

Facility: _____		Date of Examination: _____
Examination Level: RO <input type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: _____
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations		
Conduct of Operations		
Equipment Control		
Radiation Control		
Emergency Procedures/Plan		
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: <u>Palo Verde</u>		Date of Examination: <u>11/04/13</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		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)		



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

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 the nearest ppm and Boron OAP parameters have been entered into Boron OAP Worksheet.						
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: 07/28/2013

Technical Review _____ Operations Approval _____

EP Review N/A Training Approval _____
(Only required for Emergency Plan JPMs)

EVALUATION

Date: _____

Examinee Name: _____

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.



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

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
- 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.
- 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:

- 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.



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

INITIAL CONDITIONS:

Given the following conditions in Unit 2:

- The reactor is critical at 40% power, BOL, 4 EFPD following a Refueling Outage.
- 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
PLCEA Position (inches)	150	150
Boron worth (pcm/ppm)	-7.25	-7.25

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

INITIATING CUE:

You have been directed to:

1. Determine the change in boron required for the power ascension using 40OP-9ZZ05 Power Operations, Appendix N, Power Change Worksheet manual version.

AND

2. Fill in the parameters needed to calculate the dilution (if using the Boron OAP) on the sheet provided.



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1.	40OP-9ZZ05, Appendix N, Steps 2.1-2.4: Instructions on use of the computer program Power Change Worksheet.	Evaluator NOTE: Per INITIATING CUE , the Power Change Worksheet program is NOT available.	Examinee marks these steps as N/A (Not Applicable).
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
2.	Step 2.5: IF using the Manual Power Change Worksheet, THEN <u>complete</u> the worksheet while observing the following guidelines: <ul style="list-style-type: none"> • 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 completes <u>FIRST</u> portion of Manual Power Change Worksheet as follows: <ul style="list-style-type: none"> • Circled Unit <u>2</u> • Entered EFPD as <u>4</u> • Entered Date: <u>11/09/13</u> • Final Date: <u>11/10/13</u> • Final Time: <u>1200</u> • Final Iodine Conc: <u>48.65</u> • Initial Date: <u>11/10/13</u> • Initial Time: <u>0000</u> • Initial RCS Boron: <u>1200(ppm)</u> • Initial Iodine Conc: <u>40</u>
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
3. *	<p>Step 2.5 (continued):</p> <p>IF using the Manual Power Change Worksheet, THEN <u>complete</u> the worksheet while observing the following guidelines:</p> <ul style="list-style-type: none"> • 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. 	<p>Evaluator NOTE:</p> <p>ONLY steps marked with asterisk (*) in STANDARD are required to meet the CRITICAL STEP.</p> <p>ANSWER KEY may be used for convenience in evaluation.</p> <p>CORRECT SIGNS ARE REQUIRED.</p>	<p>Examinee completes <u>FOLLOWING TABLE</u> portions of Manual Power Change Worksheet as follows:</p> <ul style="list-style-type: none"> • Final Xenon Conc from Xenon OAP: <u>66.4(%)</u> • (*) Final Xenon Reactivity: <u>-1765(pcm)</u> • Final Power Level: <u>60(%)</u> • (*) Final Power Defect (from Table 2.1.1 of Core Data Book): <u>-815(pcm)</u> • Initial Xenon Conc from Xenon OAP: <u>67.7(%)</u> • (*) Initial Xenon Reactivity: <u>-1791(pcm)</u> • Initial Power Level: <u>40(%)</u> • (*) Initial Power Defect (from Table 2.1.1 of Core Data Book): <u>-538(pcm)</u> • (*) delta rho (xenon): <u>+26(pcm)</u> <u>pcm(1)</u> • (*) delta rho (power): <u>-277(pcm)</u> <u>pcm(2)</u>
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>			



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
4. *	<p>Step 2.5 (continued):</p> <p>IF using the Manual Power Change Worksheet, THEN complete the worksheet while observing the following guidelines:</p> <ul style="list-style-type: none"> • 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. 	<p>Evaluator NOTE:</p> <p>ONLY steps marked with asterisk (*) in STANDARD are required to meet the CRITICAL STEP.</p> <p>ANSWER KEY may be used for convenience in evaluation.</p> <p>CORRECT SIGNS ARE REQUIRED.</p>	<p>Examinee completes <u>FOLLOWING TABLE</u> portions of Manual Power Change Worksheet as follows:</p> <ul style="list-style-type: none"> • Final RCS T-cold: <u>On Program</u> • Final Temperature Defect: <u>N/A – On Program</u> • Final Reg CEA Position: <u>150(in)</u> • (*) Final Reg CEA worth: <u>0(pcm)</u> • Final PLCEA/PSCEA Position: <u>150(in)</u> • (*) Final PLCEA/PSCEA worth: <u>0(pcm)</u> • Initial RCS T-cold: <u>561.4°F</u> • Initial Temperature Defect: <u>N/A – On Program</u> • Initial Reg CEA Position: <u>150(in)</u> • (*) Initial Reg CEA worth: <u>-0(pcm)</u> • Initial PLCEA/PSCEA Position: <u>150(in)</u> • (*) Initial PLCEA/PSCEA worth: <u>0(pcm)</u> • *delta rho (temp): <u>0(pcm) pcm(3)</u> • *delta rho (reg CEA): <u>0 (pcm) pcm(4)</u> • *delta rho (PLCEA/PSCEA): <u>0(pcm) pcm(5)</u>
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>			



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
5. *	<p>Step 2.5 (continued):</p> <p>IF using the Manual Power Change Worksheet, THEN <u>complete</u> the worksheet while observing the following guidelines:</p> <ul style="list-style-type: none"> • 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. 	<p>Evaluator NOTE:</p> <p>ONLY steps marked with asterisk (*) in STANDARD are required to meet the CRITICAL STEP.</p> <p>ANSWER KEY may be used for convenience in evaluation.</p> <p>CORRECT SIGNS ARE REQUIRED.</p>	<p>Examinee completes <u>FOLLOWING TABLE</u> portions of Manual Power Change Worksheet as follows:</p> <ul style="list-style-type: none"> • (*) Net Reactivity Change During the Power Change: <p>pcm(1) + pcm(2) + pcm(3) + pcm(4) + pcm(5):</p> <p><u>-251 net pcm(total)</u></p> <ul style="list-style-type: none"> • (*) Boron reactivity change required due to net pcm change: <p><u>251 delta rho boron (pcm)</u></p>
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>			



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
6. *	<p>Step 2.5 (continued):</p> <p>IF using the Manual Power Change Worksheet, THEN <u>complete</u> the worksheet while observing the following guidelines:</p> <ul style="list-style-type: none"> • 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. 	<p>Evaluator NOTE:</p> <p>ONLY steps marked with asterisk (*) in STANDARD are required to meet the CRITICAL STEP.</p> <p>ANSWER KEY may be used for convenience in evaluation.</p> <p>CORRECT SIGNS ARE REQUIRED.</p>	<p>Examinee completes <u>FOLLOWING TABLE</u> portions of Manual Power Change Worksheet as follows:</p> <ul style="list-style-type: none"> • (*) Delta ppm Boron is delta rho boron (pcm) divided by boron worth (BORON WORTH IS GIVEN IN INITIATING CUE): <p><u>251</u> pcm divided by <u>-7.51</u> pcm/ppm equals</p> <p><u>-34.6</u> ppm boron</p> <p>Evaluator NOTE:</p> <p>-34 ppm boron to -35 ppm boron are acceptable answers (from rounding)</p>
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>			



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
7. *	Record data on the blank BORON OAP input sheet.	Evaluator NOTE: ALL data is required to be entered.	Examinee inputs the following data into BORON OAP sheet: Tave: <u>573 degrees F.</u> RCS pressure: <u>2250 psia.</u> Pressurizer level: <u>50%.</u> VCT Level: <u>40%.</u> Current Boron Conc: <u>1200 ppm.</u> Target Boron Conc: <u>1165.4 ppm.</u> RWT Boron Conc: <u>4200 ppm.</u> Evaluator NOTE: 1165-1166 ppm are 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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
5	10/07/08	6	Modified for NRC
6	07/28/13	3, 6	Modified for NRC. Modified for U2 Cycle 18 data. Updated revision of 40OP-9ZZ05.

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



**2013 NRC RO A-1
PVNGS JOB PERFORMANCE MEASURE**

INITIAL CONDITIONS:

Given the following conditions in Unit 2:

- The reactor is critical at 40% power, BOL, 4 EFPD following a Refueling Outage.
- 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
PLCEA Position (inches)	150	150
Boron worth (pcm/ppm)	-7.25	-7.25

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

INITIATING CUE:

You have been directed to:

1. Determine the change in boron required for the power ascension using 40OP-9ZZ05 Power Operations, Appendix N, Power Change Worksheet manual version.

AND

2. Fill in the parameters needed to calculate the dilution (if using the Boron OAP) on the sheet provided.

CANDIDATE

Power Operations

40OP-9ZZ05

Revision
137

Appendix N Page 4 of 5

Manual Power Change Worksheet

Unit **(2)B** (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 **∅** * 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

15∅ in

15∅ in

delta rho (reg CEA)

* Reg CEA worth

pcm minus pcm equals **∅** * pcm(4)

Tables 2.8.1 thru 2.10.3 of Core Data Book

PSCEA
Position

15∅ in

15∅ in

delta rho (PSCEA)

* PSCEA
worth

pcm minus pcm equals **∅** * pcm(5)

Tables 2.11.1 thru 2.13.3 of Core Data Book

* DENOTES CRITICAL STEP

Power Operations

40OP-9ZZ05

Revision
137

Appendix N Page 5 of 5

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)	
$\frac{251\ pcm}{(\text{delta rho boron})} \text{ divided by } \frac{-7.25\ pcm/ppm}{(\text{boron worth})} \text{ equals } -34.6\ ppm\ boron$ (-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 _____

Boration/Dilution Calculations

Input Data	
RCS Avg Temp (deg F)	57.3
RCS Pressure (psia)	2250
Pressurizer Level (%)	50
VCT Level (%)	40
Current Boron Conc (ppm)	1200
Target Boron Conc (ppm)	1165.4 <small>NOTE</small>
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

BURNUP (EFPD)	POWER LEVEL (%)				
	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 CONDITIONS
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

Power Operations

40OP-9ZZ05

Revision
137

Appendix N Page 1 of 5

Appendix N - Power Change Worksheet

1.0 Introduction

- 1.1 This appendix may be used at the discretion of the Shift Manager/CRS.
- 1.2 A purpose of this appendix is to determine if the Power Change Worksheet is available and operating properly. This is accomplished by performing a test case on the worksheet.
- 1.3 A purpose of this appendix is to give direction on how to fill in the computer program and how to use the manual program.
- 1.4 If the computer program of Power Change Worksheet is not available or is not functioning properly then a manual version is available for use.

2.0 Instructions

_____ 2.1 Open the Power Change Worksheet as follows:

- 1. Go To server 'apsc.com \apsfiles' (U:).
- 2. The path is U:\U8220\OPS\Common\EXCEL\PwrChg.worksheet.xls

2.2 Perform test case by inputting the following data from Power Change Worksheet Test Case.

- _____ 1. Initial Conditions
- _____ 2. Final Conditions
- _____ 3. Current RCS boron
- _____ 4. Boron Worth

----- **NOTE** -----

If all the rows fill out the same as in the test case, then the computer version of the Power Change Worksheet is available for use.

_____ 2.3 **WHEN** all this data has been entered,
THEN check that all Calculated Values are the same as on the Power Change Worksheet Test Case.

Power Operations

40OP-9ZZ05

Revision
137

Appendix N Page 2 of 5

----- **NOTE** -----

Use of this worksheet generates an average Dilution/Boration rate for the power change selected. Consideration should be given to the non-linear transient Xenon behavior when selecting the magnitude of the difference between initial and final conditions.

_____ 2.4 **IF** using the computer program,
THEN enter the requested data in the yellow cells of the Power Change Worksheet, while observing the following guidelines:

- Date and time format must be followed exactly for program to work properly.
- Power, Tcold, CEA positions, Xenon concentration, Iodine concentration and RCS boron concentration are not used in the calculations. The user refers to these values to find the corresponding reactivity value/worth in the Core Data Book.
- When the required reactivity values/worths are inserted in the spread sheet the spread sheet then calculates the required boration or dilution and the suggested rate.
- Signs must be inserted correctly for program to work properly.

_____ 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.

Power Operations

400P-9ZZ05

Revision
137

Appendix N Page 3 of 5

Power Change Worksheet Test Case

UNIT: 1 2 3 (circle one)				EFPD:			Date:		
Enter requested data in yellow cells.				Blue cells show calculation result					
Initial Conditions		(projected) Final Conditions		Calculated Values					
Date	01/01/99	01/02/99	xx/xx/xx	Elapsed Time	4:00:00	HRS			
Time	21:00	01:00	24 hr xx:xx	Delta PWR	1600	PCM			
Power	100	20	JSCALOR	Delta TEMP	-80	PCM			
Power Defect	-2000	-400	pcm	Delta REG CEA	-95	PCM			
(Core Data Book Table 2.1.1)				Delta PSCEA	-115	PCM			
				Delta Xenon	-200	PCM			
Tcold	554	560	RCTCAVG	Net Reactivity change					
Temp Defect	0	-80	pcm						
(Enter "0" if Tc is on program) (Core Data Book Table 4.2.1 thru 4.2.9)				Boron Worth					
Reg CEA Position	150	110	inches						
Reg CEA Worth	0	-95	pcm	Required Change in Boron Conc.					
(Core Data Book Table 2.8.1 thru 2.10.3)									
PSCEA Position	150	110	inches	Caution: the following results are estimates, use the Boron OAP for best result					
PSCEA Worth	0	-115	pcm						
(Core Data Book Table 2.11.1 thru 2.13.3)				Required Boration	3336	gallons			
[Xenon]	100.00	105.98	Xenon OAP	Suggested Rate					
[Iodine]	100.00	95.55	Xenon OAP						
Reactivity(Xe)	-2700	-2900	pcm	Required Dilution					
Current RCS Boron	973		ppm						
Boron Worth	-7.50		pcm/ppm	Suggested Rate					
(Core Data Book Table 2.3.1 thru 2.3.9)									

Boron OAP result (if used)		
Boration/Dilution	0	gallons
Suggested Rate	0.0	gallons/min

Power Operations

400P-9ZZ05

Revision
137

Appendix N Page 4 of 5

Manual Power Change Worksheet

Unit 1 2 3 (circle one)

EFPD:

Date:

Final
Conditions
(projected)

Initial
Conditions

Date					
Time					
RCS Boron (Sample ppm)					
Iodine Conc (Xenon OAP)					

Xenon Conc From Xenon OAP					delta rho (xenon)
Xenon Reactivity	pcm minus		pcm equals		pcm(1)
Reactivity Xenon OAP using appropriate history and projected ramp input					

Power Level (JSCALOR)					delta rho (power)
Power Defect	pcm minus		pcm equals		pcm(2)
Table 2.1.1 of Core Data Book					

RCS T-cold (RCTCAVG)					delta rho (temp)
Temperature Defect	pcm minus		pcm equals		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					delta rho (reg CEA)
Reg CEA worth	pcm minus		pcm equals		pcm(4)
Tables 2.8.1 thru 2.10.3 of Core Data Book					

PSCEA Position					delta rho (PSCEA)
PSCEA worth	pcm minus		pcm equals		pcm(5)
Tables 2.11.1 thru 2.13.3 of Core Data Book					

Power Operations

40OP-9ZZ05

Revision
137

Appendix N Page 5 of 5

Manual Power Change Worksheet

Net Reactivity Change During the Power Change. $pcm(1) + pcm(2) + pcm(3) + pcm(4) + pcm(5)$ (keep signs correct)	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) $delta\ rho\ boron\ (pcm) = (-)\ net\ pcm\ (total)$	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)	
$\frac{\text{_____ pcm}}{(\text{delta rho boron})}$ divided by $\frac{\text{_____ pcm/ppm}}{(\text{boron worth})}$ equals	ppm boron
Delta gallons Boration/Dilution (Use the BORON OAP) (circle)	gallons (boration/ dilution) (circle)

Performed by _____/Date_____

Verified by _____/Date_____

Boration/Dilution Calculations

Input Data

RCS Avg Temp (deg F)

RCS Pressure (psia)

Pressurizer Level (%)

VCT Level (%)

Current Boron Conc (ppm)

Target Boron Conc (ppm)

RWT Boron Conc (ppm)

Calculation Results

Requested boron change requires:

gallons of



**2013 NRC RO A-2
PVNGS JOB PERFORMANCE MEASURE**

1. SIMULATOR SETUP:

N/A

2. SPECIAL TOOLS/EQUIPMENT:

- 40ST-9RC01, RCS and Pressurizer Heatup and Cooldown Rates, Revision 17 available
- Attached copy of 40ST-9RC01, Appendix A data sheet
- Pressure and Temperature Limits Report (PTLR) – TRM, Appendix A, Revision 52 available
- PVNGS Technical Specifications
- 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-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.



**2013 NRC RO A-2
PVNGS JOB PERFORMANCE MEASURE**

INITIAL CONDITIONS:

- **Unit 1 has performed a HEATUP to Mode 3**
- **The 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**
- **Attached is the completed Data Sheet**

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 any errors found**
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)

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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC RO A-2
PVNGS JOB PERFORMANCE MEASURE**

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 annotates 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 annotates that Change in T_{cold} value at 0115 is 25°F NOT 15°F
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC RO A-2
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
3. *	Determines that a limit/guideline was exceeded		Examinee annotates that the 75°F/hr heatup rate limit was exceeded Evaluator NOTE: Satisfactory performance must include: 15 minute equivalent heatup rate limit AND/OR The 75°F/hr rolling hour heatup rate limit AND/OR The 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 the Tech Spec limit being exceeded – which is to restore parameters to within limits within 30 minutes. This will meet the STANDARD for this STEP .	Examinee annotates that the heatup rate should have been REDUCED or STOPPED .
SAT / UNSAT Comments (required for UNSAT):			



2013 NRC RO A-2
PVNGS JOB PERFORMANCE MEASURE

	STEP	CUE	STANDARD
5. *	Determines that a Technical Specification violation DID occur		Examinee answers YES
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



**2013 NRC RO A-2
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
0	5/1/2008		Record created.
6	06/05/13	3, 6	Modified for 2013 NRC Exam. Updated for Revision 17 of 40ST-9RC01.

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC RO A-2
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

INITIAL CONDITIONS:

- Unit 1 has performed a HEATUP to Mode 3
- The 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
- Attached is the completed Data Sheet

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 any errors found

2. List limits or guidelines exceeded (if any)

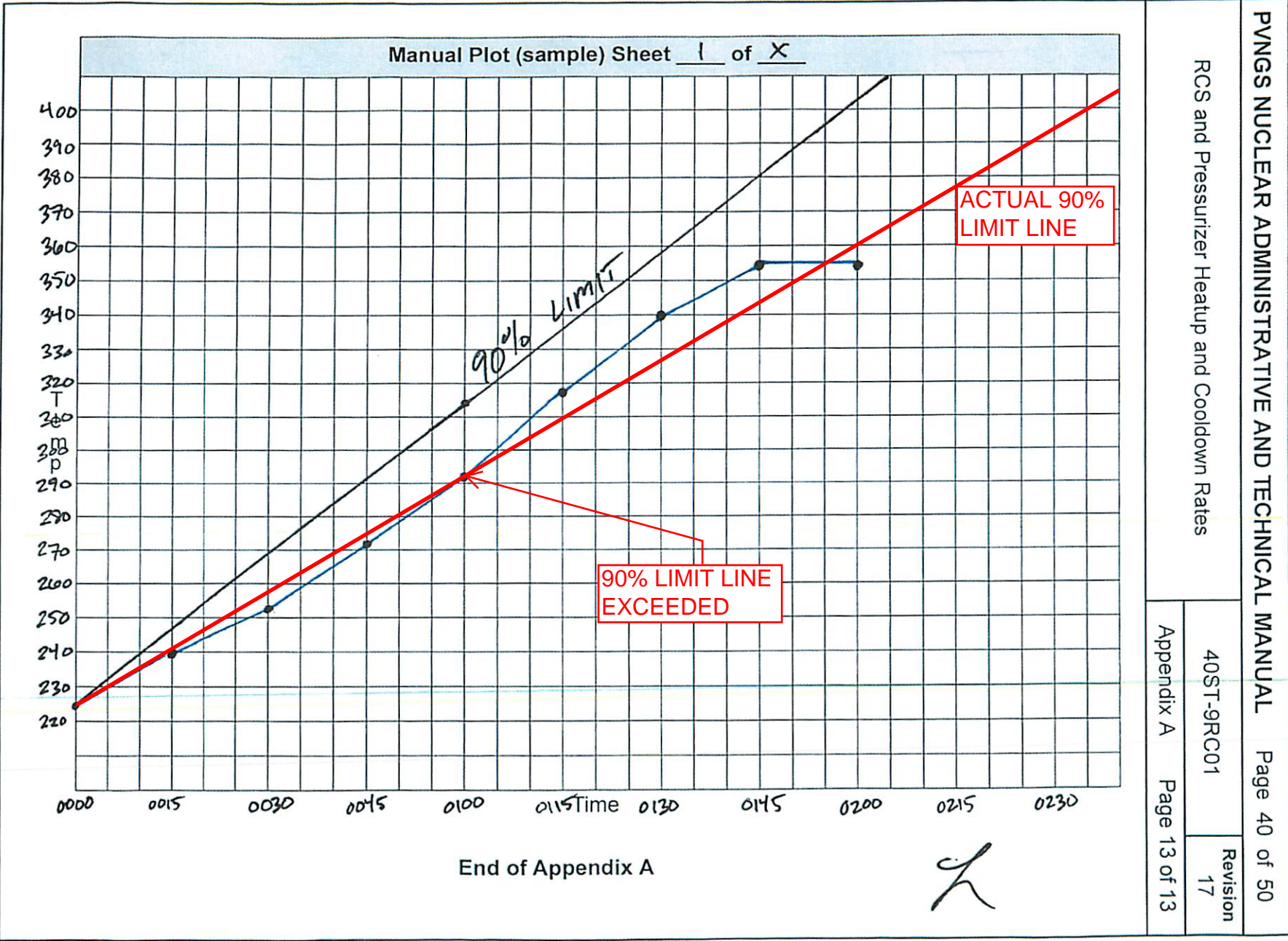
3. If limits/guidelines were exceeded, list what action should have been taken

4. Did a Technical Specification violation occur?
YES -OR- NO (CIRCLE ONE)

RECORD ANSWERS ON THIS SHEET

CANDIDATE

ANSWER KEY



ANSWER KEY

ANSWER KEY

L

Manual RCS and PZR heatup and Cooldown Rates (sample)	Date: TODAY	Page <u>1</u> of <u>X</u>							
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		
RCS T	225	240	253	272	293	318	340	355	255
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									

Heatup Rate Limit/
Guidelines exceeded

Math Error: Should be 25°F

Heatup Rate Limit
should be 75°F/hr

ANSWER KEY

RCS and Pressurizer Heatup and Cooldown Rates

40ST-9RC01

Revision
17

Appendix A Page 1 of 13

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

L 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

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

NOTE

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

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

- L* • 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

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

NOTE

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

L A.2.3 Record BOTH of the following:

- L* • T_c instrument number being used for the heatup

RCA-TI-115

- L* • 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}
- L • 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.

N/A 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.

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

N/A A.3.5 Ensure PZR Press is entered.

N/A A.3.6 Ensure PZR Temp is entered.

N/A 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.

RCS and Pressurizer Heatup and Cooldown Rates

40ST-9RC01

Revision
17

Appendix A Page 4 of 13

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

- N/A • Data entry
- ↓ • Calculations

RCS and Pressurizer Heatup and Cooldown Rates

40ST-9RC01

Revision
17

Appendix A Page 5 of 13

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.

RCS and Pressurizer Heatup and Cooldown Rates

40ST-9RC01

Revision
17

Appendix A Page 6 of 13

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

RCS and Pressurizer Heatup and Cooldown Rates

40ST-9RC01

Revision
17

Appendix A Page 8 of 13

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

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

L A.6.1 Obtain ANY of the following:

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

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

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

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

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

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

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

L

RCS and Pressurizer Heatup and Cooldown Rates

Appendix A Page 11 of 13
 40ST-9RC01
 Revision 17

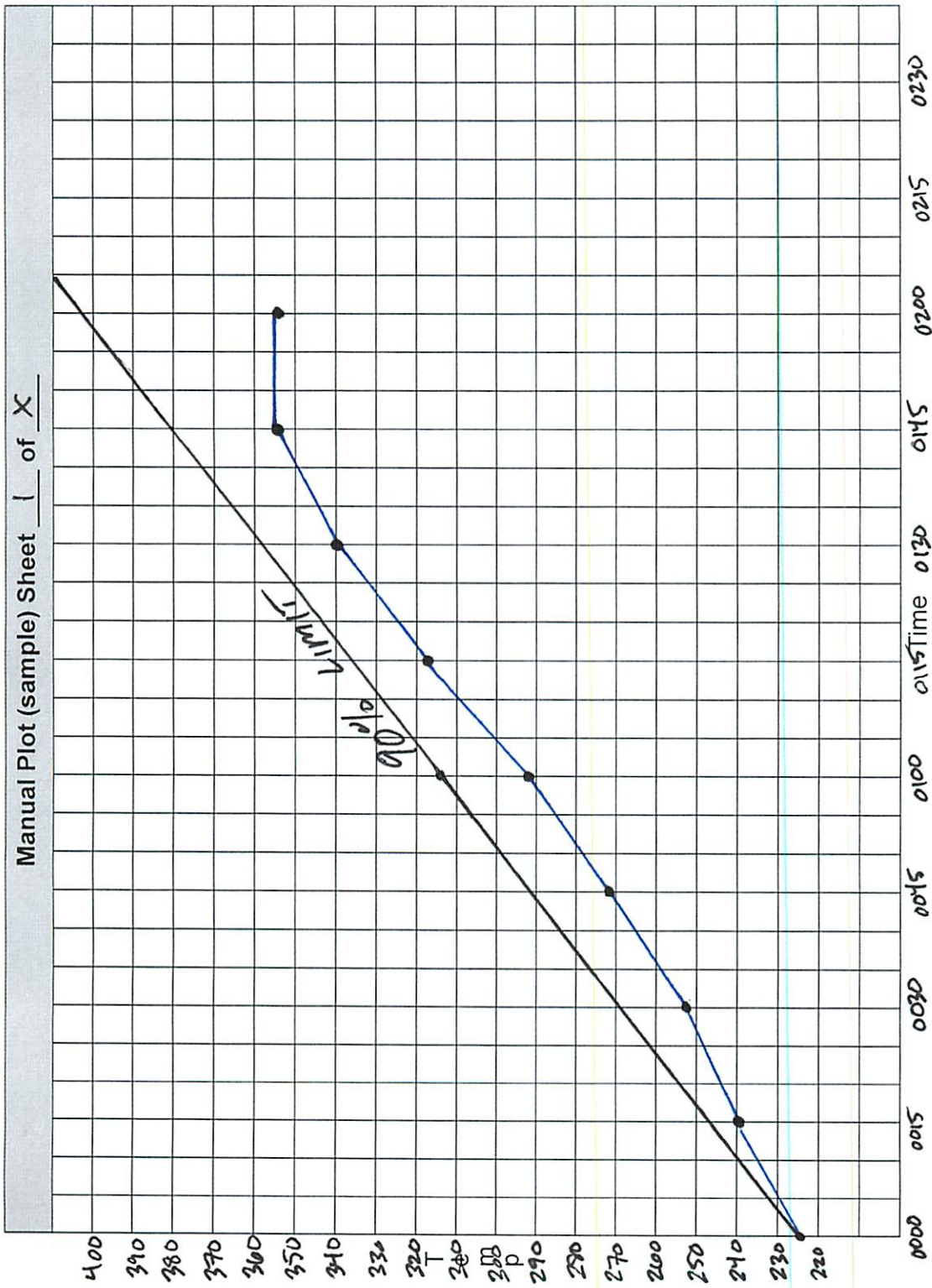
Manual RCS and PZR heatup and Cooldown Rates (sample)				Date: TODAY	Page 1 of X					
RCS Data										
Time	0000	0015	0030	0045	0100	0115	0130	0145	0200	
PZR Pressure	750	750	750	750	800	850	900	950	950	
Next Transition (Temp or condition) (Note 1)	MODE 3	MODE 3	MODE 3	MODE 3	MODE 3	MODE 3	MODE 3			
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										

RCS and Pressurizer Heatup and Cooldown Rates

40ST-9RC01

Revision
17

Appendix A Page 13 of 13



[Handwritten signature]

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
<p>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.</p>	<p>A.1 Restore parameter(s) to within limits. <u>AND</u> A.2 Determine RCS is acceptable for continued operation.</p>	<p>30 minutes 72 hours</p>
<p>B. Required Action and associated Completion Time of Condition A not met.</p>	<p>B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 5 with RCS pressure < 500 psia.</p>	<p>6 hours 36 hours</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>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.</p>	<p>C.1 Initiate action to restore parameter(s) to within limits. <u>AND</u> C.2 Determine RCS is acceptable for continued operation.</p>	<p>Immediately Prior to entering MODE 4</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>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.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

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.

TABLE OF CONTENTS

TA1.0 Reactor Coolant System Pressure and Temperature Limits Report TA-1

TA2.0 Operating Limits..... TA-1

 TA2.1 RCS Pressure and Temperature Limits (LCO 3.4.3)..... TA-2

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

 TA2.3 RCS Loops - Mode 5, Loops Filled (LCO 3.4.7)..... TA-2

 TA2.4 Pressurizer Safety Valves - Mode 4 (LCO 3.4.11)..... TA-2

 TA2.5 Low Temperature Overpressure Protection System
 (LCO 3.4.13)..... TA-2

TA3.0 Neutron Fluence..... TA-8

TA4.0 Reactor Vessel Material Surveillance Program..... TA-8

TA5.0 Adjusted Reference Temperature..... TA-8

TA6.0 Application of Reactor Vessel Surveillance Data..... TA-9

 TA6.1 Applicability to Adjusted Reference Temperature..... TA-9

 TA6.2 Evaluation of Surveillance Data Credibility..... TA-10

 TA6.3 Derivation of Chemistry Factors from Surveillance Data TA-15

TA7.0 References..... TA-15

TABLE OF CONTENTS

<u>List of Figures</u>	<u>Page</u>
TA2-1 RCS Heatup Limits through 32 EFPY.....	TA-6
TA2-2 RCS Cooldown Limits through 32 EFPY.....	TA-7

<u>List of Tables</u>	<u>Page</u>
TA2-1 RCS Heatup and Cooldown Rate Limits through 32 EFPY.....	TA-3
TA2-2 Limiting RCS Temperatures through 32 EFPY.....	TA-3
TA2-3 RCS Heatup P/T Limits through 32 EFPY.....	TA-4
TA2-4 RCS Cooldown P/T Limits through 32 EFPY.....	TA-5
TA3-1 Summary of Fluence and Fluence Factors.....	TA-8
TA5-1 Summary of Limiting ART and RT _{PTS} Values.....	TA-9
TA6-1 Base Metal Materials Selected for Surveillance Program.....	TA-11
TA6-2 Unit 1 Credibility of Surveillance Measurements.....	TA-13
TA6-3 Unit 2 Credibility of Surveillance Measurements.....	TA-14
TA6-4 Unit 3 Credibility of Surveillance Measurements.....	TA-14

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 (LC0 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 $\pm 10^{\circ}\text{F}$ in any 1-hour period is the maximum permitted during inservice hydrostatic and leak testing.

TA2.2 RCS Loops - Mode 4 (LC0 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 (LC0 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 (LC0 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 (LC0 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)

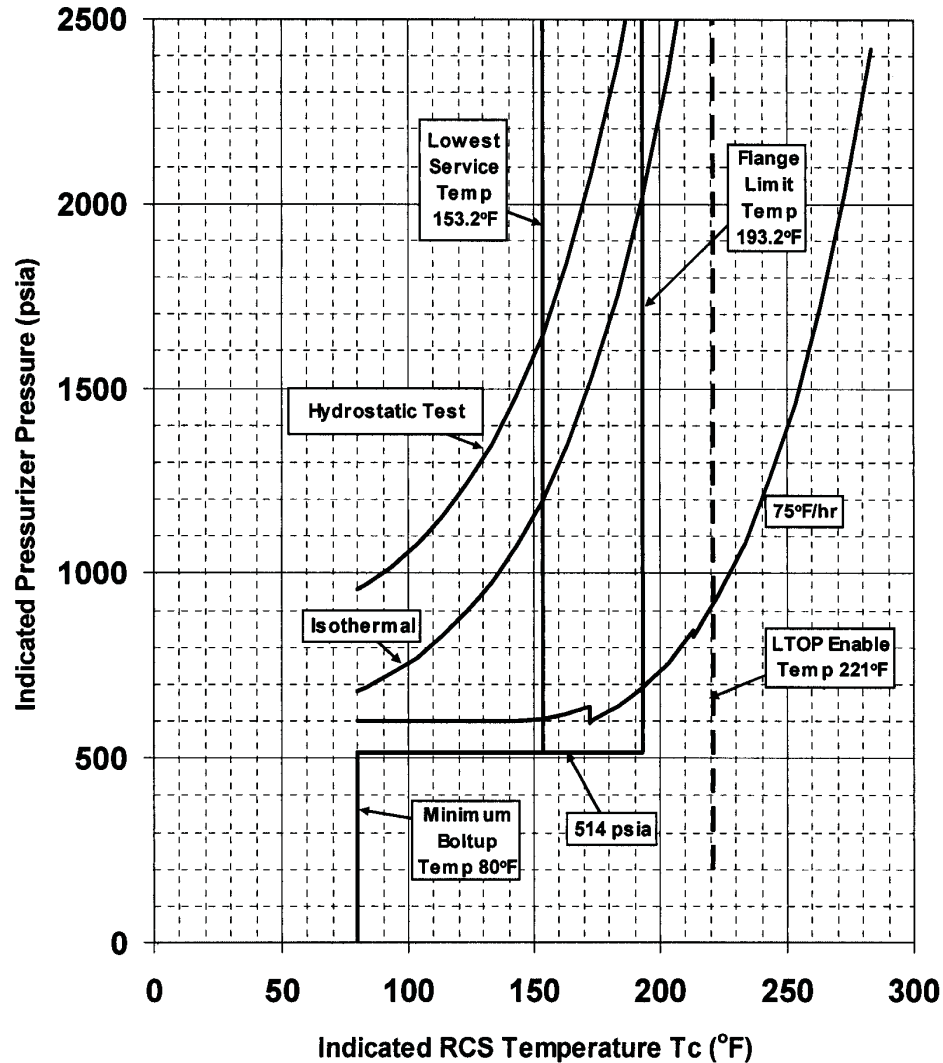
Table TA2-4
PVNGS Unit 1, 2 and 3
RCS Cooldown P/T Limits through 32 EFPY

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)

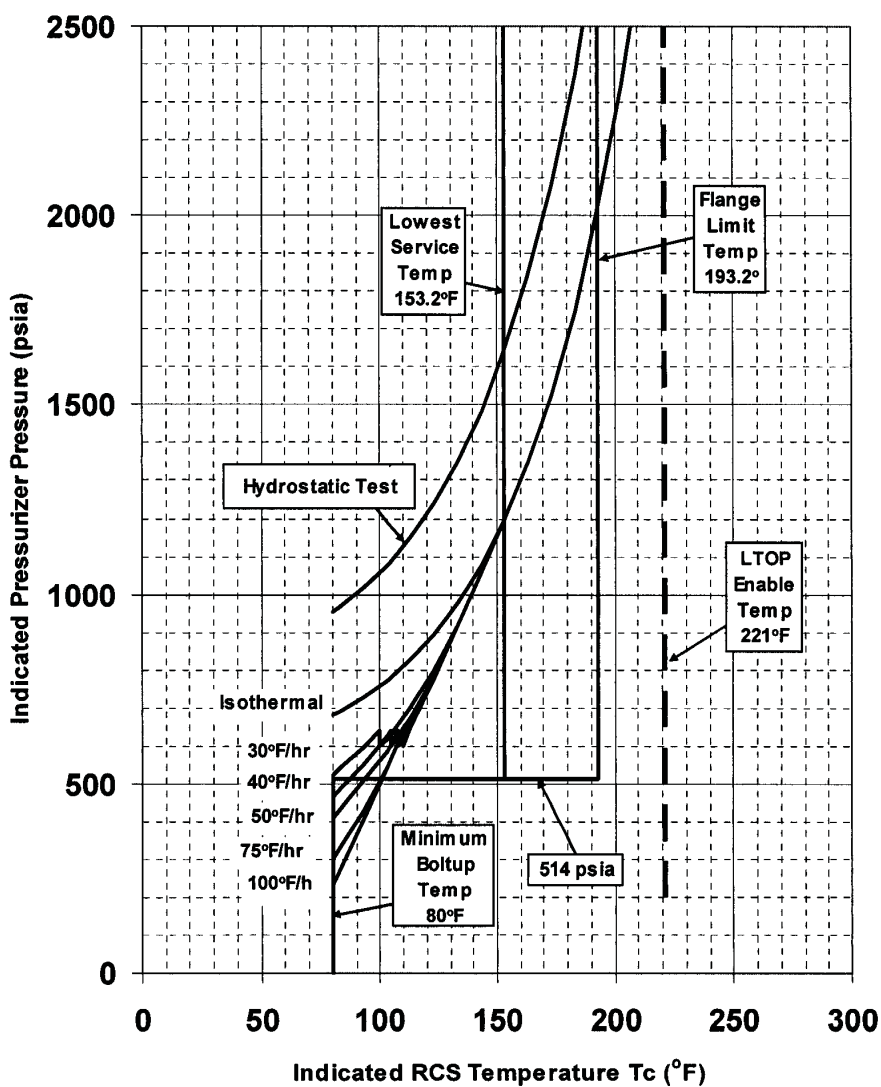
Figure TA2-1
PVNGS Units 1, 2 and 3
RCS Heatup Limits⁽¹⁾⁽²⁾ through 32 EFPY
(Formerly TS Figure TS 3.4.3-2)



- (1) Corrected for instrument uncertainty and for RCS pressure and elevation effects.
- (2) A gradual change in reactor coolant system temperature of $\pm 10^\circ\text{F}$ 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 EFY
(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 $\pm 10^\circ\text{F}$ in any 1-hour period is the maximum permitted during inservice hydrostatic and leak testing.

(continued)



**2013 NRC RO A-3
PVNGS JOB PERFORMANCE MEASURE**

JPM BASIS INFORMATION

TASK:	1280010801 Perform Surveillance Test						
TASK STANDARD:	Total RCS Leakrate has been calculated using the data provided within specified tolerances						
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: 06/11/2013

Revised By: N/A Date: _____

Technical Review _____ Operations Approval _____

EP Review N/A Training Approval _____
(Only required for Emergency Plan JPMs)

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.*



**2013 NRC RO A-3
PVNGS JOB PERFORMANCE MEASURE**

1. SIMULATOR SETUP:

N/A

2. SPECIAL TOOLS/EQUIPMENT:

- 40ST-9RC05, Manual Calculation of RCS Water Inventory Balance 3.4.14.1, Revision 32 available
- Attached copy of 40ST-9RC05 (completed up to step 8.7)
- Attached copy of 40ST-9RC05, Appendix A, Manual Logging of Plant Parameters Using Control Board Instruments
- 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.



**2013 NRC RO A-3
PVNGS JOB PERFORMANCE MEASURE**

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 has been completed up to step 8.7.**
- **Data was collected manually per Appendix A (see attached Data Sheet).**
- **TSCCR #3881280 is 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. It shall be terminated when the Examinee has verbalized completion of 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.



2013 NRC RO A-3
PVNGS JOB PERFORMANCE MEASURE

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Step 8.7.1 Initial VCT Volume Calculation 3. <u>Calculate</u> Initial VCT Volume	Evaluator Note: See ANSWER KEY for justification of ACCEPTABLE range	Examinee calculates Initial VCT Volume: 358 ft³ - 359 ft³
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
2. *	Step 8.7.1 4. <u>Convert</u> Volume to gallons	Evaluator Note: See ANSWER KEY for justification of ACCEPTABLE range	Examinee converts 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. <u>Calculate</u> Final VCT Volume	Evaluator Note: See ANSWER KEY for justification of ACCEPTABLE range	Examinee converts Final VCT Volume: 347 ft³ – 348 ft³
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
4. *	Step 8.7.2 4. <u>Convert</u> Volume to gallons	Evaluator Note: See ANSWER KEY for justification of ACCEPTABLE range	Examinee converts Final VCT Volume: 2579 gal – 2587 gal
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC RO A-3
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
5. *	Step 8.7.3 <u>Determine</u> the change in VCT volume	Evaluator Note: See ANSWER KEY for justification of ACCEPTABLE range	Examinee determines 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. <u>Calculate</u> Initial PZR Volume	Evaluator Note: See ANSWER KEY for justification of ACCEPTABLE range	Examinee calculates Initial PZR Volume: 896 ft³ - 897 ft³
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
7. *	Step 8.8.1 3. <u>Convert</u> Volume to gallons	Evaluator Note: See ANSWER KEY for justification of ACCEPTABLE range	Examinee converts 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. <u>Calculate</u> Final PZR Volume	Evaluator Note: See ANSWER KEY for justification of ACCEPTABLE range	Examinee converts Final PZR Volume: 867 ft³ – 868 ft³
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC RO A-3
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
9. *	Step 8.8.2 4. <u>Convert</u> Volume to gallons	Evaluator Note: See ANSWER KEY for justification of ACCEPTABLE range	Examinee converts Final PZR Volume: 3852 gal – 3857 gal
SAT / UNSAT Comments (required for UNSAT):			

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

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

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

Evaluator NOTE: Due to the fact that RCS temperatures did not change, RCS volume did not change.



