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# Watts Bar Nuclear Plant

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2013-03 NRC Exam

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Administrative JPM 1

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**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

**2013-03 NRC Exam  
EVALUATION SHEET**

**Task:** CALCULATE TARGET BORON ( $C_B$ ) FOR LOAD ESCALATION

**Alternate Path:** n/a

**Facility JPM #:** Modified A.1-2

**Safety Function:** 2.3 **Title:** Conduct of Operations

**K/A** 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc.

**Rating(s):** 3.9/4.2 **CFR:** 41.10 / 43.5 / 45.12

**Evaluation Method:** Simulator \_\_\_\_\_ In-Plant \_\_\_\_\_ Classroom X\*

**References:** 1.) SOI-62.02, "Boron Concentration Control," Rev. 55  
2.) Nuclear Parameters & Operations Package (NuPOP) WCAP-17401-P, Watts Bar Unit 1 Cycle 11, Rev. 1

**Task Number:** RO-062-SOI-62-016 **Title:** Perform dilution of the Reactor Coolant system.

**Task Standard:** The applicant completes the calculations required by SOI-62.02, Appendix E "REACTIVITY BALANCE CALCULATION," The target RCS Boron Concentration is determined to be **572.5 ppm (acceptable range 564.6 to 580.5 ppm).**

**Validation Time:** 20 minutes **Time Critical:** Yes \_\_\_\_\_ No X

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**Applicant:** \_\_\_\_\_ NAME \_\_\_\_\_ Docket No. Time Start: \_\_\_\_\_  
Time Finish: \_\_\_\_\_

**Performance Rating:** SAT \_\_\_\_\_ UNSAT \_\_\_\_\_ Performance Time \_\_\_\_\_

**Examiner:** \_\_\_\_\_ NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_ / \_\_\_\_\_ DATE

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**COMMENTS**

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**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

**2013-03 NRC Exam**

**Tools/Equipment/Procedures Needed:**

The following information will be handed out to each applicant:

1. Copy of XENON CALCULATION WATTS BAR UNIT 1 CYCLE 11 MOL NIX XENON DATA for power change from 80% to 100% at 2%/min.
2. Copy of SOI-62.02, "Boron Concentration Control," Appendix E, "Reactivity Balance Calculation."
3. Copy of Nuclear Parameters & Operations Package (NuPOP) WCAP-17401-P, Watts Bar Unit 1 Cycle 11, Rev. 1
4. ***NRC REFERENCE DISK.***

**\*NOTE: This JPM is designed to be performed in a classroom with procedures available to the applicant via a laptop computer loaded with the NRC REFERENCE DISK.**

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

2013-03 NRC Exam

**READ TO APPLICANT**

**DIRECTION TO APPLICANT:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the cue sheet I provided you.

**INITIAL CONDITIONS:**

1. Unit 1 is operating at 80% power.
2. Core average burnup is 8000 MWD/MTU, middle-of-life.
3. Control Bank "D" rods are at 190 steps.
4. RCS boron concentration is 600 ppm.
5. Target rod position at 100% power is 220 steps on Control Bank "D."
6. Power will be raised at 2% per hour.
7. Xenon printout from REACTINW has been performed by an STA and is provided with this cue sheet.

**INITIATING CUES:**

The Shift Manager has directed you to calculate the target boron concentration for raising power to 100% per SOI-62.02, Appendix E, "Reactivity Balance Calculation."

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

2013-03 NRC Exam

<b>STEP/STANDARD</b>	<b>SAT/UNSAT</b>
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**START TIME:** \_\_\_\_\_

**EXAMINER JPM Steps 1 through 5 evaluate the applicants completion of the first page of Appendix E.**

<p><u>STEP 1:</u> [1]    <b>CALCULATE</b> Target <math>C_B</math> by performing the following:</p> <p style="padding-left: 40px;">Obtains: Current RCS Boron <math>C_B</math>: _____ PPM.</p> <p><u>STANDARD:</u></p> <p style="padding-left: 40px;">Applicant enters <b>600</b> ppm from the INITIAL CONDITIONS provided on the APPLICANT CUE SHEET.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u>        Enters: Core Burnup: _____ MWD/MTU</p> <p><u>STANDARD:</u></p> <p style="padding-left: 40px;">Applicant enters value <b>8000</b> from the INITIAL CONDITIONS provided on the APPLICANT CUE SHEET.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 3: Enters:</u></p> <p>Initial Reactor power = _____ %            Final Reactor power = _____ %</p> <p>Calculates: Total Reactor Power change: _____ Δ%</p> <p><u>STANDARD:</u></p> <p>Applicant enters target reactor power value from the INITIAL CONDITIONS provided on the APPLICANT CUE SHEET</p> <p>Initial Reactor Power = <b><u>80%</u></b>.</p> <p>Final Reactor Power = <b><u>100%</u></b>.</p> <p>Applicant determines total power change to be <b><u>20%</u></b>.</p> <p><b>Step is critical since the change in power is the basis for the calculation.</b></p> <p><u>COMMENTS:</u></p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 4:</u> Enters:</p> <p align="center">Rate of Reactor Power change: _____ %/hr Number of hours to change power: _____ hr(s)</p> <p><u>STANDARD:</u></p> <p>Applicant determines rate of reactor power change to be <b>2%</b> per hour from the INITIAL CONDITIONS provided on the APPLICANT CUE SHEET.</p> <p>Applicant calculates number of hours projected to reach target power as <b>10</b> hrs.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 5:</u> Obtains:</p> <p align="center">Current Rod Position: _____ steps Final Rod Position: _____ steps</p> <p><u>STANDARD:</u></p> <p>Applicant determines current rod position is <b>190</b> steps from the INITIAL CONDITIONS provided on the Applicant Cue Sheet.</p> <p>Applicant determines final rod position is <b>220</b> steps from the INITIAL CONDITIONS provided on the Applicant Cue Sheet.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><b>EXAMINER JPM Steps 6 through 11 evaluate the applicants completion of the second page of Appendix E.</b></p>	

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 6:</u> Determines <math>\Delta\rho</math> Power Defect.</p> <p><b>NOTE:</b> Must be entered into equation as a positive value Power Defect From NUPOP, from Table 7-17, 7-18, or 7-19</p> <p style="text-align: center;"><b><u>1789</u> pcm PD - <u>2230</u> pcm PD = -441 pcm <math>\Delta\rho</math> Power Defect</b>  Initial                      Final</p> <p><u>STANDARD:</u></p> <p>Applicant determines the following:</p> <p style="padding-left: 40px;">The value for initial power level is <b><u>1789</u></b> pcm from Table 7-18.</p> <p style="padding-left: 40px;">The value for the final power level as <b><u>2230</u></b> pcm from Table 7-18, and enters the values in appropriate table locations.</p> <p>Applicant then calculates <math>\Delta\rho</math> Power Defect by algebraically subtracting the Final Power Defect from Initial Power Defect. The value determined is <b><u>-441</u></b> pcm.</p> <p><b>Step is critical since the change in power defect is one of the parameters that are the basis for the calculation.</b></p> <p><u>COMMENTS:</u></p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>



**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 7:</u> Determines <math>\Delta\rho</math> Xenon.</p> <p><b>NOTE:</b> Must be entered into equation as a positive value Initial Xenon From REACTW (either current conditions or projection to initial condition). Final Xenon: From REACTW (projection over time).</p> <p align="center"><u>2739.7</u> pcm XE - <u>2621.5</u> pcm XE = <b>118.2</b> pcm <math>\Delta\rho</math> Xenon Initial                      Final</p> <p><u>STANDARD:</u> Applicant determines the following:</p> <p>Xenon for the initial power level is <u>-2739.7</u> pcm from Xenon REACTW printout and enters <u>2739.7</u> in appropriate table locations.</p> <p>Xenon for final power level as <u>-2621.5</u> pcm from the same printout, and enters <u>2621.5</u> in appropriate table locations.</p> <p>Applicant then calculates <math>\Delta\rho</math> Xenon by algebraically subtracting Final Xenon from Initial Xenon. The value determined is <u>118.2</u> pcm.</p> <p><b>Step is critical since the change in xenon is one of the parameters that are the basis for the calculation.</b></p> <p><u>COMMENTS:</u></p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 8</u> Determines <math>\Delta\rho</math> rods.</p> <p><b>NOTE</b> Must be entered into equation as a positive value Rods Integral worth From NUPOP, Figure 6-24, Figure 6-25, or Figure 6-26.</p> <p><b><u>150 pcm Rods</u> - <u>0 pcm Rods</u> = 150 pcm <math>\Delta\rho</math> Rods</b>  Initial                      Final</p> <p><u>STANDARD:</u> Applicant determines Initial Integral Rod Worth for current rod position as <b><u>150</u> pcm (accept 100 to 200 pcm)</b> from NUPOP Figure 6-25.</p> <p>Applicant determines Final Integral Rod Worth as <b><u>0</u> pcm (accept 0 to 10 pcm)</b> from the same figure, and enters the values in appropriate table locations.</p> <p>Applicant calculates <math>\Delta\rho</math> Rods by algebraically subtracting Final Integral Rod Worth from Initial Integral Rod Worth. The value determined is <b><u>150</u> pcm (accept 100 to 200 pcm)</b>.</p> <p><b>Step is critical since the change in rods is one of the parameters that are the basis for the calculation.</b></p> <p><u>COMMENTS:</u></p>	<p align="center"><b>CRITICAL STEP</b></p> <p align="center">___ SAT</p> <p align="center">___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 9:</u> Determines <math>\Delta\rho</math>.</p> <p style="padding-left: 40px;">Add reactivity values to determine pcm adjustment to be made by changing <math>C_B</math>. (NOTE: Watch the signs.)</p> <p><u>STANDARD:</u> Applicant adds values entered for:</p> <p style="padding-left: 40px;"><math>\Delta\rho</math> POWER DEFECT = (-441 pcm)  <math>\Delta\rho</math> XENON = (118.2 pcm)  <math>\Delta\rho</math> RODS = (150 pcm) (accept 100 to 200 pcm)</p> <p style="padding-left: 40px;">and enters a value of <u>-172.8</u> pcm (accept -223 to -122.8 pcm) as the <b>SUM</b>.</p> <p style="padding-left: 40px;"><b>Step is critical since this is the reactivity change required to accomplish the power change.</b></p> <p><u>COMMENTS:</u></p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**1**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 10</u>: Converts to PPM <math>\Delta</math>.</p> <p>(NUPOP Figure 6-21) <u>-159</u> ppm/%<math>\Delta\rho</math> (Inverse Boron Worth) X <u>-172.8</u> pcm <math>\Delta\rho</math> (needed) X 0.001 %<math>\Delta\rho</math>/pcm = <u>27.5</u> ppm</p> <p><u>STANDARD</u>: Applicant converts the reactivity change into a boron concentration change using the equation provided.</p> <p>Applicant determines Inverse Boron Worth from NUPOP Figure 6-21 to be <u>-159</u> ppm/%<math>\Delta\rho</math> (accept <b>-158.5</b> to <b>-159.5</b> ppm/%<math>\Delta\rho</math>) at 8000 MWD/MTU. After performing the indicated calculation, the applicant determines the change in boron concentration to be <u>27.5</u> ppm (accept <b>19.5</b> to <b>35.4</b> ppm).</p> <p><b>Step is critical to determine the boron concentration change required to accomplish the power change.</b></p> <p><u>COMMENTS</u>:</p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 11</u>: Determines TARGET PPM.</p> <p><u>600</u> Current RCS <math>C_B</math> - <u>27.5</u> Total <math>\Delta C_B</math> = <u>572.5</u> ppm</p> <p><u>STANDARD</u>: Applicant determines Target Boron Concentration performing the indicated calculation and determines the TARGET PPM is <u>572.5</u> ppm (accept <b>564.6</b> to <b>580.5</b> ppm).</p> <p><b>Step is critical since this is the target boron required for the planned power escalation.</b></p> <p><u>COMMENTS</u>:</p> <p align="center"><b><u>END OF TASK</u></b></p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>

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

**1**

**KEY**

**DO NOT HAND TO  
APPLICANT**

# NRC EXAM MATERIAL

WBN Unit 1	Boron Concentration Control	SOI-62.02 Rev. 0053 Page 55 of 58
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Appendix E  
(Page 1 of 2)

## REACTIVITY BALANCE CALCULATION

### 1.0 REACTIVITY BALANCE CALCULATION

#### NOTES

- 1) One calculation is required for each major change. Calculation is an approximation of Final Target  $C_B$
- 2) Appendix E may be used by an SRO to approve and independently verify data provided by Reactor Engineering. In this case, an additional IV by another SRO is **NOT** required

[1] **CALCULATE** Target  $C_B$  by performing the following:

		Date:	Performer Initials:
DATA REQUIRED	DATA		Where To Get
Initial RCS Boron $C_B$	600	ppm	Chem Lab
Core Burnup	8000	MWD/MTU	ICS U7981
Initial Reactor power	80	%	NIS
Final Reactor power	100	%	As required for plant conditions
Total Reactor Power change	20	$\Delta\%$	$\Delta$ Initial to Final Reactor power
Rate of Reactor power change	2	%/hr	As required for plant conditions
Number of hours to change power	10	hr(s)	As required for plant conditions
Current Rod Position	190	steps	ICS or MCR Board
Final Rod Position	220	steps	Final rod position based on estimated number of steps required to control $\Delta I$ and insertion limits for power change.
Initial Reactor Power: %		Final Reactor Power: %	
Parameter	Where To Get	Calculation	Value

# JPM 1 KEY

# NRC EXAM MATERIAL

WBN Unit 1	Boron Concentration Control	SOI-62.02 Rev. 0053 Page 56 of 58
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## Appendix E (Page 2 of 2)

Date \_\_\_\_\_

Initials \_\_\_\_\_

### 1.0 REACTIVITY BALANCE CALCULATION (continued)

$\Delta\rho$ POWER DEFECT	NOTE: Must be entered into equation as a positive value Power Defect From NUPOP, Table 7-17, 7-18, or 7-19.	<u>1789</u> pcm PD - <u>2230</u> pcm PD = Initial Final	<u>-441</u> pcm $\Delta\rho$ POWER DEFECT
$\Delta\rho$ XENON	NOTE: Must be entered into equation as a positive value Initial Xenon From REACTW (either current conditions or projection to initial condition). Final Xenon: From REACTW (projection over time).	<u>2739.7</u> pcm XE - <u>2621.5</u> pcm XE = Initial Final	<u>118.2</u> pcm $\Delta\rho$ XENON
$\Delta\rho$ RODS	NOTE Must be entered into equation as a positive value Rods Integral worth From NUPOP, Figure 6-24, Figure 6-25, or Figure 6-26.	Accept 100-200 pcm      Accept 0-10 pcm <u>150</u> pcm Rods - <u>0</u> pcm Rods = Initial Final	<u>150</u> pcm $\Delta\rho$ RODS
$\Delta\rho$	Add reactivity values to determine pcm adjustment to be made by changing $C_B$ . (NOTE: Watch the signs.)	Accept -223 to -122.8 pcm	<u>-172.8</u> pcm $\Delta\rho$ needed
Convert to PPM $\Delta$	Accept 158.5 to 159.5 pcm      Accept -223 to -122.8 pcm (NUPOP Figure 6-21) <u>-159</u> ppm/% $\Delta\rho$ (Inverse Boron Worth) X <u>-172.8</u> pcm $\Delta\rho$ (needed) X 0.001 % $\Delta\rho$ /pcm =		<u>27.48</u> ppm Total $\Delta C_B$
TARGET PPM		<u>600</u> Current RCS $C_B$ - <u>27.5</u> Total $\Delta C_B$ =	<u>572.5</u> ppm Target $C_B$
PERFORMER: _____			

Accept  
200-100  
pcm

Accept  
19.5 to  
35.4 pcm  
Accept  
564.6 to  
580.5 ppm

[2] APPROVE calculation and Target PPM change for planned change in reactor power. \_\_\_\_\_ SRO

# JPM 1 KEY

**1**

# **Handout Package for Applicant**



# APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

## INITIAL CONDITIONS:

1. Unit 1 is operating at 80% power.
2. Core average burnup is 8000 MWD/MTU, middle-of-life.
3. Control Bank "D" rods are at 190 steps.
4. RCS boron concentration is 600 ppm.
5. Target rod position at 100% power will be 220 steps on Control Bank "D."
6. Power will be raised at 2% per hour.
7. Xenon printout from REACTINW has been performed by an STA and is provided with this cue sheet.

## INITIATING CUES:

The Shift Manager has directed you to calculate the target boron concentration for raising power to 100% per SOI-62.02, Appendix E, "Reactivity Balance Calculation."

# APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

[REACTW - VERS WB3.4]

XENON CALCULATION  
WATTS BAR UNIT 1 CYCLE 11  
MOL NIX XENON DATA

TIME (HRS)	POWER (%)	XE (% EQ)	I (% EQ)	XE WORTH (PCM)	DEL XE WORTH (PCM)
.0	80.0	93.2	80.0	-2739.7	.0
1.0	82.0	92.9	80.2	-2732.2	7.5
2.0	84.0	92.5	80.6	-2720.0	12.2
3.0	86.0	92.0	81.1	-2705.3	14.7
4.0	88.0	91.5	81.8	-2689.6	15.7
5.0	90.0	91.0	82.6	-2674.2	15.4
6.0	92.0	90.5	83.6	-2659.8	14.4
7.0	94.0	90.0	84.6	-2647.0	12.8
8.0	96.0	89.7	85.7	-2636.3	10.7
9.0	98.0	89.4	87.0	-2627.8	8.5
10.0	100.0	89.2	88.3	-2621.5	6.3

<b>WBN Unit 1</b>	<b>Boron Concentration Control</b>	<b>SOI-62.02 Rev. 0055 Page 55 of 58</b>
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**Appendix E  
(Page 1 of 2)**

**REACTIVITY BALANCE CALCULATION**

**1.0 REACTIVITY BALANCE CALCULATION**

<b>NOTES</b>	
1)	One calculation is required for each major change. Calculation is an approximation of Final Target $C_B$
2)	Appendix E may be used by an SRO to approve and independently verify data provided by Reactor Engineering. In this case, an additional IV by another SRO is <b>NOT</b> required

[1] **CALCULATE** Target  $C_B$  by performing the following:

Date:		Performer Initials:	
DATA REQUIRED	DATA	Where To Get	
Initial RCS Boron $C_B$	ppm	Chem Lab	
Core Burnup	MWD/MTU	ICS U7981	
Initial Reactor power	%	NIS	
Final Reactor power	%	As required for plant conditions	
Total Reactor Power change	$\Delta\%$	$\Delta$ Initial to Final Reactor power	
Rate of Reactor power change	%/hr	As required for plant conditions	
Number of hours to change power	hr(s)	As required for plant conditions	
Current Rod Position	steps	ICS or MCR Board	
Final Rod Position	steps	Final rod position based on estimated number of steps required to control $\Delta I$ and insertion limits for power change.	

<b>Initial Reactor Power:</b>	%	<b>Final Reactor Power:</b>	%	
<b>Parameter</b>	<b>Where To Get</b>	<b>Calculation</b>	<b>Value</b>	

<b>WBN Unit 1</b>	<b>Boron Concentration Control</b>	<b>SOI-62.02 Rev. 0055 Page 56 of 58</b>
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**Appendix E  
(Page 2 of 2)**

Date \_\_\_\_\_

Initials

**1.0 REACTIVITY BALANCE CALCULATION (continued)**

Δρ POWER DEFECT	<b>NOTE:</b> Must be entered into equation as a positive value Power Defect From NUPOP, Table 7-17, 7-18, or 7-19.	_____pcm PD – _____pcm PD = Initial                      Final	_____pcm Δρ POWER DEFECT
Δρ XENON	<b>NOTE:</b> Must be entered into equation as a positive value Initial Xenon From REACTW (either current conditions or projection to initial condition). Final Xenon: From REACTW (projection over time).	_____pcm XE – _____pcm XE = Initial                      Final	_____pcm Δρ XENON
Δρ RODS	<b>NOTE</b> Must be entered into equation as a positive value Rods Integral worth From NUPOP, Figure 6-24, Figure 6-25, or Figure 6-26.	_____pcm Rods – _____pcm Rods = Initial                      Final	_____pcm Δρ RODS
Δρ	Add reactivity values to determine pcm adjustment to be made by changing C <sub>B</sub> . ( <b>NOTE:</b> Watch the signs.)	<b>SUM</b>	_____pcm Δρ needed
Convert to PPM Δ	(NUPOP Figure 6-21) _____ppm/%Δρ (Inverse Boron Worth) X _____pcm Δρ (needed) X 0.001 %Δρ/pcm =		_____ppm Total ΔC <sub>B</sub>
<b>TARGET PPM</b>	_____Current RCS C <sub>B</sub> – _____Total ΔC <sub>B</sub> =		_____ppm Target C <sub>B</sub>
<b>PERFORMER:</b>			

[2] **APPROVE** calculation and Target PPM change for planned change in reactor power. \_\_\_\_\_ SRO

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# Watts Bar Nuclear Plant

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2013-03 NRC Exam

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Administrative JPM 2

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**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**2**

**2013-03 NRC Exam**

**EVALUATION SHEET**

**Task:** EVALUATE CRITICAL SAFETY FUNCTION STATUS TREES.  
**Alternate Path:** n/a  
**Facility JPM #:** Modified  
**Safety Function:** n/a      **Title:** Conduct of Operations  
**K/A**      2.1.7      Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.  
**Rating(s):** 4.4/4.7      **CFR:** 41.5 / 43.5 / 45.12 / 45.13  
**Evaluation Method:** Simulator     In-Plant       Classroom  
**References:** FR-0, "Status Trees," Rev.14.  
**Task Number:** STA-113-FR-0-001      **Title:** Analyze plant conditions utilizing status trees and/or Integrated Computer System.

**Task Standard:** The applicant evaluates parameters displayed on the **STATIC SIMULATOR** and determines the following:  
1. Status Tree Priority:  
FR-S - ORANGE  
FR-C - YELLOW  
FR-H - YELLOW  
FR-P - GREEN  
FR-Z - ORANGE  
FR-I - GREEN  
2. 1-FR-S.1, "Nuclear Power Generation/ATWS," ORANGE PATH is the highest priority CSFST.

**Validation Time:** 15 minutes      **Time Critical:** Yes  No

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**Applicant:** \_\_\_\_\_ NAME \_\_\_\_\_ Docket No. \_\_\_\_\_ Time Start: \_\_\_\_\_  
Time Finish: \_\_\_\_\_  
**Performance Rating:** SAT  UNSAT  Performance Time \_\_\_\_\_

**Examiner:** \_\_\_\_\_ NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_ / \_\_\_\_\_ DATE \_\_\_\_\_

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**COMMENTS**

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**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**2**

2013-03 NRC Exam

**SIMULATOR OPERATOR INSTRUCTIONS:**

1. **ENSURE NRC Examination Security has been established.**
2. **RESET to Initial Condition 347 by performing the following actions:**
  - a. **Select ICManger on the THUNDERBAR menu (right hand side of Instructor Console Screen).**
  - b. **Locate IC# 347.**
  - c. **Right “click” on IC# 347.**
  - d. **Select Reset on the drop down menu.**
  - e. **Right “click” on RESET.**
  - f. **Enter the password for IC# 347.**
  - g. **Select “Yes” on the INITIAL CONDITION RESET pop-up window.**
  - h. **Perform SWITCH CHECK.**
3. **ENSURE the following information appears on the Director Summary Screen:**

Key		Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
hs-72-10a-1	05010 rwst spray hdr b fcv(green)	O		00:00:00	00:00:00	00:00:00		Off	Off
hs-72-21a-1	06010 cntmt spray pump b mtr sw (green)	O		00:00:00	00:00:00	00:00:00		Off	Off
hs-72-2a-1	05070 cs hdr b isol vlv hand sw (green)	O		00:00:00	00:00:00	00:00:00		Off	Off
hs-72-45a-1	05030 cntmt sump hdr b fcv(green)	O		00:00:00	00:00:00	00:00:00		Off	Off
hs-72-13a-1	05050 cs pump b recirc fcv (green)	O		00:00:00	00:00:00	00:00:00		Off	Off
fi-3-147a	02070 stm gen #3 aux fw in	O		00:00:00	00:00:00	00:00:00		130	110
fi-3-147b	02070 stm gen #3 aux fw in	O		00:00:00	00:00:00	00:00:00		130	110
csr04	containment spray pump b power	R		00:00:00	00:00:00	00:00:00		Off	Off
fw29c	main fw reg vlv fcv-3-90 fail position	M	1	00:00:00	00:00:00	00:00:00		0	0
th03b	loca - small leak loop2	M	1	00:00:00	00:00:00	00:00:00		37.5	37.5
cs01a	containment spray system pump a trip	M	13	00:00:00	00:00:00	00:00:00		Active	Active

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**2**

2013-03 NRC Exam

Key		Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
ni04a	ir channel failure ir chnl 1	M	19	00:00:00	00:00:00	00:00:00		0.05	0.05
ni04b	ir channel failure ir chnl 2-	M	19	00:00:00	00:00:00	00:00:00		0.055	0.055
nini35d	07030 n35 startup-rate (dpm) ao	O	19	00:00:00	00:00:00	00:00:00		0.33	0.33
nini36d	07030 n36 startup-rate (dpm) ao	O	18	00:00:00	00:00:00	00:00:00		0.35	0.35

4. **ENSURE SIMULATOR REMAINS IN FREEZE FOR THE DURATION OF ALL OF THE JPM PERFORMANCES.**
6. **PERFORM a board walk-down to verify:**
  - a. **Startup Rate on 1-NI-35D, IR STARTUP RATE DPM and 1-NI-36D, IR STARTUP RATE DPM indicate a positive value, approximately 0.3 DPM.**
  - b. **TOTAL AFW flow is approximately 430 gpm.**
  - c. **WHITE motor trip-out and GREEN light LIT on 1-HS-72-27A, CNTMT SPRAY PUMP A.**
  - d. **Containment pressure is approximately 5 psig.**
7. **ENSURE HOLD ORDER Tags are hung on 1-HS-72-10A, CNTMT SPRAY PUMP B, 1-HS-72-21A, RWST TO CS PMP B SUCTION, 1-HS-72-2A, CNTMT SPRAY HDR B TO CNTMT, 1-HS-72-13, CNTMT SPRAY PMP B MINI FLOW.**
8. **ENSURE ALL ICS Screens are closed on each ICS terminal. Windows Desktop screen should be visible.**
9. **RESET/ACKNOWLEDGE annunciators that are flashing.**
10. **INFORM the Examiner that Copies of FR-0, "Status Trees," are available for each applicant as part of this JPM package.**



**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**2**

2013-03 NRC Exam

**DIRECTIONS TO APPLICANT**

**DIRECTION TO APPLICANT:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the cue sheet I provided you.

**NOTE: THE SIMULATOR WILL REMAIN IN FREEZE FOR THE DURATION OF THE JPM.**

**INITIAL CONDITIONS:**

1. Unit 1 tripped from 100% power.
2. A Safety Injection occurred 15 minutes ago.
3. The crew is performing actions in 1-E-1, "Loss of Reactor or Secondary Coolant."
4. The ICS/SPDS computer is NOT available for monitoring Critical Safety Functions.

**INITIATING CUE:**

You have been directed perform a manual evaluation the Critical Safety Functions using FR-0, "Status Trees," based on the indications displayed on the simulator.

**ENSURE THAT YOU:**

1. Document each Critical Safety Function evaluation performed in FR-0, "Status Trees."
2. Report the highest priority Function Restoration Procedure (FR) required to be implemented, if any.

# WATTS BAR NUCLEAR PLANT JOB PERFORMANCE MEASURE

## 2

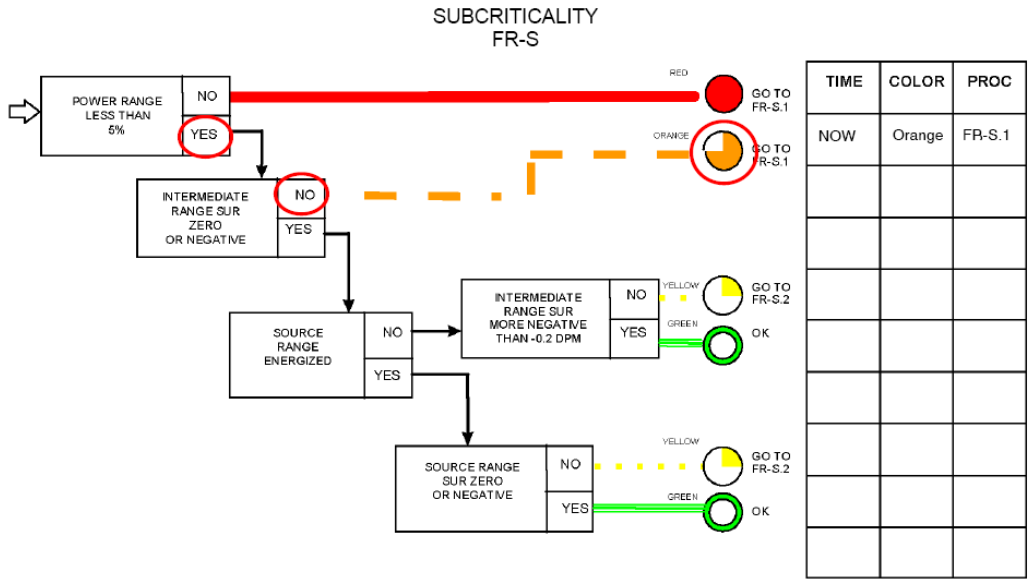
2013-03 NRC Exam

<b>STEP/STANDARD</b>	<b>SAT/UNSAT</b>
----------------------	------------------

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

**STEP 1:** Evaluate SUBCRITICALITY FR-S Status Tree.

**STANDARD:**



**CRITICAL  
STEP**

\_\_\_ SAT

\_\_\_ UNSAT

\_\_\_ Applicant determines that an ORANGE path exists on FR-S Status Tree, and that FR-S.1, "Nuclear Power Generation/ATWS," is required to be entered.

**The step is critical to properly evaluate FR-0, "Status Trees," to determine that an ORANGE path condition exists. This is the highest priority FR for the conditions given. If this is not evaluated properly, a transition to a lower level procedure could occur, and the highest priority FR would not be implemented.**

COMMENTS:

# WATTS BAR NUCLEAR PLANT JOB PERFORMANCE MEASURE

## 2

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT																						
<p><b>STEP 2:</b> Evaluate CORE COOLING FR-C Status Tree.</p> <p><b>STANDARD:</b></p> <div style="text-align: center;"> <p><b>CORE COOLING FR-C</b></p> </div>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p> <table border="1" style="margin-top: 20px;"> <thead> <tr> <th>COLOR</th> <th>PROC</th> </tr> </thead> <tbody> <tr> <td>Yellow</td> <td>FR-C.3</td> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	COLOR	PROC	Yellow	FR-C.3																		
COLOR	PROC																						
Yellow	FR-C.3																						
<p>___ Applicant determines that a YELLOW path exists on FR-C Status Tree. The applicant notes that when no RED or ORANGE path exists, the YELLOW path Function Restoration Instruction can be implemented at the Operator's discretion.</p> <p><b>The step is critical to properly evaluate FR-0, "Status Trees," to determine each CSF properly to complete task successfully. This CSF evaluation should determine the CSF color and procedure, if any, that apply.</b></p> <p><b>COMMENTS:</b></p>																							

# WATTS BAR NUCLEAR PLANT JOB PERFORMANCE MEASURE

## 2

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT																						
<p><b>STEP 3:</b> Evaluate HEAT SINK FR-H Status Tree.</p> <p><u>STANDARD:</u></p> <div style="text-align: center;"> </div>	<p style="text-align: center;"><b>CRITICAL STEP</b></p> <p style="text-align: center;">___ SAT</p> <p style="text-align: center;">___ UNSAT</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 20px;"> <thead> <tr> <th style="width: 50%;">COLOR</th> <th style="width: 50%;">PROC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Yellow</td> <td style="text-align: center;">FR-H.5</td> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	COLOR	PROC	Yellow	FR-H.5																		
COLOR	PROC																						
Yellow	FR-H.5																						
<p>___Applicant determines that a YELLOW path exists on FR-H Status Tree. The applicant notes that when no RED or ORANGE path exists, the YELLOW path Function Restoration Instruction can be implemented at the Operator’s discretion.</p> <p><b>The step is critical to properly evaluate FR-0, “Status Trees,” to determine each CSF properly to complete task successfully. This CSF evaluation should determine the CSF color and procedure, if any, that apply.</b></p> <p><u>COMMENTS:</u></p>																							

# WATTS BAR NUCLEAR PLANT JOB PERFORMANCE MEASURE

## 2

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><b>STEP 4:</b> Evaluate PRESSURIZED THERMAL SHOCK FR-P Status Tree.</p> <p><b>STANDARD:</b></p> <div style="text-align: center;"> <p><b>PRESSURIZED THERMAL SHOCK FR-P</b></p> </div>	

# WATTS BAR NUCLEAR PLANT JOB PERFORMANCE MEASURE

## 2

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT																						
<p><b>STEP 5:</b> Evaluate CONTAINMENT FR-Z Status Tree.</p> <p><b>STANDARD:</b></p> <div style="text-align: center;"> <p>CONTAINMENT FR-Z</p> </div> <p style="text-align: center;">Page 10 of 11</p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>COLOR</th> <th>PROC</th> </tr> </thead> <tbody> <tr> <td>Orange</td> <td>FR-Z.1</td> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	COLOR	PROC	Orange	FR-Z.1																		
COLOR	PROC																						
Orange	FR-Z.1																						
<p>___ Applicant determines that an ORANGE path exists on FR-Z Status Tree, and that FR-Z.1 is required to be entered after FR-S.1 actions are complete (assuming the conditions still exist).</p> <p><b>The step is critical to properly evaluate FR-0, “Status Trees,” to determine each CSF properly to complete task successfully. This CSF evaluation should determine the CSF color and procedure, if any, that apply.</b></p> <p><b>COMMENTS:</b></p>																							

# WATTS BAR NUCLEAR PLANT JOB PERFORMANCE MEASURE

## 2

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT																						
<p><b>STEP 6:</b> Evaluate INVENTORY FR-I Status Tree.</p> <p><b>STANDARD:</b></p> <div style="text-align: center;"> <p>INVENTORY FR-I</p> </div>	<p style="text-align: center;"><b>CRITICAL STEP</b></p> <p style="text-align: center;">___ SAT</p> <p style="text-align: center;">___ UNSAT</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50px;">COLOR</th> <th style="width: 50px;">PROC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Green</td> <td style="text-align: center;">N/A</td> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	COLOR	PROC	Green	N/A																		
COLOR	PROC																						
Green	N/A																						
<p>___Applicant determines that a GREEN path exists on FR-I Status Tree.</p> <p><b>The step is critical to properly evaluate FR-0, “Status Trees,” to determine each CSF properly to complete task successfully. This CSF evaluation should determine the CSF color and procedure, if any, that apply.</b></p> <p><b>COMMENTS:</b></p>																							

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**2**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 7:</u>      Determination of priority of Critical Safety Functions.</p> <p><u>STANDARD:</u></p> <p>Applicant evaluates the results of FR-0, "Status Trees," and determines that <b>FR-S, "SUBCRITICALITY," ORANGE PATH</b> is of the highest priority and that FR-S.1, "Nuclear Power Generation/ATWS," must be implemented.</p> <p><b>The step is critical to properly evaluate FR-0, "Status Trees," to determine each CSF properly to complete task successfully. This CSF evaluation should determine the CSF color and procedure, if any, that apply.</b></p> <p><u>COMMENTS:</u></p> <p align="center"><b>END OF TASK</b></p>	<p align="center"><b>CRITICAL STEP</b></p> <p align="center">___ SAT</p> <p align="center">___ UNSAT</p>

**STOP TIME** \_\_\_\_\_



**2 KEY**

**DO NOT HAND TO  
APPLICANT**

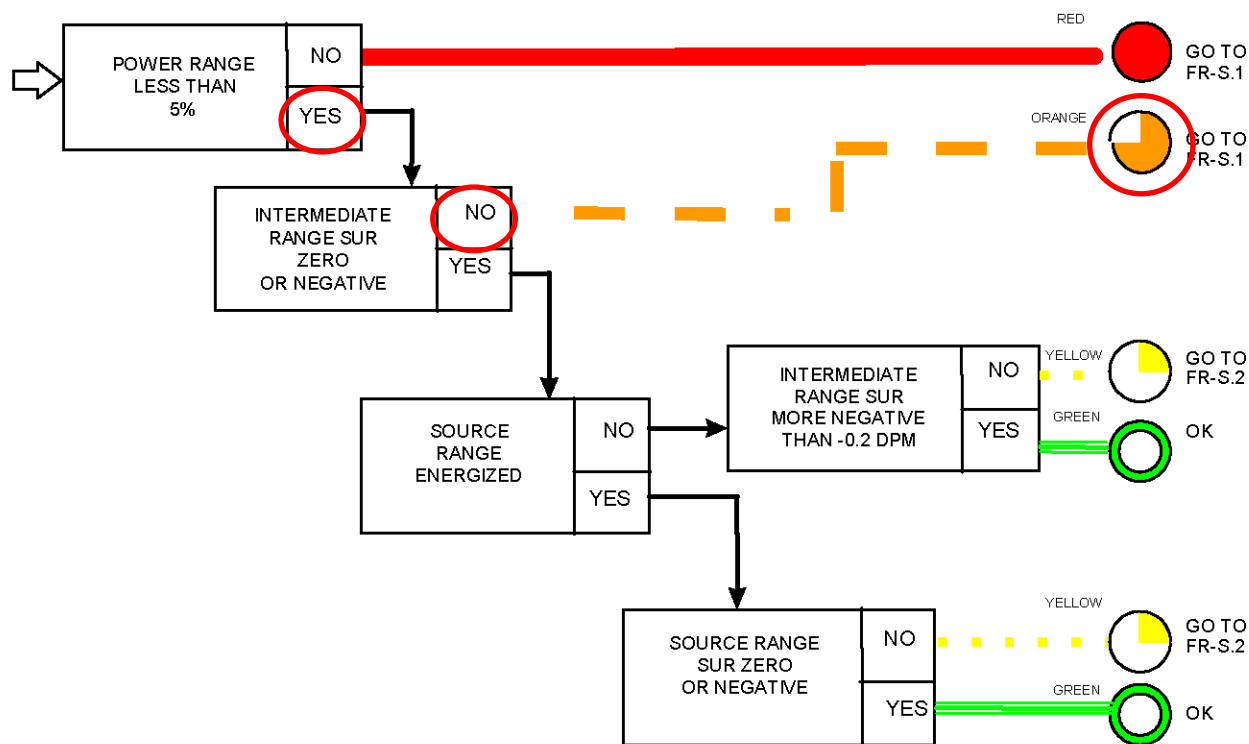
# NRC EXAM MATERIAL

WBN Unit 1	Status Trees	FR-0 Rev. 0014
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## Attachment 1 (Page 1 of 8)

