H.B. Robinson

ILC-13 NRC Licensing Exam
Admin JPMs

Final Submittal

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ILC-13 NRC JPM RO A1-1
Rev 0

Determine Power Distribution Flux Limits

Concurred By: ______________________________ **Date:** ________________
Operations

Approved By: ______________________________ **Date:** ________________
Superintendent/Supervisor - Training

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: 01083100401, Determine Operator Actions if the ERFIS Computer Becomes Inoperable IAW OMM-001-11.

Alternate Path:

NO

JPM #:

ILC-13 NRC JPM RO A1-1

Candidate

SRO

K/A	**Rating (RO/SRO):**
G 2.1.7	4.4

Task Standard:

Perform a MANUAL Calculation of Penalty Points IAW FMP-009, Power Distribution Control.

Preferred Evaluation Location:

Simulator ____ Classroom __X__

Preferred Evaluation Method:

Perform __X__ Simulate ____

References:

FMP-009, Power Distribution Control

ITS Books

Validation Time: 15 Minutes **Time Critical:** NO **Time Critical Time:** N/A

Candidate: ____________________
Name

SSN ____ - ____ - ____

	Overall Time		(N/A if not time critical) **Critical Time**
Start:		Start:	
Finish:		Finish:	
Performance Time (min):			

Performance Rating: SAT UNSAT
circle one

Examiner: ____________ ____________ ________
Print Name Signature Date

COMMENTS:

QUESTION DOCUMENTATION:

Question:

Response:

Tools/Equipment/Procedures Needed:

Calculator

FMP-009, Power Distribution Control

FMP-009, Attachment 10.5 filled out.

ITS Books

READ TO OPERATOR

DIRECTIONS TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. 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 Operator Cue Sheet I provided you along with completed JPM material.

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. The plant is at 70% RTP with power ascension halted due to the Xenon transient in progress.
2. PDC-3 program is inoperable.
3. FMP-009 Attachment 10.5 has been provided.
4. 100% Target Value is + 2%
5. Target Band = +/- 5%

INITIATING CUES:

1. **Perform a MANUAL Calculation of Penalty Points IAW FMP-009, Power Distribution Control.**

START TIME: __________

STEP 1: Candidate will calculate the corrected target value for the reduced power levels provided in Attachment 10.5

Critical Step

STANDARD: Candidate calculates the target value as a percentage of power level as follows: (Target Value = +2% at 100% RTP
25% = 2 x 0.25 = 0.5%
35% = 2 x 0.35 = 0.7%
45% = 2 x 0.45 = 0.9%
50% = 2 x 0.5 = 1.0%
60% = 2 x 0.6 = 1.2%
70% = 2 x 0.7 = 1.4%

___ SAT

___ UNSAT

EXAMINER'S NOTE: The candidate will take the above calculated target values and establish a target band by adding +/- 5%.

EQUATIONS AND ERFIS POINTS USED TO CALCULATE TARGET VALUES

Target Value (P) = Target Value$_{ref}$ * P/P$_{ref}$

where: Target Value (P) = Target Value at power P;
Target Value$_{ref}$ = Target Value during flux map;
P = Current power level; and,
P$_{ref}$ = Power level during flux map.

Parameter	N41	N42	N43	N44
Target Value (P)	N/A	N/A	N/A	N/A
Target Value$_{ref}$	NPK1603	NPK1604	NPK1605	NPK1606
P	NIN0041M	NINOO42M	NIN0043M	NIN0044M
P$_{ref}$	NPK1608	NPK1609	NPK1610	NPK1611

COMMENTS:

STEP 2: Determine the Power Range Channels that are outside of the target band for the data given. (Target bands are +/- 5%)

Critical Step

STANDARD:

25% RTP, All indications are inside of the target band. (-4.5 to +5.5).

35% RTP, NI-41 is outside of the target band. (-4.3 to +5.7)

45% RTP, NI-41 and NI-42 are outside of the target band and penalty point accumulation begins at 0.5 minute penalty for each minute of power operation with AFD outside the target band. (-4.1 to +5.9)

50% RTP, NI-41 and NI-42 are outside of the target band and 15 penalty points have been accumulated. (-4.0 to +6.0)

60% RTP, NI-41 and NI-42 are outside of the target band and penalty point accumulation has increased to 1 minute penalty point for every minute outside the target band. (-3.8 to +6.2)

70% RTP (1430 reading), NI-41 and NI-42 are outside of the target band and penalty point accumulation continues at 1 penalty point for every minute outside the target band. (-3.6 to +6.4)

70% RTP (1500 reading), NI-41 and NI-42 are outside of the target band and penalty point accumulation continues at 1 penalty point for every minute outside the target band. (-3.6 to +6.4)

___ SAT

___ UNSAT

EXAMINER'S NOTE: **NONE**

COMMENTS:

ANSWER KEY

This revision is the latest revision available and has been verified against the Document Management System.

