWB-FI-14) total EW system flow.
(70' Shutdown Hx Room "B"; 10' Above Platform)

____ 9. Place EWN-FI-064, “ECW OUTLET FROM ESSENTIAL CHILLER "B" FLOW INDICATION”, into service by performing the following:
(B EC Chiller Rm, 74' Cont Bldg)

a. Ensure the local equalizing valve is open.

b. Open EWB-V217, “EWN-FI-64 ROOT ISOLATION”.

c. Open EWB-V216, “EWN-FI-64 ROOT ISOLATION”.

d. Open the local low side isolation valve.

e. Close the equalizing valve.

f. Slowly open the local high side isolation valve.

g. Verify EWN-FI-064 comes on scale.

INSTRUCTIONS

CONTINGENCY ACTIONS

____ 10. Unlock and adjust EWB-V044, ""B" ESSENTIAL CHILLER EW OUTLET ISOLATION VALVE" to obtain 740 - 780 gpm. (B EC Chiller Rm, 74' Cont Bldg)

____ 11. **IF** a flow of 740 - 780 gpm can **NOT** be obtained,
AND Spray Pond Temp is 65° F or more,
THEN perform the following:
(70 ft. Control Bldg)

a. Open EWB-V349, "REFRIGERANT HEAD PRESSURE CONTROL BYPASS VALVE".

b. Adjust EWB-V044, ""B" ESSENTIAL CHILLER EW OUTLET ISOLATION VALVE" to obtain 740 - 780 gpm.

End of Attachment

JPM BASIS INFORMATION

TASK:	1250080201 Respond to a Steam Generator Tube Leak								
TASK STANDARD:	Turbine Building Sumps have been aligned to LRS								
K/A:	4.2 037 AK3.06		K/A RATING:	RO:	3.6	SRO:	4.1		
10 CFR 55:	41.5 / 41.10 / 45.6 / 45.13								
APPLICABLE POSITION(S):	SRO/RO		VALIDATION TIME:	15 minutes					
REFERENCES:	40AO-9ZZ02, Excessive RCS Leakrate								
SUGGESTED TESTING ENVIRONMENT:	SIMULATOR			PLANT	X	OTHER			

JPM TYPE

Time Critical? *(Yes/No)* ***No*** Alternative Path? *(Yes/No)* ***No***
PRA/SRA related? *(Yes/No)* ***No***

APPROVAL

Developed By: Joe Hoover Date: 05/10/2007

Revised By: Adam Rasmussen Date: 10/23/2013

Technical Review ______________________ Operations Approval ______________________

Training Approval ______________________

EVALUATION

Examinee Name: ______________________________ Date: ____________

Evaluator Name: ______________________________

Time to complete: Minutes GRADE *(Circle One)* SAT / UNSAT *

** For E-Plan JPMs, a grade of UNSAT requires a PVAR to be written, remediation, and re-evaluation.PVAR # _____________*
Problems/issues identified on E-Plan JPMs during performance will be documented with a formal postcritique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to the Emergency Preparedness organization for resolution.

1. **SIMULATOR SETUP:**
   N/A
2. **SPECIAL TOOLS/EQUIPMENT:**
   - 40AO-9ZZ02, Excessive RCS Leakrate, Appendix D Revision 16 available
   - This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.
3. **JPM PERFORMANCE:**
   MALFUNCTIONS, OVERRIDES, etc. **during** JPM: N/A

TASK CONDITIONS

INFORMATION PRESENTED TO EXAMINEE:

SPECIAL CONSIDERATIONS:

IN-PLANTJPMs ONLY:

- o Operation of in-plant equipment is to be **SIMULATED ONLY, DO NOT OPERATE** any equipment.
- o Inform the control room staff of any discovered deficiencies.
- o Comply with the REP, if it is not possible to enter an area it may be permissible to discuss the equipment to be operated. Do **NOT** enter contaminated, airborne, or high radiation areas.

ALL JPMs:

- o You may use any source of information normally available.

INITIAL CONDITIONS:

- **A Steam Generator Tube Leak is in progress.**

INITIATING CUE:

- **The CRS directs you to align the Turbine Building Sumps to LRS in accordance with 40AO-9ZZ02, Excessive RCS Leakrate, Appendix D.**

INFORMATION FOR EVALUATOR'S USE:

- An asterisk (*)denotes a Critical Step
- At the discretion of the Examiner/Evaluator, this JPM may be terminated when the Task Standard is met or adequate time has been allowed to complete the JPM.
- Any step marked UNSAT requires comments.
- If this is the first JPM of the set then ensure the examinee has been briefed.
- Step sequence is not critical unless noted or will prevent achieving the task standard.
- Notify the unit Shift Manager of in-plant JPM performance.
- Performance of this JPM may require entry into areas with alarmed doors. Security requirements must be observed.
- Locked valves may be involved. No attempt will be made to actually operate any valves.

JPM START TIME:

	STEP	CUE	STANDARD
1.	Step 1: Enter Appendix Entry Time and Date:		Examinee records current time and date
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
2. *	Step 2: Align the Turbine Building Sump by performing the following: a. Unlock and open OWN-V022, "TURBINE BUILDING SUMPS TO LRS SYSTEM HEADER ISOLATION VALVE." (At Turb Bldg Sump) b. Close OWN-V021, "TURBINE BUILDING SUMPS TO OW SEPARATOR HDR ISOLATION VALVE." (Turb Bldg South Above Turb Bldg Sump)	**Information CUE:** **"OWN-V022 has been rotated counter-clockwise and is no longer moving."** **"OWN-V021 has been rotated clockwise and is no longer moving."**	Examinee locates and simulates unlocking and opening OWN-V022 by rotating handwheel counter-clockwise Examinee locates and simulates closing OWN-V021 by rotating handwheel clockwise
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
3.	Step 3: Align the South Condenser Area Sump by performing the following: a. Unlock and open OWN-V033, "S CONDENSER AREA SUMPS TO LRS SYSTEM HEADER ISOL VALVE." (At South Cond Area Sump) b. Close OWN-V029, "S CONDENSER AREA SUMPS TO SEPERATOR HEADER ISOL VAVLE." (At South Cond Area Sump)	**Information CUE:** **"Another operator has performed Step 3. The South Condenser Area Sump is aligned."**	Examinee acknowledges report

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
4. *	Step 4: Align the Condensate Polishing and the Blowdown Low TDS Sump by performing the following: a. Open CMN-V091, "CD LOW TDS HEADER TO LRS HOLDUP TANKS HEADER." (Turb Bldg Southwest Of Cond Demins Above & Northwest of Cation Vessel ~ 110 ft. elev)	**Information CUE:** **"CMN-V091 has been rotated counter-clockwise and is no longer moving."**	Examinee locates and simulates opening CMN-V091 by rotating lever counter-clockwise
	b. Open SCN-V175, "BLOWDOWN LOW TDS SUMP TO LRS." (Turb Bldg Soutwest Of Cond Demins Above & Northwest of Cation Vessel ~ 110 ft. elev)	**"SCN-V175 has been rotated counter-clockwise and is no longer moving."**	Examinee locates and simulates opening SCN-V175 by rotating lever counter-clockwise
	c. Close CMN-V076, "CD LOW TDS HEADER TO CIRC WATER RETURN ISOL." (Turb Bldg East of Cond Demins Above High TDS Sump ~104 ft. elev)	**"CMN-V076 has been rotated clockwise and is no longer moving."**	Examinee locates and simulates opening CMN-V076 by rotating lever clockwise
	d. Close SCN-V176, "BLOWDOWN LOW TDS SUMP TO CIRC WATER RETURN LINE." LINE".(Turb Bldg East of Cond Demins Above High TDS Sump ~104 ft. elev)	**"SCN-V176 has been rotated clockwise and is no longer moving."**	Examinee locates and simulates opening SCN-V176 by rotating lever clockwise

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
5.	Step 5: <u>Align</u> the North Condenser Area Sump by performing the following: a. <u>Unlock</u> and <u>open</u> OWN-V042, "N COND AREA SUMPS DISCHARGE TO LRS SYSTEM ISOLATION VALVE." (Turb Bldg North Wall at North Cond Area Sump) b. <u>Close</u> OWN-V151, "N CONDENSER AREA SUMPS TO OILY WATER SEPARATOR HDR ISOLATION VALVE." (Turb Bldg North Wall at North Cond Area Sump)	**Information CUE:** **"Another operator has performed Step 5. The North Condenser Area Sump is aligned."**	Examinee acknowledges report
SAT / UNSAT **Comments (required for UNSAT):**			

	STEP	CUE	STANDARD
6.	Step 6: <u>Inform</u> the responsible operator that this appendix is complete.	**Information CUE: "This completes the JPM."**	Examinee simulates calling the Control Room to report completion of the appendix.
SAT / UNSAT **Comments (required for UNSAT):**			

JPM STOP TIME: ____________

NOTE:

Problems/issues identified on E-Plan JPMs during performance will be documented with a formal post-critique using Form 0800 (Electronic Forms under Emergency Preparedness) and forwarded to Emergency Preparednessorganization for resolution.

NORMAL TERMINATION POINT

APPLICANT

INITIAL CONDITIONS:

- A Steam Generator Tube Leak is in progress.

INITIATING CUE:

- The CRS directs you to align the Turbine Building Sumps to LRS in accordance with 40AO-9ZZ02, Excessive RCS Leakrate, Appendix D.

APPLICANT

Appendix D, Aligning Turbine Building Sumps to LRS

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 1. Enter Appendix Entry Time and Date: ________________	
____2. Align the Turbine Building Sump by performing the following: a. Unlock and open OWN-V022, “TURBINE BUILDING SUMP’S TO LRS SYSTEM HEADER ISOLATION VALVE”. (At Turb Bldg Sump) b. Close OWN-V021, “TURBINE BUILDING SUMP’S TO OW SEPARATOR HDR ISOLATION VALVE”. (Turb Bldg South Above Turb Bldg Sump)	

Appendix D, Aligning Turbine Building Sumps to LRS

INSTRUCTIONS	CONTINGENCY ACTIONS
____3. Align the South Condenser Area Sump by performing the following: a. Unlock and open OWN-V033, '"S" CONDENSER AREA SUMP'S TO LRS SYSTEM HEADER ISOL VALVE". (At South Cond Area Sump) b. Close OWN-V029, '"S" CONDENSER AREA SUMP'S TO SEPERATOR HEADER ISOL VALVE". (At South Cond Area Sump)	

Appendix D, Aligning Turbine Building Sumps to LRS

INSTRUCTIONS	CONTINGENCY ACTIONS
____4. Align the Condensate Polishing and the Blowdown Low TDS Sump by performing the following:	
a. Open CMN-V091, "CD LOW TDS HEADER TO LRS HOLDUP TANKS HEADER". (Turb Bldg Southwest Of Cond Demins Above & Northwest of Cation Vessel ~ 110 ft. elev)	
b. Open SCN-V175, "BLOWDOWN LOW TDS SUMP TO LRS".(Turb Bldg Southwest Of Cond Demins Above & Northwest of Cation Vessel ~ 110 ft. elev)	
c. Close CMN-V076, "CD LOW TDS HEADER TO CIRC WATER RETURN ISOL". (Turb Bldg East of Cond Demins Above High TDS Sump ~104 ft. elev)	
d. Close SCN-V176, "BLOWDOWN LOW TDS SUMP TO CIRC WATER RETURN LINE".(Turb Bldg East of Cond Demins Above High TDS Sump ~104 ft. elev)	

Appendix D, Aligning Turbine Building Sumps to LRS

INSTRUCTIONS	CONTINGENCY ACTIONS
____5. Align the North Condenser Area Sump by performing the following: a. Unlock and open OWN-V042, ““N” COND AREA SUMP’S DISCHARGE TO LRS SYSTEM ISOLATION VALVE”. (Turb Bldg North Wall at North Cond Area Sump) b. Close OWN-V151,””N” CONDENSER AREA SUMP’S TO OILY WATER SEPARATOR HDR ISOLATION VALVE”. (Turb Bldg North Wall at North Cond Area Sump)	
____6. Inform the responsible operator that this appendix is complete.	

End of Appendix

2013 NRC EXAM

Scenario 1

Setup Instructions

1. _____ Reset to IC-20

2. _____ Run scenario file: **2013 NRC SCENARIO 1.scn** under “Simulator Scenario Files” from NRC exam thumb drive

3. _____ Stage radios for operators

4. _____ Alarm Silence to “**OFF**”

5. _____ Ensure CVCS and DFWCS alarms are reset

6. _____ Place the simulator in freeze until the crew enters the simulator.

7. _____ Hang caution tag on HPSI ‘A’ Pump handswitch SIA-HS-1.

8. _____ Hang caution tag on HPSI ‘A’ Recirc Valve handswitch SIA-HS-666.

9. _____ Hang “Train B” protected sign.

10. _____Hang “Protected Equipment” cover on the handswitch for HPSI ‘B’ Pump.

11. _____ Verify RCS leakrate has stabilized at ~ 0 gpm.

12. _____ Review procedures listed on the next page for marks and missing pages:

2013 NRC EXAM

Scenario 1

Procedures to check:

	40OP-9AR01, Section 6.2		40OP-9SG03, Section 5
	40AL-9RK7A: 7A01A, 7A04A, 7A03A, 7A06B		41AL-1RK5A: 5A10C, 5A10D
	40AL-9RK4A: 4A01A, 4A01B		40AL-9RK5B: 5B10C, 5B10D, 5B02D, 5B03D, 5B04D
	74RM-9EF41: RU-139, 142		40AL-9RK7B: 7B06B
	40AL-9RK6A: 6A04A		40AL-9RK1A: 1A12C
	40AO-9ZZ02, Excessive RCS Leakrate		40AL-9RK6B: 6B03A, 6B05A, 6B06A, 6B06B, 6B06D
	40OP-9ZZ05, Power Operations		
	40AO-9ZZ03, Loss of Cooling Water		40EP-9EO04, Steam Generator Tube Rupture
	40AO-9ZZ09, RPCB (Loss of MFP)		40EP-9EO09, Functional Recovery
	40EP-9EO01, Standard Post Trip Actions		Technical Specifications and Bases

Driver Station Menu should look like this:

SCENARIOS	TRIGGERS	MALFS	COMP MALFS	REMOTES	COMP REMOTES	I/O OVERRIDES	ALARM OVRDS
0	1	2:0	10:7	0	2	0:0	0:0

COMPLETE LIST OF COMMANDS

Triggers	
RPSCHC	Reactor Trip
Malfunctions	
mfTH06A f:0.6 k:3	Steam Generator Tube Leak
mfMS03A e:"RPSCHC" f:30 r:5:00	ESD develops upstream of MSIV on Reactor Trip
Component Malfunctions	
cmMVSI01SIAUV666_1	HPSI Pump A is tagged out
cmTRRC03RCNPT100X_4 k:2	PT-100X fails low
cmTRRX12SGBLT1123B_4 k:4	Steam Generator #2 WR Level Transmitter failure
cmCPTP04TCNP01B_5 cmCPTP04TCNP01A_1 k:5	TCW Pump A shaft shear with TCW Pump B failing to auto-start
cmCPCC08SPAP01_5	Spray Pond Pump A fails to auto-start
cmBSRP01BSPZRPRLOAT_1 cmBSRP01BSPZRPRLOBT_1 cmBSRP01BSPZRPRLOCT_1 cmBSRP01BSPZRPRLODT_1	SIAS/CIAS fails to automatically initiate on low pressurizer pressure
Remote Functions	
rfFW13 f:0 k:33	Simulates closing CDN-V099
Component Remote Functions	
crB2SI01SIAP02_2 f:RACK_OUT crMVSI01SIAUV666_9 f:0	HPSI Pump A is tagged out

EVENT	TIME	SYNTAX	DESCRIPTION	MISC.
1	**WHEN** directed by Control Room	N/A	40OP-9AR01 Actions Step 6.2.3 Steps 6.2.8-6.2.10	**WHEN** directed by Control Room to cycle the Discharge Header Stop Check Valve for D Air Removal Pump, wait 1 minute then report "**ARN-V207** has been **cycled**." (no DRIVER action) **IF** directed to verify all personnel standing clear of equipment being started, report "all personnel are standing clear." **WHEN** directed to ensure B Air Removal Pump suction valve is closed, report "**ARN-UV-26** is **closed**." **WHEN** directed to ensure B Air Removal Pump recirculation pump is stopped, report "**ARN-P02B** is **stopped**." **IF** directed to perform checks on B Air Removal Pump: Wait 1 minutes, **then** report: "For Air Removal Pump B, the speed reducer shows normal oil levels, there is no evidence of grease leakage, and water level in the Seal Water Tank is normal."
2	**WHEN** directed by Lead Evaluator	INSERT **KEY 2** cmTRRC03RCNPT100X_4 k:2	**PT-100X** fails low	**IF** contacted as I&C and/or Maintenance, acknowledge communication and report personnel are on their way to investigate.
3	**WHEN** directed by Lead Evaluator	INSERT **KEY 3** mfTH06A f:0.6	Small steam generator tube leak on Steam Generator #1 (~8 gpm)	**WHEN** contacted as Chemistry, RP, and/or Radiological Monitoring Technician acknowledge communications and directions. (Chemistry will be directed to perform **74DP-9ZZ05, Abnormal Occurrence Checklist**) **IF** contacted as Chemistry to determine if any Condensate Demins should be removed from service, report "no condensate demins should be removed."

continued on next page

3 (cont)	**WHEN** directed by Control Room			**IF** contacted as Chemistry regarding status of samples, report that no samples are currently being drawn. **IF** contacted as Area Operators to perform Appendices out of 40AO-9ZZ02, acknowledge directions and receive Control Room briefs (as applicable). **IF** asked status of Appendices, report "in progress."
3 (cont)	**WHEN** directed by Control Room to close CDN-V099	Wait 30 seconds, **THEN** INSERT **KEY 33** rfFW13 f:0		**IF** directed to CLOSE CDN-V099, wait 30 seconds, INSERT **KEY 33**, **THEN** report CDN-V099 is closed.
4	**WHEN** directed by Lead Evaluator	INSERT **KEY 4** cmTRRX12SGBLT1123B_4	CH B Steam Generator #2 WR Level Transmitter fails low	**IF** contacted as I&C and/or Maintenance, acknowledge communication and report personnel are on their way to investigate.
5	**WHEN** directed by Lead Evaluator	INSERT **KEY 5** cmCPTP04TCNP01B_5 cmCPTP04TCNP01A_1	Turbine Cooling Water Pump A shaft shear, Pump B fails to auto-start	**IF** directed to investigate TCW Pump A (**AND** TCW A is **STILL** operating), **WAIT** until after TCW Pump B is started **THEN** report "The motor for TCW Pump A running but the pump is not turning." **IF** directed to investigate TCW Pump A (**AND** TCW A is **NOT** operating, report "TCW Pump A is secured with no apparent issues." **IF** directed to report status/post-start checks of TCW Pump B, report "TCW Pump B is running with no issues." **IF** crew fails to start standby TCW Pump causing a Main Turbine Trip **OR** the crew decides to trip the Reactor: PROCEED to next event.

continued on next page

6	**WHEN** directed by Lead Evaluator **OR** if crew manually trips the reactor at any time	MODIFY Steam Generator Tube Leak Rate mfTH06A f:20	Modifies leak rate to beyond charging pump capacity **TRIP INITIATOR**	**Acknowledge** reports and direction given by Control Room (There are no further actions to take)
End Point	**WHEN** directed by Lead Evaluator	GOTO **FREEZE**		
end of scenario				

Facility: PVNGS Scenario No.: 1 Op-Test No: 2013

Examiners: ____________ Operators: ____________

Initial Conditions: (100% power, MOC).
Turnover: Unit 1 is at 100% power (250 EFPD). HPSI "A" Pump is tagged out.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N BOP/SRO	Shift Condenser AR Pumps to ARN-P01D running with ARN-P01B shutdown for preventative maintenance in accordance with **40OP-9AR01, Condenser Air Removal, Section 6.2**.
2	cmTRRC03RCNPT100X_4	I ATC/SRO	PT-100X fails low. Crew will select "Y" on Pressurizer Pressure Control selector switch and will reset the proportional heaters in accordance with alarm response. **40AL-9RK4A, Panel B04A Alarm Responses**
3	mfTH06A f:0.6	C ALL (AOP/TS)	Small Steam Generator #1 tube leak requires entry into **40AO-9ZZ02, Excessive RCS Leakrate.** **[LCO 3.4.14 CONDITION B; LCO 3.4.18 CONDITION B]** Tube leak is on Steam Generator 1 with a leakrate of **~8.1 gpm**.
4	cmTRRX12SGBLT1123B_4	I BOP/SRO (TS)	CH B Steam Generator #2 WR Level Transmitter will fail low. Crew will address Technical Specifications and bypass affected channel and bistables in accordance with alarm response, **40AL-9RK5B, Panel B05B Alarm Responses.** **[LCO 3.3.1 CONDITION A; LCO 3.3.5 CONDITION A; LCO 3.3.11 CONDITION A]**
5	cmCPTP04TCNP01B_5 cmCPTP04TCNP01A_1	C BOP/SRO (AOP)	Running Turbine Cooling Water pump 'A' experiences a shaft shear but will not trip and standby pump ('B') will fail to automatically start requiring crew to start manually. Crew will enter **40AO-9ZZ03, Loss of Cooling Water**.
6	modify mfTH06A f:20	M ALL	Steam Generator #1 tube leak will degrade to beyond charging pump capacity. Crew will trip perform a Reactor Trip due to meeting criteria. **40EP-9EO01, SPTAs**
7	mfMS03A f:30 r:5:00	M ALL	On the Reactor Trip, an ESD will develop on the affected Steam Generator (#1). This will require entry into **40EP-9EO09, Functional Recovery Procedure**. **CRITICAL TASK – Once SPTAs completed and FRP is entered, establish 1360-1600 gpm feed to ruptured Steam Generator prior to exiting HR-2 of FRP.**
8	cmCPCC08SPAP01_5	C ATC/SRO	Spray Pond pump "A" will fail to auto start. Crew will manually start pump to supply cooling water to a running (unloaded) Diesel Generator.
9	cmBSRP01BSPZRPRLOAT_1 cmBSRP01BSPZRPRLOBT_1 cmBSRP01BSPZRPRLOCT_1 cmBSRP01BSPZRPRLODT_1	C BOP/SRO	SIAS/CIAS will fail to automatically initiate on low pressurizer pressure (1837 psia) requiring the crew to manually initiate. **CRITICAL TASK – When the SIAS/CIAS setpoint is exceeded, manually initiate SIAS and CIAS prior to completion of SPTAs.**
End point			Scenario may be ended once SIAS and CIAS have been manually initiated and Steam Generator #1 is being fed at 1360-1600 gpm.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5-8)	6
2. Malfunctions after EOP entry (1-2)	2
3. Abnormal events (2-4)	2
4. Major transients (1-2)	2
5. EOPs entered/requiring substantive actions (1-2)	2
6. EOP contingencies requiring substantive actions (0-2)	1
7. Critical tasks (2-3)	2

CRITICAL TASK	JUSTIFICATION
Once SPTAs completed and FRP is entered, establish 1360-1600 gpm feed to ruptured Steam Generator prior to exiting HR-2 of FRP.	FSAR Chapter 15.6.3 analysis for a Steam Generator Tube Rupture event requires the establishment of a minimum 1360 in order to ensure tube coverage within the design basis time (>45% NR SGWL) to minimize dose to the public.
When the SIAS/CIAS setpoint is exceeded, manually initiate SIAS and CIAS prior to completion of SPTAs.	This task is a condition of license. Inadequate Safety Injection and Containment Isolation may result in loss of subcooled margin, core uncovery, and/or degradation of a barrier to fission product release.