### Monitoring Critical Safety Functions

#### SUBCRITICALITY FR-S



TIME	COLOR	PROC
NOW	Orange	FR-S.1

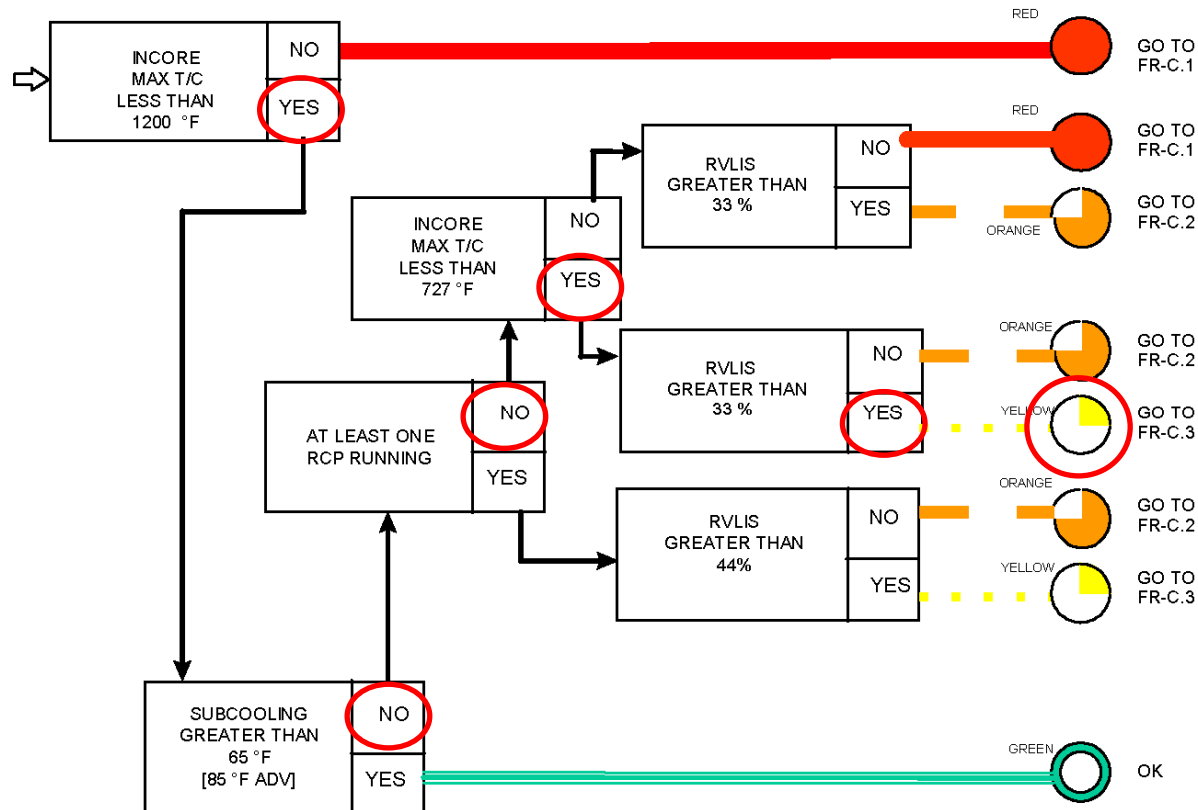
# NRC EXAM MATERIAL

WBN Unit 1	Status Trees	FR-0 Rev. 0014
---------------	--------------	-------------------

## Attachment 1 (Page 2 of 8)

### Monitoring Critical Safety Functions

#### CORE COOLING FR-C



COLOR	PROC
Yellow	FR-C.3

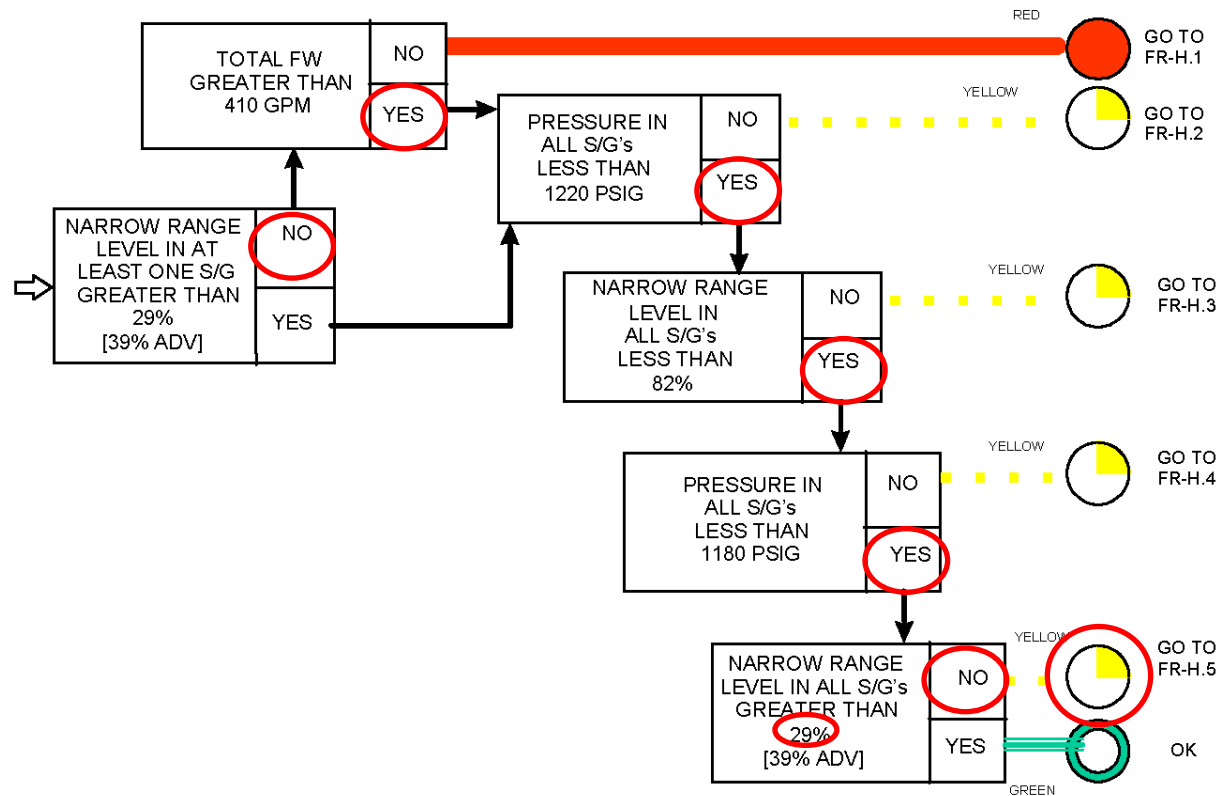
# NRC EXAM MATERIAL

WBN Unit 1	Status Trees	FR-0 Rev. 0014
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## Attachment 1 (Page 3 of 8)

### Monitoring Critical Safety Functions

#### HEAT SINK FR-H



COLOR	PROC
Yellow	FR-H.5

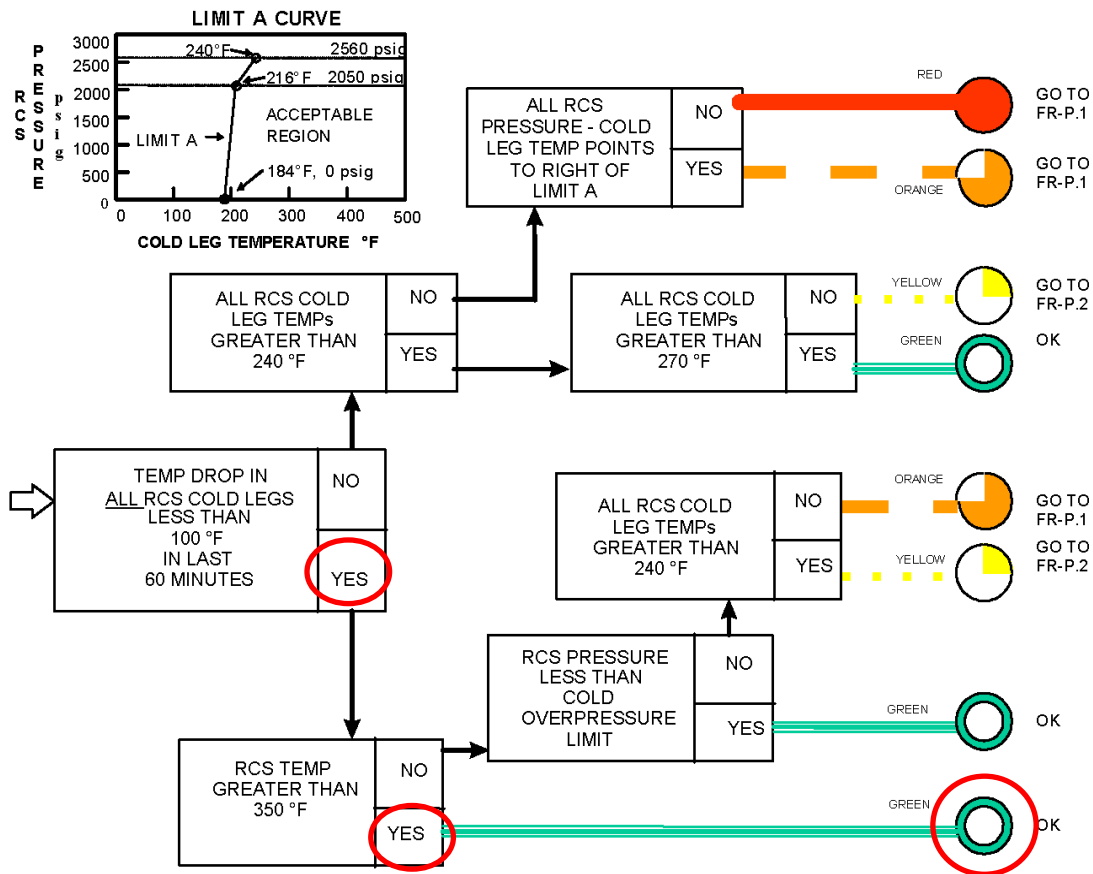
# NRC EXAM MATERIAL

WBN Unit 1	Status Trees	FR-0 Rev. 0014
---------------	--------------	-------------------

## Attachment 1 (Page 4 of 8)

### Monitoring Critical Safety Functions

#### PRESSURIZED THERMAL SHOCK FR-P



COLOR	PROC
Green	N/A

# NRC EXAM MATERIAL

WBN  
Unit 1

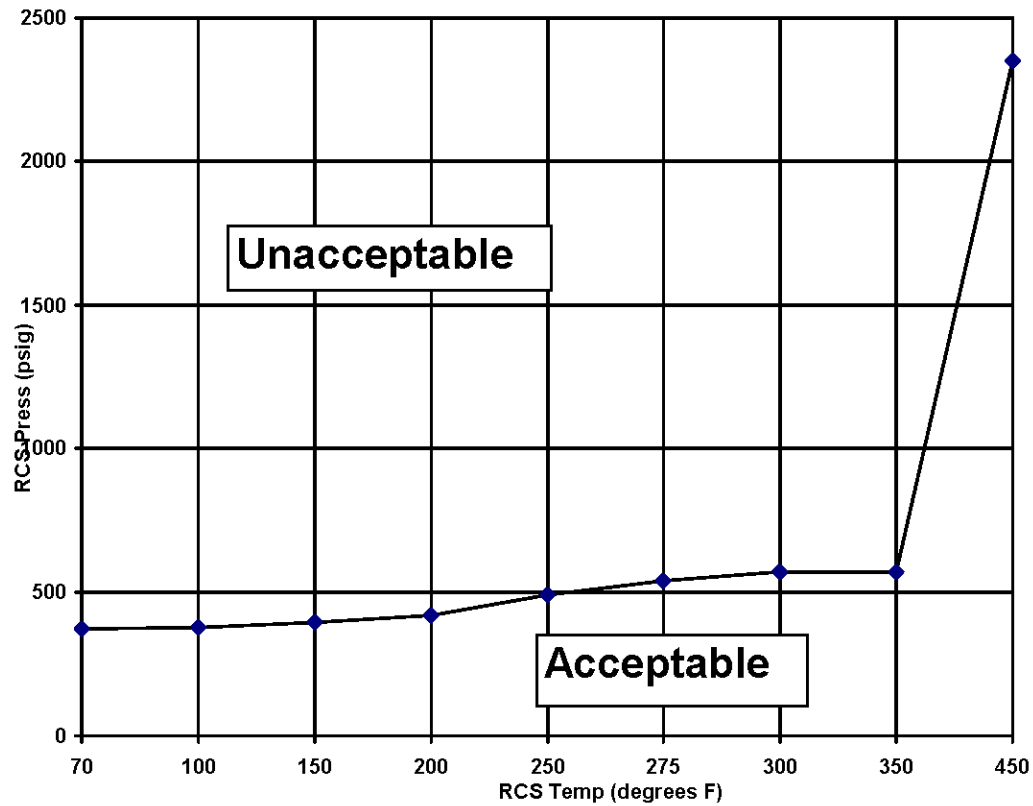
Status Trees

FR-0  
Rev. 0014

Attachment 1  
(Page 5 of 8)

## Monitoring Critical Safety Functions

COLD OVERPRESSURE LIMIT CURVE  
FIGURE 1



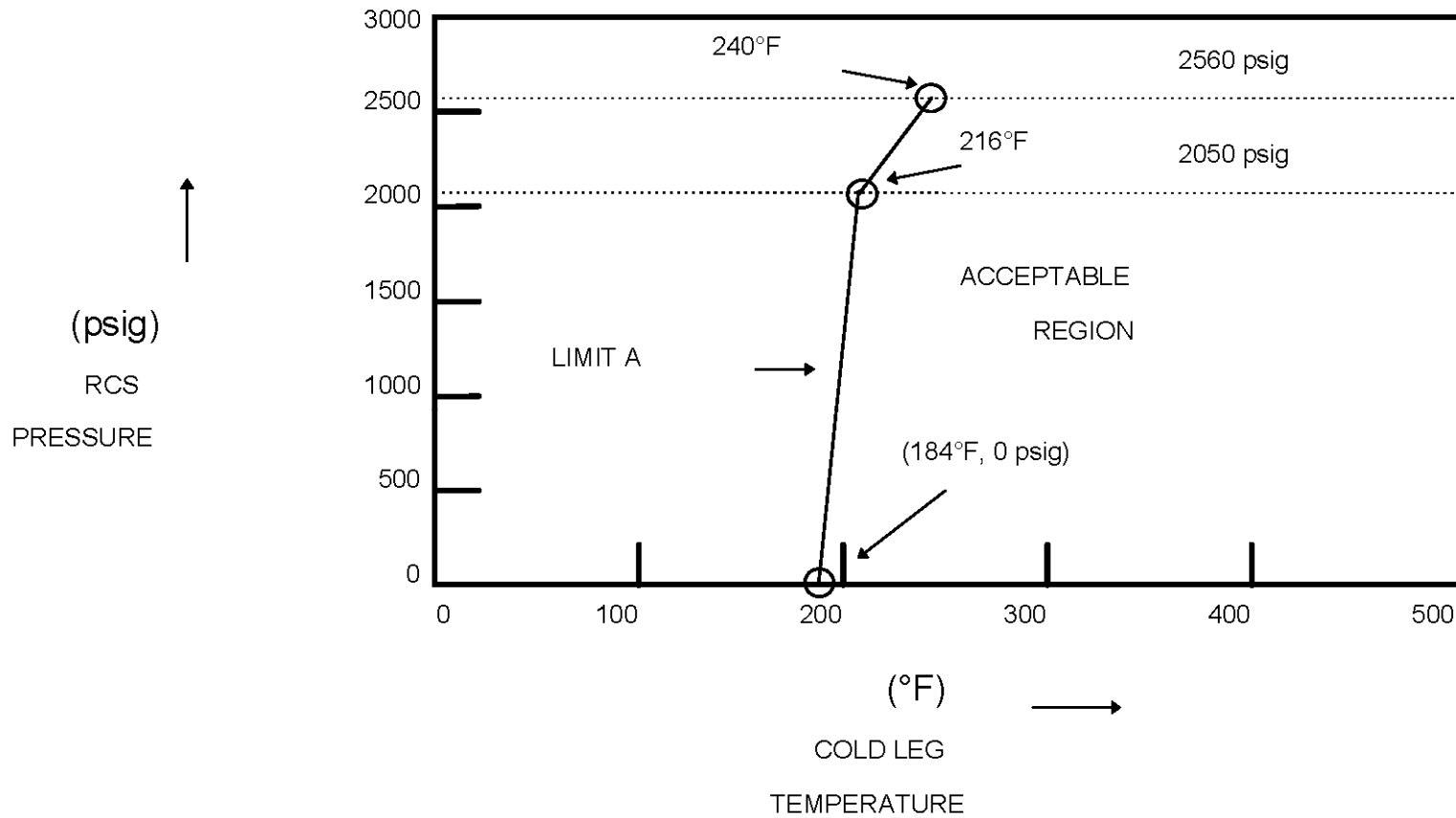
# NRC EXAM MATERIAL

WBN Unit 1	Status Trees	FR-0 Rev. 0014
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## Attachment 1 (Page 6 of 8)

### Monitoring Critical Safety Functions

LIMIT A CURVE  
FIGURE 2



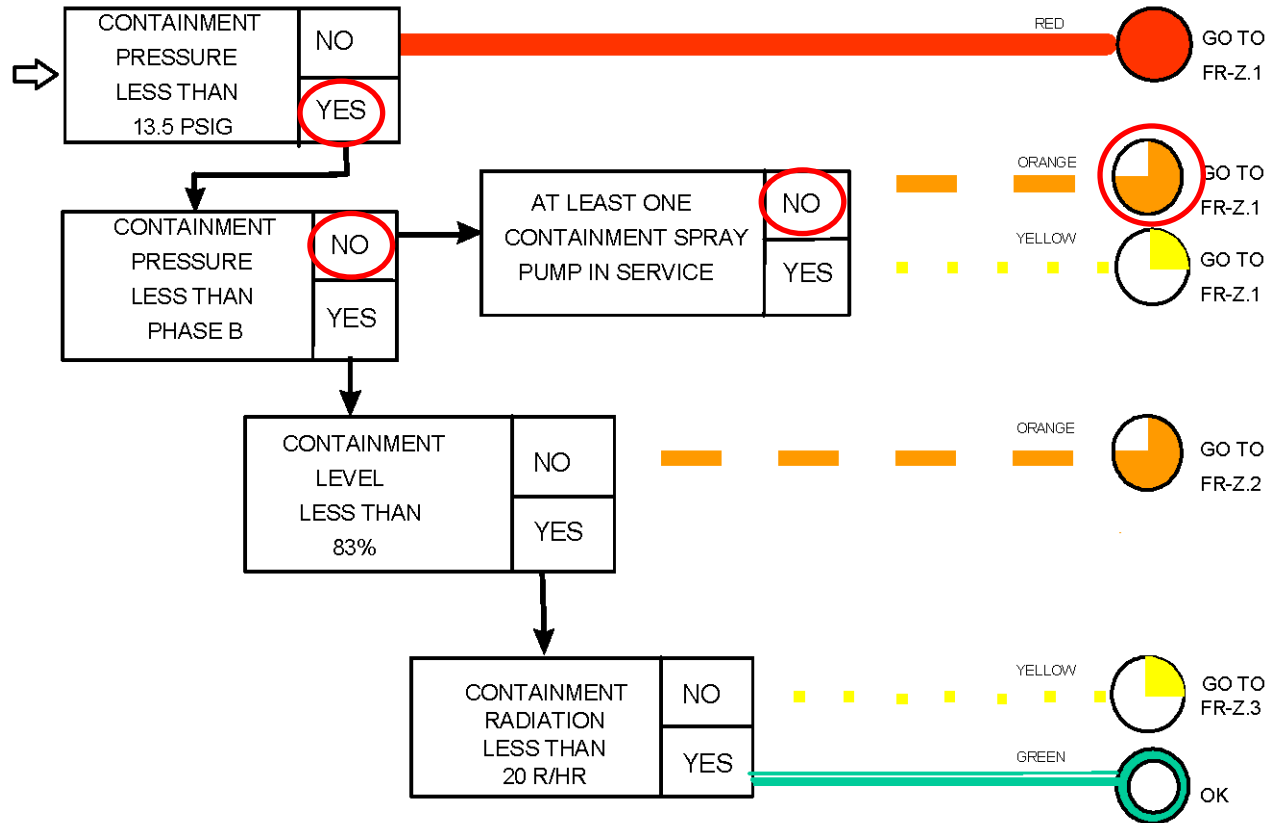
# NRC EXAM MATERIAL

WBN Unit 1	Status Trees	FR-0 Rev. 0014
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## Attachment 1 (Page 7 of 8)

### Monitoring Critical Safety Functions

#### CONTAINMENT FR-Z



COLOR	PROC
Orange	FR-Z.1



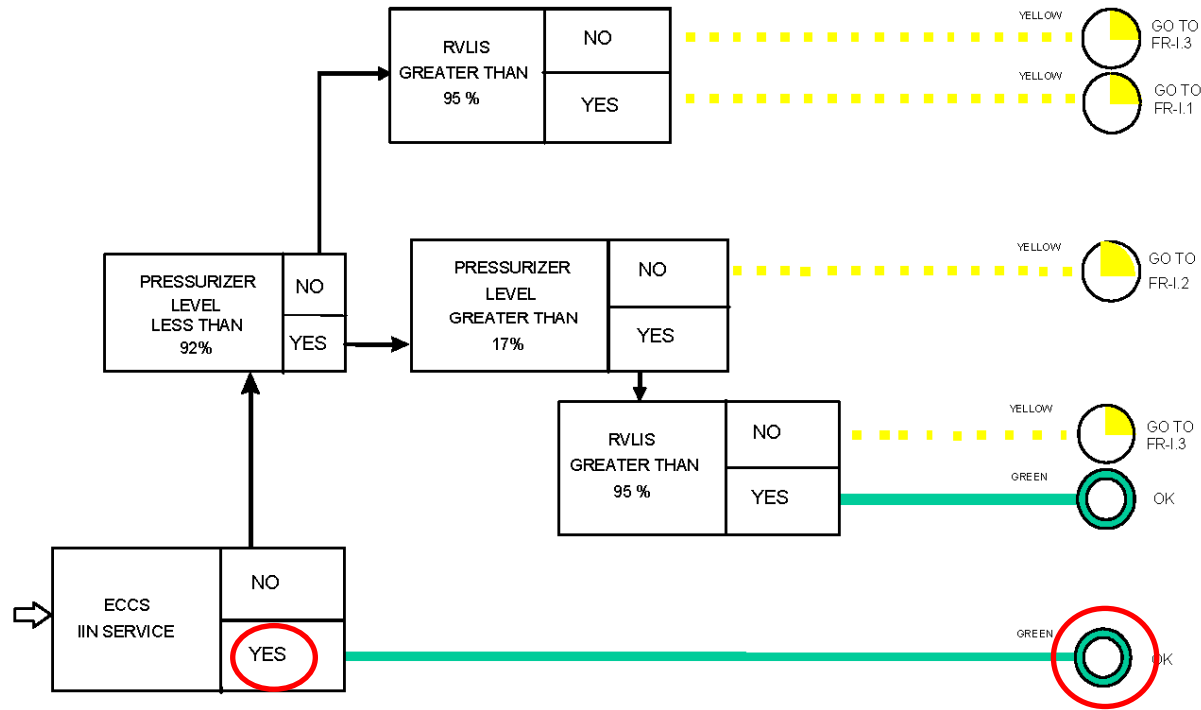
# NRC EXAM MATERIAL

<b>WBN Unit 1</b>	<b>Status Trees</b>	<b>FR-0 Rev. 0014</b>
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## Attachment 1 (Page 8 of 8)

### Monitoring Critical Safety Functions

#### INVENTORY FR-I



COLOR	PROC
Green	N/A

**2**

# **Handout Package for Applicant**

# APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

**NOTE: THE SIMULATOR WILL REMAIN IN FREEZE FOR THE DURATION OF THE JPM.**

## INITIAL CONDITIONS:

1. Unit 1 tripped from 100% power.
2. A Safety Injection occurred 15 minutes ago.
3. The crew is performing actions in 1-E-1, "Loss of Reactor or Secondary Coolant."
4. The ICS/SPDS computer is NOT available for monitoring Critical Safety Functions.

## INITIATING CUE:

You have been directed perform a manual evaluation the Critical Safety Functions using FR-0, "Status Trees," based on the indications displayed on the simulator.

## ENSURE THAT YOU:

1. Document each Critical Safety Function evaluation performed in FR-0, "Status Trees."
2. Report the highest priority Function Restoration Procedure (FR) required to be implemented, if any.



Watts Bar Nuclear Plant

**Unit 1**

Emergency Operating Instruction

**FR-0**

**Status Trees**

Revision 0014

Quality Related

Level of Use: Continuous Use

Effective Date: 12-21-2010

Responsible Organization: OPS, Operations

Prepared By: Nicholas Armour

Approved By: Brian McInay

**Current Revision Description**

Minor/editorial revision: Converted to Word 2007 (PCR 4899).

<b>WBN Unit 1</b>	<b>Status Trees</b>	<b>FR-0 Rev. 0014</b>
-----------------------	---------------------	---------------------------

**1.0 PURPOSE**

This instruction provides parameters to be monitored for challenges to Critical Safety Functions and to identify the appropriate Function Restoration Instruction to implement.

**2.0 SYMPTOMS AND ENTRY CONDITIONS**

Status Trees monitoring is initiated when transitioned out of E-0, Reactor Trip or Safety Injection, or as instructed in E-0.

<b>WBN Unit 1</b>	<b>Status Trees</b>	<b>FR-0 Rev. 0014</b>
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Step	Action/Expected Response	Response Not Obtained
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### 3.0 OPERATOR ACTIONS

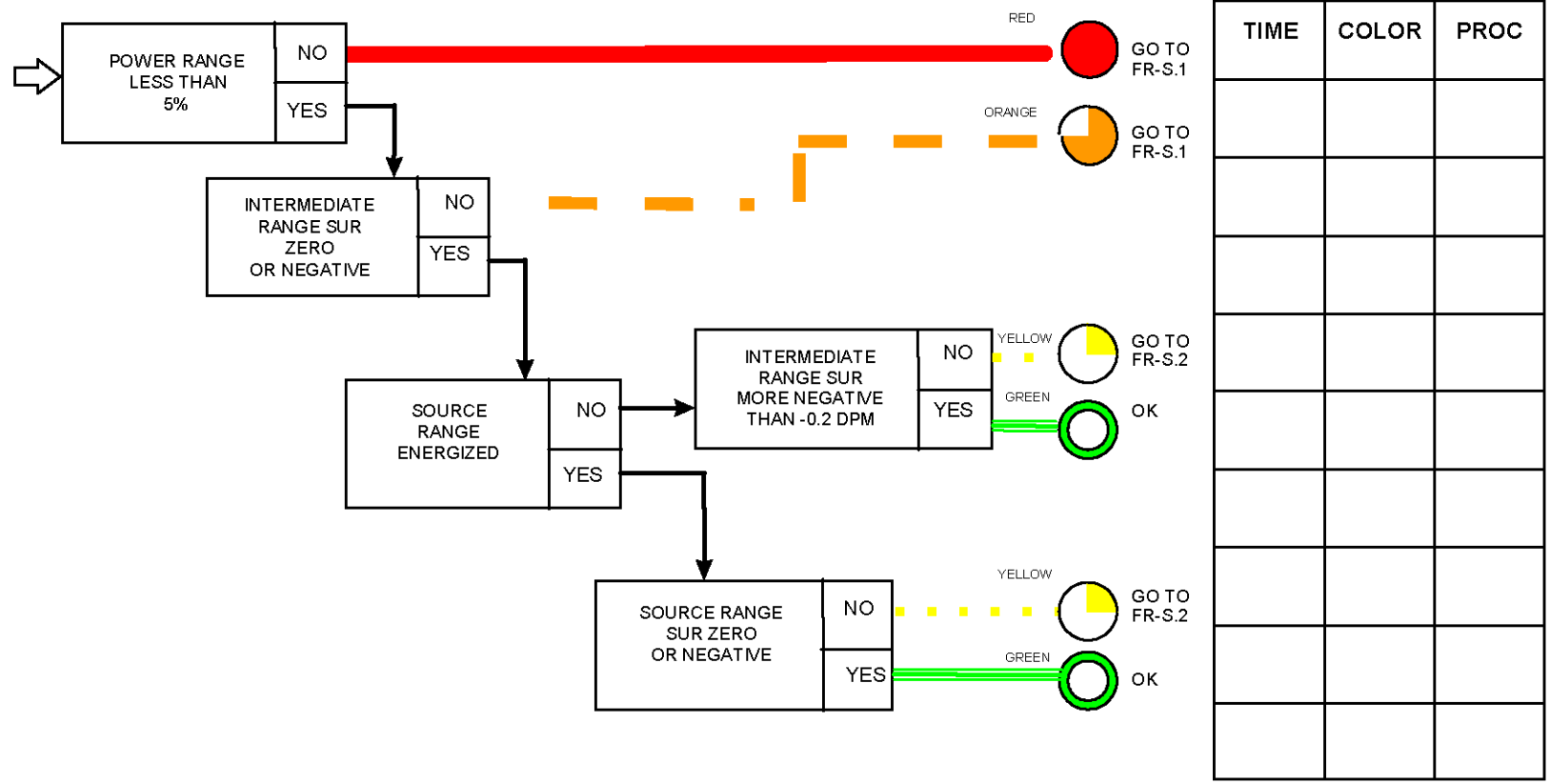
**NOTE** The following rules of usage apply to Status Tree monitoring.

- A. While any RED or ORANGE path exists, the Status Trees will be monitored continuously. When no RED or ORANGE path exists, the Status Trees will be monitored every 10 to 20 minutes until the plant operation is controlled by normal operating instructions (GOs) with ESF System ARMED, **OR** the plant is in COLD SHUTDOWN.
- B. Status Trees shall be monitored in the following priority:
  - 1. FR-S, Subcriticality,
  - 2. FR-C, Core Cooling,
  - 3. FR-H, Heat Sink,
  - 4. FR-P, Pressurized Thermal Shock (PTS),
  - 5. FR-Z, Containment,
  - 6. FR-I, Inventory.
- C. If a RED path is diagnosed, then the Function Restoration Instruction will be implemented IMMEDIATELY.
- D. If an ORANGE path is diagnosed, then the remaining Status Trees will be checked. If **NO** RED path exists, then the ORANGE path Function Restoration Instruction will be implemented.
- E. Once implemented due to any RED or ORANGE path, that Function Restoration Instruction will be performed to completion or to a point of transition UNLESS a higher priority condition develops.
- F. When no RED or ORANGE path exists, the YELLOW path Function Restoration Instruction can be implemented at the Operator's discretion.

**Attachment 1  
(Page 1 of 8)**

**Monitoring Critical Safety Functions**

**SUBCRITICALITY  
FR-S**



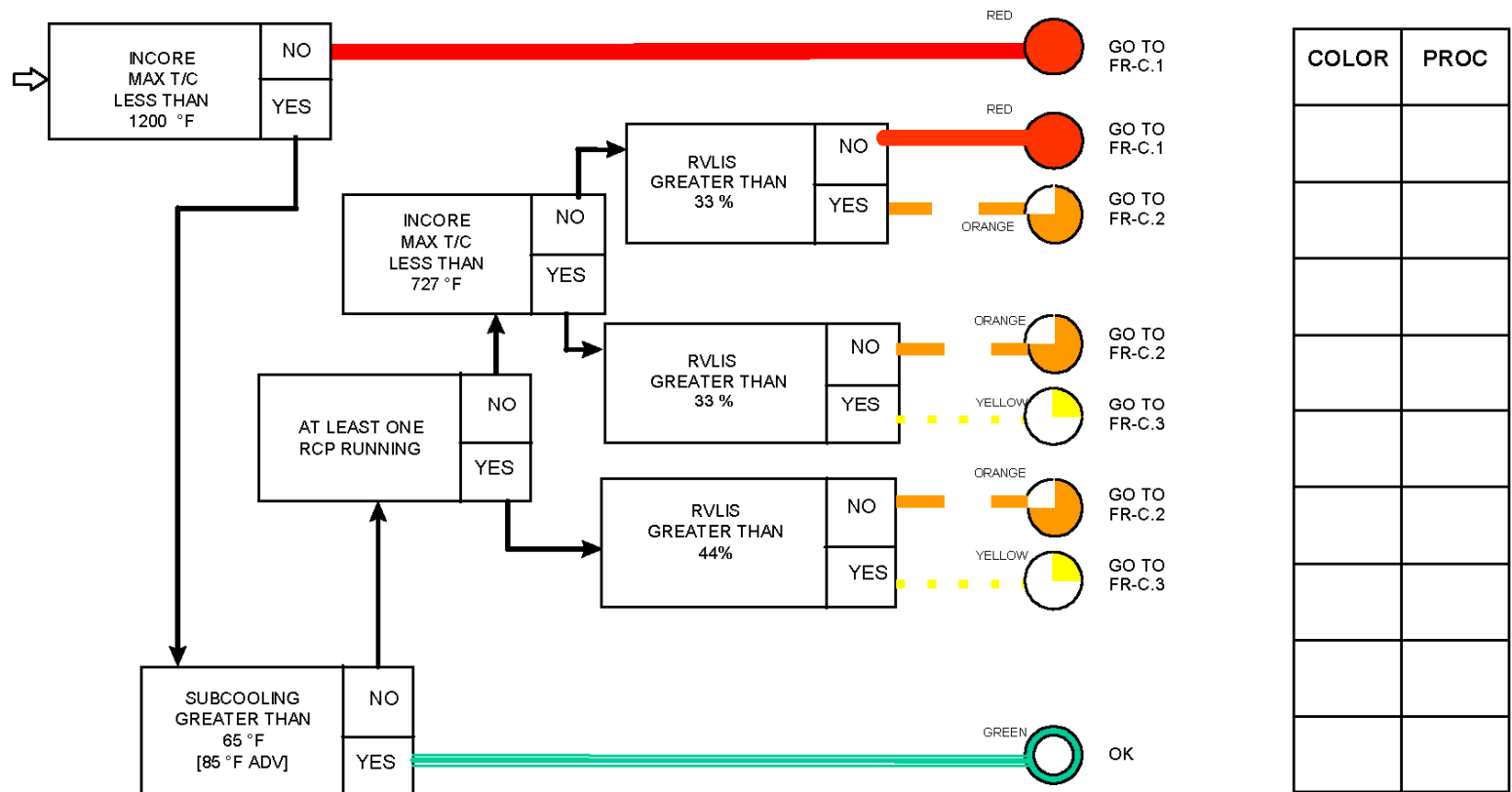
TIME	COLOR	PROC

<b>WBN Unit 1</b>	<b>Status Trees</b>	<b>FR-0 Rev. 0014</b>
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**Attachment 1  
(Page 2 of 8)**