J. L. Smith (Print) ______________ Today

Name — Signature — Date

Date/Time	Power %RTP	N41 AFD	N42 AFD	N43 AFD	N44 AFD	Penalty Points This Interval	Total Penalty Points	Comments	Initials
1200	25	5.4	5.4	5.3	5.3	**0**	**0**	**Target = 0.5 (-4.5 to +5.5)**	
1230	35	5.8	5.6	5.5	5.5	**0**	**0**	**Target = 0.7 (-4.3 to +5.7)**	
1300	45	6.1	6.0	5.7	5.6	**0**	**0**	**Target = 0.9 (-4.1 to +5.9)**	
1330	50	6.3	6.1	5.8	5.7	**15**	**15**	**Target = 1.0 (-4.0 to +6.0)**	
1400	60	6.7	6.5	6.1	6.0	**30**	**45**	**Target = 1.2 (-3.8 to +6.2)**	
1430	70	7.1	6.9	6.3	6.2	**30**	**75**	**Target = 1.4 (-3.6 to +6.4)**	
1500	70	6.6	6.5	5.9	5.8	**30**	**105**	**Target = 1.4 (-3.6 to +6.4)**	

SSO Review: ______________________ Date: ______________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. The plant is at 70% RTP with power ascension halted due to the Xenon transient in progress.
2. PDC-3 program is inoperable.
3. FMP-009 Attachment 10.5 has been provided.
4. 100% Target Value is + 2%
5. Target Band = +/- 5%

INITIATING CUES:

1. **Perform a MANUAL Calculation of Penalty Points IAW FMP-009, Power Distribution Control.**

STEP 3:	Determine the penalty points accumulated during each 30 minute interval and the cumulative total penalty points.	**Critical Step**
STANDARD:		
	At 1200 hours, 0 penalty points for the interval and 0 total penalty points. No NI is currently outside the target band.	___ SAT
	At 1230 hours, 0 penalty points for the interval and 0 total penalty points. NI-41 is the only NI outside of the target band. Requires two NIs outside of target band to collect penalty points.	___ UNSAT
	At 1300 hours, 0 penalty points for the interval and 0 total penalty points. NI-41 and NI-42 are outside of the target band. Penalty point accumulation has begun at 0.5 minute penalty points for every 1 minute of power operation outside of the target band while reactor power is less than 50%.	
	At 1330 hours, 15 penalty points for the interval and 15 total penalty points. NI-41 and NI-42 outside of Target Band. 15 penalty points have been accumulated between 1300 and 1330 due to point accumulation at 0.5 minute penalty points for every 1 minute outside of target band for 30 minutes and reactor power <50%.	
	At 1400 hours, 30 penalty points for the interval and 45 total penalty points. NI-41 and NI-42 outside of Target Band. 30 penalty points have been accumulated between 1330 and 1400 due to point accumulation at 1 minute penalty point for every 1 minute outside of target band for 30 minutes and reactor power ≥ 50%.	
	At 1430 hours, 30 penalty points for the interval and 75 total penalty points. NI-41 and NI-42 outside of Target Band. 30 penalty points have been accumulated between 1400 and 1430 due to point accumulation at 1 minute penalty point for every 1 minute outside of target band for 30 minutes and reactor power ≥ 50%.	
	At 1500 hours, 30 penalty points for the interval and 105 total penalty points. NI-41 and NI-42 outside of Target Band. 30 penalty points have been accumulated between 1430 and 1500 due to point accumulation at 1 minute penalty point for every 1 minute outside of target band for 30 minutes and reactor power ≥ 50%.	
EXAMINER'S NOTE:	NONE	
COMMENTS:		

END OF TASK

Terminating Cue: Penalty points have been manually calculated.

TIME STOP: ________

MANUAL AFD MONITORING LOG

This revision is the latest revision available and has been verified against the Document Management System.

J. L. Smith ____________(Print) ______________________________ Today
Name Signature Date

Date/Time	Power %RTP	N41 AFD	N42 AFD	N43 AFD	N44 AFD	Penalty Points This Interval	Total Penalty Points	Comments	Initials
1200	25	5.4	5.4	5.3	5.3				
1230	35	5.8	5.6	5.5	5.5				
1300	45	6.1	6.0	5.7	5.6				
1330	50	6.3	6.1	5.8	5.7				
1400	60	6.7	6.5	6.1	6.0				
1430	70	7.1	6.9	6.3	6.2				
1500	70	6.6	6.5	5.9	5.8				

SSO Review: ____ Date: ________________

Progress Energy

R
Reference Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 6
PART 5

FMP-009

POWER DISTRIBUTION CONTROL

REVISION 17

SUMMARY OF CHANGES
PRR 207424

REVISION #	REVISION COMMENTS
17	Convert to WORD XP Change CP&L to Progress Energy Format to current procedure format Change NRCS to Document Management System

TABLE OF CONTENTS

1.0 **PURPOSE**

1.1 To provide instructions and guidance to ensure that the core axial power distribution is maintained within the limits established in Technical Specifications (ITS) LCO 3.2.3, SR 3.2.3.1 and SR 3.2.3.2

1.2 To provide instructions for identifying, monitoring and controlling divergent axial oscillations.

1.3 To satisfy Technical Specification (ITS) SR 3.2.3.2

2.0 **REFERENCES**

2.1 Technical Specifications (ITS) 1.1, LCO 3.2.3, SR 3.2.3.1, SR 3.2.3.2, SR 3.2.3.3

2.2 FMP-001, Core Operating Limits Report (COLR)

2.3 XN-76-40(A), Exxon Nuclear Power Distribution Control For Pressurized Water Reactors, September 1976

2.4 XN-NF-77-57 and XN-NF-77-57 Supplement 1 (A), Exxon Nuclear Power Distribution Control for Pressurized Water Reactors Phase II, May 1981