TURNOVER

Plant conditions:

Unit 1 is at 100% power.

The core is presently at 250 EFPD.

Risk Management Action Level is GREEN

HPSI “B” Pump is protected in accordance with 40DP-9AP21, Protected Equipment

Train B is protected.

PC is NOT recircing the RWT.

Unit 2 is supplying the Aux Steam cross-tie header.

Equipment out of service:

HPSI “A” Pump is under clearance for bearing inspection. LCO 3.5.3 Condition B has been entered. The pump is expected to return to service in 8 hours.

Planned shift activities:

Shift Condenser Air Removal Pumps to ARN-P01D running with ARN-P01B shutdown in preparation for preventative maintenance in accordance with **40OP-9AR01, Condenser Air Removal, Section 6.2**.

Sections 6.2.1 and 6.2.2 have been completed. An area operator has been briefed and is standing by.

CREW HANDOUT

Plant conditions:

Unit 1 is at 100% power.

The core is presently at 250 EFPD.

Risk Management Action Level is GREEN

HPSI “B” Pump is protected in accordance with 40DP-9AP21, Protected Equipment

Train B is protected.

PC is NOT recircing the RWT.

Unit 2 is supplying the Aux Steam cross-tie header.

Equipment out of service:

HPSI “A” Pump is under clearance for bearing inspection. LCO 3.5.3 Condition B has been entered. The pump is expected to return to service in 8 hours.

Planned shift activities:

Shift Condenser Air Removal Pumps to ARN-P01D running with ARN-P01B shutdown in preparation for preventative maintenance in accordance with **40OP-9AR01, Condenser Air Removal, Section 6.2**.

Sections 6.2.1 and 6.2.2 have been completed. An area operator has been briefed and is standing by.

Scenario 1 Overview

Event 1	The BOP operator will shift Condenser AR Pumps to ARN-P01D running with ARN-P01B shutdown in accordance with **40OP-9AR01, Condenser Air Removal**.
Event 2	Pressurizer Pressure Transmitter, PT-100X, fails low. ATC operator will respond to alarm response procedure and select Channel "Y" on the Pressure Control Channel Selector Switch, RCN-HS-100. **40AL-9RK4A, Panel B04A Alarm Responses**.
Event 3	Steam Generator #1 tube leak. The CRS should respond by entering Abnormal operating procedure **40AO-9ZZ02, Excessive RCS Leakrate**, and addressing Tech Specs. The crew should address charging pumps and letdown. The ATC will perform a leakrate determination and the BOP will minimize the release to environment.
Event 4	CH B Steam Generator #2 WR Level Transmitter will fail low. Crew will address Technical Specifications and bypass affected channel and bistables in accordance with alarm response, **40AL-9RK5B, Panel B05B Alarm Responses.**
Event 5	Turbine Cooling Water Pump 'A' will trip due to rapid seizure of the impeller and the standby pump ('B') will fail to automatically start requiring crew to start manually. Crew will address alarm response procedure, **40AL-9RK7A, Panel B07A Alarm Responses** and enter **40AO-9ZZ03, Loss of Cooling Water**.
Event 6	Steam Generator tube leak will degrade to beyond charging pump capacity. Crew will trip perform a Reactor Trip due to meeting criteria. **40EP-9EO01, SPTAs**
Event 7	On the Reactor Trip, an ESD will develop on the affected Steam Generator (#1). This will require entry into **40EP-9EO09, Functional Recovery Procedure**.
Event 8	Spray Pond pump "A" will fail to auto start. Crew will manually start pump to supply cooling water to a running (unloaded) Diesel Generator. **40EP-9EO01, SPTAs**
Event 9	SIAS/CIAS will fail to automatically initiate on low pressurizer pressure (1837 psia) requiring the crew to manually initiate. **40EP-9EO01, SPTAs**

Op-Test No.: _____ Scenario No.: __1__ Event No.: __1__

Event Description: Shift Condenser AR Pumps to ARN-P01D running with ARN-P01B shutdown configuration

Time	Position	Applicant's Actions or Behavior
T=0	CRS	Directs the BOP operator to shift Condenser AR Pumps to ARN-P01D running with ARN-P01B secured in accordance with **40OP-9AR01, Condenser Air Removal, Section 6.2**, beginning at step 6.2.3.
	BOP	Step 6.2.3 Directs area operator to cycle ARN-V207, D Air Removal Pump ARN-P01D Discharge Header Stop Check Valve. Step 6.2.4 Starts Air Removal Pump D using ARN-HS-28, COND AIR REMOVAL PMP D P01D handswitch. **Evaluator NOTE:** It is expected that a communication will be made via plant paging system OR radio anytime plant equipment is started (non-emergency) to verify personnel are standing clear. Booth operators will acknowledge communications. Marks Step 6.2.5 as N/A. Step 6.2.6 Places ARN-HS-15, COND B AIR REMOVAL SUCTION VLV UV-15 to OPEN.
Examiner NOTE: Annunciator 7A1A, AIR REM SYS TRBL, may alarm. PM Task AR001 requires operation of ARN-P01D, D Air Removal Pump, for a minimum of 30 minutes.		
	BOP	Step 6.2.7 Stops Air Removal Pump B using ARN-HS-26, COND AIR REMOVAL PMP B P01B.

COMMENTS

	BOP (continued)	Steps 6.2.8-6.2.10 Directs an area operator to: Ensure ARN-UV-26, B ARN-UV-26, B AR Pump ARN-P01B Suction Isolation Valve, is closed. Ensure ARN-P02B, B AR System Recirc Pump, is stopped. Check oil level in the speed reducer is normal, oil level is within the red band in bearing assemblies, for evidence of grease leakage, water level in AR Pump Seal Water Tank is normal.
Examiner NOTE: May proceed to next event prior to area operator reporting back the status of post-shutdown evaluation of the secured Air Removal pump **OR** at the discretion of the Lead Examiner.		

COMMENTS

Op-Test No.: _____ Scenario No.: __1__ Event No.: __2__

Event Description: Pressurizer Pressure Transmitter, PT-100X, fails low.

Time	Position	Applicant's Actions or Behavior
T=15	CREW	Alarms for B04 windows 4A01A (PZR TRBL) and 4A01B (PZR PRESS HI-LO) are received and acknowledged. Alarm response procedure **40AL-9RK4A** is referenced for operator response. All Pressurizer backup heaters will be energized. May brief on the impact the transmitter failure will have on SBCS.
	ATC	Diagnoses that PT-100X has failed as indicated by observing Pressurizer pressure on RCN-PIC-100X, RCN-PIC-100Y, and/or RCN-PR-100 on Board B04. Addresses alarm response procedure 40AL-9RK4A. Actions will be taken in accordance with 4A01A, GROUP J (window 1A) OR 4A01B, GROUP A (window 1B). Selects Channel "Y" on Pressurizer Pressure Control Channel Selector Switch, RCN-HS-100. Resets and energizes Pressurizer proportional heaters breakers by placing the following handswitches to "ON": • RCN-HS-100-1 • RCN-HS-100-2

Examiner NOTE: Once proportional heaters are energized **OR** at the discretion of the Lead Examiner, proceed to the next event.

COMMENTS

Op-Test No.: _____ Scenario No.: __1__ Event No.: __3__

Event Description: Steam Generator #1 Tube Leak.

Time	Position	Applicant's Actions or Behavior
T=23	CREW	Receives and acknowledges Radiation Monitor alarms **RU-139 AND RU-142.** Alarm response procedure **74RM-9EF41** is referenced for alarm

	BOP	Per **74RM-9EF41**:
		• Determines Steam Generator #1 is affected
		• Secures blowdown to the affected Steam Generator using **40OP-9SG03**, Operating the Steam Generator Blowdown System, **Section 5.3**:
		  • Inserts zero for Blowdown COLSS Constant into CMC and PMC
		  • Places **SCN-HS-1**, Steam Generator Blowdown Path Selector, to the **OFF** position
		  • At the discretion of the CRS, closes the following valves:
		  • **SGA-UV-500P**, SG 1 Common Upstream Isolation
		  • **SGB-UV-500Q**, SG 1 Common Downstream Isolation
		  • **SGE-HV-43**, SG 1 Hot Leg Isolation
		  • **SGE-HV-41**, SG 1 Cold Leg Isolation
		  • **SGE-HV-47**, SG 1 Downcomer Isolation
		• Notifies Radiological Monitoring Technician and RP of the alarm and that blowdown is secured

COMMENTS

	CRS	Enters **40AO-9ZZ02, Excessive RCS Leakrate**, **Section 5.0, STEPS:** 1. Records the AOP Entry Time and Date. **Evaluator NOTE:** At this time, the leak is not significant enough to warrant starting an additional charging pump or isolating letdown. 5. Ensures the event is being classified. 6. Addresses Technical Specifications: • **LCO 3.4.14**, RCS Operational Leakage **Condition B** is applicable (primary to secondary LEAKAGE >150 gal/day) ➢ Required to be in MODE 3 within 6 hours, MODE 5 within 36 hours • **LCO 3.4.18**, Steam Generator Tube Integrity **Condition B** is applicable (SG tube integrity not maintained) ➢ Required to be in MODE 3 within 6 hours, MODE 5 within 36 hours 7. Directs Chemistry to perform 74DP-9ZZ05, Abnormal Occurrence Checklist. 8. Notifies RP that a leak is in progress 9. Directs ATC or BOP to report **Leakrate** and **Rate of Change of Leakrate** from RMS Steam Generator Tube Leak Rate screens 10. Refers to Appendix F, Steam Generator Tube Leak Guidelines to 11. Directs ATC to determine the leakrate using either of the following: • **Appendix A**, 15 Minute Leak Rate Calculation • **Appendix B**, ERFDADS Leak Rate Determination 12. Prepares for plant shutdown by entering **40OP-9ZZ05, Power Operations** 13. Directs BOP to perform **Appendix C, Minimize Release to the Environment** 14. Addresses 40DP-9ZZ14, Contaminated Water Management 15. Directs an operator to perform Appendix D, Aligning Turbine Building Sumps to LRS (may be delegated to ATC or BOP) 16. Directs Chemistry to sample condensate and connecting systems for activity

COMMENTS

	ATC	Performs **40AO-9ZZ02, Appendix B, ERFDADS Leak Rate Determination** (preferred appendix) **STEPS**: 1. Records Appendix Entry Time and Date 2. Ensures RCS Tc is constant 3. Checks pressurizer pressure is stable 2235-2265 psia 4. Directs Chemistry to not draw RCS or CVCS samples 5. Ensures that Letdown is either aligned to the VCT or isolated 6. Ensures that charging pump suction is aligned to the VCT 7. Places CHN-FIC-210X, Reactor Makeup Water to VCT, in "**MANUAL**" with **zero output** 8. Places CHN-FIC-210Y, Boric Acid Makeup to VCT, in "**MANUAL**" with **zero output** 9. Places CHN-HS-527, Make-up to charging pumps (VCT Bypass), in "**CLOSED**" 10. After CHN-UV-527 is closed, places CHN-HS-210, Make-up Mode Select Switch, in "**MANUAL**" 11-15. Monitors RCS Leakrate on ERFDADS for 15 minutes OR until VCT level has lowered to 15% **Evaluator NOTE: IF** Appendix **A** is used (not preferred), steps 1-10 are the same as in Appendix **B**. After these steps are performed, operator will fill out **Attachment A-1**, Leakrate Data Sheet.
	BOP	Performs **40AO-9ZZ02, Appendix C, Minimize Release to the Environment STEPS**: 1. Records Appendix Entry Time and Date 2. Ensures ARN-HS-19, Post Filter Mode Select Switch, is in the THRU FILTER MODE" 4. Selects "**OFF**" on **BOTH** SGN-HS-1007 and SGN-HS-1008 5. Directs an operator to perform Attachment C-1, Condensate Cross-Tie Isolation

COMMENTS

	BOP (continued)	6. Throttles OPEN CDN-HV-275, Demin Water Feed to Condensate Service Header, to maintain 50-100 psig on CDN-PI-201 7. Directs an operator to CLOSE CDN-V099, Condensate Service Header Supply Reg Valve CDN-PV-200 Outlet Isolation 8. Ensures **BOTH** CDN-HV-29/30, Condensate Pump Overboard Valves, are closed 9. **IF** at least two Condensate Demins are **NOT** in service… (N/A) 10. Contacts Chemistry to determine if any Condensate Demins should be removed from service 11. Ensures Blowdown Demins are in service
Evaluator NOTE: May proceed to the next event once the crew begins the 15 minute wait for leakrate determination **OR** at the discretion of the Lead Examiner.		

COMMENTS

Op-Test No.: _____ Scenario No.: __1__ Event No.: __4__

Event Description: Steam Generator #2 CH B WR Level Transmitter Fails Low

Time	Position	Applicant's Actions or Behavior
T=43	CREW	Alarms for B05 windows 5A10C/D (LO SG 2 LVL CH TRIP/PRE-TRIP), 5B10C/D (LO SG 2 LVL AFAS CH TRIP/PRE-TRIP), and 5B02D (PPS TRBL/GRD) are received and acknowledged. Alarm response procedure **41AL-9RK5A OR 40AL-9RK5B** is referenced for operator response.
	BOP	Performs applicable steps in alarm response procedures Per **41AL-1RK5A** (5A10C): • Compares indicators SGA-LI-1123A, SGB-LI-1123B, SGC-LI-1123C, and SGD-LI-1123D and determines SGB-LI-1123B has failed low • Reports to CRS that Technical Specifications 3.3.1, 3.3.5, 3.3.11, and 3.3.10 may be impacted • Recommends bypassing the affected channel in PPS cabinet SBB-C01 • Bypasses all other associated bistable circuits for trip generation circuits that affect multiple bistable circuits

Evaluator NOTE: The applicable parameters are **8**, **18**, and **19** at the PPS cabinet

COMMENTS

	CRS	Addresses Technical Specifications Enters: • **LCO 3.3.1** (Reactor Protection System (RPS) Instrumentation – Operating) **Condition A** AND **LCO 3.3.5** (Engineered Safety Feature Actuation System (ESFAS) Instrumentation) **Condition A** which both require bypassing or tripping the affected channel within 1 hour • **LCO 3.3.11** (Remote Shutdown System) **Condition A** which requires restoring the channel within 30 days • Refers to the bases for LCO 3.3.1 or LCO 3.3.5 to determine which instruments need to be bypassed. **Evaluator NOTE:** LCO 3.3.10 is not applicable because it only requires 2 of the 4 channels. • Directs the CO to bypass Steam Generator #2 Level Low (RPS) and Steam Generator #1 and #2 Level Low (ESFAS) per the LCO bases.
Evaluator NOTE: May proceed to next event once parameters have been bypassed **AND** the leak rate from Steam Generator Tube Leak has been obtained and it has been determined that a reactor shutdown is required **OR** when Lead Evaluator deems appropriate		

COMMENTS

Op-Test No.: _____ Scenario No.: __1__ Event No.: __5__

Event Description: Turbine Cooling Water Pump ‘A’ Shaft Shear, Pump ‘B’ Fails to Auto-Start

Time	Position	Applicant’s Actions or Behavior
T=55	CREW	Alarms for B07 windows 7A03A (CIRC WTR SYS TRBL) and 7A06B (TCW HDR PRESS HI-LO) are received and acknowledged. Various alarms on B06 and B01 are received and acknowledged. Alarm response procedure **40AL-9RK7A** is referenced for operator response.
	BOP	Observes RJ screen for alarming point for Turbine Cooling Water. TCPS90 – Turbine Cooling Water Header Pressure Lo **GROUP B** in **7A06B** of **40AL-9RK7A** has mitigating actions. First Priority Operator Actions: 1. Reports to CRS that the standby pump did not start and manually starts Turbine Cooling Water Pump B using **TCN-HS-22** 2. **IF** the alarm clears, **THEN** stops Pump A using **TCN-HS-21** Second Priority Operator Actions: 1. Directs an operator to ensure TCW Expansion Tank pressure is in band.
	CRS	Enters **40AO-9ZZ03, Loss of Cooling Water, Section 5.0** 1. Enters AOP Entry Time and Date. 2. Directs Reactor Operator to start Turbine Cooling Water Pump B (if not done already via ARP).

Evaluator NOTE: If the crew does not diagnose the failure and take action in time, the Main Generator will trip (~4-5 minutes). If the Main Generator Trips, the Simulator Driver will proceed to the next event. If the crew is successful in mitigating actions for TCW pump failure, may proceed to the next event once Turbine Cooling Water flow has been restored with Pump B **running** and Pump A handswitch in **Normal AFTER Stop OR Pull-to-Lock (at CRS discretion); OR** as deemed appropriate by the Lead Evaluator.

COMMENTS

Op-Test No.: _____ Scenario No.: 1 Event No.: 6-9

Event Description: Steam Generator Tube Leak Degrades to Exceed Rx Trip Criteria / ESD Outside Containment Develops on Steam Generator with the Tube Leak When Reactor Trips

TRIP INITIATOR

Time	Position	Applicant's Actions or Behavior
Evaluator NOTE: Reactor Trip criteria are met when all available charging pumps are running, letdown is isolated, and pressurizer level is lowering.		
T=60	CREW	Acknowledges degrading conditions
	CRS	• Directs ATC to start additional charging pumps and isolate letdown per **40AO-9ZZ02, Excessive RCS Leakrate, Section 5.0, Steps 2-3** • **AFTER** it has been determined that reactor trip criteria are met, directs either ATC or BOP to initiate a manual reactor trip **Evaluator NOTE:** Letdown is isolated via CHB-HS-523, CHA-HS-516, or CHB-HS-515. The CRS **MAY** also direct a manual initiation of SIAS and CIAS due to the Steam Generator Tube Leak
STANDARD POST TRIP ACTIONS		
	CRS	Enters 40EP-9EO01, Standard Post Trip Actions 1. Opens the Placekeeper and enters the EOP Entry Time 2. Determines that Reactivity Control acceptance criteria are met by the following: a. Checks that reactor power is dropping b. Checks that start-up rate is negative c. Checks that **ALL** full strength CEAs are inserted

COMMENTS

<table>
<tr><td></td><td>CRS
(continued)</td><td>3. <u>Determines</u> that Maintenance of Vital Auxiliaries acceptance criteria are met by the following:
a. <u>Checks</u> that the Main Turbine is tripped
b. <u>Checks</u> that the Main Generator output breakers are open
c. <u>Checks</u> that station loads have transferred to offsite electrical power such that BOTH of the following conditions are met:
• All vital and non-vital AC buses are powered
• All vital and non vital DC buses are powered</td></tr>
<tr><td colspan="3">Evaluator NOTE: Diesel Generator A is currently running without Spray Pond cooling requiring operator action (Spray Pond Pump A has failed to auto-start). Operator has 15 minutes to restore Spray Pond flow to a running (unloaded) diesel generator.</td></tr>
<tr><td></td><td>ATC
EVENT 8</td><td><u>Obtains</u> SPTA Hard Card:
AFTER Reactivity Control has been addressed, <u>determines</u> the status of Maintenance of Vital Auxiliaries acceptance criteria
• Reports that all vital and non-vital AC and DC buses are being powered from Offsite Power
AFTER SIAS has actuated
• Reports that Diesel Generator A is running UNLOADED without Spray Pond support
• Takes CONTINGENCY ACTION c.2 and manually STARTS Spray Pond Pump A</td></tr>
</table>

COMMENTS

	CRS (continued)	4. Determines that RCS Inventory Control acceptance criteria are met by the following: a. Checks that pressurizer level meets **BOTH** of the following: • 10-65% • Trending as expected to 33-53% b. Checks that the RCS is 24°F or more subcooled c. Checks that **BOTH** of the following are in service to all RCPs • Seal injection • Nuclear Cooling Water 5. Determines that RCS Pressure Control acceptance criteria are met by **BOTH** of the following: • Pressurizer pressure is 1837-2285 psia • Pressurizer pressure is trending as expected to 2225-2275 psia **Evaluator NOTE:** Due to Steam Generator Tube Rupture **AND** ESD, RCS Pressure Control acceptance criteria are **NOT MET.** CONTINGENCY ACTIONS are required.
	BOP or ATC (continued)	Obtains SPTA Hard Card: Determines that RCS Pressure Control acceptance criteria are NOT met and takes CONTINGENCY ACTIONS: **Evaluator NOTE:** SIAS/CIAS setpoint is 1837 psia in the Pressurizer.