**Monitoring Critical Safety Functions**

**CORE COOLING  
FR-C**

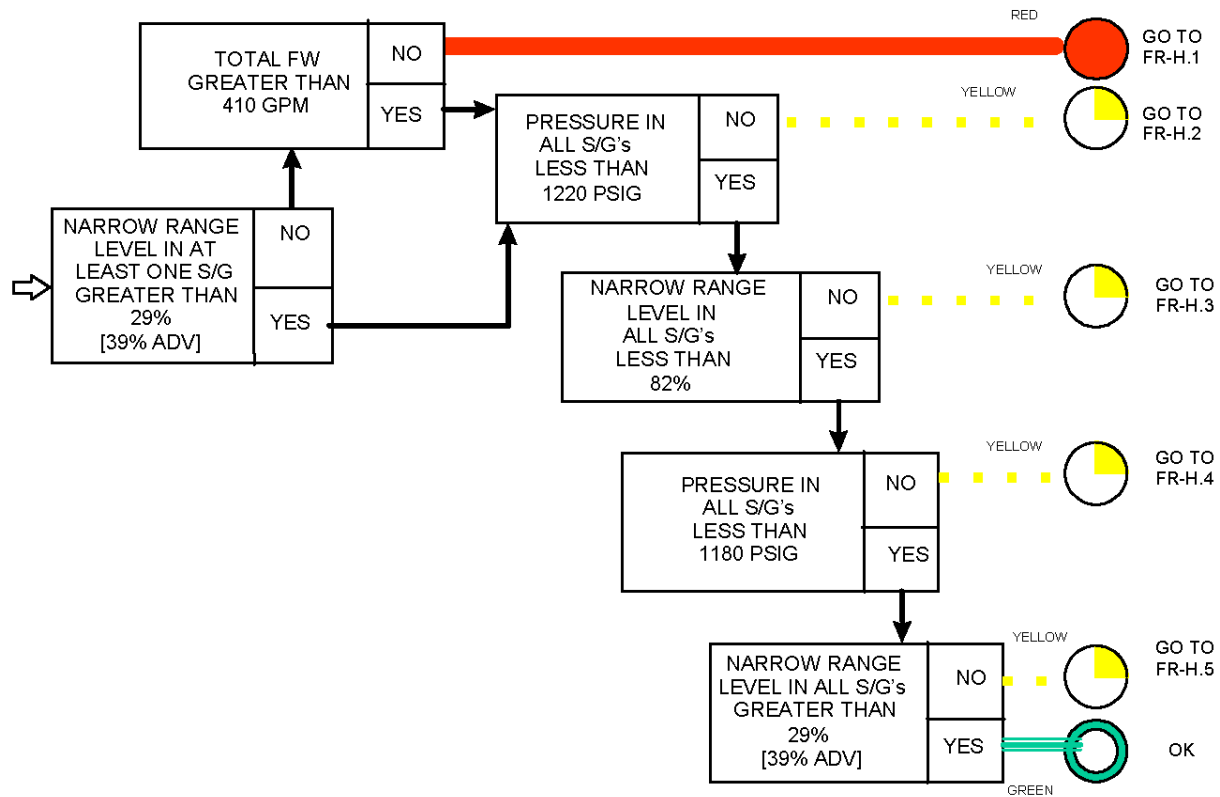




**Attachment 1  
(Page 3 of 8)**

**Monitoring Critical Safety Functions**

**HEAT SINK  
FR-H**

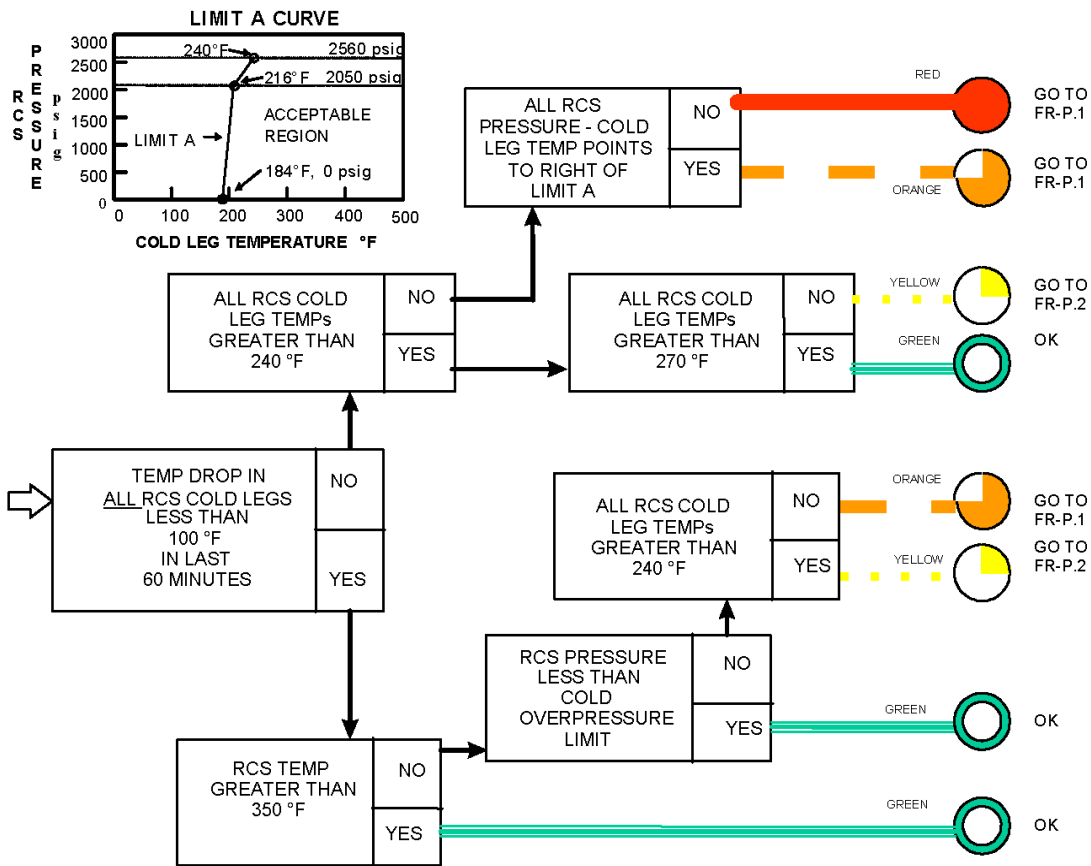


COLOR	PROC

**Attachment 1  
(Page 4 of 8)**

**Monitoring Critical Safety Functions**

**PRESSURIZED THERMAL SHOCK  
FR-P**

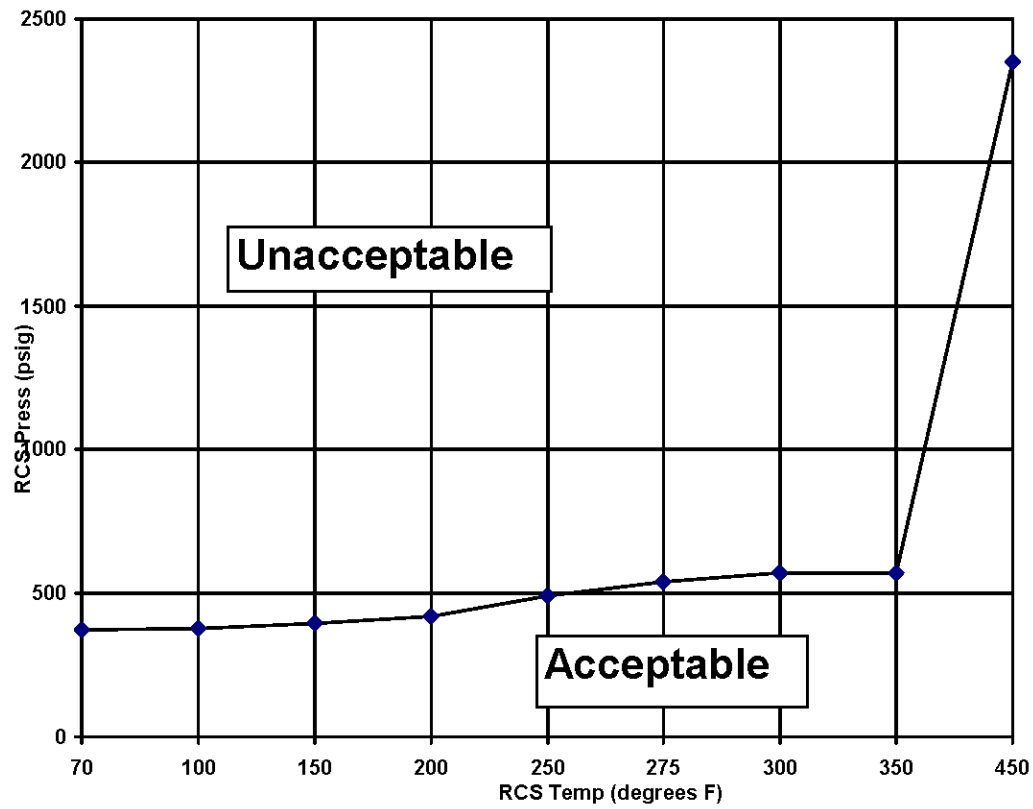


COLOR	PROC

**Attachment 1  
(Page 5 of 8)**

**Monitoring Critical Safety Functions**

**COLD OVERPRESSURE LIMIT CURVE  
FIGURE 1**

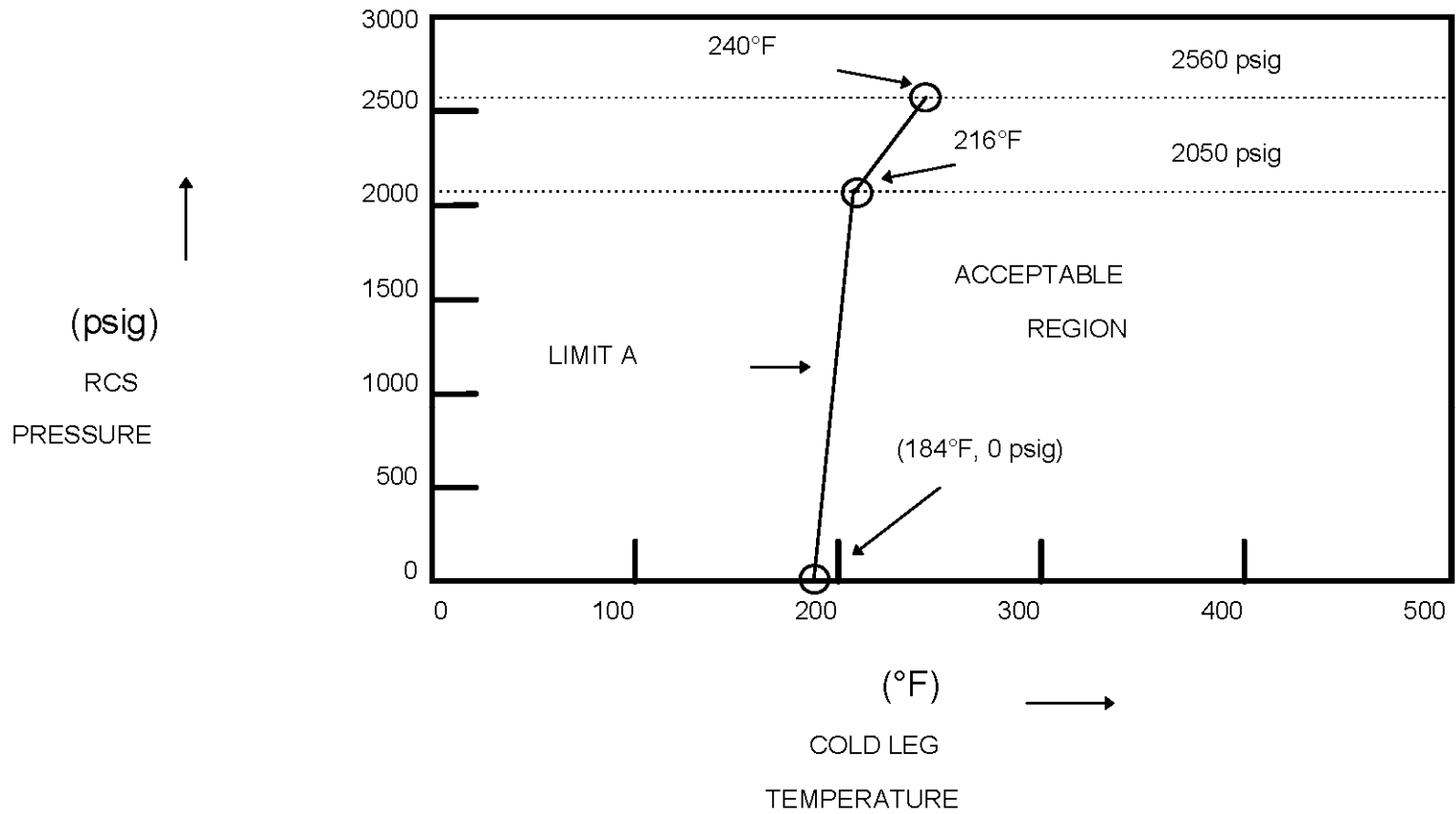


<b>WBN Unit 1</b>	<b>Status Trees</b>	<b>FR-0 Rev. 0014</b>
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**Attachment 1  
(Page 6 of 8)**

**Monitoring Critical Safety Functions**

**LIMIT A CURVE  
FIGURE 2**







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# Watts Bar Nuclear Plant

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2013-03 NRC Exam

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Administrative JPM 3 R

---

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 R**

2013-03 NRC Exam

**EVALUATION SHEET**

**Task:** PERFORM A CLEARANCE WITHOUT USE OF ESOMS COMPUTER.

**Alternate Path:** n/a

**Facility JPM #:** New

**Safety Function:** 2.2 **Title:** Equipment Control

**K/A** 2.2.13 Knowledge of tagging and clearance procedures.

**Rating(s):** 4.2/4.3 **CFR:** 41.10/45.13

**Evaluation Method:** Simulator \_\_\_\_\_ In-Plant \_\_\_\_\_ Classroom \_\_\_\_\_ **X\***

**References:** 1.) 1-47W811-1, Mechanical Flow Diagram Safety Injection System, Rev. 50.  
2.) NPG-SPP-10.2, "Clearance Procedure to Safely Control Energy," Rev. 1  
3.) TVA 17984 [11-2005]. CLEARANCE TAG LIST AND OPERATIONAL STEPS.

**Task Number:** RO-119-NOMS-010 **Title:** Enter/edit devices held for active clearances.

**Task Standard:** The applicant:  
1.) Identifies the critical breakers and fuses, their required positions to electrically clear the 1B-B SI pump in preparation for relay replacement.  
2.) Identifies the critical components and positions required to isolate the correct section of piping in preparation for lubrication and oil sample collection of the 1B-B SI pump.  
3.) Identifies that electrical isolations are required prior to mechanical isolations.

**Validation Time:** 45 minutes **Time Critical:** Yes \_\_\_\_\_ No **X**

=====  
===

**Applicant:** \_\_\_\_\_ Time Start: \_\_\_\_\_  
NAME Docket No. Time Finish: \_\_\_\_\_

**Performance Rating:** SAT \_\_\_\_\_ UNSAT \_\_\_\_\_ Performance Time \_\_\_\_\_

**Examiner:** \_\_\_\_\_ / \_\_\_\_\_  
NAME SIGNATURE DATE

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**COMMENTS**

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**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 R**

2013-03 NRC Exam

**Tools/Equipment/Procedures Needed:**

- ***PRINT HANDOUT containing:***  
***1-45W724-1 through - 4***  
***1-45W760-63-1 through - 9***  
***1-47W811-1 through - 1A***
- ***BLANK TVA 17984 [11-2005] Clearance Tag List and Operational Steps.***
- ***NRC REFERENCE DISK.***

**\*NOTE: This JPM is designed to be performed in a classroom with procedures available to the applicant via a laptop computer loaded with the NRC REFERENCE DISK.**

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 R**

2013-03 NRC Exam

**DIRECTION TO APPLICANT:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the cue sheet I provided you.

**INITIAL CONDITIONS:**

1. Unit 1 is in Mode 1.
2. Electrical Maintenance will be replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit. While relay replacement is in progress, the 1B-B SI pump will be lubricated and oil samples collected.
3. The eSOMS Clearance System computer program is NOT available.

**INITIATING CUES:**

Using the references provided, manually prepare a TVA 17984 [11-2005], "Clearance Tag List and Operational Steps," to de-energize and isolate the 1B-B SI pump for relay replacement, cleaning and lubrication.

**NOTE:** Complete the first, third, fourth, and fifth columns on TVA 17984 [11-2005], "Clearance Tag List and Operational Steps."

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 R**

2013-03 NRC Exam

<b>STEP/STANDARD</b>	<b>SAT/UNSAT</b>
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**START TIME:** \_\_\_\_\_

**EXAMINER:** Control power fuses are **REQUIRED** to be pulled. Per NPG-SPP-10.2, "Clearance Procedure to Safely Control Energy," Requirement O. states, "Control power circuits shall be tagged if (1) the work is on the control circuit, (2) the proximity of the work is near the energized control circuit, or (3) there exists a possibility of grounding the control circuit."

Control power fuses are **REQUIRED** to be addressed to satisfy the CRITICAL STEP.

**STEP 1:** Applicant identifies components that must be operated to support replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit, lubricating and collecting oil samples from the 1B-B SI pump. Applicant enters data in the "Equipment ID, Equipment Description, Equipment Location" Column.

**CRITICAL  
STEP**

\_\_\_ SAT

\_\_\_ UNSAT

**STANDARD:**

The applicant completes Column 1 of the TVA 17984 [11-2005] form provided:

- 1-BKR-63-15, SIP 1B-B (1-PMP-63-15), 6.9KV SD BD 1B-B, C/15
- 1-FU-211-B15/1N SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15
- 1-FU-211-B15/1A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15
- 1-FU-211-B15/2N SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15
- 1-FU-211-B15/2A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15
- 1-BKR-63-175, SI PUMP 1-B-B MINI FLOW RECIRC TO RWST, 480V RX MOV BD 1B1-B, C/13D
- 1-ISV-63-527, SI PUMP DISCHG ISOL, A7V/700
- 1-FCV-63-175, SI PUMP 1B-B MINI FLOW RECIRC TO RWST, A6U/692

**Listed components are critical to correctly isolate the electrical and mechanical portions of the system prior to work being performed.**

**COMMENTS:**

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 R**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 2:</u> Applicant identifies components that must be operated to support replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit, lubricating and collecting oil samples from the 1B-B SI pump. Applicant enters data in the “Tag Type” Column.</p> <p><u>STANDARD:</u></p> <p>The applicant completes Column 3 of the TVA 17984 [11-2005] form provided:</p> <p>The applicant enters “DANGER” in the Tag Type Column for each of the components.</p> <p><b>Listed components are critical to correctly isolate the electrical and mechanical portions of the system prior to work being performed.</b></p> <p><u>COMMENTS:</u></p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 R**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><b>STEP 3:</b> Applicant identifies components that must be operated to support replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit, lubricating and collecting oil samples from the 1B-B SI pump. Applicant identifies enters data in the "Place Seq." Column.</p> <p><b>STANDARD:</b></p> <p>The applicant completes Column 4 of the TVA 17984 [11-2005] form by entering the following sequence ( ) for operation of the following components:</p> <p><b>1-BKR-63-15, SIP 1B-B (1-PMP-63-15), 6.9KV SD BD 1B-B, C/15 (2)</b>  <b>1-FU-211-B15/1N SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 (3)</b>  <b>1-FU-211-B15/1A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 (3)</b>  <b>1-FU-211-B15/2N SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15(3)</b>  <b>1-FU-211-B15/2A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 (3)</b>  <b>1-BKR-63-175, SI PUMP 1-B-B MINI FLOW RECIRC TO RWST, 480V RX MOV BD 1B1-B, C/13D (4)</b>  <b>1-ISV-63-527, SI PUMP DISCHG ISOL, A7V/700 (5)</b>  <b>1-FCV-63-175, SI PUMP 1B-B MINI FLOW RECIRC TO RWST, A6U/692 (5)</b></p> <p>Listed components are critical to correctly de-energize and isolate the portion of the system prior to work being performed.</p> <p><b>NOTE: Sequence variations are allowed as long as the sequence does not result in Mechanical Isolations prior to Electrical isolations.</b></p> <p><b>COMMENTS:</b></p>	<p align="center"><b>CRITICAL STEP</b></p> <p align="center">___ SAT</p> <p align="center">___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 R**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 4:</u> Applicant identifies components that must be operated to support replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit, lubricating and collecting oil samples from the 1B-B SI pump <u>SAFELY</u>. Applicant enters the correct position in the "Place Config." Column.</p> <p><u>STANDARD:</u></p> <p>The applicant completes Column 5 of the TVA 17984 [11-2005] form by listings the following POSITION for each of the following components:</p> <p>1-BKR-63-15, SIP 1B-B (1-PMP-63-15), 6.9KV SD BD 1B-B, C/15 - <b>RACKED DOWN</b></p> <p>1-FU-211-B15/1N SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 <b>REMOVED</b></p> <p>1-FU-211-B15/1A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 <b>REMOVED</b></p> <p>1-FU-211-B15/2NSIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 <b>REMOVED</b></p> <p>1-FU-211-B15/2A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 <b>REMOVED</b></p> <p>1-BKR-63-175, SI PUMP 1-B-B MINI FLOW RECIRC TO RWST, 480V RX MOV BD 1B1-B, C/13D - <b>OFF</b></p> <p>1-ISV-63-527, SI PUMP DISCHG ISOL, A7V/700 - <b>CLOSED</b></p> <p>1-FCV-63-175, SI PUMP 1B-B MINI FLOW RECIRC TO RWST, A6U/692 - <b>CLOSED</b></p> <p><b>Positions of listed components are critical to correctly de-energize and isolate the portion of the system prior to work being performed.</b></p> <p><u>COMMENTS:</u></p> <p align="center"><b>END OF TASK</b></p>	<p align="center"><b>CRITICAL STEP</b></p> <p align="center">___ SAT</p> <p align="center">___ UNSAT</p>

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

**3 R  
KEY**

**DO NOT HAND TO  
APPLICANT**

**3 R**

## Tennessee Valley Authority Clearance Tag List and Operational Steps

Clearance No.

Page 1 of 2

Apparatus: Lubricate, sample oil and replace 30X, 1X and 30RX relays on 1B Safety Injection Pump.												
Equipment ID Equipment Description Equipment Location	Tag Serial No.	Tag Type	Place. Seq.	Place. Config.	Place. 1st Verifier	Place. 2nd Verifier	Rest. Seq.	Restore Config.	As left Config.	Restore 1st Verifier	Restore 2nd Verifier	Tag Notes
1-HS-63-15A SIS PUMP B-B 1-M-6		Danger	1	PULL-TO-LOCK								
1-HS-63-175A SIP 1B-B RECIRC TO RWST 1-M-6		Danger	1	MID POSITION AFTER CLOSE								
1-BRK-63-15 SIP 1B-B (1-PMP-63-15) 6.9KV SD BD 1B, C/15		Danger	2	RACKED DOWN								
1-FU-211-B15/1N SIS PUMP 1B-B FUSES 6.9 KV SD BD 1B-B, C/15		Danger	3	REMOVED								
1-FU-211-B15/ 1A SIS PUMP 1B-B FUSES 6.9 KV SD BD 1B-B, C/15		Danger	3	REMOVED								
1-FU-211-B15/ 2N SIS PUMP 1B-B FUSES 6.9 KV SD BD 1B-B, C/15		Danger	3	REMOVED								
1-FU-211-B15/2A, SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15		Danger	3	REMOVED								
1-BKR-63-175, SI PUMP 1B-B MINI FLOW RECIRC TO RWST 480V RX MOV BD 1B1-B, C13D		Danger	4	OFF								
1-ISV-63-527 SI PUMP 1B-B DISCHARGE ISOLATION RM 692-A12 SI PUMP 1B-B RM EL. 692 A6U/692		Danger	5	CLOSED								
1-FCV-63-175 SI PUMP MINI FLOW RECIRC TO RWST RM 692-A12 SI PUMP 1B-B RM EL. 692 A6U/692		Danger	5	CLOSED								

**CRITICAL ITEMS ARE IN BOLD PRINT.**



<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 34 of 80</b>
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## 5.0 DEFINITIONS

**Affected Employee** - Employees, contractors, and others who are required to operate or use equipment identified for servicing, maintenance, or modification under a clearance or works in an area where such servicing, maintenance, or modification is being performed. Affected employees include the general population who works in an area where equipment is under clearance or may observe clearance tags on such equipment. An affected employee becomes an authorized employee when that person performs servicing, maintenance, or modification on equipment under clearance. An affected employee may become an authorized employee, a primary authorized employee, or a responsible employee based on the level of training received and work functions assigned.

**Authorized Employees** – Employees, contractors, and others who perform servicing, maintenance, or modification on machines or equipment under a clearance and have successfully completed the appropriate level of training required by this procedure. These employees work on equipment under a clearance that has been issued in accordance with this procedure. An authorized employee may become a primary authorized employee or a responsible employee based on the level of training received and work functions assigned.

**Capable Of Being Locked Out** - An energy-isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy-isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy control capability.

**Caution Order Tag** – A Caution Order is a yellow tag that is attached to plant equipment, switches, or controls where a hazardous or abnormal condition(s) exists. The Caution Order Tag has its own set of instructions for the condition under caution. See Appendix G.

**Clearance** – A condition established by an “issued clearance” meaning that all energy sources of feed and feedback, such as electrical, mechanical and/or hydraulic, have been isolated and tagged. A clearance is established when it is placed in issued status by the Responsible Employee in accordance with this procedure.

**Clearance Boundary** – Points at energy-isolating devices established in accordance with this procedure that allows authorized employees to safely work on equipment under a clearance.

**Clearance Personal Accountability Log (CPAL)** - A log that identifies all Authorized Employees who are working on equipment under a specific clearance.

**Current SRO** - An individual who has obtained and currently holds a valid SRO license for the plant at which they are working and is up to date on all auxiliary requirements such as licensed operator training requirements and medical requirements. This individual may or may not be currently qualified to hold an on-shift SRO position (i.e., be an Active SRO).

**Danger Tag** – A red tag used to identify energy-isolating devices for a clearance. See Appendix F, “Danger Tag.”

**Electrical Representative PAE** – A PAE authorized by the Plant Manager to be qualified to install and remove temporary protective grounds and to receive and return ground discs.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 35 of 80</b>
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## 5.0 DEFINITIONS (continued)

**Electrically De-energized** - Free from any electrical connection to a source of potential difference and from electric charge; not having a potential different from that of the earth. Note: The term is used only with reference to current-carrying parts, which are sometimes electrically energized (live).

**Electrically Energized (live)** - Electrically connected to a source of potential difference, or electrically charged so as to have a potential significantly different from that of earth in the vicinity.

**Emergency** – Conditions that threaten the life of an employee or member of the public, or the plant operability.

**Energy Isolating Device** – A device that physically prevents the transmission or release of energy including, but not limited to, the following: An electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device with a visible indication of the position of the device used to block or isolate energy. Push buttons, selector switches and other control-circuit type devices are not energy-isolating devices.

**Energy Source** - Any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, or other energy source that could cause injury to personnel.

**External Energy Source** - Any electrical, mechanical (e.g., rotation of a shaft with a come-a-long), hydraulic, pneumatic, chemical, nuclear, thermal, or other energy source that is not provided by the equipment's normal designed energy source(s).

**Group Tagout** – The process by which a PAE holds a clearance for two or more authorized employees who will work on the equipment under a specific clearance. The authorized employees indicate that they are working under the clearance through the “Clearance Personal Accountability Log (CPAL).”

**Issued Clearance** – A clearance is issued when all actions required to establish a clearance in accordance with this procedure are completed and the responsible employee places the clearance in issued status. Regardless of the presence of a danger tag, all equipment is considered energized unless it is known to be controlled by a clearance in issued status.

**Lines** – Refers to transmission system conductors that are installed to distribute electrical power in the power transmission system.

**Lockout** - The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensures that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

**Lockout Device** - A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy-isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 36 of 80</b>
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## 5.0 DEFINITIONS (continued)

**Normal Energy Source** – This is the energy normally available to the machine or equipment for its proper operation. There may be more than one type of normal energy source supplied such as electric, mechanical, hydraulic, pneumatic, etc.

**Management Official-In-Charge** – This means the plant, facility, production, or site manager.

**Operating Permit Tag** - An operating permit is a blue tag shown in Figure H-1 that is attached to equipment or controls when the equipment is to be operated by any person other than its operator. The equipment operator may not operate equipment except by instruction of the person holding the operating permit. The operating permit does not authorize persons other than the operator to operate the equipment from a switchboard. It does authorize the operator to operate equipment from a switchboard only under direction of the person holding the Operating Permit. The Operating Permit does not signify that the equipment tagged is de-energized. Where it is necessary for the equipment to be de-energized for work on the equipment, a danger tag clearance shall be issued.

**Official Plant Clearance List** – A list of names approved by the Plant Manager. The personnel are approved to perform the specific authorized functions designated on the list in accordance with this procedure. A RE, QE, or PAE on this list may be issued clearances.

**Primary Authorized Employees** - Employees, contractors, and others who request/identify the work to be performed under a clearance, walk down the boundaries of a clearance to determine if energy-isolating devices are set in proper position and tagged in accordance with the applicable clearance instruction; and have successfully completed the appropriate level of training and the associated qualifying examination(s) required by this procedure. The primary authorized employee is responsible for administering the CPAL.

**Qualified Employees** - Employees, contractors, and others who prepare equipment for servicing, maintenance, and modification and return equipment to operational status and have successfully completed the training and the associated qualifying examination(s) required by this procedure. They have completed appropriate training for the area of the plant for which they have clearance responsibilities.

**Released Clearance**– A clearance is released when all actions required to release a clearance in accordance with this procedure are completed and the responsible employee removes the clearance from issued status.

**Responsible Employees** - Employees, contractors, and others who write and issue clearances in accordance with this procedure and have successfully completed the appropriate level of training and the associated qualifying examination(s) required by this procedure.

**Servicing, Maintenance, and Modification** - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energizing or startup of the equipment or release of hazardous energy.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 37 of 80</b>
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## 5.0 DEFINITIONS (continued)

**Sign-on/Sign-off** – A personal act an employee, contractor, or other person takes to acknowledge his or her responsibilities for their name being on a log, list, or other documentation associated with a clearance.

**Tagout** - The placement of a tagout device on an energy-isolating device, in accordance with a clearance instruction, to indicate that the energy-isolating device and the equipment being controlled **shall not be operated until the tagout device is removed.**

**Tagout device** - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy-isolating device in accordance with a clearance instruction, to indicate that the energy-isolating device and the equipment being controlled shall not be operated until the tagout device is removed.

**Transmission Operator (Dispatcher)** – refers to the TVA power system transmission operator who controls the transmission system lines and equipment.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 54 of 80</b>
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**Appendix D  
(Page 1 of 3)**

**Special Requirements for Electrical Clearances**

**1.0 REQUIREMENTS**

- A. Only component handswitches that meet the definition of an energy isolating device may be used as a clearance energy isolation point.
- B. Component handswitches not meeting the definition of a clearance isolating device may be tagged as indication/information that associated equipment is under a clearance.
- C. If potential or station service transformers are outside of the clearance zone, they may be cleared from the primary side. If they are inside the clearance zone, they shall be cleared from both the primary and secondary side.
- D. Coupling capacitors within a clearance zone shall have their secondary circuits shorted if work is to be performed on or within the minimum approach distance to them.
- E. Static capacitors within a clearance zone shall be grounded. The PAE holding the clearance is responsible for discharging and grounding the static capacitors.
- F. The RE who is responsible for maintaining protection to equipment shall approve any changes in current transformer secondary circuits that are in service.
- G. Blocks shall be removed in current transformer secondaries when connected in parallel with current transformers that are energized, before work is performed on them. If blocks are not available, it will be necessary to short circuit the current transformer, ground, and open the secondary circuits.
- H. When two or more transformers are connected to ground through a common reactor, the transformer's neutral ground switch for the transformer to be cleared shall be opened and tagged with a danger tag.
- I. All disconnecting devices or breakers that establish a clearance boundary shall be opened made inoperable, when possible, and tagged to ensure that they will not be closed.
- J. Gang or motor-operated disconnects/air-break switches shall be mechanically locked in the open position and visually checked to verify that all blades are open.
- K. The QE should verify, by secondary means, the absence of energy on circuits involving circuit breakers whenever a means of verification is available.
- L. When opening molded case breakers, positive indication in the form of a snap or click is required to ensure that the breaker is open. If positive indication is not verified, evaluate the situation with the RE.
- M. The procedure for clearing a 161 kV or 500 kV air blast power circuit breaker requires the breaker and its disconnects to be "opened" and then the breaker cycled at the direction of the transmission operator to discharge any capacitors that may be in parallel with the contacts of the breaker.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 55 of 80</b>
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**Appendix D  
(Page 2 of 3)**

**Special Requirements for Electrical Clearances**

**1.0 REQUIREMENTS (continued)**

N. When placing or removing clearances inside electrical boards, the QE shall ensure that no loose materials remain in the breaker compartment.

O. Control power circuits shall be tagged if (1) the work is on the control circuit, (2) the proximity of the work is near the energized control circuit, or (3) there exists a possibility of grounding the control circuit.

P. Clearances on fused circuits other than control circuits (e.g., bus PT, voltage regulator PT, metering PT, etc.) shall have the danger tag attached to the fuse compartment door after the fuses have been removed from the circuit. The fuses shall be placed in an approved storage location.

Q. Clearances involving control fuses located on multi-fused terminal boards required to be tagged shall have the control fuses removed, a danger tag attached to non-conducting fuse blanks, and the blanks inserted into the fuse clips.

R. Clearances on fused control circuits (1) on boards with molded case breakers or (2) for which fuse blanks are not provided, do not require tagging and installation of fuse blanks. The location from which fuses were removed shall have a danger tag attached. Fuses removed should be placed in a secure, easily identifiable location where adverse plant conditions would not occur if they became dislodged from that location. Fuse storage may be in a fuse storage cabinet or in an appropriate bag attached to the compartment from which the fuses were removed (e.g., door handle, lugs attached to the relay covers, etc.). Fuses stored in a fuse storage cabinet should be clearly annotated on the clearance sheet.

S. The following applies for placement of clearances on low voltage circuits (250V or less):

1. When available, appropriate electrical prints for load lists and electrical circuit prints shall be utilized.
2. If plant conditions preclude tagging of main breaker to multiple components in a circuit, fuses shall be removed and tagged where available to isolate only those components affected by the work.
3. If the circuit involves relays or solenoids that are normally energized, the impact of a loss of power as well as a return to power to these components shall be evaluated, e.g. review of applicable logic or control diagrams.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 56 of 80</b>
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**Appendix D  
(Page 3 of 3)**

**Special Requirements for Electrical Clearances**

**1.0 REQUIREMENTS (continued)**

4. Circuits that supply power to a board or panel often "daisy-chain" and supply additional panels and components. A detailed search of wiring connection prints is required to determine all the components affected.
5. When low-voltage circuits are de-energized, alarms and responses shall be evaluated to ensure expected results are obtained. The MCR shall be contacted immediately prior to opening the circuit. When the affected unit is at power, the MCR shall be contacted after the circuit is opened to verify expected results.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 57 of 80</b>
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**Appendix E  
(Page 1 of 3)**

**Special Requirements for Mechanical Clearances**

**1.0 REQUIREMENTS**

- A. An air-operated valve that fails open on a loss of air is not be considered closed for blocking purposes unless it is held closed with an installed jacking device or device used to secure the valve in the required position. A clearance tag will be issued and attached to the jacking or other device.
- B. An air-operated valve that fails closed shall have its air supply electrically or mechanically isolated, depressurized, and the valve visually checked-to-be-closed by local or remote indication. The air supply energy-isolating devices shall be tagged.
- C. An air-operated valve that fails “as is” shall be closed and mechanically restrained. Its air supply should be electrically or mechanically isolated, depressurized, and the valve visually checked to be closed by local or remote indication. The air supply energy-isolating devices and mechanical restraint shall be tagged.
- D. In cases where it is not possible to physically secure an air operated valve that fails “as-is” in the closed position, the valve will be tagged closed by applying closing air to the valve diaphragm by the use of the solenoid valve air overrides and tagging both the handswitch in the closed position and the solenoid valve air overrides. Prior to allowing work to begin, the equipment will be drained and de-pressurized to ensure the boundary valves are holding. This condition will be noted in the remarks section of the clearance sheet to inform PAE/Authorized Employee(s) that pressurized air is required to ensure the valve remains closed. This work is considered “working on energized equipment” and must be approved by the Plant Manager.

E. Pressure controlled valves, relief valves, and check valves will not be used as isolation boundary valves under normal conditions. Where such a valve does not have an external means of physical restraint, the work is considered “working on energized equipment” and must be approved by the Plant Manager.

- F. The following instructions govern the use of freeze plugs
  - 1. The clearance should be in place, but not issued, before establishing the freeze plug.
  - 2. The need for the freeze plug should be identified on the Remarks Section of the clearance sheet. The freeze plug should not be listed as a device held on the clearance sheet. The establishment and maintenance of the freeze plug shall be in accordance with approved procedures or work documents.
  - 3. The freeze plug shall be attended by qualified personnel to ensure that it is maintained intact until all work is complete and the proper Post Maintenance Tests (PMTs) are performed.
  - 4. If the clearance must be released to allow performance of a PMT, the equipment shall be retagged before allowing the freeze plug to thaw. This will prevent migration of a portion of the plug.



<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 58 of 80</b>
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**Appendix E  
(Page 2 of 3)**

**Special Requirements for Mechanical Clearances**

**1.0 REQUIREMENTS (continued)**

5. The clearance must be released before allowing the freeze plug to thaw. However, to prevent migration of the freeze plug, tags on boundary valves shall not be removed until the freeze plug has completely thawed.
  6. All vents and drains shall be verified CLOSED before allowing the freeze plug to thaw.
- G. If suitable means are not available to depressurize or control hazardous energy, the PAE, RE, and responsible manager(s) will determine actions necessary to protect employees. These actions must be approved by the Plant Manager or designee and documented in the Remarks section. The inability to depressurize shall be clearly documented in the remarks section and communicated to the proposed clearance holder. In cases where the component design does not include a vent or drain path within the clearance boundary, the clearance shall be “locked” to preclude clearance holder sign-on and initiation of work prior to direct communication with the RE. Suitable methods to depressurize and prevent repressurization shall be agreed upon by the RE and the PAE before the clearance is held by the PAE.
- H. When performing Temporary Lifts that could result in fluid flow (e.g., Motor Operated Valve Actuator Test (MOVAT) testing, valve stroke, etc.) the PAE responsible for the activity shall ensure that a flow blocking clearance is in place to maintain safe isolation and adequate flow blocking.
- I. Clearances for work on high energy systems (operate with temperature greater than 200°F or pressure greater than 500 psig), lethal chemical systems, or systems connected to high energy systems shall, when possible isolate the work area by two closed valves in series. If equipped, a tell-tale vent or drain between the isolation valves should be opened. Lack of two valve isolation shall be clearly documented and communicated to the proposed clearance holder before issue.
- J. The use of Abandoned Equipment Boundary valves as energy isolating devices requires the application of the same constraints that apply for the use on any other valve used as an energy isolating device. For example: position verification capability, maintenance of isolation from hazardous energy, etc.
- K. The establishment of a safe boundary to allow work to be done on an Abandoned Equipment Boundary valve shall utilize equipment NOT abandoned. The boundary shall meet the same criteria as any other boundary.
- L. When underground piping systems with “slip-joint” construction, e.g., a fire protection system, is being cleared, write the clearance to isolate at the second valve back from the work location to prevent release of energy at the first valve by a slip joint during excavation and work. The first valve back from the work location is tagged in the opened position to relieve pressure. If the location of the second valve back is such that the valve may be disturbed by the excavation, then a valve further back shall be closed and tagged to provide a safe clearance.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 59 of 80</b>
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**Appendix E  
(Page 3 of 3)**

**Special Requirements for Mechanical Clearances**

**1.0 REQUIREMENTS (continued)**

- M. Clearances for entry into Permit Required Confined Spaces with piping, lines, or ducts (steam, water, inert gases, chemicals, etc) must be completely protected against the release of energy and material into the space by such means as: 1) blanking or blinding; 2) misaligning or removing sections of lines, pipes, or ducts; 3) a double block and bleed system, such as two closed valves in series with an open vent between the valves. Entry into confined spaces must comply with **TSP 801, Confined Space Entry**.

**3 R**

# **Handout Package for Applicant**

**3 R**

# APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

## INITIAL CONDITIONS:

1. Unit 1 is in Mode 1.
2. Electrical Maintenance will be replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit. While relay replacement is in progress, the 1B-B SI pump will be lubricated and oil samples collected.
3. The eSOMS Clearance System computer program is NOT available.

## INITIATING CUES:

Using the references provided, manually prepare a TVA 17984 [11-2005], "Clearance Tag List and Operational Steps," to de-energize and isolate the 1B-B SI pump for relay replacement, cleaning and lubrication.

**NOTE:** Complete the first, third, fourth, and fifth columns on TVA 17984 [11-2005], "Clearance Tag List and Operational Steps."



## Tennessee Valley Authority Clearance Tag List and Operational Steps

**Clearance Sheet**

Clearance No.	Page of
---------------	---------

<b>Apparatus:</b>												
Equipment ID Equipment Description Equipment Location	Tag Serial No.	Tag Type	Place. Seq.	Place. Config.	Place. 1 <sup>st</sup> Verifier	Place. 2 <sup>nd</sup> Verifier	Rest. Seq.	Restore Config.	As left Config.	Restore 1 <sup>st</sup> Verifier	Restore 2 <sup>nd</sup> Verifier	Tag Notes

## Tennessee Valley Authority Clearance Tag List and Operational Steps

**Clearance Sheet**

Clearance No.