2.5 XN-NF-77-57 Supplement 2(A) and XN-NF-77-57 Supplement 2 Addendum 1 (A), Exxon Nuclear Power Distribution Control for Pressurized Water Reactors Phase II, October 1982

2.6 ANF-88-054(P), PDC-3: Advanced Nuclear Fuels Corporation Power Distribution Control for Pressurized Water Reactors and Application of PDC-3 to H.B. Robinson Unit 2, July 1988

2.7 EST-003, Incore/Excore Detector Calibration

2.8 SCM-003, Plant Computer Systems Database Control Procedure

2.9 UFSAR 1.5.3, 3.1.1.2.2, 3.1.2.7, 4.3.1.6, 4.3.2.2, 4.3.2.6, 4.3.3.3, 4.4.3.1, 7.2.1.1.2, 7.2.1.1.7, 7.7.1.5, 7.7.1.6

2.10 EC 47211 ERFIS Data Concentrator replacement.

2.11 EC 47160 NSS and BOP Analysis to Support Appendix K Uprate

3.0 RESPONSIBILITIES

3.1 Reactor Engineering is responsible for performing flux maps every 31 Effective Full Power Days (EFPDs) to determine the Target Axial Flux Difference (AFD) values, the Target Band values and the Allowable Power Level (APL) value in accordance with Technical Specifications (ITS) SR 3.2.3.3 and LCO 3.2.3. Reactor Engineering is also responsible for ensuring that the Control Room Status Board and the ERFIS CAOC software is updated to reflect the correct Target AFD values, Target Band values and APL value. Reactor Engineering is also responsible for ensuring the ERFIS CAOC software is updated to reflect the correct Incore/Excore calibration constants.

3.2 The Control Operator is responsible for maintaining the AFD within the limits specified in Technical Specifications (ITS) LCO 3.2.3 and SR 3.2.3.1 and the COLR. The Control Operator is also responsible for logging the AFD in accordance with Technical Specification (ITS) SR 3.2.3.2 when the AFD Alarms are inoperable.

3.3 The Superintendent - Shift Operations is responsible for reviewing the Manual AFD Monitoring Log.

4.0 PREREQUISITES

N/A

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Any Technical Specification Required Action regarding reactor power limitations, including the setting of trip setpoints, should be based on a Rated Thermal Power (RTP) of 2339 MW_{th}. A trip setpoint based on a 2300 MW_{th} would satisfy Technical Specification requirements; however, if a trip setpoint is based on an RTP of 2300 MW_{th}, then the actual trip would occurr at a lower indicated power when operating based on a 2339 MW_{th} RTP.

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

N/A

8.0 PROCEDURE

8.1 Definitions

8.1.1 Axial Flux Difference (AFD)

The Axial Flux Difference (AFD) is defined as the difference in normalized flux signals between the top and bottom halves of a two section excore neutron detector (ITS 1.1). This parameter is synonymous with Delta Flux, Indicated Flux Difference, ΔI, $\%\Delta I$, $\%\Delta$ Flux and Δq. AFD can also be related to core Axial Offset (AO) using the following equation:

AFD = AO * Power Level/Rated Thermal Power.

AFD relates the power in the top of the core to the power in the bottom of the core as seen by the excore NIS Power Range detectors. A separate AFD value is calculated for each NIS Power Range channel. The equations and ERFIS Point IDs used in calculating AFD for each of the four Power Range channels are shown in ATTACHMENT 10.1. It should be noted that the ERFIS AFD is calculated once per minute and is based on 1 minute average values for V(top), V(bottom) and P.

8.1.2 Target Value (TV)

The Target Value, also known as the Target Flux Difference, is the value of AFD determined in conjunction with the measurement of $F_Q^V(Z)$ under equilibrium conditions within 31 EFPD after each refueling and every 31 EFPD thereafter (ITS SR 3.2.3.3). During startup and power ascension following each refueling, the Target Value may be based on design predictions until equilibrium conditions for long term operation are reached. Like AFD, the Target Value is power dependent (examples of the variation of Target Value with power are provided in ATTACHMENT 10.2). A separate Target Value is calculated for each NIS Power Range channel. The Target Value for a Power Range channel is generally the average ERFIS AFD value recorded for that channel during the course of the flux map. The equations and ERFIS Point IDs used in calculating the power dependent Target Value for each of the four Power Range channels are shown in ATTACHMENT 10.1.

8.1.3 Allowable Power Level (APL)

The Allowable Power Level is the limit placed on reactor power due to the $F_Q^V(Z)$ peaking factor. The APL is used in applying the AFD target flux and operational limit curves (ITS LCO 3.2.3). The equation for determining the APL is provided in Technical Specification (ITS) LCO 3.2.3. The effect of APL on the Target Bands and Operating Bands can be seen in ATTACHMENT 10.2

8.1.4 Target Bands (TB)

The Target Bands establish a region of operation around the Target Value in which the AFD may vary without adversely affecting the axial power distribution or the axial xenon distribution. The allowable values of the Target Band are provided in the COLR for each cycle. The allowable Target Band values are currently $\pm 3\%$ and $\pm 5\%$. If the APL is less than 90% RTP, then the values of the Target Bands are reduced to account for the effects of the reduced APL; however, they are still referred to as the $\pm 3\%$ and $\pm 5\%$ Target Bands in order to maintain a consistent nomenclature under all operating conditions. Since the Target Band moves with the Target Value, separate Upper and Lower Target Bands are calculated for each NIS Power Range channel (examples of the variation of the Target Bands with power and with APL are provided in ATTACHMENT 10.2). The equations and ERFIS Point IDs used in calculating the Target Bands for each of the four Power Range channels are shown in ATTACHMENT 10.1.