**2013 NRC RO A-3
PVNGS JOB PERFORMANCE MEASURE**

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

	STEP	CUE	STANDARD
14. *	Step 8.12.3 <u>Determine</u> 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 justification of 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 determines 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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



**2013 NRC RO A-3
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
0	06/11/2013		Record created.

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



CANDIDATE

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 has been completed up to step 8.7.**
- **Data was collected manually per Appendix A (see attached Data Sheet).**
- **TSCCR #3881280 is 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.***

CANDIDATE

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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	
<u>54</u> %	x	5.4289 ft ³ /%	+	65.38 ft ³	=	<u>358.54</u> ft ³	359 upper - 358 Lower

JR 4. Convert Volume in ft³ to volume in standard (STP) gallons.

$$\begin{aligned}
 \text{Initial VCT Volume (gal)} &= \frac{\text{Initial VCT Volume (ft}^3\text{)}}{\text{Specific Volume of Liquid at Initial VCT temp. from ASME Steam Tables (Saturated Liquid)}} \\
 &= \frac{358.54 \text{ (ft}^3\text{)}}{0.016145 \left(\frac{\text{ft}^3}{\text{lbm}}\right) \times 8.33 \left(\frac{\text{lbm}}{\text{gal}}\right)} \\
 &= \underline{2665.97} \text{ gal (Initial)}
 \end{aligned}$$

NOTE: 2661 gal through 2670 gal ACCEPTABLE

ANSWER KEY

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

8.7.2 Final VCT Volume calculation.

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

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

JR 3. Calculate Final VCT Volume

Percent VCT Level	x	Volume per percent	+	VCT Volume below 0%	=	Final VCT Volume	
<u>52</u> %	x	5.4289 ft ³ /%	+	65.38 ft ³	=	<u>347.68</u> ft ³	<i>348 upper - 347 lower</i>

JR 4. Convert Volume in ft³ to volume in standard (STP) gallons.

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

$$= \frac{347.68 \text{ (ft}^3\text{)} \overset{348}{-} \overset{347}{}}{0.016152 \left(\frac{\text{ft}^3}{\text{lbm}}\right) \times 8.33 \left(\frac{\text{lbm}}{\text{gal}}\right)}$$

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

*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
<u>2665.97</u>	-	<u>2584.12</u>	=	<u>81.85</u>
Gallons (Initial)		Gallons (Final)		Gallons

NOTE: 91 gal - 74 gal ACCEPTABLE

ANSWER KEY

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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.

- JK 1. Record Initial PZR level 51.6 %
(Appendix A or operator logs)
- JK 2. Record Initial PZR pressure 2260 psia
(Appendix A or operator logs)
- JK 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	
(<u>51.6</u> %	-	10%)	x	18.0358 ft ³ /%	+	145.94 ft ³	=	<u>896.23</u> ft ³	<div style="text-align: right; margin-right: 10px;"> <u>897</u> upper <u>896</u> lower </div>

- JK 4. Convert Volume in ft³ to Volume in standard (STP) gallons.

$$\begin{aligned}
 \text{Initial PZR Volume (gal)} &= \frac{\text{Initial PZR Volume (ft}^3\text{)}}{\text{Specific Volume of Liquid at Initial PZR press. from ASME Steam Tables. (Saturated Liquid)}} \times 8.33 \left(\frac{\text{lbm}}{\text{gal}} \right) \\
 &= \frac{\text{896.23 (ft}^3\text{)}}{\text{0.02702} \left(\frac{\text{ft}^3}{\text{lbm}} \right)} \times 8.33 \left(\frac{\text{lbm}}{\text{gal}} \right) \\
 &= \text{3981.89 gal (Initial)}
 \end{aligned}$$

NOTE: 3980 gal through 3986 gal ACCEPTABLE

ANSWER KEY

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

8.8.2 Final PZR Volume Calculation.

- JK* 1. Record Final PZR level 50.0 %
(Appendix A or operator logs)
- JK* 2. Record Final PZR pressure 2260 psia
(Appendix A or operator logs)
- JK* 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
(<u>50.0</u> %		- 10%)	x	18.0358 ft ³ /%	+	145.94 ft ³	=	<u>867.37</u> ft ³

868 upper
867 lower

- JK* 4. Convert Volume in ft³ to volume in standard (STP) gallons.

$$\begin{aligned}
 \text{Final PZR Volume (gal)} &= \frac{\text{Final PZR Volume (ft}^3\text{)}}{\text{Specific Volume of Liquid at Final PZR press. from ASME Steam Tables. (Saturated Liquid)}} \\
 &= \frac{867.37 \text{ (ft}^3\text{)}}{0.02702 \left(\frac{\text{ft}^3}{\text{lbm}}\right) \times 8.33 \left(\frac{\text{lbm}}{\text{gal}}\right)} \\
 &= \underline{3853.67} \text{ gal (Final)}
 \end{aligned}$$

NOTE: 3852 gal - 3857 gal ACCEPTABLE

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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	<i>NOTE:</i>
<u>3981.89</u>	-	<u>3853.67</u>	=	<u>128.22</u>	123 gal -
Gallons (Initial)		Gallons (Final)		Gallons	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.

$$\text{Compensated Volume} = \text{Change in PZR Volume from step 8.8.3} \\ (\text{gal}) \times .83$$

$$\text{Compensated Volume} = dV_{PZR} (\underline{128.22} \text{ gal}) \times .83$$

$$\text{Compensated Volume} = \underline{106.42} \text{ gal}$$

NOTE: 102 gal - 112 gal
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

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
328.9 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

$$\underline{120} \text{ (Final)} - \underline{0} \text{ (Initial)} = \underline{120} \text{ minutes.}$$

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

$$T_{c1a} \underline{564} \text{ °F}$$

$$T_{c1b} \underline{564} \text{ °F}$$

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

JR 4. Calculate initial loop 1 T_{ave}

$$\frac{T_h \underline{620} \text{ °F} + T_{c \text{ ave}} \underline{564} \text{ °F}}{2} = \underline{592} \text{ °F}$$

ANSWER KEY

ANSWER KEY

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

~~HL~~ 1. Record loop 2 T_h 620 °F

~~HL~~ 2. Record loop 2a and 2b T_c .

$$T_{c2a} \text{ 564 } ^\circ\text{F}$$

$$T_{c2b} \text{ 564 } ^\circ\text{F}$$

~~HL~~ 3. Calculate Average $T_c = \frac{T_{c2a} + T_{c2b}}{2} = \text{564 } ^\circ\text{F}$

~~HL~~ 4. Calculate initial loop 2 T_{ave}

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

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

$$T_{ave} = \frac{T_{ave1} + T_{ave2}}{2} = \text{592 } ^\circ\text{F}$$

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

~~HL~~ 1. Record loop 1 T_h 620 °F

~~HL~~ 2. Record loop 1a and 1b T_c

$$T_{c1a} \text{ 564 } ^\circ\text{F}$$

$$T_{c1b} \text{ 564 } ^\circ\text{F}$$

~~HL~~ 3. Calculate Average $T_c = \frac{T_{c1a} + T_{c1b}}{2} = \text{564 } ^\circ\text{F}$

~~HL~~ 4. Calculate final loop 1 T_{ave}

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

ANSWER KEY

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
328.10.5 Calculate the final average T_{ave} for Loop 2.~~HR~~ 1. Record loop 2 T_h 620 °F~~HR~~ 2. Record loop 2a and 2b T_c . T_{c2a} 564 °F T_{c2b} 564 °F~~HR~~ 3. Calculate Average $T_c = \frac{T_{c2a} + T_{c2b}}{2} = \underline{564}$ °F~~HR~~ 4. Calculate final loop 2 T_{ave}

$$\frac{T_h \underline{620} \text{ } ^\circ F + T_{c \text{ ave}} \underline{564} \text{ } ^\circ F}{2} = \underline{592} \text{ } ^\circ F$$

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

$$T_{ave} = \frac{T_{ave1} + T_{ave2}}{2} = \underline{592} \text{ } ^\circ F$$

ANSWER KEY

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

8.10.7 Initial RCS Volume Calculation

- JK 1. Record Initial RCS Average T_{ave} 592 °F
- JK 2. Record Initial PZR Pressure 2260 psia
- JK 3. Calculate Initial Volume in standard (STP) gallon

$$\begin{aligned} \text{Initial RCS Volume (gal)} &= \frac{13,351 \text{ (ft}^3\text{)}}{\text{Specific Volume of Liquid at Initial temperature from ASME Steam Tables.} \left(\frac{\text{ft}^3}{\text{lbm}}\right) \times 8.33 \left(\frac{\text{lbm}}{\text{gal}}\right)} \\ &= \frac{13,351 \text{ (ft}^3\text{)}}{0.62328 \left(\frac{\text{ft}^3}{\text{lbm}}\right) \times 8.33 \left(\frac{\text{lbm}}{\text{gal}}\right)} \\ &= \underline{68847.13} \text{ gal. (Initial RCS Volume)} \end{aligned}$$

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

ANSWER KEY

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

8.10.8 Final RCS Volume Calculation

- JK 1. Record Final RCS average T_{ave} 592 °F
- JK 2. Record Final PZR Pressure 22600 psia
- JK 3. Calculate Final Volume in standard (STP) gallons.

$$\begin{aligned} \text{Final RCS Volume (gal)} &= \frac{13,351 \text{ (ft}^3\text{)}}{\text{Specific Volume of Liquid at Final temperature from ASME Steam Tables. } \left(\frac{\text{ft}^3}{\text{lbm}}\right) \times 8.33 \left(\frac{\text{lbm}}{\text{gal}}\right)} \\ &= \frac{13,351 \text{ (ft}^3\text{)}}{0.02328 \left(\frac{\text{ft}^3}{\text{lbm}}\right) \times 8.33 \left(\frac{\text{lbm}}{\text{gal}}\right)} \\ &= \underline{68847.13} \text{ gal. (Final RCS Volume)} \end{aligned}$$

NON-CRITICAL STEP

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

$$\begin{array}{rcl} \text{Gallons in RCS (Initial)} & - & \text{Gallons in RCS (Final)} & = & \text{Change in RCS Volume} \\ \underline{68847.13} & - & \underline{68847.13} & = & \underline{\phi} \\ \text{Gallons (Initial)} & & \text{Gallons (Final)} & & \text{Gallons} \end{array}$$

ANSWER KEY

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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.

$$\begin{aligned} \text{Total System Leakage} &= \text{Change in VCT Volume} + \text{Change in PZR Volume} + \text{Change in RCS Volume} \\ &= \frac{81.85}{203} \frac{91}{74} \text{ gal} + \frac{106.42}{102} \frac{112}{102} \text{ gal} + \phi \text{ gal} \\ &= \frac{188.27}{176} \text{ gal} \end{aligned}$$

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

$$\begin{aligned} \text{Total System Leakage} \div \text{Elapsed Time} &= \text{Total System Leakrate} \\ \frac{188.27}{203} \frac{176}{176} \text{ gal} \div \underline{120} \text{ min} &= \underline{1.57} \text{ gpm} \end{aligned}$$

NOTE: 1.47 gpm - 1.7 gpm
ACCEPTABLE

ANSWER KEY

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 reevaluate 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.

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

pr 8.12.2.3 Record TSCCR number(s) TSCCR# 3881280

pr 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: 1.27 gpm - 1.5 gpm ACCEPTABLE**

pr 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 RD WILL COMPLETE ST

END OF JPM

ANSWER KEY

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

Appendix A Page 1 of 3

Appendix A -

Manual Logging of Plant Parameters Using Control Board Instruments

- AR* 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:
- AR* 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.
- AR* 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 T_{cold} 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
- AR* 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.

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

Appendix A Page 2 of 3

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 <u>HCT-39, 40, 41</u>	109.1	111.0
RCS T _{hot} Loop 1	<u>TT-112HA</u> , TT-112HB or RCT111X	620	620
RCS T _{cold} Loop 1a	<u>TT-112CA</u> , TT-112CC or RCT111Y	564	564
RCS T _{cold} Loop 1b	<u>TT-112CB</u> , TT-112CD or TI-115	564	564
RCS T _{hot} Loop 2	<u>TT-122HA</u> , TT-122HB or RCT121X	620	620
RCS T _{cold} Loop 2a	<u>TT-122CA</u> , TT-122CC or TI-125	564	564
RCS T _{cold} Loop 2b	<u>TT-122CB</u> , TT-122CD or RCT121Y	564	564
PZR Pressure	RCN-PR- <u>100X</u> /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	<u>RCA-LI-110X</u> 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	<u>CHN-LI-226</u> 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

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

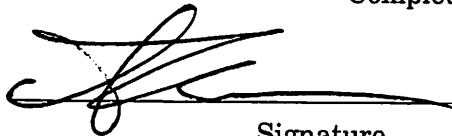
Appendix A Page 3 of 3

(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 <u>ISCALOR</u> , NKBDDEL	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;

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

**MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1**

40ST-9RC05

**Revision
32**

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 $\pm 1.0^{\circ}\text{F}$ 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.

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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)

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

7.0 PREREQUISITES

- JK* 7.1 The Shift Manager/CRS has given his permission to perform this test.
- JK* 7.2 This copy of the procedure is the current revision.
- JK* 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.
- JK* 7.4 The CVCS is stabilized in the normal system lineup with pressurizer level control system in operation.
- JK* 7.5 The VCT is filled to near the top of the operating band (about 44%) as indicated on CHN-LI-226.
- JK* 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.
- JK* 7.7 The reactor drain pumps are off and remain off during the test.
- JK* 7.8 Chemistry will **not** sample the RCS or CVCS during this performance.
- JK* 7.9 The following Sample Isolation Valves are closed;
 - JK* SSA-UV-203 *JK* SSB-UV-200
 - JK* SSA-UV-204 *JK* SSB-UV-201
 - JK* SSA-UV-205 *JK* SSB-UV-202

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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 CHRГ 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.
- N/A* ↓
- 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.

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

JN 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.

JN 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 $\pm 1.0^\circ F$).
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.

JN

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.

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

8.6 for 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 for (Init)

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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 ft³ to volume in standard (STP) gallons.

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

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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 ft³ to volume in standard (STP) gallons.

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

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

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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 ft³ to Volume in standard (STP) gallons.

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

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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 ft³ to volume in standard (STP) gallons.

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

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

----- **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 - Gallons in PZR = Change in PZR
 (Initial) (Final) 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.

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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 $T_c = \frac{T_{c1a} + T_{c1b}}{2} =$ _____ °F

___ 4. Calculate initial loop 1 T_{ave}

$$\frac{T_h \text{ } ^\circ F + T_{c \text{ ave}} \text{ } ^\circ F}{2} = \text{ } ^\circ F$$

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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 $T_c = \frac{T_{c2a} + T_{c2b}}{2} =$ _____ °F

___ 4. Calculate initial loop 2 T_{ave}

$$\frac{T_h \text{ } ^\circ F + T_{c \text{ ave}} \text{ } ^\circ F}{2} = \text{ } ^\circ F$$

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

$$T_{ave} = \frac{T_{ave1} + T_{ave2}}{2} = \text{ } ^\circ F$$

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 $T_c = \frac{T_{c1a} + T_{c1b}}{2} =$ _____ °F

___ 4. Calculate final loop 1 T_{ave}

$$\frac{T_h \text{ } ^\circ F + T_{c \text{ ave}} \text{ } ^\circ F}{2} = \text{ } ^\circ F$$

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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 $T_c = \frac{T_{c2a} + T_{c2b}}{2} =$ _____ °F

___ 4. Calculate final loop 2 T_{ave}

$$\frac{T_h \text{ } ^\circ F + T_{c \text{ ave}} \text{ } ^\circ F}{2} = \text{ } ^\circ F$$

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

$$T_{ave} = \frac{T_{ave1} + T_{ave2}}{2} = \text{ } ^\circ F$$

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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

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

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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.

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

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

$$\begin{aligned}
 \text{Gallons in RCS (Initial)} & - \text{Gallons in RCS (Final)} & = & \text{Change in RCS Volume} \\
 \text{_____} & - \text{_____} & = & \text{_____} \\
 \text{Gallons (Initial)} & & & \text{Gallons (Final)} & & = & \text{Gallons}
 \end{aligned}$$

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

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.

$$\begin{aligned}
 \text{Total System Leakage} &= \text{Change in VCT Volume} + \text{Change in PZR Volume} + \text{Change in RCS Volume} \\
 &= \text{_____ gal} + \text{_____ gal} + \text{_____ gal} \\
 &= \text{_____ gal}
 \end{aligned}$$

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

$$\begin{aligned}
 \text{Total System Leakage} \div \text{Elapsed Time} &= \text{Total System Leakrate} \\
 \text{_____ gal} \div \text{_____ min} &= \text{_____ gpm}
 \end{aligned}$$

MANUAL CALCULATION OF RCS WATER INVENTORY
BALANCE 3.4.14.1

40ST-9RC05

Revision
32

- 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 reevaluate 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.
- $$\begin{aligned}
 \text{Total RCS Leakrate} &= \text{Total System Leakrate} && - && \text{RCS Connecting System} \\
 & \quad \text{(from step 8.11.2)} && && \text{Leakrate (Total)} \\
 &= \text{_____ gpm} && - && \text{_____ gpm} \\
 &= \text{_____ gpm}
 \end{aligned}$$
- ___ 8.12.4 **IF** the connecting system Leak Rate is greater than 0.3 gpm,
THEN initiate corrective action to repair the leak(s).



**2013 NRC RO A-4
PVNGS JOB PERFORMANCE MEASURE**

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: 07/05/2013

Technical Review _____ Operations Approval _____

EP Review N/A Training Approval _____

(Only required for Emergency Plan JPMs)

EVALUATION

Date: _____

Examinee Name: _____

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.



**2013 NRC RO A-4
PVNGS JOB PERFORMANCE MEASURE**

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 - Attached
- 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-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:

- 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):

- Correct 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:



**2013 NRC RO A-4
PVNGS JOB PERFORMANCE MEASURE**

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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC RO A-4
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

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

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

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



**2013 NRC RO A-4
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
4. *	Examinee determines appropriate EPD Dose Rate Alarm		Examinee determines 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.” Evaluator NOTE: Examinee may determine by looking at the survey map that Contaminated Area boundary work is required. If he/she does, then a lab coat and gloves would be required. Both <i>No PCs AND Lab Coat and Gloves</i> are acceptable answers.	Examinee determines NO PCs OR Examinee determines Lab Coat and Gloves
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
6. *	Examinee determines appropriate RP coverage		Examinee determines Intermittent OR Examinee determines Not Required
SAT / UNSAT Comments (required for UNSAT):			



2013 NRC RO A-4
PVNGS JOB PERFORMANCE MEASURE

	STEP	CUE	STANDARD
7. *	Examinee determines appropriate RP briefing and/or authorization		Examinee determines 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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



**2013 NRC RO A-4
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
002	3, 6	09/18/2012	Updated Survey Map and Ops Routine Tasks REP
003	3, 6	07/05/2013	Updated Format and Survey Map

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC RO A-4
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

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

CANDIDATE



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 OR Lab Coat and Gloves (examinee may believe CA boundary work would be required, but NO CA entry is allowed)
Required RP coverage (if any):	Intermittent OR Not Required
Required RP briefing and/or authorization:	A formal RP Pre-Job Brief and RP authorization is REQUIRED for entry into HRA

ANSWER KEY

REP#: 9-1002	Revision: 01	Effective Date & Time: 9/5-2012 @ 1145
<p>Description of variance:</p> <p>RP leader to provide direction for attaching hose(s) or directly inserting hose(s) into floor drains for draining/flushing contaminated systems.</p>		
<p>Evaluation Summary (include survey numbers as appropriate):</p> <p>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.</p>		
<p>Limitations / Applicability:</p> <p>Use for ALL TASKS.</p>		
<p>Approval RPDL required for Medium Risk REPs Manager, Radiation Protection required For High Risk REPs</p>	<p>Signature</p>	<p>Date & Time</p>



**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



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.

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

Areas Allowed for Entry (Area Status: RA)

<u>Radiation Area:</u> YES	<u>High Radiation Area:</u> NO	<u>Locked High Radiation Area:</u> NO
--------------------------------------	------------------------------------------	-------------------------------------------------

Electronic Dosimeter Alarm Setpoints

<u>Dose Alarm Setpoint (mRem):</u> 10	<u>Dose Rate Alarm Setpoint (mRem/Hr):</u> 75
------------------------------------------	--------------------------------------------------

Authorization List

<u>Authorization Required:</u> NO	<u>Authorization Expires:</u> NO
--------------------------------------	-------------------------------------

Requirements

<u>Requirement Groups</u>	<u>Requirement Descriptions</u>
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



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.

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

Areas Allowed for Entry (Area Status: HRA)

<u>Radiation Area:</u> YES	<u>High Radiation Area:</u> YES	<u>Locked High Radiation Area:</u> NO
--------------------------------------	-------------------------------------------	-------------------------------------------------

Electronic Dosimeter Alarm Setpoints

<u>Dose Alarm Setpoint (mRem):</u> 15	<u>Dose Rate Alarm Setpoint (mRem/Hr):</u> 200
------------------------------------------	---------------------------------------------------

Authorization List

<u>Authorization Required:</u> NO	<u>Authorization Expires:</u> NO
--------------------------------------	-------------------------------------

Requirements

<u>Requirement Groups</u>	<u>Requirement Descriptions</u>
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.



RADIATION EXPOSURE PERMIT

Task Number **Two**

REP Number: **9-1002** Rev.: **01**

Attachments

N/A



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.

<u>Radiological Risk:</u>	<u>Time Alarm (HH:MM):</u> 13:00	<u>Min. Avail. Dose (mRem):</u> 20
<u>Estimated Dose:</u> 50.00	<u>Estimated Hours:</u> 25.00	<u>Chirp Rate:</u> 1 mrem

Areas Allowed for Entry (Area Status: LHRA)

<u>Radiation Area:</u> YES	<u>High Radiation Area:</u> YES	<u>Locked High Radiation Area:</u> YES
--------------------------------------	-------------------------------------------	--------------------------------------------------

Electronic Dosimeter Alarm Setpoints

<u>Dose Alarm Setpoint (mRem):</u> 20	<u>Dose Rate Alarm Setpoint (mRem/Hr):</u> 300
------------------------------------------	---------------------------------------------------

Authorization List

<u>Authorization Required:</u> YES	<u>Authorization Expires:</u> NO
---------------------------------------	-------------------------------------

Requirements

<u>Requirement Groups</u>	<u>Requirement Descriptions</u>
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

VSDS Standard Map Survey Report

Survey 1-M-2LLLLLL-L

General Information

Title: LPSI B Quarterly

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

Lead Surveyor: Y æ!^} ÁÚ[æ!

Survey Type: Routine

Work Order/Task #: 4023YYYY

Counted By:

REP: 9-1009 RevÆ

Rx % Pwr: 100%

Status: Approved by: Šæ!^ ÁÚ[æ!}, YY/YY/20YY

Ready for Review by: Œ!^ ÁÚ[æ!}, YY/YY/20YY

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

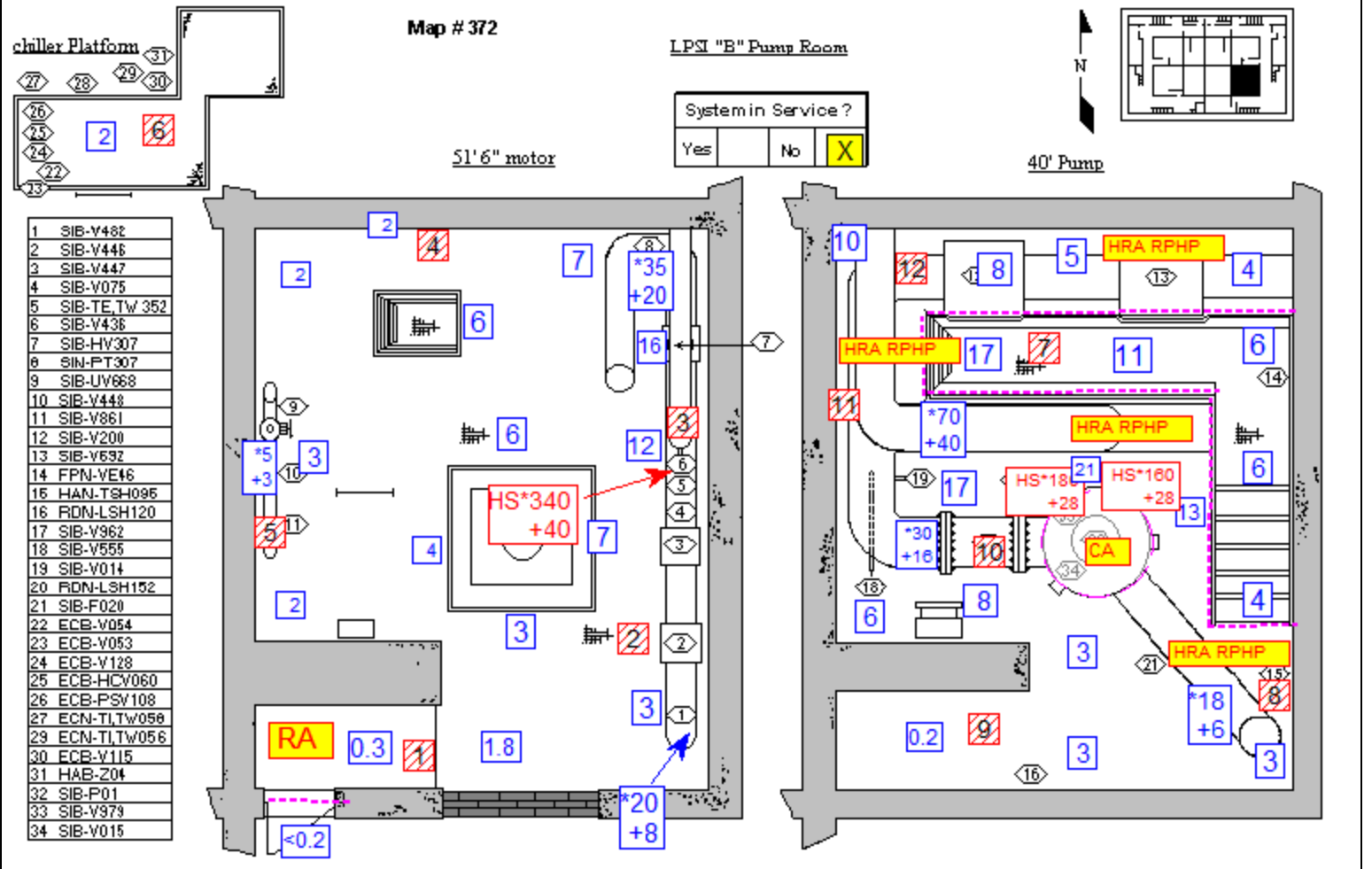
#	Instrument Model	Instrument Serial #	Inst Type	Probe Model	Probe Serial #	Probe Type	Calibration Date/Time	Efficiency		
								β/γ	β	α
1	40GL	14449	D	INTERNAL	N/A	D	9/12/20YY	N/A	N/A	N/A
2	RM20	11160	C	HP-260	N/A	C	11/24/20YY	N/A	N/A	N/A

VSDS Standard Map Survey Report

A040 | LPSI B Room | Auxiliary

Survey #: 1-M-2LLLLLLLL-L

Date/Time: LL/LL/20LL 10:28



Comments:

Type: Routine

Symbol Legend (for example only)		RWP #: 9-1009 Rev 0 Reactor Power = 100%
Dose Rate	Drip Bag	HS-50 Hot Spot
*150 ← Contact		RICA Posting
+75 ← 30 cm		△ 15 Air Sample
20 ← General Area		□ 15 Smear
		◇ 15 Direct Frisk
		○ 15 Wipe

Unless otherwise noted, dose rates in mRem/hr.

Lead Surveyor: Y æ!^} ÁÚ[æ!	Status: Approved by: Šæ!^ ÁÚ[æ!}, ÝÝ/ÝÝ/20ÝÝ
Location Code: Auxiliary	Bldg/Area Name: A040
Location Description: LPSI B Room	

Image File: LPSI B Rm 40'-51'

VSDS Standard Map Survey Report

Data Point Details

Survey #: 1-M-2LLLLLLLL-L

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	* 20	mRem/hr		
		N/A	+ 8	mRem/hr		
DR	γ HS	N/A	HS * 340	mRem/hr		underside of line
		N/A	+ 40	mRem/hr		
DR	γ	N/A	* 35	mRem/hr		
		N/A	+ 20	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	* 18	mRem/hr		* on overhead line
		N/A	+ 6	mRem/hr		
DR	γ	N/A	* 70	mRem/hr		upper pipe
		N/A	+ 40	mRem/hr		
DR	γ	N/A	0.2	mRem/hr		
DR	γ	N/A	13	mRem/hr		
DR	γ HS	N/A	HS * 180	mRem/hr		cyclone seperator
		N/A	+ 28	mRem/hr		
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	HS * 160	mRem/hr		upper cyclone seperator
		N/A	+ 28	mRem/hr		
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	* 5	mRem/hr		
		N/A	+ 3	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		

VSDS Standard Map Survey Report

<p>Data Point Details</p> <p>Survey #: 1-M-2LLLLLLLL-L</p> <p>Map: A040 LPSI B Room Auxiliary</p>					
----------------------------------------------------------------------------------------------------------------------------	--	--	--	--	--

#	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			

VSDS Standard Map Survey Report

Comments:

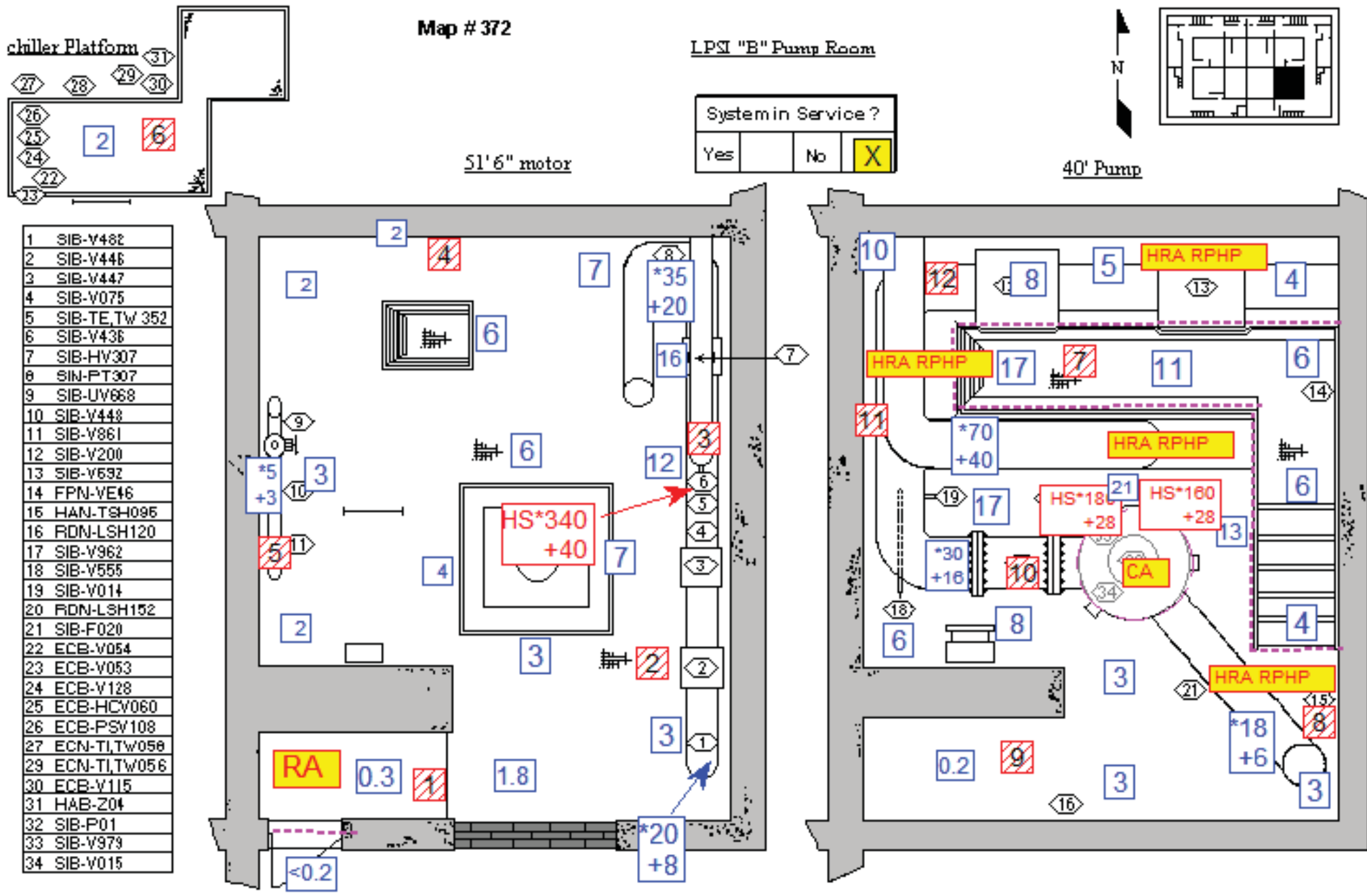
LAS taken on floors, walls and equipment up to 6' above floor.

VSDS Standard Map Survey Report

A040 | LPSI B Room | Auxiliary

Survey #: 1-M-2XXXXXXX-X

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



- 1 SIB-V482
- 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-V692
- 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-204
- 32 SIB-P01
- 33 SIB-V979
- 34 SIB-V015



2013 NRC SRO A-1
PVNGS JOB PERFORMANCE MEASURE

JPM BASIS INFORMATION

Table with 7 columns and 8 rows containing task details, standards, ratings, and testing environment information.

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: 08/29/2013
Technical Review Operations Approval
EP Review N/A Training Approval
(Only required for Emergency Plan JPMs)

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.



**2013 NRC SRO A-1
PVNGS JOB PERFORMANCE MEASURE**

1. SIMULATOR SETUP:

N/A

2. SPECIAL TOOLS/EQUIPMENT:

- Attached copy of 40DP-9OP06, Appendix EC003 available. This JPM was written using Revision 120 of 40DP-9OP06, Operations Department Repetitive Task Program, Appendix EC003. 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
 - 195 minute elapsed time duration
 - 1.0 °F change in temperature
 - Total leak rate (before adjustment) of 0.578 gph
 - Adjusted leak rate (incorrect value) of 0.588 gph
- Technical Specifications.
- 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:

- 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.



**2013 NRC SRO A-1
PVNGS JOB PERFORMANCE MEASURE**

INITIAL CONDITIONS:

- **You are the Control Room Supervisor in Unit 3**
- **Operations Repetitive task Appendix EC003, is in progress, performed up to Step 18.0**
- **Mode 1, 100% power**

INITIATING CUE:

Your task is to:

- 1. Identify (1) one error (Non-clerical, not typos)**
- 2. List the required actions, if any**
- 3. Determine any applicable LCO and condition (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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC SRO A-1
PVNGS JOB PERFORMANCE MEASURE**

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 that the Adjusted leak rate is incorrect.</u> (should be 0.68 gph) <i>Note to Examiner: At step 14 the correct addition of 0.10 gpm should have been 0.678 gpm, not 0.588 (top row of blocks).</i>

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2. *	Determines Adjusted leak is \geq 0.63gph.		Examinee reviews the data and <u>determines that the leak rate exceeds 0.63 GPH and requires actions.</u> (listed below in following steps)

SAT / UNSAT

Comments (required for UNSAT):



**2013 NRC SRO A-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
3. *	Take Required actions for leak rate > .63 gph. <ul style="list-style-type: none"> • Declare 'A' Train EC inoperable 		Examinee declares 'A' Train EC INOPERABLE .
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
4.	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):			



**2013 NRC SRO A-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
5.	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
6. *	Determines any applicable LCO and applicable actions.		Examinee determines that entry into LCO 3.7.10 Condition 'A' 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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



2013 NRC SRO A-1
PVNGS JOB PERFORMANCE MEASURE

ANSWER KEY

Error:	Leak Rate is wrong at step 15. Should be 0.678 NOT 0.588
Action(s) to be taken:	<ol style="list-style-type: none">1. Declare Train 'A' EC INOPERABLE2. Initiate a PVAR for HVAC to quantify and investigate the leak rate3. Notify the System or Component Engineer EXAMINER NOTE: Actions 2 and 3 are <u>NOT</u> required for satisfactory completion of this JPM (Examinee may just state perform Step 16.2)
LCO and Condition:	LCO 3.7.10 Condition 'A'

ANSWER KEY



**2013 NRC SRO A-1
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
001	09/09/2007	3	Updated JPM to match procedure
002	04/22/2009	6	Updated format
003	08/29/2013	3, 6	Updated JPM to match Rev 120 of procedure; Updated format

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC SRO A-1
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

INITIAL CONDITIONS:

- You are the Control Room Supervisor in Unit 3
- Operations Repetitive task Appendix EC003, is in progress, performed up to Step 18.0
- Mode 1, 100% power

INITIATING CUE:

Your task is to:

1. Identify (1) one error (Non-clerical, not typos)
2. List the required actions, if any
3. Determine any applicable LCO and condition (Do NOT list any cascaded Tech Specs)

Error:	
Action(s) to be taken:	
LCO and Condition:	

CANDIDATE

Operations Department Repetitive Task Program

40DP-9OP06

Revision
120

Appendix EC003 Page 1 of 6

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 40OP-9EC01		References EC DBM table 6 CRAI 3131561 CRDR 1-8-0510 CRAI 2985204		

Purpose

----- **NOTE** -----

HL 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

- HL* • To verify that the Essential Chilled Water system leak rate will meet the requirements of the EC system Design Basis.
- HL* • To verify the wet reference leg to ECELIS0021 is filled and indicating level correctly.

Prerequisites

- HL* 1. The Essential Chilled Water expansion tank level is greater than 21 inches.
- HL* 2. The train to be tested is aligned for standby operation per 40OP-9EC01, Essential Chilled Water Train A (EC).
- HL* 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.
- HL* 4. The Shift Manager/CRS has given permission to perform this test.

Instructions

----- **NOTE** -----

HL 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.

- HL* 1.0 Start the Chilled Water Circulating Pump per 40OP-9EC01, Essential Chilled Water Train "A" (EC).

Operations Department Repetitive Task Program

40DP-9OP06

Revision
120

Appendix EC003 Page 2 of 6

----- **NOTE** -----

HL During leak rate testing, ensure that nothing is done to the EC system to affect system inventory, i. e., venting, sampling, chem add, etc.

HL 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:

HL ECA-V039, Expansion Tank Level Control Valve Inlet Isolation Valve

HL ECA-V040, Expansion Tank Level Control Valve Outlet Isolation Valve

HL 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

N/A ↓
CT-V056, Condensate Supply

HL 4.0 Verify Sightglass indication by performing the following

HL 4.1 Open ECA-V240, Expansion Tank Sightglass Upper Isolation.

HL 4.2 Open ECA-V242, Expansion Tank Sightglass Lower Isolation.

HL 4.3 Check Open LG-19 Gage Glass Upper Isolation Valve.

HL 4.4 Check Open LG-19 Gage Glass Lower Isolation Valve.

HL 4.5 Check Open LG-19 Upper Line Isolation Valve.

HL 4.6 Check Open LG-19 Lower Line Isolation Valve.

HL 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.

----- **NOTE** -----

HL LIS-21 indication troubleshooting does not have to be completed before the Essential Chilled Water System Leak Test is performed.

N/A 4.8 **IF** the difference between indications is greater than 2 inches, **THEN** write a PVAR for I&C to troubleshoot the indication.

Operations Department Repetitive Task Program

40DP-9OP06

Revision
120

Appendix EC003 Page 3 of 6

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)

HR 5.1 Close ECA-V240, Expansion Tank Sightglass Upper Isolation.

Initial Positioner HR (Init)

Independent Verification L (Init)

HR 5.2 Close ECA-V242, Expansion Tank Sightglass Lower Isolation.

Initial Positioner HR (Init)

Independent Verification L (Init)

HR 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.

HR 8.0 **WHEN** a minimum of two hours has elapsed
(Do **not** exceed a maximum test duration of four hours.),
THEN perform the following:

HR 8.1 Open ECA-V240, Expansion Tank Sightglass Upper Isolation.

HR 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))

1340 Time Expansion Tank level was recorded (to the nearest minute)

57 EC pump discharge temperature (ERFDADS point ECT11)

9.0 Restore the System

HR 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	<u>HR</u>	<u>L</u>
ECA-V040, Expansion Tank Level Control Valve Outlet Isolation Valve	<u>HR</u>	<u>L</u>
DWN-V380, Isolation Valve for Ess. Chilled Water Expansion Tank, T01, A Train	<u>HR</u>	<u>L</u>
CT-V056, Condensate Supply	<u>HR</u>	<u>L</u>

Operations Department Repetitive Task Program

40DP-9OP06

Revision
120

Appendix EC003 Page 4 of 6

JK 9.2 Ensure ALL of the following valves are closed.

NAME	FIRST VRFD	SCND VRFD
ECA-V240, Expansion Tank Sightglass Upper Isolation	<u>JK</u>	<u>L</u>
ECA-V242, Expansion Tank Sightglass Lower Isolation	<u>JK</u>	<u>L</u>

JK 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.

N/A 9.4.2 Initiate a PVAR for HVAC to quantify and investigate the system leak rate.

N/A 9.4.3 Notify the System or Component Engineer.