CRITICAL TASK – When the SIAS/CIAS setpoint is exceeded, manually initiate SIAS and CIAS prior to completion of SPTAs.	**SAT / UNSAT**

COMMENTS

	BOP or ATC (continued) **EVENT 9**	CONTINGENCY ACTIONS: **5.1** Restores and maintains pressurizer pressure to the normal control band by **ANY** of the following: • Operation of PPCS • Manual operation of pressurizer heaters and spray valves **5.2 IF** pressurizer pressure drops to the SIAS setpoint, **THEN** ensure that SIAS is actuated **Evaluator NOTE:** SIAS fails to auto-actuate, requiring operator to MANUALLY actuate. This may have been done immediately following the reactor trip. **5.3 IF** pressurizer pressure remains below the SIAS setpoint (1837 psia), **THEN** stop **ONE** RCP in each loop **5.4 IF** pressurizer pressure drops below the RCP NPSH limits (<24°F subcooling), **THEN** stop all RCPs
	CRS (continued)	6. Determines that Core Heat Removal acceptance criteria are met by **ALL** of the following: • At least one RCP is operating • Loop ΔT is less than 10°F • RCS is 24°F or more subcooled 7. Determines that RCS Heat Removal acceptance criteria are met by the following: a. Checks that at least one Steam Generator meets **BOTH** of the following conditions: • Level is 35% WR or more • Feedwater is restoring or maintaining level 45-60% NR b. Checks that T_C is 560-570°F c. Checks that steam generator pressure is 1140-1200 psia **Evaluator NOTE:** ESD and SG Tube Rupture are on Steam Generator #1; leaving Steam Generator #2 in-tact and available for Heat Removal. T_C will be <560°F and Steam Generator #1 pressure will be below MSIS setpoint (960 psia) – requiring CONTINGENCY ACTIONS
	BOP (continued)	CONTINGENCY ACTIONS: **b.2 IF** T_C<560°F • Ensures feed flow is **NOT** excessive (reports to CRS current feed flow) • Ensures S/G Blowdown has isolated • Takes action to restore T_C to 560-570°F using ADVs

COMMENTS

	BOP (continued)	• **IF** AFAS actuates, overrides and throttles Auxiliary Feedwater to maintain S/G water level and temperature **c.1** Ensures MSIS has actuated **c.2** **IF** steam generator pressure is <1140 psia, ensures ADVs are closed
	CRS (continued)	8. Determines that Containment Isolation acceptance criteria are met by the following: a. Checks that Containment pressure is <2.5 psig b. Checks that there are no valid containment area or steam plant activity monitor alarms or unexplained rises in activity **Evaluator NOTE:** There **WILL** be steam plant activity so this acceptance criterion is **NOT** met. There are no applicable CONTINGENCY ACTIONS at this point in SPTAs to take. 9. Determines that Containment Temperature, Pressure, and Combustible Gas Control acceptance criteria are met by the following: a. Checks that containment temperature is <117°F b. Checks that containment pressure is <2.5 psig 10. **IF** all acceptance criteria are met… NOT APPLICABLE 11. Determines that there is a Steam Generator Tube Rupture AND an ESD in progress (DUAL EVENT) and MAY use Section 4.0, Diagnostic Actions to diagnose • ENTERS **40EP-9EO09, Functional Recovery**
Evaluator NOTE: 40EP-9EO09, Functional Recovery Procedure NOTE Harsh conditions are containment temperature >170°F or containment radiation level greater than 10^8 mR/hr. Harsh containment values are placed in brackets next to the normal setpoint or band. (Harsh conditions will not exist for this scenario)		
	CRS (continued)	40EP-9EO09: 1. Ensures the event is being classified. 2. Enters the EOP Entry Time. 3. **IF** pressurizer pressure remains below SIAS setpoint: a. Ensures **ONE** RCP is stopped in each loop b. **IF** RCS subcooling is <24°F, ensures all RCPs are stopped 4. **IF** any RCPS are operating, checks the RCP operating limits are satisfied (Appendix 16).

COMMENTS

	CRS (continued)	5. Performs the following: a. Ensures the Steam Generator Sample Valves are open b. Directs Chemistry to perform 74DP-9ZZ05, Abnormal Occurrence Checklist 6. Directs placing the Hydrogen Analyzers in service
	BOP (continued)	**WHEN** directed: • Overrides and opens Steam Generator Sample Valves (located at B07, two-handed operation may be utilized)
	ATC (continued)	**WHEN** directed: • Places Hydrogen Analyzers in service At B02: • Opens isolation valves using: • HPA-HS-1, HPA-HS-7 (Train A) • HPB-HS-2, HPB-HS-8 (Train B) • Places the following to ANALYZE: • HPA-HS-9A • HPB-HS-10A
	CRS (continued)	7. Identifies the success path(s) to be used to satisfy each safety function. REFER TO **BOTH** of the following: • Section 4.0, Safety Function Tracking • Section 6.0, Resource Assessment Trees 8. Ensures Section 5.0, Safety Function Status Check for those success paths in use are being performed **Evaluator NOTE:** Step 7 and Step 8 are annotated with an asterisk (*) meaning these steps may be brought forward and performed at any time **Success Path for this scenario is HR-2; SG with SI** HR-2: 1. Opens the Placekeeper 2. Ensures SIAS is actuated 3. Optimizes SI flow by checking SI Pumps have started and flow is adequate per Appendix 2, Figures

COMMENTS

	CRS (continued)	5. **IF** at least one vital 4.16 kV bus is energized: a. Performs Appendix 5, RCS and PZR Cooldown Log b. Cooldown to SDC entry conditions using ADVs c. Ensures RCS inventory makeup is from a borated source during cooldown 6. **IF** steaming to atmosphere, inform Radiation Protection and RMS Technician 10. **IF** a SGTR has occurred, determine the most affected Steam Generator 12. Performs the following: a. Ensures ARN-HS-19, Post Filter Mode Select Switch, is in the "THRU FILTER MODE" b. Selects "OFF" on **BOTH** of the following switches: • SGN-HS-1007, Valve 7 Mode Select • SGN-HS-1008, Valve 8 Mode Select c. Cooldown to a T_H of less than 540°F using ADVs 13. Depressurizes the RCS by performing the following: a. Maintains pressurizer pressure within **ALL** of the following criteria: • <1135 psia • Approximately equal to pressure of S/G with the tube rupture (±50 psi) • Within the P/T Limits (Appendix 2) • Within RCP HPSH Limits (Appendix 2) b. Operates Main for Auxiliary Pressurizer spray c. Performs Appendix 6, Spray Valve Actuation Data Sheet d. **IF** Safety Injection throttle criteria are met, controls charging and letdown flow and throttles HPSI flow 14. **IF** the Steam Generator with the tube rupture has indications of an ESD **AND** is uncontrollably steaming to atmosphere, **THEN** ensure at least **ONE** of the following conditions is met: • The affected Steam Generator has level being restored by feedwater flow 1360-1600 gpm • The affected Steam Generator has level 45-60% NR with feedwater available to maintain level **Evaluator NOTE:** Step 14 is annotated with an asterisk (*) meaning this step may be brought forward and performed at any time

COMMENTS

CRITICAL TASK – Once SPTAs completed and FRP is entered, establish 1360-1600 gpm feed to ruptured Steam Generator prior to exiting HR-2 of FRP.		**SAT / UNSAT**
	BOP (continued)	Using **TWO** Auxiliary Feedwater pumps, establishes 1360-1600 gpm to Steam Generator #1 in order to feed up to 45-60% NR. **Evaluator NOTE: IF** Aux Feed Pump N is used, MSIS valves must be overridden and opened in order to establish feed. **ALL** auxiliary feed pumps may be used to achieve the desired flowrate (including AFA-P01) – Getting the steam generator tubes covered is the priority. **AFTER** 45-60% NR level is obtained, the specified flowrate is no longer required.
Evaluator NOTE: The Scenario may be ended once SIAS and CIAS have been manually actuated AND Steam Generator #1 is being fed to 45-60% NR at a rate of 1360-1600 gpm **OR** when deemed appropriate by the Lead Evaluator.		

COMMENTS

2013 NRC EXAM

Scenario 2

Setup Instructions

1. _____ Reset to IC-10

2. _____ Run scenario file: **2013 NRC SCENARIO 2.scn** under “Simulator Scenario Files” from NRC exam thumb drive

3. _____ Stage radios for operators

4. _____ Alarm Silence to “**OFF**”

5. _____ Ensure CVCS and DFWCS alarms are reset

6. _____ Ensure Steam Bypass Master Controller SGN-PIC-1010 is in Local Setpoint with SBCV 1001 in manual.

7. _____ Place the simulator in freeze until the crew enters the simulator.

8. _____ Hang caution tags on AFA steam supply, trip throttle, and feed to SG valves

9. _____ Hang “Train B” protected sign.

10. _____Hang “Protected Equipment” cover on the handswitches for AFB-P01.

11. _____ Verify RCS leakrate has stabilized at ~ 0 gpm.

12. _____ Ensure a copy of 40OP-9ZZ04, Plant Startup Mode 2 To Mode 1 is available and steps up to and including step 4.3.20 have been initialed as completed (provide to crew during Turnover)

13. _____ Review procedures listed on the next page for marks and missing pages:

Procedures to check:

	40OP-9CE01, Stator Cooling System, Section 6.5		40AO-9ZZ12, Degraded Electrical, Section 54
	40AO-9ZZ04, RCP Emergencies		40AO-9ZZ05, Loss of Letdown
	40AL-9RK4A: 4A01B, 4A09A, 4A10B, 4A12B		40AL-9RK7A: 7A03A
	41AL-1RK1C: 1C16A, 1C17A, 1C18A, 1C16C, 1C14D, 1C16D, 1C17D, 1C18D		40AL-9RK5B: 5B07B, 5B05C, 5B01D, 5B02D, 5B04D, 5B05D, 5B14B
	40AL-9RK3A: 3A08A, 3A10A, 3A11A, 3A10B, 3A11B,		40AL-9RK6A: 6A03A, 6A09A, 6A14D
	41ST-1ZZ02, Inop Power Sources		40AL-9RK6B: 6B07A
	40ST-9EC03, Essential Chilled Water & Ventilation Systems Inop Action Surv		Standard Appendices 59, 103
	40EP-9EO05, Excess Steam Demand		40EP-9EO01, Standard Post Trip Actions
	40EP-9EO09, Functional Recovery		Technical Specifications and Bases

Driver Station Menu should look like this:

SCENARIOS	TRIGGERS	MALFS	COMP MALFS	REMOTES	COMP REMOTES	I/O OVERRIDES	ALARM OVRDS
0	1	7:3	11:9	4	6	0:0	0:0

COMPLETE LIST OF COMMANDS

Triggers	
RPSCHC	Reactor Trip
Malfunctions	
mfED10B k:4	Fault on ESF Transformer NBN-X04
mfMS07 f:10 k:5	ESD on common Main Steam header
mfRD03G mfRD03L mfRD03M	Multiple CEAs stick out on Reactor Trip
mfED02 e:"RPSCHC"	Loss of Grip on Reactor Trip
mfFW21A e:"RPSCHC" d:3	Trip of AFN-P01
Component Malfunctions	
cmTRCH05HCCPT352C_1 f:85 r:1 k:2	Channel 'C' Containment Pressure Transmitter fails high
cmTRCV01CHBTT221_1 f:550 k:3	CHB-TT-221 fails high causing a Loss of Letdown
cmBSRP01BSSG1PRLOAT_1 cmBSRP01BSSG1PRLOBT_1 cmBSRP01BSSG1PRLOCT_1 cmBSRP01BSSG1PRLODT_1 cmBSRP01BSSG2PRLOAT_1 cmBSRP01BSSG2PRLOBT_1 cmBSRP01BSSG2PRLOCT_1 cmBSRP01BSSG2PRLODT_1	MSIS fails to automatically initiate (same as scenario file "noMSIS")
cmMVCV08CHEHV536_4	CHE-HV-536 fails to auto-open
Remote Functions	
rfFW59 f:TRIP rfFW60B f:OFF rfFW57 f:CLOSE	AFA-P01 is tagged out
rfEG40 f:500	Diesel Generator B Governor fails low
rfEG21 f:STOP k:31	Emergency Stops DG B

continued on next page

Component Remote Functions	
crB4FW08AFAHV32_1 f:OPEN crB4FW08AFAUV37_1 f:OPEN crB5FW08AFCHV33_1 f:OPEN crB5FW08AFCUV36_1 f:OPEN crB4MS13SGAUV134_1 f:OPEN crB4MS13SGAUV138_1 f:OPEN	AFA-P01 is tagged out
crB2FW07AFBP01_4 f:RESET k:32	Resets 86 lockout for AFB-P01 locally

EVENT	TIME	SYNTAX	DESCRIPTION	MISC.
1	**WHEN** directed by Control Room	N/A	40OP-9CE01 Actions	**IF** contacted as Area Operator to report status of Stator Cooling, report "All personnel are standing clear and pre-start checks are SAT." **IF** contacted as Area Operator to report post-start check of operating Stator Cooling Water Pump A (or B), report "Stator Cooling Water Pump A (or B) is operating with no issues." **WHEN** contacted as Area Operator to report local Stator Cooling Pump discharge pressure, report "Local Stator Cooling Pump discharge pressure is indicating 145 psig."
2	**WHEN** directed by Lead Evaluator	INSERT **KEY 2** IMF cmTRCH05HCCPT352C_1 f:85 r:1	Channel C Containment Pressure Transmitter to CSAS fails high	**IF** contacted as I&C and/or Maintenance, acknowledge communication and report personnel are on their way to investigate.
3	**WHEN** directed by Lead Evaluator	INSERT **KEY 3** cmTRCV01CHBTT221_1 f:550	CHB-TT-221 fails high causing CHB-UV-515 to isolate.	**IF** contacted as I&C, Chemistry, and/or Maintenance; acknowledge communication. **IF** personnel requested, report personnel are on their way to investigate. **IF** directed to install a jumper for the CHB-TT-221, respond that it will take approximately 45 minutes to get a tech out to install the jumper.
4	**WHEN** directed by Lead Evaluator	INSERT **KEY 4** mfED10B rfEG40 f:500	NBN-X04 faults, subsequently DG B fails to come up to minimum speed.	**IF** contacted as Maintenance, acknowledge communication and report personnel are on their way. **IF** contacted as Area Operator to inspect Diesel Generator B: Wait 3 minutes then report "The diesel is running but has not come up to speed. It is currently at ~500 rpm" **IF** contacted as Area Operator to investigate NBN-X04: Wait 3 minutes then report "there is a **phase-to-phase fault** on the supply breaker for NBN-X04"

continued on next page

4 cont	**WHEN** directed by Control Room to Emergency Stop DG B	INSERT **KEY 31** rfEG21 f:STOP		**IF** directed by Control Room to Emergency Stop DG B, wait 10 seconds, INSERT **KEY 31** then report "Diesel Generator B has been Emergency Stopped."
4 cont				**IF** contacted as Area Operator to report status of PBB-S04: Wait 3 minutes then report "there are **no lock-outs** on PBB-S04 and there is **no visible damage**. All supply breakers FROM PBB-S04 to equipment are open." **IF** contacted as Area Operator to report status of Spent Fuel Cooling Pumps: Report "Spent Fuel Cooling **Pump A** is currently in **operation**." **IF** contacted as Area Operator to report status of in-plant communications: Report "in-plant communications is aligned to its **normal source**." **IF** contacted as Area Operator or Security to report status of SA UPS Cabinet: Report "SA UPS Cabinet is aligned to its **alternate source**." **IF** contacted as ECC to report status of grid: Report "all lines at Palo Verde are in and capable of carrying load."
5	**WHEN** directed by Lead Evaluator	INSERT **KEY 5** mfMS07 f:10	ESD on common Main Steam header outside containment	**Acknowledge** reports and direction given by Control Room
9	**AFTER** SPTAs completed and when directed by lead evaluator.	ON REACTOR TRIP mfFW21A mfED02	Trip of AFN-P01 Loss of Grid	**IF** directed to inspect AFN-P01 breaker: Wait 1 minute and report "there is an overcurrent trip and **86 lockout** on breaker **AFN-P01 supply breaker**." **IF** directed to inspect AFN-P01 pump, report that the motor is not running and there appears to be no visible damage.
continued on next page				

9 cont	**WHEN** directed by Control Room to perform Standard Appendix 59, Attachment 59-A	RUN EOP SCENARIO FILE **attach59A**	Area Operator actions for Standard Appendix 59, Attachment 59A	**WHEN** directed to perform Attachment 59A, RUN EOP scenario file **attach59A** **AFTER** scenario file disables PBB-S04 breakers (STEP 8 of Attachment 59A): Report "PBB-S04 breakers are disabled." **AFTER** scenario file finishes executing: Report "Attachment 59-A is complete."
	IF directed by Control Room to reset 86 lockout for AFB-P01 locally	WAIT 10 seconds, **THEN** INSERT **KEY 32** crB2FW07AFBP01_4 f:RESET k:32	Resets 86 lockout for AFB-P01	**IF** directed to reset 86 lockout on AFB-P01 locally: Wait 30 seconds, insert **KEY 32**, then report "The 86 lockout has been reset for **PBB-S04S**."
end of scenario				

Facility: PVNGS Scenario No.: 2 Op-Test No: 2013

Examiners: ______ Operators: ______

Initial Conditions: (2% power, MOC).
Turnover: Unit 1 is at ~2% power (200 EFPD). AFA-P01 is tagged out.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N BOP/SRO	Shift Stator Cooling Water pumps to P01A running with P01B in standby (including Auto Start Test) in accordance with **40OP-9CE01, Stator Cooling System, Section 6.5.**
2	cmTRCH05HCCPT352C_1	I BOP/SRO (TS)	Channel 'C' Containment Pressure Transmitter fails high requiring the crew to bypass the affected channel and the CRS to address Technical Specifications. **[LCO 3.3.5 CONDITION A]** **41AL-1RK5A, Panel B05A Alarm Responses**
3	cmTRCV01CHBTT221_1 f:550	I ATC/SRO (AOP)	Regen Heat Exchanger Letdown Temperature transmitter, CHB-TT-221 fails high causing CHB-UV-515 to isolate. Crew takes action in accordance with **40AL-9RK3A, Panel B03A Alarm Responses** and **40AO-9ZZ05, Loss of Letdown for extended operations without letdown**.
4	mfED10B rfEG40 f:500	C ATC/SRO (AOP/TS)	NBN-X04 faults. The DG 'B' governor fails low resulting in the diesel failing to come up to the required speed for the output breaker to automatically close causing a LOP of PBB-S04. **[LCO 3.8.1 CONDITIONS A, B, and D; LCO 3.8.4 CONDITION C]]** **40AO-9ZZ12, Degraded Electrical**
5	mfMS07 f:10	M ALL	ESD on common Main Steam common header outside containment. **40EP-9EO05, Excessive Steam Demand.**
6	Scenario File "**noMSIS**"	C BOP/SRO	MSIS will fail to automatically initiate (setpoint 960 psia). **CRITICAL TASK – Crew manually initiates MSIS after initiation setpoints are exceeded prior to completion of the SPTAs.**
7	mfRD03G mfRD03L mfRD03M cmMVCV08CHEHV536_4	C ATC/SRO	Multiple CEAs stick out on the reactor trip. CHE-HV-536 fails to AUTO-Open. **CRITICAL TASK – Crew establishes > 44 gpm boration prior to completion of the SPTAs.** **40EP-9EO01, SPTAs**
8	mfED02	M ALL	Loss of Grid on Reactor Trip.
9	mfFW21A	C ALL	Trip of AFN-P01. **CRITICAL TASK – Implement the FRP to restore power to PBB-S04 and establish AFW flow to the SGs prior to completion of HR-2.** **40EP-9EO09, Functional Recovery Procedure**
End point	Crew has restored AFW flow to the SGs		

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5-8)	6
2. Malfunctions after EOP entry (1-2)	3
3. Abnormal events (2-4)	2
4. Major transients (1-2)	2
5. EOPs entered/requiring substantive actions (1-2)	2
6. EOP contingencies requiring substantive actions (0-2)	1
7. Critical tasks (2-3)	3

CRITICAL TASK	JUSTIFICATION
Crew manually initiates MSIS after initiation setpoints are exceeded prior to completion of the SPTAs.	An MSIS ensures acceptable consequences during a Main Steam Line Break and will isolate both steam generators in the event of a low pressure condition. This prevents an excessive rate of heat removal and subsequent cooldown of the RCS.
Crew establishes > 44 gpm boration prior to completion of the SPTAs.	Having more than one full-strength CEA not insert upon a reactor trip places the unit in an unanalyzed condition with regards to reactivity control. All safety functions may be in jeopardy if reactivity contingency actions are not taken.
Implement the FRP to restore power to PBB-S04 and establish AFW flow to the SGs prior to completion of HR-2.	Failure to establish and maintain a heat sink will eventually result in the core overheating and fuel failure. In this case MVAC safety function is addressed to establish power to a feed source to recover heat removal capabilities.