8.1.5 Operating Bands (OB)

The Operating Bands establish a region of acceptable operation outside of the Target Bands in which the AFD may vary for a short time period without adversely affecting the axial power distribution or the axial xenon distribution. The Operating Bands are only applicable to operation at power levels between 50% RTP and 90% RTP (or 90% APL if the APL is less than 100% RTP). The allowable values of the Operating Bands are provided in the COLR for each cycle. The Operating Bands use the same nomenclature as the Target Bands (i.e. ±3% and ±5% Operating Bands). The ±3% Operating Bands are used with the ±3% Target Bands and the ±5% Operating Bands are used with the ±5% Target Bands. If the APL is less than 90% RTP, then the values of the Operating Bands are reduced to account for the effects of the reduced APL; however, they are still referred to as the ±3% and ±5% Operating Bands in order to maintain a consistent nomenclature under all operating conditions. If 0.9*APL is less than 90% RTP, then the top of the Operating Bands is limited to 0.9*APL. The Operating Bands, like Target Bands, move with the Target Value (examples of the variation of the Operating Bands with power and APL are provided in ATTACHMENT 10.2). Separate Upper and Lower Operating Bands are calculated for each NIS Power Range channel. The equations and ERFIS Point IDs used in calculating the Operating Bands for each of the four Power Range channels are shown in ATTACHMENT 10.1.

8.1.6 Penalty Points

Penalty Points are used to track the amount of time that operation outside of the Target Bands has occurred. Penalty point accumulation only occurs when two or more operable Power Range channels indicate that AFD is outside of the Target Bands. Penalty points are related to time of operation outside of the Target Bands through the following relations:

≥50% RTP: 1 Penalty Point= 1 minute outside the Target Bands

<50% RTP: 1 Penalty Point= 2 minutes outside the Target Bands

Penalty points are eliminated by operation within the Target Bands at the same rates at which they were accumulated. The ERFIS Point ID used to track penalty point accumulation is shown in ATTACHMENT 10.1.

8.1.7 Target Warning Bands (TWB)
The Target Warning Bands are provided to alert the Operator that the AFD for one or more NIS Power Range channels is approaching the Target Bands (examples of the Target Warning Bands are provided in ATTACHMENT 10.2). Separate upper and lower Target Warning Bands are calculated for each NIS Power Range channel. The equations and ERFIS Point IDs used in calculating the Target Warning Bands for each of the four Power Range channels are shown in ATTACHMENT 10.1.

8.1.8 Operating Warning Band (OWB)
The Operating Warning Bands are provided to alert the Operator that the AFD for one or more NIS Power Range channels is approaching the Operating Bands (examples of the Operating Warning Bands are provided in ATTACHMENT 10.2). Separate upper and lower Operating Warning Bands are calculated for each NIS Power Range channel. The equations and ERFIS Point IDs used in calculating the Operating Warning Bands for each of the four Power Range channels are shown in ATTACHMENT 10.1.

8.2 Power Distribution Control Methodology

8.2.1 The Power Distribution Control (PDC) methodology for controlling the core axial power distribution tries to avoid the "building-in" of adverse axial power distributions during plant operations by maintaining a relatively constant power shape based on the equilibrium conditions encountered throughout a given core cycle. Maintaining a relatively constant axial power shape ensures that the $F_Q^V(Z)$ peaking factor limit will not be exceeded. Since the "building-in" of adverse power shapes is a function of power level, the restrictions on deviation from the Target Value also vary with power level.

8.2.2 The Operator can use the RTGB AFD meters or the ERFIS AFD point IDs to monitor the status of AFD. Spurious alarms and any other applicable comments relating to AFD monitoring should be entered in the Control Operator's narrative log, when necessary.

8.2.3 The AFD is considered to be outside of the Target Bands or Operating Bands when the AFD for two operable Power Range channels exceed their Target Bands or Operating Bands.

8.2.4 At power levels $\geq$90% RTP (or 0.9*APL, whichever is less), the AFD must be maintained within the Target Bands. If the AFD is outside of the Target Bands then the AFD must be returned to within the Target Bands within 15 minutes or power must be reduced below 90% RTP (or 0.9*APL, whichever is less) within 30 minutes (Technical Specification (ITS) LCO 3.2.3 Conditions A and B). Penalty Points are accumulated while the AFD is outside the Target Bands.

8.2.5 At power levels <90% RTP (or 0.9*APL, whichever is less) but $\geq$50% RTP, the AFD may deviate from the Target Bands as long as the total number of Penalty Points incurred over the previous 24 hours does not exceed 60 Penalty Points. The AFD must be maintained within the Operating Bands. If the number of accumulated Penalty Points exceeds 60 or if the AFD is outside of the Operating Bands then power must be reduced below 50% RTP within 30 minutes (Technical Specification (ITS) LCO 3.2.3 Condition C). If power is not reduced below 50% RTP within 30 minutes then power must be reduced below 15% RTP within 9 hours (ITS LCO 3.2.3 Condition D)

8.2.6 At power levels <50% RTP, the AFD may deviate from the Target Bands since adverse power shapes at lower power levels are sufficiently accounted for by the F(ΔI) input to the Overtemperature ΔT (OTΔT) and Overpower ΔT (OPΔT) Reactor Protection setpoints. A power increase to $\geq$50% RTP is permitted only if the accumulation of Penalty Points within the previous 24 hour period does not exceed 60 points.