Page of

Apparatus:												
Equipment ID Equipment Description Equipment Location	Tag Serial No.	Tag Type	Place. Seq.	Place. Config.	Place. 1 <sup>st</sup> Verifier	Place. 2 <sup>nd</sup> Verifier	Rest. Seq.	Restore Config.	As left Config.	Restore 1 <sup>st</sup> Verifier	Restore 2 <sup>nd</sup> Verifier	Tag Notes

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# Watts Bar Nuclear Plant

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2013-03 NRC Exam

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Administrative JPM 3 S

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**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 S**

2013-03 NRC Exam

**Tools/Equipment/Procedures Needed:**

- ***PRINT HANDOUT containing:***
  - 1-45W724-1 through - 4***
  - 1-45W760-63-1 through - 9***
  - 1-47W811-1 through - 1A***
- ***BLANK TVA 17984 [11-2005] Clearance Tag List and Operational Steps.***
- ***NRC REFERENCE DISK.***

**\*NOTE: This JPM is designed to be performed in a classroom with procedures available to the applicant via a laptop computer loaded with the NRC REFERENCE DISK.**

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 S**

2013-03 NRC Exam

**DIRECTION TO APPLICANT:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the cue sheet I provided you.

**INITIAL CONDITIONS:**

1. Unit 1 is in Mode 1.
2. Electrical Maintenance will be replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit. While relay replacement is in progress, the 1B-B SI pump will be lubricated and oil samples collected.
3. The eSOMS Clearance System computer program is NOT available.

**INITIATING CUES:**

Part 1 - Using the references provided, manually prepare a TVA 17984 [11-2005], "Clearance Tag List and Operational Steps," to de-energize and isolate the 1B-B SI pump for relay replacement, cleaning and lubrication.

NOTE: Complete the first, third, fourth, and fifth columns on TVA 17984 [11-2005], "Clearance Tag List and Operational Steps."

**ASSUME WORK IS NOW IN PROGRESS ON THE 1B-B SI PUMP.**

Part 2 - The Auxiliary Building AUO reports the ERCW supply line to the 1A SI Pump room cooler has ruptured. Local actions have been taken to isolate the leak.

What, if any, Technical Specifications/Technical Requirements must be entered due to the failure of the 1A-A SI Pump Room Cooler? What, if any, actions are required to be taken?

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 S**

2013-03 NRC Exam

<b>STEP/STANDARD</b>	<b>SAT/UNSAT</b>
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**START TIME:** \_\_\_\_\_

**EXAMINER:** Control power fuses are **REQUIRED** to be pulled. Per NPG-SPP-10.2, "Clearance Procedure to Safely Control Energy," Requirement O. states, "Control power circuits shall be tagged if (1) the work is on the control circuit, (2) the proximity of the work is near the energized control circuit, or (3) there exists a possibility of grounding the control circuit."

Control power fuses are **REQUIRED** to be addressed to satisfy the CRITICAL STEP.

**STEP 1:** Applicant identifies components that must be operated to support replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit, lubricating and collecting oil samples from the 1B-B SI pump. Applicant enters data in the "Equipment ID, Equipment Description, Equipment Location" Column.

**CRITICAL  
STEP**

\_\_\_ SAT

\_\_\_ UNSAT

**STANDARD:**

The applicant completes Column 1 of the TVA 17984 [11-2005] form provided:

- 1-BKR-63-15, SIP 1B-B (1-PMP-63-15), 6.9KV SD BD 1B-B, C/15**
- 1-FU-211-B15/1N SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15**
- 1-FU-211-B15/1A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15**
- 1-FU-211-B15/2N SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15**
- 1-FU-211-B15/2A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15**
- 1-BKR-63-175, SI PUMP 1-B-B MINI FLOW RECIRC TO RWST, 480V RX MOV BD 1B1-B, C/13D**
- 1-ISV-63-527, SI PUMP DISCHG ISOL, A7V/700**
- 1-FCV-63-175, SI PUMP 1B-B MINI FLOW RECIRC TO RWST, A6U/692**

**Listed components are critical to correctly isolate the electrical and mechanical portions of the system prior to work being performed.**

**COMMENTS:**

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 S**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 2:</u> Applicant identifies components that must be operated to support replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit, lubricating and collecting oil samples from the 1B-B SI pump. Applicant enters data in the “Tag Type” Column.</p> <p><u>STANDARD:</u></p> <p>The applicant completes Column 3 of the TVA 17984 [11-2005] form provided:</p> <p>The applicant enters “DANGER” in the Tag Type Column for each of the components.</p> <p><b>Listed components are critical to correctly isolate the electrical and mechanical portions of the system prior to work being performed.</b></p> <p><u>COMMENTS:</u></p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 S**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><b>STEP 3:</b> Applicant identifies components that must be operated to support replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit, lubricating and collecting oil samples from the 1B-B SI pump. Applicant identifies enters data in the "Place Seq." Column.</p> <p><b>STANDARD:</b></p> <p>The applicant completes Column 4 of the TVA 17984 [11-2005] form by entering the following sequence ( ) for operation of the following components:</p> <p><b>1-BKR-63-15, SIP 1B-B (1-PMP-63-15), 6.9KV SD BD 1B-B, C/15 (2)</b>  <b>1-FU-211-B15/1N SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 (3)</b>  <b>1-FU-211-B15/1A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 (3)</b>  <b>1-FU-211-B15/2N SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15(3)</b>  <b>1-FU-211-B15/2A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 (3)</b>  <b>1-BKR-63-175, SI PUMP 1-B-B MINI FLOW RECIRC TO RWST, 480V RX MOV BD 1B1-B, C/13D (4)</b>  <b>1-ISV-63-527, SI PUMP DISCHG ISOL, A7V/700 (5)</b>  <b>1-FCV-63-175, SI PUMP 1-B-B MINI FLOW RECIRC TO RWST, A6U/692 (5)</b></p> <p>Listed components are critical to correctly de-energize and isolate the portion of the system prior to work being performed.</p> <p><b>NOTE: Sequence variations are allowed as long as the sequence does not result in Mechanical Isolations prior to Electrical isolations.</b></p> <p><b>COMMENTS:</b></p>	<p align="center"><b>CRITICAL STEP</b></p> <p align="center">___ SAT</p> <p align="center">___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 S**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 4:</u> Applicant identifies components that must be operated to support replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit, lubricating and collecting oil samples from the 1B-B SI pump <u>SAFELY</u>. Applicant enters the correct position in the "Place Config." Column.</p> <p><u>STANDARD:</u></p> <p>The applicant completes Column 5 of the TVA 17984 [11-2005] form by listings the following POSITION for each of the following components:</p> <p>1-BKR-63-15, SIP 1B-B (1-PMP-63-15), 6.9KV SD BD 1B-B, C/15 - <b>RACKED DOWN</b></p> <p>1-FU-211-B15/1N SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 <b>REMOVED</b></p> <p>1-FU-211-B15/1A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 <b>REMOVED</b></p> <p>1-FU-211-B15/2NSIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 <b>REMOVED</b></p> <p>1-FU-211-B15/2A SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15 <b>REMOVED</b></p> <p>1-BKR-63-175, SI PUMP 1-B-B MINI FLOW RECIRC TO RWST, 480V RX MOV BD 1B1-B, C/13D - <b>OFF</b></p> <p>1-ISV-63-527, SI PUMP DISCHG ISOL, A7V/700 - <b>CLOSED</b></p> <p>1-FCV-63-175, SI PUMP 1-B-B MINI FLOW RECIRC TO RWST, A6U/692 - <b>CLOSED</b></p> <p><b>Positions of listed components are critical to correctly de-energize and isolate the portion of the system prior to work being performed.</b></p> <p><u>COMMENTS:</u></p>	<p align="center"><b>CRITICAL STEP</b></p> <p align="center">___ SAT</p> <p align="center">___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**3 S**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><b>STEP 5:</b> Applicant answers the question in Part 2 of the JPM.</p> <p><b>“The Auxiliary Building AUO reports the ERCW supply line to the 1A SI Pump room cooler has ruptured. Local actions have been taken to isolate the leak.</b></p> <p><b>What, if any, Technical Specifications/Technical Requirements must be entered due to the failure of the 1A-A SI Pump Room Cooler? What, if any, actions are required to be taken?</b></p> <p><u>STANDARD:</u></p> <p><b>OPERABLE-OPERABILITY</b> A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).</p> <p><b>The applicant determines:</b></p> <p><u>    </u> <b>Loss of the 1A-A SI pump room cooler renders the 1A-A SI pump inoperable.</b></p> <p><u>    </u> <b>With both of the SI pumps inoperable, entry into LCO 3.0.3 is required.</b></p> <p><u>    </u> <b>The plant needs to be in Mode 4 within 13 hours.</b></p> <p><i>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:</i></p> <p><i>a. MODE 3 within 7 hours;</i></p> <p><i>b. MODE 4 within 13 hours; and</i></p> <p><i>c. MODE 5 within 37 hours.</i></p> <p><i>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.</i></p> <p><u>COMMENTS:</u></p> <p align="center"><b>END OF TASK</b></p>	<p align="center"><b>CRITICAL STEP</b></p> <p align="center"><u>    </u> SAT</p> <p align="center"><u>    </u> UNSAT</p>

**STOP TIME** \_\_\_\_\_



**3 S  
KEY**

**DO NOT HAND TO  
APPLICANT**

## Tennessee Valley Authority Clearance Tag List and Operational Steps

<b>Apparatus: Lubricate, sample oil and replace 30X, 1X and 30RX relays on 1B Safety Injection Pump.</b>												
Equipment ID Equipment Description Equipment Location	Tag Serial No.	Tag Type	Place. Seq.	Place. Config.	Place. 1st Verifier	Place. 2nd Verifier	Rest. Seq.	Restore Config.	As left Config.	Restore 1st Verifier	Restore 2nd Verifier	Tag Notes
1-HS-63-15A SIS PUMP B-B 1-M-6		Danger	1	PULL-TO-LOCK								
1-HS-63-175A SIP 1B-B RECIRC TO RWST 1-M-6		Danger	1	MID POSITION AFTER CLOSE								
1-BRK-63-15 SIP 1B-B (1-PMP-63-15) 6.9KV SD BD 1B, C/15		Danger	2	RACKED DOWN								
1-FU-211-B15/1N SIS PUMP 1B-B FUSES 6.9 KV SD BD 1B-B, C/15		Danger	3	REMOVED								
1-FU-211-B15/ 1A SIS PUMP 1B-B FUSES 6.9 KV SD BD 1B-B, C/15		Danger	3	REMOVED								
1-FU-211-B15/ 2N SIS PUMP 1B-B FUSES 6.9 KV SD BD 1B-B, C/15		Danger	3	REMOVED								
1-FU-211-B15/2A, SIS PUMP 1B-B FUSE 6.9 KV SD BD 1B-B, C/15		Danger	3	REMOVED								
1-BKR-63-175, SI PUMP 1B-B MINI FLOW RECIRC TO RWST 480V RX MOV BD 1B1-B, C13D		Danger	4	OFF								
1-ISV-63-527 SI PUMP 1B-B DISCHARGE ISOLATION RM 692-A12 SI PUMP 1B-B RM EL. 692 A6U/692		Danger	5	CLOSED								
1-FCV-63-175 SI PUMP MINI FLOW RECIRC TO RWST RM 692-A12 SI PUMP 1B-B RM EL. 692 A6U/692		Danger	5	CLOSED								

**CRITICAL ITEMS ARE IN BOLD PRINT.**

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 34 of 80</b>
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## 5.0 DEFINITIONS

**Affected Employee** - Employees, contractors, and others who are required to operate or use equipment identified for servicing, maintenance, or modification under a clearance or works in an area where such servicing, maintenance, or modification is being performed. Affected employees include the general population who works in an area where equipment is under clearance or may observe clearance tags on such equipment. An affected employee becomes an authorized employee when that person performs servicing, maintenance, or modification on equipment under clearance. An affected employee may become an authorized employee, a primary authorized employee, or a responsible employee based on the level of training received and work functions assigned.

**Authorized Employees** – Employees, contractors, and others who perform servicing, maintenance, or modification on machines or equipment under a clearance and have successfully completed the appropriate level of training required by this procedure. These employees work on equipment under a clearance that has been issued in accordance with this procedure. An authorized employee may become a primary authorized employee or a responsible employee based on the level of training received and work functions assigned.

**Capable Of Being Locked Out** - An energy-isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy-isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy control capability.

**Caution Order Tag** – A Caution Order is a yellow tag that is attached to plant equipment, switches, or controls where a hazardous or abnormal condition(s) exists. The Caution Order Tag has its own set of instructions for the condition under caution. See Appendix G.

**Clearance** – A condition established by an “issued clearance” meaning that all energy sources of feed and feedback, such as electrical, mechanical and/or hydraulic, have been isolated and tagged. A clearance is established when it is placed in issued status by the Responsible Employee in accordance with this procedure.

**Clearance Boundary** – Points at energy-isolating devices established in accordance with this procedure that allows authorized employees to safely work on equipment under a clearance.

**Clearance Personal Accountability Log (CPAL)** - A log that identifies all Authorized Employees who are working on equipment under a specific clearance.

**Current SRO** - An individual who has obtained and currently holds a valid SRO license for the plant at which they are working and is up to date on all auxiliary requirements such as licensed operator training requirements and medical requirements. This individual may or may not be currently qualified to hold an on-shift SRO position (i.e., be an Active SRO).

**Danger Tag** – A red tag used to identify energy-isolating devices for a clearance. See Appendix F, “Danger Tag.”

**Electrical Representative PAE** – A PAE authorized by the Plant Manager to be qualified to install and remove temporary protective grounds and to receive and return ground discs.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 35 of 80</b>
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## 5.0 DEFINITIONS (continued)

**Electrically De-energized** - Free from any electrical connection to a source of potential difference and from electric charge; not having a potential different from that of the earth. Note: The term is used only with reference to current-carrying parts, which are sometimes electrically energized (live).

**Electrically Energized (live)** - Electrically connected to a source of potential difference, or electrically charged so as to have a potential significantly different from that of earth in the vicinity.

**Emergency** – Conditions that threaten the life of an employee or member of the public, or the plant operability.

**Energy Isolating Device** – A device that physically prevents the transmission or release of energy including, but not limited to, the following: An electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device with a visible indication of the position of the device used to block or isolate energy. Push buttons, selector switches and other control-circuit type devices are not energy-isolating devices.

**Energy Source** - Any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, or other energy source that could cause injury to personnel.

**External Energy Source** - Any electrical, mechanical (e.g., rotation of a shaft with a come-a-long), hydraulic, pneumatic, chemical, nuclear, thermal, or other energy source that is not provided by the equipment's normal designed energy source(s).

**Group Tagout** – The process by which a PAE holds a clearance for two or more authorized employees who will work on the equipment under a specific clearance. The authorized employees indicate that they are working under the clearance through the “Clearance Personal Accountability Log (CPAL).”

**Issued Clearance** – A clearance is issued when all actions required to establish a clearance in accordance with this procedure are completed and the responsible employee places the clearance in issued status. Regardless of the presence of a danger tag, all equipment is considered energized unless it is known to be controlled by a clearance in issued status.

**Lines** – Refers to transmission system conductors that are installed to distribute electrical power in the power transmission system.

**Lockout** - The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensures that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

**Lockout Device** - A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy-isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 36 of 80</b>
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## 5.0 DEFINITIONS (continued)

**Normal Energy Source** – This is the energy normally available to the machine or equipment for its proper operation. There may be more than one type of normal energy source supplied such as electric, mechanical, hydraulic, pneumatic, etc.

**Management Official-In-Charge** – This means the plant, facility, production, or site manager.

**Operating Permit Tag** - An operating permit is a blue tag shown in Figure H-1 that is attached to equipment or controls when the equipment is to be operated by any person other than its operator. The equipment operator may not operate equipment except by instruction of the person holding the operating permit. The operating permit does not authorize persons other than the operator to operate the equipment from a switchboard. It does authorize the operator to operate equipment from a switchboard only under direction of the person holding the Operating Permit. The Operating Permit does not signify that the equipment tagged is de-energized. Where it is necessary for the equipment to be de-energized for work on the equipment, a danger tag clearance shall be issued.

**Official Plant Clearance List** – A list of names approved by the Plant Manager. The personnel are approved to perform the specific authorized functions designated on the list in accordance with this procedure. A RE, QE, or PAE on this list may be issued clearances.

**Primary Authorized Employees** - Employees, contractors, and others who request/identify the work to be performed under a clearance, walk down the boundaries of a clearance to determine if energy-isolating devices are set in proper position and tagged in accordance with the applicable clearance instruction; and have successfully completed the appropriate level of training and the associated qualifying examination(s) required by this procedure. The primary authorized employee is responsible for administering the CPAL.

**Qualified Employees** - Employees, contractors, and others who prepare equipment for servicing, maintenance, and modification and return equipment to operational status and have successfully completed the training and the associated qualifying examination(s) required by this procedure. They have completed appropriate training for the area of the plant for which they have clearance responsibilities.

**Released Clearance**– A clearance is released when all actions required to release a clearance in accordance with this procedure are completed and the responsible employee removes the clearance from issued status.

**Responsible Employees** - Employees, contractors, and others who write and issue clearances in accordance with this procedure and have successfully completed the appropriate level of training and the associated qualifying examination(s) required by this procedure.

**Servicing, Maintenance, and Modification** - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energizing or startup of the equipment or release of hazardous energy.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 37 of 80</b>
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## 5.0 DEFINITIONS (continued)

**Sign-on/Sign-off** – A personal act an employee, contractor, or other person takes to acknowledge his or her responsibilities for their name being on a log, list, or other documentation associated with a clearance.

**Tagout** - The placement of a tagout device on an energy-isolating device, in accordance with a clearance instruction, to indicate that the energy-isolating device and the equipment being controlled **shall not be operated until the tagout device is removed.**

**Tagout device** - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy-isolating device in accordance with a clearance instruction, to indicate that the energy-isolating device and the equipment being controlled shall not be operated until the tagout device is removed.

**Transmission Operator (Dispatcher)** – refers to the TVA power system transmission operator who controls the transmission system lines and equipment.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 54 of 80</b>
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**Appendix D  
(Page 1 of 3)**

**Special Requirements for Electrical Clearances**

**1.0 REQUIREMENTS**

- A. Only component handswitches that meet the definition of an energy isolating device may be used as a clearance energy isolation point.
- B. Component handswitches not meeting the definition of a clearance isolating device may be tagged as indication/information that associated equipment is under a clearance.
- C. If potential or station service transformers are outside of the clearance zone, they may be cleared from the primary side. If they are inside the clearance zone, they shall be cleared from both the primary and secondary side.
- D. Coupling capacitors within a clearance zone shall have their secondary circuits shorted if work is to be performed on or within the minimum approach distance to them.
- E. Static capacitors within a clearance zone shall be grounded. The PAE holding the clearance is responsible for discharging and grounding the static capacitors.
- F. The RE who is responsible for maintaining protection to equipment shall approve any changes in current transformer secondary circuits that are in service.
- G. Blocks shall be removed in current transformer secondaries when connected in parallel with current transformers that are energized, before work is performed on them. If blocks are not available, it will be necessary to short circuit the current transformer, ground, and open the secondary circuits.
- H. When two or more transformers are connected to ground through a common reactor, the transformer's neutral ground switch for the transformer to be cleared shall be opened and tagged with a danger tag.
- I. All disconnecting devices or breakers that establish a clearance boundary shall be opened made inoperable, when possible, and tagged to ensure that they will not be closed.
- J. Gang or motor-operated disconnects/air-break switches shall be mechanically locked in the open position and visually checked to verify that all blades are open.
- K. The QE should verify, by secondary means, the absence of energy on circuits involving circuit breakers whenever a means of verification is available.
- L. When opening molded case breakers, positive indication in the form of a snap or click is required to ensure that the breaker is open. If positive indication is not verified, evaluate the situation with the RE.
- M. The procedure for clearing a 161 kV or 500 kV air blast power circuit breaker requires the breaker and its disconnects to be "opened" and then the breaker cycled at the direction of the transmission operator to discharge any capacitors that may be in parallel with the contacts of the breaker.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 55 of 80</b>
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**Appendix D  
(Page 2 of 3)**

**Special Requirements for Electrical Clearances**

**1.0 REQUIREMENTS (continued)**

N. When placing or removing clearances inside electrical boards, the QE shall ensure that no loose materials remain in the breaker compartment.

O. Control power circuits shall be tagged if (1) the work is on the control circuit, (2) the proximity of the work is near the energized control circuit, or (3) there exists a possibility of grounding the control circuit.

P. Clearances on fused circuits other than control circuits (e.g., bus PT, voltage regulator PT, metering PT, etc.) shall have the danger tag attached to the fuse compartment door after the fuses have been removed from the circuit. The fuses shall be placed in an approved storage location.

Q. Clearances involving control fuses located on multi-fused terminal boards required to be tagged shall have the control fuses removed, a danger tag attached to non-conducting fuse blanks, and the blanks inserted into the fuse clips.

R. Clearances on fused control circuits (1) on boards with molded case breakers or (2) for which fuse blanks are not provided, do not require tagging and installation of fuse blanks. The location from which fuses were removed shall have a danger tag attached. Fuses removed should be placed in a secure, easily identifiable location where adverse plant conditions would not occur if they became dislodged from that location. Fuse storage may be in a fuse storage cabinet or in an appropriate bag attached to the compartment from which the fuses were removed (e.g., door handle, lugs attached to the relay covers, etc.). Fuses stored in a fuse storage cabinet should be clearly annotated on the clearance sheet.

S. The following applies for placement of clearances on low voltage circuits (250V or less):

1. When available, appropriate electrical prints for load lists and electrical circuit prints shall be utilized.
2. If plant conditions preclude tagging of main breaker to multiple components in a circuit, fuses shall be removed and tagged where available to isolate only those components affected by the work.
3. If the circuit involves relays or solenoids that are normally energized, the impact of a loss of power as well as a return to power to these components shall be evaluated, e.g. review of applicable logic or control diagrams.



<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 56 of 80</b>
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**Appendix D  
(Page 3 of 3)**

**Special Requirements for Electrical Clearances**

**1.0 REQUIREMENTS (continued)**

4. Circuits that supply power to a board or panel often "daisy-chain" and supply additional panels and components. A detailed search of wiring connection prints is required to determine all the components affected.
5. When low-voltage circuits are de-energized, alarms and responses shall be evaluated to ensure expected results are obtained. The MCR shall be contacted immediately prior to opening the circuit. When the affected unit is at power, the MCR shall be contacted after the circuit is opened to verify expected results.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 57 of 80</b>
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**Appendix E  
(Page 1 of 3)**

**Special Requirements for Mechanical Clearances**

**1.0 REQUIREMENTS**

- A. An air-operated valve that fails open on a loss of air is not be considered closed for blocking purposes unless it is held closed with an installed jacking device or device used to secure the valve in the required position. A clearance tag will be issued and attached to the jacking or other device.
- B. An air-operated valve that fails closed shall have its air supply electrically or mechanically isolated, depressurized, and the valve visually checked-to-be-closed by local or remote indication. The air supply energy-isolating devices shall be tagged.
- C. An air-operated valve that fails “as is” shall be closed and mechanically restrained. Its air supply should be electrically or mechanically isolated, depressurized, and the valve visually checked to be closed by local or remote indication. The air supply energy-isolating devices and mechanical restraint shall be tagged.
- D. In cases where it is not possible to physically secure an air operated valve that fails “as-is” in the closed position, the valve will be tagged closed by applying closing air to the valve diaphragm by the use of the solenoid valve air overrides and tagging both the handswitch in the closed position and the solenoid valve air overrides. Prior to allowing work to begin, the equipment will be drained and de-pressurized to ensure the boundary valves are holding. This condition will be noted in the remarks section of the clearance sheet to inform PAE/Authorized Employee(s) that pressurized air is required to ensure the valve remains closed. This work is considered “working on energized equipment” and must be approved by the Plant Manager.

E. Pressure controlled valves, relief valves, and check valves will not be used as isolation boundary valves under normal conditions. Where such a valve does not have an external means of physical restraint, the work is considered “working on energized equipment” and must be approved by the Plant Manager.

- F. The following instructions govern the use of freeze plugs
  - 1. The clearance should be in place, but not issued, before establishing the freeze plug.
  - 2. The need for the freeze plug should be identified on the Remarks Section of the clearance sheet. The freeze plug should not be listed as a device held on the clearance sheet. The establishment and maintenance of the freeze plug shall be in accordance with approved procedures or work documents.
  - 3. The freeze plug shall be attended by qualified personnel to ensure that it is maintained intact until all work is complete and the proper Post Maintenance Tests (PMTs) are performed.
  - 4. If the clearance must be released to allow performance of a PMT, the equipment shall be retagged before allowing the freeze plug to thaw. This will prevent migration of a portion of the plug.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 58 of 80</b>
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**Appendix E  
(Page 2 of 3)**

**Special Requirements for Mechanical Clearances**

**1.0 REQUIREMENTS (continued)**

5. The clearance must be released before allowing the freeze plug to thaw. However, to prevent migration of the freeze plug, tags on boundary valves shall not be removed until the freeze plug has completely thawed.
  6. All vents and drains shall be verified CLOSED before allowing the freeze plug to thaw.
- G. If suitable means are not available to depressurize or control hazardous energy, the PAE, RE, and responsible manager(s) will determine actions necessary to protect employees. These actions must be approved by the Plant Manager or designee and documented in the Remarks section. The inability to depressurize shall be clearly documented in the remarks section and communicated to the proposed clearance holder. In cases where the component design does not include a vent or drain path within the clearance boundary, the clearance shall be “locked” to preclude clearance holder sign-on and initiation of work prior to direct communication with the RE. Suitable methods to depressurize and prevent repressurization shall be agreed upon by the RE and the PAE before the clearance is held by the PAE.
- H. When performing Temporary Lifts that could result in fluid flow (e.g., Motor Operated Valve Actuator Test (MOVAT) testing, valve stroke, etc.) the PAE responsible for the activity shall ensure that a flow blocking clearance is in place to maintain safe isolation and adequate flow blocking.
- I. Clearances for work on high energy systems (operate with temperature greater than 200°F or pressure greater than 500 psig), lethal chemical systems, or systems connected to high energy systems shall, when possible isolate the work area by two closed valves in series. If equipped, a tell-tale vent or drain between the isolation valves should be opened. Lack of two valve isolation shall be clearly documented and communicated to the proposed clearance holder before issue.
- J. The use of Abandoned Equipment Boundary valves as energy isolating devices requires the application of the same constraints that apply for the use on any other valve used as an energy isolating device. For example: position verification capability, maintenance of isolation from hazardous energy, etc.
- K. The establishment of a safe boundary to allow work to be done on an Abandoned Equipment Boundary valve shall utilize equipment NOT abandoned. The boundary shall meet the same criteria as any other boundary.
- L. When underground piping systems with “slip-joint” construction, e.g., a fire protection system, is being cleared, write the clearance to isolate at the second valve back from the work location to prevent release of energy at the first valve by a slip joint during excavation and work. The first valve back from the work location is tagged in the opened position to relieve pressure. If the location of the second valve back is such that the valve may be disturbed by the excavation, then a valve further back shall be closed and tagged to provide a safe clearance.

<b>NPG Standard Programs and Processes</b>	<b>Clearance Procedure to Safely Control Energy</b>	<b>NPG-SPP-10.2 Rev. 0005 Page 59 of 80</b>
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**Appendix E  
(Page 3 of 3)**

**Special Requirements for Mechanical Clearances**

**1.0 REQUIREMENTS (continued)**

- M. Clearances for entry into Permit Required Confined Spaces with piping, lines, or ducts (steam, water, inert gases, chemicals, etc) must be completely protected against the release of energy and material into the space by such means as: 1) blanking or blinding; 2) misaligning or removing sections of lines, pipes, or ducts; 3) a double block and bleed system, such as two closed valves in series with an open vent between the valves. Entry into confined spaces must comply with **TSP 801, Confined Space Entry**.

3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

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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.

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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.

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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 4 within 13 hours; and
- c. 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.

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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)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

-----NOTES-----

1. In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.14.1.
  2. In MODE 3, the safety injection pumps and charging pumps may be made incapable of injecting to support transition into or from the Applicability of the LCO 3.4.12, Cold Overpressure Mitigation System (COMS) for up to four hours or until the temperature of all the RCS cold legs exceeds 375°F, whichever occurs first.
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APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One or more trains inoperable.</p> <p><u>AND</u></p> <p>At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.</p>	<p>A.1 Restore train(s) to OPERABLE status.</p>	72 hours
<p>B. Required Action and associated Completion Time not met.</p>	<p>B.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>B.2 Be in MODE 4.</p>	<p>6 hours</p> <p>12 hours</p>

**3 S**

# **Handout Package for Applicant**

**3 S**

# APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

## INITIAL CONDITIONS:

1. Unit 1 is in Mode 1.
2. Electrical Maintenance will be replacing the 30X, 1X and 30RX relays in the 1B-B SI pump circuit. While relay replacement is in progress, the 1B-B SI pump will be lubricated and oil samples collected.
3. The eSOMS Clearance System computer program is NOT available.

## INITIATING CUES:

Part 1 - Using the references provided, manually prepare a TVA 17984 [11-2005], "Clearance Tag List and Operational Steps," to de-energize and isolate the 1B-B SI pump for relay replacement, cleaning and lubrication.

**NOTE:** Complete the first, third, fourth, and fifth columns on TVA 17984 [11-2005], "Clearance Tag List and Operational Steps."



# **APPLICANT CUE SHEET**

**(RETURN TO EXAMINER UPON COMPLETION OF TASK)**

**ASSUME WORK IS NOW IN PROGRESS ON THE 1B-B SI PUMP.**

**Part 2 - The Auxiliary Building AUO reports the ERCW supply line to the 1A SI Pump room cooler has ruptured. Local actions have been taken to isolate the leak.**

**What, if any, Technical Specifications/Technical Requirements must be entered due to the failure of the 1A-A SI Pump Room Cooler? What, if any, actions are required to be taken?**







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# Watts Bar Nuclear Plant

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2013-03 NRC Exam

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Administrative JPM 4

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**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**4**

**2013-03 NRC Exam**

**EVALUATION SHEET**

**Task:** DETERMINE REQUIREMENTS FOR LOCKED HIGH RADIATION AREA (LHRA)

**Alternate Path:** n/a

**Facility JPM #:** 3-OT-JPMADA.3-2

**Safety Function:** 2.3 **Title:** Radiation Control

**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.

**Rating(s):** 3.4/3.8 **CFR:** 41.12 / 43.4 / 45.9 / 45.10

**Evaluation Method:** Simulator \_\_\_\_\_ In-Plant \_\_\_\_\_ Classroom \_\_\_\_\_ **X\***

**References:** RCI-100, "Control of Radiological Work," Revision 38  
RCI-153, "Radiation Work Permits," Revision 3  
NPG-SPP-05.1, "Radiological Controls," Revision 2  
Radiation work Permit (RWP) #13105000  
Survey Map # M-20120217-1

**Task Number:** AUO-119-SPP-5.51-001 **Title:** Use a Radiation Work Permit  
AUO-119-SPP-5.01-001 Control Personal Radiation Exposure

**Task Standard:** Applicant determines:  
1.) C-zone protective clothing (Dressout), RP coverage, and radiological briefing requirements from the provided Radiation Work Permit.  
2.) The maximum inspection time without exceeding the administrative dose level is 35 min (0.58) (OR 30 min (0.5 hrs) based on RCI-100.)  
3.) That the LHRA key can only be issued to RP personnel in this situation and that only the RP Shift Supervisor can issue LHRA key.

**Validation Time:** 15 minutes **Time Critical:** Yes \_\_\_\_\_ No **X** \_\_\_\_\_

**Applicant:** \_\_\_\_\_ NAME \_\_\_\_\_ Docket No. \_\_\_\_\_ Time Start: \_\_\_\_\_  
Time Finish: \_\_\_\_\_

**Performance Rating:** SAT \_\_\_\_\_ UNSAT \_\_\_\_\_ Performance Time \_\_\_\_\_

**Examiner:** \_\_\_\_\_ NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_ / \_\_\_\_\_ DATE \_\_\_\_\_

**COMMENTS**

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**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**4**

2013-03 NRC Exam

**Tools/Equipment/Procedures Needed:**

The following information will be handed out to each applicant:

1. Radiation work Permit (RWP) #13105000
2. Survey Map # M-20120217-1
3. Drawing: 47W200-16 EQUIPMENT PLAN-EL 692 & 685.5, Rev. 16

- ***NRC REFERENCE DISK.***

**\*NOTE: This JPM is designed to be performed in a classroom with procedures available to the applicant via a laptop computer loaded with the NRC REFERENCE DISK.**

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**4**

2013-03 NRC Exam

**READ TO APPLICANT**

**DIRECTION TO APPLICANT:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the cue sheet I provided you.

**INITIAL CONDITIONS:**

1. You are the Auxiliary Building AUO, and will be entering the Spent Resin Storage Tank (SRST) valve gallery to inspect instrument sense lines for damage.
2. Your current year dose (CYD) is 650 mrem TEDE.
3. This inspection may require climbing, crawling, or kneeling in the SRST valve gallery, however, entry into the room where the Spent Resin Storage Tank is will not be required.
4. The SRST valve gallery is in a Locked High Radiation Area (LHRA).
5. Unit 1 is at 100% power and no emergency has been declared.

**INITIATING CUES:**

1. Using the Radiological Work Permit (RWP) and Survey Map provided, determine the following requirements for the task:
  - a. c-zone protective clothing (Dressout).
  - b. radiological protection personnel coverage.
  - c. radiological briefing.
2. Determine the maximum inspection time available without exceeding the TVA annual administrative dose level (ADL) based on the highest general area dose rate in the SRST valve gallery. Show ALL calculations.
3. Determine the following:
  - a. personnel the LHRA key can be issued to in this situation.
  - b. personnel authorized to issue the LHRA key.



**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**4**

2013-03 NRC Exam

<b>STEP/STANDARD</b>	<b>SAT/UNSAT</b>
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**START TIME:** \_\_\_\_\_

<p><u>STEP 1:</u> Determine C-zone protective clothing, radiological protection personnel coverage and radiological briefing requirements from the provided Radiological Work Permit (RWP).</p> <p><u>STANDARD:</u></p> <p>Applicant determines the following requirements from the RWP:</p> <p>___ <b>C-zone protective clothing (Dressout) required is:</b> 1 PR coveralls, 1 PR booties, 1 PR shoe covers , 1 PR rubber gloves, cloth inserts, surgeons cap, secure gloves / booties, modesty clothing.</p> <p><b>EXAMINER: This protective clothing is required by the RWP due to potential climbing, crawling, or kneeling in SRST valve gallery.</b></p> <p>___ <b>Radiological Protection coverage is:</b> Continuous</p> <p>___ <b>Radiological Briefing:</b> Brief on current radiological conditions is required prior to RCA entry (Daily Briefing). May also enter "Pre-Job Brief"</p> <p><b>Step is critical to ensure compliance with Radiological Work Permit requirements.</b></p> <p><u>COMMENTS:</u></p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>
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**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**4**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 2:</u> Determine the maximum inspection time available without exceeding the TVA annual administrative dose level based on the <u>highest</u> general area dose rate in the SRST valve gallery.</p> <p><u>STANDARD:</u></p> <p>___ Applicant determines the remaining administrative dose is 350 mrem.</p> <p>1000 mrem - 650 mrem = 350 mrem</p> <p><b>EXAMINER: The TVA administrative dose level (ADL) is 1000 mrem.</b></p> <p>___ Applicant determines the maximum General area dose to be 600 mrem / hour from the survey map near the piping in the upper right portion of the SRST valve gallery.</p> <p>___ Applicant calculates the maximum inspection time to be <b><u>35 minutes (0.58 hours)</u></b>.</p> <p><math>(350 \text{ mr}) \times (1 \text{ hr} / 600 \text{ mr}) \times (60 \text{ min} / 1 \text{ hr}) = 35 \text{ min (or 0.58 hours)}</math></p> $\frac{350 \text{ mr}}{600 \text{ mr}} \times \frac{1 \text{ hr}}{1 \text{ hr}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 35 \text{ min}$ <p><b>EXAMINER: Applicant may use the calculation formula contained in RCI-100, which subtracts 50 mr to ensure the dose limit is not exceeded.</b></p> <p><math>(350 \text{ mr}) - (50 \text{ mr}) \times (1 \text{ hr} / 600 \text{ mr}) \times (60 \text{ min} / 1 \text{ hr}) = 30 \text{ min (or 0.5 hours)}</math></p> <p>___ Applicant calculates the maximum inspection time to be <b><u>30 minutes (0.5 hours)</u></b>.</p> $\frac{350 \text{ mr} - 50 \text{ mr}}{600 \text{ mr}} \times \frac{1 \text{ hr}}{1 \text{ hr}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 30 \text{ min}$ <p><b>Step is critical to ensure the TVA annual administrative dose level is not exceeded.</b></p> <p><u>COMMENTS:</u></p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**4**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 3:</u> Determine the personnel the LHRA key can be issued to in this situation and who is authorized to issue the LHRA key.</p> <p><u>STANDARD:</u></p> <p>___ Applicant determines that LHRA keys for this task can only be issued to RP personnel in this non-emergency situation, and that LHRA keys can only be issued by the RP Shift supervisor.</p> <p><b>NOTE:</b> RCI-100 Section 2.6, "Key Control" States: C. HRA, LHRA and VHRA keys may only be issued to RP personnel, except in declared emergency situations.</p> <p>I. The on-duty RP Shift Supervisor shall maintain control of the access key to the HRA/LHRA key box. Issue of the key to a HRA or LHRA must be authorized by the on-duty RP Shift Supervisor. HRA/LHRA keys shall only be issued by a RP Shift Supervisor.</p> <p><b>Step is critical to ensure proper RP control and monitoring of this non-emergency work and prevent inadvertent entry into the LHRA.</b></p> <p><u>COMMENTS:</u></p> <p align="center"><b>END OF TASK</b></p>	<p align="center"><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>

**STOP TIME** \_\_\_\_\_

**4**

**Handout Package for  
Applicant**

# APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

## INITIAL CONDITIONS:

1. You are the Auxiliary Building AUO, and will be entering the Spent Resin Storage Tank (SRST) valve gallery to inspect instrument sense lines for damage.
2. Your current year dose (CYD) is 650 mrem TEDE.
3. This inspection may require climbing, crawling, or kneeling in the SRST valve gallery, however, entry into the room where the Spent Resin Storage Tank is will not be required.
4. The SRST valve gallery is in a Locked High Radiation Area (LHRA).
5. Unit 1 is at 100% power and no emergency has been declared.

## INITIATING CUES:

1. Using the Radiological Work Permit (RWP) and Survey Map provided, determine the following requirements for the task:
  - a. c-zone protective clothing (Dressout).
  - b. radiological protection personnel coverage.
  - c. radiological briefing.
2. Determine the maximum inspection time available without exceeding the TVA annual administrative dose level (ADL) based on the highest general area dose rate in the SRST valve gallery. Show ALL calculations.
3. Determine the following:
  - a. personnel the LHRA key can be issued to in this situation.
  - b. personnel authorized to issue the LHRA key.