TURNOVER

Plant conditions:

Unit 1 is at ~2% power (being controlled 1.5%-2.5% power).

40OP-9ZZ04, Plant Startup Mode 2 To Mode 1, has been completed up to and including step 4.3.20.

The plant has been at 2% power for 11 hours awaiting repair of AFA-P01.

The core is presently at 250 EFPD.

Risk Management Action Level is ORANGE.

Train B is protected equipment.

AF “B” is protected in accordance with 40DP-9AP21, Protected Equipment.

PC is NOT recircing the RWT.

Unit 2 is supplying the Aux Steam cross-tie header.

CEDMCS is in Manual Sequential

Steam Bypass Master Controller SGN-PIC-1010 is in Local Setpoint with SBCV 1001 in manual

Pressurizer is in “Boron Equalization”

AFN-P01 is in service feeding the SGs thru the Feedwater Isolation bypasses (SGN-HS-1143/1145)

Maintenance has just been performed on the Auto Start Test valve for the Stator Cooling Water system and is awaiting retest.

Equipment out of service:

Auxiliary Feedpump “A” (AFA-P01) is tagged out due to a noisy bearing. LCO 3.7.5 Conditions “A” and “B” have been entered. It is expected to return to service in 7 hours.

Planned shift activities:

Shift Stator Cooling Water pumps to P01A running with P01B in standby (including Auto Start Test) in accordance with **40OP-9CE01, Stator Cooling System, Section 6.5.** An Area Operator has been briefed and is standing by.

CREW HANDOUT

Plant conditions:

Unit 1 is at ~2% power (being controlled 1.5%-2.5% power).

40OP-9ZZ04, Plant Startup Mode 2 To Mode 1, has been completed up to and including step 4.3.20.

The plant has been at 2% power for 11 hours awaiting repair of AFA-P01.

The core is presently at 250 EFPD.

Risk Management Action Level is ORANGE.

Train B is protected equipment.

AF "B" is protected in accordance with 40DP-9AP21, Protected Equipment.

PC is NOT recircing the RWT.

Unit 2 is supplying the Aux Steam cross-tie header.

CEDMCS is in Manual Sequential

Steam Bypass Master Controller SGN-PIC-1010 is in Local Setpoint with SBCV 1001 in manual

Pressurizer is in "Boron Equalization"

AFN-P01 is in service feeding the SGs thru the Feedwater Isolation bypasses (SGN-HS-1143/1145)

Maintenance has just been performed on the Auto Start Test valve for the Stator Cooling Water system and is awaiting retest.

Equipment out of service:

Auxiliary Feedpump "A" (AFA-P01) is tagged out due to a noisy bearing. LCO 3.7.5 Conditions "A" and "B" have been entered. It is expected to return to service in 7 hours.

Planned shift activities:

Shift Stator Cooling Water pumps to P01A running with P01B in standby (including Auto Start Test) in accordance with **40OP-9CE01, Stator Cooling System, Section 6.5.** An Area Operator has been briefed and is standing by.

Scenario 2 Overview

Event 1	BOP operator will shift Stator Cooling Water pumps to Pump A running, Pump B standby in accordance with **40OP-9CE01, Stator Cooling System, Section 6.5.**
Event 2	Channel 'C' Containment Pressure Transmitter fails high requiring the crew to bypass the affected channel. The CRS will address Technical Specifications. **41AL-1RK5A, Panel B05A Alarm Responses**
Event 3	Regen Heat Exchanger Letdown Temperature transmitter, CHB-TT-221 fails high. This will cause CHB-UV-515 to isolate and a loss of letdown. Crew will respond by taking actions in accordance with **40AO-9ZZ05, Loss of Letdown**.
Event 4	NBN-X04 faults and subsequently the DG will fail to come up to speed causing a LOP of class 4160 bus, PBB-S04. Crew will take actions per **40AO-9ZZ12, Degraded Electrical.**
Event 5	An ESD on common Main Steam header outside containment. This is the trip initiator. **40EP-9EO05, Excessive Steam Demand**
Event 6	An MSIS will fail to automatically initiate requiring the crew to manually initiate (MSIS setpoint is 960 psia). **40EP-9EO01, SPTAs**
Event 7	Multiple CEAs stick out on the reactor trip. CHE-HV-536 fails to AUTO-Open. This requires the crew to establish emergency boration per Standard Appendix 103. **40EP-9EO01, SPTAs**
Event 8	Loss of Grid on Reactor Trip. **40EP-9EO01, SPTAs**
Event 9	Trip of AFN-P01. This will require the crew to enter **40EP-9EO09, Functional Recovery Procedure**, to restore power to PBB-S04 in order to reestablish a Steam Generator feed source.

Op-Test No.: _____ Scenario No.: __2__ Event No.: __1__

Event Description: Shifting the Stator Cooling Water Pumps

Time	Position	Applicant's Actions or Behavior
T=0	CRS	Directs the BOP operator to shift Stator Cooling Water pumps in accordance with **40OP-9CE01, Stator Cooling System, Section 6.5.**
	BOP	Operator turns to section 6.5 of 40OP-9CE01: **Evaluator NOTE:** The following alarms will be received when shifting pumps: • GEN H2 SEAL OIL SYS TRBL • GEN STATOR CLG WATER SYS TRBL • GEN STATOR CLG WATER INLET PRESSUR LOW 6.5.1 Both Initial Conditions are met (Pump B is running, Pump A is in standby). 6.5.2 Presses **CEN-HS-29B**, Auto Start Test Button 6.5.3 Verifies BOTH of the following: • CEN-P01A, Stator Cooling Water Pump A, starts • CEN-P01A auto start amber light is on 6.5.4 Takes CEN-HS-30, CEN-P01A HS A Stator Cooling Pump, to START to make the flag indicate actual pump status. 6.5.5 Verifies CEN-P01A pump running red light is on. 6.5.6 Takes CEN-HS-37, CEN-P01B HS B Stator Cooling Pump, to STOP. 6.5.7 Presses CEN-HS-29B, Auto Start Test Button.

COMMENTS

	BOP (continued)	6.5.8 <u>Verifies</u> BOTH of the following: • CEN-P01B, Stator Cooling Water Pump B starts. • CEN-P01B auto start amber light is on. 6.5.9 <u>Takes</u> CEN-HS-37, CEN-P01B HS B Stator Cooling Pump, to STOP. 6.5.10 <u>Directs</u> Area Operator to check CEN-PI-4, Stator Cooling Pump Discharge Local Pressure Indication, indicates between 140 psig and 147 psig.
Evaluator NOTE: May proceed to the next event anytime **AFTER** the direction has been given to the Area Operator to check local Stator Cooling Pump discharge pressure **OR** at the discretion of the Lead Evaluator.		

COMMENTS

Op-Test No.: _____ Scenario No.: __2__ Event No.: __2__

Event Description: ‘C’ Channel Containment Pressure Transmitter HCC-PT-352C Fails High

Time	Position	Applicant's Actions or Behavior
T=8	CREW	Alarms for B05 windows **5B02D** (PPS TRBL/GRD), 5B05C (HI-HI CNTMT PRESS CH TRIP), and **5B05D** (HI-HI CNTMT PRESS CH PRE-TRIP) are received and acknowledged. Alarm response procedure **40AL-9RK5B** is referenced for operator response.
	BOP	• Addresses alarm response procedure 40AL-9RK5B. Actions will be taken in accordance with 5B05C. • Diagnoses Channel C Containment Pressure HCC-PI-352C has failed high
	CRS	Addresses Technical Specifications • LCO 3.3.5, CONDITION A, is applicable. Directs BOP operator to bypass Channel C Containment High High Pressure at PPS C Cabinet (**Parameter 17**)
	BOP (continued)	Obtains PPS Channel C Cabinet key Bypasses **Parameter 17** (High High Containment Pressure) by depressing parameter 17 pushbutton at PPS Ch C Cabinet

Evaluator NOTE: May proceed to the next event once Channel C High High Containment Pressure is bypassed **OR** at the discretion of the lead evaluator.

COMMENTS

Op-Test No.: _____ Scenario No.: __2__ Event No.: __3__

Event Description: Letdown Isolated Due To CHB-TT-221 Regen HX Letdown Temp Failing High

Time	Position	Applicant's Actions or Behavior
T=15	CREW	Alarms for B03 windows **3A10A** (LD HDR SYS TRBL) and **3A10B** (LD PROCESS MON TRBL) are received and acknowledged. Alarm response procedure **40AL-9RK3A** is referenced for operator response. Crew diagnoses that CHB-UV-515 has isolated and Letdown has been lost.
	ATC	Address **40AL-9RK3A**. After verifying on Board B03, reports to CRS that letdown has been lost.
	CRS	Enters **40AO-9ZZ05, Loss of Letdown:** Directs ATC to perform the following: 3. Place RCN-LIC-110, PLCS Master Controller, in "MAN" and close the selected Letdown Control Valves. 4. Check that letdown backpressure is less than setpoint. 5. Ensure no more than one Charging Pump is running. 7. Determine the cause of the loss of letdown (if not already done – may refer to Appendix E, Supplementary Information) 10. **IF ALL** of the following conditions exist: • CHB-UV-515, Regen Hx Inlet Isolation, closed due to an **invalid** high temperature interlock • CHN-TI-221, Regenerative Heat Exchanger Letdown Temperature, indication is available • Letdown is desired **THEN** direct maintenance to PERFORM 81DP-0DC17, Temporary Modification Control, to install a jumper across relay 63X-T221, points 19 and 20 in cabinet E-ZJB-C03. **Evaluator NOTE:** Driver will report at this time that maintenance personnel will be unavailable for at least 45 minutes.

COMMENTS

	CRS (continued)	15. Directs ATC to perform Appendix C, Extended Operations Without Letdown.
	ATC (continued)	3. Places RCN-LIC-110, PLCS Master Controller, in "MAN" and close the selected Letdown Control Valves. 4. Checks that letdown backpressure is less than setpoint. 5. Ensures no more than one Charging Pump is running. 7. Determines the cause of the loss of letdown (if not already done – may refer to Appendix E, Supplementary Information) Performs Appendix C, Extended Operations Without Letdown: **NOTE:** Boron equalization should be minimized since it depletes RCS hydrogen. The reduction in RCS hydrogen concentration may require entry into chemistry actions levels that may cause the unit to be shutdown. 3. Stops boron equalization by securing pressurizer backup heaters 4. Notifies Chemistry that the plant will be operated with letdown flow isolated. **NOTES:** • RCP HP seal cooler inlet temperature is expected to rise to between 200°F and 220°F when seal injection is stopped. All other seal temperatures are expected to remain normal. • Intentional entry into L.C.O. 3.4.9, Pressurizer, Condition A is prohibited. 5. **WHEN** the CRS determines seal injection and charging are to be stopped, **OR** pressurizer level is 56% or more and rising, **THEN** perform the following: a. IF the unit is in Mode 1, 2 or 3, THEN ensure compliance with LCO 3.4.9, Pressurizer. b. Ensure controlled bleedoff is isolated on all standby RCP's prior to Seal 2 Outlet Temperature exceeding 250°F. c. Close the Seal Injection Flow Control Valves. d. Place all Charging Pumps in "PULL TO LOCK".

COMMENTS

	ATC (continued)	NOTE: RCP controlled bleedoff will lower pressurizer level approximately 10% in 55 minutes. This assumes 3 gpm bleedoff flow from each RCP. 6. **IF ALL** of the following conditions are met: • Charging has been stopped • Pressurizer level is less than 53% • Raising Pressurizer level is desired **THEN** performs the following: 1. Opens CHN-PDV-240, Charging Line to Reactor Coolant Loop 2A Differential Pressure Control Valve. 2. Starts at least one Charging Pump. 3. Adjusts CHN-PDIC-240 to 90-135 psid and place in "AUTO". 4. Operates charging as needed to maintain pressurizer level between 33 and 53%.
Evaluator NOTE: May proceed to the next event once Appendix C, Extended Operations Without Letdown has been entered **OR** at the discretion of the Lead Evaluator.		

COMMENTS

Op-Test No.: _____ Scenario No.: __2__ Event No.: __4__

Event Description: NBN-X04 Faults and DG B Fails to Come Up to Speed - LOP

Time	Position	Applicant's Actions or Behavior
T=31	CREW	Several alarms for Board B01 are received and acknowledged due to loss of power to PBB-S04.
	ATC or BOP	Assesses Board B01 and determines that PBB-S04 has lost power due to a fault on NBN-X04 and that DG B has failed to come up to speed.
	CRS	Enters **40AO-9ZZ12, Degraded Electrical, Section 54.0** 1. **IF** the Diesel Generator is running with its output breaker open, **THEN** PERFORM Appendix N, DG B Running with the Output Breaker Open. • Directs operator to perform Appendix N
	ATC or BOP	**Appendix N, DG B Running with the Output Breaker Open:** Performs CONTINGENCY ACTIONS : 2.1 Performs the following: a. **IF** a LOP has occurred, **THEN** places PEB-SS-G02D, Diesel Generator B Speed Mode Select, to "DROOP". b. Places the DG handswitch to "START" to override Diesel Generator B. c. **IF** minimum speed criteria is not met, **THEN** adjusts DG B frequency using PEB-SC-G02, Diesel Generator B Speed to 59.9 - 60.5 Hz. **Evaluator NOTE:** The DG B governor has failed; this action will fail to bring the DG up to the minimum speed required. 2.2 **IF** minimum speed or voltage criteria can NOT be met, **THEN** GO TO step 7.1 to shutdown the Diesel Generator.

COMMENTS

	ATC or BOP (continued)	7.1 <u>Performs</u> the following: a. <u>Directs</u> an operator to emergency stop the Diesel Generator. b. <u>Ensures</u> that the Diesel Generator has stopped rotating. **c.** <u>Directs</u> maintenance to investigate the cause of the breaker failure.
	CRS (continued)	**40AO-9ZZ12, Degraded Electrical, Section 54.0** 2. <u>Directs</u> an operator to <u>check</u> that **BOTH** of the following are energized: • NNN-D12 • NNN-D16 3. <u>Directs</u> an operator to <u>check</u> that **BOTH** of the following are energized: • PNB-D26 • PND-D28 4. May <u>direct</u> operator to start additional charging pumps as necessary. <u>Directs</u> operator to perform the following: 5. <u>Ensure</u> adequate CTMT Normal cooling for present plant conditions 6. <u>Ensure</u> adequate CEDM Normal cooling for present plant conditions 7. <u>Determine</u> which Spent Fuel Cooling Pump was running and, if necessary, <u>perform</u> 40OP-9PC01 to start PCA-P01 8. <u>Ensure</u> in-plant communications is aligned to its normal source 9. <u>Ensure</u> SA UPS Cabinet is aligned to its alternate source 10. <u>Perform</u> **BOTH** of the following: • 41ST-1ZZ02, Inoperable Power Sources Action Statement • 40ST-9EC03, Essential Chilled Water & Ventilation Systems Inoperable Action Surveillance 11. <u>Refers</u> to table **PBB-S04 Loads** 12. <u>Bypasses</u> all parameters on Channel B or D that are **NOT** bypassed on Channels A or C within 90 minutes **Evaluator NOTE:** Parameter 17 is bypassed on C channel. Because the requirement is 90 minutes this may be delayed. This is **NOT** required to be performed prior to proceeding to the next event. <u>Addresses</u> Technical Specifications associated with a loss of PBB-S04

COMMENTS

Evaluator NOTE: LCO 3.8.1 Conditions A, B, and **D**; **LCO 3.8.4 Condition C** should be entered. Other applicable LCOs (CRS may not have time to address all before proceeding to next event): LCO 3.5.3, 3.6.6, 3.7.5, 3.7.7, 3.3.11, 3.7.8, 3.7.10, 3.8.9. (May be asked as follow-up question)

	ATC or BOP (continued)	Checks the following are energized: • NNN-D12 • NNN-D16 • PNB-D26 • PND-D28 Ensures adequate CTMT Normal cooling for present plant conditions Ensures adequate CEDM Normal cooling for present plant conditions Determines which Spent Fuel Cooling Pump was running and, if necessary, performs 40OP-9PC01 to start PCA-P01 **Evaluator NOTE:** PCA-P01 was already running so no action required Ensures in-plant communications is aligned to its normal source Ensures SA UPS Cabinet is aligned to its alternate source Performs **BOTH** of the following: • 41ST-1ZZ02, Inoperable Power Sources Action Statement • 40ST-9EC03, Essential Chilled Water & Ventilation Systems Inoperable Action Surveillance Bypasses all parameters on Channel B or D that are **NOT** bypassed on Channels A or C within 90 minutes **Evaluator NOTE:** Parameter 17 is bypassed on C channel. Because the requirement is 90 minutes this may be delayed. This is **NOT** required to be performed prior to proceeding to the next event.

Evaluator NOTE: may proceed to the next event after crew addresses 40AO-9ZZ12, Degraded Electrical, Appendix N and DG B is Emergency Shutdown **OR** as deemed necessary by the Lead Evaluator.

COMMENTS

Op-Test No.: _____ Scenario No.: __2__ Event No.: __5-9__

Event Description: ESD on Common Main Steam Header, Multiple CEAs Stuck Out, Loss of Grid and Loss of AFN-P01 on Reactor Trip

TRIP INITIATOR

Time	Position	Applicant's Actions or Behavior
Evaluator NOTE: MSIS Automatic Initiation is failed requiring crew action (MSIS setpoint is 960 psia)		
T=54	CREW	Recognizes degrading conditions
	CRS	Directs a reactor trip
STANDARD POST TRIP ACTIONS		
	CRS	Enters 40EP-9EO01, Standard Post Trip Actions 1. Opens the Placekeeper and enters the EOP Entry Time 2. Determines that Reactivity Control acceptance criteria are met by the following: a. Checks that reactor power is dropping b. Checks that start-up rate is negative c. Checks that **ALL** full strength CEAs are inserted **Evaluator NOTE:** Multiple CEAs are sticking out requiring **CONTINGENCY ACTION c.1** c.1 Directs operator to borate the RCS until adequate SDM is established using Standard Appendix 103, RCS Makeup/Emergency Boration
Evaluator NOTE: PBB-S04 is currently de-energized with **NO** electrical lockouts present (ie there are no faults on the bus)		

COMMENTS

	ATC or BOP **EVENT 7**	Obtains SPTA Hard Card: • Addresses Reactivity Control • Reports that multiple CEAs did NOT insert • Takes **CONTINGENCY ACTION c.1** of Reactivity Control: • Performs **Standard Appendix 103**, RCS Makeup/Emergency Boration **Evaluator NOTE:** CHE-HV-536 has failed to automatically open Appendix 103, Attachment 103-D 1. Ensures that CHE-HV-532, RWT to Boric Acid Makeup Pumps, is open 2. Places CHN-HS-527, VCT Bypass, in the CLOSE position 3. Ensure CHN-FIC-210X, Reactor Makeup Water to VCT Flow Control, is in Manual with 9% output 4. Places CHN-HS-210, Makeup Mode Select Switch in MANUAL 5. Ensures the BAMPs are stopped 6. Opens CHE-HV-536, RWT to Charging Pumps 7. Closes CHN-UV-501, VCT Outlet • Ensures at least one charging pump is running
CRITICAL TASK – Crew establishes > 44 gpm boration prior to completion of the SPTAs		**SAT / UNSAT**
	CRS (continued) **EVENT 8**	3. Determines that Maintenance of Vital Auxiliaries acceptance criteria are met by the following: a. Checks that the Main Turbine is tripped b. Checks that the Main Generator output breakers are open c. Checks that station loads have transferred to offsite electrical power such that **BOTH** of the following conditions are met: • All vital and non-vital AC buses are powered • All vital and non vital DC buses are powered **Evaluator NOTE:** PBB-S04 is currently de-energized with no lockouts on the bus. DG B is unavailable due to being emergency shutdown. Due to the Loss of Offsite Power, PBA-S03 is being supplied by DG A.