8.2.7 At power levels <15% RTP, AFD monitoring is not required by the Technical Specifications (ITS LCO 3.2.3). The ERFIS CAOC program does not perform any AFD calculations below 15% power in order to prevent extraneous alarms during periods when the instrumentation noise levels are significant and power operations is minimal.

8.2.8 Certain evolutions such as Incore/Excore calibrations require the AFD to be outside of the Target Bands. Deviation from the Target Bands for a limited amount of time is permitted by the Technical Specifications provided the AFD is maintained within the Operating Bands (Technical Specifications (ITS) LCO 3.2.3).

8.3 ERFIS Monitoring of AFD

8.3.1 Normal Operation
During normal operation above 15% power, the ERFIS CAOC software program calculates the following values for each of the four NIS Power Range channels once per minute:

1. AFD;
2. Target Value for the current power level;
3. Upper and Lower Target Bands for the current power level;
4. Upper and Lower Operating Bands for the current power level;
5. Upper and Lower Target Warning Bands for the current power level; and,
6. Upper and Lower Operating Warning Bands for the current power level.

The CAOC software program compares the calculated AFD for each Power Range channel to that channel's Target Warning Bands, Target Bands, Operating Warning Bands and Operating Bands. If a Power Range channel crosses one or more of the bands, the ERFIS CAOC program informs the Operator of the condition by providing a message on the ERFIS alarm screen and a report on the Control Room printer and if necessary by actuating the appropriate annunciators on the RTGB (APP-005-D6, Δ FLUX WARNING/STATUS and APP-005-E4, Δ FLUX ALARM). The ERFIS CAOC reports that are printed on the Control Room printer are retained as part of the operating logs.

8.3.1 (Continued)

The ERFIS CAOC software program automatically accumulates Penalty Points at the appropriate rate based on power level if two or more operable Power Range channels are outside of their Target Bands. The program also automatically subtracts penalty points at the appropriate rate if the AFD is within the Target Band and the required time since the points were accumulated (24 hours) has elapsed.

8.3.2 ERFIS CAOC Alarms
If the calculated AFD for any channel is outside of any of the bands for that channel then an alarm is generated via annunciators APP-005-D6 and/or APP-005-E4. The specific cause of the alarm (i.e. the identification of the channel and the band that has been exceeded) is displayed on the ERFIS alarm screen and a report is printed on the Control Room printer. Examples of the types of warning/status/alarms messages are shown in ATTACHMENT 10.3.

8.3.3 ERFIS CAOC Shift Summary Report
A Shift Summary Report is printed on the Control Room printer at 0730, 1530, and 2330 hours. The Shift Summary Report is intended to provide information on the change in AFD with time to allow the Operator or Reactor Engineer to easily detect axial oscillations or instrument calibration problems.

The Shift Summary Report lists the AFD for each of the four channels at the time of the report as well as the Minimum AFD and Maximum AFD each of the channels reached during the eight hour period preceding the report. The report also lists the values for the Target Bands, Target Warning Bands, Operating Bands and Operating Warning Bands for each channel at the time of the report. The report has blanks for the Operator to record the AFD indication from the RTGB meters in order to verify that the RTGB indicated AFD is within 2% of the ERFIS calculated AFD. A deviation between the RTGB indicated AFD and the ERFIS calculated AFD of greater that 2% is not expected and would warrant further investigation to determine if an ERFIS or NIS problem exists. The Shift Summary Report is retained as part of the normal operating logs.

8.3.4 Removing a Channel From Service in CAOC

A NIS Power Range channel may be removed from service in the ERFIS CAOC program by removing that channel's instantaneous % power point from scan. This will generate an APP-005-D6, Δ FLUX WARNING, alarm with the following description displayed on the CAOC alarm report:

CHANNEL #__ NOW OUT OF SERVICE.

A Power Range channel may be returned to service in the ERFIS CAOC program by restoring that channel's instantaneous % power point to scan. This will generate an APP-005-D6, FLUX STATUS, alarm with the following description displayed on the CAOC alarm report:

CHANNEL #__ JUST RETURNED TO SERVICE.

The ERFIS point IDs used in removing channels from service and restoring channels to service are as follows:

NIS CHANNEL	CAOC CHANNEL	ERFIS POINT ID
N41	#1	NIN0041A
N42	#2	NIN0042A
N43	#3	NIN0043A
N44	#4	NIN0044A

8.3.5 Demand AFD Report Disabling Alarms and Penalty Logging

During certain activities such as Incore/Excore calibrations or other maintenance or calibration activities involving the Power Range channels, it may be necessary to demand an AFD printout, disable the alarm function and/or Penalty Point logging function of the ERFIS CAOC computer program to provide immediate information or to prevent extraneous alarms and/or inadvertent accumulation of Penalty Points.