JK 10.0 Calculate the change in expansion tank level by performing the following calculation:

$$\frac{21.75}{\text{(Beginning Expansion Tank Level)}} - \text{minus} \frac{20.75}{\text{(Ending Expansion Tank Level)}} = \text{equals} \frac{1.0}{\text{(Change in Expansion Tank Level)}} \text{ inches}$$

JK 11.0 Calculate the elapsed time duration in minutes by performing the following:

$$\frac{1340}{\text{(Time of Ending Expansion Tank Level)}} - \text{minus} \frac{1025}{\text{(Time of Beginning Expansion Tank Level)}} = \text{equals} \frac{195}{\text{(Elapsed time in minutes)}} \text{ minutes}$$

JK 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:

$$\frac{1}{195} \frac{\Delta \text{ level in.}}{\Delta \text{ time min.}} \times \text{times} \frac{60 \text{ min.}}{1 \text{ hr.}} \times \text{times} \frac{1.88 \text{ gal.}}{1 \text{ in.}} = \frac{0.578}{\text{Total leakrate}} \text{ gph}$$

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.

$$\frac{57}{\text{(Ending Temp from step 8.3)}} \text{ } ^\circ\text{F} - \text{minus} \frac{56}{\text{(Beginning Temp from step 5.0)}} \text{ } ^\circ\text{F} = \text{equals} \frac{1}{\text{(Change in System Temp)}} \text{ } ^\circ\text{F}$$

Operations Department Repetitive Task Program

40DP-9OP06

Revision
120

Appendix EC003 Page 5 of 6

14.0 Evaluation of Data:

IF change in Expansion tank level: (Step 12.0)	AND change in system temp is:	THEN perform the following action:
decreases 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.
	greater than 9.0°F	GO TO Step 16.1
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.
	greater than 9.0°F	GO TO Step 16.1
increases 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
	greater than 9.0°F	GO TO Step 16.1
increases 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
	greater than 9.0°F	GO TO Step 16.1

Operations Department Repetitive Task Program

40DP-9OP06

Revision 120

Appendix EC003 Page 6 of 6

15.0 Adjusted leak rate: 0.588 gph. (initial) JK

15.1 Independently verify the adjusted leak rate.
(sign) JK

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 ≥ 0.63 gph,
THEN perform the following:

- N/A 1. Declare this train of EC Inoperable.
- J 2. Initiate a PVAR for HVAC to quantify and investigate the system leak rate.
- ↓ 3. Notify the System or Component Engineer.

JK 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 JK 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:	15 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: 07/02/2013

Revised By: N/A Date: N/A

Technical Review _____ Operations Approval _____

EP Review N/A Training Approval _____

(Only required for Emergency Plan JPMs)

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.



**2013 NRC SRO A-2
PVNGS JOB PERFORMANCE MEASURE**

1. SIMULATOR SETUP:

N/A

2. SPECIAL TOOLS/EQUIPMENT:

- 01DP-0AP17 available. This JPM was written using Revision 07 of 01DP-0AP17, Managing Personnel Fatigue. 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.
- 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:

- 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.



**2013 NRC SRO A-2
PVNGS JOB PERFORMANCE MEASURE**

INITIAL CONDITIONS:

- You are the CRS on Unit One 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.

1. Operator #1 CAN / CANNOT fill the position on Tuesday for 12.5 hours. (CIRCLE ONE)
2. Operator #2 CAN / CANNOT fill the position on Tuesday for 12.5 hours. (CIRCLE ONE)
3. Operator #3 CAN / CANNOT fill the position on Tuesday for 12.5 hours. (CIRCLE ONE)
4. Operator #4 CAN / CANNOT fill the position on Tuesday for 12.5 hours. (CIRCLE ONE)
5. Have any of the operators exceeded the Fatigue Rule requirements during the past week? If yes, which operator? <p align="center">YES / NO (CIRCLE ONE) If YES: Reactor Operator _____</p>

Continued on next page



**2013 NRC SRO A-2
PVNGS JOB PERFORMANCE MEASURE**

	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			



**2013 NRC SRO A-2
PVNGS JOB PERFORMANCE MEASURE**

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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC SRO A-2
PVNGS JOB PERFORMANCE MEASURE**

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 determines 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 determines 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 determines that Operator #3 CAN be called in to fill the position for Tuesday.
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC SRO A-2
PVNGS JOB PERFORMANCE MEASURE**

	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 determines 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 determines 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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



**2013 NRC SRO A-2
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
0	07/02/2013		JPM Created

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC SRO A-2
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

INITIAL CONDITIONS:

- You are the CRS on Unit One 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.

6. Operator #1 CAN / CANNOT fill the position on Tuesday for 12.5 (CIRCLE ONE) hours.
7. Operator #2 CAN / CANNOT fill the position on Tuesday for 12.5 (CIRCLE ONE) hours.
8. Operator #3 CAN / CANNOT fill the position on Tuesday for 12.5 (CIRCLE ONE) hours.
9. Operator #4 CAN / CANNOT fill the position on Tuesday for 12.5 (CIRCLE ONE) hours.
10. Have any of the operators exceeded the Fatigue Rule requirements during the past week? If yes, which operator? YES / NO (CIRCLE ONE) If YES: Reactor Operator _____

Continued on next page

CANDIDATE



CANDIDATE

2013 NRC SRO A-2 PVNGS JOB PERFORMANCE MEASURE

	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			

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Procedure Usage Requirements		Sections
Information Use:	<ul style="list-style-type: none"> Refer To 01DP-0AP09, Procedure and Work Instruction Use and Adherence. 	All

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 PURPOSE AND SCOPE	4
1.1 Purpose	4
1.2 Scope	4
2.0 RESPONSIBILITIES	5
2.1 Appropriate Senior Management such as Palo Verde Nuclear Executives, Vice Presidents, General Managers, and Plant Managers	5
2.2 Operations Shift Manager	5
2.3 Security Operations Section Leader	5
2.4 PVNGS Department Leaders	6
2.5 PVNGS Section Leaders / Team Leaders / Operations Shift Managers.....	6
2.6 Each employee (PVNGS, contractor or vendor)	7
2.7 PVNGS Nuclear Training Director	8
2.8 Nuclear Security Division Programs Department Leader	8
2.9 PVNGS Nuclear Assurance Director	8
2.10 PVNGS Work Management / Outage Control Manager.....	8
2.11 Substance Abuse Expert (SAE)	8
2.12 Qualified Fatigue Assessors	9
2.13 Software Users.....	9
2.14 Fatigue Administrators	10
3.0 PROCEDURE	11
3.1 Individuals Subject to Fatigue Management and Work Hour Controls	11
3.2 Work Hours Scheduling	15
3.3 Managing Hours Worked	21
3.4 Personnel Actions	34
3.5 Exceptions	36
3.6 Waivers.....	37
3.7 Fatigue Assessments	41
3.8 Training and Examination.....	49
3.9 Reviews	50
3.10 Records	52
3.11 Reporting	53
3.12 Audits	54
3.13 Reporting Software Deviation Guidance.....	55

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

3.14 Reporting Fatigue Software Late Entries Guidance 56

4.0 DEFINITIONS..... 58

5.0 REFERENCES 64

 5.1 Implementing References 64

 5.2 Developmental References..... 64

6.0 APPENDICES..... 64

7.0 SUMMARY OF CHANGES..... 65

APPENDICES

<u>APPENDIX</u>	<u>PAGE</u>
Appendix A - Fatigue Assessment Tool.....	68
Appendix B - Fatigue Assessment Exemption.....	73
Appendix C - Action Matrix for Reporting Fatigue Deviations	74
Appendix D - Action Matrix for Reporting Late Entries.....	76
Appendix E - Fatigue Management Covered vs. Non-Covered.....	72

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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).

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

- 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:

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

- 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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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/default.aspx>
- 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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.)

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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).

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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 exceedances 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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.)

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

- 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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

- 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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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-ORM32, 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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

- 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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

- 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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

- 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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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 by 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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

- 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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

- 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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

- 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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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"

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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"

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix A Page 1 of 5

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix A Page 2 of 5

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																

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix A Page 3 of 5

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	<input type="checkbox"/>
2. I get tired very quickly.	1	2	3	4	5	<input type="checkbox"/>
3. I don't do much during my off-time.	1	2	3	4	5	<input type="checkbox"/>
4. I have enough energy for everyday life.	1	2	3	4	5	<input type="checkbox"/>
5. Physically, I feel exhausted.	1	2	3	4	5	<input type="checkbox"/>
6. I have problems starting things.	1	2	3	4	5	<input type="checkbox"/>
7. I have problems thinking clearly.	1	2	3	4	5	<input type="checkbox"/>
8. I feel no desire to do anything.	1	2	3	4	5	<input type="checkbox"/>
9. Mentally, I feel exhausted.	1	2	3	4	5	<input type="checkbox"/>
10. When I am doing something, I can concentrate quite well.	1	2	3	4	5	<input type="checkbox"/>

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?
- 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?
- 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...
- 3. Is the amount of daily sleep you have gotten over the past seven days typical for you? 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?

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix A Page 4 of 5

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix A Page 5 of 5

- 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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix B Page 1 of 1

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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix C Page 1 of 2

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.

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix C Page 2 of 2

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.
	<ul style="list-style-type: none"> - 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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix D Page 1 of 2

**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 adherence/verification of work hours.
Step 6:	Monthly KPIM metrics updated to report any Late Entries recorded by workgroups (Departments).		

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix D Page 2 of 2

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."
	<ul style="list-style-type: none"> - 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

MANAGING PERSONNEL FATIGUE

01DP-0AP17

Revision
7

Appendix E Page 1 of 1

Appendix E - Fatigue Management Covered vs. Non-Covered

(SAMPLE)

Palo Verde
Nuclear Generating Station

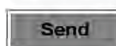
Fatigue Management Covered vs. Non-Covered

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?		<input type="checkbox"/> Yes <input type="checkbox"/> 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?		<input type="checkbox"/> Yes <input type="checkbox"/> No
* Close proximity can be determined by contacting the Work Control SRO, or CRS/SM for that Unit.		
Name:	Determination:	
Does the worker have unescorted access?		<input type="checkbox"/> Yes <input type="checkbox"/> No
Is the individual actively and directly involved in the execution of the work activity?		<input type="checkbox"/> Yes <input type="checkbox"/> 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.



End of Appendix

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) Major	Full Basis Check? (7) No	NAD Review: (8) No	PRG Review: (9) No	Upgraded Procedures: (10) No
EOP? (11) No	Dry Cask? (12) No	Decommissioning Doc? (13) 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 -0700

Is Environmental Screening Required?: (18) <input checked="" type="checkbox"/> No (done) <input type="checkbox"/> Yes	Env. Reg./Permit Review req'd? (19) (Use 91DP-0EN02, App. A) <input type="checkbox"/> No <input type="checkbox"/> Yes	If "Yes" send 91DP-0EN02, Appendix A to Environmental (20) Scrn Log Number:
Screening performed by:		

Procedure Preparer: (21) Crook, Christopher (Z03355) <small>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 -0700'</small>	IQR Approval Recommendation: (22) Michael Mahoney <small>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 -0700'</small>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

NAD Concurs (if required): (23)	PRG Concurs (if required): (24)
---------------------------------	---------------------------------

Approval: (25) Cosenza, Michael J(Z27806) <small>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 -0700'</small>	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

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”



**2013 NRC SRO A-3
PVNGS JOB PERFORMANCE MEASURE**

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 at 1100, and LCO 3.0.3 at 1300; and the unit must be in Mode 3 by 2000						
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: 05/29/2013

Technical Review _____ Operations Approval _____

EP Review N/A Training Approval _____

(Only required for Emergency Plan JPMs)

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.



2013 NRC SRO A-3
PVNGS JOB PERFORMANCE MEASURE

1. SIMULATOR SETUP:

N/A

2. SPECIAL TOOLS/EQUIPMENT:

- Technical Specifications.
- 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:

- 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 and has had a series of events associated with the Main Steam Isolation Valves (MSIVs).
- The WORKSHEET on the next page gives a chronological order of conditions of MSIVs.

INITIATING CUE:

Your tasks are to:

1. Evaluate MSIV status for the time line (attached) and determine what LCO(s) and action(s) should have been applied for each time and
2. Determine the next MODE change required AND the latest time the Unit may remain in MODE 1 to maintain compliance with Technical Specifications.



**2013 NRC SRO A-3
PVNGS JOB PERFORMANCE MEASURE**

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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC SRO A-3
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Determine LCO and Condition for Today at 0900		Examinee enters LCO 3.7.2 Condition 'B'
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
2. *	Determine LCO and Condition for Today at 1100		Examinee enters LCO 3.7.2 Condition 'C'
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
3. *	Determine LCO and Condition for Today at 1300		Examinee enters LCO 3.7.2 Condition 'E' Examinee enters LCO 3.0.3
SAT / UNSAT Comments (required for UNSAT):			



2013 NRC SRO A-3
PVNGS JOB PERFORMANCE MEASURE

	STEP	CUE	STANDARD
4. *	Determine MODE change requirement and latest time Unit may remain in MODE 1		Examinee enters MODE <u>3</u> at time T = <u>2000</u>
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



**2013 NRC SRO A-3
PVNGS JOB PERFORMANCE MEASURE**

ANSWER KEY

Time	MSIV #	Accumulator Train	Pressure	LCO and action entered
Today at 0900	170	A	4950	LCO 3.7.2 Condition 'B' Evaluator 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.
	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	LCO 3.7.2 Condition 'C' Evaluator 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.
	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	LCO 3.7.2 Condition 'E' 3 MSIVs INOPERABLE requires entry into LCO 3.0.3.
	170	B	5050	
	180	A	5200	
	180	B	5200	
	171	A	5100	
	171	B	4975	
	181	A	5300	
	181	B	4950	

Must be in MODE 3 at T = 2000 (Latest time required to comply with Tech Specs)

ANSWER KEY



**2013 NRC SRO A-3
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
001	01/12/2012	6	Updated JPM format
002	05/29/2013	6	Modified for use in 2013 NRC Initial License Exam

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



CANDIDATE

INITIAL CONDITIONS:

- **Unit 1 is in Mode 1 and has had a series of events associated with the Main Steam Isolation Valves (MSIVs).**
- **The WORKSHEET on the next page gives a chronological order of conditions of MSIVs.**

INITIATING CUE:

Your tasks are to:

- 1. Evaluate MSIV status for the time line (attached) and determine what LCO(s) and action(s) should have been applied for each time.**
- 2. Determine the next MODE change required AND the latest time the Unit may remain in MODE 1 to maintain compliance with Technical Specifications.**

Use WORKSHEET on the next page to record answers

CANDIDATE



**2013 NRC SRO A-3
PVNGS JOB PERFORMANCE MEASUR**

CANDIDATE

Time	MSIV #	Accumulator Train	Pressure	LCO and action entered
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	

Must be in MODE _____ at T = _____ (Latest time required to comply with Tech Specs)

CANDIDATE

MSIVs - INSERVICE TEST

73ST-9SG01

Revision
38

5.0 LIMITATIONS AND PRECAUTIONS

The differential pressure across a MSIV should not be greater than 100 psid prior to opening to prevent possible damage to the valve.

Installation of test equipment makes MSIVs or associated actuator train/s INOPERABLE. Comply with Technical Specification 3.7.2, Main Steam Isolation Valves (MSIVs).

The MSIV air reservoir pressure low alarm should be received on the SEIS Panel, window ES2A02A for Train A and ES2B02A for Train B, in the event of a failed instrument air check valve for the respective MSIV.

Inputs to the multi-channel strip chart recorder used in Appendix C - I&C Recorder Table and Instructions, are approximately 135 VDC. Personnel are required to use appropriate personal protective equipment as required per 01DP-0IS13, Palo Verde Nuclear Generating Station Electrical Safe Work Practices.

All test personnel are required to immediately notify the CRS/Shift Manager if the test fails or if any deficiency occurs.

If any fyrquel ejects from the MSIV reservoir, personnel should not enter the area without appropriate personnel protective equipment. (gloves and goggles as a minimum)

The MSIV slow open stroke time is ~ 5 minutes. If the valve does not open within 5 minutes, take the handswitch that was used to open the valve originally and reposition it to "Slow Open", then release.

When adjusting the hydraulic pump air regulator do not exceed 60 psig outlet pressure. The air relief valve downstream of the regulator lifts between 63-65 psig.

The accumulator pressure limit of 5000 psig is the minimum pressure for valve operability. The 5400 upper limit is not an operability limit, and is based only on the manufacturer's recommendations that pressures above 5400 psig may reduce seal and component reliability and entry into an LCO is not required. (CRDRs 4021240, 3440326)

6.0 PERSONNEL INDOCTRINATION

MSIVs are exercised, full stroke time tested and fail safe tested in the close direction by initiation of simulated MSIS signal using a toggle switch installed in SGA-C01 or SGB-C01. Closed stroke time is measured using a Multi-channel strip chart recorder. Unless otherwise indicated, valves demonstrate ability to travel to "fail safe" position on loss of actuator power (electrical or pneumatic) by stroking to that position.

Due to limit switch arrangement, a MSIV handswitch may indicate intermediate indication after the valve is positioned during testing. If this condition is observed, ensure both accumulators for the MSIV being tested are > 5000 to < 5400 psig and position the handswitch to the desired position ("slow open" to obtain open indication or "slow close" to obtain closed indication), then release. This should clear the intermediate indication. SG ISOL VLV TRBL due to MSIV High Rod End Pressure could be received during this testing. Alarm response procedure 40AL-9RK6A, window 6A07A Group "A" should be reviewed.

The SESS alarm is used to ensure the Bi-Directional Open testing of the air reservoir supply check valve at step 8.2.31. Other steps for SESS testing do not contain acceptance criteria and should not interfere with completion of this surveillance test.

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
<p>E. Three or more MSIV actuator trains inoperable.</p> <p><u>OR</u></p> <p>Required Action and associated Completion Time of Condition A, B, or C not met.</p>	<p>E.1 Declare each affected MSIV inoperable.</p>	<p>Immediately</p>
<p>F. One MSIV inoperable in MODE 1.</p>	<p>F.1 Restore MSIV to OPERABLE status.</p>	<p>4 hours</p>
<p>G. Required Action and Associated Completion Time of Condition F not met.</p>	<p>G.1 Be in MODE 2.</p>	<p>6 hours</p>
<p>H. -----NOTE----- Separate Condition entry is allowed for each MSIV. ----- One or more MSIVs inoperable in MODE 2, 3, or 4.</p>	<p>H.1 Close MSIV.</p> <p><u>AND</u></p> <p>H.2 Verify MSIV is closed.</p>	<p>4 hours</p> <p>Once per 7 days</p>
<p>I. Required Action and associated Completion Time of Condition H not met.</p>	<p>I.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>I.2 Be in MODE 5.</p>	<p>6 hours</p> <p>36 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.7.2.1 -----NOTE----- Not required to be performed prior to entry into MODE 3. -----</p> <p>Verify closure time of each MSIV is within limits with each actuator train on an actual or simulated actuation signal.</p>	<p>In accordance with the Inservice Testing Program</p>



**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						
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: 08/29/2013

Technical Review _____ Operations Approval _____

EP Review N/A Training Approval _____
(Only required for Emergency Plan JPMs)

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.



2013 NRC SRO A-4
PVNGS JOB PERFORMANCE MEASURE

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
- 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-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:

- Your total dose exposure this year has been **1127 mrem.**
- Your 5 year cumulative exposure has been **3200 mrem.**
- You have been directed to enter the Radiation Control Area (RCA) to perform a task which you are the only qualified person on site to perform this task.
- The work area (including transit path) is in a **600 mrem/hr** radiation field
- The highest accessible area radiation dose rate in the room is **1050 mrem/hr.**
- The task will take **2 hours 30 minutes.**

INITIATING CUE:

- What is your total dose upon completion of this task?
- Whose permission is required to receive this amount of dose?
- Should this area be posted as a Radiation area, High Radiation area, Locked High Radiation area, or Very High Radiation area?



**2013 NRC SRO A-4
PVNGS JOB PERFORMANCE MEASURE**

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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC SRO A-4
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Determines total dose expected to be received after completion of this task		Examinee determines dose achieved will be 2627 mrem $2.5 \text{ hr} * 600 \text{ mrem/hr} + 1127 \text{ mrem} = 2627 \text{ mrem}$ Evaluator NOTE: 2620-2630 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 determines ALARA Committee/Committee Chairman's approval is required
SAT / UNSAT Comments (required for UNSAT):			



2013 NRC SRO A-4
PVNGS JOB PERFORMANCE MEASURE

	STEP	CUE	STANDARD
3. *	Determines expected most restrictive radiation posting in the area		Examinee determines 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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



2013 NRC SRO A-4
PVNGS JOB PERFORMANCE MEASURE

ANSWER KEY

1. Total dose for the year upon completion of this task:	2627 mrem
2. Permission required from (to receive this does):	ALARA Committee Chairman
3. Most restrictive radiation posting in the area:	Locked High Radiation Area

ANSWER KEY



**2013 NRC SRO A-4
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
003	10/15/2010	6	Fixed cue sheet numbering
004	08/29/2013	3, 6	Modified for use in 2013 NRC Initial License Exam. Updated for current revisions of procedures used.

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



CANDIDATE

INITIAL CONDITIONS:

- Your total dose exposure this year has been **1127 mrem**.
- Your 5 year cumulative exposure has been **3200 mrem**.
- You have been directed to enter the Radiation Control Area (RCA) to perform a task which you are the only qualified person on site to perform this task.
- The work area (including transit path) is in a **600 mrem/hr** radiation field
- The highest accessible area radiation dose rate in the room is **1050 mrem/hr**.
- The task will take **2 hours 30 minutes**.

INITIATING CUE:

- What is your total dose 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: a Radiation area, High Radiation area, Locked High Radiation area, or Very High Radiation area?

<p>1. Total dose for the year upon completion of this task:</p>	
<p>2. Permission required from (to receive this does):</p>	
<p>3. Most restrictive radiation posting in the area:</p>	

Record your answers in the area provided above

CANDIDATE

Radiological Posting and Labeling	75RP-0RP01	Revision 30

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:	<ul style="list-style-type: none"> • 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

<u>Section</u>	<u>Page Number</u>
1.0 PURPOSE and SCOPE	4
1.1 Purpose	4
1.2 Scope	4
2.0 RESPONSIBILITIES	4
3.0 PROCEDURE	4
3.1 General	4
3.2 Radiological Controlled Area Boundary (RCA)	7
3.3 Radioactive Materials Posting	7
3.4 Contaminated Area Postings	7
3.5 Airborne Radioactivity Area Posting	9
3.6 Cold Area Posting	9
3.7 Hot Spot Posting	9
3.8 Radiation Area Posting	10
3.9 High Radiation Area Posting	10
3.10 Locked High Radiation Area Posting	10
3.11 Very High Radiation Area Posting	11
3.12 Exceptions to Posting	11
3.13 Labeling Containers	12
3.14 Exceptions to Labeling Requirements	12
3.15 Labeling of Significant Dose Rate Items in the Spent Fuel Pool / Refuel Pool	13
4.0 DEFINITIONS and ABBREVIATIONS	14
4.1 Definitions	14
4.2 Abbreviations	16
5.0 REFERENCES	16
5.1 Implementing References	16
5.2 Developmental References	16
6.0 APPENDICES	18
Appendix A - Procedure Bases, Action Bases, & RP Tech Tools	19
Appendix B - RCA Deposting Checklist	40
7.0 SUMMARY OF CHANGES	18

RP Tech Tools - Table of Contents

<u>Section</u>	<u>Page Number</u>
1. Enclosure of Posted Areas	27
2. Securing Radiological Boundaries	27
3. Attaching Postings to Doors or Gates	27
4. Cumulative Dose Rate Considerations	27
5. Posting Expansion / Upgrade Notifications	27
6. ALARA Considerations	27
7. RCA Boundary Posting Considerations	27
8. Posting of Externally Contaminated Drains in Clean Areas	28
9. Drip Catch Posting	28
10. Level II Alpha Area Posting	28
11. Level III Alpha Area Posting	28
12. "Alpha frisking /monitoring required upon exit" posting	28
13. "BUFFER ZONE" Posting	28
14. Historical Hot Spot Posting	28
15. LHRA / VHRA Posting Considerations	29
16. HRA Posting Considerations	30
17. Posting of Areas with Fluctuating Dose Rates	33
18. Posting of Sumps Outside an RCA	33
19. Posting for Significant Radiological Evolutions in Progress	33
20. Posting of RP Barricades	33
21. Posting of Temporary Shielding	33
22. Posting of Exits from Turbine Building, Cold Lab, Blowdown Demin Area, and Chem Waste Neutralizing Tank Area	34
23. Posting of Overhead Areas within an RCA	34
24. Use of the area "STAGED" posting covers	34
25. Posting Areas Where Residual Soil Contamination is Suspected	35
26. Use of the "RP HOLD POINT" insert	35
27. Posting SDRI Locking Devices	36
28. Labeling Significant Dose Rate Items	36
29. Posting of areas affected by Peroxide Injection evolutions	36
30. Radioactive Material Labeling Considerations	37
31. Criteria for Updating Radioactive Material Data Labels	38
32. Posting of Ion Exchanger and Filter Vaults	39
33. Posting of the 114' to 98' Reactor Cavity Ladder	39

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 deposited, 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 depositing 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 depositing 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 depositing the area.

Note:

Prior to depositing 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 depositing 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 depositing 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 depositing 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**
 - ➔ $\geq 100,000$ dpm/100 cm² Beta-Gamma
 - ➔ More than one discrete particle found with activity $\geq 100,000$ dpm
 - **Level II Alpha Area:** ≥ 20 dpm/100 cm² α AND a β - γ : α ratio $<30,000:1$.*
 - **Level III Alpha Area:** ≥ 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 $\geq 500,000$ 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

Radiological Posting and Labeling	75RP-0RP01	Revision 30

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 ≥ 1000 mr/hr at 12" out of the water or ≥ 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 $\geq 100,000$ dpm/100 cm² β - γ , or with more than one discrete particle with $\geq 100,000$ 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 $\geq 500,000$ 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(e), 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

<u>Partition</u>	<u>Commitment Number</u>	<u>Action or CRAI Number</u>	<u>Procedure Section</u>	<u>Reference</u>
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

<u>Partition</u>	<u>Number</u>	<u>CRAI Number</u>	<u>Section</u>	<u>Reference</u>
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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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.

Radiological Posting and Labeling	75RP-0RP01	Revision 30
Appendix A - Procedure Bases, Action Bases, & RP Tech Tools		Page 1 of 21

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.

Radiological Posting and Labeling	75RP-0RP01	Revision 30
Appendix A - Procedure Bases, Action Bases, & RP Tech Tools		Page 2 of 21

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.

Radiological Posting and Labeling	75RP-0RP01	Revision 30
Appendix A - Procedure Bases, Action Bases, & RP Tech Tools		Page 3 of 21

Procedure Bases / Action Bases

Action Bases (continued)

- 3.1.5** 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 is 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)
- 3.1.11**
- 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 : β/γ 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 <u>OR</u> <20dpm/100cm ² α	\leq 30,000:1 <u>AND</u> , \geq 20 dpm/100cm ² α	< 300:1 <u>AND</u> , \geq 200 dpm/100cm ² α
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;...

Radiological Posting and Labeling	75RP-0RP01	Revision 30
Appendix A - Procedure Bases, Action Bases, & RP Tech Tools		Page 7 of 21

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)

Radiological Posting and Labeling	75RP-0RP01	Revision 30
Appendix A - Procedure Bases, Action Bases, & RP Tech Tools		Page 8 of 21

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.

Radiological Posting and Labeling	75RP-0RP01	Revision 30
Appendix A - Procedure Bases, Action Bases, & RP Tech Tools		Page 9 of 21

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 >190°F.
 - 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 190°F. 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. HRA Posting Considerations

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).

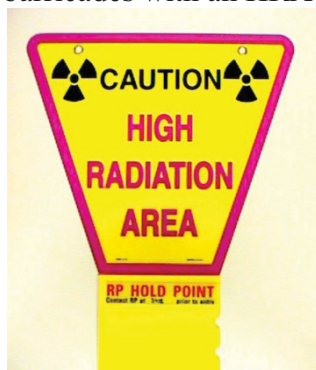


Figure 3



Figure 4

RP Tech Tools (Continued)

16. HRA Posting Considerations (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.

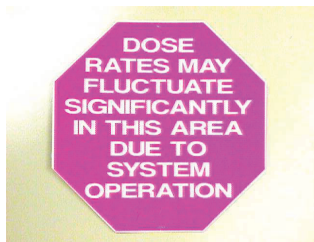


Figure 8

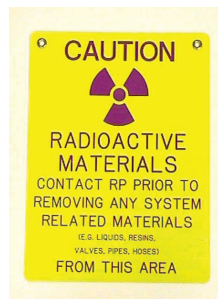


Figure 9

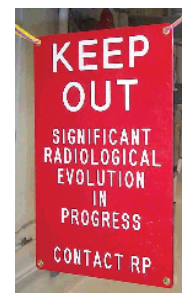


Figure 10



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

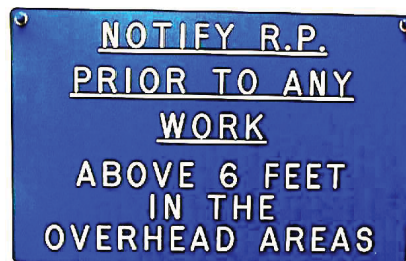


Figure 13

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:

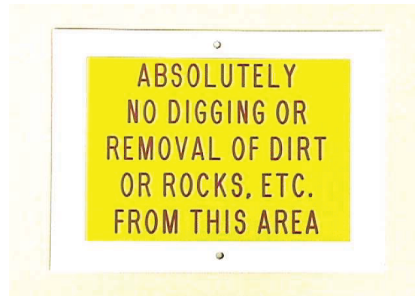


Figure 14

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 deposit 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

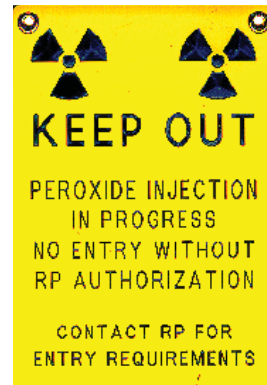


Figure 18

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.

Radiological Posting and Labeling	75RP-0RP01	Revision 30
Appendix A - Procedure Bases, Action Bases, & RP Tech Tools		Page 20 of 21

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. Deposting 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:

<i>Organization</i>	<i>Phone Number</i>	<i>Person Contacted (last name)</i>
Security Headquarters	(6473, 6475)	_____
Fire Protection Operations	(1612)	_____
Responsible Control Room (U-1 for non-unit RCAs)	(<u>X</u> 203, <u>X</u> 205)	_____

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 shiftily status of incremental deposting to the following:

<i>Organization</i>	<i>Phone Number</i>	<i>Person Contacted (last name)</i>
Security Headquarters	(6473, 6475)	_____
Fire Protection Operations	(1612)	_____
Responsible Control Room	(<u>X</u> 203, <u>X</u> 205)	_____

7. Obtain RP Department Leader or Director confirmation upon completion. _____
Name of RPL

Electronic Procedure Change Record

Procedure No.: (1) 75RP-0RP01		Revision No.: (2) 30	Category: (3) 2	Expedite? (4) No
Title: (5) Radiological Posting and Labeling				
Procedure Action: (6) Minor	Full Basis Check? (7) Yes	NAD Review: (8) No	PRG Review: (9) No	MRL Update? (10) No
EOP? (11) No	Dry Cask? (12) No	Decommissioning Doc? (13) No	Level of Use: (14) Information	
AD Review: (15) No	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) <input type="checkbox"/> Yes		
Applicability Determination performed by: (18) David J. Heckman				
Is Environmental Screening Required?: (19) <input checked="" type="checkbox"/> No (done) <input type="checkbox"/> Yes \Rightarrow	Env. Reg./Permit Review req'd? (Use 91DP-0EN02, App. A) <input checked="" type="checkbox"/> No (20) <input type="checkbox"/> Yes \Rightarrow	If "Yes" send 91DP-0EN02, Appendix A to Environmental (21)		
Screening performed by:		Scrn Log Number:		
Procedure Preparer: (22) Heckman, David J(Z00977) <small>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'</small>		IQR Approval Recommendation: (23) Gray, Thomas S(Z99610) <small>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'</small>		
NAD Concurs (if required): (24)		PRG Concurs (if required): (25)		
Approval: (26) Gray, Thomas S(Z99610) <small>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'</small>		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 deposing checklist.				
Text does not automatically roll to continuation page.		Change Summary - Continuation (29) <input type="checkbox"/> Yes		

Radiation Exposure and Access Control

75DP-9RP01

Revision
20a

Procedure Owner:

Signature Witzak, Robert
A(Z09644) Digitally signed by Witzak, Robert
A(Z09644)
DN: cn=Witzak, Robert A(Z09644)
Date: 2013.07.21 14:32:15 -07'00'

Procedure Reviewer:

Signature Bungard, James
P(Z18012) Digitally signed by Bungard, James
P(Z18012)
DN: cn=Bungard, James P(Z18012)
Reason: I have reviewed this document
Date: 2013.07.18 11:07:22 -07'00'

BASIS

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 PURPOSE AND SCOPE	5
1.1 Purpose	5
1.2 Scope	5
2.0 RESPONSIBILITIES	6
2.1 Senior Vice President - Site Operations	6
2.2 Radiation Protection Manager	7
2.3 Radiation Protection Department Leaders	7
2.4 ALARA Committee Chairman	7
2.5 Radiation Protection	7
2.6 Dosimetry	8
2.7 Operations Shift Managers	8
2.8 Work Group Section Leaders	8
2.9 Individuals	11
3.0 DEFINITIONS	14
4.0 INSTRUCTIONS	18
4.1 General	18
4.2 Personnel Radiation Dosimetry	19
4.3 Dosimetry for Visitors	28
4.4 Radiation Exposure Permits (REP)	31
4.5 Restricted Area Access and Egress	33
4.6 Radiological Controlled Area Entry	35

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

<u>SECTION</u>	<u>PAGE</u>
4.7 Monitoring/Coverage of Radiological Work	38
4.8 Radiological Controlled Area Exit:	40
4.9 Special Area Access	44
4.10 Radiation Exposure Limitations and Controls	48
4.11 Assignment of Higher Administrative Exposure Hold Points	55
4.12 Personnel Overexposures	58
4.13 Radiation Protection Manager Review of Radworker Error	59
5.0 REFERENCES	60
5.1 Implementing References	60
5.2 Developmental References	60
6.0 RECORDS	62

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

APPENDICES

<u>APPENDIX</u>	<u>PAGE</u>
Appendix A - Pre-Natal Dose Limit Statement	65
Appendix B - Supplemental Exposure Notification	66
Appendix C - Radiation Protection Requirement Waiver	67
Appendix D - Off Site Support Agency Radiological Determination Matrix	68
Appendix E - Visitor Request for RCA Access	69
Appendix F - Request for a Higher Administrative Exposure Hold Point	71
Appendix G - Criteria for Reporting Personnel Overexposure to the USNRC	72

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

1.0 PURPOSE AND SCOPE

1.1 Purpose

1.1.1 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).

<u>Basis Information</u>
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.
UFSAR 12.3.1.2 - Plant areas are categorized as design radiation zones according to expected maximum radiation levels and anticipated personnel occupancy with consideration given toward maintaining personnel exposures ALARA. (RCTS2 010602-01)
RCTS2 002495-01 - A system should be established to permit effective control over personnel access to the radiation areas and control over the movement of sources of radiation within the station.

1.1.2 This procedure supports implementation of the Radiation Protection Program within the Operate the Plant Program Area.

1.2 Scope

1.2.1 This procedure is applicable to radiation protection personnel for the following activities:

- Entering and exiting a Radiological Controlled Area (RCA)
- Administrative exposure hold points
- Radiation Exposure Permit (REP) generation
- Authorizing waivers of RCA access prerequisites
- Requesting RCA access for visitors

1.2.2 This procedure is applicable to radiation workers (radworkers) for the following activities:

- Entering and exiting an RCA
- Requesting RCA access for visitors



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

2.0 RESPONSIBILITIES

2.1 Senior Vice President - Site Operations

- 2.1.1 Approves administrative exposure hold points which would allow an individual to accumulate more than 10 rem in 5 years.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

2.2 Radiation Protection Manager

2.2.1 Establishes radiation exposure control procedures.

<u>Basis Information</u>
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 - Step C 1.b.3.d - Developing plans, procedures, and methods for keeping radiation exposures of station personnel ALARA. (RCTS2 010553-01)

2.2.2 Ensures the investigation of all actual or suspected personnel overexposures.

2.2.3 Approves requests for administrative exposure hold points above 2 rem/year.

2.3 Radiation Protection Department Leaders

2.3.1 Approve requests for administrative exposure hold points above 1.5 rem/year.

2.4 ALARA Committee Chairman

2.4.1 Approves requests for administrative exposure hold points greater than 2.5 rem/year up to 4.0 rem/year and any new hold point which would allow an individual's cumulative lifetime exposure (in rem) to exceed the individual's age (in years).

2.5 Radiation Protection

2.5.1 Control the initiation, revision, and termination of REPs.

2.5.2 Specify REP requirements (for example, personnel dosimetry, protective clothing, and respiratory protection equipment requirements).

2.5.3 When necessary, issue dosimetry to individuals as specified by the REP.

2.5.4 Relieve the radiation worker (radworker) of the responsibility to self-monitor dosimetry when the radworker is unable to self-monitor.

2.5.5 Evaluate radiological conditions throughout the site.

2.5.6 Update radiological postings and access control requirements.

2.5.7 Document (via manual records or by computer access control system) personnel access/egress into RCAs when ARACS is not available.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

2.6 Dosimetry

- 2.6.1 Provide thermoluminescent dosimeters (TLDs) to monitor an individual's exposure.
 - 2.6.1.1 Issue personnel record TLDs and perform periodic change-out and evaluation of the record TLDs.
 - 2.6.1.2 Provide special dosimetry to radiation protection (RP) for issue to individuals.
- 2.6.2 Make available to site departments involved in radiological work a periodic listing of the exposure to date for departmental personnel.
- 2.6.3 Perform whole body counts.

2.7 Operations Shift Managers

- 2.7.1 Ensure RP is informed of changes in plant conditions which are known to have significant impact on radiological conditions.

2.8 Work Group Section Leaders

- 2.8.1 Plan and coordinate tasks to be performed within an RCA with RP.
- 2.8.2 Evaluate each work order for system, work location, and radiological conditions to determine the requirement for an REP.

NOTE

The exception will be work orders determined to be emergent work. If the work order requires an REP, the planner should contact RP as soon as practicable to allow time for RP preparation.

- 2.8.3 Provide work orders, as requested by RP via electronic routing location code 360 for RP evaluation and REP assignment.

Basis Information

IIR 010301-01 - Review current work control procedures and evaluate the methods for accomplishing an RP review of all work orders in the planning stage.

- 2.8.4 High Profile/High Risk Activities require Work Group Leadership's increased involvement in the REP planning and REP ALARA review processes.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

SUSTAINABILITY ITEM - CRAI 3152607 (Pri-3) - Revise 75DP-9RP01, Radiation Exposure and Access Control, to adopt SOER 2001-01 Recommendation 3 for direct involvement by work supervisors in planning of JHES Cat 1 REPs (High Profile / High Risk Activities).
(CRAI 3084518 SOER 01-01 Area for Improvement)

SUSTAINABILITY ITEM - CRAI 3152614 (Pri-3) - Revise 75RP-9RP02, Radiation Exposure Permits, and 75DP-9RP01, Radiation Exposure and Access Control, to adopt SOER 2001-01 Recommendation 3 for direct involvement by work supervisors in planning of JHES Cat 1 REPs (High Profile / High Risk Activities).
(CRAI 3084518 SOER 01-01 Area for Improvement)

- 2.8.5 Ensure RP related steps, hold points, and comments resulting from work order reviews are incorporated into the work order or resolved in conjunction with RP.
- 2.8.6 Ensure radworkers assigned to the work group have completed the required radiation protection training and are fully qualified for use of respiratory protection equipment, if required.
- 2.8.7 Ensure radworkers assigned to the work group are familiar with the task to be performed to ensure maximum task benefit is derived when radworker exposure to radiation is involved.
- 2.8.8 Ensure radworkers assigned to the task have sufficient remaining exposure available to contribute significantly to the completion of the task and requests for new administrative exposure hold points are submitted to RP in a timely manner with proper justification.
- 2.8.9 Coordinate activities of radworkers assigned to the work group with other work groups to achieve maximum efficiency in the task and to minimize the potential for unnecessary exposure due to poor communications or lack of proper planning or scheduling.
- 2.8.10 Ensure radworkers assigned to the work group have been briefed on the radiological conditions in the work area, will comply with RP personnel instruction in matters pertaining to radiation protection, and follow the specific instructions and requirements on the REP.
- 2.8.11 Monitor activities of radiation workers assigned to the work group during job performance to ensure proper radiological protection measures are being used.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

2.8.11.1 Medium and high risk work activities require increased levels of work group supervisory oversight. Refer to 75DP-0RP08, Managing Radiological Risk.

Basis Information

SUSTAINABILITY ITEM - CRAI 3152616 (Pri-3) - Revise 75DP-9RP01, Radiation Exposure and Access Control, to address increased levels of work group supervisory oversight for JHES Cat 1 REPs (High Profile / High Risk Activities).

(CRAI 3084518 SOER 01-01 Area for Improvement)

- 2.8.12 Ensure parts, tools, and equipment necessary to perform the task are proper for the job, readily available, and have proper power sources available.
- 2.8.13 Develop person-rem estimates for each job.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

2.9 Individuals

NOTE

Although 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 personal exposure to radiation when working in the vicinity of sources of radiation.

2.9.1 Each individual has the following responsibilities:

- 2.9.1.1 Do not loiter in an RCA.
- 2.9.1.2 Do not move or adjust any radiation protection boundary, barrier or posting without the approval of RP.
- 2.9.1.3 Remain aware of personal exposure status and ensure personal exposure remains below the assigned administrative exposure hold point.
- 2.9.1.4 Comply with instructions of RP personnel in all matters pertaining to radiation protection.
- 2.9.1.5 Comply with standard operating procedures, warning signs, and barriers that concern radiation and contamination control.
- 2.9.1.6 Read the applicable REP for the specific job or task assigned and obey instructions and requirements (for example, dosimetry and protective clothing requirements).

NOTE

RP personnel may relieve individuals of the responsibility to self monitor dosimetry due to contamination control or when employing remote monitoring technologies.