COMMENTS

	CRS (continued)	4. <u>Determines</u> that RCS Inventory Control acceptance criteria are met by the following: a. <u>Checks</u> that pressurizer level meets **BOTH** of the following: • 10-65% • Trending as expected to 33-53% b. <u>Checks</u> that the RCS is 24°F or more subcooled c. <u>Checks</u> that **BOTH** of the following are in service to all RCPs • Seal injection • Nuclear Cooling Water 5. <u>Determines</u> that RCS Pressure Control acceptance criteria are met by **BOTH** of the following: • Pressurizer pressure is 1837-2285 psia • Pressurizer pressure is trending as expected to 2225-2275 psia
Evaluator NOTE: The ESD is isolated on a MANUAL MSIS initiation (AUTO initiation has failed). Depending on when this occurs, some contingency actions with regards to RCS Inventory Control and RCS Pressure Control may be required. The RCS is INTACT. Due to the Loss of Offsite Power, CONTINGENCY ACTION c.1 under RCS Inventory Control will be required to be performed.		
	BOP or ATC	<u>Obtains</u> SPTA Hard Card: <u>Reports</u> status of Maintenance of Vital Auxiliaries: • <u>Takes</u> CONTINGENCY ACTION **b.1** and <u>opens</u> the Main Generator output breaker that is closed. • PBA-S03 is being powered by DG A with cooling water. DC buses are powered. <u>Determines</u> status of RCS Inventory Control and takes **CONTINGENCY ACTION c.1:** • <u>Isolates</u> controlled bleedoff from all RCPs due to loss of Nuclear Cooling Water <u>Takes</u> further contingency actions as applicable with regards to RCS Inventory Control and RCS Pressure Control

COMMENTS

	CRS (continued)	6. Determines that Core Heat Removal acceptance criteria are met by **ALL** of the following: • At least one RCP is operating • Loop ΔT is less than 10°F • RCS is 24°F or more subcooled **Evaluator NOTE:** There are no contingency actions for Core Heat Removal 7. Determines that RCS Heat Removal acceptance criteria are met by the following: a. Checks that at least one Steam Generator meets **BOTH** of the following conditions: • Level is 35% WR or more • Feedwater is restoring or maintaining level 45-60% NR b. Checks that T_C is 560-570°F c. Checks that steam generator pressure is 1140-1200 psia **Evaluator NOTE:** Due to ESD on common header, CONTINGENCY ACTIONS are required.
	BOP **EVENT 6**	CONTINGENCY ACTIONS: **a.1** Restores and maintains level in at least one Steam Generator 45-60% NR (**Aux Feed Pump N** will be required to establish feed) • Aux Feed Pump N trips on SIAS and must be overridden to restart **b.2 IF** T_C<560°F • Ensures feed flow is **NOT** excessive (reports to CRS current feed flow) • Ensures S/G Blowdown has isolated • **AFTER** MSIS actuates, takes action to stabilize T_C using ADVs • **IF** AFAS actuates, overrides and throttles Auxiliary Feedwater to maintain S/G water level and temperature **c.1** Ensures MSIS has actuated **Evaluator NOTE:** MSIS will fail to automatically initiate, requiring manual initiation (MSIS setpoint is 960 psia) **c.2 IF** steam generator pressure is <1140 psia, ensures ADVs are closed

CRITICAL TASK – Crew manually initiates MSIS after initiation setpoints are exceeded prior to completion of the SPTAs	**SAT / UNSAT**

COMMENTS

	CRS (continued)	8. Determines that Containment Isolation acceptance criteria are met by the following: a. Checks that Containment pressure is <2.5 psig b. Checks that there are no valid containment area or steam plant activity monitor alarms or unexplained rises in activity 9. Determines that Containment Temperature, Pressure, and Combustible Gas Control acceptance criteria are met by the following: a. Checks that containment temperature is <117°F b. Checks that containment pressure is <2.5 psig 10. **IF** all acceptance criteria are met… NOT APPLICABLE 11. Determines a Loss OF All Feed and ESD is in progress and MAY use Section 4.0, Diagnostic Actions to diagnose • ENTERS **40EP-9EO09, Functional Recovery**
	CRS **EVENT 9**	Due to a Safety Function not being met (Heat Removal) and/or dual event (Loss of all feed and ESD), ENTERS **40EP-9EO09, Functional Recovery** 1. Ensures the event is being classified. 2. Enters the EOP Entry Time. 5. Performs the following: a. Ensures the Steam Generator Sample Valves are open b. Directs Chemistry to perform 74DP-9ZZ05, Abnormal Occurrence Checklist 6. Directs placing the Hydrogen Analyzers in service
	BOP or ATC	**WHEN** directed: • Overrides and opens Steam Generator Sample Valves (located at B07, two-handed operation may be utilized)
	BOP or ATC	**WHEN** directed: • Places Hydrogen Analyzer (Train A) in service At B02: • Opens isolation valves using: • HPA-HS-1, HPA-HS-7 (Train A) • Places the following to ANALYZE: • HPA-HS-9A

COMMENTS

	CRS (continued)	7. Identifies the success path(s) to be used to satisfy each safety function. REFER TO **BOTH** of the following: • Section 4.0, Safety Function Tracking • Section 6.0, Resource Assessment Trees 8. Ensures Section 5.0, Safety Function Status Check for those success paths in use are being performed **Evaluator NOTE:** Step 7 and Step 8 are annotated with an asterisk (*) meaning these steps may be brought forward and performed at any time **Success Path for this scenario is MVAC-2; DG and HR-2; SG with SI** **MVAC-2:** 11. **IF one** vital bus is energized by its DG **AND** vital AC powered equipment needed to maintain Safety Functions is **NOT** available on the energized bus, **THEN** PERFORM the following: • Appendix 59, Cross-Tie DG A to PBB-S04 **Evaluator NOTE:** Step 11 is annotated with an asterisk (*) meaning this step may be brought forward and performed at any time
	ATC or BOP	**Appendix 59:** 1. Directs Area Operator to PERFORM Attachment 59-A, Disable PBB-S04 Breakers. 2. Ensures the following breakers are open: • NAN-S03A (NBN-HS-S03A) • PBA-S03K (PBA-HS-S03K) • PBA-S03L (PBA-HS-S03L) • NAN-S04A (NBN-HS-S04A) • PBB-S04L (PBB-HS-SO4L) • PBB-S04K (PBB-HS-SO4K) 3. Ensures that PBB-S04B, Diesel Generator B 4.16kV Breaker, is open 4. Places the following in "PULL TO LOCK:" • Train B Containment Normal ACUs • Train B CEDM ACUs 5. Performs the following: • Places synchronizing switch PBA-SS-S03L, to ON • Closes breaker PBA-S03L • Places synchronizing switch PBA-SS-S03L to OFF 6. **WHEN** Attachment 59-A is completed: • Places synchronizing switch PBB-SS-S04L to ON • Closes breaker PBB-S04L • Places synchronizing switch PBB-SS-S04L to OFF

COMMENTS

Evaluator NOTE: PBB-S04 is now energized, the 86 lockout for AFB-P01 must be reset prior to starting the pump and establishing feed. This may be done from the control room or locally by Area Operator.

	CRS	**AFTER** PBB-S04 is energized, directs operator to establish feed to steam generators using AFB-P01.
	ATC or BOP (continued)	AFB-P01 is started and feed is established to the steam generators.

CRITICAL TASK – Implement the FRP to restore power to PBB-S04 and establish AFW flow to the SGs prior to completion of HR-2	**SAT / UNSAT**

Evaluator NOTE: Scenario may be ended once feed is established to at least one steam generator.

COMMENTS

2013 NRC EXAM

Scenario 3

Setup Instructions

1. _____ Reset to IC-20.

2. _____ Run scenario file: **2013 NRC SCENARIO 3.scn** under "Simulator Scenario Files" from NRC exam thumb drive.

3. _____ Stage radios for operators.

4. _____ Alarm Silence to "**OFF.**"

5. _____ Ensure CVCS and DFWCS alarms are reset.

6. _____ Ensure CEDM HVAC is aligned such that fans A/C are running with B/D in standby.

7. _____ Place the simulator in freeze until the crew enters the simulator.

8. _____ Hang caution tag on HPSI 'A' Pump handswitch SIA-HS-1.

9. _____ Hang caution tag on HPSI 'A' Recirc Valve handswitch SIA-HS-666.

10. _____ Hang "Train B" protected sign.

11. _____Hang "Protected Equipment" cover on the handswitch for HPSI 'B' Pump.

12. _____ Verify RCS leakrate has stabilized at ~ 0 gpm.

13. _____ Review procedures listed on the next page for marks and missing pages:

Scenario 3

Procedures to check:

	40OP-9HC01, Section 4.4		74RM-9EF41: RU-1, RU-16
	40OP-9CH01, Section 7		40ST-9ZZ23, CEA Position Data Log
	40OP-9SG03, Operating SG Blowdown, Section 5, Section 6, Appendix O		40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations
	40AO-9ZZ16, RRS Malfunctions, Section 4.0		40OP-9SF08, Operation of RRS, Section 6.3, Appendix B
	40AL-9RK2B: 2B06A, 2B09B		40OP-9SF05, Operation of SBCS, Section 4.4, Appendix C.
	40AL-9RK7A: 7A09B		40AL-9RK4A: 4A08A, 4A11A, 4A10B, 4A04B, 4A06B, 4A09B, 4A12B
	40AL-9RK3A: 3A08A, 3A10A, 3A04B, 3A10B, 3A11B		40AL-9RK5B: 5B02A, 5B01C, 5B01D
	41AL-1RK5A: 5A13B, 5A13D, 5A14A, 5A16D		40AO-9ZZ11, CEA Malfunctions
	40AL-9RK6A: 6A06A		40AO-9ZZ05, Loss of Letdown
	40AO-9ZZ02, Excessive RCS Leakrate		40EP-9EO03, LOCA
	40EP-9EO01, Standard Post Trip Actions		Technical Specifications and Bases

Driver Station Menu should look like this:

SCENARIOS	TRIGGERS	MALFS	COMP MALFS	REMOTES	COMP REMOTES	I/O OVERRIDES	ALARM OVRDS
0	1	5:0	6:4	0	2	0:0	0:0

COMPLETE LIST OF COMMANDS

Triggers	
RPSCHC	Reactor Trip
Malfunctions	
mfTH01A f:1 k:6	RCS leak/LOCA
mfRD02B f:100 k:5	CEA 15 drops
mfRP06C1 k:4	Inadvertent SIAS train A
mfRP06C2 k:4	
mfED10B e:"RPSCHC"	NBN-X04 fault on Reactor Trip
Component Malfunctions	
cmMVSI01SIAUV666_1	HPSI A is tagged out
cmTRMS03MTNPT11A_1 k:2	TLI 1 fails high
cmTRMS17SGNFT1011_4 k:3	Steam generator flow transmitter FT-1011 failure
cmBKEG03PBBS04B_2	DG B output breaker fails to auto-close
cmCPRH02SIAP03_5	CS-A fails to auto-start
cmCPSI01SIBP02_5	HPSI Pump B fails to auto-start
Remote Functions	
NONE	
Component Remote Functions	
crB2SI01SIAP02_2 f:RACK_OUT	HPSI A is tagged out
crMVSI01SIAUV666_9 f:0	

2013 NRC EXAM
Scenario 3
Driver's Page

EVENT	TIME	SYNTAX	DESCRIPTION	MISC.
1	**WHEN** directed by Control Room			**IF** contacted as Area Operator to verify personnel are standing clear of switchgear, report "all personnel are standing clear." **IF** contacted as Area Operator to verify damper positions, report HCN-M03D is open at MCC NHN-M2804 and HCN-M03C is closed at MCC NHN-M2803.
2	**WHEN** directed by Lead Evaluator	INSERT **KEY 2** cmTRMS03MTNPT11A_1 f:839 r:1	TLI Channel 1 fails high	**IF** contacted as I&C and/or Maintenance, acknowledge communication and report personnel are on their way to investigate.
3	**WHEN** directed by Lead Evaluator	INSERT **KEY 3** cmTRMS17SGNFT1011_4	Steam Generator Flow Transmitter FT-1011 fails low	**IF** contacted as I&C and/or Maintenance, acknowledge communication and report personnel are on their way to investigate.
4	**WHEN** directed by Lead Evaluator	INSERT **KEY 4** mfRP06C1 mfRP06C2 cmCPRH02SIAP03_5	Inadvertent SIAS Train A CS A fails to auto-start	**WHEN** contacted as Chemistry, RP, and/or Radiological Monitoring Technician acknowledge communications and directions. **IF** contacted as Area Operator to verify QBN-D91 tripped, wait 2 minutes then report QBN-D91 is tripped. **IF** contacted as Area Operator(s) and directed to perform 40OP-9SG03, Appendix I and/or Appendix L to secure Steam Generator Blowdown, acknowledge direction. **IF** contacted to give status reports of appendices, report they are in progress. **IF** contacted as I&C and/or Maintenance, acknowledge communication and report personnel are on their way to investigate.
continued on next page				

5	**WHEN** directed by Lead Evaluator	INSERT **KEY 5** mfRD02B f:100	CEA 15 drops	**WHEN** contacted as Area Operator to go to the CEDM Control Room and report indications and perform alarm responses: Wait 2 minutes, then report "there are no abnormalities at the M/G set control panels and CEDM Control Cabinets other than the CEA drop indication. The local alarm response says to inform the Control Room of the CWP (CEA Withdraw Prohibit)." **IF** contacted as I&C, Reactor Engineering, and/or Maintenance; acknowledge communication and report personnel are on their way to investigate. **IF** contacted as [organization] to inform of downpower, acknowledge communication.
6	**WHEN** directed by Lead Evaluator	INSERT **KEY 6** mfTH01A f:1	RCS leak that exceeds charging pump capacity **TRIP INITIATOR**	**Acknowledge** reports and direction given by Control Room (There are no further actions to take)
End Point	**WHEN** directed by Lead Evaluator	GOTO **FREEZE**		
end of scenario				

Facility: PVNGS Scenario No.: 3 Op-Test No: 2013

Examiners: ______________ Operators: ______________

Initial Conditions: (100% power, MOC).
Turnover: Unit 1 is at 100% power (250 EFPD). HPSI "A" Pump is tagged out.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N BOP/SRO	Shift CEDM HVAC to B/D running with A/C in standby fans in accordance with **40OP-9HC01, Containment HVAC, Section 4.4.**
2	cmTRMS03MTNPT11A_1 f:839 r:1	I BOP/SRO (AOP)	TLI Channel 1, 1st Stage Pressure Transmitter to Reactor Regulating System, fails high requiring the crew to take actions in accordance with **40AO-9ZZ16, RRS Malfunctions**.
3	cmTRMS17SGNFT1011_4	I BOP/SRO	Steam Generator flow transmitter FT-1011 will fail low requiring the crew to place it in maintenance mode and remove the three-element lockout on the DFWCS in accordance with associated alarm response procedure, **40AL-9RK6A, Panel B06A Alarm Responses**
4	mfRP06C1 mfRP06C2 cmCPRH02SIAP03_5	C ALL (AOP/TS)	An inadvertent Train 'A' SIAS occurs requiring entry into **40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations** and **40AO-9ZZ05, Loss of Letdown**. Crew will identify that Containment Spray Pump 'A' failed to auto-start. **[LCO 3.3.6 CONDITION D; LCO 3.5.3 CONDITION A; LCO 3.6.6 CONDITION A; LCO 3.6.3 CONDITION A; LCO 3.4.9 CONDITION A]**
5	mfRD02B f:100	R – SRO, ATC C - BOP (AOP/TS)	CEA 15 will drop requiring entry into **40AO-9ZZ11, CEA Malfunctions.** The crew will begin a power reduction. **[LCO 3.1.5 CONDITION A]** **CRITICAL TASK – Crew begins power reduction within 10 minutes of dropped CEA.**
6	mfTH01A f:1	M ALL	RCS leak that exceeds the capacity of the charging pumps requiring a Reactor Trip. **40EP-9EO01, SPTAs**
7	mfED10B (NBN-X04 fault) cmBKEG03PBBS04B_2	C ATC/SRO	A phase-to-phase fault will occur on NBN-X04 causing PBB-S04 to lose power. The DG supply breaker will fail to automatically close requiring the Reactor Operator to manually close it onto PBB-S04. **CRITICAL TASK – Crew will close 'B' DG supply breaker to energize PBB-S04 prior to completion of SPTAs.**
8	cmCPSI01SIBP02_5	C ATC/SRO	HPSI Pump "B" will fail to auto start. **CRITICAL TASK – Crew will manually start HPSI "B" prior to exiting SPTAs.**
End point	Crew establishes adequate HPSI flow to RCS per Standard Appendix 2.		

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5-8)	6
2. Malfunctions after EOP entry (1-2)	2
3. Abnormal events (2-4)	3
4. Major transients (1-2)	1
5. EOPs entered/requiring substantive actions (1-2)	1
6. EOP contingencies requiring substantive actions (0-2)	0
7. Critical tasks (2-3)	3

CRITICAL TASK	JUSTIFICATION
Crew begins power reduction within 10 minutes of dropped CEA.	The FSAR assumes the operators takes action within 900 seconds to reduce power. This assumption is used to ensure the core does not exceed DNBR or LPD limits. Although the FSAR states 900 seconds, Tech Specs requires a power reduction per the COLR which requires a power reduction within 10 minutes.
Crew will close 'B' DG supply breaker to energize PBB-S04 prior to completion of SPTAs.	With HPSI "A" pump unavailable, PBB-S04 is required to be powered up in order to achieve adequate safety injection during a LOCA.
Crew will manually start HPSI "B" prior to exiting SPTAs.	HPSI "B" pump will fail to start automatically requiring it to be manually started. Inadequate Safety Injection may result in loss of subcooled margin and/or core uncovery.

TURNOVER

Plant conditions:

Unit 1 is at 100% power.

The core is presently at 250 EFPD.

Risk Management Action Level is GREEN

HPSI "B" Pump is protected in accordance with 40DP-9AP21, Protected Equipment

Train B is protected.

PC is NOT recircing the RWT.

Unit 2 is supplying the Aux Steam cross-tie header.

Equipment out of service:

HPSI "A" Pump is under clearance for bearing inspection. LCO 3.5.3 Condition B has been entered. The pump is expected to return to service in 8 hours.

Planned shift activities:

Shift CEDM HVAC such that fans B/D are running with A/C in standby in accordance with 40OP-9HC01, Containment HVAC, Section 4.4, for upcoming engineering evaluation of the system.

CREW HANDOUT

Plant conditions:

Unit 1 is at 100% power.

The core is presently at 250 EFPD.

Risk Management Action Level is GREEN

HPSI "B" Pump is protected in accordance with 40DP-9AP21, Protected Equipment

Train B is protected.

PC is NOT recircing the RWT.

Unit 2 is supplying the Aux Steam cross-tie header.

Equipment out of service:

HPSI "A" Pump is under clearance for bearing inspection. LCO 3.5.3 Condition B has been entered. The pump is expected to return to service in 8 hours.

Planned shift activities:

Shift CEDM HVAC such that fans B/D are running with A/C in standby in accordance with 40OP-9HC01, Containment HVAC, Section 4.4, for upcoming engineering evaluation of the system.

Scenario 3 Overview

Event 1	Shift CEDM HVAC fans to B/D running with A/C in standby in accordance with **40OP-9HC01, Containment HVAC.**
Event 2	TLI Channel 1, 1st Stage Pressure Transmitter to Reactor Regulating System, fails high requiring the crew to respond in accordance with **40AO-9ZZ16, RRS Malfunctions.** The crew will select the unaffected transmitter at the RRS cabinet.
Event 3	Steam Generator flow transmitter FT-1011 fails requiring the crew to place it in maintenance mode and remove the three-element lockout on the DFWCS in accordance with alarm response procedure, **40AL-9RK6A, Panel B06A Alarm Responses.**
Event 4	An inadvertent 'A' Train SIAS occurs requiring the crew to respond in accordance with **40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations**. The crew will identify that Containment Spray pump A failed to auto-start and restore letdown.
Event 5	CEA 15 will drop requiring entry into **40AO-9ZZ11, CEA Malfunctions.** The crew will begin a power reduction.
Event 6	RCS leak that exceeds the capacity of the charging pumps requiring a Reactor Trip. Crew performs Standard Post Trip Actions in accordance with **40EP-9EO01, SPTAs.**
Event 7	A phase-to-phase fault occurs on NBN-X04 causing PBB-S04 to lose power. The DG supply breaker will fail to automatically close requiring the Reactor Operator to manually close it onto PBB-S04 in accordance with **40EP-9EO01, SPTAs, Contingency Actions.**
Event 8	HPSI Pump "B" fails to auto-start requiring the crew to manually start in response to LOCA.

Op-Test No.: _____ Scenario No.: __3__ Event No.: __1__

Event Description: Shift CEDM HVAC Fans

Time	Position	Applicant's Actions or Behavior
T=0	CRS	Directs the BOP operator to shift CEDM HVAC fans in accordance with **40OP-9HC01, Containment HVAC, Section 4.4**.
	BOP	Step 4.4.1 is Not Applicable. Step 4.4.1 Ensures Nuclear Cooling Water System is aligned to the Containment CEDM fans. Step 4.4.3 Ensures Appendix C – CEDM HVAC Electrical Verification List is completed.
NOTE To place Train A CEDM Normal ACU Fans A/C in operation, Step 4.4.4 is used. To place Train B CEDM Normal ACU Fans B/D in operation, Step 4.4.5 is used.		
	BOP	Step 4.4.4 is Not Applicable Step 4.4.5 Performs **ALL** of the following:
NOTE The following step is performed to document proper operation of the SESS. There are no Tech Spec operability concerns with this equipment.		

COMMENTS

	BOP (continued)	4.4.5.1 Performs **ALL** of the following to test Train B SESS: 1. Presses and holds the STATUS DISPLAY pushbutton on the Train B SESS control panel. 2. Ensures that Misc window 21B, CEDM NORM ACU FANS A02B/A02D is **not** illuminated blue. 3. Releases the STATUS DISPLAY pushbutton 4. Not Applicable 4.4.5.2 is Not Applicable 4.4.5.3 Ensures HCB-HS-50, CEDM ACU Fans B/D, A02B/A02D handswitch is in the normal after stop position. 4.4.5.4 Ensures HCA-HS-49, CEDM ACU Fans A/C, A02A/A02C handswitch is in PULL TO LOCK. 4.4.5.5 **WHEN** 120 seconds elapses, ensures that CEDM Normal ACU Fans B/D, A02B/A02D have started. 4.4.5.6 Places HCB-HS-50 in the normal after start position. 4.4.5.7 is Not Applicable 4.4.5.8 Places HCA-HS-49 in the normal after stop position. 4.4.5.9 Ensures Nuclear Cooling Water flow is ~400 gpm (NCN-FI-487). 4.4.5.10 Checks Nuclear Cooling Water Temperature for the in-service CEDM ACU is 105°F-130°F (NCN-TI-488). 4.4.5.11 - 4.4.5.12 Directs Area Operator to verify damper positions. 4.4.5.13 Performs the following to test Train B SESS: 1. Presses and holds the STATUS DISPLAY pushbutton on the Train B SESS control panel. 2. Ensures that Misc window 21B, CEDM NORM ACU FANS A02B/A02D **is** illuminated blue. 3. Releases the STATUS DISPLAY pushbutton 4. Not Applicable 4.4.5.14 Checks CEDM ACU outlet temperature at computer point HCT56
Evaluator NOTE: May proceed to next event once CEDM ACU Fans B/D are running with Fans A/C in standby.		