To initiate any of these ERFIS functions select TOC AFD4. The current state of these functions is reflected in the "Current State" column in the lower part of the display. Select the button appropriate for the desired function to toggle the desired state in the "New State" column. The "New State" indication will update in the lower part of the screen to reflect the selected condition. Toggle the buttons as appropriate to enable or disable logging and alarming or to demand an AFD printout. Once the desired states have been input, select the "Update". Button to execute the new states. The AFD demand print will only print once and the CAOC program will set the "Current State" to Off automatically. The Alarm and logging states will remain until new states are input and Update Button is selected. Disabling of the Alarm or Penalty Point Logging functions is treated as removing the AFD monitoring program from service and manual monitoring of AFD is required in accordance with Technical Specification (ITS) SR 3.2.3.2. An alternative to disabling the Alarm and Penalty Point Logging functions during Incore/Excore calibrations and other maintenance activities is to allow the Penalty Points to be accumulated and remove any invalid points after completion of the calibration as described in 8.3.7.

8.3.6 ERFIS Out Of Service

If the ERFIS computer, the CAOC software program or the RTGB annunciators which provide AFD monitoring (APP-005-D6 or APP-005-E4) are inoperable then manual monitoring of AFD is required in accordance with Technical Specification (ITS) SR 3.2.3.2. Manual monitoring is described in Section 8.4.

8.3.7 ERFIS Computer Restart

Whenever the ERFIS computer is restarted, the Operator should verify that the Penalty Point "file" is accurate and should manually update the file if necessary. Several options are available to perform this verification/updating.

1. If no Penalty Points had been accumulated prior to ERFIS being out of service and no Penalty Points were accumulated while ERFIS was out of service, then check that ERFIS Point ID NPU0941 reflects 0 Penalty Points or, if desired, perform the following to view the contents of the Penalty Time Buffer:

   a. Type in the turn on code "CAOCEDIT" or select the TOC from the ERFIS NSSS menu.

   b. Enter the desired beginning time to start browsing at the selected time in the Penalty Point Buffer.;

   c. Use the "-Time", "+Time", "-1 hour", "+1 hour" buttons to sequence forward and backward through the Penalty Point Buffer;

   d. Select "Exit" when finished.

2. If invalid Penalty Point data is present in the Penalty Point buffer and no valid Penalty Points have been accumulated in the previous 24 hours then the entire 24 hour Penalty Point buffer may be initialized to "No Penalty" by performing the following:

   a. Type in the turn on code "AFD1";or select the TOC from the ERFIS NSSS menu.

   b. Click on the initialization box and then select the "initialize" button to begin clearing the penalty point buffer.

   c. When the confirmation message is displayed select "yes" to continue or "no". If "yes" is selected, a confirmation message that the penalty point buffer has been cleared will be displayed and the program will automatically exit. If "no" then select "Exit" to close the window.

8.3.7 (Continued)

3. If valid Penalty Points had been accumulated prior to ERFIS being out of service but no Penalty Points were accumulated while ERFIS was out of service and ERFIS was out of service for less than 24 hours then perform the following to retain the earlier valid Penalty Point data and insert "No Penalty" into the buffer for the period of time that ERFIS was out of service:

   a. Type in the turn on code "AFD2";or select the TOC from the ERFIS NSSS menu

   b. Enter the time that ERFIS went out of service as the "Restart Begin Time"

   c. Enter "0" in the "Restart penalty rate" and then select the "Restart" button.

   d. When the confirmation message is displayed select "yes" to continue or "no". If "yes" is selected, a confirmation message that the Penalty point Buffer" has been restarted will be displayed and the program will automatically exit. If "no" then select "Exit" to close the window.

4. If valid Penalty Points were accumulated while ERFIS was out of service then perform the following to manually update any or all of the 24 hour Penalty Time buffer:

   a. Type in the turn on code "CAOCEDIT";or select the TOC from the ERFIS NSSS menu.

   b. Using data from ATTACHMENT 10.5, enter the time at which the penalty update block is to begin;

   c. Using data from ATTACHMENT 10.5, enter the time the penalty update block is to end;

8.3.7.4 (Continued)

d. Using data from ATTACHMENT 10.5, enter the appropriate penalty rate for the update block from the following choices:

PENALTY VALUE	PENALTY RATE	POWER
0	No Penalty	Any
1	½ Penalty Point per minute	<50%
2	1 Penalty Point per minute	>50%

e. If desired, the penalty buffer can be updated on a minute by minute basis with the "CAOCEDIT" TOC, ELSE go to step f.

1) Type in the turn on code "CAOCEDIT" or select the TOC from the ERFIS NSSS menu.

2) Enter the desired beginning time to start browsing at the selected time in the penalty point buffer;

3) Use the "-Time", "+Time", "- hour" "+ hour" buttons to sequence forward and backward through the penalty point buffer.

4) Enter the desired penalty rate for the desired hour/minute as needed using data from Attachment 10.5 and the above penalty point value table used in step d.

f. When finished with a block or individual hour/minute update, validate the updated penalty time entries by browsing through the buffer as describbed in step g above. If the penalty point data is correct, then select the "Update Buffer" button to incorporate the update.

g. Select the "Exit" button to close the window

8.3.8 ERFIS CAOC Program Constants
Except for the ERFIS Point IDs described above which are provided for the Operator's use, all changes to CAOC program constants should be performed in accordance with SCM-003.

8.4 Manual Monitoring of AFD

8.4.1 If the ERFIS computer, the CAOC software program or the RTGB annunciators which provide AFD monitoring (APP-005-D6 or APP-005-E4) are inoperable then manual monitoring of AFD is required in accordance with Technical Specification (ITS) SR 3.2.3.2.

8.4.2 If the Thermal Power is ≥90% RTP or 0.9*APL, whichever is less, then the AFD indicated on the RTGB meters must be verified to be within limits and must be logged on ATTACHMENT 10.5 within 15 minutes of the alarms becoming inoperable and every 15 minutes thereafter.