RADIOLOGICAL WORK PERMIT  
 DAILY BRIEFING  
 LOCKED HIGH RADIATION AREAS

**GENERAL DESCRIPTION**

Status:SUSPENDED	End Date: 31-DEC-2013 23:59
Start Date: 31-DEC-2012 23:30	Outage: N Name:
Type:SPECIFIC :	PSE: N
Task:ROUTINE PLANT MAINTENANCE	Authorization Type: ALL
HP Coverage:CONTINUOUS	Primary WorkDoc:
ALARA Review Number:10001	Person-Hrs Estimate:100
Person-mrem Estimate:25	Dose Rate Alarm:800
Dose Alarm:25	DAC-hrs Tracked:Y
Work Area Description:ALL RADIOLOGICALLY CONTROLLED AREAS	

**DESCRIPTION OF WORK TO BE PERFORMED**

LOCKED HIGH RADIATION AREAS (CONTAMINATION AND NON-CONTAMINATION AREAS) IN THE AUX BLDG RCA - PERFORMANCE OF OPERATIONS SURVEILLANCE ACTIVITIES.
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**DOSIMETRY REQUIREMENTS**

ELECTRONIC DOSIMETER	TLD
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**BRIEFING REQUIREMENTS**

PRE-JOB BRIEFING	
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**EQUIS**

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- 1 ALL PERSONNEL MUST OBTAIN BRIEF ON CURRENT RADIOLOGICAL CONDITIONS PRIOR TO RCA ENTRY.
- 2 REVIEW APPROPRIATE SURVEY DATA PRIOR TO ENTRY. RADIOLOGICAL SURVEY DATA IS AVAILABLE AT THE RADIATION PROTECTION DESK AT THE RCA ACCESS ON ELEVATION 713.
- 3 NO ENTRY ALLOWED INTO HOT PARTICLE CONTROL ZONES, AREAS WITH GENERAL CONTAMINATION LEVELS >50,000 DPM/100CM2, AIRBORNE AREAS, U1 CONTAINMENT, AND U1 ANNULUS.
- 4 MONITOR ELECTRONIC DOSIMETER FREQUENTLY (I.E., 1/3 OF JOB ENTRY TIME OR EVERY 15 MINUTES, WHICHEVER IS SHORTER).
- 5 LEAVE THE AREA PRIOR TO REACHING THE DOSE ALARM SET POINT OR UPON RECEIVING ANY UNEXPECTED DOSE RATE ALARM. NOTIFY RP IF ANY ALARM IS RECEIVED.
- 6 REPORT TO RADIATION PROTECTION IMMEDIATELY IF ELECTRONIC DOSIMETER IS DROPPED OR DAMAGED.
- 7 COMPENSATORY MEASURES SUCH AS VISUAL OR VIBRATING ALARMS OR REMOTE MONITORING WITH VOICE COMMUNICATION ARE REQUIRED IN HIGH NOISE AREAS.
- 8 WEAR ELECTRONIC DOSIMETER OUTSIDE OF PROTECTIVE CLOTHING SO THAT IT CAN BE EASILY READ.
- 9 AVOID POSTED HOT SPOTS
- 10 NOTIFY RADIATION PROTECTION PRIOR TO WORKING IN OVERHEAD (>6 FT OFF FLOOR).



RADIOLOGICAL WORK PERMIT  
DAILY BRIEFING  
LOCKED HIGH RADIATION AREAS

- 11 RADIOACTIVE SYSTEM BREACHES ALLOWED FOR THE FOLLOWING: INSTALLATION / DISCONNECTION OF MT&E EQUIPMENT AND TEST CONNECTIONS, AND DRAIN / VENT HOSES. CONTACT RP PRIOR TO ANY RADIOACTIVE SYSTEM BREACHES.
- 12 IF FOREIGN MATERIAL FROM PRIMARY SYSTEMS IS ENCOUNTERED, DO NOT TOUCH THE MATERIAL. EVACUATE THE AREA AND NOTIFY RADIATION PROTECTION AND YOUR SUPERVISOR.
- 13 NOTIFY RADIATION PROTECTION OF ANY UNUSUAL RADIOLOGICAL CONDITIONS SUCH AS WATER, LEAKS OR RADIATION MONITOR ALARMS.
- 14 ENSURE ALL MATERIAL IS SURVEYED BY RADIATION PROTECTION UPON REMOVAL FROM CONTAMINATED AREAS.

- 1 FOR HANDS ONLY ENTRY INTO CONTAMINATED AREAS: CLOTH INSERTS AND RUBBER GLOVES OR SURGEON'S GLOVES.  
HP Coverage: CONTINUOUS
- 2 CONTAMINATED AREAS <10,000 DPM/100CM2 NO CLIMBING, KNEELING OR CRAWLING: DRESSOUT - COTTON INSERTS, RUBBER GLOVES, BOOTIES, SHOECOVERS.  
HP Coverage: CONTINUOUS
- 3 CONTAMINATED AREAS >10,000 DPM/100CM2 OR IF CLIMBING, KNEELING OR CRAWLING: DRESSOUT - 1 PR COVERALLS, 1 PR BOOTIES, 1 PR SHOE COVERS, 1 PR RUBBER GLOVES, CLOTH INSERTS, SURGEON'S CAP, SECURE GLOVES / BOOTIES, MODESTY CLOTHING.  
HP Coverage: CONTINUOUS
- 4 CONTINUOUS RADIATION PROTECTION COVERAGE REQUIRED FOR ENTRIES INTO POSTED LOCKED HIGH RADIATION AREAS.  
HP Coverage: CONTINUOUS
- 5 NO PROTECTIVE CLOTHING REQUIRED FOR CLEAN AREAS.  
HP Coverage: CONTINUOUS
- 6 STAY TIME CONTROLS IAW RCI-100.  
HP Coverage: CONTINUOUS

**APPROVAL**

Prepared By: KRSUMMER  
Approved By:  
Approved By:  
Final Approval: CWPARKS

End of RWP

# VSDS Standard Map Survey Report

## Survey M-20120217-1

### General Information

Title: WBN61.PCX - Spent Resin Tank Valve Gallery 692'

Survey Date/Time: 02/17/2012 07:43

Lead Surveyor: Mahlon Tuck

Survey Type: Job Coverage

Work Order/Task #: NA

Counted By: M. Tuck 02/17/2012 09:44

KCN:

Rx % Pwr: 100%

Status: In Process

### 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

LHRA=Locked High Radiation Area

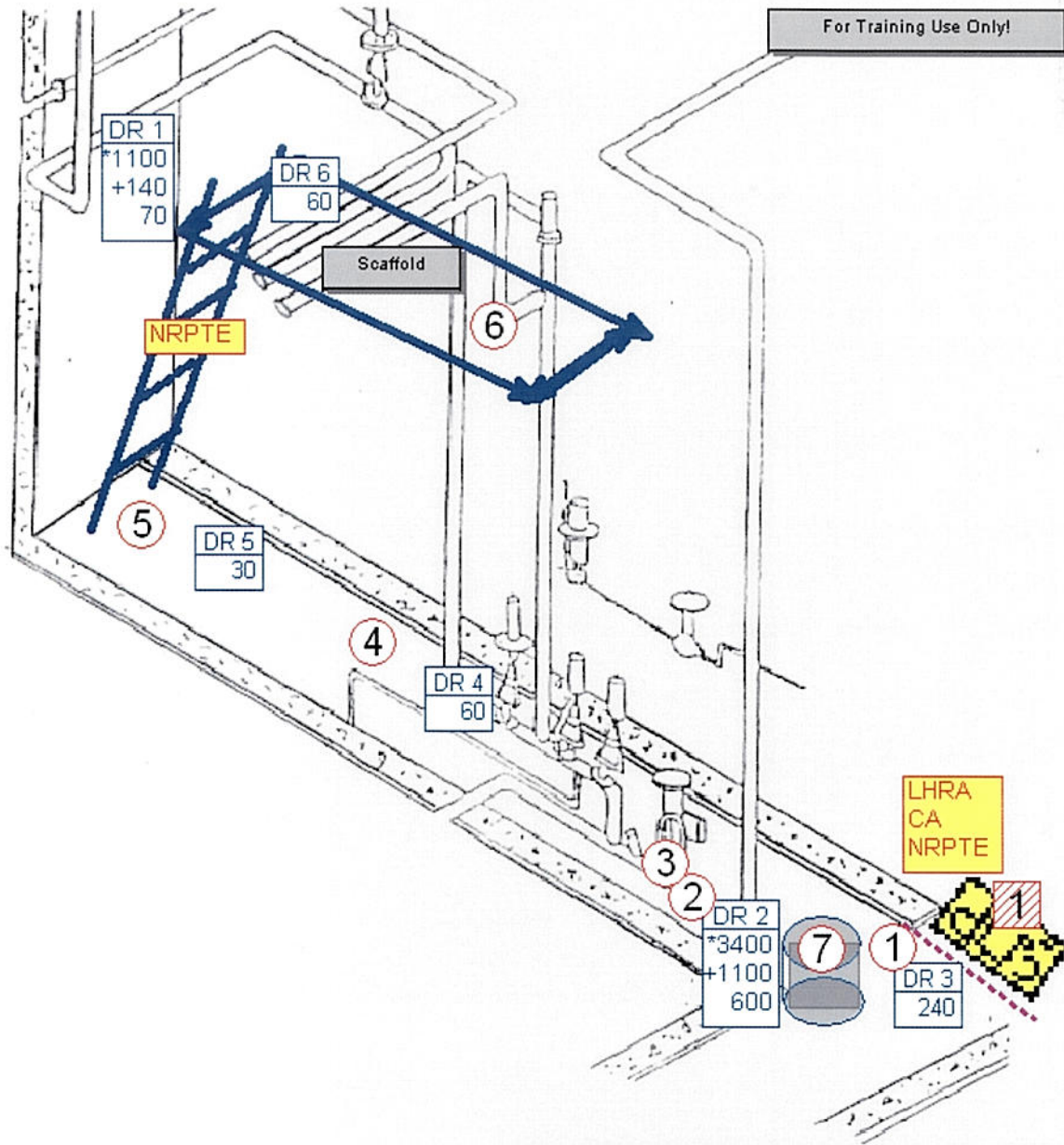
NRPTE=Notify RADCON Prior To Entry

# VSDS Standard Map Survey Report

Spent Resin Tank Valve Gallery 692'

Survey #: M-20120217-1

Date/Time: 02/17/2012 07:43



Comments:

### Summary of Highest Readings (All available values may not be listed)

Smears	Air Samples & Wipes
2) 8000 DPM/100 cm <sup>2</sup> β/γ	Wipe 1) <MDA CPM Reading 1

Type: Job Coverage

**Symbol Legend (for example only)** Reactor Power = 100%

<p><b>Dose Rate</b></p> <ul style="list-style-type: none"> <li>*150 ← Contact Reading</li> <li>+ 75 ← 30 cm Reading</li> <li>20 ← General Area</li> </ul> <p> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">15</span> Smear               <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">15</span> Air Sample               <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">0</span> RM               <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">15</span> Wipe         </p>	<ul style="list-style-type: none"> <li><span style="border: 1px solid black; padding: 2px;">HS-50</span> Hot Spot</li> <li><span style="background-color: yellow; border: 1px solid black; padding: 2px;">FCA</span> Posting</li> <li><span style="border: 1px solid black; padding: 2px;">Drip Bag</span> Drip Bag</li> </ul>
--	--

Beta Correction Factor (BCF) = 5.0

Lead Surveyor: Mahlon Tuck

Location Code: 692

Location Description:

Status: In Process

Bldg/Area Name: AUX. BLDG.

## VSDS Standard Map Survey Report

### Data Point Details Survey #: M-20120217-1 Map: WBN61

#	Type	Inst.	Value	Units	Position	Notes
1	DR $\gamma$	N/A	* 1100	mrem/hr	At penetration	
		N/A	+ 140	mrem/hr		
		N/A	70	mrem/hr		
2	DR $\gamma$	N/A	* 3400	mrem/hr	Filter Storage Drum	
		N/A	+ 1100	mrem/hr		
		N/A	600	mrem/hr		
3	DR $\gamma$	N/A	240	mrem/hr		
4	DR $\gamma$	N/A	60	mrem/hr		
5	DR $\gamma$	N/A	30	mrem/hr		
6	DR $\gamma$	N/A	60	mrem/hr	Scaffold	
1	Smear	N/A	$\beta/\gamma$ <1000	DPM/100 cm2	Floor	
2	Smear	N/A	$\beta/\gamma$ 8000	DPM/100 cm2	On floor under leaking valve	
3	Smear	N/A	$\beta/\gamma$ 7000	DPM/100 cm2	Valve	
4	Smear	N/A	$\beta/\gamma$ 1000	DPM/100 cm2	Floor	
5	Smear	N/A	$\beta/\gamma$ 3000	DPM/100 cm2	Floor	
6	Smear	N/A	$\beta/\gamma$ 4000	DPM/100 cm2	Scaffold	
7	Smear	N/A	$\beta/\gamma$ <1000	DPM/100 cm2	Drum	
1	Wipe		Reading 1 <MDA	CPM	SOP	
	Posting		LHRA CA NRPTE			
	Posting		NRPTE		On Ladder	

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# Watts Bar Nuclear Plant

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2013-03 NRC Exam

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Administrative JPM 5 S

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**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**5 S**

2013-03 NRC Exam

**Tools/Equipment/Procedures Needed:**

- ***NRC REFERENCE DISK.***

**\*NOTE:** This JPM is designed to be performed in a classroom with procedures available to the applicant via a laptop computer loaded with the NRC REFERENCE DISK.

**EXAMINER:** Multiple copies of each of the following forms will be available for use by the applicants:

**EPIP-2, "Notification of Unusual Event," Appendix A, "Notification of Unusual Event Initial Notification Form," and Appendix B, "State of Tennessee Notification."**

**EPIP-3, "Alert," Appendix A, "Alert Notification Form," and Appendix B, "State of Tennessee Notification."**

**EPIP-4, "Site Area Emergency," Appendix A, "Site Area Emergency Initial Notification Form," and Appendix B, "State of Tennessee Notification."**

**EPIP-5, "General Emergency," Appendix A, "General Emergency Initial Notification Form," Appendix B, "State of Tennessee Notification," and Appendix H, "Initial - Protective Action Recommendations."**

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**5 S**

2013-03 NRC Exam

**DIRECTION TO APPLICANT:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the cue sheet I provided you.

**INITIAL CONDITIONS:**

***TREAT THIS AS A RADIOLOGICAL EMERGENCY DRILL***

Unit 1 is cooling down to support outage work. RCS temperature is 285°F and RCS pressure is 350 psig. 1A-A 6.9kV Shutdown Board is de-energized and tagged for inspection of lugs, repairs will take 90 minutes.

At 1600, the following occur:

1. A tornado touched down in the Watts Bar Hydroelectric Switchyard, severely damaging both 161kv lines to the plant which resulted in the lines being lost.
2. The 1B-B DG tripped when started. The AUO at the DG Bldg reports that the 1B-B DG Engine 2 is severely damaged.

At 1615 the AUO at the DG Bldg reports that another tornado caused damage to the C-S Diesel Building.

**INITIATING CUES:**

1. Assuming the listed conditions have not changed at 1618, classify the event.
2. RAISE YOUR HAND when your classification is complete.
3. Complete the associated TVA Initial Classification form.
4. Determine what, if any, Protective Action Recommendations are required.
5. RAISE YOUR HAND when you have completed the notification form.

***Element(s) of this task is/are time critical.***



**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**5 S**

2013-03 NRC Exam

<b>STEP/STANDARD</b>	<b>SAT/UNSAT</b>
----------------------	------------------

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

**EXAMINER:** *Potential exists for the applicant to INCORRECTLY choose:*  
*EAL 3.2 Loss of AC (Shutdown), if operating mode is applied incorrectly*  
*EAL 5.2, Tornado, since there is damage to the Diesel Building and 1B-B Diesel Generator,*  
*EAL 6.2, Loss of AC (Shutdown) if operating mode is applied incorrectly.*

STEP 1: Refers to EPIP-1 to determine level of classification required for the events in progress.

**CRITICAL  
STEP**

STANDARD:

\_\_\_ SAT

Applicant refers to EPIP-1, Section 3, "Loss of Power."

\_\_\_ UNSAT

Applicant determines that the plant is in Mode 4, and that the EAL 3.1 Loss of AC (Power Ops) column is applicable.

\_\_\_ Based on "Emergency Class Criteria", the applicant determines that a **Site Area Emergency**, needs to be declared, based on EAL 3.1, Loss of AC (Power Ops), Loss of Offsite and Onsite AC Power >15 minutes.

*The applicant may also indicate that EPIP-1, Section 5, "Destructive Phenomenon," EAL 5.2, Tornado should be evaluated. EAL 5.2 would result in an ALERT, since the Diesel Building and 1B Diesel Generator were damaged by the tornado.*

**Criteria to meet the critical step is for the EALs to be correctly identified and the declaration made within 15 minutes.**

**EXAMINER: RECORD** time that declaration was made: \_\_\_\_\_

COMMENTS:

**WATTS BAR NUCLEAR PLANT  
JOB PERFORMANCE MEASURE**

**5 S**

2013-03 NRC Exam

STEP/STANDARD	SAT/UNSAT
<p><b>EXAMINER: A completed copy of EPIP-4, "Site Ares Emergency," Appendix A for this JPM is included and marked NRC EXAM MATERIAL - S 5 KEY.</b></p>	
<p><b>EXAMINER: <u>NO PAR RECOMMENDATION IS REQUIRED FOR THIS DECLARATION.</u></b></p>	
<p><u>STEP 2:</u> INITIATES EPIP-4, "SITE AREA EMERGENCY" Appendix A, "TVA Initial Notification Form For Site Area Emergency."</p> <p><u>STANDARD:</u></p> <p>Applicant completes EPIP-4, Appendix A, "TVA Initial Notification Form For Site Area Emergency," within 15 minutes of initial event classification.</p> <p><b>Critical elements that must appear on Appendix A form:</b></p> <p><b>Item 3. - EAL Designators - EAL 3.1,</b></p> <p><b>Item 4. - Brief Description of the Event - Loss of AC (Power Ops), Loss of Offsite and Onsite AC Power &gt;15 minutes.</b></p> <p><b>Item 5. - Radiological Conditions - <u>EITHER</u> "Minor releases within federally approved limits" <u>OR</u> "Release Information not known" checked or otherwise indicated on form.</b></p> <p><b>Item 6. - Time that applicant declared the event and the date.</b></p> <p><u>COMMENTS:</u></p> <p align="center"><b>END OF TASK</b></p>	<p><b>CRITICAL STEP</b></p> <p>___ SAT</p> <p>___ UNSAT</p>

**STOP TIME \_\_\_\_\_**

**5 S  
KEY**

**DO NOT HAND TO  
APPLICANT**

# 03-2013 NRC Exam 5S JPM KEY

Attachment 3  
(Page 1 of 4)

## Loss of Power

### FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

- 1.1 Fuel Clad
- 1.2 RCS
- 1.3 Containment

# 1

### SYSTEM DEGRADATION

- |                                    |                             |
|------------------------------------|-----------------------------|
| 2.1 Loss of Instrumentation        | 2.6 RCS Identified Leakage  |
| 2.2 Loss of Function/Communication | 2.7 Uncontrolled Cool Down  |
| 2.3 Failure of Reactor Protection  | 2.8 Turbine Failure         |
| 2.4 Fuel Clad Degradation          | 2.9 Technical Specification |
| 2.5 RCS Unidentified Leakage       | 2.10 Safety Limit           |

# 2

### LOSS OF POWER

- 3.1 Loss of AC (Power Ops)
- 3.2 Loss of AC (Shutdown)
- 3.3 Loss of DC

# 3

### HAZARDS and SED JUDGMENT

- |               |                   |                  |
|---------------|-------------------|------------------|
| 4.1 Fire      | 4.3 Flammable Gas | 4.5 Control Room |
| 4.2 Explosion | 4.4 Toxic Gas     | Evacuation       |
| Table 4-1     | Table 4-2         | 4.6 Security     |
| Figure 4-A    | Figure 4-B        | 4.7 SED Judgment |

# 4

### DESTRUCTIVE PHENOMENON

- |                         |                      |
|-------------------------|----------------------|
| 5.1 Earthquake          | 5.4 River Level High |
| 5.2 Tornado             | 5.5 River Level Low  |
| 5.3 Aircraft/Projectile | 5.6 Watercraft Crash |
| Crash Figure 5-A        |                      |
| Table 5-1               |                      |

# 5

### SHUTDOWN SYSTEM DEGRADATION

- 6.1 Loss of Shutdown Systems
- 6.2 Loss of AC (Shutdown)
- 6.3 Loss of DC (Shutdown)

# 6

### RADIOLOGICAL

- |                      |                      |
|----------------------|----------------------|
| 7.1 Gaseous Effluent | 7.3 Radiation Levels |
| 7.2 Liquid Effluent  | 7.4 Fuel Handling    |
| Table 7-1            | Table 7-2            |
| Figure 7-A           |                      |

# 7

# 03-2013 NRC Exam 5S JPM KEY

## Attachment 3

### (Page 2 of 4)

**UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY:** (see SED Judgment 4.7).

**BOMB:** An explosive device (See EXPLOSION).

**CIVIL DISTURBANCE:** A group of twenty (20) or more persons violently protesting station operations or activities at the site.

**CREDIBLE SITE-SPECIFIC** -The determination is made by WBN senior plant management through use of information found in the Safeguards Contingency Plan.

**CRITICAL-SAFETY FUNCTION (CSFs):** A plant safety function required to prevent significant release of core radioactivity to the environment. There are six CSFs: Sub-criticality, Core Cooling, Heat Sink, Pressurized Thermal Shock, Integrity (Containment) and Inventory (RCS).

**EVENT:** Assessment of an **EVENT** commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

**EXCLUSION AREA BOUNDARY (EAB):** The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

**EXPLOSION:** A rapid, violent, unconfined combustion or a catastrophic failure of pressurized equipment that potentially imparts significant energy to near-by structures and materials.

**EXTORTION:** An attempt to cause an action at the station by threat of force.

**FAULTED:** (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

**FIRE:** Combustion characterized by heat and light. Source of smoke such as slipping drive belts or overheated electrical components do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

**FLAMMABLE GAS:** Combustible gases maintained at concentrations less than the **LOWER EXPLOSIVE LIMIT (LEL)** will not explode due to ignition.

**HOSTAGE:** A person(s) held as leverage against the station to ensure that demands will be met by the station.

**HOSTILE ACTION:** An act toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidates the licensee to achieve an end. This includes attack by air, land, or water; using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. **HOSTILE ACTION** should NOT be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the nuclear power plant. Non-terrorism-based EALs should be used to address such activities, (e.g., violent acts between individuals in the owner controlled area.)

**HOSTILE FORCE:** Individual(s) involved with a **HOSTILE ACTION**. One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

**INEFFECTIVE:** The specified restoration action(s) does not result in a reduction in the level of severity of the **RED PATH** condition within 15 minutes from identification of the Core Cooling CSF Status Tree **RED PATH**. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

**INITIATING CONDITIONS:** Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

**INTRUSION/INTRUDER:** Suspected hostile individual present in a protected area without authorization.

**ODCM:** Offsite Dose Calculation Manual.

**ORANGE PATH:** Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

**PROJECTILE:** An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

**PROTECTED AREA:** Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

**RED PATH:** Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

**RUPTURED:** (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

**SABOTAGE:** Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

**SECURITY CONDITION-** Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A **SECURITY CONDITION** does not involve a **HOSTILE ACTION**.

**SIGNIFICANT TRANSIENT:** An **UNPLANNED** event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

**SITE PERIMETER:** Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-A and 7-A.

**STRIKE ACTION:** A work stoppage within the **PROTECTED AREA** by a body of workers to enforce compliance with demands made on TVA. The **STRIKE ACTION** must threaten to interrupt normal plant operations.

**TOXIC GAS:** A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

**UNPLANNED:** An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are **UNPLANNED**.

**UNPLANNED:** (With specific regard to radioactivity releases) A release of radioactivity is **UNPLANNED** if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

**VALID:** An indication or report or condition is considered to be **VALID** when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

**VISIBLE DAMAGE:** Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

**VITAL AREA:** Is any area within the **PROTECTED AREA** which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

03-2013 NRC Exam 5S JPM KEY  
Attachment 3  
(Page 3 of 4)

		3.1 Loss of AC (Power Ops)	
		Mode	Initiating/Condition
GENERAL SITE ALERT UNUSUAL EVENT	1,2, 3,4		<b>Prolonged loss of Offsite and Onsite AC power (1 and 2)</b> 1. 1A <b>and</b> 1B 6.9KV Shutdown Boards de-energized for >15 minutes 2. (a or b) a. Core Cooling Red <b>or</b> Orange b. Restoration of Either 1A <b>or</b> 1B 6.9KV Shutdown Board(s) is not likely within 4 hours of loss.
	1,2, 3,4		<b>Loss of Offsite <b>and</b> Onsite AC Power &gt; 15 minutes</b> 1. 1A <b>and</b> 1B 6.9KV Shutdown Boards de-energized for >15 minutes
	1,2, 3,4		<b>Loss of Offsite Power for &gt;15 minutes (1 and 2)</b> 1. C <b>and</b> D CSSTs are not available for >15 minutes 2. 1A <b>or</b> 1B Diesel Generator not available
	1,2 3,4		<b>Loss of Offsite Power for &gt;15 minutes (1 and 2)</b> 1. C <b>and</b> D CSSTs not available for >15 minutes 2. Each Diesel Generator is supplying power to its respective Shutdown Board

		3.2 Loss of AC (Shutdown)	
		Mode	Initiating/Condition
			<i>Not Applicable</i>
			<i>Not Applicable</i>
		5,6, or Defuel	<b>UNPLANNED loss of Offsite <b>and</b> Onsite AC power for &gt;15 minutes</b> 1. 1A <b>and</b> 1B 6.9KV Shutdown Boards de-energized for >15 minutes <i>Also Refer to "Loss of Shutdown Systems" (6.1)</i>
		5,6, or Defuel	<b>UNPLANNED loss of Offsite Power for &gt;15 minutes (1 and 2)</b> 1. C <b>and</b> D CSSTs not available for >15 minutes 2. Either Diesel Generator is supplying power to its respective Shutdown Board

**03-2013 NRC Exam 5S JPM KEY**  
**Attachment 5**  
**(Page 1 of 7)**

**Destructive Phenomenon**

<b>FISSION PRODUCT BARRIER MATRIX (Modes 1-4)</b> 1.1 Fuel Clad 1.2 RCS 1.3 Containment	<h1>1</h1>
<b>SYSTEM DEGRADATION</b> 2.1 Loss of Instrumentation 2.2 Loss of Function/Communication 2.3 Failure of Reactor Protection 2.4 Fuel Clad Degradation 2.5 RCS Unidentified Leakage 2.6 RCS Identified Leakage 2.7 Uncontrolled Cool Down 2.8 Turbine Failure 2.9 Technical Specification 2.10 Safety Limit	<h1>2</h1>
<b>LOSS OF POWER</b> 3.1 Loss of AC (Power Ops) 3.2 Loss of AC (Shutdown) 3.3 Loss of DC	<h1>3</h1>
<b>HAZARDS and SED JUDGMENT</b> 4.1 Fire 4.2 Explosion Table 4-1 Figure 4-A 4.3 Flammable Gas 4.4 Toxic Gas Table 4-2 Figure 4-B 4.5 Control Room Evacuation 4.6 Security 4.7 SED Judgment	<h1>4</h1>
<b>DESTRUCTIVE PHENOMENON</b> 5.1 Earthquake 5.2 Tornado 5.3 Aircraft/Projectile Crash Figure 5-A Table 5-1 5.4 River Level High 5.5 River Level Low 5.6 Watercraft Crash	<h1>5</h1>
<b>SHUTDOWN SYSTEM DEGRADATION</b> 6.1 Loss of Shutdown Systems 6.2 Loss of AC (Shutdown) 6.3 Loss of DC (Shutdown)	<h1>6</h1>
<b>RADIOLOGICAL</b> 7.1 Gaseous Effluent 7.2 Liquid Effluent Table 7-1 Figure 7-A 7.3 Radiation Levels 7.4 Fuel Handling Table 7-2	<h1>7</h1>

# 03-2013 NRC Exam 5S JPM KEY

## Attachment 5

### (Page 2 of 7)

**UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY:** (see SED Judgment 4.7).

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**HOSTAGE:** A person(s) held as leverage against the station to ensure that demands will be met by the station.

**HOSTILE ACTION:** An act toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidates the licensee to achieve an end. This includes attack by air, land, or water; using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. **HOSTILE ACTION** should NOT be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the nuclear power plant. Non-terrorism-based EALs should be used to address such activities, (e.g., violent acts between individuals in the owner controlled area.)

**HOSTILE FORCE:** Individual(s) involved with a **HOSTILE ACTION**. One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

**INEFFECTIVE:** The specified restoration action(s) does not result in a reduction in the level of severity of the **RED PATH** condition within 15 minutes from identification of the Core Cooling CSF Status Tree **RED PATH**. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

**INITIATING CONDITIONS:** Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

**INTRUSION/INTRUDER:** Suspected hostile individual present in a protected area without authorization.

**ODCM:** Offsite Dose Calculation Manual.

**ORANGE PATH:** Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

**PROJECTILE:** An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

**PROTECTED AREA:** Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

**RED PATH:** Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

**RUPTURED:** (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

**SABOTAGE:** Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

**SECURITY CONDITION-** Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A **SECURITY CONDITION** does not involve a **HOSTILE ACTION**.

**SIGNIFICANT TRANSIENT:** An **UNPLANNED** event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

**SITE PERIMETER:** Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-A and 7-A.

**STRIKE ACTION:** A work stoppage within the **PROTECTED AREA** by a body of workers to enforce compliance with demands made on TVA. The **STRIKE ACTION** must threaten to interrupt normal plant operations.

**TOXIC GAS:** A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

**UNPLANNED:** An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are **UNPLANNED**.

**UNPLANNED:** (With specific regard to radioactivity releases) A release of radioactivity is **UNPLANNED** if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

**VALID:** An indication or report or condition is considered to be **VALID** when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

**VISIBLE DAMAGE:** Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

**VITAL AREA:** Is any area within the **PROTECTED AREA** which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.



03-2013 NRC Exam 5S JPM KEY  
Attachment 5  
(Page 3 of 7)

		5.1 Earthquake		5.2 Tornado	
		Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL SITE			Refer to "Fission Product Barrier Matrix"		Refer to "Fission Product Barrier Matrix"
			Refer to "Fission Product Barrier Matrix"		Refer to "Fission Product Barrier Matrix"
	All	<p><b>Earthquake detected by site seismic instrumentation (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. (a and b)                             <ol style="list-style-type: none"> <li>a. Ann.166 D indicates "OBE Spectra Exceeded"</li> <li>b. Ann.166 E indicates "Seismic Recording Initiated"</li> </ol> </li> <li>2. (a or b)                             <ol style="list-style-type: none"> <li>a. Ground motion sensed by Plant personnel</li> <li>b. National Earthquake Information Center at 1-(303) 273-8500 can confirm the event.</li> </ol> </li> </ol>	All	<p><b>Tornado or High Winds strikes any structure listed in Table 5-1 and results in VISIBLE DAMAGE (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. Tornado or High Winds (Sustained &gt;80 mph &gt; one minute) strikes any structure listed in Table 5-1</li> <li>2. (a or b)                             <ol style="list-style-type: none"> <li>a. Confirmed report of any <b>VISIBLE DAMAGE</b></li> <li>b. Control Room indications of degraded Safety System <u>or</u> component response due to event</li> </ol> </li> </ol> <p><i>Note: Site Met Data Instrumentation fails to 0 at &gt;100 mph. National Weather Service Morristown 1-(423) 586-8400 can provide additional information if needed.</i></p>	
UNUSUAL EVENT	All	<p><b>Earthquake detected by site seismic instrumentation (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. Ann. 166 E indicator "Seismic Recording Initiated"</li> <li>2. (a or b)                             <ol style="list-style-type: none"> <li>a. Ground motion sensed by Plant personnel</li> <li>b. National Earthquake Information Center at 1-(303) 273-8500 can confirm the event.</li> </ol> </li> </ol>	All	<p><b>Tornado within the SITE PERIMETER</b></p> <ol style="list-style-type: none"> <li>1. Plant personnel report a Tornado has been sighted within the <b>SITE PERIMETER</b> (Refer to Figure 5-A)</li> </ol>	

WBN  
Unit 0

Site Area Emergency

EPIP-4  
Rev. 0034  
Page 13 of 26

# 03-2013 NRC Exam 5S JPM KEY

Appendix A  
(Page 1 of 1)

## Site Area Emergency Initial Notification Form

1.  This is a Drill       This is an Actual Event - Repeat - This is an Actual Event

2.  the SED at **Watts Bar** has declared a **Site Area Emergency**

3. **EAL Designator:**

4. **Brief Description of the Event:**

Loss of Offsite and Onsite AC Power > 15 minutes 1. 1A and 1B 6.9 KV Shutdown Boards de-energized for > 15 minutes.

5. **Radiological Conditions:** (Check one under both Airborne and Liquid column.)

Airborne Releases Offsite

Liquid Releases Offsite

Minor releases within federally approved limits<sup>1</sup>

Minor releases within federally approved limits<sup>1</sup>

Releases above federally approved limits<sup>1</sup>

Releases above federally approved limits<sup>1</sup>

Release information not known  
(<sup>1</sup>Tech Specs/ODCM)

Release information not known  
(<sup>1</sup>Tech Specs/ODCM)

6. **Event Declared:** Time:  Date:   
Eastern Time

7. **Provide Protective Action Recommendation:**  None

Completed By:

Approved By: \_\_\_\_\_

CRITICAL  
STEP

CRITICAL  
STEP

CRITICAL  
STEP

Checking  
either of  
these  
items is  
acceptabl

Checking  
either of  
these  
items is  
acceptable

CRITICAL  
STEP

# 03-2013 NRC Exam 5S JPM KEY

Appendix B  
(Page 1 of 1)

## State of Tennessee Notification

### 1.0 State Notification

#### CAUTION

Notification of the State of Tennessee is required to be completed as soon as possible not to exceed 15 minutes from the time of emergency classification declaration.

- [1] **FAX** a copy of completed Appendix A to the State of Tennessee at 9-1-615-242-9635
- [2] **REPORT** to the State of Tennessee the information on Appendix A utilizing:  
24 Hours  
Primary: 9-1-800-262-3300  
Backup: 9-1-615-741-0001  
Backup: 9-1-800-262-3400

#### NOTE

The Time of the notification is when the State Representative answers the phone.

- [3] **RECORD** Information from the notification  
Name of Person Notified: \_\_\_\_\_  
Time and Date of Notification: \_\_\_\_\_
- [4] **RETURN** the completed Appendix B and Appendix A to the SED

**5 S**

**BLANK FORMS**

**HAND REQUESTED FORM  
TO APPLICANT**



<b>WBN Unit 0</b>	<b>Notification of Unusual Event</b>	<b>EPIP-2 Rev. 0031 Page 13 of 22</b>
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**Appendix B  
(Page 1 of 1)**

**State of Tennessee Notification**

**1.0 State of Tennessee Notification**

**CAUTION**

Notification of the State of Tennessee is required to be completed as soon as possible not to exceed 15 minutes from the time of emergency classification declaration.

- [1] **FAX** a copy of completed Appendix A to the State of Tennessee at 9-1-615-242-9635.
  
- [2] **REPORT** to the State of Tennessee the information on Appendix A utilizing:
  - 24 Hours
  - Primary: 9-1-800-262-3300
  - Backup: 9-1-615-741-0001
  - Backup: 9-1-800-262-3400

**NOTE**

The Time of the notification is when the State Representative answers the phone.

- [3] **RECORD** information from the notification
  - Name of Person Notified: \_\_\_\_\_
  - Time and Date of Notification: \_\_\_\_\_
  
- [4] **RETURN** the completed Appendix B and Appendix A to the SED



<b>WBN Unit 0</b>	<b>Alert</b>	<b>EPIP-3 Rev. 0036 Page 14 of 28</b>
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**Appendix B  
(Page 1 of 1)**

**State of Tennessee Notification**

**1.0 State of Tennessee Notification**

**CAUTION**

Notification of the State of Tennessee is required to be completed as soon as possible not to exceed 15 minutes from the time of emergency classification declaration.

- [1] **FAX** a copy of completed Appendix A to the State of Tennessee at 9-1-615-242-9635.
- [2] **REPORT** to the State of Tennessee the information on Appendix A utilizing:  
24 Hours  
Primary: 9-1-800-262-3300  
Backup: 9-1-615-741-0001  
Backup: 9-1-800-262-3400

**NOTE**

The Time of notification is when the State Representative answers the phone.

- [3] **RECORD** information from the notification  
Name of Person Notified: \_\_\_\_\_  
Time and Date of Notification: \_\_\_\_\_
- [4] **RETURN** the completed Appendix B and Appendix A to the SED.





<b>WBN Unit 0</b>	<b>Site Area Emergency</b>	<b>EPIP-4 Rev. 0034 Page 14 of 26</b>
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**Appendix B  
(Page 1 of 1)**

**State of Tennessee Notification**

**1.0 State Notification**

**CAUTION**

Notification of the State of Tennessee is required to be completed as soon as possible not to exceed 15 minutes from the time of emergency classification declaration.

- [1] **FAX** a copy of completed Appendix A to the State of Tennessee at 9-1-615-242-9635
  
- [2] **REPORT** to the State of Tennessee the information on Appendix A utilizing:
  - 24 Hours
  - Primary: 9-1-800-262-3300
  - Backup: 9-1-615-741-0001
  - Backup: 9-1-800-262-3400

**NOTE**

The Time of the notification is when the State Representative answers the phone.

- [3] **RECORD** Information from the notification
  - Name of Person Notified: \_\_\_\_\_
  - Time and Date of Notification: \_\_\_\_\_
  
- [4] **RETURN** the completed Appendix B and Appendix A to the SED



**Appendix B  
(Page 1 of 1)**

**State of Tennessee Notification**

**1.0 State Notification**

**CAUTION**

Notification of the Risk Counties / State of Tennessee is required to be completed within 15 minutes from the time of emergency declaration.