- 2.9.1.7 Wear designated dosimetry devices, protective clothing, and respiratory protection equipment as prescribed by procedures or instructions.
- 2.9.1.8 Notify RP personnel promptly of any known or suspected change in radiological conditions.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 2.9.1.9 Ensure activities do not create unnecessary radiological problems for others, and be alert for possible activities of others which may change the radiological conditions in the work area.
- 2.9.1.10 Notify RP Leadership of any aspects of radiation protection the individual believes are not being properly administered.
- 2.9.1.11 Notify RP personnel promptly of any known or suspected overexposure, or lost or damaged dosimetry.
- 2.9.1.12 Report all open wounds to RP prior to entering the RCA and report any wounds or skin contamination received while in the RCA.
- 2.9.1.13 Notify Dosimetry personnel, before entering the Restricted Area, of any medical diagnosis or treatment involving the administration of radioactive pharmaceuticals (for example, 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 administration of radioactive pharmaceuticals.
- 2.9.1.14 Do not smoke, eat, drink, chew, or have possession of such items while in an RCA, unless authorized by RP Management.

Basis Information

PCR 3948843 - Procedure 75DP-9RP01, Radiation Exposure and Access Control is silent regarding accommodations for personnel with special medical needs regarding solid and liquid food intake, and medical devices while in a radiological controlled area (RCA).

- 2.9.1.15 Immediately leave the affected area and contact RP when an Area Radiation Monitor alarms.
- 2.9.1.16 Prevent the spread of contamination by contacting RP personnel for direction on the removal of tools, equipment, and/or trash from Contaminated Areas and follow RP instructions for the disposition of the items.
- 2.9.1.17 Monitor for personal contamination when leaving a Contaminated Area or radiological control point, as directed by RP.
- 2.9.1.18 Ensure tools and equipment are surveyed by RP personnel prior to removing the tools and equipment from the RCA.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 2.9.1.19 If a female decides to declare a pregnancy, the intent to become pregnant or a suspected pregnancy, the female shall notify the leader and provide Dosimetry with a completed Appendix A - Pre-Natal Dose Limit Statement.
- 2.9.1.20 Provide bioassay samples for the purpose of detection of radionuclides when requested by RP personnel.
- 2.9.1.21 Notify Dosimetry of any personal information changes (for example, name, address, department number, employer) to allow updates of the dosimetry records.
- 2.9.1.22 Inform Dosimetry of any occupational exposure received at an offsite facility while an employee of Palo Verde Nuclear Generating Station (PVNGS).
 - a. Prior to leaving Palo Verde, a whole body count should be performed, if required, and Appendix B - Supplemental Exposure Notification completed.

Basis Information

CRAI 2977470 (Pri-3) - Develop guidance for radworkers that go on training trips and a method to formally communicate the RP requirements for training trips and the impacts of the open exception. This guidance should be included in 75DP-9RP01- Radiation Exposure and Access Control.

PCR 4294661 - Requirements for individual's performing benchmarking or other activities that involve the monitoring for radiation exposure at another facility while badged at Palo Verde needs clarification. Request that procedure 75DP-9RP01 be modified to clarify the verbiage.

- 2.9.1.23 Keep RP informed of the nature of work being performed in the RCA and immediately report any changes to the work scope.
- 2.9.1.24 If protective clothing is worn while working in an RCA, ensure monitoring is performed at the following frequency, or as directed by RP:
 - a. Whole body monitoring by a personnel contamination monitor (PCM) or equivalent (for example, CM-11) is performed at approximately eight hour intervals.
 - b. Monitoring for hot particles periodically and when exiting a Hot Particle Control Area (HPCA) with an RCA stay time not to exceed six hours if an HPCA was entered.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 2.9.1.25 Obtain an exit Whole Body Count or exit bioassay analysis prior to terminating at PVNGS.
- 2.9.1.26 Perform RCA access and egress via ARACS for REPs which allow automated access.
- 2.9.1.27 Ensure medical devices (for example, insulin pumps) are protected from contamination while in the RCA.

Basis Information

PCR 3948843 - Procedure 75DP-9RP01, Radiation Exposure and Access Control is silent regarding accommodations for personnel with special medical needs regarding solid and liquid food intake, and medical devices while in a radiological controlled area (RCA).

3.0 DEFINITIONS

- 3.1 **ACAD** — Automated Control Access Device
- 3.2 **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.
- 3.3 **Annual Limit on Intake (ALI)** — 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 10 CFR 20.1001-20.2401.
- 3.4 **ARA** — Airborne Radioactivity Area
- 3.5 **Automated Radiological Access Control System (ARACS)** — A computer based system which utilizes worker information, REP data and TLD data to facilitate individual automated RCA access and egress transactions.

Basis Information

ICR 00114 - Revise definition 4.1.3 for ARACS to eliminate reference to RRACS data base.

- 3.6 **CA** — Contaminated (Contamination) Area



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

CRAI 3373967 (Pri-4) - Change 75DP-9RP01, 4.2.4 to...Contaminated (Contamination) Area... to clarify the use of the term Contamination Area for contaminated area postings.



- 3.7 **Committed Dose Equivalent** — 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.
- 3.8 **Committed Effective Dose Equivalent** — 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 ($H_{E,50} = \sum W_T H_{T,50}$).
- 3.9 **Declared Fertile Woman** — A woman who has voluntarily informed the licensee, in writing, of intent to become pregnant.
- 3.10 **Declared Pregnant Woman** — A woman who has voluntarily informed the licensee, in writing, of 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.
- 3.11 **Deep Dose Equivalent (DDE)** — The external whole-body exposure, the dose equivalent at a tissue depth of one centimeter (1000 mg/cm²).
- 3.12 **Derived Air Concentration (DAC)** — 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 10 CFR 20.1001-20.2401.
- 3.13 **Emergent Work** — Any work that is added to the station master work schedule after schedule freeze, but does not include fix-it-now or short-cycle work process work.
- 3.14 **Electronic Personal Dosimetry (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 Self Indicating Dosimeter and an alarming dosimeter.
- 3.15 **Electronic Signature** — A process within the computerized access control system to document an individual worker's acknowledgement that the individuals 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.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 3.16 **HCA** — High Contamination Area
- 3.17 **HPA** — Hot Particle Control Area
- 3.18 **HPPOS** — NRC Health Physics Position

Basis Information

USNRC NUREG/CR-5569 ORNL/TM-12067, Health Physics Positions Data Base, May 1992.

- 3.19 **HRA** — High Radiation Area
- 3.20 **Individual Qualified in Radiation Protection Procedures** — Individuals are considered qualified in radiation protection procedures when the individuals are certified as capable of successfully accomplishing the following activities as required by federal regulations, license conditions, and facility procedures pertaining to radiation protection:
 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 back shifts or weekends.

Basis Information

HPPOS-015 - Safety Evaluation of the Proposed Yankee Atomic Power Company's Modification of their Technical Specifications Relating to High Radiation Areas.

- 3.21 **ISFSI** — Independent Spent Fuel Storage Installation



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 3.22 **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/cm²).
- 3.23 **LHRA** — Locked High Radiation Area
- 3.24 **LLRMSF** — Low Level Radioactive Material Storage Facility
- 3.25 **Personnel Contamination Monitor (PCM)** — An instrument used to provide automatic whole body monitoring of personnel for external radioactive contamination.
- 3.26 **Radiation Exposure Permit (REP)** — A document issued by the Radiation Protection (RP) Department identifying radiological conditions in the work area, job scope, and protective requirements necessary to perform work in the RCA or when handling radioactive material.
- 3.27 **Radiological Controlled Area (RCA)** — Any area within the Restricted Area which features positive controls for the purpose of protecting personnel from radiation exposure and radioactive contamination.
- 3.28 **Restricted Area** — An area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to 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.
- 3.29 **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/cm²).
- 3.30 **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).

Basis Information

This change to 10 CFR 20.1003, 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.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

CRAI 3120698 (Pri-4) - Revise the definition for Total Effective Dose Equivalent (TEDE) in 75DP-9RP01, Radiation Exposure and Access Control.

- 3.31 **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.
- 3.32 **VHRA** — Very High Radiation Area
- 3.33 **Visitor** — Individual who has been assigned a Visitor ACAD or badge from Security and requires an escort while in the Restricted Area.
- 3.34 **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.
- 3.35 **WBC** — Whole Body Count or other bioassay permitted by 75RP-9RP03, Bioassay Analysis.

4.0 INSTRUCTIONS

4.1 General

- 4.1.1 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.
- 4.1.2 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 controlling personnel access to the RCA.

Basis Information

UFSAR 12.5.2.2.7 - Radiological Records and Access Control System - A computerized radiation exposure management information system is available to assist radiation protection personnel in preparation of the records and reports required by 10 CFR 19 and 10 CFR 20.1001 - 20.2402.

QATS 390346-08 - Change procedure 75AC-9RP01 to identify the RP technician's actions prior to allowing an individual access to the RCA.

- 4.1.2.1 When the computerized system(s) are available, the computer services may be used during the performance of the procedure.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.1.2.2 When the computerized system(s) are not available, methods of control should be performed per the guidance provided in the appropriate RP written instruction.

4.2 Personnel Radiation Dosimetry

4.2.1 The radiation protection requirements for issuing an individual a record TLD include either:

- A current NRC Form 4
- A written signed statement from the individual indicating occupational exposure received during the current year and previous years

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 4.2.2 The radiation protection requirements for unescorted access within an RCA include:
- 4.2.2.1 Successful completion of Radiological Work Practices Training (RWT).
 - 4.2.2.2 Whole body count performed at PVNGS, if required.
 - 4.2.2.3 If necessary, Step 4.2.2.1 and/or Step 4.2.2.2 RP requirement(s) for unescorted access may be waived with approval of the Radiation Protection Manager.
 - a. Document the approval and any assigned restrictions on Appendix C - Radiation Protection Requirement Waiver.
 - b. The requesting department should initiate a Training Exemption as detailed in 15DP-0TR69 Training and Qualification Administration using the signed Appendix C as the justification for exemption.
- 4.2.3 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 10 CFR 20.1201(a) shall be issued a personnel dosimetry device.

Basis Information

10 CFR 20.1502(a) - Each licensee shall monitor occupational exposure to radiation from licensed and unlicensed radiation sources under the control of the licensee and shall supply and require the use of individual monitoring devices by-

- (1) Adults likely to receive, in 1 year from sources external to the body, a dose in excess of 10 percent of the limits in § 20.1201(a),
- (2) Minors likely to receive, in 1 year, from radiation sources external to the body, a deep dose equivalent in excess of 0.1 rem (1 mSv), a lens dose equivalent in excess of 0.15 rem (1.5 mSv), or a shallow dose equivalent to the skin or to the extremities in excess of 0.5 rem (5 mSv);
- (3) Declared pregnant women likely to receive during the entire pregnancy, from radiation sources external to the body, a deep dose equivalent in excess of 0.1 rem (1 mSv);² and
- (4) Individuals entering a high or very high radiation area. (RP 046012-01)

UFSAR 12.5.3.3 - Control of Access and Stay Time in Radiation Areas - Authorized personnel who enter station restricted areas are issued appropriate dosimetry devices in accordance with Nuclear Administrative and Technical Manual procedures. (RCTS2 041015-01)



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

ICR 00120 - ANI recommendation - Revise 3.2.3 to conform to ANI recommendation to lower TLD issue threshold to 100 mr/yr DDE instead of 10% of CFR 20.1201 limits & add Action Basis.

4.2.3.1 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.

4.2.4 Personnel shall obtain dosimetry as specified on the REP which shall be worn at all times within an RCA. Exceptions to the requirement include:

Basis Information

USNRC Regulatory Guide 8.2, Guide for Administrative Practices in Radiation Monitoring, Rev. 0, Feb 1973. (RCTS2 010523-01)

FSAR 12.5.3.6 - Personnel Monitoring - Station employees, contractor personnel, support personnel, and visitors are required to wear TLD or self-reading dosimeters when in a controlled area. In addition, incremental dosimetry is issued to individuals working under a radiation exposure permit. (RCTS2 041026-01)

RCTS 010827-01 - Upon receipt of PU-Be sources, the Radiation Protection section will issue personnel dosimetry (TLDs) for persons entering the Controlled Area per FSAR 12.5.2.2.3.

- Special dosimetry issued that includes head dosimetry. With RP permission, head dosimetry may be hand carried by the radworker to the job site
- During RCA egress when dosimetry is removed and surveyed
- When protective clothing is being doffed

4.2.5 Electronic Personal Dosimeter (EPD), provide an individual's current exposure status in between record TLD evaluations.

Basis Information

UFSAR 12.5.3.6 - Personnel Monitoring - In addition, incremental dosimetry is issued to individuals working under a radiation exposure permit. The exposure readings of this incremental dosimetry is used for specific ALARA job exposure evaluation, as well as to indicate current individual exposure status. (RCTS2 010679-01) (RCTS2 041027-01)



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

PCR 4130723 - References to self-indicating dosimeters need to either be deleted or replaced with a reference to electronic dosimeters and the developmental reference to Regulatory Guide 8.4 Rev 0 needs to be deleted.

- 4.2.5.1 The exposure information obtained from the EPD is used for job exposure tracking and by departments for budgeting job exposure for department personnel.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.2.6 RP may also require an alarming dosimeter or special dosimetry to be worn on certain jobs.

4.2.6.1 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.

4.2.7 DMC-2000 EPDs equipped with an iPAM-Tx (or equivalent) are:

4.2.7.1 Required for hearing impaired workers.

4.2.7.2 Required in High Radiation Areas (HRAs) when the worker's ability to hear an alarm is impaired by high noise environment, hearing protection use, use of audio headset, or personal hearing loss.

Basis Information

CRAI 3218552 (Pri-3) - Revise High Noise Area EPDs, 75RP-9ME27, step 3.1.3 to include Worker's use of Audio Headsets as an example of a situation to consider the use of PAM-1s.

CRAI 2817781 (Pri-3) -Revise Procedure 75RP-9ME27, High Noise Area EPDs, to clarify the requirement to issue external alarming devices to compensate for the limitations of EPD's in high noise environments. The procedure should clearly state that amplification and/or visual devices such as PAM-1 will be issued for tours and routine operational activities in high noise areas to ensure electronic personal dosimetry (EPD) remains effective as an ALARA control barrier.

4.2.7.3 Considered in Radiation Areas in situations where a worker's hearing is impaired (for example, while using audio headsets) based on plant conditions and the probability of radiological conditions changing during the work.

4.2.7.4 RP Leader's authorization is required to deviate from the requirements for an EPD with an iPAM-Tx on a case by case basis.

Basis Information

CRAI 3218533 (Pri-3) - Revise High Noise Area EPDs, 75RP-9ME27, step 3.1.3 to add RP Leader's authority to deviate from this recommendation on a case by case basis.

4.2.7.5 In addition to having workers wear an external alarming device, the following additional dose control measures should be emphasized:

- More frequent monitoring of dosimetry



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- Reduced stay times in high noise/high radiation work areas

Basis Information

ICR 00349 - Provide instructions to address issuing External Alarming Device for (1) high noise HRA entries and (2) other RCA entries for those with hearing loss per attached e-mail.

CRAI 2776072 (Pri-4) - Add clarifying guidance to procedure 75DP-9RP01, Radiation Exposure and Access Control. This guidance should be similar to the additional dose control measures specified in procedure 75RP-9ME27, High Noise Area EPDs section 3.1.2: more frequent monitoring of secondary dosimetry, not covering up dosimetry, and ensuring that self-monitoring of exposure by workers can be performed. (ICR 00483)

4.2.8 Placement of dosimetry devices should be as follows:

- 4.2.8.1 Dosimetry devices (for example, TLDs, EPDs) should normally be worn on the front of the body between the thigh and head unless directed otherwise by RP.
- 4.2.8.2 TLDs should be worn on the outside of protective clothing when skin is exposed and shallow-dose equivalent is of concern (for example, noble gas environment).



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 4.2.8.3 TLDs should be placed under the protective clothing if all skin is covered (that is, full PCs plus respirator)
- 4.2.8.4 Special dosimetry shall be worn as specified on the REP.
 - a. EPDs should be worn on the same approximate location of the body as the special dosimetry.
- 4.2.9 EPDs should be worn so the EPDs are easily retrieved and read.
- 4.2.10 The neutron TLD should normally be worn face out on the front and center of the body on the abdomen.
 - 4.2.10.1 The neutron TLD should be held tightly to the body by either a pouch or belt, or by use of tape.
- 4.2.11 Personnel are responsible for the safekeeping of assigned dosimetry devices and shall not tamper with nor cause the dosimetry to be exposed to radiation except during the performance of work requirements.

Basis Information

CRAI 3165248 (Pri-4) - 75DP-9RP01 step 3.2.6 states: Personnel are responsible for the safekeeping of their dosimetry devices and shall not tamper with nor cause the dosimetry to top be exposed to radiation except during the performance of work requirements. While this is statement is clearly understood by the RP staff, workers may not fully understand the requirement or consequences. Therefore, it is recommended that examples be included, such as:

Do not pass your assigned dosimetry device (TLD or EPD) through the security x-ray.

Do not wear your dosimetry following the administration of radiopharmaceuticals unless directed by Radiation Protection.

- 4.2.11.1 Do not pass dosimetry device (TLD or EPD) through the security x-ray.
- 4.2.11.2 Do not wear dosimetry following the administration of radiopharmaceuticals unless directed by radiation protection.
- 4.2.12 Lost or damaged dosimetry shall be immediately reported to radiation protection and a report filed per 75RP-9ME23, Exposure Evaluation for Lost, Damaged, or Suspect Dosimetry, and Anticipated EPD Dose Rate Alarms, by RP personnel.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.2.13 If an individual's dosimeter alarms, the individual shall:

- Notify co-workers
- Place work in a safe condition
- Immediately exit the area
- Immediately report to RP

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 4.2.14 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 to prevent contamination
 - When practical, dosimetry should not be covered in such a manner that the dosimetry cannot be seen and/or heard or impair self-monitoring of exposure by the worker
 - RP personnel shall assume responsibility for monitoring the worker's exposure when dosimetry is worn under protective clothing impairing the worker's ability to see and/or hear the dosimetry. This is performed per 75RP-9RP29 Remote Monitoring

Basis Information

CRAI 2776072 (Pri-4) - Add clarifying guidance to procedure 75DP-9RP01, Radiation Exposure and Access Control. This guidance should be similar to the additional dose control measures specified in procedure 75RP-9ME27, High Noise Area EPDs section 3.1.2: more frequent monitoring of secondary dosimetry, not covering up dosimetry, and ensuring that self-monitoring of exposure by workers can be performed. (ICR 00483)

CRAI 2776076 (Pri-4) - Add step to 3.2.5 - When dosimetry is worn under PCs, the ability to self monitor is impaired hence this requires turning over responsibility to RP via telemetry, time keeping, etc. Wearing dosimetry under PCs impairs ability to hear EPD. (ICR 00432)

- 4.2.15 Exposures received by personnel monitored by dosimetry devices should be recorded under the applicable REP number.

Basis Information

USNRC Regulatory Guide 8.10, Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As is Reasonably Achievable, Rev. 1R, Sept. 1975, 2.A - Where radiation work permits are used, exposures received should be recorded on the permits. (RCTS2 009656-01)

- 4.2.16 Visitors entering the RCA should be issued dosimetry and be continuously escorted to ensure that radiological requirements are met.
- 4.2.17 Consult Appendix D - Off Site Support Agency Radiological Determination Matrix for assistance in determining dosimetry, training requirements and exposure limits for Off Site Agencies assigned to PVNGS.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

CRAI 2853889 (Pri-4) - Evaluate including the Off-Site Support Agency Radiological Determination Matrix - Normal Operations and Table Explanation into 75DP-9RP01 or other applicable 75-series RP procedure and incorporate as applicable.

CRAI 2853889 (Pri-4) - Evaluate including off-site support agency Radiological Determination Matrix-Normal Ops & Table Explanation in procedure. (ICR 00450)



4.3 Dosimetry for Visitors

4.3.1 Issue, exchange, evaluate, and terminate visitor dosimetry as follows:

4.3.1.1 Use an EPD to monitor exposure.

4.3.1.2 Access restrictions for the visitor include the following:

- a. The visitor must be escorted by a qualified radiation worker for RCA entry.
- b. Exposure is limited to 100 mrem TEDE per year at PVNGS.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

c. The visitor cannot enter 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)
- Level II or Level III Alpha Areas

Basis Information

PCR 4057670 - Include Level II / III Alpha Areas as visitor prohibited.

d. The visitor can enter a Contaminated Area if approved by an RP Department Leader and appropriate protective clothing dress-out instruction is provided prior to entering a contaminated area.

4.3.1.3 Request RCA access by completing Section A of Appendix E - Visitor Request for RCA Access and provide the completed form to the appropriate RP Leader for approval.

NOTE

A computer access control system may be used to perform verification

a. Contact dosimetry or RP to complete Appendix E, Section A, Part 2.

4.3.1.4 Verify if a record TLD has been previously issued to the individual during the current year.

a. The name of the individual completing the verification shall be entered on the line provided in Appendix E, Section A, Part 2.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- b. Verify the following:
 - 1) The individual was not issued a record TLD at PVNGS during the current year.
 - 2) The individual's current year TEDE is less than 1500 mrem or RP Leader approval has been obtained for those individuals whose current year TEDE is greater than 1500 mrem and were not previously issued a record TLD at PVNGS during the year.
- c. If the individual does not meet the items in Step 4.3.1.4.b., the visitor process cannot be used to allow entry into an RCA.
 - 1) If the individual was previously issued a record TLD at PVNGS during the current year, the individual must be issued another record TLD per 75RP-9ME21, TLD Issue, Exchange and Termination, to enter an RCA.
- d. If the visitor has been monitored for exposure at PVNGS, during the current year using the visitor dosimetry process, then document the accumulated exposure to date on the first entry line in Section D of Appendix E.

4.3.1.5 The appropriate RP Leader will complete Section B of Appendix E.

4.3.1.6 The visitor and escort will complete Section C of Appendix E.

4.3.1.7 Visitor dosimetry issue shall be documented on Section D of Appendix E.

- a. Enter the appropriate information on Appendix E, Section D, Dosimetry Device Issue and Results, for each RCA entry. (Date, EPD serial number, RP Initials).
- b. The visitor's escort is responsible for ensuring the visitor obtains an EPD prior to entering an RCA.

4.3.1.8 Evaluate the visitor's exposure after each RCA entry by:

- Recording the EPD exit reading on Appendix E
- Calculating the accumulated total dose (in mrem)
- Ensuring the accumulated total dose remains below 100 mrem in a year

4.3.1.9 Do NOT allow further RCA entries if the entries would cause the visitor's accumulated total dose to exceed 100 mrem in a year.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.3.1.10 If the individual requires further RCA entries and does not have sufficient visitor exposure remaining, then issue the individual a record TLD per 75RP-9ME21, TLD Issue, Exchange and Termination.

NOTE

Reporting of visitor exposure is not required.

4.3.1.11 Forward the completed Appendix E to Dosimetry.

- a. If requested, a copy of Appendix E may be provided to the individual after it has been reviewed by Dosimetry.

4.4 Radiation Exposure Permits (REP)

4.4.1 General

4.4.1.1 REPs are the principal administrative means to manage radiation exposure received by personnel at PVNGS.

Basis Information

UFSAR 12.5.3.2.C 0 Radiation Exposure Permits - Procedures require radiation exposure permits for entry into radiologically controlled areas. These permits are a principal administrative means of managing personnel radiation exposure and describe the radiological controls required to perform the activity and maintain personnel radiation exposure ALARA. (RCTS2 010665-01)

4.4.1.2 An REP should specify the job to be performed, the radiological conditions at the job location, the protective clothing, dosimetry and respiratory protection requirements for the job, and the date(s) and time that the REP is valid.

- a. Additionally, any special instructions for completing the job in a radiologically safe manner should be specified on the REP.

4.4.1.3 An active REP shall be required for the following:

- a. Any job or task within an RCA.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

UFSAR 12.5.3.2.C - Radiation Exposure Permits - Procedures require radiation exposure permits for entry into radiologically controlled areas. These permits are a principal administrative means of managing personnel radiation exposure and describe the radiological controls required to perform the activity and maintain personnel radiation exposure ALARA. (RCTS2 010664-01)

- b. Any use of radioactive sources which could result in significant exposures to individuals.

Basis Information

UFSAR 12.5.3.7 - Handling of Radioactive Material - Licensed sources used for calibration are used by or under the direction of personnel who have received training in the safe use and handling of sources. A radiation exposure permit will be required if such use could result in significant personnel exposure. (RCTS2 010683-01)

RCTS 010913-01 - A Radiation Exposure Permit (REP) which provides instructions to personnel on apparel, surveys, safety precautions, posting, and personnel monitoring devices, will be issued prior to individuals working with radioactive material.

- 4.4.1.4 RP has the capability to expedite entries by individuals into RCAs should it become necessary to meet critical operational needs.
 - a. Expedited entries can be done by providing an RP technician to escort personnel in lieu of generating a new REP.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.4.2 Initiating an REP

4.4.2.1 Personnel needing to perform work requiring an REP should provide the RP Operations ALARA Planning section, with information pertaining to the work to be performed (for example, component ID, location, scope of work).

4.4.2.2 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 ALARA Planning while the REP is active.

4.4.3 Revising an REP

4.4.3.1 All revisions to REPs should be made by RP personnel, who should ensure all copies are revised.

4.4.4 Terminating an REP

4.4.4.1 When all work covered by the REP is completed, the originator should notify RP.

4.4.4.2 RP personnel should terminate all associated REPs and ensure all copies are removed.

4.4.4.3 When the expiration date of the REP has been reached, RP should terminate the REP unless requested by the originator to extend the REP.

4.4.4.4 RP may terminate the REP if radiological conditions at the job site have changed (or will change), or if the REP is improperly used (that is, scope of the original job has changed).

4.5 Restricted Area Access and Egress

4.5.1 Personnel issued a TLD shall pick up and wear the TLD upon entering a Restricted Area.

Basis Information

UFSAR 12.5.3.2.A - Restricted Areas - restricted areas as defined in 10 CFR 20.1003 are established at the protected area fence and access is controlled at that point for the purpose of protecting individuals from exposure to radiation and radioactive materials. (RCTS2 010660-01)

4.5.1.1 Visitors will pick up visitor dosimetry from RP at the applicable unit.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.5.2 All personnel issued a TLD shall return the assigned TLD to the designated storage location upon exiting a Restricted Area except as noted below.

Basis Information

CRAI 3165249 (Pri-4) - 75DP-9RP01 states:

3.5.2 All personnel issued a TLD should return their TLD to the designated storage location upon exiting a Restricted Area except as noted below.

3.5.2.1 Individuals whose work involves radioactive material outside of an established Restricted Area.

Recommend changing the phrase All personnel issued a TLD should return their TLD. to All personnel issued a TLD shall return their TLD.

4.5.2.1 Individuals whose work involves radioactive material outside of the permanent Restricted Area (for example, ISFSI, LLRMSF).

NOTE

The Emergency Plan exception is applicable for drills as well as an actual emergency.

4.5.2.2 Individuals required to exit a Restricted Area due to the Emergency Plan for any of the following:

- Assembly and Accountability
- Evacuation
- Emergency Plan assignment(s)

4.5.2.3 Security personnel while working in Protected Area Security Access Facilities and the Sally Ports.

Basis Information

CRAI 3391284 (Pri-4) - Revise the Radiation Exposure and Access Control procedure, 75DP-9RP01, section 3.5, (NOTE: Now Step 4.5.2.3) to permit the use of Security Officer's working in Security Headquarter and the Sally Port to retain their TLDs.

4.5.3 All personnel exiting the Protected Area through the Security Building should be monitored by passing through a radiation portal monitor (if operable).

4.5.4 If the portal monitors alarms, the individual shall attempt monitoring a second time.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

NOTE

Excepted from Step 4.5.4.1 are individuals who have a valid Portal Monitor Release form

- 4.5.4.1 If a portal monitor alarms on the second monitoring attempt, the individual shall ensure RP Operations in Unit 2 is notified.

Basis Information

CRDR 2548498 - Revise first bullet of 3.5.4.1 to direct individuals who alarm the portal monitor to standby and wait for RP evaluation/direction. (ICR 00216)

ICR 00219 - Evaluate the portal monitor release process for people with medical uptakes (in conjunction with ICR 00216).

- The Radiation Protection Technician will take actions per 75DP-0RP02, Radioactive Contamination Control

Basis Information

CRDR 2548498 - On 8-5-02, an individual (who is not currently issued a TLD at PVNGS) alarmed the portal monitor at the Restricted Area exit after having a medical uptake. The individual failed to notify Dosimetry prior to entering the Restricted Area, as required by step 2.1.13 of 75DP-9RP01, Radiation Exposure and Access Control. The individual stated that she was aware of the requirement to notify Dosimetry, but she thought the activity would be decayed before her entry into the Restricted Area.

- The individual causing the alarm shall not exit the Restricted Area until receiving authorization from RP Leadership

4.6 Radiological Controlled Area Entry

- 4.6.1 Normal Unit RCA access is established at the 140 ft Access Control Area located adjacent to the Unit RP Island using an access control turnstile, although other RCAs may exist within the Restricted Area.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

UFSAR 12.5.3.2.B - Controlled Areas - Procedures establish permanent and temporary controlled areas within the restricted areas where access is further administratively controlled for the purpose of limiting exposure of individuals to radiation and radioactive materials. Radiation and high radiation areas identified within controlled areas are posted appropriately and access control maintained in accordance with PVNGS Technical Specifications and 10 CFR 20. (RCTS2 010661-01)

SUSTAINABILITY ITEM - CRAI 2510316 (Pri -2) - Fully implement the LDM-101T's (Access Control Turnstile) at both the U-1 RCA entrance and the U-1 Containment entrance area prior to the start of the U1R10 Refueling Outage.

NOTE

Minimize Unit RCA Entries from other than the 140 ft Auxiliary Building RP Control Point.

- 4.6.1.1 Personnel who must enter a Unit RCA other than at the Auxiliary Building 140 ft level, must be approved by RP prior to entry.

Basis Information

Basis for NOTE preceding Step 4.6.1.1 - CRAI 3122498 (Pri-3) from CRDR 3065824 - Change procedure 75DP-9RP01 Radiation Exposure and Access Control to increase the verification requirements when allowing personnel to enter a RCA at a location other than at the normal 140 ft Auxiliary Building Access Control area. This action should be done in conjunction with Pri-3 corrective action 3117267

- 4.6.1.2 Personnel who must enter a non-Unit RCA located inside or outside the permanent Restricted Area boundary (for example, Service Building, LLRMSF, ISFSI) must be approved by RP prior to entry.

4.6.2 The RP requirements for unescorted entry into an RCA are:

- Have a TLD and EPD
- Up to date whole body count (WBC)
- RWT training is current
- Read the appropriate REP
- Received any associated pre-job briefing



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- Signed onto the appropriate REP via an REP Sign-in Sheet or electronic signature as applicable

4.6.3 By signing the REP, individuals indicate the individuals have read and understand the REP requirements and will comply with them.

Basis Information

RCTS 010915-01 - Procedures will ensure that individuals are familiar with the Radiation Exposure Permit (REP) prior to work on a job covered by that REP.

4.6.4 Personnel should read the appropriate REP prior to each subsequent entry.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 4.6.5 The requirements for a WBC and/or RWT may be waived to allow an RCA entry with approval of the Radiation Protection Manager.
 - 4.6.5.1 Document the approval and any restrictions on Appendix C - Radiation Protection Requirement Waiver.
 - 4.6.5.2 The requesting department should initiate a Training Exemption as detailed in 15DP-0TR69 Training and Qualification Administration using the signed Appendix C as the justification for exemption.

Basis Information

PCR 4350328 - Section 3.6.2.3 should read as follows: The requirements for a WBC and/or RWT may be waived to allow an RCA entry with approval of the Radiation Protection Manager. A bullet should follow this step stating The requesting department should initiate a Training Exemption as detailed in 15DP-0TR69 Training and Qualification Administration Section 4.6.3 using the signed Appendix F waiver as the justification for exemption.

- 4.6.6 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.
- 4.6.7 Personnel should obtain any protective clothing, additional dosimetry and/or respiratory protection equipment required by the REP.

4.7 Monitoring/Coverage of Radiological Work

- 4.7.1 Work group supervision (for example, section leaders, team leaders) should routinely monitor the activities of assigned personnel during job performance to ensure that proper radiological protection measures are being used.
 - 4.7.1.1 Improper work practices should be immediately stopped and reported to RP personnel for an evaluation of any radiological impact.
- 4.7.2 RP personnel should monitor the performance of radiation workers periodically and correct improper work practices on the spot.
 - 4.7.2.1 Issuance of a Palo Verde Action Request (PVAR) may be necessary based on the severity of any violations.
- 4.7.3 Continuous surveillance by RP personnel may be necessary when potentially extreme radiological conditions exist in a work area. This process is controlled by 75DP-0RP08, Managing Radiological Risk.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

NRC IR 529/88-22-01/LER 2-88-011-01 - Radiation Worker Overexposure

RCTS 039536-02 - Incorporate into procedures, as appropriate, requirements for vigilant RP coverage at the job site for all work that is performed in areas of high radiation, high contamination, and hot particles.

4.7.4 Jobs requiring continuous surveillance should be clearly identified on the applicable REP.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.7.5 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.

Basis Information

CRAI 3314054 (Pri-3) - Revise 75DP-9RP01, Radiation Exposure and Access Control, step 3.7.4, to include additional guidance on what constitutes a successful peer check of EPD and/or task change while in the RCA. Consider making this step reference use.

4.7.5.1 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

4.7.5.2 Document REP and/or task change in the appropriate log book.

4.8 Radiological Controlled Area Exit:

4.8.1 Personnel Monitoring at RCA Exits

4.8.1.1 All personnel exiting an RCA are required to be monitored by a contamination monitor (for example, PCM).

4.8.1.2 All personnel exiting an RCA are required to be monitored by a radiation portal monitor, if operable.

4.8.1.3 Exceptions to personnel monitoring:

- If the Unit 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



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

ICR 00097 - The process owner suggest that the bullet under step 3.8.1 (NOTE: now Step 4.8.1.1) be revised to include direction that a whole body frisk be performed prior to exiting the RCA and going to another unit.

- 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
- Personnel verified to have a medical uptake may undergo modified egress monitoring per an RP Department Leader subject to an RP Log entry

Basis Information

PCR 4061673 - Enhancement for monitoring personnel while being treated with radiopharmaceuticals.

ACT, 3072663 - A non utility worker was injured while in containment. During the medical response, it was determined that the patient needed to be immobilized using a backboard/stretchers. Due to this condition, the patient was unable to use the PCM prior to exiting the RCA. Their patient was unable to process through a portal monitor prior to leaving a Restricted Area

4.8.2 Personnel Monitoring for Radioactive Material Transfer between RCAs (for example, exiting through an RCA Yard gate)



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 4.8.2.1 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.
 - 1) 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.

Basis Information

ICR 00224 Clarify the third bullet in Step 3.8.2 (Requirement for PCM monitoring at receiving unit's RCA): Not all RCA's will have PCM (LLRMSF, ISFSI), so additional guidance is needed for RCA exit and monitoring.

- 4.8.3 Except for Security gun belts, tool belts should be removed prior to entering a PCM.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

NOTE

Plant personnel should be reminded that all PCM alarms are to be treated as actual contamination alarms until proven otherwise by Radiation Protection.

4.8.4 If the PCM alarms, take the following actions, as appropriate:

4.8.4.1 PCM alarm during initial monitoring:

- a. If you receive a PCM alarm during the initial monitoring, notify RP and remain near the PCM.

4.8.5 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.

4.8.6 If the RCA portal monitor alarms when exiting, the individual shall notify Radiation Protection.

4.8.6.1 The RP representative will evaluate the situation and take the appropriate actions.

4.8.7 Except as specified in Step 4.8.8 and Step 4.8.9, personnel should return all dosimetry other than assigned permanent whole body TLD to RP upon exiting an RCA.

Basis Information

QATS 391132-05 Revise procedure 75AC-9RP01 - Workers exiting an RCA without accurate accountability or tracking.

4.8.8 Operations, Radiation Protection, Chemistry, Security, and Fire Protection (including roving firewatch) personnel may retain assigned dosimetry (for example, EPD, special dosimetry) provided:

- The individual is logged in on an appropriate REP
- The potential exists to need immediate access to an RCA
- The individual does not leave the permanent Restricted Area



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 4.8.9 Individuals may retain assigned dosimetry for work in RCAs located outside of the permanent Restricted Area boundary (for example, LLRMSF) provided:
- The individual is logged in on an appropriate REP
 - The dosimetry is returned to the appropriate issue point when the work is completed (or prior to leaving the site for the day)

4.9 Special Area Access

NOTE

RP personnel or personnel escorted by RP may be exempt from the REP issuance requirement during the performance of assigned duties, provided Plant RP procedures for entry into High Radiation Areas are followed.

4.9.1 High Radiation Area Access

Basis Information

10 CFR 20.1601(a)(3) - The licensee shall ensure that each entrance or access point to a high radiation area has one or more of the following features -
(3) Entryways that are locked, except during periods when access to the areas is required, with positive control over each individual entry. (RP 046013-01)

- 4.9.1.1 Any personnel accessing an HRA without being signed in on an REP must be escorted at all times by an RP technician.
- 4.9.1.2 Access into a High Radiation Area requires the issuance of a specific REP authorizing entry.

Basis Information

Technical Specification 5.7.1...as defined in 10 CFR 20, in which the intensity of radiation is greater than 100 mrem/hr but less than 1000 mrem/hr, shall be barricaded and conspicuously posted as a high radiation area and entrance thereto shall be controlled by requiring issuance of a Radiation Exposure Permit (REP). (RCTS 011131-01)

RCTS2 010601-01 - Access to High Radiation Areas will be under the supervision of radiation protection personnel.

- RP shall ensure that an individual authorized access has sufficient remaining exposure to work in the area



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- Access into an HRA is NOT authorized for individuals using Appendix E - Visitor Request for RCA Access (that is, exposure monitoring by EPD only)

4.9.1.3 Any individual or group permitted to enter a High Radiation Area shall be provided with, or accompanied by one or more of the following:

<u>Basis Information</u>
<p>Technical Specification 5.7.1 - Any individual or group of individuals permitted to enter such areas shall be provided with or accompanied by one or more of the following:</p> <ul style="list-style-type: none"> a. A radiation monitoring device that continuously indicates the radiation dose rate in the area. b. A radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rate levels in the area have been established and personnel are aware of them. 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 by the Radiation Protection Section Leader or designated alternate in the REP. (RCTS 011132-01)

- a. Radiation dose rate meter.
- b. Alarming dosimeter (for example, 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.

4.9.2 Locked High Radiation Area Access



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

Technical Specification 5.7.2 - In addition to the requirements of Specification 5.7.1, areas accessible to personnel with radiation levels such that an individual could receive in 1 hour a dose greater than 1000 mrem shall be provided with locked or continuously guarded doors to prevent unauthorized entry and the keys shall be maintained under the administrative control of the Shift Manager on duty or Radiation Protection supervision.

UFSAR 12.5.3 - Radiation protection procedures are established to keep personnel radiation exposures ALARA and within the limits of 10 CFR 20.1001 - 20.2402. (RCTS2 010663-01)

- 4.9.2.1 In addition to the HRA requirements stated in Step 4.9.1.2 and Step 4.9.1.3, access to Locked High Radiation Areas shall be controlled as follows:
 - a. 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.

Basis Information

Technical Specification 5.7.2 - 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)

- b. In lieu of the stay time specification of the REP, direct or remote continuous surveillance (for example, closed circuit TV cameras) may be made by personnel qualified in radiation protection procedures to provide positive exposure control over the activities being performed within the area.

Basis Information

Technical Specification 5.7.2 - 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.

- 4.9.3 Very High Radiation Areas



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

10 CFR 20.1602 - In addition to the requirements in § 20.1601, the licensee shall institute additional measures to ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads (5 grays) or more in 1 hour at 1 meter from a radiation source or any surface through which the radiation penetrates. (RP 046014-01)

- 4.9.3.1 In addition to the HRA and LHRA requirements above, personnel access to a Very High Radiation Area (VHRA) shall be controlled as follows:
- a. Access shall be under an REP which is specific to the individual VHRA and requires continuous surveillance by RP.
 - b. Entry shall be authorized by an RP Department Leader.
 - c. The Operations Control Room Supervisor shall be contacted prior to entry into a VHRA.

4.9.4 Contaminated Area Access/Egress

- 4.9.4.1 Contaminated Area access and egress should be performed per 75DP-0RP02, Radioactive Contamination Control. Special clothing requirements should be determined by RP and should be specified on the REP.

Basis Information

UFSAR 12.5.1.3.B - The radiation protection program will ensure that: Appropriate access control techniques and protective clothing are used to limit external contamination. (RCTS2 010616-01)



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.9.5 Airborne Radioactivity Area Access

4.9.5.1 Respiratory protection equipment should be determined by RP and specified on the REP.

Basis Information

UFSAR 12.5.3.5 - Airborne Activity Exposure Control - Occupancy is restricted, process or other Engineering Controls are utilized, or respiratory protection equipment is provided to maintain exposures TEDE ALARA if personnel entry is required into areas where the source of airborne radioactivity cannot be removed or controlled. (RCTS2 010673-01)

- a. 01DP-0IS08, PVNGS Respiratory Protection Equipment Usage provides additional guidance and restrictions.

4.9.6 Containment Building Access

4.9.6.1 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.

Basis Information

UFSAR 12.3.2.2.2 - Containment Interior Shielding Design - After shutdown, the containment is accessible for limited periods of time and all access is controlled. Areas are surveyed to establish allowable working periods. (RCTS2 010606-01)

SUSTAINABILITY ITEM - CRAI 2510316 (Pri-2) - Fully implement the LDM-101T's (Access Control Turnstile) at both the U-1 RCA entrance and the U-1 Containment entrance area prior to the start of the U1R10 Refueling Outage.

4.10 Radiation Exposure Limitations and Controls

4.10.1 10 CFR 20.1201 Occupational Dose Limits



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

10 CFR 20.1201(a) - The licensee shall control the occupational dose to individual adults, except for planned special exposures under § 20.1206, to the following dose limits.