8.4.3 If the Thermal Power is <90% RTP or 0.9*APL, whichever is less, then the AFD indicated on the RTGB meters must be verified to be within limits and must be logged on ATTACHMENT 10.5 within 1 hour of the alarms becoming inoperable and every 1 hour thereafter.

8.4.4 If two or more operable excore channels indicate that AFD is outside of the Target Band then the applicable Actions of Technical Specifications (ITS) LCO 3.2.3 must be completed and the resultant Penalty Points must be logged on ATTACHMENT 10.5 in accordance with the following rates:

POWER LEVEL	PENALTY POINT RATE
≥ 50% RTP	1 Point/minute
<50% RTP	1/2 Point/minute

8.4.5 If the total number of Penalty Points exceeds 60 in a 24 hour period, then the applicable Actions of Technical Specifications (ITS) LCO 3.2.3 must be completed.

8.4.6 Penalty point are eliminated 24 hours after accumulation by operation within the Target Bands at the same rate at which they were accumulated. Elimination of penalty points is denoted by a negative (-) value on ATTACHMENT 10.5.

8.5 Divergent Axial Oscillation Control

> **NOTE:** UFSAR Sections 1.5.3, 3.1.2.7 and 7.7.1.6 state that procedures are available for the Operator to control axial oscillations. This section provides those procedures.

8.5.1 Axial oscillations can be induced by changes in power level, control rod movement, or a combination of both. A sudden change in either will cause some change in flux shape with a resulting redistribution of xenon concentrations in the core. This will invariably start a xenon oscillation in the axial direction.

8.5.2 Axial oscillations are easily started by control rod motion. The flux shape is very dependent on control rod position due to the high neutron absorption of the control rods. Improper use of the control rods at any time can create very serious oscillations. On the other hand, control rods are the best method for manually controlling a xenon oscillation; therefore, use extreme care when making extensive control rod movement. The control bank should be moved slowly and action taken prior to reaching any limit. Attempt to maintain the control rods retracted as far as is practical during steady-state and power ramp conditions to minimize the "pinching" effect of the control bank.

8.5.3 Depending on the core conditions and Operator actions, an axial oscillation can be dampened out or amplified until it becomes divergent. The most serious axial oscillation is the divergent oscillation. Its amplitude increases with each cycle if left to oscillate naturally and can be increased in size by control rod motion if not carefully applied.

8.5.4 The most important factor in control of a divergent oscillation is the timing of the oscillation. The core oscillates axially with a period of 26 hours; that is, it takes 26 hours for the same point on the sinusoidal wave to reoccur (see ATTACHMENT 10.4). The wave may be halved and quartered down to 6.5 hour intervals where the oscillation goes from maximum AFD to Target Value, Target Value to minimum AFD, etc. Once the timing of the oscillation has been determined, the following control procedure may be used to stop or reduce the oscillation to a minimum:

NOTE: ATTACHMENT 10.4 provides an illustration of the control procedure.

If the oscillation has just begun, an accurate timing determination may be difficult. If the Target Value is known accurately, the control rods should be inserted 5 hours after crossing the Target Value in the positive direction since the equilibrium AFD to peak AFD time is 6.5 hours.

If sufficient rod worth is present, the procedure may be performed in reverse by withdrawing control rods 1.5 hours before the minimum AFD.

The control rod insertion is best done slightly early rather than late since if the insertion is done late an amplification might result which is undesirable.

If after returning the control rods to the initial position the oscillation continues upward, then the control rods were returned to normal too soon. If a downward swing starts, then the control rods were left in too long.

A way of approximating the proper insertion time is to consider it 11.5 hours after the last minimum AFD.

Do not allow the power level to change during the control rod maneuvers since this may induce additional unwanted oscillations which will eventually have to be dampened.

If the core is divergent, the least disturbance may become significant after 1 or 2 periods of oscillation. Therefore, if the control procedure does not work effectively, additional control measures should be taken as soon as practical.

The procedure for control of divergent oscillations can also be effectively applied to very large convergent oscillations where there is a possibility of exceeding control rod insertion limits if normal methods were used.

8.5.4 (Continued)

1. At 1.5 hours before the most positive peak, determine the AFD from ERFIS or the AFD meters and insert the control rods using dilution until the AFD reaches the Target Value;
2. Determine the change in AFD caused by the control rod insertion (AFD before insertion - Target Value);
3. Maintain a constant control rod position and allow AFD to decrease;
4. When AFD is lower than the Target Value by the amount determined in Step 8.5.4.2, withdraw control rods to their original position using boration.

9.0 RECORDS

ATTACHMENT 10.5 must be sent to the vault as a QA record

10.0 ATTACHMENTS

10.1 ERFIS CAOC Software And AFD Related Parameters

10.2 Target and Operating Band Examples

10.3 ERFIS CAOC Warning/Status/Alarm Messages

10.4 Divergent Axial Oscillation

10.5 Manual AFD Monitoring Log

ERFIS CAOC SOFTWARE AND AFD RELATED PARAMETERS

EQUATIONS AND ERFIS POINTS USED TO CALCULATE AXIAL FLUX DIFFERENCE (AFD)

$$AFD = \frac{V(top) - V(bottom)}{V(top) + V(bottom)} * K * P$$

where:

V(top) = Voltage representing the core power as seen by a NIS Power Range channel top detector;
V(bottom)= Voltage representing the core power as seen by a NIS Power Range channel bottom detector;
K = Incore/Excore calibration constant determined in accordance with EST-003.
P = Power Level (%) at the time of the calculation.