- [1] **REPORT** the information recorded on completed Appendix A to the WBN Risk Counties
- |                    |                  |           |       |
|--------------------|------------------|-----------|-------|
| A. Rhea County     | 9-775-2505       | Person    |       |
| (Alternate number) | 9-775-7828       | Contacted | _____ |
|                    |                  |           |       |
| B. Meigs County    | 9-1-423-334-3211 | Person    |       |
| (Alternate number) | 9-1-423-334-5268 | Contacted | _____ |
|                    |                  |           |       |
| C. McMinn County   | 9-1-423-744-5256 | Person    |       |
| (Alternate number) | 9-1-423-745-3222 | Contacted | _____ |
- [2] **FAX** a copy of completed Appendix A to the State of Tennessee at 9-1-615-242-9635
- [3] **REPORT** to the State of Tennessee the information on Appendix A utilizing:
- 24 Hours
- Primary: 9-1-800-262-3300
- Backup: 9-1-615-741-0001

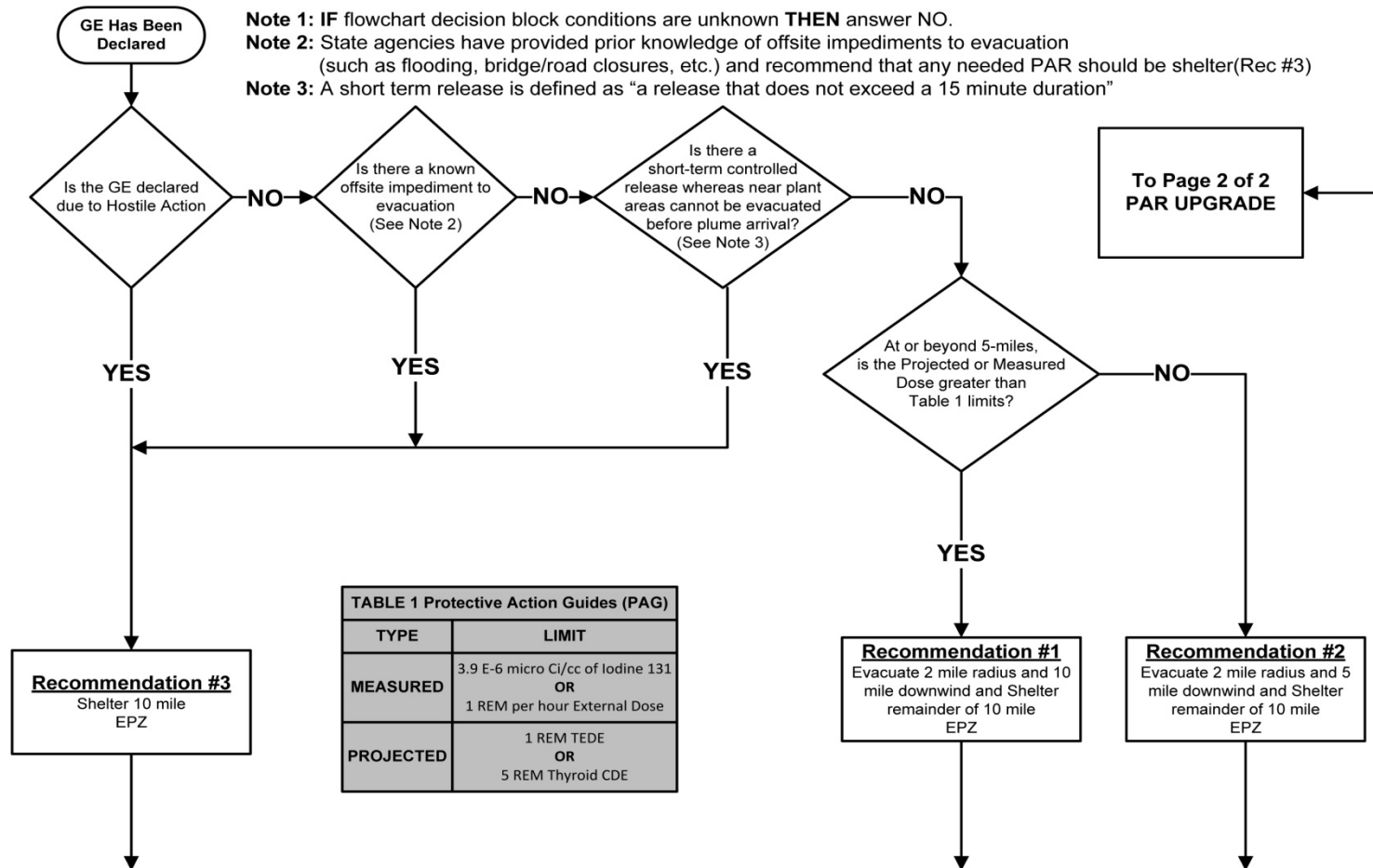
**NOTE**

The Time of the notification is when the State Representative answers the phone.

- [4] **RECORD** information from the notification
- Name of Person Notified \_\_\_\_\_
- Time and Date of Notification \_\_\_\_\_
- [5] **RETURN** the completed Appendix B and Appendix A to the SED.

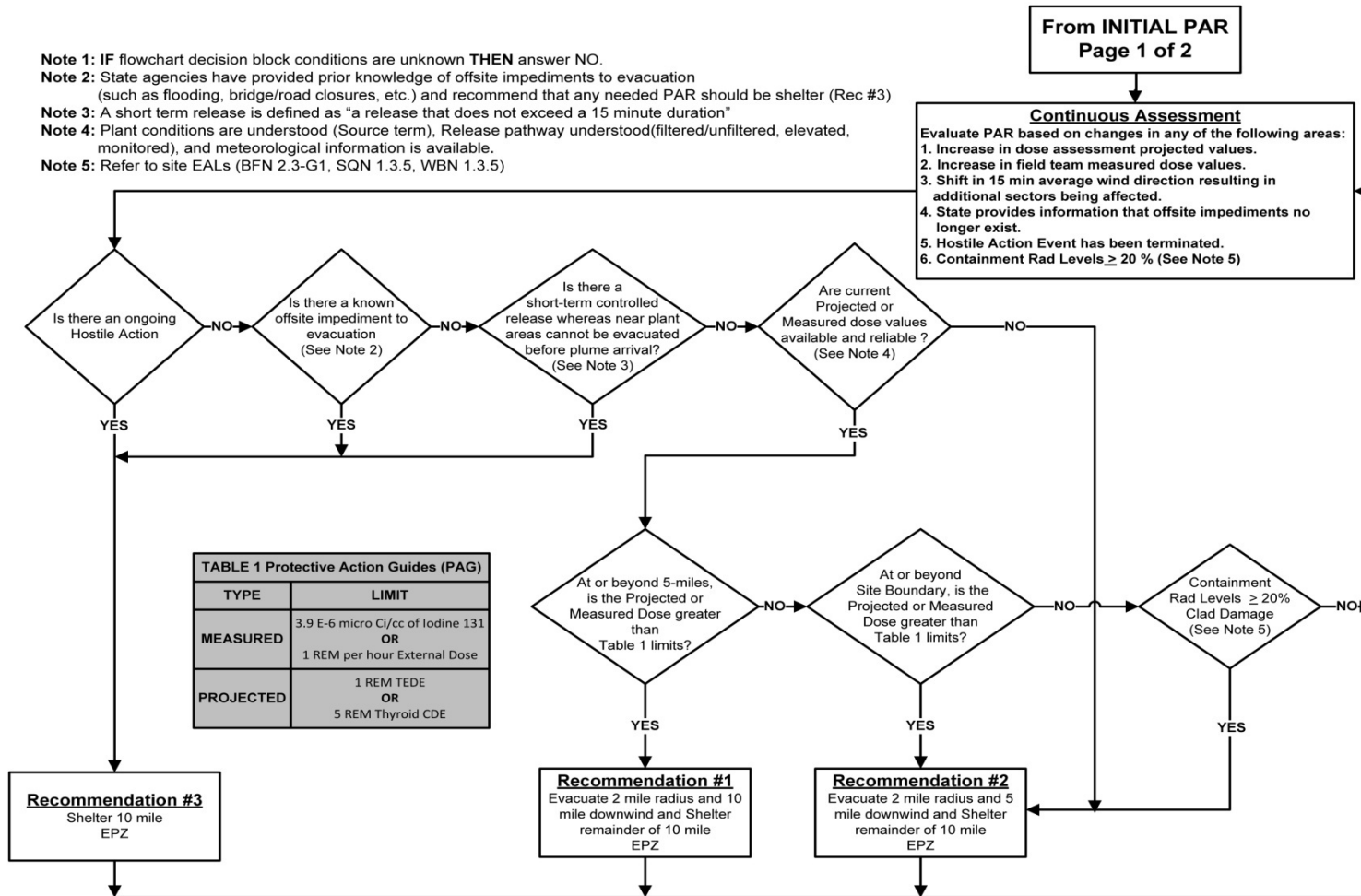
## Appendix H (Page 1 of 2)

### Initial - Protective Action Recommendations



## Appendix H (Page 2 of 2)

### Initial - Protective Action Recommendations



**5 S**

**Handout Package for  
Applicant**

# APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

## INITIAL CONDITIONS:

***TREAT THIS AS A RADIOLOGICAL EMERGENCY DRILL***

Unit 1 is cooling down to support outage work. RCS temperature is 285°F and RCS pressure is 350 psig. 1A-A 6.9kV Shutdown Board is de-energized and tagged for inspection of lugs, repairs will take 90 minutes.

At 1600, the following occur:

1. A tornado touched down in the Watts Bar Hydroelectric Switchyard, severely damaging both 161kv lines to the plant which resulted in the lines being lost.
2. The 1B-B DG tripped when started. The AUO at the DG Bldg reports that the 1B-B DG Engine 2 is severely damaged.

At 1615 the AUO at the DG Bldg reports that another tornado caused damage to the C-S Diesel Building.

## INITIATING CUES:

1. Assuming the listed conditions have not changed at 1618, classify the event.
2. RAISE YOUR HAND when your classification is complete.
3. Complete the associated TVA Initial Classification form.
4. Determine what, if any, Protective Action Recommendations are required.
5. RAISE YOUR HAND when you have completed the notification form.

*Element(s) of this task is/are time critical.*





Watts Bar Nuclear Plant

**Unit 0**

Emergency Plan Implementing Procedure

**EPIP-1**

**Emergency Plan Classification Logic**

Revision 0037

Quality Related

Level of Use: Continuous Use

Effective Date: 10-05-2012

Responsible Organization: REP, Radiological Emer. Prep.

Prepared By: Michael White

Approved By: Thomas Detchemendy

### Revision Log

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
27	07/13/07	1, 5, 27	<p>Plan effectiveness determination review indicate the following revisions so not reduce the level of effectiveness of the procedure or REP.</p> <p>Added Turbine Building to Table 4.1 per NUMARC/NESP-007 revision 2 for PER 121163</p>
28	12/18/2007	1, 12 13,	<p>Plan effectiveness determination review indicate the following revision does not reduce the level of effectiveness of the procedure or REP.</p> <p>Added instruction note for containment high range radiation monitors for PER #100095.</p>
29	02/13/2008	2, 9B	<p>Plan effectiveness determination review indicate the following revision does not reduce the level of effectiveness of the procedure or REP.</p> <p>Revised instruction Note 5 for containment high range radiation monitors as the result of TVA testing for PER #100095.</p> <p>Removed old Revision Log items.</p>
30	09/03/2008	4	<p>Clarified the actions to be taken in the event a plant condition occurs that meets EAL conditions but is completely resolved prior to being classified as an emergency.</p>
31	04/01/2009	2, 7, 10, 21, 29, 36, 39, 40	<p>Plan effectiveness determination review indicates the following revision does not reduce the level of effectiveness of the procedure or REP.</p> <p>Removed a duplicate EAL (6.4 Fuel Handling) from the Shutdown System Degradation section as the EAL is covered in Section 7.4 (Fuel Handling) of the procedure. PER 142875</p> <p>Corrected page numbering and formatting.</p>

<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 3 of 53</b>
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**Revision Log**

<b>Revision or Change Number</b>	<b>Effective Date</b>	<b>Affected Page Numbers</b>	<b>Description of Revision/Change</b>
<p align="center">32</p>	<p align="center">02/01/2010</p>	<p>1, 2, 9B, 34, 45</p>	<p>Changed to Continuous Use procedure.</p> <p>Changed "O" to zero "0" on EAL 5.6 Pressure Indicator nomenclature and changed 0-RE-90-101 to 0-RE-90-101B to align with the REP (PER 173367).</p> <p>Revised note #5 on page 9B to include statement regarding insulation resistance. (PER 162319)</p> <p>Removed BP-236, Event Critique and Root Cause Analysis from reference and replaced with PIDP-6 Root Cause Analysis and SPP-3.1 Corrective Action Program.</p>
<p align="center">33</p>	<p align="center">03/30/2010</p>	<p>1,2, 3, 7, 11, 18, 22, 27, 28, 30, 37, 41</p>	<p>Revised all security EALs in Section 4.6 to align with NEI 03-12 revision 6, Appendix C. Appendix C details Security Regulations that are to be implemented by March 31, 2010.</p> <p>Revised Section 2.0 clarifying non-delegatable shift manager/SED duties. (PER 179269).</p> <p>Added Definition for Security Condition.</p>

<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 4 of 53</b>
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### Revision Log

<b>Revision or Change Number</b>	<b>Effective Date</b>	<b>Affected Page Numbers</b>	<b>Description of Revision/Change</b>
<p style="text-align: center;">34</p>	<p style="text-align: center;">09/30/10</p>	<p style="text-align: center;">All</p>	<p>Procedure converted from W95 to W2007 using Rev. 33. Performed line by line validation.</p> <p>Changed procedure title to “Emergency Plan Classification Logic” in accordance with the REP Appendix C (PER 226527)</p> <p>Changed the values in table 7.1 (pg 46) to align with those found in the REP Appendix C from calculation WBNTSR115.</p> <p>Changed definition for explosion to align with definition found in the REP Appendix C (PER 217025)</p> <p>Changed the values for EAL 1.1.5 and EAL 1.3.5 (pg 11-12) to align with those found in the REP Appendix C from calculation TI-RPS-162 (PER 226777)</p> <p>Updated References (pg 7-8) to the new NPG procedures.</p>
<p style="text-align: center;">35</p>	<p style="text-align: center;">05/06/2011</p>	<p style="text-align: center;">pg 17</p>	<p>Revised EAL 2.4 Unusual Event Dose Equivalent Iodine (DEI) activity from 21uCi/g to 14UCi/g (PER 360041).</p>
<p style="text-align: center;">36</p>	<p style="text-align: center;">07/17/12</p>	<p style="text-align: center;">Pg 7</p>	<p>Removed the reference to the Operations Duty Specialist (ODS) in Step 3.0 C.8. Notifications to the State of Tennessee are made directly to the state and not through the ODS.</p>
<p style="text-align: center;">37</p>	<p style="text-align: center;">10/05/12</p>	<p style="text-align: center;">Pg 6,7,9</p>	<p>Plan Effectiveness Determination reviews indicate the following revisions do not reduce the level of effectiveness of the procedure or REP.</p> <p>Adds additional guidance in section 3.1 for EALs that have a “timed” clock associated with the classification. Adds section 3.2 Initial Classification as part of fleet initiative to standardize procedures. (PER 591076)</p>

**Table of Contents**

<b>1.0</b>	<b>PURPOSE<sup>4</sup></b> .....	<b>6</b>
<b>2.0</b>	<b>RESPONSIBILITY<sup>2,4</sup></b> .....	<b>6</b>
<b>3.0</b>	<b>INSTRUCTIONS<sup>4</sup></b> .....	<b>6</b>
3.1	Precautions and Limitations .....	6
3.2	Initial Classification .....	9
<b>4.0</b>	<b>RECORDS</b> .....	<b>9</b>
4.1	Non-QA Records .....	9
4.2	QA Records .....	9
<b>5.0</b>	<b>REFERENCES</b> .....	<b>10</b>
5.1	Interfacing References .....	10
5.2	Other Documents .....	10
<b>Attachment 1: Fission Product Barrier Matrix (Modes 1-4)</b> .....		<b>12</b>
<b>Attachment 2: System Degradation</b> .....		<b>16</b>
<b>Attachment 3: Loss of Power</b> .....		<b>23</b>
<b>Attachment 4: Hazards and SED Judgment</b> .....		<b>27</b>
<b>Attachment 5: Destructive Phenomenon</b> .....		<b>35</b>
<b>Attachment 6: Shutdown System Degradation</b> .....		<b>42</b>
<b>Attachment 7: Radiological</b> .....		<b>46</b>
	<b>Source Notes</b> .....	<b>53</b>

<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 6 of 53</b>
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## 1.0 PURPOSE<sup>4</sup>

This Procedure provides guidance in determining the classification and declaration of an emergency based on plant conditions.

## 2.0 RESPONSIBILITY<sup>2,4</sup>

The responsibility of declaring an Emergency based on the guidance within this procedure belongs to the Shift Manager/Site Emergency Director (SM/SED) or designated Unit Supervisor (US) when acting as the SM or the TSC Site Emergency Director (SED). The following duties CAN NOT be delegated:

Emergency Classification, Emergency Dose Approval and PAR development prior to CECC Director ownership for PAR development.

## 3.0 INSTRUCTIONS<sup>4</sup>

### 3.1 Precautions and Limitations

- A. The criteria in WBN EPIP-1 are given for GUIDANCE ONLY: knowledge of actual plant conditions or the extent of the emergency may require that additional steps be taken. In all cases, this logic procedure should be combined with the sound judgment of the SM/SED and/or the TSC SED to arrive at a classification for a particular set of circumstances.
- B. The Nuclear Power (NP) Radiological Emergency Plan (REP) will be activated when any one of the conditions listed in this logic is detected.
- C. The SM/SED shall assess, classify, and declare an emergency condition within 15 minutes after information is first available to plant operators to recognize that an EAL has been exceeded and to make the declaration promptly upon identification of the appropriate Emergency Classification Level (ECL).
  1. For EAL thresholds that specify duration of the off-normal condition, the emergency declaration process runs concurrently with the specified threshold duration.
    - a. Consider as an example, the EAL “fire which is not extinguished within 15 minutes of detection.” On receipt of a fire alarm, the plant fire brigade is dispatched to the scene to begin fire suppression efforts.
    - b. If the fire is still burning after the specified duration has elapsed, the EAL is exceeded, no further assessment is necessary, and the emergency declaration would be made promptly.

<p><b>WBN Unit 0</b></p>	<p><b>Emergency Plan Classification Logic</b></p>	<p><b>EPIP-1 Rev. 0037 Page 7 of 53</b></p>
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### 3.1 Precautions and Limitations (continued)

- c. If, for example, the fire brigade notifies shift supervision 5 minutes after detection that the brigade itself cannot extinguish the fire such that the EAL will be met imminently and cannot be avoided, it is **not** a violation of the licensee’s emergency plan to declare the event before the EAL is met (e.g., the 15-minute duration has elapsed). While a prompt declaration would be beneficial to public health and safety and is encouraged, it is not required by regulation.
- 2. Once the off-normal condition has existed for the duration specified in the EAL, no further effort on this declaration is necessary—the EAL has been exceeded.
- D. The 15-minute criterion commences when plant instrumentation, plant alarms, computer displays, or incoming verbal reports that correspond to an EAL first become available to **any** plant operator.
- E. As used here, “plant operator” means any member of the plant staff who, by virtue of training and experience, is qualified to assess the indications or reports for validity and to compare the same to the EALs in the licensee’s emergency classification scheme.
- F. Validation or confirmation of plant indications, or reports to the plant operators, is to be accomplished within the 15-minute period as part of the assessment. Since this validation or confirmation is being performed to determine the veracity of an alarm, indication, or report, the 15-minute period **starts** with the availability of the alarm, indication, or report, and not the completion of the validation or confirmation, because the former is the time that the information was first available.
- G. As used here, “promptly” means the next available opportunity unimpeded by activities not related to the emergency declaration, unless such activities are necessary for protecting health and safety.
- H. This 15-minute criterion ends as soon as the nuclear power reactor licensee determines that an EAL has been exceeded and upon identification of the appropriate ECL **and** when the licensee makes the emergency declaration.
- I. If a Critical Safety Function (CSF) is listed as an Initiating Condition: the respective status tree criteria will be monitored and used to determine the Event classification for the modes listed on the classification flowchart.
- J. The highest classification for which an Emergency Action level (EAL) currently exists shall be declared.
- K. After an Event classification, if the following investigation shows that Initiating Conditions were met that dictate a higher Event classification, the new event classification shall be declared at the clock time of the determination.

<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 8 of 53</b>
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**3.1 Precautions and Limitations (continued)**

- L. **IF** an EAL for a higher classification was exceeded but the present situation indicates a lower classification, the fact that the higher classification occurred SHALL be reported to the NRC and Central Emergency Control Center (CECC), but should not be declared. (Refer to NPG-SPP-03.5, Regulatory Reporting Requirements)
  
- M. **IF** the Parameter is indeterminate due to instrument malfunction and the existence of the condition **CAN NOT** be reasonably discounted (i.e., spurious or false alarm that can be substantiated within 15 minutes) the condition is considered **MET** and the SM/SED SHALL follow the indications provided until such time as the alarm is verified to be false.

**NOTE**

IF an EAL was exceeded, but the emergency has been totally resolved prior to declaration, then EPIP 2, 3, 4 and 5 are not applicable.

- N. **IF** an EAL was exceeded, but the emergency has been totally resolved (prior to declaration), the emergency condition that was appropriate **shall not** be declared but reported to the NRC and Operations Duty Specialist (ODS) within one hour using NPG-SPP-03.5, Regulatory Reporting Requirements.
  
- O. The **ACCEPTABLE** time frame for notification to the State of Tennessee is fifteen (15) minutes.



<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 9 of 53</b>
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**3.2 Initial Classification**

**NOTE**

The Shift Manager shall be solely responsible for classification and declaration of the event.

- A. Classify the Event (To determine the classification of the emergency, the responsible individual shall review the Initiating Conditions of the Events described in this procedure with the known or suspected conditions and classify the event. Declaration of the event shall occur promptly after the Shift Manager classification.)
- B. Declare the Event
- C. If the event is determined to be one of the four emergency classifications, the Shift Manager assumes the responsibility of SED until relieved by the Plant Manager or designee.
- D. Implement the applicable procedure:
  - EPIP-2      Notification of Unusual Event
  - EPIP-3      Alert
  - EPIP-4      Site Area Emergency
  - EPIP-5      General Emergency
- E. Continue to review the emergency conditions in the event classification matrix and escalate, terminate, or implement recovery as appropriate. Refer To EPIP-16, Termination and Recovery.

**4.0 RECORDS**

**4.1 Non-QA Records**

None

**4.2 QA Records**

None

<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 10 of 53</b>
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**5.1 Interfacing References (continued)**

**5.0 REFERENCES**

**5.1 Interfacing References**

SPP-3.1.6, *Root Cause Analysis*

NPG-SPP-03.1, *Corrective Action Program*

NPG-SPP-03.5, *Regulatory Reporting Requirements*

WBN-EPIP-2, *Unusual Event*

WBN-EPIP-3, *Alert*

WBN-EPIP-4, *Site Area Emergency*

WBN-EPIP-5, *General Emergency*

WBN-EPIP-9, *Loss of Meteorological Data (Canceled see EPIP-13)*

WBN-EPIP-13, *Initial Dose Assessment for Radiological Emergencies*

WBN-EPIP-14, *Radiological Control Response*

WBN-EPIP-16, *Termination of the Emergency and Recovery*

CECC-EPIP-9, *Emergency Environmental Radiological Monitoring Procedures*

1-SI-68-34, *Reactor Coolant System Water Inventory Balance*

**5.2 Other Documents**

10 CFR 50, *Domestic Licensing of Production and Utilization Facilities*

10 CFR 20, *Standards for Protection from Radiation*

REG GUIDE-1.101, *Emergency Planning and Preparedness for Nuclear Power Reactors endorsing NUMARC NESP-007 Methodology for Development of Emergency Action Levels.*

Site Technical Specifications (Tech Specs), Abnormal Operating Instructions (AOIs), Emergency Operating Procedures (EOPs), Set Point Verification documents, Chemistry Technical documents (CTDs), and the Final Safety Analysis Report (FSAR) are also referenced in Appendix C of the Radiological Emergency Plan.

ICS Operator's Manual

<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 11 of 53</b>
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EPPOS #2, "NRC EP Position on Timeliness of Classification of Emergency Conditions

EPRI Report 6695 Guidelines for Nuclear Power Plant Response to Earthquakes.

**Attachment 1  
(Page 1 of 4)**

**Fission Product Barrier Matrix (Modes 1-4)**

<b>FISSION PRODUCT BARRIER MATRIX (Modes 1-4)</b> 1.1 Fuel Clad 1.2 RCS 1.3 Containment	1
<b>SYSTEM DEGRADATION</b> 2.1 Loss of Instrumentation 2.2 Loss of Function/Communication 2.3 Failure of Reactor Protection 2.4 Fuel Clad Degradation 2.5 RCS Unidentified Leakage 2.6 RCS Identified Leakage 2.7 Uncontrolled Cool Down 2.8 Turbine Failure 2.9 Technical Specification 2.10 Safety Limit	2
<b>LOSS OF POWER</b> 3.1 Loss of AC (Power Ops) 3.2 Loss of AC (Shutdown) 3.3 Loss of DC	3
<b>HAZARDS and SED JUDGMENT</b> 4.1 Fire 4.2 Explosion Table 4-1 Figure 4-A 4.3 Flammable Gas 4.4 Toxic Gas Table 4-2 Figure 4-B 4.5 Control Room Evacuation 4.6 Security 4.7 SED Judgment	4
<b>DESTRUCTIVE PHENOMENON</b> 5.1 Earthquake 5.2 Tornado 5.3 Aircraft/Projectile Crash Figure 5-A Table 5-1 5.4 River Level High 5.5 River Level Low 5.6 Watercraft Crash	5
<b>SHUTDOWN SYSTEM DEGRADATION</b> 6.1 Loss of Shutdown Systems 6.2 Loss of AC (Shutdown) 6.3 Loss of DC (Shutdown)	6
<b>RADIOLOGICAL</b> 7.1 Gaseous Effluent 7.2 Liquid Effluent Table 7-1 Figure 7-A 7.3 Radiation Levels 7.4 Fuel Handling Table 7-2	7

Attachment 1  
(Page 2 of 4)

**UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY:** (see SED Judgment 4.7).

**BOMB:** An explosive device (See EXPLOSION).

**CIVIL DISTURBANCE:** A group of twenty (20) or more persons violently protesting station operations or activities at the site.

**CREDIBLE SITE-SPECIFIC** -The determination is made by WBN senior plant management through use of information found in the Safeguards Contingency Plan.

**CRITICAL-SAFETY FUNCTION (CSFs):** A plant safety function required to prevent significant release of core radioactivity to the environment. There are six CSFs: Sub-criticality, Core Cooling, Heat Sink, Pressurized Thermal Shock, Integrity (Containment) and Inventory (RCS).

**EVENT:** Assessment of an **EVENT** commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

**EXCLUSION AREA BOUNDARY (EAB):** The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

**EXPLOSION:** A rapid, violent, unconfined combustion or a catastrophic failure of pressurized equipment that potentially imparts significant energy to near-by structures and materials.

**EXTORTION:** An attempt to cause an action at the station by threat of force.

**FAULTED:** (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

**FIRE:** Combustion characterized by heat and light. Source of smoke such as slipping drive belts or overheated electrical components do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

**FLAMMABLE GAS:** Combustible gases maintained at concentrations less than the **LOWER EXPLOSIVE LIMIT (LEL)** will not explode due to ignition.

**HOSTAGE:** A person(s) held as leverage against the station to ensure that demands will be met by the station.

**HOSTILE ACTION:** An act toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidates the licensee to achieve an end. This includes attack by air, land, or water; using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. **HOSTILE ACTION** should NOT be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the nuclear power plant. Non-terrorism-based EALs should be used to address such activities, (e.g., violent acts between individuals in the owner controlled area.)

**HOSTILE FORCE:** Individual(s) involved with a **HOSTILE ACTION**. One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

**INEFFECTIVE:** The specified restoration action(s) does not result in a reduction in the level of severity of the **RED PATH** condition within 15 minutes from identification of the Core Cooling CSF Status Tree **RED PATH**. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

**INITIATING CONDITIONS:** Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

**INTRUSION/INTRUDER:** Suspected hostile individual present in a protected area without authorization.

**ODCM:** Offsite Dose Calculation Manual.

**ORANGE PATH:** Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

**PROJECTILE:** An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

**PROTECTED AREA:** Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

**RED PATH:** Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

**RUPTURED:** (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

**SABOTAGE:** Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

**SECURITY CONDITION-** Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A **SECURITY CONDITION** does not involve a **HOSTILE ACTION**.

**SIGNIFICANT TRANSIENT:** An **UNPLANNED** event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

**SITE PERIMETER:** Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-A and 7-A.

**STRIKE ACTION:** A work stoppage within the **PROTECTED AREA** by a body of workers to enforce compliance with demands made on TVA. The **STRIKE ACTION** must threaten to interrupt normal plant operations.

**TOXIC GAS:** A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

**UNPLANNED:** An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are **UNPLANNED**.

**UNPLANNED:** (With specific regard to radioactivity releases) A release of radioactivity is **UNPLANNED** if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

**VALID:** An indication or report or condition is considered to be **VALID** when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

**VISIBLE DAMAGE:** Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

**VITAL AREA:** Is any area within the **PROTECTED AREA** which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 14 of 53</b>
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**Attachment 1  
(Page 3 of 4)**

<b>1.1. _ Fuel Clad Barrier</b>	
<b>1. Critical Safety Function Status</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
Core Cooling Red (FR-C.1)	Core Cooling Orange (FR-C.2)  <b>OR</b> Heat Sink Red (FR-H.1) (RHR <u>Not</u> in Service)
<b>-OR-</b>	
<b>2. Primary Coolant Activity Level</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
RCS sample activity is Greater Than 300 $\mu$ Ci/gm dose equivalent iodine-131	Not applicable
<b>-OR-</b>	
<b>3. Incore TCs Hi Quad Average</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
Greater Than 1200°F	Greater Than 727°F
<b>-OR-</b>	
<b>4. Reactor Vessel Water Level</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
Not Applicable	VALID RVLIS level <33% (No RCP running)
<b>-OR-</b>	
<b>5. Containment Radiation Monitors</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
VALID reading increase of Greater Than: 293 R/hr On 1-RM-90-271 and 272  <b>OR</b> 261 R/hr On 1-RM-90-273 and 274 (see instruction note 5)	Not Applicable
<b>-OR-</b>	
<b>6. Site Emergency Director Judgment</b>	
Any condition that, in the Judgment of the SM/SED, Indicates Loss or Potential Loss of the Fuel Clad Barrier Comparable to the Conditions Listed Above.	

<b>1.2. _ RCS Barrier</b>	
<b>1. Critical Safety Function Status</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
Not Applicable	Pressurized Thermal Shock Red (FR-P.1)  <b>OR</b> Heat Sink Red (FR-H.1) (RHR <b>Not</b> in Service)
<b>-OR-</b>	
<b>2. RCS Leakage/LOCA</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
RCS Leak results in Loss of subcooling (<65°F Indicated), [85°F ADV]	Non Isolatable RCS Leak Exceeding The Capacity of <u>One</u> Charging Pump (CCP) In the Normal Charging Alignment.  <b>OR</b> RCS Leakage Results In Entry Into E-1
<b>-OR-</b>	
<b>3. Steam Generator Tube Rupture</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
SGTR that results in a safety injection actuation  <b>OR</b> Entry into E-3	Not Applicable
<b>-OR-</b>	
<b>4. Reactor Vessel Water Level</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
VALID RVLIS level <33% (No RCP Running)	Not Applicable
<b>-OR-</b>	
<b>-OR-</b>	
<b>5. Site Emergency Director Judgment</b>	
Any condition that, in the Judgment of the SM/SED, Indicates Loss or Potential Loss of the RCS Barrier Comparable to the Conditions Listed Above.	

**Attachment 1  
(Page 4 of 4)**

<b>1.3. _ CNTMT Barrier</b>	
<b>1. Critical Safety Function Status</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
Not Applicable	Containment (FR-Z.1) <u>Red</u> <b>OR</b> Actions of FR-C.1 (Red Path) are <b>INEFFECTIVE</b> (i.e.: core TCs trending up)
<b>-OR-</b>	
<b>2. Containment Pressure/Hydrogen</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
Rapid unexplained decrease following initial increase <b>OR</b> Containment pressure or Sump level <b>Not</b> increasing (with LOCA in progress)	Containment Hydrogen Increases to >4% by volume <b>OR</b> Pressure >2.8 PSIG (Phase B) with < One full train of Containment spray
<b>-OR-</b>	
<b>3. Containment Isolation Status</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
Containment Isolation is Incomplete (when required) <b>AND</b> a Release Path to the Environment Exists	Not Applicable
<b>-OR-</b>	
<b>4. Containment Bypass</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
RUPTURED S/G is also FAULTED outside CNTMT <b>OR</b> Prolonged (>4 Hours) Secondary Side release outside CNTMT from a S/G with a SGTL > T/S Limits	Unexplained VALID increase in area or ventilation RAD monitors in areas adjacent to CNTMT (with LOCA in progress)
<b>-OR-</b>	
<b>5. Significant Radioactivity in Containment</b>	
<b>LOSS</b>	<b>Potential LOSS</b>
Not Applicable	VALID Reading increase of Greater Than: 5290 R/hr on 1-RM-90-271 and 1-RM-90-272 <b>OR</b> 4710 R/hr on 1-RM-90-273 and 1-RM-90-274 <b>(see instruction note 5)</b>
<b>-OR-</b>	
<b>6. Site Emergency Director Judgment</b>	
Any condition that, in the Judgment of the SM/SED, Indicates Loss or Potential Loss of the CNTMT Barrier Comparable to the Conditions Listed Above.	

**Modes: 1, 2, 3, 4**

**INSTRUCTIONS**

*NOTE:*

*A condition is considered to be MET if, in the judgment of the Site Emergency Director, the condition will be MET imminently (i.e., within 1 to 2 hours, in the absence of a viable success path). The classification shall be made as soon as this determination is made.*

- In the matrix to the left, review the **INITIATING CONDITIONS** in all columns and identify which, if any, **INITIATING CONDITIONS** are MET. Circle these **CONDITIONS**.
- For each of the three barriers, identify if any **LOSS** or Potential **LOSS INITIATING CONDITIONS** have been MET.
- If a CSF is listed as an **INITIATING CONDITION**; the respective status tree criteria will be monitored and used to determine the **EVENT** classification for the Modes listed on the classification flowchart.
- Compare the barrier losses and potential losses to the **EVENTS** below and make the appropriate declaration.
- Containment High Range Radiation Monitors (HRRMs) are temperature sensitive and can be affected by both temperature induced currents and insulation resistance temperature effects. Following the initial increase in containment temperature the HRRM monitors can give erratic indication for up to 1 minute. Steady state temperature effects on cable insulation resistance for the HRRM signal cable is dependent on containment temperature and could result in a shift in monitor output indication. With a containment excursion temperature to 327 °F (HELB), the output of the HRRMs could potentially have up to a 25 R/hr indicated offset for duration of 10 minutes until the containment air return fans are started and temperature starts to reduce. **(Caution: Should the containment air return fans not start, containment temperatures could remain elevated resulting in potential false HRRM indicated readings).**

**EVENTS**

**UNUSUAL EVENT**

Loss **or** Potential LOSS of Containment Barrier

**ALERT**

Any LOSS **or** Potential LOSS of Fuel Clad barrier

**OR**

Any LOSS **or** Potential LOSS of RCS barrier

**SITE AREA EMERGENCY**

LOSS **or** Potential LOSS of any two barriers

**GENERAL EMERGENCY**

LOSS of any two barriers **and** Potential LOSS of third barrier

**F I S S I O N P R O D U C T B A R R I E R M A T R I X U 1**

**Attachment 2  
(Page 1 of 7)**

**System Degradation**

<p><b>FISSION PRODUCT BARRIER MATRIX (Modes 1-4)</b></p> <p>1.1 Fuel Clad 1.2 RCS 1.3 Containment</p>	<b>1</b>												
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**Attachment 2  
(Page 2 of 7)**

**UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY:** (see SED Judgment 4.7).

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**ODCM:** Offsite Dose Calculation Manual.

**ORANGE PATH:** Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

**PROJECTILE:** An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

**PROTECTED AREA:** Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

**RED PATH:** Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

**RUPTURED:** (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

**SABOTAGE:** Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

**SECURITY CONDITION-** Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A **SECURITY CONDITION** does not involve a **HOSTILE ACTION**.

**SIGNIFICANT TRANSIENT:** An **UNPLANNED** event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

**SITE PERIMETER:** Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-A and 7-A.

**STRIKE ACTION:** A work stoppage within the **PROTECTED AREA** by a body of workers to enforce compliance with demands made on TVA. The **STRIKE ACTION** must threaten to interrupt normal plant operations.

**TOXIC GAS:** A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

**UNPLANNED:** An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are **UNPLANNED**.

**UNPLANNED:** (With specific regard to radioactivity releases) A release of radioactivity is **UNPLANNED** if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

**VALID:** An indication or report or condition is considered to be **VALID** when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

**VISIBLE DAMAGE:** Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

**VITAL AREA:** Is any area within the **PROTECTED AREA** which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

**Attachment 2  
(Page 3 of 7)**

		2.1 Loss of Instrumentation		2.2 Loss of Function	
		Mode	Initiating/Condition	Mode	Initiating/Condition
<b>GENERAL</b>	<b>SITE</b>		Refer to "Fission Product Barrier Matrix" and "Radiological Effluents" (Section 7)		Refer to "Fission Product Barrier Matrix"
		1,2 3,4	<b>Inability to monitor a SIGNIFICANT TRANSIENT in progress (1 and 2 and 3 and 4)</b> 1. Loss of most (>75%) of MCR annunciators ( <b>and</b> Annunciator Monitor) <b>or</b> indications 2. <b>SIGNIFICANT TRANSIENT</b> in progress 3. Loss of ICS Computer <b>and</b> SPDS 4. Inability to directly monitor any of the following CSFs: Sub-criticality           PTS Core Cooling             Containment Heat Sink                 Inventory	1,2 3,4	<b>Complete loss of function needed to achieve <u>or</u> maintain Hot Shutdown (1 or 2)</b> 1. CSF status tree indicates Core Cooling Red 2. CSF status tree indicates Heat Sink Red (RHR <b>not</b> in service)  <i>Note: Also Refer to "Failure of Rx Protection" (2.3) and "Fission Product Barrier Matrix"</i>
		1,2 3,4	<b>UNPLANNED loss of most (&gt;75%) MCR annunciators (<b>and</b> Annunciator Printer) or indications for &gt;15 minutes <b>with either a SIGNIFICANT TRANSIENT in progress or ICS computer and SPDS Unavailable (1 and 2 and 3)</b></b>	4	<b>Complete loss of function needed to achieve Cold Shutdown when Shutdown required by Tech Specs (1 and 2 and 3)</b> 1. Shutdown is required 2. Loss of RHR capability 3. Loss of secondary heat sink and condenser
<b>ALERT</b>	<b>UNUSUAL</b>	1,2 3,4	<b>UNPLANNED loss of most <u>or</u> All Safety System annunciators or indications in the Control Room for &gt;15 Minutes (1 and 2 and 3)</b> 1. <b>UNPLANNED</b> loss of most (>75%) MCR annunciators ( <b>and</b> Annunciator Monitor) <b>or</b> indications for >15 minutes. 2. SM/SED Judgment that increased surveillance is required to Safely operate the unit (beyond Shift compliment) 3. ICS Computer <b>or</b> SPDS is in service and capable of displaying data requested.	ALL	<b>A. Unplanned loss of all In-Plant Communication capability (1 and 2 and 3)</b> 1. <b>UNPLANNED</b> loss of EPABX (PAX) phones 2. <b>UNPLANNED</b> loss of all sound powered phones 3. <b>UNPLANNED</b> loss of all radios <b>or</b> <b>B. UNPLANNED loss of all Offsite Communication capability (1 and 2 and 3 and 4 and 5)</b> 1. <b>UNPLANNED</b> loss of all EPABX (PAX) phones 2. <b>UNPLANNED</b> loss of all Radio frequencies 3. <b>UNPLANNED</b> loss of all OPX (Microwave) system 4. <b>UNPLANNED</b> loss of all 1 FB-Bell lines 5. <b>UNPLANNED</b> loss of all FTS 2000 (NRC) system
		1,2 3,4	<b>UNPLANNED loss of most <u>or</u> All Safety System annunciators or indications in the Control Room for &gt;15 Minutes (1 and 2 and 3)</b> 1. <b>UNPLANNED</b> loss of most (>75%) MCR annunciators ( <b>and</b> Annunciator Monitor) <b>or</b> indications for >15 minutes. 2. SM/SED Judgment that increased surveillance is required to Safely operate the unit (beyond Shift compliment) 3. ICS Computer <b>or</b> SPDS is in service and capable of displaying data requested.		