- (1) An annual limit, which is the more limiting of -
 - (i) The total effective dose equivalent being equal to 5 rems (0.05 Sv); or
 - (ii) 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 being equal to 50 rems (0.5 Sv).
- (2) The annual limits to the lens of the eye, to the skin of the whole body, and to the skin of the extremities, which are:
 - (i) A lens dose equivalent of 15 rems (0.15 Sv), and
 - (ii) A shallow-dose equivalent of 50 rem (0.5 Sv) to the skin of the whole body or to the skin of any extremity. (RP 046002-01)

4.10.1.1 Annual Occupational radiation dose to adults shall be limited to all of the following:

- a. 5 rem total effective dose equivalent (TEDE) or 50 rem total organ dose equivalent (TODE), whichever is more limiting.
- b. 15 rem lens dose equivalent (lens of the eye).
- c. 50 rem shallow-dose equivalent (skin or any extremity).

4.10.1.2 Occupational dose limits authorized by 10 CFR 20.1201 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 (that is, no signed statement of previous occupational exposure or incomplete NRC Form 4).

Basis Information

10 CFR 20.2104(e)(1) - If the licensee is unable to obtain a complete record of an individual's current and previously accumulated occupational dose, the licensee shall assume -

- (1) In establishing administrative controls under § 20.1201(f) for the current year, that the allowable dose limit for the individual is reduced by 1.25 rems (12.5 mSv) for each quarter for which records were unavailable and the individual was engaged in activities that could have resulted in occupational radiation exposure. (RP 046036-05)



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.10.2 PVNGS Annual Exposure Goal

4.10.2.1 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).

- a. 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.

4.10.3 Administrative Exposure Hold Points

4.10.3.1 To further maintain exposures ALARA, individuals are assigned an initial administrative exposure hold point of 1.5 rem/year TEDE.

- a. To ensure exposures are kept ALARA, management must approve requests for assignment of higher administrative hold points.

4.10.4 Exposure of Pregnant Women

4.10.4.1 Female radiation workers who choose to declare pregnancy or suspected pregnancy should fill out and sign Appendix A - Pre-Natal Dose Limit Statement acknowledging an 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.

Basis Information

10 CFR 20.1208(a) - The licensee shall ensure that the dose equivalent to the embryo/fetus during the entire pregnancy, due to the occupational exposure of a declared pregnant woman, does not exceed 0.5 rem (5 mSv). (RP 046008-01)

10 CFR 20.1208(b) - The licensee shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the limit in paragraph (a) of this section. (RP 046008-02)

USNRC Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure, Rev. 3, June 1999,B - In order for a pregnant worker to take advantage of the lower exposure limit and dose monitoring provisions specified in 10 CFR Part 20, the woman must declare her pregnancy in writing to the licensee. A form letter for declaring pregnancy is provided in this guide or the licensee may use its own form letter for declaring pregnancy. A separate written declaration should be submitted for each pregnancy. (RCTS2 010505-01)

- a. Fill out the top section of the Appendix A, read the block for Declared Pregnant Woman, then sign on the Employee’s Signature line.
- b. Obtain the Section Leader’s signature.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 1) The female's direct supervisor should assign the individual tasks which ensure the dose restriction are adhered to.
- c. Deliver the Appendix A to Dosimetry after signature by the supervisor.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- d. Upon receipt of the Appendix A, Dosimetry will perform the following in order to establish baseline monitoring for the declared pregnant woman:

Basis Information

ICR 00232 - Add a step that requires a DPW's TLD to be read, if one has been issued, and at time of declaration, performing a WBC to review any current internal exposure. Include an action basis for Embryo/Fetus Dose based on DPW CEDE.

- Whole body count the individual
- Issue a new TLD and process the individual's current TLD (if issued a TLD)
- Establish a lower administrative exposure hold point

4.10.4.2 Female radiation workers who choose to declare an intention to become pregnant (declared fertile woman) should fill out and sign an Appendix A acknowledging an exposure limitation to 50 mrem per month.

- a. Fill out the top section of the Appendix A, read the block for Declared Fertile Woman, then sign the Employee's Signature line.
- b. Obtain the Section Leader's signature.
 - 1) The female's direct supervisor should assign the individual tasks which ensure adherence to the dose restriction.
- c. Deliver the Appendix A to Dosimetry after signature by the supervisor.
- d. Upon receipt of the Appendix A, Dosimetry will perform the following in order to establish baseline monitoring for the declared pregnant woman:

Basis Information

ICR 00232 - Add a step that requires a DPW's TLD to be read, if one has been issued, and at time of declaration, performing a WBC to review any current internal exposure. Include an action basis for Embryo/Fetus Dose based on DPW CEDE.

- Whole body count the individual



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- Issue a new TLD and process the individual's current TLD (if issued a TLD)
- Establish a lower administrative exposure hold point
- e. Declared fertile women that become pregnant should declare the pregnancy acknowledging an exposure limitation for the gestation period per Step 4.10.4.1.
- f. Declared fertile women whose status has not changed after six months should resubmit the Appendix A - Pre-Natal Dose Limit Statement per Step 4.10.4.2.

4.10.4.3 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 female radiation worker declares pregnancy, the female radiation worker may receive an additional 50 mrem during the remainder of the pregnancy.

Basis Information

10 CFR 20.1208(d) - If the dose equivalent to the embryo/fetus is found to have exceeded 0.5 rem (5 mSv), or is within 0.05 rem (0.5 mSv) of this dose, by the time the woman declares the pregnancy to the licensee, the licensee shall be deemed to be in compliance with paragraph (a) of this section if the additional dose equivalent to the embryo/fetus does not exceed 0.05 rem (0.5 mSv) during the remainder of the pregnancy. (RP 046008-04)

4.10.4.4 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.

Basis Information

10 CFR 20.1208(b) - The licensee shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the limit in paragraph (a) of this section.

USNRC Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure, Rev. 3, June 1999, C.5 - In view of the NCRP recommendation, any monthly dose of less than 0.1 rem (1 mSv) may be considered as not a substantial variation above a uniform monthly dose rate and as such will not require licensee justification.

ICR 00088 - Review for impact to declared fertile female dose limit due to changes in RG 8.13, Rev-3, June 99.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- a. If a monthly dose greater than 0.1 rem is received, a justification for the exposure should be written.

Basis Information

USNRC Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure, Rev. 3, June 1999, C.5 - However, a monthly dose greater than 0.1 rem (1 mSv) should be justified by the licensee.

- 4.10.4.5 If a female radiation worker no longer requires a pre-natal dose limit, the Appendix A - Pre-Natal Dose Limit Statement, female radiation worker needs to inform Dosimetry, in writing, using the following method:
 - a. Obtain a new Appendix A.
 - 1) Fill out the personnel information at the top of the form.
 - 2) Place signature in the section titled Dose Limit Correction.
 - b. Obtain Section Leader's signature.
 - c. Deliver the Appendix A to Dosimetry after signature by the supervisor.
 - d. Upon receipt of the Appendix A 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:
 - 1) Whole body count the individual.
 - 2) Issue a new TLD and process the individual's current TLD used to establish the baseline monitoring.
 - 3) Returned the individual to the individual's normal administrative exposure hold point.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.10.5 Exposure of Visitors

- 4.10.5.1 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.
- 4.10.5.2 Normally, visitors should enter the RCA using a general REP, and enter only areas and perform functions permitted by the general REPs.
- 4.10.5.3 Refer to Section 4.3, Dosimetry for Visitors, for additional information, requirements, and restrictions.

4.10.6 Exposure of Minors

- 4.10.6.1 No individual under 18 years of age should be permitted to receive occupational exposure to radiation or airborne radioactivity at PVNGS.

Basis Information

10 CFR 20.1207 - The annual occupational dose limits for minors are 10 percent of the annual dose limits specified for adult workers in § 20.1201. (RP 046007-01)

USNRC Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure, Rev. 3, June 1999. (RCTS2 010506-01)



4.11 Assignment of Higher Administrative Exposure Hold Points

4.11.1 Requests for a Higher Hold Point

- 4.11.1.1 Management approval is needed to obtain a higher hold point. Appendix F - Request for a Higher Administrative Exposure Hold Point, is used to request the new hold point. Appendix F is available at the RP Island, Dosimetry office or as an electronic form in the Palo Verde Site Specific Forms Menu under Radiation Protection.
 - a. If the request is due to an individual exceeding an assigned hold point, RP management shall ensure a documented evaluation is performed for the cause.
- 4.11.1.2 The requesting supervisor completes the Originator section of the form, ensuring the ALARA concept is maintained within the department and the request for a higher individual administrative exposure hold point is warranted. (That is, no other qualified personnel are available who have sufficient remaining exposure below the assigned hold point.)
- 4.11.1.3 Submit Appendix F to RP for concurrence.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.11.1.4 If concurrence is obtained from RP, the request is forwarded to Dosimetry.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 4.11.1.5 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 the record search should sign and date in the designated space.
- 4.11.1.6 The requesting supervisor should route Appendix F to applicable management for approval.

4.11.2 Approvals

- 4.11.2.1 The individual requiring the higher administrative exposure hold point signs the request to verify all occupational exposure is accounted for in the individual’s PVNGS Dosimetry Records.

Basis Information

NRC IR 528/90-55-01 NCV - Failure to determine an individuals accumulated occupational exposure consistent with 10 CFR 20.102(B)(1) prior to exceeding 1.25 Rem during the second calendar quarter of 1990.

RCTS 040337-02 - Revise procedure to assure that each individual will sign the request for exceeding admin exposure limits to indicate that all periods of occupational radiation exposure are accounted for in the determination of accumulated occupational dose.

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.

- 4.11.2.2 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.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

- 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 within a 5 year period, approval of the Sr Vice President, Site Operations is required.

4.11.2.3 The request is returned to the Dosimetry Office for processing.

4.12 Personnel Overexposures

4.12.1 Personnel who exceed or suspect exceeding any exposure limit in Step 4.10.1, shall immediately report to the RP Department or the Dosimetry Office.

4.12.2 RP should obtain all pertinent information concerning the potential overexposure from the individual and initiate reporting in accordance with 90DP-01P10, Condition Reporting.

4.12.2.1 The Radiation Protection Manager ensures the incident is investigated.

4.12.3 The individual should be directed to the Dosimetry Office.

4.12.4 Dosimetry evaluates the individual's record TLD and restricts the individual from entering the RCA until the record TLD is reissued.

4.12.5 Any overexposure meeting the criteria of Appendix G - Criteria for Reporting Personnel Overexposure to the USNRC, shall be reported as described in Appendix G.

4.12.6 Any report, as described in Appendix G, shall require a written report to be provided to the affected individual(s) no later than the time of official written notification to the NRC. The report should be prepared per 75DP-0RP04, Radiological Reports.

Basis Information

RCTS 039454-01 - Potential violation of 10 CFR 20.201, not notifying the worker of his amount of exposure. Complete modification to appropriate procedure to include written notification to worker.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

4.13 Radiation Protection Manager Review of Radworker Error

4.13.1 At the discretion of the Radiation Protection Manager, the review and resolution of radworker errors (including inappropriate, unauthorized possession or use of contraband materials in the RCA) and lifting the radworker’s RCA Access restriction should include:

<u>Basis Information</u>
CRAI 3214174 (Pri-3) - Develop guidance for consistent resolution for identified inappropriate, unauthorized possession or use of contraband materials in the RCA. Include guidance as procedure change to Radiation Exposure and Access Control, 75DP-9RP01.

- 4.13.1.1 A meeting of the affected radworker’s Director (and Site Coordinator for Non Utility Radworkers) and the Radiation Protection Manager to review and discuss the circumstances surrounding the radworker error.
 - a. The decision to lift the Radworker’s RCA Access restriction is at the sole discretion of the Radiation Protection Manager.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

5.0 REFERENCES

5.1 Implementing References

- 5.1.1 01DP-0IS08, PVNGS Respiratory Protection Equipment Usage
- 5.1.2 15DP-0TR69 Training and Qualification Administration
- 5.1.3 75DP-0RP02, Radioactive Contamination Control
- 5.1.4 75DP-0RP04, Radiological Reports
- 5.1.5 75DP-0RP08, Managing Radiological Risk
- 5.1.6 75RP-9ME21, TLD Issue, Exchange and Termination
- 5.1.7 75RP-9ME23, Exposure Evaluation for Lost, Damaged, or Suspect Dosimetry, and Anticipated EPD Dose Rate Alarms
- 5.1.8 75RP-9RP03, Bioassay Analysis
- 5.1.9 75RP-9RP29 Remote Monitoring
- 5.1.10 90DP-0IP10, Condition Reporting

5.2 Developmental References

- 5.2.1 Developmental references are listed in the Basis Document

<u>Basis Information</u>
Title 10 Code of Federal Regulations Part 20, Standards for Protection Against Radiation.
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.
USNRC Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure, Rev. 3, June 1999.
USNRC Regulatory Guide 8.36, Radiation Dose to the Embryo/Fetus, July 1992
USNRC I.E. Circular No. 81-07, Control of Radioactively Contaminated Material; May 1981.
PVNGS Updated Final Safety Analysis Report.
PVNGS Technical Specifications Units 1, 2, and 3.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

IE Information Notice No. 86-107, "Entry Into PWR Cavity With Retractable Incore Detector Thimbles Withdrawn," Dec. 29, 1986.

INPO Significant Operating Experience Report (SOER) 85-3, "Excessive Personnel Radiation Exposures," April 30, 1985.

IE Information Notice No. 84-19, "Two Events Involving Unauthorized Entries Into PWR Reactor Cavities." March 21, 1984.

IE Information Notice No. 82-51, "Overexposure in PWR Cavities," December 21, 1982.

IE Circular No. 76-03, "Radiation Exposure in Reactor Cavities," September 13, 1976.

INPO 05-008, Rev 1, Guidelines for Radiological Protection at Nuclear Power Stations, January 2011.

INPO Significant Event Report (SER) 88-37, "Personnel Radiation Overexposure Due To Work Generated Hot Spots," December 22, 1988.

American Nuclear Insurers (ANI) "Nuclear Insurance Inspection Report," Document #L060800.266, dated June 14, 2000

National Council on Radiation Protection and Measurements, "Limitations of Exposure to Ionizing Radiation," NCRP Report No. 16, 1993.

USNRC Regulatory Guide 8.38, Control of Access to High and Very High Radiation Areas in Nuclear Power Plants, May 2006.

USNRC NUREG-1736, "Consolidated Guidance: 10 CFR 20 – Standards for Protection Against Radiation," October 2000

USNRC NUREG/CR-5569 ORNL/TM-12067, "Health Physics Positions Data Base," May 1992

Site Integrated Business Plan CRAI 3084518, "Review recommendation #3 of SOER 01-01"

75RP-9RP02, Radiation Exposure Permits

75RP-9RP09, Release of Vehicles, Equipment, and Material from Radiological Controlled Areas

84DP-0RM31, Handling of Proprietary, Confidential and Highly Confidential Information

PCR 4160680 - Correct Errors in Appendix E, Visitor Request for RCA Access

PCR 4233882 - Update Appendix E, Visitor Request for RCA Access

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

PCR 4350330 - Update Appendix E, Visitor Request for RCA Access

6.0 RECORDS

6.1 The following records are required by this procedure:

6.1.1 Record Name: Pre-Natal Dose Limit Statement

- Classification: Good Business Practice
- Retention: 10 Years Plus Insurance Policy
- Turnover Instruction: OPN5.04

Basis Information

ANI 80-1A, R-5, June 1999 - Section II.1, 1.9 - Master Worker's Policy (LP+1) - 75DP-9RP01 Appendix B - Retention period based on American Nuclear Insurers Information Bulletin 80-1A, R-5, June 1999, section II, Indoctrination, Training and Retraining, 1.9 - Declarations and undeclarations of pregnancy by radiation workers. (LP+1) However, PVNGS will retain for LP+10 to maintain all ANI records for the same period. ANSI N45.2.9 - 1974, Appendix A, Section A.6.1 only discusses "radiation exposure records."



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

6.1.2 Record Name: Radiation Protection Requirements Waiver

- Classification: Good Business Practice
- Retention: 10 Years Plus Insurance Policy
- Turnover Instruction: OPN5.04

Basis Information

ANI 80-1A, R-5, June 1999 - Section VIII.2, 2.8 - Master Worker's Policy (LP+1) - 75DP-9RP01 Appendix E - Retention period based on American Nuclear Insurers Information Bulletin 80-1A, R-5, June 1999, section VIII, Personnel Exposure Records, 2.8 - Waivers of requirements for whole body counting. (LP+1) However, PVNGS will retain for LP+10 to maintain all ANI records for the same period. ANSI N45.2.9 - 1974, Appendix A, Section A.6.1 only discusses radiation exposure records.

6.1.3 Record Name: Request for Higher Administrative Exposure Hold Point

- Classification: Good Business Practice
- Retention: 10 Years Plus Insurance Policy
- Turnover Instruction: OPN5.04

Basis Information

ANI 80-1A, R-5, June 1999 - Section VIII.3, 3.3 - Master Worker's Policy (LP+1) - 75DP-9RP01 Appendix A - Retention period based on American Nuclear Insurers Information Bulletin 80-1A, R-5, June 1999, section VIII, Personnel Exposure Records, 3.3 - Total Effective Dose Equivalent (TEDE). (LP+1) However, PVNGS will retain for LP+10 to maintain all ANI records for the same period. ANSI N45.2.9 - 1974, Appendix A, Section A.6.1 only discusses radiation exposure records.

6.1.4 Record Name: Visitor Request for RCA Access

- Classification: Good Business Practice
- Retention: 10 Years Plus Insurance Policy
- Turnover Instruction: OPN5.98



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Basis Information

ANI 80-1A, R-5, June 1999 - Section II.2, 2.1 - Master Worker's Policy (LP+1) - 75DP-9RP01 Appendix F - Retention period based on American Nuclear Insurers Information Bulletin 80-1A, R-5, June 1999, section II, Indoctrination, Training and Retraining, 2. Visitors and escorted personnel, 2.1 - Special instructions given to such persons should be documented. (LP+1) However, PVNGS will retain for LP+10 to maintain all ANI records for the same period. ANSI N45.2.9 - 1974, Appendix A, Section A.6.1 only discusses radiation exposure records.



Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Appendix A Page 1 of 1

Appendix A - Pre-Natal Dose Limit Statement

Sample

Palo Verde
Nuclear Generating Station

Pre-Natal Dose Limit Statement

Page 1 of 1

Employee Name:		Social Security No. ¹ :	Employee No.:
Telephone Extension:		HPID No.:	Employee Date of Birth:
<p>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.</p>			
<p>Check One:</p> <p><input type="checkbox"/> Declared Pregnant Woman I hereby notify APS of my pregnancy 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 _____.</p> <p><input type="checkbox"/> 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.</p> <p>As a Declared Pregnant 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.</p>			
Employee's Signature:		Date:	
Section Leader's Acknowledgement:		Date:	
DOSE LIMIT CORRECTION			
<p><input type="checkbox"/> 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 re-established to 1500 mrem per year.</p>			
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)			
<input type="checkbox"/> Whole Body Count Performed	_____ Dosimetry Initial	<input type="checkbox"/> Whole Body Count Performed	_____ Dosimetry Initial
<input type="checkbox"/> Individual's TLD processed	_____ Dosimetry Initial	<input type="checkbox"/> Individual's TLD processed	_____ Dosimetry Initial
<input type="checkbox"/> Establish lower Admin Exposure Hold Point	_____ Dosimetry Initial	<input type="checkbox"/> 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

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Appendix B Page 1 of 1

Appendix B - Supplemental Exposure Notification

Sample

Palo Verde
Nuclear Generating Station

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:					
<p><i>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".</i></p>					
_____			_____		
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.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Appendix C Page 1 of 1

Appendix C - Radiation Protection Requirement Waiver

Sample

Palo Verde
Nuclear Generating Station

Radiation Protection Requirement Waiver

Page 1 of 1

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: <input type="checkbox"/> Whole Body Count <input type="checkbox"/> 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
PV-E0133

Appendix D - Off Site Support Agency Radiological Determination Matrix

Normal Operation		Badging	Limits	Part 19.12	Training
Situation	Badging	Limits	Part 19.12	Training	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, 10CFR 19.12 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 4.2. and 4.3	PVNGS may classify these personnel as occupational workers. If so, the Occupational Dose Limits of 10CFR20.1201 apply	If Occupational, 10CFR 19.12 applies	Escort, Complete Rad Worker Training or Waive Training	

Emergencies		Badging	Limits	Part 19.12	Training	KI	Evacuation
Situation	Badging	Limits	Part 19.12	Training	KI	Evacuation	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 nonessential personnel	
Offsite support agencies are at PVNGS Supporting an emergency in progress, Not entering the Restricted, 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 section 6.8.1. Emergency workers carry dosimeters in addition to TLDs. PVNGS may provide to their 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 Section 6.7.1.7.3. EC authorizes use of KI. PVNGS may provide to other agencies if requested.	N/A	

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Appendix E Page 1 of 2

Appendix E - Visitor Request for RCA Access

Sample

Palo Verde
Nuclear Generating Station

Visitor Request for RCA Access

Page 1 of 2

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 1500 mrem? If "Yes", then RP Department Leader approval is required to allow RCA access.			<input type="checkbox"/> Yes <input type="checkbox"/> 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: _____			<input type="checkbox"/> Yes <input type="checkbox"/> No
c. Has the visitor been issued visitor dosimetry at PVNGS during the current year? If "Yes" how many times? _____ if more than 3, then Dosimetry Section Leader to evaluate if TLD is required.			<input type="checkbox"/> Yes <input type="checkbox"/> No
If all questions above are answered as "No", an RP Section Leader can approve the visitor's RCA access request.			
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? (If "Yes" then RP Department Leader approval is required prior to allowing entry into CAs.)			<input type="checkbox"/> Yes <input type="checkbox"/> No
Requested by (Print): Name	Dept.	Ext.	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 1500 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.

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Appendix E Page 2 of 2

Palo Verde
Nuclear Generating Station

Visitor Request for RCA Access

Page 2 of 2

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), or Level II or Level III Alpha areas.
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 and that all information provided in Section "A" of this document is accurate.

Signature of Visitor:	Date
-----------------------	------

Part 2. Escort Acknowledgement

Name: First	Middle	Last	Jr., Sr.	Escort's HPID #:
-------------	--------	------	----------	------------------

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

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Appendix F Page 1 of 1

Appendix F - Request for a Higher Administrative Exposure Hold Point

Sample

Palo Verde
Nuclear Generating Station

Request for a Higher Administrative Exposure Hold Point

Page 1 of 1

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				<input type="checkbox"/> Record Dose	<input type="checkbox"/> APS Dose = _____
				<input type="checkbox"/> Included estimate of _____	<input type="checkbox"/> Offsite Dose = _____
5 Year					
Lifetime ²				Is exposure greater than age?	<input type="checkbox"/> Yes <input type="checkbox"/> 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

- New Administrative Exposure Hold Point assigned _____ for a period of _____
Effective beginning: _____
- Personnel Exposure file / RRAC System updated: _____ Date: _____
RP Technician Signature
- Form Distribution (a) Original to: Worker's Exposure File (b) Copies to: Dosimetry, Radiation Protection, Originator

¹SSN use requires marking as CONFIDENTIAL, see 84DP-0RM32

²Lifetime exposures need not be obtained for individuals not participating in a planned special exposure program. (CRAI 3120700)

Radiation Exposure and Access Control

75DP-9RP01

Revision
20

Appendix G Page 1 of 1

Appendix G - Criteria for Reporting Personnel Overexposure to the USNRC

	TEDE	LDE	SDE
<p>IMMEDIATE NOTIFICATION 10CFR20.2202(a)</p>	25 rem	75 rem	250 rads
<p>NOTIFICATION Within 24 HOURS 10CFR20.2202(b)</p>	5 rem	15 rem	50 rem
<p>WRITTEN REPORT Within 30 DAYS 10CFR20.2203</p>	<ol style="list-style-type: none"> 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. 		



**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: 06/04/2013

Revised By: N/A Date: _____

Technical Review _____ Operations Approval _____

EP Review _____ Training Approval _____

(Only required for Emergency Plan JPMs)

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.



2013 NRC SRO A-5
PVNGS JOB PERFORMANCE MEASURE

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, PV NAN Emergency Message Form 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.



**2013 NRC SRO A-5
PVNGS JOB PERFORMANCE MEASURE**

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-One-Tango-Foxtrot”

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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC SRO A-5
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1.	Enter EP-0901, Classifications to classify the event		Examinee refers 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 determines 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):			



**2013 NRC SRO A-5
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
3. *	Enters EP-0902 to make notification	<p>If Requested CUE: If examinee requests Area Operator report: “I am the Area Operator”</p> <p>Information CUE: Examinee should be given ERFDADS MET data along with INITIATING CUE</p> <p>Information CUE: After examinee hands EP-0541 to communicator report: “This concludes the JPM”</p>	<p>Examinee completes FORM EP-0541 and hands to the STSC communicator. The form must contain the following information to be SAT:</p> <ul style="list-style-type: none"> • 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 <p>End Time: _____</p> <p>Notification Time: _____ (End Time – Start Time must be < 14 minutes to be SAT, giving communicator 1 minute for notifications)</p>
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>			

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



2013 NRC SRO A-5
PVNGS JOB PERFORMANCE MEASURE

ANSWER KEY

FORM EP-0541 AB

PVNGS EMERGENCY PREPAREDNESS

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 on XX / XX / XX EAL: HA4.2
(time) (MM/DD/YY) (driving current classification only)

EVENT TERMINATION AT _____ / _____ / _____
(time) (MM/DD/YY)

- 3. The wind speed is 22 MPH from 320 degrees
(35 foot elevation - 15 min avg) (35 foot elevation - 15 min avg)
 Authenticator Code WHISKY ONE TANGO FOXTROT
 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 CURRENT TIME AND DATE
(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)

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		

EP EP-0541 AB

ANSWER KEY



**2013 NRC SRO A-5
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
000	06/04/2013	6	Record Created

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC SRO A-5
PVNGS JOB PERFORMANCE MEASURE

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-One-Tango-Foxtrot”**

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**

<p>to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable release. The shutdown of systems required to protect life operations or safely shutdown the plant.</p> <p>Equipment in the stated area was already out of service, before the event. This EAL should not be declared as it does not have an adverse impact on the ability of the plant to operate or safely shutdown beyond that required by Technical Specifications at the plant.</p> <p>VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable release. The shutdown of systems required to protect life operations or safely shutdown the</p>	<p>HA4 - HOSTILE ACTION within the Owner Controlled Area or airborne attack threat.</p> <ol style="list-style-type: none"> A HOSTILE ACTION is occurring or has occurred within the Owner Controlled Area as reported by the Security Team. A validated notification from NRC of an airliner attack threat within 30 minutes of the site. A HOSTILE ACTION directed toward the ISFSI. 	<p>HA5 - Control Room evacuation has been initiated.</p> <ol style="list-style-type: none"> Control Room evacuation is required by: 40AO-9ZZ18, Shutdown Outside Control Room OR 40AO-9ZZ19, Control Room Fire. 	<p>HA6 - Other conditions exist which in the judgment of the EC warrant declaration of an Alert.</p>	<p>HA6 - Other conditions exist which in the judgment of the EC warrant declaration of an Alert.</p>
<p>HA6 - Other conditions exist which in the judgment of the EC warrant declaration of an Alert.</p>	<p>HU4 - Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant.</p> <ol style="list-style-type: none"> A SECURITY CONDITION that does NOT 	<p>HU5 - Other conditions exist which in the judgment of the EC warrant declaration of a UE</p> <ol style="list-style-type: none"> Other conditions exist which in the judgment of the EC indicate that events are in progress or have 	<p>HU5 - Other conditions exist which in the judgment of the EC warrant declaration of a UE</p> <ol style="list-style-type: none"> Other conditions exist which in the judgment of the EC indicate that events are in progress or have 	<p>HU5 - Other conditions exist which in the judgment of the EC warrant declaration of a UE</p>

HA4.2 is the correct call



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)	$^{\circ}F$	-0.99	-0.99	-0.99
ATMOSPHERIC STABILITY CLASS (ASC)			D	
TEMPERATURE (T)	$^{\circ}F$	84.62	84.57	84.57
DEW POINT (D)	$^{\circ}F$	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)

<input type="checkbox"/> UNUSUAL EVENT	<input type="checkbox"/> ALERT	<input type="checkbox"/> SITE AREA EMERGENCY	<input type="checkbox"/> GENERAL EMERGENCY
Declared at _____ on _____		EAL: _____	
<small>(time)</small>	<small>(MM/DD/YY)</small>	<small>(driving current classification only)</small>	

<input type="checkbox"/> EVENT TERMINATION AT _____
<small>(time)</small> <small>(MM/DD/YY)</small>

3. The wind speed is _____ MPH from _____ degrees
(35 foot elevation - 15 min avg) (35 foot elevation - 15 min avg)

Authenticator Code _____

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: <u>PVNGS</u> Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	Date of Examination: <u>11/04/13</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] Reduce to Two CW Pumps and Two Cooling Towers (K/A: 3.8 075 A2.02)	A, N, S	8
e. [S-5] Transfer 13.8 kV buses (K/A: 3.6 062 K1.04)	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: <u>PVNGS</u> Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Date of Examination: <u>11/04/13</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] Reduce to Two CW Pumps and Two Cooling Towers (K/A: 3.8 075 A2.02)	A, N, S	8	
e. [S-5] Transfer 13.8 kV buses (K/A: 3.6 062 K1.04)	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: <u>PVNGS</u> Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>	Date of Examination: <u>11/04/13</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-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 (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	



**2013 NRC S-1
PVNGS JOB PERFORMANCE MEASURE**

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: 08/13/2013

Revised By: N/A Date:

Technical Review Operations Approval

EP Review N/A Training Approval

(Only required for Emergency Plan JPMs)

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.



**2013 NRC S-1
PVNGS JOB PERFORMANCE MEASURE**

1. SIMULATOR SETUP:

- IC#: 141 (When run with 2013 NRC S-2) **-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 79 available.
- This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.



2013 NRC S-1
PVNGS JOB PERFORMANCE MEASURE

3. JPM PERFORMANCE:

- MALFUNCTIONS, OVERRIDES, etc. **during** JPM

STEP	COMMAND/COMMUNICATION	DESCRIPTION
5	<u>INSERT KEY 1 – HPSI A TRIP</u> OR <u>INSERT KEY 2 – HPSI B TRIP</u> 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:

- 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 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 has directed you to perform Steps 19-23 of 40EP-9EO04, Steam Generator Tube Rupture.**



**2013 NRC S-1
PVNGS JOB PERFORMANCE MEASURE**

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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC S-1
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1. *	<p>Step 19 IF at least one HPSI Pump is operating, AND ALL of the following conditions exist:</p> <ul style="list-style-type: none"> • 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 <p>THEN <u>throttle</u> HPSI flow or <u>stop</u> the HPSI Pumps one pump at a time.</p>	<p>Evaluator NOTE: INITIAL CONDITIONS specify that the intact SG is being maintained within 45-65% NR.</p> <p>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.”</p> <div style="background-color: #e0e0e0; padding: 5px; margin-top: 10px;"> <p>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.</p> </div>	<p>Examinee verifies:</p> <ul style="list-style-type: none"> • RCS is $\geq 24^\circ\text{F}$ subcooled using ERFDADS or QSPDS • Pressurizer level is $\geq 10\%$ 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 $\geq 16\%$ on QSPDS display <p>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.</p> <p align="center">OR</p> <p>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.</p> <p align="center">OR</p> <p>Rotates SIA-HS-1 to the START position to override HPSI Pump A, then to the STOP position to secure HPSI Pump A.</p> <p align="center">OR</p> <p>Rotates SIB-HS-2 to the START position to override HPSI Pump B, then to the STOP position to secure HPSI Pump B.</p>
<p>SAT / UNSAT Comments (required for UNSAT):</p>			



**2013 NRC S-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
2.	<p>Step 20</p> <p>IF any of the Safety Injection throttle criteria can NOT be maintained, THEN <u>perform</u> the following:</p> <p>a. <u>Raise</u> HPSI flow b. <u>Start</u> HPSI pumps as needed</p>	<p>Evaluator NOTE:</p> <p>At THIS time, throttle criteria is met.</p>	<p>Examinee <u>acknowledges</u> step by circling or initialing procedure</p>
<p>SAT / UNSAT Comments (required for UNSAT):</p>			

	STEP	CUE	STANDARD
3. *	<p>Step 21</p> <p>IF pressurizer pressure is greater than 220 psia, AND is being controlled, THEN <u>perform</u> the following:</p> <p>a. <u>Stop</u> the LPSI Pumps b. <u>Close</u> the LPSI Injection Valves</p>	<p>Evaluator NOTE:</p> <p>At this time pressurizer pressure is greater than 220 psia.</p>	<p>Examinee <u>verifies</u> pressurizer pressure is greater than 220 psia, THEN <u>performs</u> the following:</p> <p>Rotates SIA-HS-3 to the START position to override LPSI Pump A, then to the STOP position to secure LPSI Pump A.</p> <p align="center">AND</p> <p>Rotates SIB-HS-4 to the START position to override LPSI Pump B, then to the STOP position to secure LPSI Pump B.</p> <p align="center">AND</p> <p>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%.</p> <p align="center">AND</p> <p>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%.</p>
<p>SAT / UNSAT Comments (required for UNSAT):</p>			



**2013 NRC S-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
4.	<p>Step 22</p> <p>IF pressurizer pressure can NOT be maintained above 220 psia, AND the LPSI Pump(s) have been stopped, THEN <u>perform</u> the following:</p> <p>a. <u>Start</u> available LPSI Pumps b. <u>Open</u> the LPSI Injection Valves</p>		Examinee <u>acknowledges</u> step by circling or initialing procedure
<p>SAT / UNSAT Comments (required for UNSAT):</p>			

	STEP	CUE	STANDARD
5. *	<p>Step 23</p> <p><u>Stop</u> the Containment Spray Pumps.</p>	<p>Evaluator NOTE:</p> <p>AFTER examinee acknowledges the SESS Panel alarm for securing FIRST Containment Spray pump have DRIVER <u>insert</u> KEY 1 OR KEY 2 (86 lockout on HPSI Pump being used to maintain PZR level).</p> <p align="center">ALTERNATE PATH</p>	<p>Examinee rotates SIA-HS-5 to the START position to override CS Pump A, then to the STOP position to secure CS Pump A.</p> <p align="center">AND/OR</p> <p>Rotates SIB-HS-6 to the START position to override CS Pump B, then to the STOP position to secure CS Pump B.</p>
<p>SAT / UNSAT Comments (required for UNSAT):</p>			



**2013 NRC S-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
6. *	Examinee acknowledges SESS alarm for HPSI B Pump trip and readdresses HPSI throttle criteria.	<p>Evaluator NOTE:</p> <p>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.”</p>	<p>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).</p> <p>AND</p> <p>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.</p>
<p>SAT / UNSAT Comments (required for UNSAT):</p>			

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



**2013 NRC S-1
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
0	08/13/2013	6	JPM Created

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC S-1
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

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 has directed you to perform Steps 19-23 of 40EP-9EO04, Steam Generator Tube Rupture.**

CANDIDATE



**2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE**

1. SIMULATOR SETUP:

- IC#: 141 (When run with 2013 NRC S-1) **-OR-**
- IC#: 20

- SCENARIOS, MALFUNCTIONS, OVERRIDES, etc. for Setup:

COMMAND/COMMUNICATION	DESCRIPTION
mfTH06A f:50	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 141 is used, reset to **IC 141**, 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-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 79 available.
- This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.



**2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE**

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	<u>DELETE</u> cmAVWD06SGBUV500Q_4 <u>WAIT</u> 2 minutes AFTER the malfunction is DELETED, 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
8. When directed by examinee to close SGE-V293, SGE-V267, and SGE-VA33	<u>WAIT</u> 2 minutes then report that the valves are CLOSED	
9. When directed by examinee to open SCN-V088, V099, V071, and V072	<u>WAIT</u> 2 minutes then report that the valves are OPEN	These valves are open in the simulator setup

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.



2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE

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 has directed 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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1. *	Standard Appendix 33: 1. <u>Place</u> 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. <u>Ensure</u> 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):			



**2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE**

	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: <ul style="list-style-type: none"> • 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, direct him or her to select either valve 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):			



**2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
5.	5. <u>Check</u> 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 <u>Perform</u> the following to open SGB-UV-500Q: a. <u>Direct</u> an operator to perform the following: 1) <u>Unlock</u> and <u>open</u> SGE-V293, SGB-UV-500Q BYPASS HDR INLET ISOL VALVE 2) <u>Open</u> SGE-V267, SGB-UV-500Q BYPASS HDR OUTLET ISOL VALVE 3) <u>Slowly open</u> SGE-VA33, SGB-UV-500Q BYPASS HEADER THROTTLE VALVE	Evaluator NOTE: Simulator Driver ACTION is required at this time Trainee will use radio to communicate with Area Operator (Simulator Driver). The Simulator Driver will provide cues for local valve manipulations.	Examinee directs an Area Operator to open SGE-V293, SGE-V267, and SGE-VA33
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE**

	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: <ul style="list-style-type: none"> • SGE-V293 • SGE-V267 • SGE-VA33 	Evaluator NOTE: Simulator Driver ACTION is required at this time Trainee will use radio to communicate with Area Operator (Simulator Driver). The Simulator Driver will provide cues for local valve manipulations.	Examinee directs Area Operator to close SGE-V293, SGE-V267, and SGE-VA33
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
9. *	6. <u>Direct</u> an operator to open ALL of the following valves: <ul style="list-style-type: none"> • 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 Information CUE: Either Simulator Driver or Evaluator may inform the examinee that these valves are open	Examinee directs Area Operator open the following valves: <ul style="list-style-type: none"> • SCN-V088 • SCN-V099 • SCN-V071 • SCN-V072
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
10. *	7. <u>Place</u> 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):			



**2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE**

	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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



**2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
1	08/29/2013	3, 6	Updated to Revision 78 of Standard Appendix and updated format for 2013 NRC Exam

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC S-2
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

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 has directed you to reduce Steam Generator #1 level to 50% Narrow Range using Standard Appendix 33**

CANDIDATE



**2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE**

1. SIMULATOR SETUP:

- IC#: 143 (When run with 2013 NRC S-4) **-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** (N₂ 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. INSERT manual Containment Isolation and HPSI B SESS alarms
 10. GO TO FREEZE
 11. Provide **INITIATING CUE**
 12. 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
 - Manual Containment Isolation and HPSI B SESS alarms are inserted
 - Radio is staged and communications tested with Driver's Booth



**2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE**

- 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
1	IF Examinee requests status of personnel clear of HPSI B: “Everyone is clear of HPSI B pump and switchgear”	NOTE: Communications may be provided by Evaluator
4	IF Examinee requests status of HPSI B seal leakage: “Only a dripping seal with NO indication of unusual leakage at HPSI pump B”	NOTE: Communications may be provided by Evaluator
6	IF Examinee requests status of HAB-Z01: “HAB-Z01 is running with no issues”	NOTE: Communications may be provided by Evaluator
8 *	WHEN directed to throttle open SIB-UV-667 INSERT KEY 8 IRF crMVSI01SIBUV667_9 f:40 r:120 k:8 “SIN-FI-300 is reading approximately 680 gpm”	Throttles open SIB-UV-667 to achieve required flowrate from HPSI B
10	IF Examinee requests to unlock SIB-V400: “SIB-V400 is unlocked”	NOTE: Communications may be provided by Evaluator
11 *	WHEN directed to throttle open SIB-V400 INSERT KEY 11 IRF rfSI05 f:5 k:11 “SIB-V400 is throttled slightly open”	Throttles open SIB-V400. Examinee may direct adjustment of valve once SIT filling begins
12	IF Examinee directs operator to verify open SIE-V220: “ SIE-V220 has been verified open”	NOTE: Communications may be provided by Evaluator



2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE

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:

- 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
- Manual HPSI B and Containment Isolation SESS alarms have been inserted
- 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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE**

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 <u>Start</u> 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. Driver MAY also act as Area Operator for communications	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 <u>Verify</u> ALL of the following expected responses: <ul style="list-style-type: none"> • 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):			



**2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
3.	6.3.5.28 IF anomalous HPSI Pump indications are observed, THEN <u>perform</u> 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 <u>Inspect</u> 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 Driver MAY also act as Area Operator for communications	Examinee directs Area Operator to inspect HPSI pump B seals for leakage

SAT / UNSAT

Comments (required for UNSAT):



**2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE**

	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: <ul style="list-style-type: none"> • 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 Driver MAY also act as Area Operator for communications	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):			



**2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
8. *	6.3.5.33 <u>Throttle</u> 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: <ul style="list-style-type: none"> • Driver action is REQUIRED • Expected indication is for HPSI pump B discharge pressure to lower • Driver WILL act as Area Operator for communications • Local flow will be ~680 gpm 	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 <u>Open</u> 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 <u>Unlock</u> SIB-V400, SIT Fill and Drain Isolation Valve HPSI Recirc, per 40AC-0ZZ06, Locked Valve, Breaker and Component Control	Information CUE: SIB-V400 has been unlocked per 40AC-0ZZ06 Driver MAY also act as Area Operator for communications	Examinee directs Area Operator to unlock SIB-V400
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
11. *	6.3.5.36 <u>Throttle</u> open SIB-V400, SIT Fill and Drain Isolation Valve HPSI Recirc, slowly to control SIT fill rate	Evaluator NOTE: Driver action is REQUIRED Driver WILL act as Area Operator for communications	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 <u>open</u> the SIT Fill & Drain Manual Isolation Valve for the SIT to be filled: <ul style="list-style-type: none"> • SIE-V220, SIT "2B" Fill & Drain Header Manual Isol Valve 	If requested CUE: SIE-V220 has been verified open Driver MAY act as Area Operator for communications	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):



**2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
13.	6.3.5.38 IF the unit is in MODES 1 through 4, THEN <u>record</u> 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 <u>Open</u> the SIT Fill & Drain Valve for the SIT to be filled: <ul style="list-style-type: none"> • 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):			



**2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
15. *	6.3.5.40 <u>Monitor</u> level of the SIT being filled: Narrow Range: <ul style="list-style-type: none"> • SIN-LI-313 R) SIT 2B LEVEL, LT-323 Wide Range: <ul style="list-style-type: none"> • SIB-LI-311 R) SIT 2B LEVEL, LT-321 	AFTER level has increased by ~5% and SIB-UV-621 is CLOSED, Inform CUE: Another operator will complete the remaining actions Driver Action required at this point to STOP filling SIT	Examinee monitors SIT 2B level indication on SIN-LI-313 and 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



**2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
0	05/21/2013	3, 6	Updated for Revision 35 of 40OP-9SI03; Updated format for 2013 NRC Exam

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC S-3
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

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
- Manual HPSI B and Containment Isolation SESS alarms have been inserted
- 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.