COMMENTS

Op-Test No.: _____ Scenario No.: __3__ Event No.: __2__

Event Description: TLI Channel 1 Fails High

Time	Position	Applicant's Actions or Behavior
T=8	CREW	Alarms for B04 window **4A10B** (AUTOMATIC MOTION INHIBIT) is received and acknowledged. Alarm response procedure **40AL-9RK4A** is referenced for operator response.
	ATC or BOP	• Addresses **40AL-9RK4A, Panel B04A Alarm Responses, 4A10B Group C**. • Diagnoses that a TLI channel has failed. • Places CEDMCS MODE SELECT switch out of AUTO on B04.
	CRS	Enters **40AO-9ZZ16, RRS Malfunctions**, Section 4: Directs an operator to perform the following: 2. Ensures that CEDMCS is NOT in Auto Sequential (If not done per alarm response previously). **NOTE:** The DVM indication range is 0 to 10 volts for a TLI range of 0 to 125% turbine power. At 100% turbine power the DVM should indicate approximately 8 volts. 4. Determine the failed instrument by comparing the DVM indications for TLI1 and TLI2 at the RRS Test Drawer. 5. Refers to Appendix B to determine the impact of the failure.
	BOP	Ensures that CEDMCS is NOT in Auto Sequential (If not done per alarm response previously). **NOTE:** The DVM indication range is 0 to 10 volts for a TLI range of 0 to 125% turbine power. At 100% turbine power the DVM should indicate approximately 8 volts. Determines that TLI 1 has failed high by comparing the DVM indications for TLI1 and TLI2 at the RRS Test Drawer (may reference 40OP-9SF08).

COMMENTS

	CRS (continued)	6. **IF** RRS is selected to **ONE** of the following: • Average • The affected instrument **THEN** directs operator to perform BOTH of the following: a. Ensure SBCS is in ONE of the following: • Local Automatic • Manual b. Select the unaffected instrument at the RRS Test Panel
	BOP	Places SBCS in Manual or Local Automatic (may refer to 40OP-9SF05, Operation of the Steam Bypass Control System). **IF MANUAL** • Depresses the "MAN" pushbutton on the bottom of the SBCS Master Controller and ensures the pushbutton backlight illuminates. **IF LOCAL AUTOMATIC** • Adjusts black pointer on SBCS Master Controller to match the black and white pointer (Remote Setpoint) using thumbwheel on right side of controller. • Depresses "MAN" pushbutton on the bottom of controller, ensures backlight illuminates. • Places the Remote/Local Setpoint Selector switch on the left side of controller to the "L" position. • Depresses "AUTO" pushbutton on the bottom of controller, ensures backlight illuminates **NOTE:** Momentary loss of the Turbine Load Index signal when changing TLI input selection at the Reactor Regulation System Cabinet may cause SBCS to generate a Reactor Power Cutback Demand 2. Selects the unaffected TLI instrument at the RRS Test Panel (TLI 2) (may refer to 40OP-9SF08, RRS Operations). **Evaluator NOTE:** RRS Test Panel is 1JSFNC03R • Presses the TEST PROBE pushbutton, checks DVM voltage indicates 0 V **NOTE:** DVM voltage going to zero when the TEST PROBE pushbutton is depressed indicates that all the other pushbutton inputs are disconnected. • Presses the DVM pushbutton for TLI 2.

COMMENTS

	BOP (continued)	• Checks voltage is approximately 8 V (value may be looked up in Appendix B of 40OP-9SF08). • Presses the TEST PROBE pushbutton, checks DVM voltage indicates 0 V. • Places TLI INPUT selector switch to TLI 2. **CAUTION:** Selecting AVG while the "TLI DEVIATION" light is lit will generate an AMI. Changing the TLI input selection when the FWCS is in Single Element Control can cause a unit trip due to S/G level perturbations. Shifts SBCS back to Remote Automatic • **IF** SGN-PIC-1010, Master Controller is in auto, **THEN** depresses the "MAN" pushbutton on bottom of controller and ensures backlight illuminates. • Ensures Remote/Local Setpoint Selector switch on the left side of the controller is in the "R" position. • Depresses the "AUTO" pushbutton on the bottom of controller and ensures backlight illuminates.
	CRS (continued)	7. Checks that Tavg/Tref mismatch is 3°F or less. 8. Directs operator to place CEDMCS in Automatic 9. Directs operator to place SBCS Master Controller in Remote Automatic (if not done previously)
	ATC or BOP	Places CEDMCS MODE SELECT switch in AUTO.

Evaluator NOTE: May proceed to the next event once TLI 2 is selected at RRS Test Panel, CEDMCS is in Automatic, and SBCS is in Remote Automatic control **OR** at the discretion of the Lead Evaluator.

COMMENTS

Op-Test No.: _____ Scenario No.: __3__ Event No.: __3__

Event Description: Steam Generator Steam Flow Transmitter FT1011 Fails Low

Time	Position	Applicant's Actions or Behavior
T=15	CREW	Alarms for B04 windows **4A11A** (REAC PWR CUTBACK SYS TRBL) and **4A12B** (TURB BYP DEMAND); and B06 window **6A06A** (FWCS PROCESS TRBL) are received and acknowledged. Alarm response procedure **40AL-9RK6A** is referenced for operator response.

	BOP	• Ensures the Steam Generator levels are stable
		• Selects the alarm manager on DFWCS Monitor
		• Determines Steam Generator Flow Transmitter FT1011 has failed
		• Places FT1011 in maintenance mode
		    • Selects XMTR_SEL_1 page on DFWCS Monitor
		    • Under SG 1 STEAM FLOW, selects 1 MAINT – turns RED
		• Removes the 3-Element Lockout
		    • Selects RED 3ELEM LKOUT, it will disappear – DFWCS is now in 3-Element Control
		• Clears alarm on the Process Alarm page

Evaluator NOTE: May proceed to the next event after Steam Generator Flow Transmitter FT1011 is in maintenance mode and DFWCS is in 3-Element control **OR** at the discretion of the lead evaluator.

COMMENTS

Op-Test No.: _____ Scenario No.: 3 Event No.: 4

Event Description: Inadvertent 'A' Train SIAS

Time	Position	Applicant's Actions or Behavior
T=25	CREW	Alarms for B05 SIAS and window **5B02A** (LEG 1-3/204 SIAS A) and B02 alarms are received and acknowledged. The crew diagnoses an inadvertent SIAS has actuated on Train A.
	CRS	Enters **40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations**, Section 8: **NOTE:** Overriding equipment disables automatic operation of the equipment on a valid PPS-ESFAS actuation. Depending on plant conditions, this action may make the equipment inoperable. Directs operators to perform the following: 4. Reset pressurizer heaters as needed. 5. **IF** letdown is isolated, **THEN** perform the following: a. Ensure no more than one Charging Pump is running. b. Perform 40AO-9ZZ05, Loss of Letdown. (directs operator to restore letdown in accordance with Appendix A)
Evaluator NOTE: The CRS may choose to perform 40AO-9ZZ05, Loss of Letdown, Appendix C, Extended Operations Without Letdown. **IF** the CRS chooses this, cue the Shift Manager to direct CRS to **restore** letdown.		
	ATC	40AO-9ZZ05, Loss of Letdown: 3. Places RCN-LIC-110, PLCS Master Controller, in "MAN" and closes the selected Letdown Control Valve(s) 4. Checks that letdown backpressure is less than setpoint 5. Ensures no more than one charging pump is running ATC may request to Perform **Appendix A**, Restoration of Letdown With a Pressurizer Steam Bubble

COMMENTS

	ATC (continued)	**40AO-9ZZ05, Loss of Letdown, Appendix A:** 2. Ensures at least **ONE** of the following valves are closed: • CHB-UV-515, Regenerative HX Inlet Isolation • CHA-UV-516, Regenerative HX Inlet Isolation • CHB-UV-523, Regenerative HX Outlet Isolation 3. Ensures the selected Letdown Control Valve is closed. 4. Ensures **BOTH** of the following ERFDADS points are set to alarm at the appropriate setpoint: • CHT221, Regen HX Outlet Temp, at a high alarm of 380°F • CHP201, Letdown Intermediate Press/Backpressure, at a low alarm of 205 psig 5. Places CHN-PIC-201, Letdown Backpressure Controller in “MAN” and opens Letdown Backpressure Valve to 60% output 7. **WHEN** the selected Letdown Control Valve is closed, **THEN** ensures **ALL** of the following are open: • CHB-UV-523, Regenerative HX Outlet • CHB-UV-515, Regenerative HX Inlet (**Operator will have to OVERRIDE and open this valve**) • CHA-UV-516, Regenerative HX Inlet 8. **IF ANY** isolation valve is in override, **THEN** ensure compliance with LCO 3.6.3. 10. Adjusts Letdown Control Valve(s) and Backpressure Control Valve(s) to establish appropriate letdown flow, letdown backpressure, and Regen HX Letdown temperature 13-15. Ensures RCN-LIC-110, CHN-PDIC-240, and CHN-PIC-201 are in Manual and starts the second Charging Pump. 16-20 Adjusts controllers in manual until desired parameters are obtained per Appendix A and then places RCN-LIC-110, CHN-PDIC-240, and CHN-PIC-201 are in AUTO.
	CRS (continued)	7. **IF** Steam Generator Blowdown isolated, **THEN** perform the following: a. Notify Chemistry that Blowdown is isolated. b. IF COLSS is operable, THEN ensure that BOTH of the following constants are correct in the CMC and PC: • NKBMF1 • NKBMF2

COMMENTS

	CRS (continued)	8. **May** direct operator to override and start one set of CEDM ACUs **Evaluator NOTE:** CEDM standby fans will start automatically after 2 minute delay. 10. Directs an operator to perform Appendix C, PPS-ESFAS Check, Step 2. **Evaluator NOTE:** Containment Spray A failed to auto-start. Performing Appendix C will ensure the crew addresses this. 11. Addresses and enters applicable Technical Specifications: • **LCO 3.3.6,** ESFAS Logic, **CONDITION D** (Actuation Logic) ➢ Restore inoperable channel to OPERABLE status within 48 hours **Evaluator NOTE:** CRS may wait to receive results of maintenance investigation prior to entering CONDITION D of LCO 3.3.6. • **LCO 3.5.3,** ECCS – Operating, **CONDITION A** (**IF** LPSI pump overridden) ➢ Restore subsystem to OPERABLE status within 7 days • **LCO 3.6.6,** Containment Spray, **CONDITION A** (Containment Spray Pump A failed to auto-start) ➢ Restore containment spray train to OPERABLE status within 72 hours • **LCO 3.6.3,** Containment Isolation Valves, **CONDITION A** (**WHEN** CHA-UV-516 overridden) ➢ Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured within 4 hours • **LCO 3.4.9,** Pressurizer, **CONDITION A (AFTER pressurizer level is >56%)** ➢ Be in MODE 3 with reactor trip breakers open within 6 hours and be in MODE 4 within 12 hours

COMMENTS

	BOP	May used 40OP-9SG03, Operating the Steam Generator Blowdown System (AOP does not specifically state to use this procedure): • INSERTS zero for the Blowdown COLSS Constant for SG 1 and SG 2 in the Core Monitoring Computer (concurrent verification is required). • INSERTS zero for the Blowdown COLSS Constant for SG 1 and SG 2 in the Plant Monitoring Computer (concurrent verification is required). • **May** place SCN-HS-1/2 to the OFF position for SG 1 and SG 2 (not necessary due to SIAS actuation isolating blowdown paths). Performs **Appendix C, PPS-ESFAS Check, Attachment C-13, SIAS Train A:** • Discovers Containment Spray Pump A during performance of Attachment C-13 did not start (if not discovered previously) and informs CRS.

Evaluator NOTE: The CRS may elect to override and secure LPSI A pump and/or quarantine the Containment Spray A pump. This is not necessary in order to proceed.

May proceed to the next event after letdown has been restored, correct blowdown constants are entered into the CMC and PMC, and Containment Spray A was identified as not auto-starting **OR** at the discretion of the lead evaluator.

COMMENTS

Op-Test No.: _____ Scenario No.: 3 Event No.: 5

Event Description: Dropped CEA

Time	Position	Applicant's Actions or Behavior
T=47	CREW	Determines that **CEA 15** has dropped into the core by observing one or more of the following: Lowering reactor power, receiving and acknowledging alarms on B04 (**4A08A**, CEDMCS TRBL; **4A09B**, CWP), rod bottom light on the core mimic, or CEA indication on CEAC monitor.
	CRS	Enters **40AO-9ZZ11, CEA Malfunctions, Section 3.0, STEPS:** 1. Enters AOP Entry Time and Date. 2. Checks that at least one CEA is deviating from its group by greater than 6.6 inches. 7. Ensures CEDMCS is in "STANDBY." 8. Directs an operator to perform Appendix E, Initial Actions.
	ATC or BOP	Ensures CEDMCS is placed in "STANDBY" (Mode Select Switch to SB) Performs **40AO-9ZZ11, Appendix E, Initial Actions:** 1. Enters Appendix Entry Time and Date. 2. Directs an operator to report CEDM abnormalities in CEDM Control Room and M/G set control panels. 5. Informs **ALL** of the following of the CEA malfunction: • I&C Maintenance • Reactor Engineering • SM 6. Initiates pressurizer boron equalization: • Overrides and energizes all pressurizer backup heaters. • Lowers the setpoint on RCN-PIC-100 to 2220 psia. 7. Performs section 8.4 of 40ST-9ZZ23, CEA Position Data Log **within 1 hour** **Evaluator NOTE:** The intent is to move to next event prior to performing 40ST-9ZZ23.

COMMENTS

	CRS (continued)	9. Records **BOTH** of the following: • CEA deviation time • Initial power level **Evaluator NOTE:** The effects of a boration to the RCS may take 4 to 6 minutes to be seen, therefore initiating a boration (step 16) should be done as soon as possible. 12. Performs the following to start a power reduction **within 10 minutes** of the initial CEA deviation: • Log the start time for power reduction. • Directs operator to lower the turbine load to raise Tave 3°F greater than Tref
	BOP	Coordinates with ATC and lowers turbine load to raise and maintain Tave 3°F greater than Tref
CRITICAL TASK – Crew begins power reduction within 10 minutes of dropped CEA.		**SAT / UNSAT**
	CRS (continued)	13. Determines that a 20% power reduction is required. 14. Calculates the number of gallons of boric acid needed for the downpower **Evaluator NOTE: ~1120 gallons** boration will be required for power reduction 15. Directs operator to maintain Tave ~3°F greater than Tref. 16. Directs operator to commence borating to the charging pump suction using a minimum rate of **25 gpm**. Addresses Technical Specifications: • **LCO 3.1.5** (Control Element Assembly Alignment), **Condition A** is applicable (One CEA misaligned from its group by >9.9 inches) ➢ Reduce THERMAL POWER in accordance with the limits in the COLR within 1 hour and restore CEA alignment within 2 hours

COMMENTS

	ATC (continued)	Performs **40OP-9CH01, CVCS Normal Operations, Section 7.3**, to initiate boration: 7.3.6 Sets the desired boric acid makeup flow rate on the Foxboro controller, CHN-FIC-210Y (**25 gpm or greater**). 7.3.7 Selects the "Target" makeup volume on the boric acid makeup flow totalizer/counter CHN-FQIS-210Y (**~1120 gallons**). 7.3.9 Places CHN-HS-512, Makeup Inlet to VCT in the OPEN position. 7.3.10 Starts the boration as follows: • Places CHN-HS-210 in the BORATE position. • Depresses the "Reset" pushbutton • Depresses the "Start" pushbutton 7.3.11 – 7.3.14 Verifies desired boration flow rate and system response.

Evaluator NOTE: May proceed to the next event AFTER **BOTH** of the following occur:

- Reactor power has begun to lower
- The CVCS system has been aligned for boration

OR at the discretion of the Lead Evaluator

COMMENTS

Op-Test No.: _____ Scenario No.: __3__ Event No.: __6-8__

Event Description: LOCA / LOP on PBB-S04 / HPSI Pump B Fails to Auto-Start

TRIP INITIATOR

Time	Position	Applicant's Actions or Behavior
Evaluator NOTE: Reactor Trip criteria are met when all available charging pumps are running, letdown is isolated, and pressurizer level is lowering.		
T=65	CREW	Acknowledges degrading conditions
	CRS	• Directs ATC to start additional charging pumps and isolate letdown per **40AO-9ZZ02, Excessive RCS Leakrate, Section 3.0, Steps 2-3** • **AFTER** it has been determined that reactor trip criteria are met, directs either ATC or BOP to initiate a manual reactor trip **Evaluator NOTE:** The CRS **MAY** also direct a manual initiation of SIAS and CIAS due to the RCS leak
STANDARD POST TRIP ACTIONS		
	CRS	Enters 40EP-9EO01, Standard Post Trip Actions 1. Opens the Placekeeper and enters the EOP Entry Time 2. Determines that Reactivity Control acceptance criteria are met by the following: a. Checks that reactor power is dropping b. Checks that start-up rate is negative c. Checks that **ALL** full strength CEAs are inserted 3. Determines that Maintenance of Vital Auxiliaries acceptance criteria are met by the following: a. Checks that the Main Turbine is tripped b. Checks that the Main Generator output breakers are open c. Checks that station loads have transferred to offsite electrical power such that **BOTH** of the following conditions are met: • All vital and non-vital AC buses are powered • All vital and non vital DC buses are powered

COMMENTS

Evaluator NOTE: A phase-to-phase fault has occurred on NBN-X04 causing PBB-S04 to lose power. DG B output breaker has failed to auto close requiring operator action to restore power.

	ATC **EVENT 7**	Obtains SPTA Hard Card: **AFTER** Reactivity Control has been addressed, determines the status of Maintenance of Vital Auxiliaries acceptance criteria are not met. • Reports that Diesel Generator B output breaker has failed to auto-close Takes **CONTINGENCY ACTION c.1** and **c2:** **c.1:** 1. Ensures that Diesel Generator B has started. 2. Verifies the following: • DG is at correct voltage • DG is at correct frequency • Normal PBB-S04 supply breaker is open • Alternate PBB-S04 supply breaker is open • There are no lockouts on PBB-S04 **THEN** ensures DG B output breaker is closed. **c.2:** 1. Verifies Spray Pond pump operation for running Diesel Generator(s)

CRITICAL TASK – Crew will close 'B' DG supply breaker to energize PBB-S04 prior to completion of SPTAs.	**SAT / UNSAT**

	CRS (continued)	4. Determines that RCS Inventory Control acceptance criteria are met by the following: a. Checks that pressurizer level meets **BOTH** of the following: • 10-65% • Trending as expected to 33-53% b. Checks that the RCS is 24°F or more subcooled c. Checks that **BOTH** of the following are in service to all RCPs • Seal injection • Nuclear Cooling Water **Evaluator NOTE:** Due to the leak being greater than charging pump capacity, level will need to be recovered using HPSI Pump B

COMMENTS

	CRS (continued)	5. Determines that RCS Pressure Control acceptance criteria are met by **BOTH** of the following: • Pressurizer pressure is 1837-2285 psia • Pressurizer pressure is trending as expected to 2225-2275 psia
Evaluator NOTE: Due to RCS leak, **CONTINGENCY ACTIONS** are required. SIAS/CIAS may have been directed to be manually initiated immediately following reactor trip – HPSI Pump B will require a manual start.		
	ATC (continued) **EVENT 8**	Determines that RCS Pressure Control acceptance criteria are NOT met and takes **CONTINGENCY ACTIONS**: **5.1** Restores and maintains pressurizer pressure to the normal control band by **ANY** of the following: • Operation of PPCS • Manual operation of pressurizer heaters and spray valves **5.2 IF** pressurizer pressure drops to the SIAS setpoint, **THEN** ensure that SIAS is actuated **Evaluator NOTE:** HPSI Pump B fails to auto-start, requiring operator to MANUALLY start using handswitch. **5.3 IF** pressurizer pressure remains below the SIAS setpoint, **THEN** stops **ONE** RCP in each loop **5.3 IF** pressurizer pressure drops below the RCP NPSH limits (<24°F subcooled), **THEN** stops all RCPs
CRITICAL TASK – Crew will manually start HPSI "B" prior to exiting SPTAs.		**SAT / UNSAT**
	CRS (continued)	6. Determines if Core Heat Removal acceptance criteria are met by **ALL** of the following: **Evaluator NOTE:** Depending on when this step is addressed in the scenario, subcooling may or may not be sufficient. If it is not, RCPs are secured – there are no CONTINGENCY ACTIONS for this step. • At least one RCP is operating • Loop ΔT is less than 10°F • RCS is 24°F or more subcooled

COMMENTS

	CRS (continued)	7. Determines that RCS Heat Removal acceptance criteria are met by the following: a. Checks that at least one Steam Generator meets **BOTH** of the following conditions: • Level is 35% WR or more • Feedwater is restoring or maintaining level 45-60% NR b. Checks that T_C is 560-570°F c. Checks that steam generator pressure is 1140-1200 psia
	BOP	Obtains SPTA Hard Card: • Determines status of RCS Heat Removal acceptance criteria. • May take manual control of feedwater or auxiliary feedwater in order to control level. **Evaluator NOTE:** The SBCS is functioning properly so no manual action is required by the operator to control steam generator pressures **initially**. Once containment pressure reaches **3 psig**, an **MSIS** will occur. This may be initiated on trend by an operator. • **AFTER** MSIS initiates, **transitions** to **auxiliary feedwater** AND **ADVs** for steam generator level and pressure control, respectively.
	CRS (continued)	8. Determines that Containment Isolation acceptance criteria are met by the following: a. Checks that Containment pressure is <2.5 psig b. Checks that there are no valid containment area or steam plant activity monitor alarms or unexplained rises in activity **Evaluator NOTE:** There **WILL** be containment area activity AND containment pressure will be >2.5 psig so this acceptance criterion is **NOT** met.
	BOP (continued)	Takes CONTINGENCY ACTION **8.a.1:** • **IF** containment pressure is 3 psig or more, **THEN** ensures that CIAS has been initiated.