**Attachment 2  
(Page 4 of 7)**

2.3 Failure of Rx Protection		2.4 Fuel Clad Degradation	
Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL  SITE  ALERT  UNUSUAL  EVENT	1,2 <b>Loss of Core cooling capability and VALID Trip Signals did <u>not</u> result in a reduction of Rx power to &lt;5% and decreasing (1 and 2)</b>  1. (a or b) a. CSF status tree indicates Core Cooling Red b. CSF status tree indicates Heat Sink Red  2. FR-S.1 entered <b>and</b> subsequent actions Did <b>Not</b> result in a Rx Power of <5% and decreasing		Refer to "Fission Product Barrier Matrix"
	1,2 <b>Rx power <u>Not</u> &lt;5% and decreasing after VALID Auto and Manual trip signals (1 and 2 and 3)</b>  1. <b>VALID</b> Rx Auto Trip signal received or required  2. Manual Rx Trip from the MCR was <b>Not</b> successful.  3. FR-S.1 has been entered.		Refer to "Fission Product Barrier Matrix"
	1,2 <b>Automatic Rx trip did not occur after VALID Trip signal and manual trip from MCR was successful (1 and 2)</b>  1. <b>VALID</b> Rx Auto Trip signal received or required  2. Manual Rx Trip from the MCR <b>was</b> successful and power is <5% and decreasing.		Refer to "Fission Product Barrier Matrix"
	Not Applicable	1, 2, 3, 4, 5	<b>Reactor Coolant System specific activity exceeds LCO (Refer to WBN Tech. Spec. 3.4.16)</b>  1. Radiochemistry analysis indicates (a or b) a. Dose equivalent Iodine (I-131) >0.265 μCi/gm for >48 Hours <b>or</b> >14 μCi/gm. b. Specific activity >100/E μCi/gm

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**Attachment 2  
(Page 5 of 7)**

2.5 RCS Unidentified Leakage	
Mode	Initiating/Condition
	Refer to "Fission Product Barrier Matrix"
	Refer to "Fission Product Barrier Matrix"
	Refer to "Fission Product Barrier Matrix"
1,2 3,4, *5	<p><b>Unidentified <u>or</u> pressure boundary RCS leakage &gt;10 GPM</b></p> <p>1. Unidentified or pressure boundary leakage (as defined by Tech. Spec.) &gt;10 GPM as indicated below (<b>a or b</b>)</p> <p style="margin-left: 20px;">a. 1-SI-68-32 results</p> <p style="margin-left: 20px;">b. With RCS Temperature <u>and</u> PZR Level Stable, VCT Level Dropping at a Rate &gt;10 GPM</p> <p><i>*Note: Applies to Mode 5 if RCS Pressurized</i></p>

2.6 RCS Identified Leakage	
Mode	Initiating/Condition
	Refer to "Fission Product Barrier Matrix"
	Refer to "Fission Product Barrier Matrix"
	Refer to "Fission Product Barrier Matrix"
1,2 3,4, *5	<p><b>Identified RCS leakage &gt;25 GPM</b></p> <p>1. Identified RCS leakage (as defined by Tech. Spec.) &gt;25 GPM (<b>a or b</b>)</p> <p style="margin-left: 20px;">a. 1-SI-68-32 results</p> <p style="margin-left: 20px;">b. Level rise in excess of 25 GPM total into PRT, RCDT or CVCS Holdup Tank</p> <p><i>*Note: Applies to Mode 5 if RCS Pressurized</i></p>

**GENERAL  
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**Attachment 2  
(Page 6 of 7)**

2.7 Uncontrolled Cool down		2.8 Turbine Failure								
Mode	Initiating/Condition	Mode	Initiating/Condition							
G E N E R A L  S I T E			Refer to "Fission Product Barrier Matrix"							
			Refer to "Fission Product Barrier Matrix"							
			Refer to "Fission Product Barrier Matrix"							
A L E R T			Refer to "Fission Product Barrier Matrix"							
	1,2,3	<b>UNPLANNED rapid depressurization of the Main Steam System resulting in a rapid RCS cooldown <u>and</u> Safety Injection Initiation (1 and 2)</b> <ol style="list-style-type: none"> <li>1. Rapid de-pressurization of Main Steam System (&lt;675 psig)</li> <li>2. Safety Injection has initiated <u>or</u> is required</li> </ol>	<b>Turbine Failure has generated PROJECTILES that cause VISIBLE DAMAGE to any area containing Safety Related equipment</b> <ol style="list-style-type: none"> <li>1. Turbine <b>PROJECTILES</b> has resulted in <b>VISIBLE DAMAGE</b> in any of the following areas: <table style="width: 100%; border: none;"> <tr> <td>Control Building</td> <td>Diesel Generator Bldg.</td> </tr> <tr> <td>Auxiliary Building</td> <td>RWST</td> </tr> <tr> <td>Unit #1 Containment</td> <td>Intake Pumping Station</td> </tr> <tr> <td></td> <td>CST</td> </tr> </table> </li> </ol>	Control Building	Diesel Generator Bldg.	Auxiliary Building	RWST	Unit #1 Containment	Intake Pumping Station	
Control Building	Diesel Generator Bldg.									
Auxiliary Building	RWST									
Unit #1 Containment	Intake Pumping Station									
	CST									
U N U S U A L			Refer to "Fission Product Barrier Matrix"							
			Refer to "Fission Product Barrier Matrix"							
E V E N T			Refer to "Fission Product Barrier Matrix"							
	1,2,3	<b>Turbine Failure results in Casing penetration</b> <ol style="list-style-type: none"> <li>1. Turbine Failure which results in penetration of the Turbine Casing <u>or</u> Damage to Main Generator Seals</li> </ol>								

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**Attachment 2  
(Page 7 of 7)**

2.9 Technical Specification	
Mode	Initiating/Condition
	<i>Not Applicable</i>
	<i>Not Applicable</i>
	<i>Not Applicable</i>
1,2 3,4	<p><b>Inability to reach required Shutdown within Tech. Spec. limits (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. Any Tech. Spec. LCO Statement, requiring a Mode reduction, has been entered</li> <li>2. The Unit has not been placed in the required Mode within the time prescribed by the LCO Action Statement</li> </ol>

2.10 Safety Limit	
Mode	Initiating/Condition
	<i>Not Applicable</i>
	<i>Not Applicable</i>
	<i>Not Applicable</i>
1,2, 3,4, 5	<p><b>Safety Limits have been Exceeded (1 or 2)</b></p> <ol style="list-style-type: none"> <li>1. The combination of thermal power, RCS temperature, and RCS pressure &gt; safety limits as indicated by WBN Tech. Spec. Figure 2.1.1-1 "Reactor Core Safety Limits"</li> <li>2. RCS/Pressurizer pressure exceeds safety limit (&gt;2735 psig)</li> </ol>

**GENERAL SITE ALERT UNUSUAL EVENT**

**Attachment 3  
(Page 1 of 4)  
Loss of Power**

<b>FISSION PRODUCT BARRIER MATRIX (Modes 1-4)</b> 1.1 Fuel Clad 1.2 RCS 1.3 Containment	<b>1</b>
<b>SYSTEM DEGRADATION</b> 2.1 Loss of Instrumentation 2.2 Loss of Function/Communication 2.3 Failure of Reactor Protection 2.4 Fuel Clad Degradation 2.5 RCS Unidentified Leakage 2.6 RCS Identified Leakage 2.7 Uncontrolled Cool Down 2.8 Turbine Failure 2.9 Technical Specification 2.10 Safety Limit	<b>2</b>
<b>LOSS OF POWER</b> 3.1 Loss of AC (Power Ops) 3.2 Loss of AC (Shutdown) 3.3 Loss of DC	<b>3</b>
<b>HAZARDS and SED JUDGMENT</b> 4.1 Fire 4.2 Explosion Table 4-1 Figure 4-A 4.3 Flammable Gas 4.4 Toxic Gas Table 4-2 Figure 4-B 4.5 Control Room Evacuation 4.6 Security 4.7 SED Judgment	<b>4</b>
<b>DESTRUCTIVE PHENOMENON</b> 5.1 Earthquake 5.2 Tornado 5.3 Aircraft/Projectile Crash Figure 5-A Table 5-1 5.4 River Level High 5.5 River Level Low 5.6 Watercraft Crash	<b>5</b>
<b>SHUTDOWN SYSTEM DEGRADATION</b> 6.1 Loss of Shutdown Systems 6.2 Loss of AC (Shutdown) 6.3 Loss of DC (Shutdown)	<b>6</b>
<b>RADIOLOGICAL</b> 7.1 Gaseous Effluent 7.2 Liquid Effluent Table 7-1 Figure 7-A 7.3 Radiation Levels 7.4 Fuel Handling Table 7-2	<b>7</b>

<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 24 of 53</b>
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## Attachment 3 (Page 2 of 4)

**UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY:** (see SED Judgment 4.7).

**BOMB:** An explosive device (See EXPLOSION).

**CIVIL DISTURBANCE:** A group of twenty (20) or more persons violently protesting station operations or activities at the site.

**CREDIBLE SITE-SPECIFIC** -The determination is made by WBN senior plant management through use of information found in the Safeguards Contingency Plan.

**CRITICAL-SAFETY FUNCTION (CSFs):** A plant safety function required to prevent significant release of core radioactivity to the environment. There are six CSFs: Sub-criticality, Core Cooling, Heat Sink, Pressurized Thermal Shock, Integrity (Containment) and Inventory (RCS).

**EVENT:** Assessment of an **EVENT** commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

**EXCLUSION AREA BOUNDARY (EAB):** The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

**EXPLOSION:** A rapid, violent, unconfined combustion or a catastrophic failure of pressurized equipment that potentially imparts significant energy to near-by structures and materials.

**EXTORTION:** An attempt to cause an action at the station by threat of force.

**FAULTED:** (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

**FIRE:** Combustion characterized by heat and light. Source of smoke such as slipping drive belts or overheated electrical components do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

**FLAMMABLE GAS:** Combustible gases maintained at concentrations less than the **LOWER EXPLOSIVE LIMIT (LEL)** will not explode due to ignition.

**HOSTAGE:** A person(s) held as leverage against the station to ensure that demands will be met by the station.

**HOSTILE ACTION:** An act toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidates the licensee to achieve an end. This includes attack by air, land, or water; using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. **HOSTILE ACTION** should NOT be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the nuclear power plant. Non-terrorism-based EALs should be used to address such activities, (e.g., violent acts between individuals in the owner controlled area.)

**HOSTILE FORCE:** Individual(s) involved with a **HOSTILE ACTION**. One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

**INEFFECTIVE:** The specified restoration action(s) does not result in a reduction in the level of severity of the **RED PATH** condition within 15 minutes from identification of the Core Cooling CSF Status Tree **RED PATH**. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

**INITIATING CONDITIONS:** Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

**INTRUSION/INTRUDER:** Suspected hostile individual present in a protected area without authorization.

**ODCM:** Offsite Dose Calculation Manual.

**ORANGE PATH:** Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

**PROJECTILE:** An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

**PROTECTED AREA:** Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

**RED PATH:** Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

**RUPTURED:** (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

**SABOTAGE:** Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

**SECURITY CONDITION-** Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A **SECURITY CONDITION** does not involve a **HOSTILE ACTION**.

**SIGNIFICANT TRANSIENT:** An **UNPLANNED** event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

**SITE PERIMETER:** Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-A and 7-A.

**STRIKE ACTION:** A work stoppage within the **PROTECTED AREA** by a body of workers to enforce compliance with demands made on TVA. The **STRIKE ACTION** must threaten to interrupt normal plant operations.

**TOXIC GAS:** A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

**UNPLANNED:** An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are **UNPLANNED**.

**UNPLANNED:** (With specific regard to radioactivity releases) A release of radioactivity is **UNPLANNED** if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

**VALID:** An indication or report or condition is considered to be **VALID** when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

**VISIBLE DAMAGE:** Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

**VITAL AREA:** Is any area within the **PROTECTED AREA** which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.



**Attachment 3  
(Page 3 of 4)**

3.1 Loss of AC (Power Ops)	
Mode	Initiating/Condition
GENERAL	1,2, 3,4 <b>Prolonged loss of Offsite and Onsite AC power (1 and 2)</b> 1. 1A <b>and</b> 1B 6.9KV Shutdown Boards de-energized for >15 minutes 2. (a or b) a. Core Cooling Red <b>or</b> Orange b. Restoration of Either 1A <b>or</b> 1B 6.9KV Shutdown Board(s) is not likely within 4 hours of loss.
SITE	1,2, 3,4 <b>Loss of Offsite <b>and</b> Onsite AC Power &gt; 15 minutes</b> 1. 1A <b>and</b> 1B 6.9KV Shutdown Boards de-energized for >15 minutes
ALERT	1,2, 3,4 <b>Loss of Offsite Power for &gt;15 minutes (1 and 2)</b> 1. C <b>and</b> D CSSTs are not available for >15 minutes 2. 1A <b>or</b> 1B Diesel Generator not available
UNUSUAL	1,2, 3,4 <b>Loss of Offsite Power for &gt;15 minutes (1 and 2)</b> 1. C <b>and</b> D CSSTs not available for >15 minutes 2. Each Diesel Generator is supplying power to its respective Shutdown Board
EVENT	

3.2 Loss of AC (Shutdown)	
Mode	Initiating/Condition
	<i>Not Applicable</i>
	<i>Not Applicable</i>
5,6, or Defuel	<b>UNPLANNED loss of Offsite <b>and</b> Onsite AC power for &gt;15 minutes</b> 1. 1A <b>and</b> 1B 6.9KV Shutdown Boards de-energized for >15 minutes <i>Also Refer to "Loss of Shutdown Systems" (6.1)</i>
5,6, or Defuel	<b>UNPLANNED loss of Offsite Power for &gt;15 minutes (1 and 2)</b> 1. C <b>and</b> D CSSTs not available for >15 minutes 2. Either Diesel Generator is supplying power to its respective Shutdown Board

**Attachment 3  
(Page 4 of 4)**

<b>3.3 Loss of DC Power</b>	
<b>Mode</b>	<b>Initiating/Condition</b>
<b>GENERAL</b>	<i>Refer to "Fission Product Barrier Matrix" and "Loss of Function" (2.2)</i>
<b>SITE</b>	<p><b>Loss of All Vital DC Power for &gt;15 minutes</b></p> <p>1. Voltage &lt;105V DC on 125V DC Vital Battery Buses 1-I <b>and</b> 1-II <b>and</b> 1-III <b>and</b> 1-IV for &gt;15 minutes</p> <p><i>Also Refer to "Fission Product Barrier Matrix", "Loss of Function" (2.2), and "Loss of Instrumentation" (2.1)</i></p>
<b>ALERT</b>	<p><i>Also Refer to "Fission Product Barrier Matrix", "Loss of Function" (2.2), and "Loss of Instrumentation" (2.1)</i></p>
<b>UNUSUAL EVENT</b>	<p><b>UNPLANNED Loss of the Required Train of DC power for &gt;15 minutes (1 or 2)</b></p> <p>1. Voltage &lt;105V DC on 125V DC Vital Battery Buses 1-I <b>and</b> 1-III for &gt;15 minutes</p> <p>2. Voltage &lt;105V DC on 125V DC Vital Battery Buses 1-II <b>and</b> 1-IV for &gt;15 minutes</p>

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<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 28 of 53</b>
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## Attachment 4 (Page 2 of 8)

**UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY:** (see SED Judgment 4.7).

**BOMB:** An explosive device (See EXPLOSION).

**CIVIL DISTURBANCE:** A group of twenty (20) or more persons violently protesting station operations or activities at the site.

**CREDIBLE SITE-SPECIFIC** -The determination is made by WBN senior plant management through use of information found in the Safeguards Contingency Plan.

**CRITICAL-SAFETY FUNCTION (CSFs):** A plant safety function required to prevent significant release of core radioactivity to the environment. There are six CSFs: Sub-criticality, Core Cooling, Heat Sink, Pressurized Thermal Shock, Integrity (Containment) and Inventory (RCS).

**EVENT:** Assessment of an **EVENT** commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

**EXCLUSION AREA BOUNDARY (EAB):** The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

**EXPLOSION:** A rapid, violent, unconfined combustion or a catastrophic failure of pressurized equipment that potentially imparts significant energy to near-by structures and materials.

**EXTORTION:** An attempt to cause an action at the station by threat of force.

**FAULTED:** (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

**FIRE:** Combustion characterized by heat and light. Source of smoke such as slipping drive belts or overheated electrical components do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

**FLAMMABLE GAS:** Combustible gases maintained at concentrations less than the **LOWER EXPLOSIVE LIMIT (LEL)** will not explode due to ignition.

**HOSTAGE:** A person(s) held as leverage against the station to ensure that demands will be met by the station.

**HOSTILE ACTION:** An act toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidates the licensee to achieve an end. This includes attack by air, land, or water; using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. **HOSTILE ACTION** should NOT be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the nuclear power plant. Non-terrorism-based EALs should be used to address such activities, (e.g., violent acts between individuals in the owner controlled area.)

**HOSTILE FORCE:** Individual(s) involved with a **HOSTILE ACTION**. One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

**INEFFECTIVE:** The specified restoration action(s) does not result in a reduction in the level of severity of the **RED PATH** condition within 15 minutes from identification of the Core Cooling CSF Status Tree **RED PATH**. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

**INITIATING CONDITIONS:** Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

**INTRUSION/INTRUDER:** Suspected hostile individual present in a protected area without authorization.

**ODCM:** Offsite Dose Calculation Manual.

**ORANGE PATH:** Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

**PROJECTILE:** An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

**PROTECTED AREA:** Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

**RED PATH:** Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

**RUPTURED:** (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

**SABOTAGE:** Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

**SECURITY CONDITION-** Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A **SECURITY CONDITION** does not involve a **HOSTILE ACTION**.

**SIGNIFICANT TRANSIENT:** An **UNPLANNED** event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

**SITE PERIMETER:** Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-A and 7-A.

**STRIKE ACTION:** A work stoppage within the **PROTECTED AREA** by a body of workers to enforce compliance with demands made on TVA. The **STRIKE ACTION** must threaten to interrupt normal plant operations.

**TOXIC GAS:** A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

**UNPLANNED:** An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are **UNPLANNED**.

**UNPLANNED:** (With specific regard to radioactivity releases) A release of radioactivity is **UNPLANNED** if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

**VALID:** An indication or report or condition is considered to be **VALID** when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

**VISIBLE DAMAGE:** Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

**VITAL AREA:** Is any area within the **PROTECTED AREA** which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

**Attachment 4  
(Page 3 of 8)**

4.1 FIRE	
Mode	Initiating/Condition
GENERAL SITE	Refer to "Fission Product Barrier Matrix"
ALERT	Refer to "Control Room Evacuation," (4.5) or Fission Product Barrier Matrix"
UNUSUAL	<p>All</p> <p><b>FIRE in any of the areas listed in Table 4-1 that is affecting Safety Related equipment (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. <b>FIRE</b> in any of the areas listed in Table 4-1</li> <li>2. (a or b)               <ol style="list-style-type: none"> <li>a. <b>VISIBLE DAMAGE</b> to permanent structure <u>or</u> Safety Related equipment in the specified area is observed due to the <b>FIRE</b></li> <li>b. Control Room indication of degraded Safety System <u>or</u> component response due to the <b>FIRE</b></li> </ol> </li> </ol>
EVENT	<p>All</p> <p><b>FIRE in the PROTECTED AREA threatening any of the areas listed in Table 4-1 that is <u>Not</u> extinguished within 15 minutes from the Time of Control Room notification <u>or</u> verification of Control Room Alarm (Figure 4-A)</b></p>

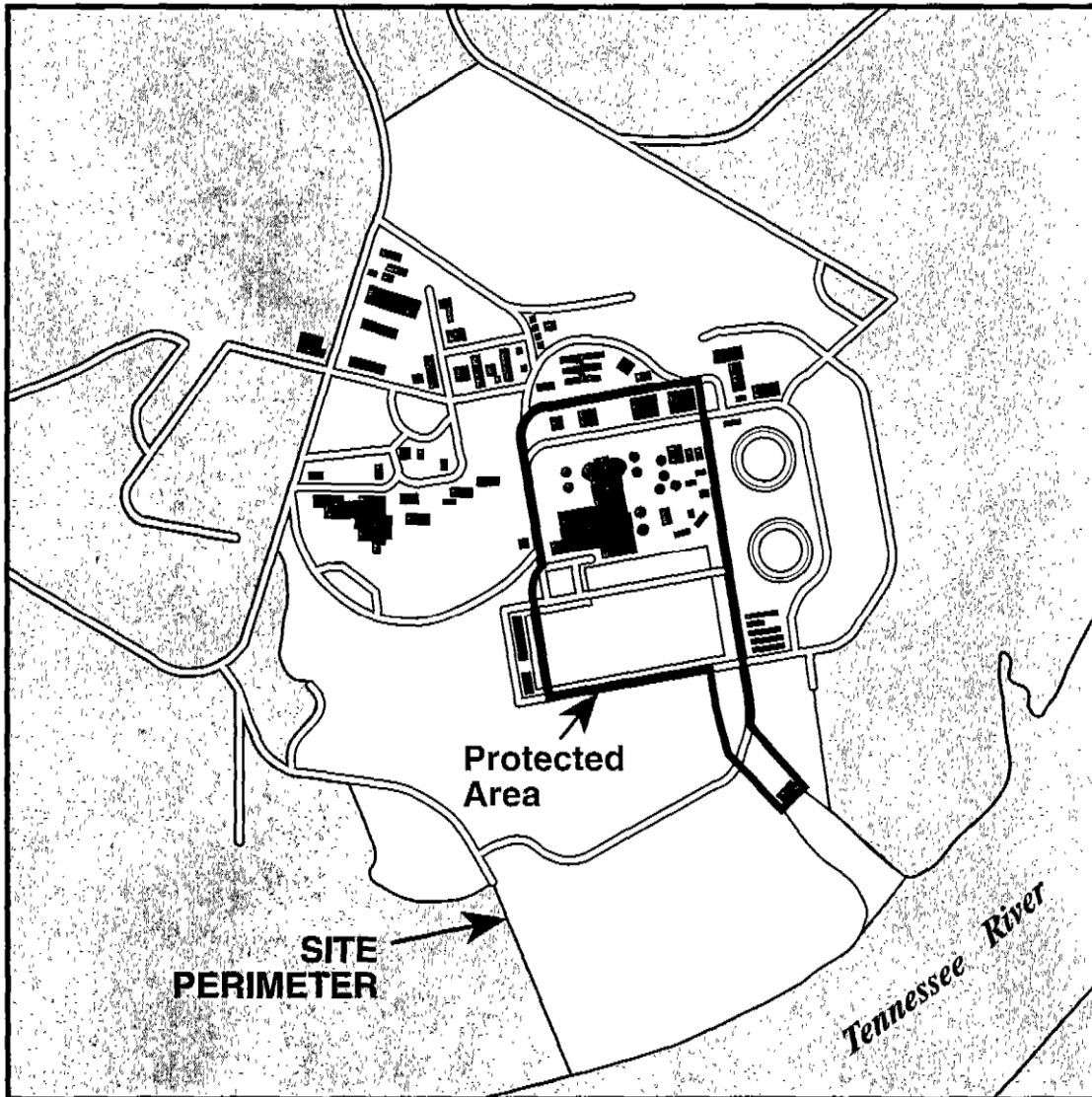
4.2 Explosions	
Mode	Initiating/Condition
GENERAL SITE	Refer to "Fission Product Barrier Matrix"
ALERT	Refer to "Fission Product Barrier Matrix"
UNUSUAL	<p>All</p> <p><b>EXPLOSION in any of the areas listed in Table 4-1 that is affecting Safety Related equipment (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. <b>EXPLOSION</b> in any of the areas listed in Table 4-1</li> <li>2. (a or b)               <ol style="list-style-type: none"> <li>a. An <b>EXPLOSION</b> has caused <b>VISIBLE DAMAGE</b> to Safety Related equipment</li> <li>b. Control Room indication of degraded Safety System <u>or</u> component response due to the <b>EXPLOSION</b></li> </ol> </li> </ol> <p>Refer to "Security" (4.6)</p>
EVENT	<p>All</p> <p><b>UNPLANNED EXPLOSION within the PROTECTED AREA resulting in VISIBLE DAMAGE to any permanent structure <u>or</u> equipment (Figure 4-A)</b></p> <p>Refer to "Security" (4.6)</p>

**Attachment 4  
(Page 4 of 8)**

**TABLE 4-1  
PLANT AREAS ASSOCIATED WITH FIRE AND EXPLOSION EALS**

Unit #1 Reactor Building	Additional Diesel Generator Building
Auxiliary Building	Intake Pumping Station
Control Building	Additional Equipment Buildings (Unit 1&2)
Diesel Generator Building	RWST
CST	Turbine Building

**Figure 4-A  
PROTECTED AREA/SITE PERIMETER**



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**Attachment 4  
(Page 5 of 8)**

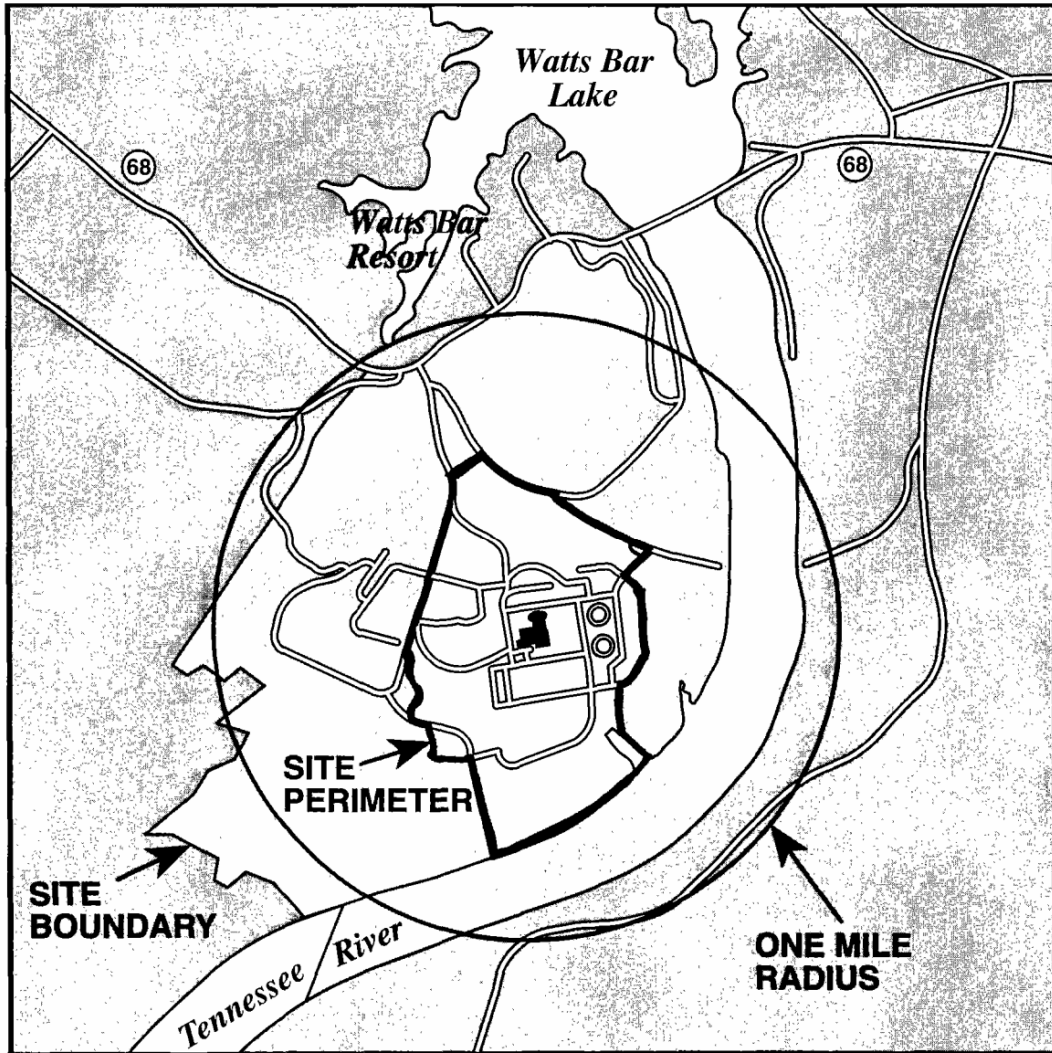
		<b>4.3 Flammable Gas</b>	<b>4.4 Toxic Gas</b>
		Mode	Initiating/Condition
<b>GENERAL SITE</b>			<i>Refer to "Fission Product Barrier Matrix"</i>
			<i>Refer to "Fission Product Barrier Matrix"</i>
	All	<p><b>UNPLANNED release of Flammable Gas within a facility structure containing Safety Related equipment <u>or</u> associated with Power production</b></p> <p>1. Plant personnel report the average of three readings taken in a ~10 ft triangular Area is &gt;25% Lower Explosive Limit (<b>LEL</b>), as indicated on the monitoring instrument within any building listed in Table 4-2.</p>	<p><b>Release of TOXIC GAS within a facility structure which Prohibits Safe Operation of systems required to establish <u>or</u> maintain Cold S/D (1 and 2 and 3)</b></p> <p>1. Plant personnel report <b>TOXIC GAS</b> within any building listed in Table 4-2</p> <p>2. (<i>a or b</i>)</p> <p>a. Plant personnel report Severe Adverse Health Reactions due to <b>TOXIC GAS</b> (i.e., burning eyes, nose, throat, dizziness)</p> <p>b. Sampling indications &gt; Permissible Exposure Limit (<b>PEL</b>)</p> <p>3. Plant personnel would be unable to perform actions necessary to establish and maintain Cold Shutdown while utilizing appropriate personnel protection equipment.</p>
All	<p><b>A. UNPLANNED release of Flammable Gas within the SITE PERIMETER</b></p> <p>1. Plant personnel report the average of three readings taken in a ~10 ft Triangular Area is &gt;25% Lower Explosive Limit (<b>LEL</b>), as indicated on the monitoring instrument within the <b>SITE PERIMETER</b> (Refer to Figure 4-B)</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p><b>B. Confirmed report by Local, County, <u>or</u> State Officials that a Large Offsite Flammable Gas release has occurred within One Mile of the Site with potential to enter the SITE PERIMETER in concentrations &gt;25% of LEL Lower Explosive Limit (Refer to Figure 4-B)</b></p>	<p><b>A. Normal Operations impeded due to access restrictions caused by TOXIC GAS concentrations within a Facility Structure listed in Table 4-2</b></p> <p style="text-align: center;"><b><u>OR</u></b></p> <p><b>B. Confirmed report by Local, County, <u>or</u> State Officials that a Large Offsite TOXIC GAS release has occurred within One Mile of the Site with potential to enter the Site Perimeter in concentrations greater than the (PEL) Permissible Exposure Limit thus causing an Evacuation (Figure 4-B)</b></p>	
<b>ALERT</b>			
<b>UNUSUAL</b>			
<b>EVENT</b>			

**Attachment 4  
(Page 6 of 8)**

**TABLE 4-2  
Plant Structures Associated With TOXIC or Flammable Gas EALs**

- |                               |                                       |
|-------------------------------|---------------------------------------|
| Unit #1 & 2 Reactor Buildings | Additional Diesel Generator Building  |
| Auxiliary Building            | Intake Pumping Station                |
| Control Building              | Additional Equipment Bldgs (Unit 1&2) |
| Diesel Generator Building     | CDWE Building                         |
|                               | Turbine Building                      |

**Figure 4-B  
ONE MILE RADIUS/SITE PERIMETER**



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**Attachment 4  
(Page 8 of 8)**

<b>4.7 Emergency Director Judgment</b>		
	<b>Mode</b>	<b>Initiating/Condition</b>
GENERAL	All	Events are in process <u>or</u> have occurred which involve Actual <u>or</u> Imminent Substantial Core Degradation <u>or</u> Melting With Potential for Loss of Containment Integrity <u>or</u> HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline Exposure Levels outside the EXCLUSION AREA BOUNDARY. Refer to Figure 7-A.
	All	Events are in process <u>or</u> have occurred which involve an Actual <u>or</u> Likely Major Failures of Plant Functions needed for Protection of the Public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the Protection of the Public. Any releases are not expected to result in Exposure Levels which Exceed EPA Protective Action Guideline Exposure Levels outside the EXCLUSION AREA BOUNDARY. Refer to Figure 7-A.
SITE	All	Events are in process <u>or</u> have occurred which involve an Actual <u>or</u> Potential Substantial Degradation of the Level of Safety of the Plant <u>or</u> a Security Event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline Exposure Levels.
ALERT	All	Events are in process <u>or</u> have occurred which indicate a Potential Degradation of the Level of Safety of the Plant <u>or</u> indicate a Security Threat to facility protection has been initiated. No releases of Radioactive Material requiring Offsite Response <u>or</u> Monitoring are expected unless further degradation of Safety Systems occurs.
UNUSUAL	All	
EVENT		



<b>H A Z A R D S / S E D J U D G M E N T U 1</b>
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**Attachment 5  
(Page 1 of 7)**

**Destructive Phenomenon**

<p><b>FISSION PRODUCT BARRIER MATRIX (Modes 1-4)</b></p> <p>1.1 Fuel Clad 1.2 RCS 1.3 Containment</p>	<b>1</b>												
<p><b>SYSTEM DEGRADATION</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">2.1 Loss of Instrumentation</td> <td style="width: 50%;">2.6 RCS Identified Leakage</td> </tr> <tr> <td>2.2 Loss of Function/Communication</td> <td>2.7 Uncontrolled Cool Down</td> </tr> <tr> <td>2.3 Failure of Reactor Protection</td> <td>2.8 Turbine Failure</td> </tr> <tr> <td>2.4 Fuel Clad Degradation</td> <td>2.9 Technical Specification</td> </tr> <tr> <td>2.5 RCS Unidentified Leakage</td> <td>2.10 Safety Limit</td> </tr> </table>	2.1 Loss of Instrumentation	2.6 RCS Identified Leakage	2.2 Loss of Function/Communication	2.7 Uncontrolled Cool Down	2.3 Failure of Reactor Protection	2.8 Turbine Failure	2.4 Fuel Clad Degradation	2.9 Technical Specification	2.5 RCS Unidentified Leakage	2.10 Safety Limit	<b>2</b>		
2.1 Loss of Instrumentation	2.6 RCS Identified Leakage												
2.2 Loss of Function/Communication	2.7 Uncontrolled Cool Down												
2.3 Failure of Reactor Protection	2.8 Turbine Failure												
2.4 Fuel Clad Degradation	2.9 Technical Specification												
2.5 RCS Unidentified Leakage	2.10 Safety Limit												
<p><b>LOSS OF POWER</b></p> <p>3.1 Loss of AC (Power Ops) 3.2 Loss of AC (Shutdown) 3.3 Loss of DC</p>	<b>3</b>												
<p><b>HAZARDS and SED JUDGMENT</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">4.1 Fire</td> <td style="width: 33%;">4.3 Flammable Gas</td> <td style="width: 33%;">4.5 Control Room</td> </tr> <tr> <td>4.2 Explosion</td> <td>4.4 Toxic Gas</td> <td>Evacuation</td> </tr> <tr> <td>Table 4-1</td> <td>Table 4-2</td> <td>4.6 Security</td> </tr> <tr> <td>Figure 4-A</td> <td>Figure 4-B</td> <td>4.7 SED Judgment</td> </tr> </table>	4.1 Fire	4.3 Flammable Gas	4.5 Control Room	4.2 Explosion	4.4 Toxic Gas	Evacuation	Table 4-1	Table 4-2	4.6 Security	Figure 4-A	Figure 4-B	4.7 SED Judgment	<b>4</b>
4.1 Fire	4.3 Flammable Gas	4.5 Control Room											
4.2 Explosion	4.4 Toxic Gas	Evacuation											
Table 4-1	Table 4-2	4.6 Security											
Figure 4-A	Figure 4-B	4.7 SED Judgment											
<p><b>DESTRUCTIVE PHENOMENON</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">5.1 Earthquake</td> <td style="width: 50%;">5.4 River Level High</td> </tr> <tr> <td>5.2 Tornado</td> <td>5.5 River Level Low</td> </tr> <tr> <td>5.3 Aircraft/Projectile Crash Figure 5-A Table 5-1</td> <td>5.6 Watercraft Crash</td> </tr> </table>	5.1 Earthquake	5.4 River Level High	5.2 Tornado	5.5 River Level Low	5.3 Aircraft/Projectile Crash Figure 5-A Table 5-1	5.6 Watercraft Crash	<b>5</b>						
5.1 Earthquake	5.4 River Level High												
5.2 Tornado	5.5 River Level Low												
5.3 Aircraft/Projectile Crash Figure 5-A Table 5-1	5.6 Watercraft Crash												
<p><b>SHUTDOWN SYSTEM DEGRADATION</b></p> <p>6.1 Loss of Shutdown Systems 6.2 Loss of AC (Shutdown) 6.3 Loss of DC (Shutdown)</p>	<b>6</b>												
<p><b>RADIOLOGICAL</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">7.1 Gaseous Effluent</td> <td style="width: 50%;">7.3 Radiation Levels</td> </tr> <tr> <td>7.2 Liquid Effluent Table 7-1 Figure 7-A</td> <td>7.4 Fuel Handling Table 7-2</td> </tr> </table>	7.1 Gaseous Effluent	7.3 Radiation Levels	7.2 Liquid Effluent Table 7-1 Figure 7-A	7.4 Fuel Handling Table 7-2	<b>7</b>								
7.1 Gaseous Effluent	7.3 Radiation Levels												
7.2 Liquid Effluent Table 7-1 Figure 7-A	7.4 Fuel Handling Table 7-2												

<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 36 of 53</b>
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## Attachment 5 (Page 2 of 7)

**UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY:** (see SED Judgment 4.7).

**BOMB:** An explosive device (See EXPLOSION).

**CIVIL DISTURBANCE:** A group of twenty (20) or more persons violently protesting station operations or activities at the site.