CANDIDATE



**2013 NRC S-4
PVNGS JOB PERFORMANCE MEASURE**

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
 - 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
- 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



2013 NRC S-4
PVNGS JOB PERFORMANCE MEASURE

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:

- The plant is operating at 100% power and you have just received low flow alarms on NCW to the RCPs due to a Containment Isolation valve closing.
- The CRS has entered 40AO-9ZZ03, Loss of Cooling Water.

INITIATING CUE:

- The CRS has directed 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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC S-4
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1.	<u>Enter</u> 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 <u>perform</u> the following within 10 minutes of the initial loss: <ul style="list-style-type: none"> • <u>Restore</u> cooling water to all operating RCP(s). • IF cooling water cannot be restored, THEN <u>perform</u> the following: <ul style="list-style-type: none"> • <u>Ensure</u> the Reactor is tripped. • <u>Stop</u> all of the RCPs. • <u>Isolate</u> controlled bleedoff. • <u>PERFORM</u> the appropriate procedure for current plant conditions. 		Examinee determines Seal Injection is in service.
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC S-4
PVNGS JOB PERFORMANCE MEASURE**

	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 <u>perform</u> the following: <ul style="list-style-type: none"> • <u>Start</u> the standby NC Pump. • <u>Check</u> that no NC system leaks exist by performing the following: <ul style="list-style-type: none"> • <u>Direct</u> an operator(s) to walkdown NC system piping. • <u>Evaluate</u> 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):			



**2013 NRC S-4
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
6.	<p>IF ANY of the NC Containment Isolation Valves have failed closed, AND there is NOT a valid CSAS signal present, THEN <u>perform</u> the following:</p> <ul style="list-style-type: none"> • <u>Open ANY</u> closed isolation valves. • Evaluate Tech Spec 3.6.3, <u>Containment Isolation Valves.</u> 	<p>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”.</p> <p>Information CUE: If examinee communicates to CRS to evaluate Tech Spec 3.6.3, inform that CRS is evaluating the Tech Spec.</p>	<p>Examinee recognizes that valve NCB-UV-403 has closed. Examinee will attempt to open by rotating NCB-HS-403 to the OPEN position.</p> <p>Examinee may contact AO to enter containment and open NCB-UV-403 locally.</p> <div align="center" style="background-color: #cccccc; padding: 10px;">ALTERNATE PATH</div>
<p>SAT / UNSAT Comments (required for UNSAT):</p>			



**2013 NRC S-4
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
7. *	<p>IF ANY of the NC Containment Isolation Valves will NOT open, THEN <u>perform</u> the following:</p> <ul style="list-style-type: none"> • <u>Close</u> all NC CTMT Isolation Valves. • <u>Ensure</u> that the Reactor is tripped. • <u>Stop</u> all of the RCPs. • <u>Isolate</u> seal bleedoff. • <u>GO TO</u> the appropriate procedure for the current plant conditions. 	<p>IF requested CUE: If examinee requests guidance from CRS respond “What actions do you recommend?”</p> <p>Inform CUE: Concur with response if examinee states to CRS he/she is performing actions of step 5.a.1.</p> <p>Inform CUE: After the reactor is tripped, other ROs will perform the SPTAs.</p> <p>Inform CUE: After bleedoff is isolated, another operator will complete 40AO-9ZZ03 actions.</p>	<p>Examinee may request concurrence from CRS to perform contingency actions.</p> <p>Examinee closes remaining NCW CTMT isolation valves by rotating handswitches NCA-HS-402 and NCB-HS-401 to the CLOSE position.</p> <p>* Examinee trips the reactor by depressing reactor trip pushbuttons on Board B05.</p> <p>* Examinee trips ALL RCPs by rotating RCP handswitches RCN-HS-1/2/3/4 to the OFF position.</p> <p>* Examinee isolates seal bleedoff by rotating handswitches RCN-HS-430/431/432/433 to the CLOSE position.</p> <p>STOP TIME: _____</p> <p>Evaluator NOTE: CRITICAL STEPS denoted by * JPM must be completed within 10 minutes of time recorded in STEP 1.</p>
<p>SAT / UNSAT Comments (required for UNSAT):</p>			

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



**2013 NRC S-4
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
003	06/28/2012	3, 6	Rev. 7 of 40AO-9ZZ03 and new JPM format
004	08/15/2013	6	Revised to 2013 NRC Exam format

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC S-4
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

INITIAL CONDITIONS:

- The plant is operating at 100% power and you have just received low flow alarms on NCW to the RCPs due to a Containment Isolation valve closing.
- The CRS has entered 40AO-9ZZ03, Loss of Cooling Water.

INITIATING CUE:

- The CRS has directed you to perform the actions of section 4 of 40AO-9ZZ03, Nuclear Cooling Water.

THIS IS A TIME Critical JPM

CANDIDATE



**2013 NRC S-5
PVNGS JOB PERFORMANCE MEASURE**

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.
- 41AL-1RK1A, Panel B01A Alarm Responses, Revision 54 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

STEP	COMMAND/COMMUNICATION	DESCRIPTION
N/A		No driver action required



2013 NRC S-5
PVNGS JOB PERFORMANCE MEASURE

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:

- 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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC S-5
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1. *	40OP-9NA03 Step 4.8.3.1 <u>Turn</u> 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 <u>Close</u> 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 is illuminated
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC S-5
PVNGS JOB PERFORMANCE MEASURE**

	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: Unit 1 OSCG OPERATED/TRBL 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 <u>Turn</u> 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):



**2013 NRC S-5
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
6.	Step 4.8.3.6 <u>Perform</u> 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 does not perform Appendix D

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
7. *	Step 4.9.3.1 <u>Turn</u> 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 is illuminated

SAT / UNSAT

Comments (required for UNSAT):



**2013 NRC S-5
PVNGS JOB PERFORMANCE MEASURE**

	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 <div style="background-color: #cccccc; padding: 5px; text-align: center;">ALTERNATE PATH</div>
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
10.	Acknowledges B01 alarm and references 41AL-1RK1A, Panel B01A Alarm Responses, Window 1A18B Group A		Examinee acknowledges B01 Alarms and opens 41AL-1RK1A to Window 1A18B Group A
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC S-5
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
11. *	41AL-1RK1A Window 1A18B Group A: Step 2 IF the running breaker did not trip automatically when the oncoming breaker control switch was returned to the normal position, THEN <u>trip</u> the running breaker	If Requested CUE: If examinee requests to open NAN-S04B, “CRS directs you to open NAN-S04B.”	Examinee rotates NAN-HS-S04B to the “TRIP” position Verifies RED close light extinguishes and GREEN trip light illuminates 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 <u>Check</u> 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):



**2013 NRC S-5
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
13.	Step 4.9.3.5 <u>Turn</u> 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 <u>Perform</u> 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 does 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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



**2013 NRC S-5
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
1	04/16/2009	6	Reformatted to new template and rewrote note
2	08/29/2013	3, 6	Updated JPM format. Updated for latest revisions of Operating and Alarm Response Procedures.

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC S-5
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

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**

CANDIDATE



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

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: 06/13/2013

Revised By: N/A Date: _____

Technical Review _____ Operations Approval _____

EP Review N/A Training Approval _____

(Only required for Emergency Plan JPMs)

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.



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

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.
- 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



2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE

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:

- 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:

- 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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1.	Step 6.1.1 Initial Condition: Section 5.0, Prerequisites and Initial Conditions is 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 <u>Ensure</u> Control Element Drive Mechanism (CEDMCS) is in any mode other than AUTO	If Requested CUE: If examinee requests what mode to place CEDMCS, report "The CRS directs you to place CEDMCS in Manual Sequential."	Examinee rotates CEDMCS Mode Select switch to any position that is NOT AUTO SEQUENTIAL
SAT / UNSAT Comments (required for UNSAT):			

NOTE
Performance of the following step will result in the actuation of alarm windo 6A06A, FWCS PROCESS TRBL.



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
3. *	<p>Step 6.1.3</p> <p><u>Place</u> Reactor Power Control Channel #1 in maintenance on the Feedwater Control System (FWCS) by performing the following:</p> <ul style="list-style-type: none"> • <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 #2 (NI0002) value displayed represents the normal value for the current power. • <u>Select</u> the white “1 MAINT” key in the upper right corner of the Reactor Power Module. • <u>Observe</u> BOTH of the following: <ul style="list-style-type: none"> • 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. • <u>Verify</u> the expected alarm for Reactor Power Control Channel #1 in maintenance is in alarm on the Process Alarm Manager Screen. 		<p>Examinee performs the following:</p> <p>* <u>Selects</u> XMTR_SEL_1 display on FWCS display</p> <p><u>Verifies</u> Reactor Power Control Channel #2 is reading the current reactor power</p> <p>* <u>Selects</u> the white 1 MAINT key in the upper right corner of the Reactor Power Module</p> <p><u>Observes</u> the 1 MAINT key changes to red and a blue STAR is alongside Reactor Power Control Channel #2</p> <p>(Only steps with an * are CRITICAL)</p>

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.



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
4. *	<p>Step 6.1.4</p> <p>Place Reactor Power Control Channel #1 in maintenance on the Reactor Regulating System (RRS) by performing the following:</p> <ul style="list-style-type: none"> • <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 ϕN2 DVM push-button for Reactor Power Control Channel #2. • <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 BOTH</u> of the following: <ul style="list-style-type: none"> • <u>Notify</u> the SM/CRS. • WHEN SM/CRS directs, THEN continue performing this section. • <u>Position</u> the ϕN Input Selector Switch to ϕN2 for Reactor Power Control Channel #2. 	<p>IF Requested CUE:</p> <p>If examinee determines that DVM value displayed for Control Channel #2 is outside the expected range for the current power (not expected):</p> <p>Report “The Shift Manager directs you to continue performing this section.”</p>	<p>Examinee performs the following:</p> <p><u>Ensures</u> TEST PROBE push-button is depressed and verifies DVM panel indicates 0 Volts</p> <p><u>Presses</u> the ϕN2 DVM push-button and verifies DVM panel indicates ~8 Volts</p> <p><u>Presses</u> the TEST PROBE push-button and verifies DVM panel indicates 0 Volts</p> <p>* <u>Positions</u> the ϕN Input Selector Switch to ϕN2 position</p> <p>(Only steps with an * are CRITICAL)</p>

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



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

	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.		Examinee <u>ensures</u> the Control Calibrate switch on Control Channel #1 is in the OPERATE position

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



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
7. *	<p>Step 6.1.7</p> <p><u>Adjust</u> the Control Gain potentiometer on Control Channel #1 in the Nuclear Instrumentation Start-Up and Control Drawer as follows:</p> <ul style="list-style-type: none"> • IF calorimetric power is equal to or greater than 30%, THEN <u>adjust</u> the Control Power meter indication using the Control Gain potentiometer to within 2% of calorimetric power. 		<p>Examinee <u>rotates</u> Control Gain potentiometer on Control Channel #1 to match Control Power meter indication to calorimetric power</p> <p>(within 2% of JSCALOR)</p>
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>			

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.



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
8. *	<p>Step 6.1.8</p> <p><u>Remove</u> Reactor Power Control Channel #1 from maintenance on the RRS by performing the following:</p> <ul style="list-style-type: none"> • <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: <ul style="list-style-type: none"> • <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. 	<p>IF Requested CUE:</p> <p>If examinee determines that DVM value displayed for Control Channel #2 is outside the expected range for the current power (not expected):</p> <p>Report “The Shift Manager directs you to continue performing this section.”</p> <p>NOTE:</p> <p>Selecting AVERAGE while the ϕN DEVIATION LED is lit will generate an Auto Motion Inhibit (AMI).</p>	<p>Examinee performs the following:</p> <p><u>Ensures</u> TEST PROBE push-button is depressed and verifies DVM panel indicates 0 Volts</p> <p><u>Presses</u> the ϕN1 DVM push-button and verifies DVM panel indicates ~8 Volts</p> <p><u>Presses</u> the TEST PROBE push-button and verifies DVM panel indicates 0 Volts</p> <p>* <u>Positions</u> the ϕN Input Selector Switch to AVERAGE position</p> <p>(Only steps with an * are CRITICAL)</p>

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



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
9. *	<p>Step 6.1.9</p> <p><u>Remove</u> Reactor Power Control Channel #1 in maintenance on the Feedwater Control System (FWCS) by performing the following:</p> <ul style="list-style-type: none"> • <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: <ul style="list-style-type: none"> • 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. 		<p>Examinee performs the following:</p> <p>* <u>Selects</u> XMTR_SEL_1 display on FWCS display</p> <p><u>Verifies</u> Reactor Power Control Channel #1 is reading the current reactor power</p> <p>* <u>Selects</u> the white 1 MAINT key in the upper right corner of the Reactor Power Module</p> <p><u>Observes</u> the 1 MAINT key changes to white</p> <p>*<u>Selects</u> SEL AVG key for Reactor Power Control Average</p> <p><u>Observes</u> SEL AVG changes from white to green, and a blue STAR is alongside Reactor Power Control Channel AVG</p> <p>(Only steps with an * are CRITICAL)</p>

SAT / UNSAT

Comments (required for UNSAT):



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

	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
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



**2013 NRC S-6
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
1	06/13/2013	6	Record Created

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



CANDIDATE

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)**

CANDIDATE



**2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE**

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: 06/13/13

Technical Review _____ Operations Approval _____

EP Review N/A Training Approval _____

(Only required for Emergency Plan JPMs)

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.



**2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE**

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. Run scenario file **2013 NRC S-7.scn** from exam flash drive
 4. Close CHE-HV-532 using **CHN-HS-532**
 5. Silence alarms, GO TO FREEZE
 6. Provide **INITIATING CUE**
 7. GO TO RUN
- REQUIRED CONDITIONS:
 1. Unit is in Mode 5
 2. Caution tags hanging for SI 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.
- 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, <u>INSERT KEY 7</u>	Resets 86 lockout on HPSI B which is tripped for current plant conditions.



2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE

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:

- 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:

- 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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1.	Section 3.0 Step 1 <u>Enter</u> AOP Entry Time and Date		Examinee records current time and date
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
2.	Step 2 <u>Check</u> that BOTH of the following are available for Emergency Boration: <ul style="list-style-type: none"> • The RWT • At least one Charging Pump 	Evaluator NOTE: Steps 3.3 and 3.4 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):			



**2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
3.	<p>Step 5</p> <p>IF Charging Pump suction will be aligned thru CHE-HV-536, Gravity Feed to Charging Pumps Suction, THEN <u>perform</u> the following:</p> <p>a. <u>Ensure</u> that CHE-HV-532, RWT to Boric Acid Makeup Pumps, is open...</p>	<p>Information CUE:</p> <p>After the examinee reports that Charging Pump A has tripped:</p> <p>“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.”</p> <p>If Requested CUE</p> <p>If examinee directs Area Operator to investigate the charging pump trip report “Charging Pump A has an 86 lockout relay tripped.”</p>	<p>Examinee rotates CHN-HS-532 to the OPEN position</p> <p>Evaluator NOTE:</p> <p>Charging Pump A will trip when CHE-HV-532 is open</p> <p align="center">ALTERNATE PATH</p>

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
4.	<p>Step 2 (Examinee must return here)</p> <p>Re-evaluate Step 2. With no charging pumps available, must take Contingency Actions:</p> <p>2.2 IF a HPSI Pump is available, THEN GO TO Section 4.0, <u>HPSI PUMP</u>.</p>	<p>Information CUE:</p> <p>AFTER examinee determines Section 4.0 is needed, give examinee 40AO-9ZZ01, Section 4.0 and report “The CRS directs using B HPSI Pump.”</p>	<p>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.</p>

SAT / UNSAT

Comments (required for UNSAT):



**2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
5.	Section 4.0 Step 1 <u>Enter</u> AOP Entry Time and Date		Examinee enters AOP Entry Time and Date
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
6.	Step 2 <u>REFER TO</u> Appendix F, <u>Simplified Drawings</u> for a basic flow view		Examinee MAY refer to Appendix F
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
7.	Steps 3-5 <u>Check</u> the following: <ul style="list-style-type: none"> • HPSI Pump breaker is racked in • HPSI Pump lockout relay is reset • HPSI Pump UC fuses are “ON” 	<p>If Requested CUES:</p> <p>If examinee directs Area Operator to report status of HPSI B Pump breaker report:</p> <p>“HPSI B Pump breaker is racked in, the 86 lockout relay is tripped.”</p> <p>If examinee directs Area Operator to reset HPSI B Pump 86 lockout, <u>DIRECT</u> Driver to insert KEY 7</p> <p>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, and the UC fuses are ON.”</p> <p>Evaluator NOTE:</p> <p>Step 6 is not applicable since HPSI B pump will be used</p>	<p>Examinee determines that HPSI B Pump breaker is racked in and the 86 lockout is tripped by one of the following:</p> <ul style="list-style-type: none"> • White SEIS light • Brighter than normal green light indication on HS • Directing AO to report local indication <p>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</p> <p>Examinee determines that UC fuses are ON by one of the following:</p> <ul style="list-style-type: none"> • Normal green light indication on HS • Directing AO to report local indication
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>			



**2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
8.	<p>Step 7</p> <p>IF HPSI Pump B will be used for emergency boration, THEN <u>perform</u> the following:</p> <p><u>Ensure</u> all of the following valves are closed:</p> <ul style="list-style-type: none"> • 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. • All Train 'B' HPSI Cold Leg Injection Valves. 		<p>Examinee rotates SIB-UV-665 to the CLOSE position and observes the GREEN indication illuminate and RED indication extinguish.</p> <p>Remaining valves are verified CLOSED</p>
	<p><u>Ensure</u> ALL of the following valves are open:</p> <ul style="list-style-type: none"> • 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. 		<p>Examinee verifies these valves are OPEN</p>
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>			



**2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
9. *	Step 8 <u>Start</u> 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): <ul style="list-style-type: none"> • 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 <u>Throttle</u> open one of the HPSI Cold Leg Injection Valves as appropriate to obtain 75 gpm or more.	Information CUE: WHEN flow \geq75gpm 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: <ul style="list-style-type: none"> • 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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



**2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
1	04/18/2008	3	Upgraded for revision of 40AO-9ZZ01
2	06/13/2013	3, 6	Updated JPM to Revision 21 of 40AO-9ZZ01. Updated to 2013 NRC Exam format.

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC S-7
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

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.**

CANDIDATE



**2013 NRC S-8
PVNGS JOB PERFORMANCE MEASURE**

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 THEN, 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, start West Containment Sump Pump P03 using RDN-HS-17, 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 the standby sump pump, **DELETE** malfunction **mfTH07**
 5. **AFTER** Reactor Cavity Sump Pump Excess Runtime alarm comes in (may manually insert annunciator), silence alarms, **GO TO FREEZE**
 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 standby sump pump
 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)



**2013 NRC S-8
PVNGS JOB PERFORMANCE MEASURE**

2. SPECIAL TOOLS/EQUIPMENT:

- 40AL-9RK7B, Panel B07B Alarm Response, 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

STEP	COMMAND/COMMUNICATION	DESCRIPTION
N/A		No driver action required

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:

- **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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC S-8
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1.	Obtain procedure 40AL-9RK7B		Examinee obtains 40AL-9RK7B and identifies Point ID RDYS2 in alarm window. 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 ANY</u> of the following sump levels on B07: <ul style="list-style-type: none"> • RDN-LI-10, Reactor Cavity sump level indicator • RDN-LI-410, Containment Radwaste sump level indicator 		Examinee determines that a high level exists in both radwaste sumps and that only the West Sump Pump is running.
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
3. *	Step 2: <u>Ensure BOTH</u> of the following valves are open: <ul style="list-style-type: none"> • RDA-HS-23, CNMT Sumps Inside Isolation valve • RDB-HS-24, CNMT Sumps Outside Isolation vavle 		Examinee opens RDB-HS-24 by rotating handswitch to the OPEN position.
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC S-8
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
4. *	Step 3: <u>Start</u> the related standby sump pump for the affected sump... <u>Containment Radwaste Sump East</u> 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: <u>Check</u> sump level is decreasing. <ul style="list-style-type: none"> • RDN-LI-10, Reactor Cavity sump level indicator • 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



**2013 NRC S-8
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
1	04/18/2008	3	Upgraded for revision of 40AO-9ZZ01
2	06/14/2013	3, 6	Updated JPM to Revision 21 of 40AO-9ZZ01. Updated to 2013 NRC Exam format.

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC S-8
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

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.**

CANDIDATE



**2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE**

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	<input checked="checked" type="checkbox"/>	PLANT	<input type="checkbox"/>	OTHER	<input type="checkbox"/>	

JPM TYPE

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

APPROVAL

Developed By: Adam Rasmussen Date: 05/28/2013

Revised By: N/A Date:

Technical Review Operations Approval

EP Review N/A Training Approval
 (*Only required for Emergency Plan JPMs*)

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.



**2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE**

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.
- This JPM may be used with later revisions if it is verified that the later revision does not affect this JPM.



**2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE**

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:

- 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 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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE**

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.	<p>IF the Unit is shutdown and this surveillance is not current, THEN <u>verify</u> the operability of all full strength CEAs prior to entering MODE 2 as follows:</p> <p>Step 8.3.1</p> <p><u>Ensure</u> the SDM requirements of LCO 3.1.2 are maintained</p>	<p>If Requested CUE:</p> <p>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</p> <p>Evaluator NOTE:</p> <p>This information is also found in the INITIAL CONDITIONS</p>	<p>Examinee either refers to INITIAL CONDITIONS or requests SDM evaluation and either circles or initials step</p>

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
2.	<p>Step 8.3.2</p> <p><u>Ensure</u> both Shutdown Groups have been fully withdrawn in accordance with 40OP-9ZZ03, Reactor Startup</p>		<p>Examinee verifies Shutdown Groups are fully withdrawn and initials step</p>

SAT / UNSAT

Comments (required for UNSAT):



**2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE**

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 <u>Record</u> 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, <u>monitor</u> at least the following parameters: <ul style="list-style-type: none"> • Rate of Change of Reactor Power • CEA individual and group positions • RCS temperature and Reactor Power • CEA positions and deviations 		Examinee circles or initials steps
CAUTION:			
An unintentional criticality could occur anytime CEAs are withdrawn.			
	<u>Monitor</u> ALL available nuclear instrumentation during CEA movement for indication of possible abnormalities IF the Reactor goes critical, THEN <u>perform</u> BOTH of the following steps <u>simultaneously</u> : <ul style="list-style-type: none"> • <u>Manually trip</u> the reactor • <u>Initiate</u> Emergency Boration IF a CEA drops, slips, or becomes misaligned > 6.6 inches between all other CEAs in its group, THEN : <ul style="list-style-type: none"> • <u>Ensure</u> the Rx remains subcritical • <u>Restore</u> the CEA per 40AO-9ZZ11, CEA Malfunctions 		
SAT / UNSAT			
Comments (required for UNSAT):			



**2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE**

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 <u>Exercise</u> each Regulating Groups 4 and 5 CEA by performing ALL of the following (Use Appendix C for place keeping): Step 8.3.8.1 <u>Select</u> 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 <u>Place</u> 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):



**2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
7. *	Step 8.3.8.3 <u>Place</u> 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 <u>Place</u> 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 <u>Ensure</u> 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 <u>Withdraw</u> 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):			



**2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
11. *	Step 8.3.8.7 <u>Insert</u> 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 <u>Record</u> 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 <u>Ensure</u> 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):			



**2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
14. *	Step 8.3.8.3 Place Individual CEA Select switch to MI position	Examiner NOTE: When next CEA is selected, this will trigger uncontrolled outward CEA motion	Examinee rotates Individual Select switch 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 all four Manual Reactor Trip pushbuttons
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



**2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
0	05/28/2013	6	JPM Created

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC S-9
PVNGS JOB PERFORMANCE MEASURE

CANDIDATE

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**

CANDIDATE



2013 NRC P-1
PVNGS JOB PERFORMANCE MEASURE

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-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:

- **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.**



**2013 NRC P-1
PVNGS JOB PERFORMANCE MEASURE**

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. It shall be terminated when the Examinee has verbalized completion of 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.



**2013 NRC P-1
PVNGS JOB PERFORMANCE MEASURE**

JPM START TIME:

	STEP	CUE	STANDARD
1.	<p>Step 1:</p> <p>Check that the closing spring indicator for breaker PBA-S03S, "AUX FEEDWATER PUMP M-AFN-P01" indicates "CHGD".</p>	<p>IF Requested CUE:</p> <p>IF examinee requests status of lights on the panel front, report "There are no lights illuminated on the panel front."</p> <p>Information CUE: AFTER examinee locates PBA-S03S, provide examinee with breaker pictures (Attached)</p> <p>WHEN examinee observes the charging spring indicator, report "Closing springs DO NOT indicate charged."</p>	<p>Evaluator NOTE: Examinee SIMULATES opening the cubicle. Examinee will explain operation of components inside the cubicle.</p> <p>Examinee simulates observing the closing spring indicator</p> <p>Evaluator NOTE: Charging spring indicator is located in the middle left side of cubicle.</p> <p>Because the springs are not charged, examinee must take contingency actions</p> <p align="center">ALTERNATE PATH</p>
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>			



**2013 NRC P-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
2. *	Contingency Step 1.1: <u>Perform</u> the following: a. <u>Obtain</u> ALL of the following equipment from FPN-C02, "EMERGENCY EQUIPMENT CABINET." <ul style="list-style-type: none"> • 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. <u>Open</u> 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):			



**2013 NRC P-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
4. *	c. Manually <u>charge</u> 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. <u>Close</u> 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: <u>Press</u> 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):



**2013 NRC P-1
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
7.	Step 3: <u>Check</u> 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: <u>Inform</u> 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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



**2013 NRC P-1
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
003	04/24/2008	6	JPM format change
004	08/29/2013	3, 6	Updated to current revision of 40EP-9EO10. Updated JPM format for 2013 NRC Exam.

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC P-1
PVNGS JOB PERFORMANCE MEASURE

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.**



**2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE**

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: 07/03/2013

Technical Review _____ Operations Approval _____

EP Review N/A Training Approval _____

(Only required for Emergency Plan JPMS)

EVALUATION

Date:

Examinee Name: _____

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.*



2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE

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-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:

- **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 has directed 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 has been granted to break 40AC-0ZZ06 locks as required.**



**2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE**

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. It shall be terminated when the Examinee has verbalized completion of 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.



2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE

JPM START TIME:

	STEP	CUE	STANDARD
1.	Step 1: <u>Ensure</u> 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: <u>Ensure</u> 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: <u>Close</u> NCB-HCV-265, “NC WATER OUTLET OF FP HXB.”	Evaluator NOTE: Valve is located in Fuel Bldg. 100' at PC Heat Exchanger B. Information CUE: AFTER examinee simulates rotating valve in clockwise direction: “NCB-HCV-265 has been rotated in the clockwise direction and has stopped moving.”	Examinee simulates rotating NCB-HCV-265 in the clockwise direction.
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE**

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. <u>Close</u> NCB-HCV-245, "NC ISOLATION TO SFP HEAT EXCHANGER."	Information CUE: <ul style="list-style-type: none"> • "NCB-HCV-245 stem lock is loosened and ZZ06 lock is broken." • NCB-HCV-245 has been rotated in the clockwise direction and has stopped moving." • "The position indication pointer is indicating closed." 	Examinee simulates loosening valve stem lock. Examinee simulates rotating NCN-HCV-245 in the clockwise direction. Evaluator NOTE: Valve is located in EW Heat Exchanger B room.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
5. *	Step 4: b. <u>Close</u> NCB-HCV-259, "NC ISOLATION FROM SFP HEAT EXCHANGER."	Information CUE: <ul style="list-style-type: none"> • "NCB-HCV-259 stem lock is loosened and ZZ06 lock is broken." • "NCB-HCV-259 has been rotated in the clockwise direction and has stopped moving." • "The position indication pointer is indicating closed." 	Examinee simulates loosening valve stem lock. Examinee simulates rotating NCN-HCV-259 in the clockwise direction. Evaluator NOTE: Valve is located in EW Heat Exchanger B room.

SAT / UNSAT

Comments (required for UNSAT):



**2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
6. *	Step 4: c. <u>Unlock</u> and <u>open</u> EWB-HCV-68, “EW ISOLATION FROM SFP HEAT EXCHANGER.”	Information CUE: UNIT 3 ONLY: <ul style="list-style-type: none"> • “EWB-HCV-68 stem lock is loosened and ZZ06 lock is broken.” • “EWB-HCV-68 has been rotated in the counter-clockwise direction and has stopped moving.” • “The position indication pointer is indicating open.” 	UNIT 3 ONLY: Examinee simulates loosening valve stem lock. Examinee simulates unlocking and rotating EWB-HCV-68 in the counter-clockwise direction. Evaluator Note: Valve is located in EW heat exchanger B room.

SAT / UNSAT

Comments (required for UNSAT):

	STEP	CUE	STANDARD
7. *	Step 4: d. <u>Unlock</u> and <u>open</u> EWB-HCV-134, “EW ISOLATION TO SFP HEAT EXCHANGER.”	Information CUE: <ul style="list-style-type: none"> • “EWB-HCV-134 stem lock is loosened and ZZ06 lock is broken.” • “EWB-HCV-134 has been rotated in the counter-clockwise direction and has stopped moving.” • “The position indication pointer is indicating open.” 	Examinee simulates loosening valve stem lock. Examinee simulates unlocking and rotating EWB-HCV-134 in the counter-clockwise direction. Evaluator NOTE: Valve is located in EW Heat Exchanger B room.

SAT / UNSAT

Comments (required for UNSAT):



**2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
8.	<p>Step 5:</p> <p><u>Direct</u> an operator to perform the following to override and open EWB-PCV-174, "REFRIGERANT HEAD PRESSURE CONTROL VALVE":</p> <p><u>Turn</u> the Pilot Bypass Stem in the fully counter clockwise position.</p>	<p>Information CUE:</p> <p>"Another operator has overridden and opened EWB-PCV-174."</p>	<p>Examinee simulates calling another operator or Control Room to have EWB-PCV-174 opened.</p>
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>			



**2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
9. *	<p>Step 6: Place NCN-FI-257, "FUEL POOL HEAT EXCH B NCWS OUTLET FLOW" into service by performing the following:</p> <p>a. <u>Ensure</u> the local equalizing valve is open.</p> <p>b. <u>Open</u> NCB-V113, "ROOT VLV TO FI 257."</p> <p>c. <u>Open</u> NCB-V114, "ROOT VLV TO FI 257."</p> <p>d. <u>Open</u> the local low side isolation valve.</p> <p>e. <u>Close</u> the equalizing valve.</p> <p>f. Slowly <u>open</u> the local high side isolation valve.</p> <p>g. <u>Verify</u> NCN-FI-257 comes on scale.</p>	<p>Information CUE: "Equalizing valve has been rotated counter-clockwise"</p> <p>"NCB-V113 has been rotated counter-clockwise and has stopped moving."</p> <p>"NCB-V114 has been rotated counter-clockwise and has stopped moving."</p> <p>"Local low side isolation has been rotated in the counter-clockwise direction and has stopped moving."</p> <p>"Equalizing valve has been rotated clockwise and has stopped moving."</p> <p>"Local high side isolation valve has been rotated counter-clockwise and has stopped moving."</p> <p>If requested CUE: IF steps followed correctly: "Flow is currently reading 1300 gpm on NCN-FI-257"</p>	<p>Examinee simulates placing flow meter in service. Steps must be performed in order listed to meet STANDARD.</p> <p>Examinee simulates rotating equalizing valve counter-clockwise.</p> <p>Examinee simulates rotating NCB-V113 counter-clockwise.</p> <p>Examinee simulates rotating NCB-V114 counter-clockwise.</p> <p>Examinee simulates rotating local low side isolation valve counter-clockwise.</p> <p>Examinee simulates rotating equalizing valve clockwise.</p> <p>Examinee simulates rotating local high side isolation valve counter-clockwise.</p> <p>Examinee simulates reading NCN-FI-257.</p>

SAT / UNSAT

Comments (required for UNSAT):



**2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
10. *	Step 7: h. <u>Adjust</u> NCB-HCV-265, "NC WATER OUTLET OF FP HX B" to obtain 1400-2400 gpm.	Information CUE: After examinee simulates rotating valve counter-clockwise: "NCN-FI-257 reads 1700 gpm. 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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



**2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
006	03/12/2009	6	JPM format change
007	07/03/2013	3, 6	Updated to current revision of 40EP-9EO10. Updated JPM format for 2013 NRC Exam.

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



2013 NRC P-2
PVNGS JOB PERFORMANCE MEASURE

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 has directed 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 has been granted to break 40AC-0ZZ06 locks as required.**



**2013 NRC P-3
PVNGS JOB PERFORMANCE MEASURE**

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: 07/05/2013

Technical Review _____ Operations Approval _____

EP Review N/A Training Approval _____

(Only required for Emergency Plan JPMS)

EVALUATION

Date: _____

Examinee Name: _____

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.*



2013 NRC P-3
PVNGS JOB PERFORMANCE MEASURE

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:

- 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 Steam Generator Tube Leak is in progress.**

INITIATING CUE:

- **The CRS has directed 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. It shall be terminated when the Examinee has verbalized completion of 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.



2013 NRC P-3
PVNGS JOB PERFORMANCE MEASURE

JPM START TIME:

	STEP	CUE	STANDARD
1.	Step 1: <u>Enter</u> Appendix Entry Time and Date:		Examinee records current time and date
SAT / UNSAT Comments (required for UNSAT):			

	STEP	CUE	STANDARD
2. *	Step 2: <u>Align</u> the Turbine Building Sump by performing the following: a. <u>Unlock</u> and <u>open</u> OWN-V022, "TURBINE BUILDING SUMPS TO LRS SYSTEM HEADER ISOLATION VALVE." b. <u>Close</u> OWN-V021, "TURBINE BUILDING SUMPS TO OW SEPARATOR HDR ISOLATION VALVE."	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):			



**2013 NRC P-3
PVNGS JOB PERFORMANCE MEASURE**

	STEP	CUE	STANDARD
3. *	Step 3: <u>Align</u> the South Condenser Area Sump by performing the following: a. <u>Unlock</u> and <u>open</u> OWN-V033, "S CONDENSER AREA SUMPS TO LRS SYSTEM HEADER ISOL VALVE." b. <u>Close</u> OWN-V029, "S CONDENSER AREA SUMPS TO SEPERATOR HEADER ISOL VAVLE."	Information CUE: "OWN-V033 has been rotated counter-clockwise and is no longer moving." "OWN-V029 has been rotated clockwise and is no longer moving."	Examinee locates and simulates unlocking and opening OWN-V033 by rotating handwheel counter-clockwise Examinee locates and simulates closing OWN-V029 by rotating handwheel clockwise
SAT / UNSAT Comments (required for UNSAT):			



**2013 NRC P-3
PVNGS JOB PERFORMANCE MEASURE**

STEP	CUE	STANDARD
<p>4.</p> <p>Step 4:</p> <p><u>Align</u> the Condensate Polishing and the Blowdown Low TDS Sump by performing the following:</p> <p>a. <u>Open</u> CMN-V091, “CD LOW TDS HEADER TO LRS HOLDUP TANKS HEADER.”</p> <p>b. <u>Open</u> SCN-V175, “BLOWDOWN LOW TDS SUMP TO LRS.”</p> <p>c. <u>Close</u> CMN-V076, “CD LOW TDS HEADER TO CIRC WATER RETURN ISOL.”</p> <p>d. <u>Close</u> SCN-V176, “BLOWDOWN LOW TDS SUMP TO CIRC WATER RETURN LINE.”</p>	<p>Information CUE:</p> <p>“CMN-V091 has been rotated counter-clockwise and is no longer moving.”</p> <p>“SCN-V175 has been rotated counter-clockwise and is no longer moving.”</p> <p>“CMN-V076 has been rotated clockwise and is no longer moving.”</p> <p>“SCN-V176 has been rotated clockwise and is no longer moving.”</p>	<p>Examinee locates and simulates opening CMN-V091 by rotating handwheel counter-clockwise</p> <p>Examinee locates and simulates opening SCN-V175 by rotating handwheel counter-clockwise</p> <p>Examinee locates and simulates opening CMN-V076 by rotating handwheel clockwise</p> <p>Examinee locates and simulates opening SCN-V176 by rotating handwheel clockwise</p>
<p>SAT / UNSAT</p> <p>Comments (required for UNSAT):</p>		



**2013 NRC P-3
PVNGS JOB PERFORMANCE MEASURE**

	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.” b. <u>Close</u> OWN-V151, “N CONDENSER AREA SUMPS TO OILY WATER SEPARATOR HDR ISOLATION VALVE.”	Information CUE: “OWN-V042 has been rotated counter-clockwise and is no longer moving.” “OWN-V151 has been rotated clockwise and is no longer moving.”	Examinee locates and simulates unlocking and opening OWN-V042 by rotating handwheel counter-clockwise Examinee locates and simulates closing OWN-V151 by rotating handwheel clockwise

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 Preparedness organization for resolution.

NORMAL TERMINATION POINT



**2013 NRC P-3
PVNGS JOB PERFORMANCE MEASURE**

RECORD OF REVISIONS

REVISION NUMBER	REVISION DATE	REASON REVISED	COMMENTS
005	05/10/2007	6	JPM format change
006	07/05/2013	3, 6	Updated to current revision of 40AO-9ZZ02. Updated JPM format for 2013 NRC Exam.

REASON REVISED Enter the numbers corresponding to the reason revised in the Reason Revised column and brief description of changes in Comments Column. Comments are to be numbered consecutively in each revision.

1. Vendor reference document upgrade
2. Plant modification (include number)
3. Procedure upgrade
4. Internal or External Agency Commitment (indicate item number)
5. Technical Specification Change (indicate amendment number)
6. Other (explain in comments)



INITIAL CONDITIONS:

- **A Steam Generator Tube Leak is in progress.**

INITIATING CUE:

- **The CRS has directed you to align the Turbine Building Sumps to LRS in accordance with 40AO-9ZZ02, Excessive RCS Leakrate, Appendix D.**

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 tube leak requires entry into 40AO-9ZZ02, Excessive RCS Leakrate. [LCO 3.4.14 CONDITION A; LCO 3.4.18 CONDITION A] 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. [LCO 3.3.1 CONDITION A; LCO 3.3.5 CONDITION A; LCO 3.3.10 CONDITION A; LCO 3.3.11 CONDITION A] 40AL-9RK5B, Panel B05B Alarm Responses
5	cmCPTP04TCNP01B_5 cmCPTP04TCNP01A_2 (TCA trips, TCB fails to start)	C BOP/SRO (AOP)	Running Turbine Cooling Water pump will trip due to rapid seizure of the impeller and the standby pump 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 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. 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 uncover, 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 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. 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	<p>Step 6.2.3 Directs area operator to <u>cycle</u> ARN-V207, D Air Removal Pump ARN-P01D Discharge Header Stop Check Valve.</p> <p>Step 6.2.4 <u>Starts</u> Air Removal Pump D using ARN-HS-28, COND AIR REMOVAL PMP D P01D handswitch.</p> <p>Marks Step 6.2.5 as N/A.</p> <p>Step 6.2.6 <u>Places</u> ARN-HS-15, COND B AIR REMOVAL SUCTION VLV UV-15 to OPEN.</p>
<p>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.</p>		
	BOP	<p>Step 6.2.7 <u>Stops</u> Air Removal Pump B using ARN-HS-26, COND AIR REMOVAL PMP B P01B.</p>

COMMENTS

	BOP (continued)	Steps 6.2.8-6.2.10 Directs an area operator to: <u>Ensure</u> ARN-UV-26, B ARN-UV-26, B AR Pump ARN-P01B Suction Isolation Valve, is closed. <u>Ensure</u> ARN-P02B, B AR System Recirc Pump, is stopped. <u>Check</u> 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.		