COMMENTS

	CRS (continued)	9. Determines that Containment Temperature, Pressure, and Combustible Gas Control acceptance criteria are met by the following: a. Checks that containment temperature is <117°F b. Checks that containment pressure is <2.5 psig 10. **IF** all acceptance criteria are met… NOT APPLICABLE 11. Determines that there is a LOCA in progress and MAY use Section 4.0, Diagnostic Actions to diagnose ENTERS **40EP-9EO03, Loss of Coolant Accident** **Evaluator NOTE:** Containment pressure will rise above **3.0 psig** at a slow rate. It is **NOT** expected to reach the CSAS setpoint of **8.5 psig** before the scenario is concluded. The operating crew **MAY** initiate **CSAS** on trend prior to ending the scenario, but it is **not required**. **IF** CSAS is initiated, the crew **MUST** stop all of the operating RCPs and ensure RCP controlled bleedoff flow is isolated.
Evaluator NOTE: The scenario may be ended once adequate HPSI flow has been established to the RCS per Standard Appendix 2 and **40EP-9EO03, Loss of Coolant Accident**, has been entered.		

COMMENTS

2013 NRC EXAM

Scenario 4

Setup Instructions

1. _____ Reset to IC-20

2. _____ Run scenario file: **2013 NRC SCENARIO 4.scn** under "Simulator Scenario Files" from NRC exam thumb drive

3. _____ Stage radios for operators

4. _____ Alarm Silence to "**OFF**"

5. _____ Ensure CVCS and DFWCS alarms are reset

6. _____ Place the simulator in freeze until the crew enters the simulator.

7. _____ Hang caution tag on HPSI 'A' Pump handswitch SIA-HS-1.

8. _____ Hang caution tag on HPSI 'A' Recirc Valve handswitch SIA-HS-666.

9. _____ Hang "Train B" protected sign.

10. _____Hang "Protected Equipment" cover on the handswitch for HPSI 'B' Pump.

11. _____ Verify RCS leakrate has stabilized at ~ 0 gpm.

12. _____ Review procedures listed on the next page for marks and missing pages:

Procedures to check:

	40OP-9SF04, Section 8		40OP-9EC01, Section 5
	40OP-9SF08, Section 6.3, App B, App C		40OP-9SF05, Section 4.4
	40OP-9SP01, Section 6.3		40OP-9HJ01, Section 7
	40OP-9EW01, Section 6.3		40OP-9SG03, Section 5, Section 6, App O
	40AL-9RK2C: SIT 1A-1B		40OP-9SI03, Safety Injection Tank Operations, Section
	40AL-9RK2B: 2B12A		40AL-9RK7B: 7B03A, 7B06A, 7B03B
	40AL-9RK3A: 3A08A, 3A10A, 3A11A, 3A10B, 3A11B		40AL-9RK4A: 4A01A, 4A09A, 4A02B, 4A08B, 4A10B, 4A12B
	40AL-9RK5B: 5B05A		41AL-1RK2A: 2A01A
	40AL-9RK6A: 4A01A, 4A02B		40OP-9CH01, CVCS Normal Ops, Section 7.3
	40AO-9ZZ20, Loss of HVAC		40AO-9ZZ05, Loss of Letdown
	40AO-9ZZ17, Inadvertent PPS-ESFAS		40EP-9EO01, Standard Post Trip Actions
	40AO-9ZZ10, Condenser Tube Rupture		Technical Specifications and Bases

2013 NRC EXAM

Scenario 4

Driver Station Menu should look like this:

SCENARIOS	TRIGGERS	MALFS	COMP MALFS	REMOTES	COMP REMOTES	I/O OVERRIDES	ALARM OVRDS
0	1	8:3	4:1	0	2	0:0	0:0

***If MSIV bypasses are under clearance this will read 2:2**

Complete list of malfunctions.

Triggers	
RPSCHC	Reactor Trip
Malfunctions	
mfSI03C f:0.6 k:2	SIT-1A gas leak
mfRP06G1 k:5	Inadvertent Train A Containment Spray Actuation due to blown fuse
mfRP06G2 k:5	
mfCW01A f:200 k:6	Condenser tube leak – Section 1A of Main Condenser
mfEG02 k:7	Main Generator Trip
mfRD12A	ATWS occurs requiring crew to open L03 and L10 breakers to trip reactor.
mfRD04A	
mfRD04C	
Component Malfunctions	
cmMVSI01SIAUV666_1	HPSI Pump A is tagged out
cmCPHV12HJNA02_2 k:3	Control Room Normal AHU Fan A02 trips on electrical protection
cmTRMS02SGNPT1024_1 f:900 e:"RPSCHC"	Steam Generator Pressure Transmitter PT-1024 fails low
cmAVWD07SCNPV4A_2 k:31	Effectively isolates SCN-V11 and V12
Remote Functions	
NONE	
Component Remote Functions	
crB2SI01SIAP02_2 f:RACK_OUT	HPSI Pump A is tagged out
crMVSI01SIAUV666_9 f:0	

EVENT	TIME	SYNTAX	DESCRIPTION	MISC.
2	**WHEN** directed by lead evaluator	INSERT **KEY 2** mfSI03C f:0.6	SIT-1A gas leak	**IF** contacted as or Maintenance, acknowledge communication and report personnel are on their way to investigate.
	IMMEDIATELY AFTER INSERTING KEY 2	Modify mfSI03C f:0 r:4:00	Ramps SIT-1A leak to 0 over 4 minutes.	**PV OE** has had a SIT air leak and then cease.
3	**WHEN** directed by lead evaluator	INSERT **KEY 3** cmCPHV12HJNA02_2	Control Room Normal AHU Fan A02 trips.	**IF** contacted as Area Operator to investigate trip: Wait 1 minute, report **NHN-M50** is tripped free.
				IF contacted as Area Operator to report the temperature of the Communications and Inverter Rooms: Wait 1 minute, report room temperatures are 75°F.
				IF contacted as Chemistry, acknowledge notifications.
				IF contacted as Area Operator prior to Spray Pond A start: Report "all personnel standing clear." **IF** contacted to check exhaust fan start for Spray Pond A: Report "Spray Pond Pump A Room exhaust fan started."
				IF contacted as Area Operator prior to EW A start: Report "all personnel standing clear." **IF** contacted as Area Operator to report local EW A discharge pressure: Wait 1 minute, report local discharge pressure at **EWN-PI-9** is **~90 psig** **IF** contacted as RP Tech, acknowledge notification and direction, report "Chemistry does not require a sample at this time."
continued				

3				**IF** contacted as Area Operator prior to EC A start: Report "all personnel standing clear." **IF** contacted as Maintenance, acknowledge notification **IF** contacted as Area Operator to perform post start checks: Report "rounds are in progress on EC A."
				IF contacted as Area Operator to report filter DPs: Report the following: • **Pre-Filter** HJN-PDI-24 is reading **0.2 inches water** • **U/S HEPA Filter** HJN-PDI-22 is reading **0.8 inches water** • **D/S HEPA Filter** HJN-PDI-20 is reading **0.8 inches water**
4	**WHEN** directed by Lead Evaluator	INSERT **KEY 4** mfRP06G1 mfRP06G2	Inadvertent Containment Spray Actuation	**IF** contacted as I&C and/or Maintenance, acknowledge communication and report personnel are on their way to investigate.
5	**WHEN** directed by Lead Evaluator	INSERT **KEY 5** mfCW01A f:200	Circulating Water condenser leak	**WHEN** contacted as Area Operator of the Condensate Demin System Trouble Alarm, acknowledge communication.
	2 minutes after INSERTING **KEY 5**			**CALL** the Control Room as Chemistry and report the following: • **Hotwell Sodium** is currently **400 ppb** and rising • **Hotwell conductivity** is currently **40 µmhos/cm** and rising • **1A Section** of the Condenser appears to be affected area

continued on next page

	WHEN directed by Control Room	<u>INSERT</u> **KEY 31** cmAVWD07SCNPV4A_2	Effectively isolates SCN-V11 and V12	**WHEN** the Control Room directs **Chemistry** to sample steam generators; <u>report</u> "steam generator chemistry is currently stable and being maintained by condensate demineralizers." **WHEN** contacted as Area Operator to close CDN-V063 and CDN-LV-75 inlet isolation: <u>Wait</u> 5 minutes then <u>report</u> "CDN-V063 and CDN-LV-75 are closed." **WHEN** contacted as Area Operator to close SCN-V11 and V12: <u>Wait</u> 3 minutes then <u>report</u> "SCN-V11 and V12 are closed." **WHEN** contacted as Area Operator to place HDT Level Controllers to Local Auto: <u>Wait</u> 5 minutes then <u>report</u> "Heater Drain Tank level controllers are in LOCAL AUTO." **IF** contacted as Chemistry for updates to Hotwell and SG chemistry, <u>report</u> "Hotwell sodium and conductivity continue to trend up slowly; steam generator chemistry is unaffected at this time." **WHEN** contacted as WRF, RP, and ECC to inform them of the downpower, acknowledge communications.
6	**WHEN** directed by Lead Evaluator	<u>INSERT</u> **KEY 6** mfEG02	Main Generator trip **TRIP INITIATOR**	**Acknowledge** reports and direction given by Control Room (There are no further actions to take)
End Point	**WHEN** directed by Lead Evaluator	<u>GOTO</u> **FREEZE**		
end of scenario				

Facility: PVNGS Scenario No.: 4 (Spare) Op-Test No: 2013

Examiners: ______________ Operators: ______________

Initial Conditions: (100% power, MOC).
Turnover: Unit 1 is at 100% power (250 EFPD). HPSI “A” Pump is tagged out.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N BOP/SRO	Remove Reactor Power Cutback System from service in accordance with **40OP-9SF04, Operation of the RPCS, Section 8**.
2	mfSI03C f:0.6	I ATC/SRO (TS)	SIT-1A gas leak develops requiring the crew to address **40AL-9RK2B, Panel B02B Alarm Responses**. Crew will pressurize SIT-1A in accordance with **40OP-9SI03, Safety Injection Tank Operations** and the CRS will address Technical Specifications. **[LCO 3.5.1 CONDITION B]**
3	cmCPHV12HJNA02_2	C ATC/SRO	Control Room Normal AHU Fan A02 will trip on electrical protection. The alarm response procedure will direct the Reactor Operator to start a Control Room Essential AHU per **40OP-9HJ01, Control Building HVAC. 41AL-1RK2A, Panel B02A Alarm Responses**
4	mfRP06G1 mfRP06G2	C ALL (TS/AOP)	An inadvertent Train ‘A’ Containment Spray Actuation will occur which will require entry into **40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations**. **[LCO 3.3.6 CONDITION D; LCO 3.6.3 CONDITION A; LCO 3.6.6 CONDITION A; LCO 3.4.9 CONDITION A]** **CRITICAL TASK – Restore NCW flow to RCPs within 10 minutes of RCP Low NCW Flow alarms**.
5	mfCW01A f:200	R – SRO, ATC C - BOP (AOP)	A Circulating Water leak will develop in the 1A section of the Main Condenser requiring entry into **40AO-9ZZ10, Condenser Tube Rupture**. The crew will perform a downpower in order to isolate the affected loop.
6	mfEG02	M ALL	The Main Generator will trip resulting in the Main Turbine tripping. Without the RPCS in service, RPS trip setpoints are exceeded requiring a Reactor Trip. Crew enters Standard Post Trip Actions procedure.**40EP-9EO01, SPTAs**
7	mfRD12A mfRP04A mfRP04C	C ATC/SRO	Due to a failure of the RPS system, an ATWS will occur. The crew will be required to open NGN-L03B2 and NGN-L10B2 breakers in order to trip the reactor. **CRITICAL TASK – After RPS trip setpoint has been exceeded, ensure the contingency actions of Reactivity Control are taken prior to continuing on in SPTAs.**
8	cmTRMS02SGNPT1024_1 f:900	I BOP/SRO	Steam Generator Pressure Transmitter PT-1024 will fail low. This will result in the SBCS not receiving a modulate demand to control SG pressure. The crew will take manual control of SBCS or SG ADVs in order to control SG pressure. **CRITICAL TASK – Take manual control of SG pressure using SBCS or ADVs to control SG pressure below SG safety valve setpoints prior to completion of SPTAs.**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5-8)	6
2. Malfunctions after EOP entry (1-2)	2
3. Abnormal events (2-4)	2
4. Major transients (1-2)	1
5. EOPs entered/requiring substantive actions (1-2)	1
6. EOP contingencies requiring substantive actions (0-2)	0
7. Critical tasks (2-3)	3

CRITICAL TASK	JUSTIFICATION
Restore NCW flow to RCPs within 10 minutes of RCP Low NCW Flow alarms.	FSAR Chapter 7.6.2.1.3.1 states that either cooling water must be supplied or RCP shutdown must be completed within 30 minutes of losing Nuclear Cooling Water in order to protect the RCPs. PVNGS is procedurally bounded to restore cooling flow within 10 minutes of receipt of alarm in order to prevent RCP seal degradation.
After RPS trip setpoint has been exceeded, ensure the contingency actions of Reactivity Control are taken prior continuing on in SPTAs.	This is a condition of license. All safety functions may be in jeopardy if reactivity contingency actions are not taken upon exceeding a reactor trip setpoint.
Take manual control of SG pressure using SBCS or ADVs to control SG pressure below SG safety valve setpoints prior to completion of SPTAs.	Relying only upon steam generator safety valves to provide pressure control may result in an uncontrolled cooldown of the RCS and exceed allowable cooldown rates.

TURNOVER

Plant conditions:

Unit 1 is at 100% power.
The core is presently at 250 EFPD.
Risk Management Action Level is GREEN
HPSI "B" Pump is protected in accordance with 40DP-9AP21, Protected Equipment
Train B is protected.
PC is NOT recircing the RWT.
Unit 2 is supplying the Aux Steam cross-tie header.

Equipment out of service:

HPSI "A" Pump is under clearance for bearing inspection. LCO 3.5.3 Condition B has been entered. The pump is expected to return to service in 8 hours.

Planned shift activities:

Remove Reactor Power Cutback System from service in accordance with **40OP-9SF04, Operation of the RPCS, Section 8,** due to overheating components.

CREW HANDOUT

Plant conditions:

Unit 1 is at 100% power.
The core is presently at 250 EFPD.
Risk Management Action Level is GREEN
HPSI "B" Pump is protected in accordance with 40DP-9AP21, Protected Equipment
Train B is protected.
PC is NOT recircing the RWT.
Unit 2 is supplying the Aux Steam cross-tie header.

Equipment out of service:

HPSI "A" Pump is under clearance for bearing inspection. LCO 3.5.3 Condition B has been entered. The pump is expected to return to service in 8 hours.

Planned shift activities:

Remove Reactor Power Cutback System from service in accordance with **40OP-9SF04, Operation of the RPCS, Section 8,** due to overheating components.

Scenario 4 Overview

Event 1	The BOP operator will remove the Reactor Power Cutback System from service in accordance with **40OP-9SF04, Operation of the Reactor Power Cutback System, Section 8.**
Event 2	SIT-1A gas leak develops requiring the crew to address **40AL-9RK2B, Panel B02B Alarm Responses**. Crew will pressurize SIT-1A in accordance with **40OP-9SI03, Safety Injection Tank Operations**.
Event 3	Control Room Normal AHU Fan A02 will trip on electrical protection. The alarm response procedure (**41AL-1RK2A, Panel B02A Alarm Responses**) will direct the Reactor Operator to start a Control Room Essential AHU per **40OP-9HJ01, Control Building HVAC**.
Event 4	An inadvertent Containment Spray actuation occurs requiring the crew to take action in accordance with **40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations**.
Event 5	A Circulating Water leak will develop in the Main Condenser requiring entry into **40AO-9ZZ10, Condenser Tube Rupture**. The crew will perform a downpower in order to isolate the affected loop.
Event 6	The Main Generator will trip which causes a Main Turbine trip. With the RPCS out of service, RPS setpoints will be exceeded requiring a Reactor Trip. Crew enters **40EP-9EO01, Standard Post Trip Actions**.
Event 7	ATWS occurs dues to failure of the RPS system. Crew will be required to trip the reactor using contingency actions of **40EP-9EO01, Standard Post Trip Actions**.
Event 8	Steam Generator Pressure Transmitter PT-1024 fails low requiring the crew to take manual control of the SBCS or Steam Generator ADVs in order to control pressure.

Op-Test No.: _____ Scenario No.: __4__ Event No.: __1__

Event Description: Remove the Reactor Power Cutback System from Service

Time	Position	Applicant's Actions or Behavior
T=0	CRS	Directs the BOP operator to remove the Reactor Power Cutback System from service in accordance with **40OP-9SF04, Operation of the Reactor Power Cutback System, Section 8.**
	BOP	Step 8.2.1 Verifies RPCS is in Automatic operation. 8.3.1 Presses the "Auto Actuate Out-of-Service" button. 8.3.2 Checks that the "Auto Actuate Out-of-Service" button illuminates. 8.3.3 Presses the "Test/Reset" button. 8.3.4 Checks that the "Test/Reset" button illuminates.

Evaluator NOTE: At this point the Reactor Power Cutback System (RPCS) is **NOT AVAILABLE**. May proceed to the next event once RBCS has been taken out of service.

COMMENTS

Op-Test No.: _____ Scenario No.: __4__ Event No.: __2__

Event Description: SIT-1A Gas Leak

Time	Position	Applicant's Actions or Behavior
T=5	CREW	Alarm for B02 window **2C SIT1A-1B** (SIT 1A-1B PRESS LOW) is received and acknowledged. Alarm response procedure **40AL-9RK2C** is referenced for operator response. **Evaluator NOTE:** Window 2B12A will subsequently come in. The actions to mitigate are the same in this alarm response.
	ATC	Addresses alarm response procedure 40AL-9RK2C: • Confirms SIT-1A pressure is less than 610 psig on SIA-PI-331 or SIA-PI-333. • **IF** power is supplied to the SIT vent valves, takes keylock switches SIB-HS-18A and SIA-HS-17A for SIT vent valves to OFF. • Checks SIT 1A vent valves closed. Recommends restoration of SIT 1A pressure per **40OP-9SI03, Safety Injection Tank Operations.**
	CRS	Addresses and enters applicable Technical Specification: **AFTER** SIT-1A pressure is less than 600 psig, the following must be entered: • **LCO 3.5.1**, Safety Injection Tanks – Operating, **CONDITION B**. ➢ Restore SIT to OPERABLE status within 24 hours Directs operator to restore SIT-1A pressure per **40OP-9SI03, Safety Injection Tank Operations.**

COMMENTS

	ATC (continued)	40OP-9SI03, Safety Injection Tank Operations, Section 6.1: 6.1.1-6.1.2 Prerequisites and Initial Conditions are satisfied. 6.1.3.1 **IF** the SIT is currently filled and pressurized **AND** requires pressurization to maintain operability, **THEN** <u>GO TO</u> Step 6.1.3.4. 6.1.3.4 <u>Opens</u> GAA-UV-1 using GAA-HS-1, HP N2 TO SI TANKS. 6.1.3.5 <u>Opens</u> SIB-HV-632 using SIB-HS-632, NITROGEN TO SIT 1A VLV. 6.1.3.6 <u>Opens</u> SIB-HV-639 using SIB-HS-639, NITROGET TO SIT 1A VLV. 6.1.3.7 **WHEN** SIT pressure is at the desired pressure, **THEN** closes the nitrogen supply valve opened in Step 6.1.3.6 to stop pressurization.
Evaluator NOTE: May proceed to the next event once nitrogen is being supplied to SIT-1A **OR** at the discretion of the lead evaluator.		