**CREDIBLE SITE-SPECIFIC** -The determination is made by WBN senior plant management through use of information found in the Safeguards Contingency Plan.

**CRITICAL-SAFETY FUNCTION (CSFs):** A plant safety function required to prevent significant release of core radioactivity to the environment. There are six CSFs: Sub-criticality, Core Cooling, Heat Sink, Pressurized Thermal Shock, Integrity (Containment) and Inventory (RCS).

**EVENT:** Assessment of an **EVENT** commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

**EXCLUSION AREA BOUNDARY (EAB):** The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

**EXPLOSION:** A rapid, violent, unconfined combustion or a catastrophic failure of pressurized equipment that potentially imparts significant energy to near-by structures and materials.

**EXTORTION:** An attempt to cause an action at the station by threat of force.

**FAULTED:** (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

**FIRE:** Combustion characterized by heat and light. Source of smoke such as slipping drive belts or overheated electrical components do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

**FLAMMABLE GAS:** Combustible gases maintained at concentrations less than the **LOWER EXPLOSIVE LIMIT (LEL)** will not explode due to ignition.

**HOSTAGE:** A person(s) held as leverage against the station to ensure that demands will be met by the station.

**HOSTILE ACTION:** An act toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidates the licensee to achieve an end. This includes attack by air, land, or water; using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. **HOSTILE ACTION** should NOT be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the nuclear power plant. Non-terrorism-based EALs should be used to address such activities, (e.g., violent acts between individuals in the owner controlled area.)

**HOSTILE FORCE:** Individual(s) involved with a **HOSTILE ACTION**. One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

**INEFFECTIVE:** The specified restoration action(s) does not result in a reduction in the level of severity of the **RED PATH** condition within 15 minutes from identification of the Core Cooling CSF Status Tree **RED PATH**. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

**INITIATING CONDITIONS:** Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

**INTRUSION/INTRUDER:** Suspected hostile individual present in a protected area without authorization.

**ODCM:** Offsite Dose Calculation Manual.

**ORANGE PATH:** Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

**PROJECTILE:** An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

**PROTECTED AREA:** Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

**RED PATH:** Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

**RUPTURED:** (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

**SABOTAGE:** Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

**SECURITY CONDITION-** Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A **SECURITY CONDITION** does not involve a **HOSTILE ACTION**.

**SIGNIFICANT TRANSIENT:** An **UNPLANNED** event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

**SITE PERIMETER:** Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-A and 7-A.

**STRIKE ACTION:** A work stoppage within the **PROTECTED AREA** by a body of workers to enforce compliance with demands made on TVA. The **STRIKE ACTION** must threaten to interrupt normal plant operations.

**TOXIC GAS:** A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

**UNPLANNED:** An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are **UNPLANNED**.

**UNPLANNED:** (With specific regard to radioactivity releases) A release of radioactivity is **UNPLANNED** if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

**VALID:** An indication or report or condition is considered to be **VALID** when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

**VISIBLE DAMAGE:** Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

**VITAL AREA:** Is any area within the **PROTECTED AREA** which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

**Attachment 5  
(Page 3 of 7)**

		5.1 Earthquake		5.2 Tornado	
		Mode	Initiating/Condition	Mode	Initiating/Condition
<b>GENERAL SITE</b>			<i>Refer to "Fission Product Barrier Matrix"</i>		<i>Refer to "Fission Product Barrier Matrix"</i>
			<i>Refer to "Fission Product Barrier Matrix"</i>		<i>Refer to "Fission Product Barrier Matrix"</i>
	All	<p><b>Earthquake detected by site seismic instrumentation (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. <i>(a and b)</i> <ol style="list-style-type: none"> <li>a. Ann.166 D indicates "OBE Spectra Exceeded"</li> <li>b. Ann.166 E indicates "Seismic Recording Initiated"</li> </ol> </li> <li>2. <i>(a or b)</i> <ol style="list-style-type: none"> <li>a. Ground motion sensed by Plant personnel</li> <li>b. National Earthquake Information Center at 1-(303) 273-8500 can confirm the event.</li> </ol> </li> </ol>	All	<p><b>Tornado <u>or</u> High Winds strikes any structure listed in Table 5-1 and results in VISIBLE DAMAGE (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. Tornado or High Winds (Sustained &gt;80 mph &gt; one minute) strikes any structure listed in Table 5-1</li> <li>2. <i>(a or b)</i> <ol style="list-style-type: none"> <li>a. Confirmed report of any <b>VISIBLE DAMAGE</b></li> <li>b. Control Room indications of degraded Safety System <u>or</u> component response due to event</li> </ol> </li> </ol> <p><i>Note: Site Met Data Instrumentation fails to 0 at &gt;100 mph. National Weather Service Morristown 1-(423) 586-8400 can provide additional information if needed.</i></p>	
<b>ALERT</b>	All	<p><b>Earthquake detected by site seismic instrumentation (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. Ann. 166 E indicator "Seismic Recording Initiated"</li> <li>2. <i>(a or b)</i> <ol style="list-style-type: none"> <li>a. Ground motion sensed by Plant personnel</li> <li>b. National Earthquake Information Center at 1-(303) 273-8500 can confirm the event.</li> </ol> </li> </ol>	All	<p><b>Tornado within the SITE PERIMETER</b></p> <ol style="list-style-type: none"> <li>1. Plant personnel report a Tornado has been sighted within the <b>SITE PERIMETER</b> (Refer to Figure 5-A)</li> </ol>	
<b>UNUSUAL</b>					
<b>EVENT</b>					

**Attachment 5  
(Page 4 of 7)**

<b>5.3 Aircraft / Projectile Crash</b>	
Mode	Initiating/Condition
GENERAL SITE	<i>Refer to "Fission Product Barrier Matrix"</i>
ALERT	<p><b>Aircraft <u>or</u> PROJECTILE impacts (Strikes) any Plant structure listed in Table 5-1 resulting in VISIBLE DAMAGE (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. Plant personnel report aircraft <u>or</u> PROJECTILE has impacted any structure listed in Table 5-1</li> <li>2. (a or b)               <ol style="list-style-type: none"> <li>a. Confirmed report of any VISIBLE DAMAGE</li> <li>b. Control Room indications of degraded Safety System <u>or</u> component response due to the event within the specified areas</li> </ol> </li> </ol>
UNUSUAL EVENT	<p><b>Aircraft crash <u>or</u> PROJECTILE impact within the SITE PERIMETER</b></p> <ol style="list-style-type: none"> <li>1. Plant personnel report a Aircraft Crash <u>or</u> PROJECTILE impact within the <b>SITE PERIMETER</b> (Refer to Figure 5-A)</li> </ol>

**Table 5-1  
Plant Structures Associated With Tornado/Hi  
Wind and Aircraft EALs**

- Unit #1 and 2 Reactor Buildings
- Auxiliary Building
- Control Building
- Diesel Generator Building
- Additional Diesel Generator Building
- Intake Pumping Station
- Additional Equipment Buildings (Units 1 & 2)
- CDWE Building
- Turbine Building
- RWST
- CST

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**Attachment 5  
(Page 5 of 7)**

5.4 River Level HIGH	
Mode	Initiating/Condition
GENERAL SITE	<i>Refer to "Fission Product Barrier Matrix"</i>
ALERT	<i>Refer to "Fission Product Barrier Matrix"</i>
UNUSUAL	<b>River Reservoir level is at Stage II Flood Warning (1 or 2)</b> <ol style="list-style-type: none"> <li>1. River Reservoir level &gt;727 Ft</li> <li>2. Stage II Flood Warning (AOI-7) has been issued by River Systems Operations</li> </ol>
EVENT	<b>River Reservoir level is at Stage I Flood Warning (1 or 2 or 3)</b> <ol style="list-style-type: none"> <li>1. River Reservoir level &gt;726.5 Ft from April 16 thru September 30</li> <li>2. River Reservoir level &gt;714.5 Ft from October 1 thru April 15</li> <li>3. Stage I Flood Warning (AOI-7) has been issued by River Systems Operations</li> </ol>

5.5 River Level LOW	
Mode	Initiating/Condition
GENERAL SITE	<i>Refer to "Fission Product Barrier Matrix"</i>
ALERT	<i>Refer to "Fission Product Barrier Matrix"</i>
UNUSUAL	<b>River Reservoir level is &lt;668 Ft (AOI-22) as reported by River Systems Operations</b>
EVENT	<b>River Reservoir level is ≤673 Ft (AOI-22) as reported by River Systems Operations</b>

**Attachment 5  
(Page 6 of 7)**

<b>5.6 Watercraft Crash</b>	
Mode	Initiating/Condition
	<i>Refer to "Fission Product Barrier Matrix"</i>
	<i>Refer to "Fission Product Barrier Matrix"</i>
	<i>Refer to "Fission Product Barrier Matrix"</i>
All	<p><b>Watercraft Strikes the Intake Pumping Station resulting in a reduction of Essential Raw Cooling Water (ERCW) or Raw Cooling Water (RCW) (1 and 2)</b></p> <ol style="list-style-type: none"> <li>1. Plant personnel report a Watercraft has struck the Intake Pumping Station</li> <li>2. (a or b or c) <ol style="list-style-type: none"> <li>a. ERCW Supply Header Pressure Train A 0-PI-67-18A is &lt;15 psig</li> <li>b. ERCW Supply Header Pressure Train B 0-PI-67-17A is &lt;15 psig</li> <li>c. RCW Supply Header Pressure 0-PI-24-22 is &lt;15 psig</li> </ol> </li> </ol>

**GENERAL SITE**

**ALERT**

**UNUSUAL**

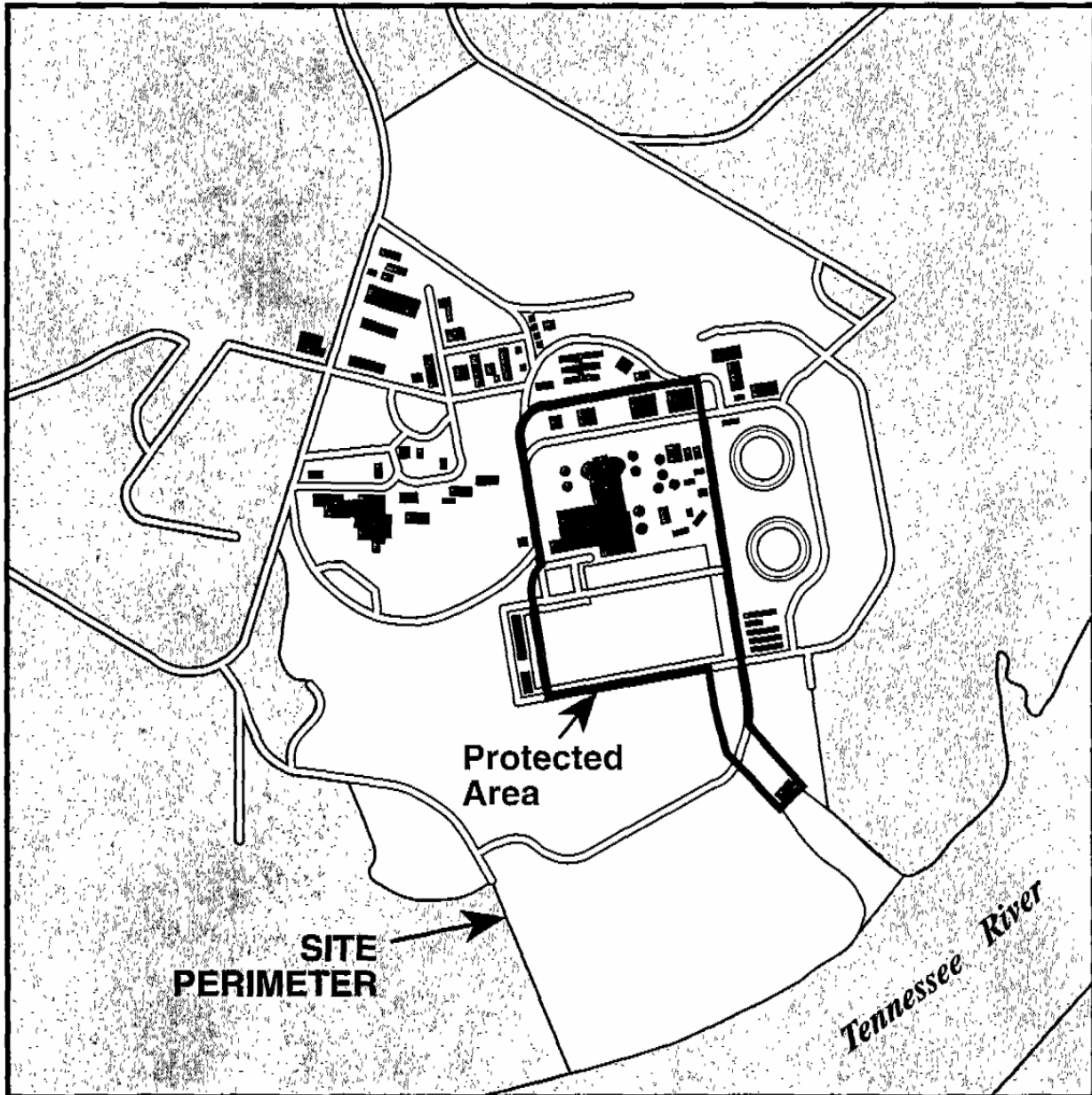
**EVENT**

**DESTRUCTIVE PHENOMENON U 1**



Attachment 5  
(Page 7 of 7)

Figure 5-A



**Attachment 6  
(Page 1 of 4)**

**Shutdown System Degradation**

<p><b>FISSION PRODUCT BARRIER MATRIX (Modes 1-4)</b></p> <p>1.1 Fuel Clad 1.2 RCS 1.3 Containment</p>	<b>1</b>												
<p><b>SYSTEM DEGRADATION</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">2.1 Loss of Instrumentation</td> <td style="width: 50%;">2.6 RCS Identified Leakage</td> </tr> <tr> <td>2.2 Loss of Function/Communication</td> <td>2.7 Uncontrolled Cool Down</td> </tr> <tr> <td>2.3 Failure of Reactor Protection</td> <td>2.8 Turbine Failure</td> </tr> <tr> <td>2.4 Fuel Clad Degradation</td> <td>2.9 Technical Specification</td> </tr> <tr> <td>2.5 RCS Unidentified Leakage</td> <td>2.10 Safety Limit</td> </tr> </table>	2.1 Loss of Instrumentation	2.6 RCS Identified Leakage	2.2 Loss of Function/Communication	2.7 Uncontrolled Cool Down	2.3 Failure of Reactor Protection	2.8 Turbine Failure	2.4 Fuel Clad Degradation	2.9 Technical Specification	2.5 RCS Unidentified Leakage	2.10 Safety Limit	<b>2</b>		
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<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 43 of 53</b>
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## Attachment 6 (Page 2 of 4)

**UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY:** (see SED Judgment 4.7).

**BOMB:** An explosive device (See EXPLOSION).

**CIVIL DISTURBANCE:** A group of twenty (20) or more persons violently protesting station operations or activities at the site.

**CREDIBLE SITE-SPECIFIC** -The determination is made by WBN senior plant management through use of information found in the Safeguards Contingency Plan.

**CRITICAL-SAFETY FUNCTION (CSFs):** A plant safety function required to prevent significant release of core radioactivity to the environment. There are six CSFs: Sub-criticality, Core Cooling, Heat Sink, Pressurized Thermal Shock, Integrity (Containment) and Inventory (RCS).

**EVENT:** Assessment of an **EVENT** commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

**EXCLUSION AREA BOUNDARY (EAB):** The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

**EXPLOSION:** A rapid, violent, unconfined combustion or a catastrophic failure of pressurized equipment that potentially imparts significant energy to near-by structures and materials.

**EXTORTION:** An attempt to cause an action at the station by threat of force.

**FAULTED:** (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

**FIRE:** Combustion characterized by heat and light. Source of smoke such as slipping drive belts or overheated electrical components do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

**FLAMMABLE GAS:** Combustible gases maintained at concentrations less than the **LOWER EXPLOSIVE LIMIT (LEL)** will not explode due to ignition.

**HOSTAGE:** A person(s) held as leverage against the station to ensure that demands will be met by the station.

**HOSTILE ACTION:** An act toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidates the licensee to achieve an end. This includes attack by air, land, or water; using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. **HOSTILE ACTION** should NOT be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the nuclear power plant. Non-terrorism-based EALs should be used to address such activities, (e.g., violent acts between individuals in the owner controlled area.)

**HOSTILE FORCE:** Individual(s) involved with a **HOSTILE ACTION**. One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

**INEFFECTIVE:** The specified restoration action(s) does not result in a reduction in the level of severity of the **RED PATH** condition within 15 minutes from identification of the Core Cooling CSF Status Tree **RED PATH**. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

**INITIATING CONDITIONS:** Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

**INTRUSION/INTRUDER:** Suspected hostile individual present in a protected area without authorization.

**ODCM:** Offsite Dose Calculation Manual.

**ORANGE PATH:** Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

**PROJECTILE:** An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

**PROTECTED AREA:** Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

**RED PATH:** Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

**RUPTURED:** (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

**SABOTAGE:** Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

**SECURITY CONDITION-** Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A **SECURITY CONDITION** does not involve a **HOSTILE ACTION**.

**SIGNIFICANT TRANSIENT:** An **UNPLANNED** event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

**SITE PERIMETER:** Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-A and 7-A.

**STRIKE ACTION:** A work stoppage within the **PROTECTED AREA** by a body of workers to enforce compliance with demands made on TVA. The **STRIKE ACTION** must threaten to interrupt normal plant operations.

**TOXIC GAS:** A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

**UNPLANNED:** An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are **UNPLANNED**.

**UNPLANNED:** (With specific regard to radioactivity releases) A release of radioactivity is **UNPLANNED** if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

**VALID:** An indication or report or condition is considered to be **VALID** when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

**VISIBLE DAMAGE:** Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

**VITAL AREA:** Is any area within the **PROTECTED AREA** which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

**Attachment 6  
(Page 3 of 4)**

6.1 Loss of Shutdown Systems	
Mode	Initiating/Condition
5,6	Note: Additional information will be provided later pending NRC Guidance on Shutdown EALs <i>Refer to "Gaseous Effluents" (7.1)</i>
5,6	<b>Loss of water level in the Rx vessel that has <u>or</u> will uncover fuel in the Rx vessel</b> <i>(1 and 2 and 3 and 4)</i> <ol style="list-style-type: none"> <li>1. Loss of RHR capability</li> <li>2. Rx vessel water level &lt; el. 718'</li> <li>3. Incore TCs (if available) indicate RCS temp. &gt;200° F</li> <li>4. RCS is vented/open to CNTMT</li> </ol> <i>Note: If CNTMT open, refer to "Gaseous Effluents" (7.1)</i>
5,6	<b>Inability to maintain Unit in Cold Shutdown</b> <i>(1 and 2)</i> <ol style="list-style-type: none"> <li>1. RHR capability is <b>not</b> available for RCS Cooling</li> <li>2. Incore TCs (if available) indicate RCS temp. &gt;200° F</li> </ol> <i>Note: If CNTMT open, refer to "Gaseous Effluents" (7.1)</i>
5,6	Note: Additional information will be provided later pending NRC Guidance on Shutdown EALs

6.2 Loss of AC (Shutdown)	
Mode	Initiating/Condition
	<i>Not Applicable</i>
	<i>Not Applicable</i>
5,6 or De-Fuel	<b>UNPLANNED loss of Offsite <u>and</u> Onsite AC Power for &gt;15 minutes</b> <ol style="list-style-type: none"> <li>1. 1A <u>and</u> 1B 6.9 KV Shutdown Bds de-energized for &gt;15 minutes</li> </ol>
5,6 or De-Fuel	<b>UNPLANNED loss of All Offsite Power for &gt;15 minutes</b> <i>(1 and 2)</i> <ol style="list-style-type: none"> <li>1. C <u>and</u> D CSSTS not available For &gt;15 minutes.</li> <li>2. Either Diesel Generator is supplying power to its respective Shutdown Board</li> </ol>

GENERAL

SITE

ALERT

UNUSUAL

EVENT

**Attachment 6  
(Page 4 of 4)**

<b>6.3 Loss of DC (Shutdown)</b>	
<b>Mode</b>	<b>Initiating/Condition</b>
	Not Applicable
	Not Applicable
	Not Applicable
5,6 or De-fuel	<b>UNPLANNED loss of the required Train of DC Power for &gt;15 minutes (1 or 2)</b> 1. Voltage <105V DC on 125V DC Vital Battery Buses 1-I <b>and</b> 1-III for >15 minutes 2. Voltage <105V DC on 125V DC Vital Battery Buses 1-II <b>and</b> 1-IV for >15 minutes.

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**Attachment 7  
(Page 1 of 7)  
Radiological**

<p><b>FISSION PRODUCT BARRIER MATRIX (Modes 1-4)</b></p> <p>1.1 Fuel Clad 1.2 RCS 1.3 Containment</p>	<b>1</b>												
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**Attachment 7  
(Page 2 of 7)**

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**ODCM:** Offsite Dose Calculation Manual.

**ORANGE PATH:** Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

**PROJECTILE:** An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

**PROTECTED AREA:** Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

**RED PATH:** Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

**RUPTURED:** (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

**SABOTAGE:** Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

**SECURITY CONDITION-** Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A **SECURITY CONDITION** does not involve a **HOSTILE ACTION**.

**SIGNIFICANT TRANSIENT:** An **UNPLANNED** event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

**SITE PERIMETER:** Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-A and 7-A.

**STRIKE ACTION:** A work stoppage within the **PROTECTED AREA** by a body of workers to enforce compliance with demands made on TVA. The **STRIKE ACTION** must threaten to interrupt normal plant operations.

**TOXIC GAS:** A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

**UNPLANNED:** An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are **UNPLANNED**.

**UNPLANNED:** (With specific regard to radioactivity releases) A release of radioactivity is **UNPLANNED** if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

**VALID:** An indication or report or condition is considered to be **VALID** when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

**VISIBLE DAMAGE:** Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

**VITAL AREA:** Is any area within the **PROTECTED AREA** which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

**Attachment 7  
(Page 3 of 7)**

		7.1 Gaseous Effluents	7.2 Liquid Effluents	
		Mode	Initiating/Condition	
<b>GENERAL</b>	All	<p><b>EAB dose resulting from an actual <u>or</u> imminent release of Gaseous Radioactivity that exceeds 1000 mrem TEDE <u>or</u> 5000 mrem Thyroid CDE for the actual <u>or</u> projected duration of the release (1 or 2 or 3)</b></p> <ol style="list-style-type: none"> <li>1. A <b>VALID</b> Rad monitor reading exceeds the values under General in Table 7-1 for &gt;15 minutes, unless assessment within this time period confirms that the <b>Criterion is <u>Not</u> exceeded.</b></li> <li>2. Field survey results indicate &gt;1000 mrem/hr gamma <u>or</u> an I-131 concentration of 3.9E-6 <math>\mu</math> Ci/cc at SP</li> <li>3. EP dose assessment results indicate EAB dose &gt;1000 mrem TEDE <u>or</u> &gt;5000 mrem Thyroid CDE for the actual <u>or</u> projected duration of the release (Figure 7-A)</li> </ol>	Not Applicable	
	<b>SITE</b>	All	<p><b>EAB dose resulting from an actual <u>or</u> imminent release of Gaseous Radioactivity that exceeds 100 mrem TEDE <u>or</u> 500 mrem Thyroid CDE for the actual <u>or</u> projected duration of the release (1 or 2 or 3)</b></p> <ol style="list-style-type: none"> <li>1. A <b>VALID</b> Rad monitor reading exceeds the values under Site in Table 7-1 for &gt;15 minutes, unless assessment within this time period confirms that the <b>Criterion is <u>Not</u> exceeded</b></li> <li>2. Field survey results indicate &gt;100 mrem/hr gamma <u>or</u> an I-131 concentration of 3.9E-7 <math>\mu</math> Ci/cc at SP</li> <li>3. EP dose assessment results indicate EAB dose &gt;100 mrem TEDE <u>or</u> &gt;500 mrem Thyroid CDE for the actual <u>or</u> projected duration of the release (Figure 7-A)</li> </ol>	Not Applicable
		<b>ALERT</b>	All	<p><b>Any UNPLANNED release of Gaseous Radioactivity that exceeds 200 times the ODCM Limit for &gt;15 minutes (1 or 2 or 3)</b></p> <ol style="list-style-type: none"> <li>1. A <b>VALID</b> Rad monitor reading exceeds the values under Alert in Table 7-1 for &gt;15 minutes, unless assessment within this time period confirms that the <b>Criterion is <u>Not</u> exceeded</b></li> <li>2. Field survey results indicate &gt;10 mrem/hr gamma at SP &gt;15 minutes</li> <li>3. EP dose assessment results indicate EAB dose &gt;10 mrem TEDE for the duration of the release (Figure 7-A)</li> </ol>
<b>UNUSUAL EVENT</b>	All		<p><b>Any UNPLANNED release of Gaseous Radioactivity that exceeds 2 times the ODCM Limit for &gt;60 minutes (1 or 2 or 3)</b></p> <ol style="list-style-type: none"> <li>1. A <b>VALID</b> Rad monitor reading exceeds the values under <b>UE</b> in Table 7-1 for &gt;60 minutes, unless assessment within this time period confirms that the <b>Criterion is <u>Not</u> exceeded</b></li> <li>2. Field survey results indicate &gt;0.1 mrem/hr gamma at SP for &gt;60 minutes</li> <li>3. EP dose assessment results indicate EAB dose &gt;0.1 mrem TEDE for the duration of the release (Figure 7-A)</li> </ol>	<p><b>Any UNPLANNED release of Liquid Radioactivity to the Environment that exceeds 2 times the ODCM Limit for &gt;60 minutes (1 or 2)</b></p> <ol style="list-style-type: none"> <li>1. A <b>VALID</b> Rad monitor reading exceeds the values under <b>UE</b> in Table 7-1 for &gt;60 minutes, unless assessment within this time period confirms that the <b>Criterion is <u>Not</u> exceeded.</b></li> <li>2. Sample results exceed 2 times the ODCM limit value for an unmonitored release of liquid radioactivity &gt;60 minutes in duration</li> </ol>



**Attachment 7  
(Page 4 of 7)**

**TABLE 7-1  
EFFLUENT RADIATION MONITOR EALS**

**NOTE**

The values below, if exceeded, indicate the need to perform the specific assessment. If the assessment cannot be completed within 15 minute (60 minutes for NOUE), the declaration shall be made based on the **VALID** reading. As used here, the radiation monitor indications on **ICS** are the primary indicators. If **ICS** is unavailable, utilize the radiation monitor readings in the control room or local indication as necessary.

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Monitor	ICS Screen	Units	UE	Alert	Site	General
<b>Total Site (GAS)</b>	EFF1	μCi/s <sup>(2)</sup>	1.98E+05	1.98E+07	2.88E+07	2.88E+08
<b>U1 Shield Building 1-RE-90-400</b>	EFF1	μCi/s	1.98E+05	1.98E+07	2.88E+07	2.88E+08
<b>U2 Shield Building 2-RE-90-400</b>	EFF1	μCi/s	1.98E+05	1.98E+07	2.88E+07	2.88E+08
<b>Auxiliary Building 0-RE-90-101B</b>	4RM1	cpm	4.77E+04	4.77E+06	6.93E+06	****(1)
<b>Service Building 0-RE-90-132B</b>	4RM1	cpm	1.09E+06	****(1)	****(1)	****(1)
<b>U1 Condenser Vacuum Exhaust 1-RE-90-404 A&amp;B</b>	3PAM	μCi/cc <sup>(3)</sup>	9.32E+00	9.32E+02	1.36E+03	1.36E+04
<b>S/G Discharge Monitors 1-RE-90-421 thru 424</b>	4RM2	mR/hr <sup>(4)</sup>	NA	5.72E+02	8.31E+02	8.31E+03
<b>Total Site (LIQUID)</b>	N/A	μCi/ml <sup>(2)</sup>	1.01E-02	1.01E+00	N/A	N/A
<b>0-RE-90-122</b>	4RM2	cpm	9.92E+05	****(1)	N/A	N/A
<b>1-RE-90-120, 121</b>	4RM2	cpm	5.68E+05	****(1)	N/A	N/A
<b>0-RE-90-225</b>	4RM2	cpm	9.92E+05	****(1)	N/A	N/A
<b>0-RE-90-212</b>	4RM2	cpm	1.18E+04	1.18E+06	N/A	N/A
<b>Release Duration</b>		<b>Minutes</b>	<b>60</b>	<b>15</b>	<b>15</b>	<b>15</b>
<b>ASSESSMENT METHOD: ICS or radiation monitor (RM) readings in the MCR or local indication as necessary</b>						

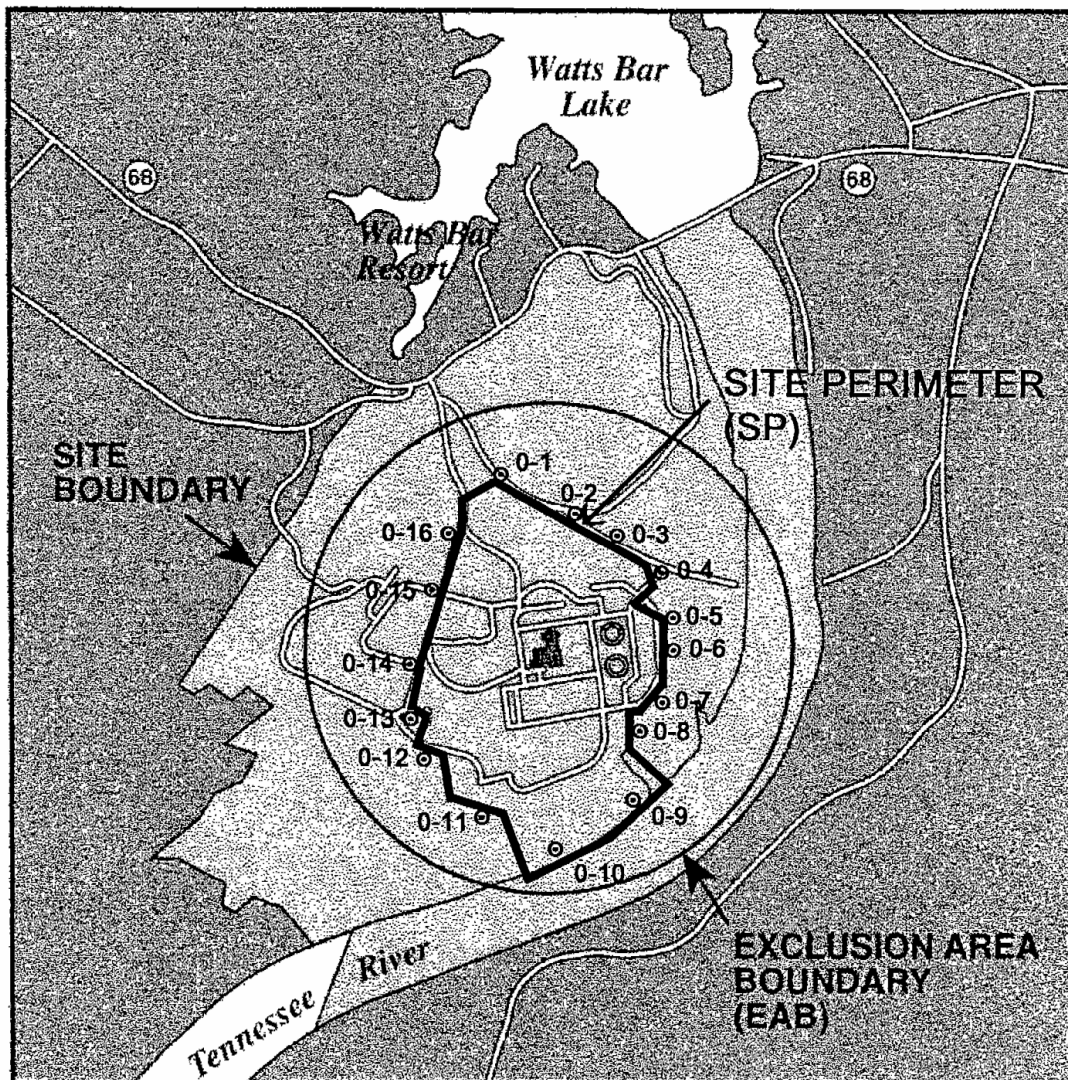
- (1) Table values are calculated values. The \*\*\*\* indicates the monitor is off scale, and other confirmatory data is required for event classification. The maximum output which can be read is 1E+07 cpm.
- (2) These EALs are based on the assumption that an emergency release is restricted to one pathway from the plant. In all cases, the total site EAL is the limiting value. Therefore, in the case where there are multiple release paths from the plant, it is the total release EAL (obtained from ICS or other analysis) that will determine whether an emergency classification is warranted.
- (3) This Eberline channel (1-RM-90-450) reads out in cpm in the **MCR**. Indications of a radioactivity release via this pathway would be S/G blowdown monitors or other indications of primary-to-secondary leakage such as S/G level increase or pressurizer level decrease. ICS calculates μCi/cc and has a visual indication of an alarm condition when the indications exceed 12.2 μCi/cc. This channel was included in the table to provide a means to further assess a release detected by other indications and to provide a path for possible escalation.
- (4) These unit values are based on flow rates through one [1] PORV of 970,000 lb/hr at 1,185 psig, 600°F. Before using these values, ensure a release to the environment is ongoing (e.g. PORV).

Attachment 7  
(Page 5 of 7)

Figure 7-A  
EXCLUSION AREA, SITE BOUNDARY and SITE PERIMETER

NOTES

- 1) The Site Boundary used here is consistent with the definition in the Offsite Dose Calculation Manual. Do not confuse this boundary with the SITE PERIMETER defined in these EALs, or with other definitions of "Site Boundary."
- 2) Numbered points are [SP] radiological survey point for all sectors.





**Attachment 7  
(Page 7 of 7)**

**Table 7-2  
ALERT - RADIATION LEVELS**

Monitor No.	Location Building and Elevation		Monitor Reading *
<b>1&amp;2 RE-90-1</b>	Auxiliary	El. 757.0 (spent fuel pool)	2.5 x 10 <sup>3</sup> mR/hr
<b>1-RE-90-2</b>	Auxiliary	El. 757.0 (personnel air lock)	2.5 x 10 <sup>0</sup> R/hr
<b>0-RE-90-3</b>	Auxiliary	El. 729.0 (waste pac. area)	2.5 x 10 <sup>3</sup> mR/hr
<b>0-RE-90-4</b>	Auxiliary	El. 713.0 (decon room)	1.5 x 10 <sup>3</sup> mR/hr
<b>0-RE-90-5</b>	Auxiliary	El. 737.0 (spt. fuel pool pmp. ar.)	1.5 x 10 <sup>3</sup> mR/hr
<b>1&amp;2-RE-90-6</b>	Auxiliary	El. 737.0 (comp. cl. wtr. ht. ex. ar.)	1.5 x 10 <sup>3</sup> mR/hr
<b>1&amp;2-RE-90-7</b>	Auxiliary	El. 713.0 (sample room)	2 x 10 <sup>3</sup> mR/hr
<b>1&amp;2-RE-90-8</b>	Auxiliary	El. 713.0 (aux. feed pump area)	1.5 x 10 <sup>3</sup> mR/hr
<b>0-RE-90-9</b>	Auxiliary	El. 692.0 (wst. cond. evap. tk. ar.)	1.5 x 10 <sup>3</sup> mR/hr
<b>1&amp;2-RE-90-10</b>	Auxiliary	El. 692.0 (cvcs area)	1.5 x 10 <sup>3</sup> mR/hr
<b>0-RE-90-11</b>	Auxiliary	El. 676.0 (ctmt. spry. & rhr pmp ar.)	1.5 x 10 <sup>3</sup> mR/hr
<b>1-RE-90-61</b>	Auxiliary	El. 736.0 (RB low. cmpt. inst. rm.)	2.5 x 10 <sup>3</sup> mR/hr
<b>0-RE-90-230</b>	Turbine	El. 685.0 (conden. demin.)	1.5 x 10 <sup>3</sup> mR/hr
<b>0-RE-90-231</b>	Turbine	El. 685.0 (conden. demin.)	1.5 x 10 <sup>3</sup> mR/hr

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\* These monitors read out in mR/hr. It is assumed that this is equivalent to mrem/hr.

<b>WBN Unit 0</b>	<b>Emergency Plan Classification Logic</b>	<b>EPIP-1 Rev. 0037 Page 53 of 53</b>
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**Source Notes  
(Page 1 of 1)**

<b>Requirements Statement</b>	<b>Source Document</b>	<b>Implementing Statement</b>
<p>Monitor readings and challenges to barriers are provided in EPIP-1, Section 1 in (1.1 Fuel Clad 1.1.5 and 1.3 CNTMT Barrier 1.3.5), Section 7 (7.1 Gaseous Effluents, 7.2 Liquid Effluents, Table 7-1, 7.3 Radiation Levels, 7.4 Fuel Handling and Table 7-2). Barriers are covered in Section 1, Fission Product Barrier Matrix. Monitor readings are also provided in EPIP-5, App. B, and Note 3.</p>	<p>NIR-0551, DV-847100 F00012, and MC-850321 809004, MSC-00956, NCO 920030366.</p>	<p align="center">1</p>
<p>SED duties that cannot be delegated. Section 2.0 Responsibility.</p>	<p>MC-84 0827 005 035A, MCS-2400</p>	<p align="center">2</p>
<p>Rad Monitors used in conjunction with a plant parameter to determine emergency classifications. Monitor readings are included with plant parameters for the purposes of emergency classifications. Section 1, Fission Product Barrier Matrix (1.1 Fuel Clad, 1.2 RCS, 1.3 Containment), Section 7 (7.1 Gaseous Effluent, 7.2 Liquid Effluent and 7.3 Radiation Levels and 7.4 Fuel Handling).</p>	<p>MC-8407 1900 3003, MSC-00701, NCO-920030222 CNTMT</p>	<p align="center">3</p>
<p>EIPs will contain the following elements.</p>	<p>ANSI Standard N.18.7-1976 Sub-Section 5.3.9.3: 01 POI</p>	<p align="center">4</p>
<p>Chemistry detection of failed fuel.</p>	<p>MSC-02401, NCO-920030998</p>	<p align="center">5</p>
<p>Emergency Preparedness Position (EPPOS) on timeliness of classification of emergency conditions.</p>	<p>EPPOS #2</p>	<p align="center">6</p>