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	<p>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.</p> <p>All Pressurizer backup heaters will be energized.</p> <p>May brief on the impact the transmitter failure will have on SBCS.</p>
	ATC	<p><u>Diagnoses</u> 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.</p> <p><u>Addresses</u> alarm response procedure 40AL-9RK4A. Actions will be taken in accordance with 4A01A, GROUP J (window 1A) OR 4A01B, GROUP A (window 1B).</p> <p><u>Selects</u> Channel "Y" on Pressurizer Pressure Control Channel Selector Switch, RCN-HS-100.</p> <p><u>Resets</u> and <u>energizes</u> Pressurizer proportional heaters breakers by placing the following handswitches to "ON":</p> <ul style="list-style-type: none"> • RCN-HS-100-1 • RCN-HS-100-2
<p>Examiner NOTE: Once proportional heaters are energized OR at the discretion of the Lead Examiner, proceed to the next event.</p>		

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 : <ul style="list-style-type: none"> • <u>Determines</u> Steam Generator #1 is affected • <u>Secures</u> blowdown to the affected Steam Generator using 40OP-9SG03, Operating the Steam Generator Blowdown System, Section 5.3: <ul style="list-style-type: none"> • <u>Inserts</u> zero for Blowdown COLSS Constant into CMC and PMC • <u>Places</u> SCN-HS-1, Steam Generator Blowdown Path Selector, to the OFF position • At the discretion of the CRS, <u>closes</u> the following valves: <ul style="list-style-type: none"> • 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 • <u>Notifies</u> Radiological Monitoring Technician and RP of the alarm and that blowdown is secured

COMMENTS

	CRS	<p>Enters 40AO-9ZZ02, Excessive RCS Leakrate, Section 5.0, STEPS:</p> <ol style="list-style-type: none"> 1. <u>Records</u> the AOP Entry Time and Date. <p>Evaluator NOTE: At this time, the leak is not significant enough to warrant starting an additional charging pump or isolating letdown.</p> <ol style="list-style-type: none"> 5. <u>Ensures</u> the event is being classified. 6. <u>Addresses</u> Technical Specifications: <ul style="list-style-type: none"> • LCO 3.4.14, RCS Operational Leakage Condition B is applicable • LCO 3.4.18, Steam Generator Tube Integrity Condition B is applicable 7. <u>Directs</u> Chemistry to perform 74DP-9ZZ05, Abnormal Occurrence Checklist. 8. <u>Notifies</u> RP that a leak is in progress 9. <u>Directs</u> ATC or BOP to report Leakrate and Rate of Change of Leakrate from RMS Steam Generator Tube Leak Rate screens 10. <u>Refers</u> to Appendix F, Steam Generator Tube Leak Guidelines to determine plant shutdown requirements. <p>Evaluator NOTE: Per Appendix F, a plant shutdown is required.</p> <ol style="list-style-type: none"> 11. <u>Directs</u> ATC to determine the leakrate using either of the following: <ul style="list-style-type: none"> • Appendix A, 15 Minute Leak Rate Calculation • Appendix B, ERFDADS Leak Rate Determination 12. <u>Prepares</u> for plant shutdown by entering 40OP-9ZZ05, Power Operations 13. <u>Directs</u> BOP to perform Appendix C, Minimize Release to the Environment
--	-----	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

COMMENTS

ATC	<p>Performs 40AO-9ZZ02, Appendix B, ERFDADS Leak Rate Determination (preferred appendix) STEPS:</p> <ol style="list-style-type: none"> 1. <u>Records</u> Appendix Entry Time and Date 2. <u>Ensures</u> RCS Tc is constant 3. <u>Checks</u> pressurizer pressure is stable 2235-2265 psia 4. <u>Directs</u> Chemistry to not draw RCS or CVCS samples 5. <u>Ensures</u> that Letdown is either aligned to the VCT or isolated 6. <u>Ensures</u> that charging pump suction is aligned to the VCT 7. <u>Places</u> CHN-FIC-210X, Reactor Makeup Water to VCT, in “MANUAL” with zero output 8. <u>Places</u> CHN-FIC-210Y, Boric Acid Makeup to VCT, in “MANUAL” with zero output 9. <u>Places</u> CHN-HS-527, Make-up to charging pumps (VCT Bypass), in “CLOSED” 10. <u>After</u> CHN-UV-527 is closed, <u>places</u> CHN-HS-210, Make-up Mode Select Switch, in “MANUAL” 11-15. <u>Monitors</u> RCS Leakrate on ERFDADS for 15 minutes OR until VCT level has lowered to 15% <p>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.</p>
BOP	<p>Performs 40AO-9ZZ02, Appendix C, Minimize Release to the Environment STEPS:</p> <ol style="list-style-type: none"> 1. <u>Records</u> Appendix Entry Time and Date 2. <u>Ensures</u> ARN-HS-19, Post Filter Mode Select Switch, is in the THRU FILTER MODE” 4. <u>Selects</u> “OFF” on BOTH SGN-HS-1007 and SGN-HS-1008 5. <u>Directs</u> an operator to perform Attachment C-1, Condensate Cross-Tie Isolation

COMMENTS

BOP (continued)	<ol style="list-style-type: none"> 6. <u>Throttles</u> OPEN CDN-HV-275, Demin Water Feed to Condensate Service Header, to maintain 50-100 psig on CDN-PI-201 7. <u>Directs</u> an operator to CLOSE CDN-V099, Condensate Service Header Supply Reg Valve CDN-PV-200 Outlet Isolation 8. <u>Ensures</u> 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. <u>Contacts</u> Chemistry to determine if any Condensate Demins should be removed from service 11. <u>Ensures</u> Blowdown Demins are in service
<p>Evaluator NOTE: The CRS may elect to perform the down power using a Reactor Power Cutback due to the indicated rate of change of the leakrate on RMS. This is not expected until the leakrate calculation has been started.</p> <p>May proceed to the next event once the crew begins the 15 minute wait for leakrate determination. The “minimize release to environment” actions by the CO will also be performed in the SGTR procedure.</p>	

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	<p><u>Performs</u> applicable steps in alarm response procedures</p> <p>Per 41AL-1RK5A (5A10C):</p> <ul style="list-style-type: none"> • <u>Compares</u> indicators SGA-LI-1123A, SGB-LI-1123B, SGC-LI-1123C, and SGD-LI-1123D and determines SGB-LI-1123B has failed low • <u>Reports</u> to CRS that Technical Specifications 3.3.1, 3.3.5, 3.3.11, and 3.3.10 may be impacted • <u>Recommends</u> bypassing the affected channel in PPS cabinet SBB-C01 • <u>Bypasses</u> 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	<p>Addresses Technical Specifications</p> <p>Enters:</p> <ul style="list-style-type: none"> • 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. <p>Evaluator NOTE: LCO 3.3.10 is not applicable because it only requires 2 of the 4 channels.</p> <ul style="list-style-type: none"> • Directs the CO to bypass Steam Generator #2 Level Low (RPS) and Steam Generator #1 and #2 Level Low (ESFAS) per the LCO bases.
<p>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</p>		

COMMENTS

Op-Test No.: _____ Scenario No.: 1 Event No.: 5 Event Description: Turbine Cooling Water Pump B Trips, Pump A Fails to Auto-Start

Time	Position	Applicant's Actions or Behavior
T=55	CREW	Alarms for B07 windows 7A06A (TCW SYS TRBL) and 7A06B (TCW HDR PRESS HI-LO) 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. TCYCS21 – Turbine Cooling Water Pump A Electrical Protection, Group D in 7A06A of 40AL-9RK7A has mitigating actions. First Priority Operator Actions: 1. <u>Reports</u> to CRS that the standby pump did not start and manually <u>starts</u> Turbine Cooling Water Pump B using TCN-HS-22 Second Priority Operator Actions: 1. <u>Directs</u> an operator to ensure standby pump is running and failed pump has stopped. 2. <u>Checks</u> normal discharge pressure of 75 psig at TCN-PI-97. 3. <u>Places</u> TCN-HS-21 , Turbine Cooling Water Pump A handswitch in Pull-to-Lock position. 4. <u>Directs</u> operator to investigate cause of trip at NBN-S01.
	CRS	<u>Enters</u> 40AO-9ZZ03, Loss of Cooling Water, Section 5.0 1. <u>Enters</u> AOP Entry Time and Date. 2. <u>Directs</u> Reactor Operator to <u>start</u> Turbine Cooling Water Pump B (if not done already via ARP).

Evaluator NOTE: May proceed to the next event once Turbine Cooling Water flow has been restored with Pump B **running** and Pump A handswitch in **Pull-to-Lock 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	<ul style="list-style-type: none"> • <u>Directs</u> 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, <u>directs</u> either ATC or BOP to initiate a manual reactor trip <p>Evaluator NOTE: The CRS MAY also direct a manual initiation of SIAS and CIAS due to the Steam Generator Tube Leak</p>
STANDARD POST TRIP ACTIONS		
	CRS	<p><u>Enters</u> 40EP-9EO01, Standard Post Trip Actions</p> <ol style="list-style-type: none"> 1. <u>Opens</u> the Placekeeper and <u>enters</u> the EOP Entry Time 2. <u>Determines</u> that Reactivity Control acceptance criteria are met by the following: <ol style="list-style-type: none"> a. <u>Checks</u> that reactor power is dropping b. <u>Checks</u> that start-up rate is negative c. <u>Checks</u> that ALL full strength CEAs are inserted 3. <u>Determines</u> that Maintenance of Vital Auxiliaries acceptance criteria are met by the following: <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • All vital and non-vital AC buses are powered • All vital and non vital DC buses are powered

COMMENTS

Evaluator NOTE: Diesel Generator A is currently running without Spray Pond cooling requiring operator action (Spray Pond Pump A has failed to auto-start)		
ATC EVENT 8	<p><u>Obtains</u> SPTA Hard Card:</p> <p>AFTER Reactivity Control has been addressed, <u>determines</u> the status of Maintenance of Vital Auxiliaries acceptance criteria</p> <ul style="list-style-type: none"> • Reports that all vital and non-vital AC and DC buses are being powered from Offsite Power <p>AFTER SIAS has actuated</p> <ul style="list-style-type: none"> • Reports that Diesel Generator A is running UNLOADED without Spray Pond support • Takes CONTINGENCY ACTION c.2 and manually STARTS Spray Pond Pump A 	
CRS (continued)	<p>4. <u>Determines</u> that RCS Inventory Control acceptance criteria are met by the following:</p> <p>a. <u>Checks</u> that pressurizer level meets BOTH of the following:</p> <ul style="list-style-type: none"> • 10-65% • Trending as expected to 33-53% <p>b. <u>Checks</u> that the RCS is 24°F or more subcooled</p> <p>c. <u>Checks</u> that BOTH of the following are in service to all RCPs</p> <ul style="list-style-type: none"> • Seal injection • Nuclear Cooling Water <p>5. <u>Determines</u> that RCS Pressure Control acceptance criteria are met by BOTH of the following:</p> <ul style="list-style-type: none"> • Pressurizer pressure is 1837-2285 psia • Pressurizer pressure is trending as expected to 2225-2275 psia <p style="background-color: #cccccc;">Evaluator NOTE: Due to Steam Generator Tube Rupture AND ESD, CONTINGENCY ACTIONS are required</p>	
BOP or ATC	<p><u>Obtains</u> SPTA Hard Card:</p> <p><u>Determines</u> that RCS Pressure Control acceptance criteria are NOT met and takes CONTINGENCY ACTIONS:</p>	
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		<p><u>CONTINGENCY ACTIONS:</u></p> <p>5.1 Restores and maintains pressurizer pressure to the normal control band by ANY of the following:</p> <ul style="list-style-type: none"> • Operation of PPCS • Manual operation of pressurizer heaters and spray valves <p>5.2 IF pressurizer pressure drops to the SIAS setpoint, THEN ensure that SIAS is actuated</p> <p>Evaluator NOTE: SIAS fails to auto-actuate, requiring operator to MANUALLY actuate. This may have been done immediately following the reactor trip.</p> <p>5.3 IF pressurizer pressure remains below the SIAS setpoint, THEN stop ONE RCP in each loop</p> <p>5.4 IF pressurizer pressure drops below the RCP NPSH limits, THEN stop all RCPs</p>
CRS (continued)		<p>6. <u>Determines</u> that Core Heat Removal acceptance criteria are met by ALL of the following:</p> <ul style="list-style-type: none"> • At least one RCP is operating • Loop ΔT is less than 10°F • RCS is 24°F or more subcooled <p>7. <u>Determines</u> that RCS Heat Removal acceptance criteria are met by the following:</p> <ol style="list-style-type: none"> a. <u>Checks</u> that at least one Steam Generator meets BOTH of the following conditions: <ul style="list-style-type: none"> • 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 <p>Evaluator NOTE: ESD and Steam Generator 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 – requiring CONTINGENCY ACTIONS</p>
BOP		<p><u>CONTINGENCY ACTIONS:</u></p> <p>b.2 IF $T_C < 560^\circ\text{F}$</p> <ul style="list-style-type: none"> • <u>Ensures</u> feed flow is NOT excessive (reports to CRS current feed flow) • <u>Ensures</u> S/G Blowdown has isolated • <u>Takes</u> action to restore T_C to 560-570°F using ADVs

COMMENTS

	BOP (continued)	<ul style="list-style-type: none"> • IF AFAS actuates, <u>overrides</u> and <u>throttles</u> Auxiliary Feedwater to maintain S/G water level and temperature c.1 <u>Ensures</u> MSIS has actuated c.2 IF steam generator pressure is <1140 psia, <u>ensures</u> ADVs are closed
	CRS (continued)	<p>8. <u>Determines</u> that Containment Isolation acceptance criteria are met by the following:</p> <ol style="list-style-type: none"> a. <u>Checks</u> that Containment pressure is <2.5 psig b. <u>Checks</u> that there are no valid containment area or steam plant activity monitor alarms or unexplained rises in activity <p>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.</p> <p>9. <u>Determines</u> that Containment Temperature, Pressure, and Combustible Gas Control acceptance criteria are met by the following:</p> <ol style="list-style-type: none"> a. <u>Checks</u> that containment temperature is <117°F b. <u>Checks</u> that containment pressure is <2.5 psig <p>10. IF all acceptance criteria are met... NOT APPLICABLE</p> <p>11. <u>Determines</u> 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</p> <ul style="list-style-type: none"> • <u>ENTERS 40EP-9EO09, Functional Recovery</u>
<p>Evaluator NOTE: 40EP-9EO09, Functional Recovery Procedure NOTE</p> <p>Harsh conditions are containment temperature >170°F or containment radiation level greater than 10⁸ mR/hr. Harsh containment values are placed in brackets next to the normal setpoint or band. (Harsh conditions will not exist for this scenario)</p>		
	CRS (continued)	<p><u>40EP-9EO09:</u></p> <ol style="list-style-type: none"> 1. <u>Ensures</u> the event is being classified. 2. <u>Enters</u> the EOP Entry Time. 3. IF pressurizer pressure remains below SIAS setpoint: <ol style="list-style-type: none"> a. <u>Ensures</u> ONE RCP is stopped in each loop b. IF RCS subcooling is <24°F, <u>ensures</u> all RCPs are stopped 4. IF any RCPS are operating, <u>checks</u> the RCP operating limits are satisfied (Appendix 16).

COMMENTS

	CRS (continued)	<p>5. <u>Performs</u> the following:</p> <ol style="list-style-type: none"> <u>Ensures</u> the Steam Generator Sample Valves are open <u>Directs</u> Chemistry to <u>perform</u> 74DP-9ZZ05, Abnormal Occurrence Checklist <p>6. <u>Directs</u> placing the Hydrogen Analyzers in service</p>
	BOP	<p>WHEN directed:</p> <ul style="list-style-type: none"> <u>Overrides</u> and <u>opens</u> Steam Generator Sample Valves
	ATC	<p>WHEN directed:</p> <ul style="list-style-type: none"> <u>Places</u> Hydrogen Analyzers in service
	CRS (continued)	<p>7. <u>Identifies</u> the success path(s) to be used to satisfy each safety function. REFER TO BOTH of the following:</p> <ul style="list-style-type: none"> Section 4.0, <u>Safety Function Tracking</u> Section 6.0, <u>Resource Assessment Trees</u> <p>8. <u>Ensures</u> Section 5.0, Safety Function Status Check for those success paths in use are being performed</p> <p>Evaluator NOTE: Step 7 and Step 8 are annotated with an asterisk (*) meaning these steps may be brought forward and performed at any time</p> <p>Success Path for this scenario is HR-2; SG with SI</p> <p>HR-2:</p> <ol style="list-style-type: none"> <u>Opens</u> the Placekeeper <u>Ensures</u> SIAS is actuated <u>Optimizes</u> SI flow by <u>checking</u> SI Pumps have started and flow is adequate per Appendix 2, Figures IF at least one vital 4.16 kV bus is energized: <ol style="list-style-type: none"> <u>Performs</u> Appendix 5, RCS and PZR Cooldown Log <u>Cooldown</u> to SDC entry conditions using ADVs <u>Ensures</u> RCS inventory makeup is from a borated source during cooldown IF steaming to atmosphere, <u>inform</u> Radiation Protection and RMS Technician IF a SGTR has occurred, <u>determine</u> the most affected Steam Generator

COMMENTS

<p>CRS (continued)</p>	<p>12. <u>Performs</u> the following:</p> <ol style="list-style-type: none"> a. <u>Ensures</u> ARN-HS-19, Post Filter Mode Select Switch, is in the "THRU FILTER MODE" b. <u>Selects</u> "OFF" on BOTH of the following switches: <ul style="list-style-type: none"> • SGN-HS-1007, Valve 7 Mode Select • SGN-HS-1008, Valve 8 Mode Select c. <u>Cooldown</u> to a T_H of less than 540°F using ADVs <p>13. <u>Depressurizes</u> the RCS by performing the following:</p> <ol style="list-style-type: none"> a. <u>Maintains</u> pressurizer pressure within ALL of the following criteria: <ul style="list-style-type: none"> • <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. <u>Operates</u> Main for Auxiliary Pressurizer spray c. <u>Performs</u> Appendix 6, Spray Valve Actuation Data Sheet d. IF Safety Injection throttle criteria are met, <u>controls</u> charging and letdown flow and <u>throttles</u> HPSI flow <p>14. IF the Steam Generator with the tube rupture has indications of an ESD AND is uncontrollably steaming to atmosphere, THEN <u>ensure</u> at least ONE of the following conditions is met:</p> <ul style="list-style-type: none"> • 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 <p>Evaluator NOTE: Step 14 is annotated with an asterisk (*) meaning this step may be brought forward and performed at any time</p>
<p>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.</p>	<p>SAT / UNSAT</p>

COMMENTS

	BOP (continued)	<p>Using TWO Auxiliary Feedwater pumps, establishes 1360-1600 gpm to Steam Generator #1 in order to feed up to 45-60% NR.</p> <p>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.</p> <p>AFTER 45-60% NR level is obtained, the specified flowrate is no longer required.</p>
<p>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.</p>		

COMMENTS

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 MFP Lube Oil Pumps per 40OP-9FT02, Feedwater Pump Turbine B, Section 6.13.
2	cmAVRC03RCEPV100F_1 cmAVRC03RCEPV100F_2	C ATC/SRO	Pressurizer spray valve fails open. Crew will respond by selecting unaffected valve using RCN-HS-100-10 in accordance with alarm response procedure. 40AL-9RK4A, Panel B04A Alarm Responses
3	mfRP06L1 mfRP06L2	C BOP/SRO (AOP/TS)	Inadvertent AFAS, "B" train AFW pumps and valves align to initiate AFW flow to the SGs. Crew takes actions to terminate flow and resulting power increase. [LCO 3.3.6 CONDITION A; LCO 3.7.5 CONDITION C] 40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations
4	cmCNCV04CHNFIC243_2 f:100	I ATC/SRO	A seal injection controller will fail closed in automatic requiring the crew to take manual control of the controller. 40AL-9RK3A, Panel B03A Alarm Responses
5	mfED10B rfEG36 f:CLOSE	C ALL (AOP/TS)	NBN-X04 faults and subsequently the DG will trip on low lube oil pressure causing a LOP of class 4160 bus, PBB-S04. [LCO 3.8.1 CONDITIONS A, B, and D; LCO 3.8.4 CONDITION C] 40AO-9ZZ12, Degraded Electrical; 40AO-9ZZ05, Loss of Letdown
6	mfMS07 f:10	M ALL	ESD on common Main Steam header outside containment. 40EP-9EO05, Excessive Steam Demand.
7	Scenario File "noMSIS"	C BOP/SRO	MSIS will fail to automatically initiate. CRITICAL TASK – Crew manually initiates MSIS after initiation setpoints are exceeded prior to completion of the SPTAs.
8	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
9	mfED02	M ALL	Loss of Grid on Reactor Trip.
10	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)	7
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)	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.

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 on the breaker was completed on MFP Lube Oil pump LON-P07B at the end of last shift and it is ready to be tested.

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 MFP Lube Oil Pumps per **40OP-9FT02, Feedwater Pump Turbine B, Section 6.13.**

CREW HANDOUT

Plant conditions:

Unit 1 is at 2% power.

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 on the breaker was completed on MFP Lube Oil pump LON-P07B at the end of last shift and it is ready to be tested.

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 MFP Lube Oil Pumps per 40OP-9FT02, Feedwater Pump Turbine B, Section 6.13.

Scenario 2 Overview

Event 1	BOP operator will Shift MFP Lube Oil Pumps per 40OP-9FT02, Feedwater Pump Turbine B, Section 6.13.
Event 2	Pressurizer spray valve will fail open. Crew will respond by selecting unaffected valve using RCN-HS-100-10 in accordance with alarm response procedure. 40AL-9RK4A, Panel B04A Alarm Responses
Event 3	Inadvertent AFAS will occur, B train. AFW pumps and valves align to initiate AFW flow to the SGs. Crew takes actions to terminate flow and resulting power increase in accordance with 40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations.
Event 4	A seal injection controller will fail closed in automatic requiring the crew to take manual control of the controller in accordance with alarm response procedure. 40AL-9RK3A, Panel B03A Alarm Responses
Event 5	NBN-X04 faults and subsequently the DG will trip on low lube oil pressure causing a LOP of class 4160 bus, PBB-S04. Crew will take actions per 40AO-9ZZ12, Degraded Electrical, and 40AO-9ZZ05, Loss of Letdown.
Event 6	An ESD on common Main Steam header outside containment. This is the trip initiator. 40EP-9EO05, Excessive Steam Demand
Event 7	An MSIS will fail to automatically initiate requiring the crew to manually initiate. 40EP-9EO01, SPTAs
Event 8	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 9	Loss of Grid on Reactor Trip. 40EP-9EO01, SPTAs
Event 10	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 MFP B Lube Oil Pumps

Time	Position	Applicant's Actions or Behavior
T=0	CRS	Directs the BOP operator to shift the Main Feed Pump B lube oil pumps per 40OP-9FT02, Feedwater Pump Turbine B, Section 6.13.
	BOP	<p>Operator turns to section 6.13 of 40OP-9FT02:</p> <p>Step 6.13.1</p> <p>Initial Condition: Section 5.0, Prerequisites and Initial Conditions is complete</p> <p>Evaluator NOTE: Operator may or may not reference Section 5.0 at this time as this may have been done prior to crew taking the shift</p> <p>Operator marks step as complete</p> <p>Step 6.13.2</p> <p>IF pump A is running AND pump B is in Standby, THEN <u>perform</u> the following:</p> <p>6.13.2.1 All of the following Prerequisites are met:</p> <ul style="list-style-type: none"> • LON-P06B, FWPT B Main Oil Pump A, is running with handswitch LON-HS-124, FWPT B Main Oil Pump A, in START • LON-P07B, FWPT B Main Oil Pump B, is not running with handswitch LON-HS-126, FWPT B Main Oil Pump B, in AUTO • LON-P08B, FWPT B Emergency Oil Pump, is available and not running <p>6.13.2.2 <u>Station</u> Aux Operator to observe local indications</p> <p>Operator verifies prerequisites</p>

COMMENTS

	BOP	<p>Steps 6.13.2.3-6.13.2.5</p> <p><u>Presses</u> and holds the blue TEST pushbutton at LON-HS-186A, FWPT B Main Oil Pump Test Valve, to start LON-P07B, FWPT B Main Oil Pump B</p> <p><u>Checks</u> LON-HS-126, FWPT B Main Oil Pump B, to verify Main Oil Pump B is running in Auto</p> <p><u>Releases</u> the blue TEST pushbutton LON-HS-186A</p> <p>Step 6.13.2.6</p> <p><u>Places</u> handswitch LON-HS-126 in START</p> <p>Step 6.13.2.7</p> <p>WHEN 15 seconds has elapsed after Main Oil Pump B was started, <u>performs</u> the following:</p> <ul style="list-style-type: none"> • <u>Directs</u> Aux Operator to notify Control Room if pressure indication at LON-PI-192 drops to ≤ 40 psig • <u>Places</u> handswitch LON-HS-124, FWPT B Main Oil Pump A in STOP, THEN <u>places</u> LON-HS-124 in AUTO
<p>Evaluator NOTE: May proceed to the next event anytime AFTER the FWPT oil pumps have been shifted. It will take almost 7 minutes AFTER malfunction is inserted prior to receiving first annunciator.</p>		

COMMENTS

Op-Test No.: _____ Scenario No.: 2 Event No.: 2 Event Description: A Pressurizer Spray Valve Fails Open Due To Controller Failure

Time	Position	Applicant's Actions or Behavior
T=6	CREW	<p>Alarm for B04 window 4A01B (PZR PRESS HI-LO) is received and acknowledged. Alarm response procedure 40AL-9RK4A is referenced for operator response.</p> <p>All Pressurizer backup heaters will be energized.</p> <p>Evaluator NOTE: It will take almost 7 minutes after the malfunction is inserted before receiving first annunciator. Crew may take actions prior to the alarm coming in if a lowering pressurizer pressure is observed.</p>
	ATC	<ul style="list-style-type: none"> • <u>Addresses</u> alarm response procedure 40AL-9RK4A. Actions will be taken in accordance with 4A01B, GROUP A (window 1B). • <u>Diagnoses</u> that RCE-PV-100F pressurizer spray valve has failed OPEN. • <u>Places</u> RCN-HS-100-10, Spray Valve Selector, to PV-100E and observes RCE-PV-100F close. • <u>Ensures</u> backup heaters and proportional heaters are ON.
<p>Evaluator NOTE: May proceed to the next event once RCE-PV-100F is closed and proportional heaters have been reset (if applicable) OR at the discretion of the lead evaluator.</p>		

COMMENTS

Op-Test No.: _____ Scenario No.: 2 Event No.: 3 Event Description: Inadvertent Train B AFAS Actuation

Time	Position	Applicant's Actions or Behavior
T=12	CREW	Alarms for B05 AFAS-1 and window 5B07B (AFAS TRN B 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 AFAS is NOT valid
	CRS	Enters 40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations, Section 3: 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. 2. Directs BOP operator to <u>override</u> and <u>operate</u> Auxiliary Feedwater Valves as needed to control steam generator level.
	BOP	Overrides and closes at least one of the following valves: <ul style="list-style-type: none"> • AFB-HS-34A, AUX FW TO SG 1 DOWNSTREAM • AFB-HS-30A, AUX FW TO SG 1 UPSTREAM
	CRS (continued)	4. a. <u>Informs</u> Chemistry that Blowdown is isolated b. <u>Ensures</u> that BOTH of the following constants are correct in the CMC and PC: <ul style="list-style-type: none"> • NKBMF1 • NKBMF2

COMMENTS

	CRS (continued)	<p>5. <u>Directs</u> performance of the following:</p> <p>a. <u>PERFORM</u> Appendix C-2, <u>PPS-ESFAS Check</u>, to check that equipment actuated as expected.</p> <p>b. <u>Document</u> components that failed to actuate in the Control Room Log.</p> <p>c. <u>Ensure</u> compliance with Technical Specifications for components that failed to actuate or were overridden.</p> <p>Evaluator NOTE: LCO 3.7.5, Condition C, is applicable</p>
	BOP (continued)	<p><u>Performs</u> Appendix C-2 to check actuated equipment.</p> <p>Evaluator NOTE: All components actuated properly for B Train AFAS-1.</p>
	CRS (continued)	<p>6. <u>Ensures</u> compliance with BOTH of the following:</p> <ul style="list-style-type: none"> • LCO 3.3.5, ESFAS Instrumentation • LCO 3.3.6, ESFAS Logic and Manual Trip <p>Evaluator NOTE: LCO 3.3.6, Condition A, is applicable</p>
<p>Evaluator NOTE: May proceed to the next event after Aux Feed flow has been stopped to Steam Generator #1 and the crew has checked actuated equipment OR when deemed appropriate by Lead Evaluator.</p>		

COMMENTS

Op-Test No.: _____ Scenario No.: 2 Event No.: 4 Event Description: Seal Injection Controller Fails Closed in Automatic

Time	Position	Applicant's Actions or Behavior
T=22	CREW	Alarms for B03 windows 3A11A (RCP SEAL SYS TRBL) and 3A11B (RCP SEAL INJ FLOW HI-HI OR LO) are received and acknowledged. Alarm response procedure 40AL-9RK3A is referenced for operator response.
	ATC	Addresses 40AL-9RK3A , Panel B03A Alarm Responses, window 3A11B Group B . <ul style="list-style-type: none"> • Determines which of the four seal injection legs has LO Flow by reading alarm CRT or using flow indication. • Determines CHN-FIC-243, RCP 2A SEAL INJECTION FLOW CONTROL, has failed to full output. • Takes manual control of the CHN-FIC-243 and adjusts output to obtain ~6.6 gpm (may request permission from CRS for this)
	CRS	Directs ATC to take manual control of CHN-FIC-243 (if requested). Evaluator NOTE: The CRS may refer to 40AO-9ZZ04, RCP Emergencies for abnormal seal parameters. Once manual control is taken of the failed controller, seal parameters return to normal shortly. No actions other than monitoring should be performed out of the procedure.
Evaluator NOTE: May proceed to the next event once crew has taken manual control of CHN-FIC-243 and established ~6.6 gpm flow OR when deemed appropriate by Lead Evaluator.		

COMMENTS

Op-Test No.: _____ Scenario No.: 2 Event No.: 5 Event Description: NBN-X04 Faults and Subsequently DG B Trips on Low Lube Oil Pressure - LOP

Time	Position	Applicant's Actions or Behavior
T=30	CREW	Several alarms for Board B01 are received and acknowledged due to loss of power to PBB-S04.
	ATC	Assesses Board B01 and determines that PBB-S04 has lost power due to a fault on NBN-X04 and that DG B has tripped.
	CRS	Enters 40AO-9ZZ12, Degraded Electrical, Section 54.0 2. <u>Directs</u> an operator to <u>check</u> that BOTH of the following are energized: <ul style="list-style-type: none"> • NNN-D12 • NNN-D16 3. <u>Directs</u> an operator to <u>check</u> that BOTH of the following are energized: <ul style="list-style-type: none"> • PNB-D26 • PND-D28
	ATC or BOP	<u>Checks</u> that the following are energized: <ul style="list-style-type: none"> • NNN-D12 • NNN-D16 • PNB-D26 • PND-D28 Evaluator NOTE: All are energized
	CRS (continued)	4. May <u>direct</u> operator to start additional charging pumps as necessary IF Letdown isolates, <u>Enters</u> 40AO-9ZZ05, Loss of Letdown

COMMENTS

<p>Evaluator Note: A loss of letdown may occur due to a high temperature isolation (~100 seconds). The crew MAY anticipate this and start an additional charging pump to prevent the isolation. PVNGS standards DO allow the crew to take action per the expected alarm response on trend then verify actions in accordance with the ARP (40AL-9RK3A window 3A10A). The CRS may hand out and direct to perform the Loss of Letdown AOP (40AO-9ZZZ05) to the ATC.</p>		
	<p>ATC (continued)</p>	<p><u>Starts</u> additional charging pump if directed.</p> <p>IF 40AO-9ZZ05, Loss of Letdown is entered:</p> <ol style="list-style-type: none"> 3. <u>Places</u> RCN-LIC-110, PLCS Master Controller, in “MAN” and <u>closes</u> the selected Letdown Control Valve(s) 4. <u>Checks</u> that letdown backpressure is less than setpoint 5. <u>Ensures</u> no more than one charging pump is running <p>ATC may request to <u>Perform</u> Appendix A, Restoration of Letdown With a Pressurizer Steam Bubble</p>
	<p>CRS (continued)</p>	<p><u>Directs</u> operator to perform the following:</p> <ol style="list-style-type: none"> 6. <u>Ensure</u> adequate CTMT Normal cooling for present plant conditions 7. <u>Ensure</u> adequate CEDM Normal cooling for present plant conditions 8. <u>Determine</u> which Spent Fuel Cooling Pump was running and, if necessary, <u>perform</u> 40OP-9PC01 to start PCA-P01 9. <u>Ensure</u> in-plant communications is aligned to its normal source 10. <u>Ensure</u> SA UPS Cabinet is aligned to its alternate source 11. <u>Perform</u> BOTH of the following: <ul style="list-style-type: none"> • 41ST-1ZZ02, Inoperable Power Sources Action Statement • 40ST-9EC03, Essential Chilled Water & Ventilation Systems Inoperable Action Surveillance 12. <u>Refers</u> to table PBB-S04 Loads 13. <u>Bypass</u> all parameters on Channel B or D that are NOT bypassed on Channels A or C within 90 minutes <p>Evaluator NOTE: No parameters are bypassed on Channels A or C. <u>Addresses</u> Technical Specifications associated with a loss of PBB-S04</p>
<p>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.</p>		

<p>COMMENTS</p>

	ATC or BOP (continued)	<p><u>Ensures</u> adequate CTMT Normal cooling for present plant conditions</p> <p><u>Ensures</u> adequate CEDM Normal cooling for present plant conditions</p> <p><u>Determines</u> which Spent Fuel Cooling Pump was running and, if necessary, <u>performs</u> 40OP-9PC01 to start PCA-P01 (Not necessary – PCA-P01 was already running)</p> <p><u>Ensures</u> in-plant communications is aligned to its normal source</p> <p><u>Ensures</u> SA UPS Cabinet is aligned to its alternate source</p> <p><u>Performs</u> BOTH of the following:</p> <ul style="list-style-type: none"> • 41ST-1ZZ02, Inoperable Power Sources Action Statement • 40ST-9EC03, Essential Chilled Water & Ventilation Systems Inoperable Action Surveillance <p><u>Bypasses</u> all parameters on Channel B or D that are NOT bypassed on Channels A or C within 90 minutes</p>
	ATC (continued)	<p>40AO-9ZZ05, Loss of Letdown, Appendix A:</p> <ol style="list-style-type: none"> 2. <u>Ensures</u> at least ONE of the following valves are closed: <ul style="list-style-type: none"> • CHB-UV-515, Regenerative HX Inlet Isolation • CHA-UV-516, Regenerative HX Inlet Isolation • CHB-UV-523, Regenerative HX Outlet Isolation 3. <u>Ensures</u> the selected Letdown Control Valve(s) are closed 4. <u>Ensures</u> BOTH of the following ERFDADS points are set to alarm at the appropriate setpoint: <ul style="list-style-type: none"> • 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. <u>Places</u> CHN-PIC-201, Letdown Backpressure Controller in “MAN” and <u>opens</u> Letdown Backpressure Valve(s) to 60% output 7. WHEN the selected Letdown Control Valve(s) is(are) closed, THEN <u>ensures</u> ALL of the following are open: <ul style="list-style-type: none"> • CHB-UV-523, Regenerative HX Outlet • CHB-UV-515, Regenerative HX Inlet • CHA-UV-516, Regenerative HX Inlet 10. <u>Adjusts</u> Letdown Control Valve(s) and Backpressure Control Valve(s) to establish appropriate letdown flow, letdown backpressure, and Regen HX Letdown temperature 13-15 <u>Ensures</u> RCN-LIC-110, CHN-PDIC-240, and CHN-PIC-201 are in Manual and <u>starts</u> the second Charging Pump

COMMENTS

	ATC (continued)	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
<p>Evaluator NOTE: may proceed to the next event after crew bypasses parameters on Channel B or D on PPS panels OR as necessary due to time constraints. It is not necessary to have the parameters in bypass or have letdown restored prior to initiation of the next event.</p> <p>The Degraded Electrical procedure allows for PBB-S04 to be powered from ESF Service Transformer NBN-X03 or a Station Blackout Generator, however, <u>PROCEED</u> to next event PRIOR to the crew taking this action.</p>		

COMMENTS

Op-Test No.: _____ Scenario No.: 2 Event No.: 6-9 Event Description: ESD on Common Main Steam Header**TRIP INITIATOR**

Time	Position	Applicant's Actions or Behavior
Evaluator NOTE: MSIS Automatic Initiation is failed requiring crew action		
T=50	CREW	Recognizes degrading conditions
	CRS	<u>Directs</u> a reactor trip
STANDARD POST TRIP ACTIONS		
	CRS	<u>Enters</u> 40EP-9EO01, Standard Post Trip Actions <ol style="list-style-type: none"> 1. <u>Opens</u> the Placekeeper and <u>enters</u> the EOP Entry Time 2. <u>Determines</u> that Reactivity Control acceptance criteria are met by the following: <ol style="list-style-type: none"> a. <u>Checks</u> that reactor power is dropping b. <u>Checks</u> that start-up rate is negative c. <u>Checks</u> that ALL full strength CEAs are inserted <p>Evaluator NOTE: Multiple CEAs are sticking out requiring CONTINGENCY ACTION c.1</p> <ol style="list-style-type: none"> c.1 <u>Directs</u> operator to <u>borate</u> 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

<p>ATC EVENT 8</p>	<p><u>Obtains</u> SPTA Hard Card:</p> <ul style="list-style-type: none"> • Addresses Reactivity Control • Reports that multiple CEAs did NOT insert • Takes CONTINGENCY ACTION c.1 of Reactivity Control: <ul style="list-style-type: none"> • Performs Standard Appendix 103, RCS Makeup/Emergency Boration <p>Evaluator NOTE: CHE-HV-536 has failed to automatically open Appendix 103, Attachment 103-D</p> <ol style="list-style-type: none"> 1. <u>Ensures</u> that CHE-HV-532, RWT to Boric Acid Makeup Pumps, is open 2. <u>Places</u> CHN-HS-527, VCT Bypass, in the CLOSE position 3. <u>Ensure</u> CHN-FIC-210X, Reactor Makeup Water to VCT Flow Control, is in Manual with 9% output 4. <u>Places</u> CHN-HS-210, Makeup Mode Select Switch in MANUAL 5. <u>Ensures</u> the BAMPs are stopped 6. <u>Opens</u> CHE-HV-536, RWT to Charging Pumps 7. <u>Closes</u> CHN-UV-501, VCT Outlet <ul style="list-style-type: none"> • <u>Ensures</u> at least one charging pump is running 	
<p>CRITICAL TASK – Crew establishes > 44 gpm boration prior to completion of the SPTAs</p>		<p>SAT / UNSAT</p>
<p>CRS (continued) EVENT 9</p>	<ol style="list-style-type: none"> 3. <u>Determines</u> that Maintenance of Vital Auxiliaries acceptance criteria are met by the following: <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • All vital and non-vital AC buses are powered • All vital and non vital DC buses are powered <p>Evaluator NOTE: PBB-S04 is currently de-energized with no lockouts on the bus. DG B is unavailable due to a trip on low lube oil pressure. Due to the Loss of Offsite Power, PBA-S03 is being supplied by DG A. There are no CONTINGENCY ACTIONS required.</p>	

COMMENTS

	CRS (continued)	<p>4. <u>Determines</u> that RCS Inventory Control acceptance criteria are met by the following:</p> <p>a. <u>Checks</u> that pressurizer level meets BOTH of the following:</p> <ul style="list-style-type: none"> • 10-65% • Trending as expected to 33-53% <p>b. <u>Checks</u> that the RCS is 24°F or more subcooled</p> <p>c. <u>Checks</u> that BOTH of the following are in service to all RCPs</p> <ul style="list-style-type: none"> • Seal injection • Nuclear Cooling Water <p>5. <u>Determines</u> that RCS Pressure Control acceptance criteria are met by BOTH of the following:</p> <ul style="list-style-type: none"> • Pressurizer pressure is 1837-2285 psia • Pressurizer pressure is trending as expected to 2225-2275 psia
<p>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.</p>		
	BOP	<p><u>Obtains</u> SPTA Hard Card:</p> <p><u>Reports</u> status of Maintenance of Vital Auxiliaries:</p> <ul style="list-style-type: none"> • PBA-S03 is being powered by DG A with cooling water. DC buses are powered. <p><u>Determines</u> status of RCS Inventory Control and takes CONTINGENCY ACTION c.1:</p> <ul style="list-style-type: none"> • <u>Isolates</u> controlled bleedoff from all RCPs due to loss of Nuclear Cooling Water <p><u>Takes</u> further contingency actions as applicable with regards to RCS Inventory Control and RCS Pressure Control</p>

COMMENTS

	<p>CRS (continued)</p>	<p>6. <u>Determines</u> that Core Heat Removal acceptance criteria are met by ALL of the following:</p> <ul style="list-style-type: none"> • At least one RCP is operating • Loop ΔT is less than 10°F • RCS is 24°F or more subcooled <p>Evaluator NOTE: There are no contingency actions for Core Heat Removal</p> <p>7. <u>Determines</u> that RCS Heat Removal acceptance criteria are met by the following:</p> <p>a. <u>Checks</u> that at least one Steam Generator meets BOTH of the following conditions:</p> <ul style="list-style-type: none"> • Level is 35% WR or more • Feedwater is restoring or maintaining level 45-60% NR <p>b. <u>Checks</u> that T_C is 560-570°F</p> <p>c. <u>Checks</u> that steam generator pressure is 1140-1200 psia</p> <p>Evaluator NOTE: Due to ESD on common header, CONTINGENCY ACTIONS are required.</p>
	<p>BOP EVENT 7</p>	<p><u>CONTINGENCY ACTIONS:</u></p> <p>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)</p> <ul style="list-style-type: none"> • Aux Feed Pump N trips on SIAS and must be overridden to restart <p>b.2 IF T_C<560°F</p> <ul style="list-style-type: none"> • <u>Ensures</u> feed flow is NOT excessive (reports to CRS current feed flow) • <u>Ensures</u> S/G Blowdown has isolated • <u>Takes</u> action to restore T_C to 560-570°F using ADVs • IF AFAS actuates, <u>overrides</u> and <u>throttles</u> Auxiliary Feedwater to maintain S/G water level and temperature <p>c.1 Ensures MSIS has actuated</p> <p>Evaluator NOTE: MSIS will fail to automatically initiate, requiring manual initiation</p> <p>c.2 IF steam generator pressure is <1140 psia, <u>ensures</u> ADVs are closed</p>
<p>CRITICAL TASK – Crew manually initiates MSIS after initiation setpoints are exceeded prior to completion of the SPTAs</p>		<p>SAT / UNSAT</p>

<p>COMMENTS</p>

	<p>CRS (continued)</p>	<p>8. <u>Determines</u> that Containment Isolation acceptance criteria are met by the following:</p> <ol style="list-style-type: none"> a. <u>Checks</u> that Containment pressure is <2.5 psig b. <u>Checks</u> that there are no valid containment area or steam plant activity monitor alarms or unexplained rises in activity <p>9. <u>Determines</u> that Containment Temperature, Pressure, and Combustible Gas Control acceptance criteria are met by the following:</p> <ol style="list-style-type: none"> a. <u>Checks</u> that containment temperature is <117°F b. <u>Checks</u> that containment pressure is <2.5 psig <p>10. IF all acceptance criteria are met... NOT APPLICABLE</p> <p>11. Determines an ESD is in progress and MAY use Section 4.0, Diagnostic Actions to diagnose</p> <ul style="list-style-type: none"> • <u>ENTERS 40EP-9EO05, Excess Steam Demand</u>
<p>Evaluator NOTE: May proceed to the next event once SPTAs are completed and 40EP-9EO05, Excess Steam Demand is entered.</p>		

COMMENTS

Op-Test No.: _____ Scenario No.: <u> 2 </u> Event No.: <u> 10 </u>		
Event Description: <u>Trip of AFN-P01</u>		
Time	Position	Applicant's Actions or Behavior
T=65	CREW	Alarms and indications are received and acknowledged for a loss of AFN-P01
	CRS	<p>Due to a Safety Function not being met (Heat Removal), EXITS 40EP-9EO05, Excess Steam Demand, and ENTERS 40EP-9EO09, Functional Recovery</p> <ol style="list-style-type: none"> 1. <u>Ensures</u> the event is being classified. 2. <u>Enters</u> the EOP Entry Time. 5. <u>Performs</u> the following: <ol style="list-style-type: none"> a. <u>Ensures</u> the Steam Generator Sample Valves are open b. <u>Directs</u> Chemistry to <u>perform</u> 74DP-9ZZ05, Abnormal Occurrence Checklist 6. <u>Directs</u> placing the Hydrogen Analyzers in service
	BOP or ATC	<p>WHEN directed:</p> <ul style="list-style-type: none"> • <u>Overrides</u> and <u>opens</u> Steam Generator Sample Valves • <u>Places</u> Hydrogen Analyzers in service
	CRS (continued)	<ol style="list-style-type: none"> 7. <u>Identifies</u> the success path(s) to be used to satisfy each safety function. REFER TO BOTH of the following: <ul style="list-style-type: none"> • Section 4.0, <u>Safety Function Tracking</u> • Section 6.0, <u>Resource Assessment Trees</u> 8. <u>Ensures</u> Section 5.0, Safety Function Status Check for those success paths in use are being performed <p>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</p>

COMMENTS

	CRS (continued)	<p>MVAC-2:</p> <p>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:</p> <ul style="list-style-type: none"> • Appendix 59, <u>Cross-Tie DG A to PBB-S04</u> <p>Evaluator NOTE: Step 11 is annotated with an asterisk (*) meaning this step may be brought forward and performed at any time</p>
	ATC or BOP	<p>Appendix 59:</p> <ol style="list-style-type: none"> 1. <u>Directs</u> Area Operator to <u>PERFORM</u> Attachment 59-A, <u>Disable PBB-S04 Breakers</u>. 2. <u>Ensures</u> the following breakers are open: <ul style="list-style-type: none"> • NAN-S03A • PBA-S03K • PBA-S03L • NAN-S04A • PBB-S04L • PBB-S04K 3. <u>Ensures</u> that PBB-S04B, Diesel Generator B 4.16kV Breaker, is open 4. <u>Places</u> the following in "PULL TO LOCK:" <ul style="list-style-type: none"> • Train B Containment Normal ACUs • Train B CEDM ACUs 5. <u>Performs</u> the following: <ul style="list-style-type: none"> • <u>Places</u> synchronizing switch PBA-SS-S03L, to ON • <u>Closes</u> breaker PBA-S03L • <u>Places</u> synchronizing switch PBA-SS-S03L to OFF 6. WHEN Attachment 59-A is completed: <ul style="list-style-type: none"> • <u>Places</u> synchronizing switch PBB-SS-S04L to ON • <u>Closes</u> breaker PBB-S04L • <u>Places</u> synchronizing switch PBB-SS-S04L to OFF
<p>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.</p>		
	CRS	<p>AFTER PBB-S04 is energized, <u>directs</u> operator to establish feed to steam generators using AFB-P01.</p>

COMMENTS

	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

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 fans in accordance with 40OP-9HC01, Containment HVAC, Section 4.4.
2	cmCNCV01CHEPDIC240_2 f:100	C ATC/SRO	Charging Header D/P controller will fail in the AUTO mode requiring the crew to take manual control of PDIC-240 in accordance with associated alarm response procedure. 40AL-9RK3A, Panel B03A Alarm Responses
3	cmTRMS17SGNFT1011_4	I BOP/SRO	Steam Generator flow transmitter FT-1011 will fail 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	mfTH07 f:6 (~13 gpm leak) 3 minute ramp	C ATC/SRO (AOP/TS)	A small non-isolable RCS instrument leak inside containment. The crew will enter 40AO-9ZZ02, Excessive RCS Leakrate and perform a leakrate calculation. The CRS will address Technical Specifications. [LCO 3.4.14 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. The CRS will address Technical Specifications. [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 will degrade to the point of exceeding 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 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)	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
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 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 uncover.