COMMENTS

Op-Test No.: _____ Scenario No.: __4__ Event No.: __3__

Event Description: Control Room Normal AHU Fan A02 Trips on Electrical Protection

Time	Position	Applicant's Actions or Behavior
T=15	CREW	Alarm for B02 window **2A01A** (CONT BLDG HVAC SYS TRBL) is received and acknowledged. Alarm response procedure **41AL-1RK2A** is referenced for operator response.
	CRS	**IF** requested, directs operator to start Control Room Essential AHU, HJA-F04 per **40OP-9HJ01, Control Building HVAC**.
Evaluator NOTE: It is possible that the CRS may elect to enter 40AO-9ZZ20, Loss of HVAC. The actions per the AOP are the same with regards to started equipment.		
	ATC	References 41AL-1RK2A, Panel B02A Alarm Responses. May request to start Control Room Essential AHU, HJA-F04. Directs an Auxiliary Operator to investigate cause of the trip. **40OP-9SP01, Essential Spray Pond Train A:** 6.3.1.4 Starts Spray Pond Pump A using SPA-HS-1, verifies pump operation. **40OP-9EW01, Essential Cooling Water System Train A:** 6.3.5 Starts Essential Cooling Water Pump A using EWA-HS-1, verifies pump operation. **40OP-9EC01, Essential Chilled Water Train A:** 5.3.8 Starts Essential Chiller Train A using ECA-HS-1A, verifies chiller operation.

COMMENTS

	ATC (continued)	**40OP-9HJ01, Control Building HVAC, Section 7.3:** 7.3.2.2 Closes Control Room Normal AHU Isolation Dampers M01/M55 using **HJB-HS-8.** 7.3.2.3 Directs an Auxiliary Operator to monitor the temperature of the Communications and Inverter Rooms. 7.3.4 Ensures Control Room Essential AHU HJA-F04 OSA Intake Damper HJB-M02 is open using HJA-HS-34. 7.3.5 Ensures Control Room Essential AHU HJA-F04 OSA Intake Damper HJA-M02 is open using HJA-HS-36. 7.3.6 Starts the Control Room Essential AHU Fan HJA-F04 using HJA-HS-28. 7.3.8 Directs an Auxiliary Operator to check filter DPs on Train A Control Room Essential AHU are below allowable pressure drops.

Evaluator NOTE: May proceed to the next event once Control Room Essential AHU Fan HJA-F04 is operating **OR** at the discretion of the lead evaluator. Do not need to wait for post-start checks report from Auxiliary Operator prior to proceeding.

COMMENTS

Op-Test No.: _____ Scenario No.: 4 Event No.: 4

Event Description: Inadvertent Containment Spray Actuation

Time	Position	Applicant's Actions or Behavior
T=40	CREW	Alarms for B05 **CSAS** and window **5B05A** (CSAS TRN A LEG 1-3/2-4) are received and acknowledged. Alarm response procedure **40AL-9RK5B** is referenced for operator response.
	BOP	Address **40AL-9RK5B**. After verifying on Board B05, reports to CRS that CSAS is **NOT** valid
	CRS	Enters **40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations, Section 5:** **NOTE:** Overriding equipment disables automatic operation of the equipment on a valid PPS-ESFAS actuation. Depending on plant conditions, this action may make the equipment inoperable. 4. Directs ATC operator to stop the 'A' Containment Spray Pump by anti-pumping the pump (by taking CS handswitch to STOP). **CAUTION:** Attempting to close the Containment Spray Header Isolation Valves while the valves are stroking to their actuated position may trip the valve breaker on overload and allow continued spray flow by gravity drain. 5. Directs ATC operator to override and close all open Containment Spray Header Isolation Valves. 6. **IF** seal injection is in service, **AND** cooling water is **NOT** restored to **ANY** operating RCP within **10 minutes** of the initial loss, **THEN** directs an operator to perform the following: a. Ensures the reactor is tripped. b. Stops all of the RCPs. c. Isolates controlled bleedoff.

COMMENTS

	CRS (continued)	7. Directs BOP operator to restore Nuclear Cooling Water to Containment.
	ATC	• Stops Containment Spray pump A by taking handswitch to STOP and anti-pumping the pump. • Overrides and closes all open Containment Spray Header Isolation Valves by taking handswitch(es) to OPEN then CLOSED.
	BOP (continued)	• Restores Nuclear Cooling Water to containment by overriding and opening NCA-UV-402, NCW Containment Downstream Return Isolation Valve.
CRITICAL TASK – Restore NCW flow to RCPs within 10 minutes of RCP Low NCW Flow alarms.		**SAT / UNSAT**
	CRS (continued)	8. Directs an operator to perform the following: a. Place the handswitches for ALL of the following valves to closed: • CHA-UV-516 • CHB-UV-515 • SGA-UV-500P • SGB-UV-500R b. Override and open **IAA-UV-2.** c. Ensure PZR Sprays are operating to control Pzr pressure. 9. Directs an operator to perform the following: a. Ensure no more than one Charging Pump is running. b. PERFORM **40AO-9ZZ05, Loss of Letdown**.

COMMENTS

	CRS (continued)	Addresses and enters applicable Technical Specifications: • **LCO 3.3.6,** ESFAS Logic, **CONDITION D** (Actuation Logic) ➢ Restore inoperable channel to OPERABLE status within 48 hours **Evaluator NOTE:** CRS may wait to receive results of maintenance investigation prior to entering CONDITION D of LCO 3.3.6. • **LCO 3.6.3,** Containment Isolation Valves, **CONDITION A** (After overriding NCA-UV-402 and/or IAA-UV-2) ➢ Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured within 4 hours • **LCO 3.6.6,** Containment Spray System, **CONDITION A** (After Containment Spray Pump has been secured) ➢ Restore containment spray train to OPERABLE status within 72 hours • **LCO 3.4.9,** Pressurizer, **CONDITION A** (**AFTER** Pressurizer level is >56%) ➢ Be in MODE 3 with reactor trip breakers open within 6 hours and be in MODE 4 within 12 hours

COMMENTS

	ATC (continued)	**40AO-9ZZ05, Loss of Letdown:** 1. Enters AOP Entry Time and Date 3. Places RCN-LIC-110, PLCS Master Controller, in "MAN" with zero output. 5. Ensures no more than 1 charging pump is running. Restores letdown in accordance with Appendix A **40AO-9ZZ05, Loss of Letdown, Appendix A:** 2. Ensures at least **ONE** of the following valves are closed: • CHB-UV-515, Regenerative HX Inlet Isolation • CHA-UV-516, Regenerative HX Inlet Isolation • CHB-UV-523, Regenerative HX Outlet Isolation 3. Ensures the selected Letdown Control Valve(s) are closed 4. Ensures **BOTH** of the following ERFDADS points are set to alarm at the appropriate setpoint: • CHT221, Regen HX Outlet Temp, at a high alarm of 380°F • CHP201, Letdown Intermediate Press/Backpressure, at a low alarm of 205 psig 5. Places CHN-PIC-201, Letdown Backpressure Controller in "MAN" and opens Letdown Backpressure Vavle(s) to 60% output 7. **WHEN** the selected Letdown Control Vavle(s) is(are) closed, **THEN** ensures **ALL** of the following are open: • CHB-UV-523, Regenerative HX Outlet • CHB-UV-515, Regenerative HX Inlet • CHA-UV-516, Regenerative HX Inlet 10. Adjusts Letdown Control Valve(s) and Backpressure Control Valve(s) to establish appropriate letdown flow, letdown backpressure, and Regen HX Letdown temperature Ensures RCN-LIC-110, CHN-PDIC-240, and CHN-PIC-201 are in Manual and start the second Charging Pump
Evaluator NOTE: May proceed to the next event once NCW has been restored to containment and RCP Low NCW flow alarms are clear AND letdown flow is established OR at the discretion of the lead evaluator.		

COMMENTS

Op-Test No.: _____ Scenario No.: __4__ Event No.: __5__

Event Description: Circulating Water Leak

Time	Position	Applicant's Actions or Behavior
Evaluator NOTE: It will take ~10 seconds for alarm(s) to come in once malfunction is inserted.		
T=55	CREW	Alarm for B07 window **7B06A** (CNDS DEMIN SYS TRBL), and Condensate Demin Computer alarms are received and acknowledged. Alarm response procedure **40AL-9RK7B** is referenced for operator response.
	BOP	References **40AL-9RK7B, Panel B07B Alarm Responses**: Notifies an Auxiliary Operator of the Condensate Demineralizer System Trouble Alarm.
Evaluator NOTE: The chemist will call the Control Room and report that **Hotwell** Sodium is **400 ppb** rising and conductivity is **40 µmhos/cm rising**. Entry condition is 30 µmhos/cm.		
	CRS	Enters **40AO-9ZZ10, Condenser Tube Rupture**: 1. Enters AOP Entry Time and Date 2. Directs Chemistry to determine most affected hotwell half. 3. Directs an operator to perform Appendix N, Initial Actions.
	BOP	Performs **40AO-9ZZ10, Condenser Tube Rupture, Appendix N:** 1. Enters Appendix Entry Time and Date. 2. Directs chemistry to perform their abnormal occurrence checklist. 3. Places CDN-LIC-75 in "MANUAL" with a zero output. 4. Places the pressurizer in boron equalization (may be done by ATC): a. Overrides and energizes all pressurizer backup heaters. b. Lowers setpoint on RCN-PIC-100 to 2220 psia 5. Closes CWN-HV-11, Circ Water X-tie Valve. 6. Directs an Auxiliary Operator to close CDN-V063, CDN-LV-75 Inlet Isolation (Hotwell Drawoff isolation valve). 7. Directs an Auxiliary Operator to close SCN-V11 and V12. 8. Directs an Auxiliary Operator to place the HDT Level Controllers to Local Auto.

COMMENTS

Evaluator NOTE: Reactor Trip Criteria for **Steam Generator** chemistry are: Sodium >1.0 ppm, Cation Conductivity >15 µmhos/cm, Sulfates >1.0 ppm, Chloride >1.0 ppm; Reactor Trip Criteria for Hotwell sodium is >35 ppm – **NONE** of these criteria are met.		
	CRS (continued)	6-7. Reviews Reactor Trip Criteria 8. Verifies Cond Demins are aligned for full flow operation and CDN-PDV-195 is fully closed. 14. Determines if Reactor Power Cutback is an option for downpower. **Evaluator NOTE:** RPCS was taken out of service in Event 1 and is unavailable. If CRS attempts to restore RPCS, SM will intervene. 15. Determines affected Circ Water Train – Train A (information given to Control Room by chemistry). 16. Transitions to **Section 4.0 NORMAL DOWNPOWER** **Section 4.0 NORMAL DOWNPOWER:** 3. Informs WRF, RP, and ECC on intent to lower power 4. Uses Maneuvering Box game plan or STA Reactivity Worksheet to determine reactivity for downpower. Directs operator to perform boration (~3360 gallons).
	ATC	Performs **40OP-9CH01, CVCS Normal Operations, Section 7.3**, to initiate boration: 7.3.6 Sets the desired boric acid makeup flow rate on the Foxboro controller, CHN-FIC-210Y (**~40 gpm)** 7.3.7 Selects the “Target” makeup volume on the boric acid makeup flow totalizer/counter CHN-FQIS-210Y. 7.3.9 Places CHN-HS-512, Makeup Inlet to VCT in the OPEN position. 7.3.10 Starts the boration as follows: • Places CHN-HS-210 in the BORATE position. • Depresses the “Reset” pushbutton • Depresses the “Start” pushbutton 7.3.11 – 7.3.14 Verifies desired boration flow rate and system response.
Evaluator NOTE: May proceed to the next event once boration has begun and power has started to lower OR at the discretion of the lead evaluator.		

COMMENTS

-Op-Test No.: ______ Scenario No.: __4__ Event No.: __6-8__

Event Description: Main Generator Trip / ATWS / Steam Generator Pressure Transmitter Failure

TRIP INITIATOR

Time	Position	Applicant's Actions or Behavior
Evaluator NOTE: Reactor Trip criteria are met as indicated by the RPS Initiation Relay light extinguishing for all channels and the following annunciators: **HI LOCAL POWER, LOW DNBR, HI PZR PRESS**		
T=80	CREW	Acknowledges degrading conditions
STANDARD POST TRIP ACTIONS		
	CRS	Enters 40EP-9EO01, Standard Post Trip Actions 1. Opens the Placekeeper and enters the EOP Entry Time 2. Determines that Reactivity Control acceptance criteria are met by the following: a. Checks that reactor power is dropping b. Checks that start-up rate is negative c. Checks that **ALL** full strength CEAs are inserted
Evaluator NOTE: Due to a failure in the RPS system, **CONTINGENCY ACTIONS** are required. RPS trip setpoints are exceeded when RPS initiation relay lights on B05 extinguish.		
	ATC **EVENT 7**	Obtains SPTA Hard Card: Takes **CONTINGENCY ACTION a.1** and **a.2:** **a.1:** Attempts to manually trip the Reactor **a.2:** Opens **BOTH** of the following supply breakers: • **NGN-L03B2** • **NGN-L10B2** **AFTER** reactor indicates tripped, recloses **NGN-L03B2** and **NGN-L10B2**, **THEN** verifies Reactivity Control acceptance criteria is met.
CRITICAL TASK – After RPS trip setpoint has been exceeded, ensure the contingency actions of Reactivity Control are taken prior to continuing on in SPTAs.	**SAT / UNSAT**	

COMMENTS

	CRS (continued)	3. <u>Determines</u> that Maintenance of Vital Auxiliaries acceptance criteria are met by the following: a. <u>Checks</u> that the Main Turbine is tripped b. <u>Checks</u> that the Main Generator output breakers are open c. <u>Checks</u> that station loads have transferred to offsite electrical power such that **BOTH** of the following conditions are met: • All vital and non-vital AC buses are powered • All vital and non vital DC buses are powered 4. <u>Determines</u> that RCS Inventory Control acceptance criteria are met by the following: a. <u>Checks</u> that pressurizer level meets **BOTH** of the following: • 10-65% • Trending as expected to 33-53% b. <u>Checks</u> that the RCS is 24°F or more subcooled c. <u>Checks</u> that **BOTH** of the following are in service to all RCPs • Seal injection • Nuclear Cooling Water 5. <u>Determines</u> that RCS Pressure Control acceptance criteria are met by **BOTH** of the following: • Pressurizer pressure is 1837-2285 psia • Pressurizer pressure is trending as expected to 2225-2275 psia 6. <u>Determines</u> that Core Heat Removal acceptance criteria are met by **ALL** of the following: • At least one RCP is operating • Loop ΔT is less than 10°F • RCS is 24°F or more subcooled 7. <u>Determines</u> that RCS Heat Removal acceptance criteria are met by the following: a. <u>Checks</u> that at least one Steam Generator meets **BOTH** of the following conditions: • Level is 35% WR or more • Feedwater is restoring or maintaining level 45-60% NR b. <u>Checks</u> that T_C is 560-570°F c. <u>Checks</u> that steam generator pressure is 1140-1200 psia

Evaluator NOTE: Due to the failure of Steam Generator Pressure Transmitter PT-1024, the SBCS will not receive a modulate signal. This will require CONTINGENCY ACTIONS to be performed to control steam generator pressures.

COMMENTS

	BOP **EVENT 8**	Obtains SPTA Hard Card: Takes **CONTINGENCY ACTION c.3:** **c.3: IF** steam generator pressure is greater than 1200 psia, **THEN** restores and maintains steam generator pressure to less than 1200 psia using SBCS or ADVs. **Evaluator NOTE:** Operator take manual control of SBCS via the master controller or an individual SBCS valve OR use ADVs in order to meet RCS Heat Removal acceptance criteria. SG safety valve setpoints begin at 1250 psig.
CRITICAL TASK – Take manual control of SG pressure using SBCS or ADVs to control SG pressure below SG safety valve setpoints prior to completion of SPTAs.		**SAT / UNSAT**
	CRS (continued)	8. Determines that Containment Isolation acceptance criteria are met by the following: a. Checks that Containment pressure is <2.5 psig b. Checks that there are no valid containment area or steam plant activity monitor alarms or unexplained rises in activity 9. Determines that Containment Temperature, Pressure, and Combustible Gas Control acceptance criteria are met by the following: a. Checks that containment temperature is <117°F b. Checks that containment pressure is <2.5 psig **10. IF** all acceptance criteria are met **THEN** GO TO **40EP-9EO02, Reactor Trip.** ENTERS **40EP-9EO02, Reactor Trip**
Evaluator NOTE: The scenario may be ended once SPTAs are completed and 40EP-9EO02, Reactor Trip, has been entered.		

COMMENTS

Facility: PVNGS						Date of Exam: 11/4/2013						Operating Test No.:					
APPLICANT	EVENT TYPE	Scenarios															
		1			2			3			4			TOTAL	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO R1	RX								5					1	1	1	0
	NOR						1							1	1	1	1
	I/C		2, 3, 8				2, 6, 9		4, 7, 8					9	4	4	2
	MAJ		6, 7				5, 8		6					5	2	2	1
	TS														0	2	2
RO R2, R4	RX								5					1	1	1	0
	NOR			1			1							2	1	1	1
	I/C			3, 4, 5, 9			2, 6, 9		4, 7, 8					10	4	4	2
	MAJ			6, 7			5, 8		6					5	2	2	1
	TS														0	2	2
RO R3, R5	RX													0	1	1	0
	NOR						1							1	1	1	1
	I/C		2, 3, 8				2, 6, 9							6	4	4	2
	MAJ		6, 7				5, 8							4	2	2	1
	TS														0	2	2
RO R6, R8, R10, R11	RX													0	1	1	0
	NOR			1										1	1	1	1
	I/C			3, 4, 5, 9		3, 4, 7, 9								8	4	4	2
	MAJ			6, 7		5, 8								4	2	2	1
	TS														0	2	2
RO R7, R9	RX													0	1	1	0
	NOR						1			1				2	1	1	1
	I/C		2, 3, 8				2, 6, 9			2, 3, 4, 5				10	4	4	2
	MAJ		6, 7				5, 8			6				5	2	2	1
	TS														0	2	2

Facility: PVNGS		Date of Exam: 11/4/2013						Operating Test No.:									
APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
SRO-I I1	RX													0	1	1	0
	NOR				1									1	1	1	1
	I/C		2, 3, 8		2, 3, 4, 6, 7, 9									9	4	4	2
	MAJ		6, 7		5, 8									4	2	2	1
	TS				2, 4									2	0	2	2
SRO-I I2	RX							5						1	1	1	0
	NOR							1						1	1	1	1
	I/C		2, 3, 8					2, 3, 4, 7, 8						8	4	4	2
	MAJ		6, 7					6						3	2	2	1
	TS							4, 5						2	0	2	2
SRO-I I3, I4	RX													0	1	1	0
	NOR	1								1				2	1	1	1
	I/C	2, 3, 4, 5, 8, 9				3, 4, 7, 9				2, 3, 4, 5				14	4	4	2
	MAJ	6, 7				5, 8				6				5	2	2	1
	TS	3, 4												2	0	2	2
SRO-I I5, I6	RX							5						1	1	1	0
	NOR			1				1						2	1	1	1
	I/C			3, 4, 5, 9		3, 4, 7, 9		2, 3, 4, 7, 8						13	4	4	2
	MAJ			6, 7		5, 8		6						5	2	2	1
	TS							4, 5						2	0	2	2
SRO-I I7	RX							5						1	1	1	0
	NOR						1	1						2	1	1	1
	I/C		2, 3, 8				2, 6, 9	2, 3, 4, 7, 8						11	4	4	2
	MAJ		6, 7				5, 8	6						5	2	2	1
	TS							4, 5						2	0	2	2

Facility: PVNGS						Date of Exam: 11/4/2013					Operating Test No.:						
APPLICANT	EVENT TYPE	Scenarios															
		1			2			3			4			TOTAL	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
SRO-I	RX								5					1	1	1	0
I8	NOR				1									1	1	1	1
	I/C				2, 3, 4, 6, 7, 9				4, 7, 8					9	4	4	2
	MAJ				5, 8				6					3	2	2	1
	TS				2, 4									2	0	2	2
SRO-U	RX													0	1	1	0
U1, U2, U3, U4, U5, U6	NOR	1			1									2	1	1	1
	I/C	2, 3, 4, 5, 8, 9			2, 3, 4, 6, 7, 9									12	4	4	2
	MAJ	6, 7			5, 8									4	2	2	1
	TS	3, 4			2, 4									4	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the “at-the-controls (ATC)” and “balance-of-plant (BOP)” positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant’s competence count toward the minimum requirements specified for the applicant’s license level in the right-hand columns.

Facility: PVNGS	Date of Examination: 11/04/2013	Operating Test No.:

Competencies	APPLICANTS											
	RO X SRO-I ☐ SRO-U ☐				RO ☐ SRO-I X SRO-U ☐				RO ☐ SRO-I ☐ SRO-U X			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	2, 3, 4, 5, 6, 7, 8, 9	2, 3, 4, 5, 6, 7, 8, 9	2, 3, 4, 5, 6, 7, 8	2, 3, 4, 5, 7, 8, 9	2, 3, 4, 5, 6, 7, 8, 9	2, 3, 4, 5, 6, 7, 8, 9	2, 3, 4, 5, 6, 7, 8	2, 3, 4, 5, 7, 8, 9	2, 3, 4, 5, 6, 7, 8, 9	2, 3, 4, 5, 6, 7, 8, 9		2, 3, 4, 5, 7, 8
Comply With and Use Procedures (1)	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6, 7	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6, 7, 8, 9	3, 4, 5, 6, 7, 8, 9	3, 5, 6, 7, 8, 9		1, 2, 3, 4, 5, 6, 7, 8
Operate Control Boards (2)	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4, 5, 6, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4, 5, 6, 8, 9				
Communicate and Interact	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9		1, 2, 3, 4, 5, 6, 7, 8
Demonstrate Supervisory Ability (3)					1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9		1, 2, 3, 4, 5, 6, 7, 8
Comply With and Use Tech. Specs. (3)					3, 4	2, 4	4, 5	2, 5	3, 4	2, 4		2, 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.