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 in accordance with 40OP-9HC01, Containment HVAC.
Event 2	Charging Header D/P controller fails in the AUTO mode requiring the crew to take manual control in accordance with associated alarm response procedure, 40AL-9RK3A, Panel B03A Alarm Responses
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	A small non-isolable RCS instrument leak inside containment. The crew will enter 40AO-9ZZ02, Excessive RCS Leakrate and perform a leakrate calculation.
Event 5	CEA 15 will drop requiring entry into 40AO-9ZZ11, CEA Malfunctions. The crew will begin a power reduction.
Event 6	RCS leak will degrade to the point of exceeding 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.

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 <u>Ensures</u> Nuclear Cooling Water System is aligned to the Containment CEDM fans. Step 4.4.3 <u>Ensures</u> Appendix C – CEDM HVAC Electrical Verification List is completed.
<u>NOTE</u>		
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 <u>Performs</u> ALL of the following:
<u>NOTE</u>		
The following step is performed to document proper operation of the SESS. There are no Tech Spec operability concerns with this equipment.		

COMMENTS

	<p>BOP (continued)</p>	<p>4.4.5.1 <u>Performs ALL</u> of the following to test Train B SESS:</p> <ol style="list-style-type: none"> 1. <u>Presses and holds</u> the STATUS DISPLAY pushbutton on the Train B SESS control panel. 2. <u>Ensures</u> that Misc window 21B, CEDM NORM ACU FANS A02B/A02D is not illuminated blue. 3. <u>Releases</u> the STATUS DISPLAY pushbutton 4. Not Applicable <p>4.4.5.2 is Not Applicable</p> <p>4.4.5.3 <u>Ensures</u> HCB-HS-50, CEDM ACU Fans B/D, A02B/A02D handswitch is in the normal after stop position.</p> <p>4.4.5.4 <u>Ensures</u> HCA-HS-49, CEDM ACU Fans A/C, A02A/A02C handswitch is in PULL TO LOCK.</p> <p>4.4.5.5 WHEN 120 seconds elapses, <u>ensures</u> that CEDM Normal ACU Fans B/D, A02B/A02D have started.</p> <p>4.4.5.6 <u>Places</u> HCB-HS-50 in the normal after start position.</p> <p>4.4.5.7 is Not Applicable</p> <p>4.4.5.8 <u>Places</u> HCA-HS-49 in the normal after stop position.</p> <p>4.4.5.9 <u>Ensures</u> Nuclear Cooling Water flow is ~400 gpm.</p> <p>4.4.5.10 <u>Checks</u> Nuclear Cooling Water Temperature for the in-service CEDM ACU is 105°F-130°F.</p> <p>4.4.5.11 - 4.4.5.12 <u>Directs</u> Area Operator to verify damper positions.</p> <p>4.4.5.13 <u>Performs</u> the following to test Train B SESS:</p> <ol style="list-style-type: none"> 1. <u>Presses and holds</u> the STATUS DISPLAY pushbutton on the Train B SESS control panel. 2. <u>Ensures</u> that Misc window 21B, CEDM NORM ACU FANS A02B/A02D is illuminated blue. 3. <u>Releases</u> the STATUS DISPLAY pushbutton 4. Not Applicable <p>4.4.5.14 <u>Checks</u> CEDM ACU outlet temperature at computer point HCT56</p>
<p>Evaluator NOTE: May proceed to next event once CEDM ACU Fans B/D are running with Fans A/C in standby.</p>		

COMMENTS

Op-Test No.: _____ Scenario No.: 3 Event No.: 2 Event Description: Charging Header D/P Controller Failure

Time	Position	Applicant's Actions or Behavior
T=8	CREW	Alarms for B03 windows 3A08A (CHG HDR SYS TRBL) and 3A11B (RCP SEAL INJ FLOW HI-HI OR LO) are received and acknowledged. Alarm response procedure 40AL-9RK3A is referenced for operator response.
	ATC	<u>Diagnoses</u> that CHN-PDIC-240 , CHARGING LINE TO RC LOOP 2A DP CONTROL, has failed low (100% output on the controller) <u>Recommends</u> or <u>requests</u> to take manual control of CHN-PDIC-240 .
	CRS	<u>Directs</u> reactor operator to take manual control of CHN-PDIC-240 .
	ATC (continued)	Takes actions per 3A08A Group C <ul style="list-style-type: none"> • <u>Places</u> CHN-PDIC-240 in manual control and adjusts output to obtain differential pressure between 90 and 135 psid as read on controller.

Evaluator NOTE: May proceed to the next event once manual control has been taken of CHN-PDIC-240 and the output has been adjusted such that alarms are clear **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 Failure

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	<ul style="list-style-type: none"> • <u>Ensures</u> the Steam Generator levels are stable • <u>Selects</u> the alarm manager on DFWCS Monitor • <u>Determines</u> Steam Generator Flow Transmitter FT1011 has failed • <u>Places</u> FT1011 in maintenance mode • <u>Removes</u> the 3-Element Lockout • <u>Clears</u> 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: Small RCS Instrument Leak Inside Containment

Time	Position	Applicant's Actions or Behavior
T=25	CREW	Discovers RCS leakrate increasing by observing one or more of the following: ERFDADS leakrate rising, letdown flow lowering, pressurizer level lowering, containment temperature/pressure rising, or by receiving and acknowledging Radiation Monitor alarms (RU-1).
	CRS	<p>Enters 40AO-9ZZ02, Excessive RCS Leakrate, Section 3.0, STEPS:</p> <ol style="list-style-type: none"> 1. <u>Records</u> AOP Entry Time and Date. <p>Evaluator NOTE: At this time, the leak is not significant enough to warrant starting an additional charging pump or isolating letdown.</p> <ol style="list-style-type: none"> 6. <u>Ensures</u> the event is being classified. 7. <u>Addresses</u> Technical Specifications: <ul style="list-style-type: none"> • LCO 3.4.14, RCS Operation Leakage, CONDITION A is applicable 8. <u>Directs</u> Chemistry to perform 74DP-9ZZ05, Abnormal Occurrence Checklist. 9. <u>Notifies</u> Radiation Protection that an RCS leak exists. 10. <u>Directs</u> ATC to determine the leakrate using either of the following: <ul style="list-style-type: none"> • Appendix A, 15 Minute Leak Rate Calculation • Appendix B, ERFDADS Leak Rate Determination
	ATC	<p><u>Performs</u> 40AO-9ZZ02, Appendix B, ERFDADS Leak Rate Determination (preferred appendix) STEPS:</p> <ol style="list-style-type: none"> 1. <u>Records</u> Appendix Entry Time and Date 2. <u>Ensures</u> RCS Tc is constant 3. <u>Checks</u> pressurizer pressure is stable 2235-2265 psia 4. <u>Directs</u> Chemistry to not draw RCS or CVCS samples

COMMENTS

<p>ATC (continued)</p>	<ol style="list-style-type: none"> 5. <u>Ensures</u> that Letdown is either aligned to the VCT or isolated 6. <u>Ensures</u> that charging pump suction is aligned to the VCT 7. <u>Places</u> CHN-FIC-210X, Reactor Makeup Water to VCT, in “MANUAL” with zero output 8. <u>Places</u> CHN-FIC-210Y, Boric Acid Makeup to VCT, in “MANUAL” with zero output 9. <u>Places</u> CHN-HS-527, Make-up to charging pumps (VCT Bypass), in “CLOSED” 10. <u>After</u> CHN-UV-527 is closed, <u>places</u> CHN-HS-210, Make-up Mode Select Switch, in “MANUAL” 11-15. <u>Monitors</u> RCS Leakrate on ERFDADS for 15 minutes OR until VCT level has lowered to 15% <p>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, <u>Leakrate Data Sheet</u>.</p>
<p>Evaluator NOTE: The remainder of the Excessive RCS Leakrate procedure consists of attempting to determine source of the leak. May proceed to the next event AFTER the leakrate has been determined by the applicable appendix OR at the discretion of the lead evaluator.</p>	

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. <u>Enters</u> AOP Entry Time and Date. 2. <u>Checks</u> that at least one CEA is deviating from its group by greater than 6.6 inches. 7. <u>Ensures</u> CEDMCS is in "STANDBY." 8. <u>Directs</u> an operator to perform Appendix E, <u>Initial Actions</u> .
	ATC or BOP	Performs 40AO-9ZZ11, Appendix E, Initial Actions: 1. <u>Enters</u> Appendix Entry Time and Date. 2. <u>Directs</u> an operator to report CEDM abnormalities in CEDM Control Room and M/G set control panels. 5. <u>Informs</u> ALL of the following of the CEA malfunction: <ul style="list-style-type: none"> • I&C Maintenance • Reactor Engineering • SM 6. <u>Initiates</u> pressurizer boron equalization: <ul style="list-style-type: none"> • <u>Overrides</u> and <u>energizes</u> all pressurizer backup heaters. • <u>Lowers</u> the setpoint on RCN-PIC-100 to 2220 psia. 7. <u>Performs</u> section 8.4 of 40ST-9ZZ23, <u>CEA Position Data Log within 1 hour</u> Evaluator NOTE: The intent is to move to next event prior to performing 40ST-9ZZ23.

COMMENTS

	<p>CRS (continued)</p>	<p>9. <u>Records</u> BOTH of the following:</p> <ul style="list-style-type: none"> • CEA deviation time • Initial power level <p>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.</p> <p>12. <u>Performs</u> the following to start a power reduction within 10 minutes of the initial CEA deviation:</p> <ul style="list-style-type: none"> • <u>Log</u> the start time for power reduction. • <u>Directs</u> operator to <u>lower</u> the turbine load to raise Tave 3°F greater than Tref
	<p>BOP</p>	<p><u>Coordinates</u> with ATC and <u>lowers</u> turbine load to raise and maintain Tave 3°F greater than Tref</p>
<p>CRITICAL TASK – Crew begins power reduction within 10 minutes of dropped CEA.</p>		<p>SAT / UNSAT</p>
	<p>CRS (continued)</p>	<p>13. <u>Determines</u> that a 20% power reduction is required.</p> <p>14. <u>Calculates</u> the number of gallons of boric acid needed for the downpower</p> <p>Evaluator NOTE: ~1120 gallons boration will be required for power reduction</p> <p>15. <u>Directs</u> operator to <u>maintain</u> Tave ~3°F greater than Tref.</p> <p>16. <u>Directs</u> operator to <u>commence</u> borating to the charging pump suction using a minimum rate of 25 gpm.</p> <p>Addresses Technical Specifications: LCO 3.1.5 (Control Element Assembly Alignment), Condition A is applicable</p>

COMMENTS

ATC (continued)	<p><u>Performs 40OP-9CH01, CVCS Normal Operations, Section 7.3</u>, to initiate boration:</p> <p>7.3.6 <u>Sets</u> the desired boric acid makeup flow rate on the Foxboro controller, CHN-FIC-210Y (25 gpm or greater).</p> <p>7.3.7 <u>Selects</u> the “Target” makeup volume on the boric acid makeup flow totalizer/counter CHN-FQIS-210Y (~1120 gallons).</p> <p>7.3.9 <u>Places</u> CHN-HS-512, Makeup Inlet to VCT in the OPEN position.</p> <p>7.3.10 <u>Starts</u> the boration as follows:</p> <ul style="list-style-type: none">• <u>Places</u> CHN-HS-210 in the BORATE position.• <u>Depresses</u> the “Reset” pushbutton• <u>Depresses</u> the “Start” pushbutton <p>7.3.11 – 7.3.14 <u>Verifies</u> desired boration flow rate and system response.</p>
<p>Evaluator NOTE: May proceed to the next event AFTER BOTH of the following occur:</p> <ul style="list-style-type: none">• Reactor power has begun to lower• The CVCS system has been aligned for boration <p>OR at the discretion of the Lead Evaluator</p>	

COMMENTS

Op-Test No.: _____ Scenario No.: 3 Event No.: 6-8 Event Description: RCS Leak Degrades To 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	<ul style="list-style-type: none"> • <u>Directs</u> 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, <u>directs</u> either ATC or BOP to initiate a manual reactor trip <p>Evaluator NOTE: The CRS MAY also direct a manual initiation of SIAS and CIAS due to the RCS leak</p>
STANDARD POST TRIP ACTIONS		
	CRS	<p><u>Enters</u> 40EP-9EO01, Standard Post Trip Actions</p> <ol style="list-style-type: none"> 1. <u>Opens</u> the Placekeeper and <u>enters</u> the EOP Entry Time 2. <u>Determines</u> that Reactivity Control acceptance criteria are met by the following: <ol style="list-style-type: none"> a. <u>Checks</u> that reactor power is dropping b. <u>Checks</u> that start-up rate is negative c. <u>Checks</u> that ALL full strength CEAs are inserted 3. <u>Determines</u> that Maintenance of Vital Auxiliaries acceptance criteria are met by the following: <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • All vital and non-vital AC buses are powered • All vital and non vital DC buses are powered

COMMENTS

<p>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.</p>		
<p>ATC EVENT 7</p>	<p><u>Obtains</u> SPTA Hard Card: AFTER Reactivity Control has been addressed, <u>determines</u> the status of Maintenance of Vital Auxiliaries acceptance criteria are not met.</p> <ul style="list-style-type: none"> • Reports that Diesel Generator B output breaker has failed to auto-close <p>Takes CONTINGENCY ACTION c.1 and c2:</p> <p>c.1:</p> <ol style="list-style-type: none"> 1. <u>Ensures</u> that Diesel Generator B has started. 2. <u>Verifies</u> the following: <ul style="list-style-type: none"> • 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 <p>THEN <u>ensures</u> DG B output breaker is closed.</p> <p>c.2:</p> <ol style="list-style-type: none"> 1. Verifies Spray Pond pump operation for running Diesel Generator(s) 	
<p>CRITICAL TASK – Crew will close DG supply breaker to energize PBB-S04 prior to completion of SPTAs.</p>		<p>SAT / UNSAT</p>
<p>CRS (continued)</p>	<p>4. <u>Determines</u> that RCS Inventory Control acceptance criteria are met by the following:</p> <ol style="list-style-type: none"> a. <u>Checks</u> that pressurizer level meets BOTH of the following: <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Seal injection • Nuclear Cooling Water <p>Evaluator NOTE: Due to the leak being greater than charging pump capacity, level will need to be recovered using HPSI Pump B</p>	

COMMENTS

	CRS (continued)	<p>5. <u>Determines</u> that RCS Pressure Control acceptance criteria are met by BOTH of the following:</p> <ul style="list-style-type: none"> • Pressurizer pressure is 1837-2285 psia • Pressurizer pressure is trending as expected to 2225-2275 psia
<p>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.</p>		
	ATC (continued) EVENT 8	<p><u>Determines</u> that RCS Pressure Control acceptance criteria are NOT met and takes CONTINGENCY ACTIONS:</p> <p>5.1 Restores and <u>maintains</u> pressurizer pressure to the normal control band by ANY of the following:</p> <ul style="list-style-type: none"> • Operation of PPCS • Manual operation of pressurizer heaters and spray valves <p>5.2 IF pressurizer pressure drops to the SIAS setpoint, THEN ensure that SIAS is actuated</p> <p>Evaluator NOTE: HPSI Pump B fails to auto-start, requiring operator to MANUALLY start using handswitch.</p> <p>5.3 IF pressurizer pressure remains below the SIAS setpoint, THEN stops ONE RCP in each loop</p> <p>5.3 IF pressurizer pressure drops below the RCP NPSH limits (<24°F subcooled), THEN stops all RCPs</p>
<p>CRITICAL TASK – Crew will manually start HPSI “B” prior to exiting SPTAs.</p>		<p>SAT / UNSAT</p>
	CRS (continued)	<p>6. <u>Determines</u> that Core Heat Removal acceptance criteria are met by ALL of the following:</p> <ul style="list-style-type: none"> • At least one RCP is operating • Loop ΔT is less than 10°F • RCS is 24°F or more subcooled

COMMENTS

CRS (continued)		<p>7. <u>Determines</u> that RCS Heat Removal acceptance criteria are met by the following:</p> <p>a. <u>Checks</u> that at least one Steam Generator meets BOTH of the following conditions:</p> <ul style="list-style-type: none"> • Level is 35% WR or more • Feedwater is restoring or maintaining level 45-60% NR <p>b. <u>Checks</u> that T_C is 560-570°F</p> <p>c. <u>Checks</u> that steam generator pressure is 1140-1200 psia</p>
BOP		<p><u>Obtains</u> SPTA Hard Card:</p> <ul style="list-style-type: none"> • Determines status of RCS Heat Removal acceptance criteria. • May take manual control of feedwater or auxiliary feedwater in order to control level. <p>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.</p> <ul style="list-style-type: none"> • AFTER MSIS initiates, <u>transitions</u> to auxiliary feedwater AND ADVs for steam generator level and pressure control, respectively.
CRS (continued)		<p>8. <u>Determines</u> that Containment Isolation acceptance criteria are met by the following:</p> <p>a. <u>Checks</u> that Containment pressure is <2.5 psig</p> <p>b. <u>Checks</u> that there are no valid containment area or steam plant activity monitor alarms or unexplained rises in activity</p> <p>Evaluator NOTE: There WILL be containment area activity AND containment pressure will be >2.5 psig so this acceptance criterion is NOT met.</p>
BOP (continued)		<p><u>Takes</u> CONTINGENCY ACTION 8.a.1:</p> <ul style="list-style-type: none"> • IF containment pressure is 3 psig or more, THEN <u>ensures</u> that CIAS has been initiated.

COMMENTS

	<p>CRS (continued)</p>	<p>9. <u>Determines</u> that Containment Temperature, Pressure, and Combustible Gas Control acceptance criteria are met by the following:</p> <p>a. <u>Checks</u> that containment temperature is <117°F</p> <p>b. <u>Checks</u> that containment pressure is <2.5 psig</p> <p>10. IF all acceptance criteria are met... NOT APPLICABLE</p> <p>11. <u>Determines</u> that there is a LOCA in progress and MAY use Section 4.0, Diagnostic Actions to diagnose</p> <p>ENTERS 40EP-9EO03, Loss of Coolant Accident</p> <p>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 <u>ensure</u> RCP controlled bleedoff flow is isolated.</p>
<p>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.</p>		

COMMENTS

Facility: PVNGS Scenario No.: 4 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	cmTRCV19RCALT110X_1 f:0	I ATC/SRO (TS)	Pressurizer Level Transmitter LT-110X will fail low. Crew will take actions per alarm response procedures and take the Pressurizer Level Control Selector Switch to CH Y. Technical Specifications will be addressed for PAM Instrumentation. [LCO 3.3.10 CONDITION A; LCO 3.3.11 CONDITION A] 40AL-9RK4A, Panel B04A Alarm Responses
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	cmTRMS03MTNPT11A_1 f:0	I BOP/SRO (AOP)	The 1 st Stage Pressure Transmitter to Reactor Regulating System (TLI) will fail low. Crew will respond by taking actions per alarm response procedures and 40AO-9ZZ16, RRS Malfunctions.
5	mfRP06G1 mfRP06G2	C BOP/SRO (TS/AOP)	An inadvertent Containment Spray Actuation will occur which will require entry into 40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations. [LCO 3.3.6 CONDITION A; LCO 3.6.3 CONDITION A; LCO 3.6.6 CONDITION A] CRITICAL TASK – Restore NCW flow to RCPs within 10 minutes of RCP Low NCW Flow alarms.
6	mfCW01A f:200	R – SRO, ATC C - BOP (AOP)	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.
7	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
8	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 completion of SPTAs.
9	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)	7
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
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 to completion of 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	Pressurizer Level Transmitter LT-110X will fail low. Crew will take actions per alarm response procedure 40AL-9RK4A, Panel B04A Alarm Responses and CRS will address Technical Specifications.
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	The Turbine 1 st Stage Pressure Transmitter to the Reactor Regulating System (TLI) fails low requiring the crew to take action in accordance with 40AO-9ZZ16, RRS Malfunctions.
Event 5	An inadvertent Containment Spray actuation occurs requiring the crew to take action in accordance with 40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations.
Event 6	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 7	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 8	ATWS occurs due 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 9	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	<p>Step 8.2.1 <u>Verifies</u> RPCS is in Automatic operation.</p> <p>8.3.1 <u>Presses</u> the "Auto Actuate Out-of-Service" button.</p> <p>8.3.2 <u>Checks</u> that the "Auto Actuate Out-of-Service" button illuminates.</p> <p>8.3.3 <u>Presses</u> the "Test/Reset" button.</p> <p>8.3.4 <u>Checks</u> that the "Test/Reset" button illuminates.</p>

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: Pressurizer Level Transmitter LT-110X Fails Low

Time	Position	Applicant's Actions or Behavior
T=5	CREW	Alarms for B04 windows 4A01A (PZR TRBL) and 4A02B (PZR LVL HI-LO) are received and acknowledged. Alarm response procedure 40AL-9RK6A is referenced for operator response.
	ATC	<p>References 40AL-9RK6A, window 4A01A, GROUP A: <u>Verifies</u> all pressurizer heaters are deenergized. <u>Places</u> the following handswitches on B04 to the unaffected channel: Evaluator NOTE: Unaffected is Channel Y</p> <ul style="list-style-type: none"> • RCN-HS-110, Level Control Selector Channel X/Y • RCN-HS-100-3, Heater Control Selector Level Trip Channel X/Y <p><u>Closes</u> the proportional heater breakers by selecting the following handswitches to ON:</p> <ul style="list-style-type: none"> • RCN-HS-100-1, PROPORTIONAL HEATERS BANK B02/B08/B14 • RCN-HS-100-2, PROPORTIONAL HEATERS BANK B05/B11/B17
	BOP	<u>Performs</u> independent verification of switch manipulations.
	CRS	<p><u>Addresses</u> and <u>enters</u> applicable Technical Specifications:</p> <ul style="list-style-type: none"> • LCO 3.3.10, Post Accident Monitoring Instrumentation, CONDITION A • LCO 3.3.11, Remote Shutdown System, CONDITION A
<p>Evaluator NOTE: May proceed to the next event once the Level and Heater Control Selector handswitches are selected to the unaffected channel and the proportional heater bank breakers have been close OR at the discretion of the lead evaluator.</p>		

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, <u>directs</u> operator to <u>start</u> 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	<p><u>References</u> 41AL-1RK2A, Panel B02A Alarm Responses.</p> <p><u>May</u> request to <u>start</u> Control Room Essential AHU, HJA-F04.</p> <p><u>Directs</u> an Auxiliary Operator to investigate cause of the trip.</p> <p>40OP-9SP01, Essential Spray Pond Train A:</p> <p>6.3.1.4 <u>Starts</u> Spray Pond Pump A using SPA-HS-1, verifies pump operation.</p> <p>40OP-9EW01, Essential Cooling Water System Train A:</p> <p>6.3.5 <u>Starts</u> Essential Cooling Water Pump A using EWA-HS-1, verifies pump operation.</p> <p>40OP-9EC01, Essential Chilled Water Train A:</p> <p>5.3.8 <u>Starts</u> Essential Chiller Train A using ECA-HS-1A, verifies chiller operation.</p>

COMMENTS

ATC (continued)	<p>40OP-9HJ01, Control Building HVAC, Section 7.3:</p> <p>7.3.2.2 <u>Closes</u> Control Room Normal AHU Isolation Dampers M01/M55 using HJB-HS-8.</p> <p>7.3.2.3 <u>Directs</u> an Auxiliary Operator to monitor the temperature of the Communications and Inverter Rooms.</p> <p>7.3.4 <u>Ensures</u> Control Room Essential AHU HJA-F04 OSA Intake Damper HJB-M02 is open using HJA-HS-34.</p> <p>7.3.5 <u>Ensures</u> Control Room Essential AHU HJA-F04 OSA Intake Damper HJA-M02 is open using HJA-HS-36.</p> <p>7.3.6 <u>Starts</u> the Control Room Essential AHU Fan HJA-F04 using HJA-HS-28.</p> <p>7.3.8 <u>Directs</u> an Auxiliary Operator to check filter DPs on Train A Control Room Essential AHU are below allowable pressure drops.</p>
<p>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.</p>	

COMMENTS

Op-Test No.: _____ Scenario No.: <u> 4 </u> Event No.: <u> 4 </u>		
Event Description: <u>1st Stage Pressure Transmitter to RRS Fails Low</u>		
Time	Position	Applicant's Actions or Behavior
T=25	CREW	Alarm for B04 windows 4A09A (AUTOMATIC WITHDRAWAL PROHIBIT), 4A08B (TAVG-TREF HI-LO), 4A10B (AUTOMATIC MOTION INHIBIT), and 4A12B (TURB BYP DEMAND) are received and acknowledged. Alarm response procedure 40AL-9RK4A is referenced for operator response. Crew diagnoses Turbine 1 st Stage Pressure Transmitter has failed low.
	CRS	<u>Enters</u> 40AO-9ZZ16, RRS Malfunctions, Section 4.0 , Steps: 1. <u>Enters</u> AOP Entry Time and Date. 2. <u>Directs</u> operator to take CEDMCS out of Auto Sequential.
Evaluator NOTE: Rapid changes to SBCS Master Controller signal when in Single Element Control could cause perturbations in the DFWCS which may result in a Rx trip.		
	BOP or ATC	<u>Takes</u> CEDMCS out of Auto Sequential using CEDMCS Mode Select switch.
	CRS (continued)	3. May <u>direct</u> operator to take SBCS out of REMOTE AUTO at this time (This will be required regardless prior to selecting unaffected instrument at the RRS Test Drawer). 4. <u>Directs</u> operator to determine the failed instrument by comparing the DVM indications for TLI1 and TLI2 at the RRS Test Drawer. 5. <u>Refers</u> to Appendix B to determine impact of the TLI failure. 6. <u>Directs</u> operator to perform the following: a. <u>Place</u> SBCS in Local Automatic OR Manual b. <u>Select</u> the unaffected instrument at the RRS Test Panel. 7. <u>Checks</u> that Tavg/Tref mismatch is 3°F or less. 8. <u>Directs</u> operator to place CEDMCS in Auto Sequential. 9. <u>Directs</u> operator to place SBCS in REMOTE AUTO.

COMMENTS

	BOP	<p>Evaluator NOTE: Operator may reference 40OP-9SF08, Operation of the Reactor Regulation System, but it is not required.</p> <p>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 ~8 volts.</p> <ul style="list-style-type: none"> • Determines TLI1 has failed low using DVM indications at the RRS Test Drawer. <p>NOTE: TLI failed low may cause “REAC PWR CUTBACK SYS TRBL” annunciator (4A11A).</p> <ul style="list-style-type: none"> • Places SBCS in Local Automatic OR Manual (Operator may reference 40OP-9SF05, Section 4.4 to perform) • Selects the unaffected instrument at the RRS Test Panel. • Checks that Tavg/Tref mismatch is 3°F or less (may be done by ATC) • Places CEDMCS in Auto Sequential (may be done by ATC) • Places SBCS in REMOTE AUTO.
<p>Evaluator NOTE: May proceed to the next event once the unaffected instrument is selected at the RRS Test Drawer and the SBCS is in REMOTE AUTO OR sufficient time has passed at the discretion of the lead evaluator.</p>		

COMMENTS

Op-Test No.: _____ Scenario No.: 4 Event No.: 5Event 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	<p>Enters 40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations, Section 5:</p> <p style="text-align: center;">NOTE:</p> <p>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.</p> <p>4. <u>Directs</u> ATC operator to <u>stop</u> the Containment Spray Pump by anti-pumping the pump.</p> <p style="text-align: center;">CAUTION:</p> <p>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.</p> <p>5. <u>Directs</u> ATC operator to <u>override</u> and <u>close</u> all open Containment Spray Header Isolation Valves.</p> <p>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 <u>directs</u> an operator to perform the following:</p> <ol style="list-style-type: none"> a. <u>Ensures</u> the reactor is tripped. b. <u>Stops</u> all of the RCPs. c. <u>Isolates</u> controlled bleedoff.

COMMENTS

	CRS (continued)	7. <u>Directs</u> BOP operator to restore Nuclear Cooling Water to Containment.
	ATC	<ul style="list-style-type: none"> • <u>Stops</u> Containment Spray pump A by taking handswitch to STOP and anti-pumping the pump. • <u>Overrides</u> and <u>closes</u> all open Containment Spray Header Isolation Valves by taking handswitch(es) to OPEN then CLOSED.
	BOP (continued)	<ul style="list-style-type: none"> • <u>Restores</u> 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)	<p>8. <u>Directs</u> an operator to <u>perform</u> the following:</p> <p>a. <u>Place</u> the handswitches for ALL of the following valves to closed:</p> <ul style="list-style-type: none"> • CHA-UV-516 • CHB-UV-515 • SGA-UV-500P • SGB-UV-500R <p>b. <u>Override</u> and <u>open</u> IAA-UV-2.</p> <p>c. <u>Ensure</u> PZR Sprays are operating to control Pzr pressure.</p> <p>9. <u>Directs</u> an operator to <u>perform</u> the following:</p> <p>a. <u>Ensure</u> no more than one Charging Pump is running.</p> <p>b. <u>PERFORM 40AO-9ZZ05, Loss of Letdown</u>.</p> <p><u>Addresses</u> and <u>enters</u> applicable Technical Specifications:</p> <ul style="list-style-type: none"> • LCO 3.3.6, ESFAS Logic and Manual Trip, CONDITION A • LCO 3.6.3, Containment Isolation Valves, CONDITION A • LCO 3.6.6, Containment Spray System, CONDITION A <p>AFTER Pressurizer level is above 56%</p> <ul style="list-style-type: none"> • LCO 3.4.9, Pressurizer, CONDITION A

COMMENTS

<p>ATC (continued)</p>	<p>40AO-9ZZ05, Loss of Letdown:</p> <ol style="list-style-type: none"> 1. <u>Enters</u> AOP Entry Time and Date 3. <u>Places</u> RCN-LIC-110, PLCS Master Controller, in “MAN” with zero output. 5. <u>Ensures</u> no more than 1 charging pump is running. <p><u>Restores</u> letdown in accordance with Appendix A</p> <p>40AO-9ZZ05, Loss of Letdown, Appendix A:</p> <ol style="list-style-type: none"> 2. <u>Ensures</u> at least ONE of the following valves are closed: <ul style="list-style-type: none"> • CHB-UV-515, Regenerative HX Inlet Isolation • CHA-UV-516, Regenerative HX Inlet Isolation • CHB-UV-523, Regenerative HX Outlet Isolation 3. <u>Ensures</u> the selected Letdown Control Valve(s) are closed 4. <u>Ensures</u> BOTH of the following ERFDADS points are set to alarm at the appropriate setpoint: <ul style="list-style-type: none"> • 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. <u>Places</u> CHN-PIC-201, Letdown Backpressure Controller in “MAN” and <u>opens</u> Letdown Backpressure Valve(s) to 60% output 7. WHEN the selected Letdown Control Valve(s) is(are) closed, THEN <u>ensures</u> ALL of the following are open: <ul style="list-style-type: none"> • CHB-UV-523, Regenerative HX Outlet • CHB-UV-515, Regenerative HX Inlet • CHA-UV-516, Regenerative HX Inlet 10. <u>Adjusts</u> Letdown Control Valve(s) and Backpressure Control Valve(s) to establish appropriate letdown flow, letdown backpressure, and Regen HX Letdown temperature <p><u>Ensures</u> RCN-LIC-110, CHN-PDIC-240, and CHN-PIC-201 are in Manual and <u>start</u> the second Charging Pump</p>
<p>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.</p>	

COMMENTS

Op-Test No.: _____ Scenario No.: <u> 4 </u> Event No.: <u> 6 </u>		
Event Description: <u>Circulating Water Leak</u>		
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	<u>References</u> 40AL-9RK7B, Panel B07B Alarm Responses: <u>Notifies</u> 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	<u>Enters</u> 40AO-9ZZ10, Condenser Tube Rupture: 1. <u>Enters</u> AOP Entry Time and Date 2. <u>Directs</u> Chemistry to determine most affected hotwell half. 3. <u>Directs</u> an operator to perform Appendix N, Initial Actions.
	BOP	<u>Performs</u> 40AO-9ZZ10, Condenser Tube Rupture, Appendix N: 1. <u>Enters</u> Appendix Entry Time and Date. 2. <u>Directs</u> chemistry to perform their abnormal occurrence checklist. 3. <u>Places</u> CDN-LIC-75 in "MANUAL" with a zero output. 4. <u>Places</u> the pressurizer in boron equalization (may be done by ATC): a. <u>Overrides</u> and <u>energizes</u> all pressurizer backup heaters. b. <u>Lowers</u> setpoint on RCN-PIC-100 to 2220 psia 5. <u>Closes</u> CWN-HV-11, Circ Water X-tie Valve. 6. <u>Directs</u> an Auxiliary Operator to close CDN-V063, CDN-LV-75 Inlet Isolation (Hotwell Drawoff isolation valve). 7. <u>Directs</u> an Auxiliary Operator to close SCN-V11 and V12. 8. <u>Directs</u> 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)	<p>6-7. <u>Reviews</u> Reactor Trip Criteria</p> <p>8. <u>Verifies</u> Cond Demins are aligned for full flow operation and CDN-PDV-195 is fully closed.</p> <p>14. <u>Determines</u> if Reactor Power Cutback is an option for downpower.</p> <p>Evaluator NOTE: RPCS was taken out of service in Event 1 and is unavailable. If CRS attempts to restore RPCS, SM will intervene.</p> <p>15. <u>Determines</u> affected Circ Water Train – Train A (information given to Control Room by chemistry).</p> <p>16. <u>Transitions</u> to Section 4.0 NORMAL DOWNPOWER</p> <p>Section 4.0 NORMAL DOWNPOWER:</p> <p>3. <u>Informs</u> WRF, RP, and ECC on intent to lower power</p> <p>4. Uses Maneuvering Box game plan or STA Reactivity Worksheet to determine reactivity for downpower.</p> <p><u>Directs</u> operator to perform boration (~3360 gallons).</p>
	ATC	<p><u>Performs</u> 40OP-9CH01, CVCS Normal Operations, Section 7.3, to initiate boration:</p> <p>7.3.6 <u>Sets</u> the desired boric acid makeup flow rate on the Foxboro controller, CHN-FIC-210Y (~40 gpm)</p> <p>7.3.7 <u>Selects</u> the “Target” makeup volume on the boric acid makeup flow totalizer/counter CHN-FQIS-210Y.</p> <p>7.3.9 <u>Places</u> CHN-HS-512, Makeup Inlet to VCT in the OPEN position.</p> <p>7.3.10 <u>Starts</u> the boration as follows:</p> <ul style="list-style-type: none"> • <u>Places</u> CHN-HS-210 in the BORATE position. • <u>Depresses</u> the “Reset” pushbutton • <u>Depresses</u> the “Start” pushbutton <p>7.3.11 – 7.3.14 <u>Verifies</u> desired boration flow rate and system response.</p>

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.: 7-9 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	<u>Enters</u> 40EP-9EO01, Standard Post Trip Actions 1. <u>Opens</u> the Placekeeper and <u>enters</u> the EOP Entry Time 2. <u>Determines</u> that Reactivity Control acceptance criteria are met by the following: <ol style="list-style-type: none"> a. <u>Checks</u> that reactor power is dropping b. <u>Checks</u> that start-up rate is negative c. <u>Checks</u> that ALL full strength CEAs are inserted
--	-----	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Evaluator NOTE: Due to a failure in the RPS system, **CONTINGENCY ACTIONS** are required.

	ATC EVENT 8	<u>Obtains</u> SPTA Hard Card: Takes CONTINGENCY ACTION a.1 and a.2 : a.1: Attempts to manually <u>trip</u> the Reactor a.2: <u>Opens</u> BOTH of the following supply breakers: <ul style="list-style-type: none"> • NGN-L03B2 • NGN-L10B2 AFTER reactor indicates tripped, <u>recloses</u> NGN-L03B2 and NGN-L10B2 , THEN <u>verifies</u> 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 completion of SPTAs.

SAT / UNSAT

COMMENTS

	<p>CRS (continued)</p>	<ol style="list-style-type: none"> 3. <u>Determines</u> that Maintenance of Vital Auxiliaries acceptance criteria are met by the following: <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • 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: <ol style="list-style-type: none"> a. <u>Checks</u> that pressurizer level meets BOTH of the following: <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Seal injection • Nuclear Cooling Water 5. <u>Determines</u> that RCS Pressure Control acceptance criteria are met by BOTH of the following: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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: <ol style="list-style-type: none"> a. <u>Checks</u> that at least one Steam Generator meets BOTH of the following conditions: <ul style="list-style-type: none"> • 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
--	----------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

COMMENTS

<p>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.</p>		
<p>BOP EVENT 9</p>	<p><u>Obtains</u> SPTA Hard Card: Takes CONTINGENCY ACTION c.3: c.3: IF steam generator pressure is greater than 1200 psia, THEN <u>restores</u> and <u>maintains</u> 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 critiera.</p>	
<p>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.</p>		<p>SAT / UNSAT</p>
<p>CRS (continued)</p>	<p>8. <u>Determines</u> that Containment Isolation acceptance criteria are met by the following: a. <u>Checks</u> that Containment pressure is <2.5 psig b. <u>Checks</u> that there are no valid containment area or steam plant activity monitor alarms or unexplained rises in activity 9. <u>Determines</u> that Containment Temperature, Pressure, and Combustible Gas Control acceptance criteria are met by the following: a. <u>Checks</u> that containment temperature is <117°F b. <u>Checks</u> that containment pressure is <2.5 psig 10. IF all acceptance criteria are met THEN <u>GO TO 40EP-9EO02, Reactor Trip.</u> <u>ENTERS 40EP-9EO02, Reactor Trip</u></p>	
<p>Evaluator NOTE: The scenario may be ended once SPTAs are completed and 40EP-9EO02, Reactor Trip, has been entered.</p>		

<p>COMMENTS</p>