Parameter	N41	N42	N43	N44
AFD	NPU0900	NPU0901	NPU0902	NPU0903
V(top)	NIN0051M	NIN0053M	NIN0055M	NIN0057M
V(bottom)	NIN0052M	NIN0054M	NIN0056M	NIN0058M
K	NPK1612	NPK1613	NPK1614	NPK1615
P	NIN0041M	NIN0042M	NIN0043M	NIN0044M

EQUATIONS AND ERFIS POINTS USED TO CALCULATE TARGET VALUES

$$\text{Target Value (P)} = \text{Target Value}_{ref} * P/P_{ref}$$

where:

Target Value (P) = Target Value at power P;
Target Value_{ref} = Target Value during flux map;
P = Current power level; and,
P_{ref} = Power level during flux map.

Parameter	N41	N42	N43	N44
Target Value (P)	N/A	N/A	N/A	N/A
Target Value_{ref}	NPK1603	NPK1604	NPK1605	NPK1606
P	NIN0041M	NINOO42M	NIN0043M	NIN0044M
P_{ref}	NPK1608	NPK1609	NPK1610	NPK1611

ERFIS CAOC SOFTWARE AND AFD RELATED PARAMETERS

EQUATIONS AND ERFIS POINTS USED TO CALCULATE TARGET BAND VALUES

APL $\geq$ 90% RTP
TB Low Limit = TV - TB Value
TB High Limit = TV + TB Value

APL < 90% RTP
TB Low Limit = TV - [TB Value * (APL/100)]
TB High Limit = TV + [TB Value * (APL/100)]

where: TV(P) =Target Value
TB Value = Selected Target Band value ($\pm$3% or $\pm$5%)
APL = Allowable Power Level

Parameter	N41	N42	N43	N44
Target Band Low Limit	NPU0905	NPU0906	NPU0907	NPU0908
Target Band High Limit	NPU0909	NPU0910	NPU0911	NPU0912
Target Band Value	NPK1620	NPK1620	NPK1620	NPK1620
APL	NPK0320	NPK0320	NPK0320	NPK0320

EQUATIONS AND ERFIS POINTS USED TO CALCULATE TARGET WARNING BAND VALUES

TWB Low Limit = TB Low Limit + TWB Value
TWB High Limit = TB High Limit - TWB Value

where: TWB = Target Warning Band; and,
TB = Target Band.

Parameter	N41	N42	N43	N44
TWB Low Limit	NPU0913	NPU0914	NPU0915	NPU0916
TWB High Limit	NPU0917	NPU0918	NPU0919	NPU0920
TB Low Limit	NPU0905	NPU0906	NPU0907	NPU0908
TB High Limit	NPU0909	NPU0910	NPU0911	NPU0912
TWB Value	NPK1622	NPK1622	NPK1622	NPK1622

ERFIS CAOC SOFTWARE AND AFD RELATED PARAMETERS

EQUATIONS AND ERFIS POINTS USED TO CALCULATE OPERATING BAND VALUES

5% OB, APL≥90% RTP: Upper OB = TV + 0.5 * [110 - (P/PL * 100)]
Lower OB = TV - 0.4 * [110 - (P/PL *100)]

5% OB, APL<90% RTP: Upper OB=TV+ {0.5 * [110 -(P/PL*100)]*(APL/100)}
Lower OB= TV - {0.4 * [110 - (P/PL*100)]*(APL/100)}

3% OB, APL≥90% RTP: Upper OB = TV + 0.5 *[106 - (P/PL * 100)]
Lower OB = TV - 0.4 * [105 - (P/PL *100)]

3% OB, APL<90% RTP: Upper OB=TV + {0.5*[106-(P/PL*100)]*(APL/100)}
Lower OB= TV - {0.4 * [105 -(P/PL*100)]*(APL/100)}

where: OB = Operating Band;
TV =Target Value;
P = Average NIS Power Range power expressed as % RTP;
PL = The lesser of 100% RTP or APL; and,
APL = Allowable Power Level

Parameter	N41	N42	N43	N44
Operating Band Low Limit	NPU0921	NPU0922	NPU0923	NPU0924
Operating Band High Limit	NPU0925	NPU0926	NPU0927	NPU0928
P	NIN0041M	NIN0042M	NIN0043M	NIN0044M
APL	NPK0320	NPK0320	NPK0320	NPK0320

EQUATIONS AND ERFIS POINTS USED TO CALCULATE OPERATING WARNING BAND VALUES

OWB Low Limit = OB Low Limit + OW Envelope Value
OWB High Limit = OB High Limit - OW Envelope Value

where: OWB = Operating Warning Band; and,
OB = Operating Band.

Parameter	N41	N42	N43	N44
OWB Low Limit	NPU0929	NPU0930	NPU0931	NPU0932
OWB High Limit	NPU0933	NPU0934	NPU0935	NPU0936
OB Low Limit	NPU0921	NPU0922	NPU0923	NPU0924
OB High Limit	NPU0925	NPU0926	NPU0927	NPU0928
OW Envelope Value	NPK1616	NPK1616	NPK1616	NPK1616

ERFIS CAOC SOFTWARE AND AFD RELATED PARAMETERS

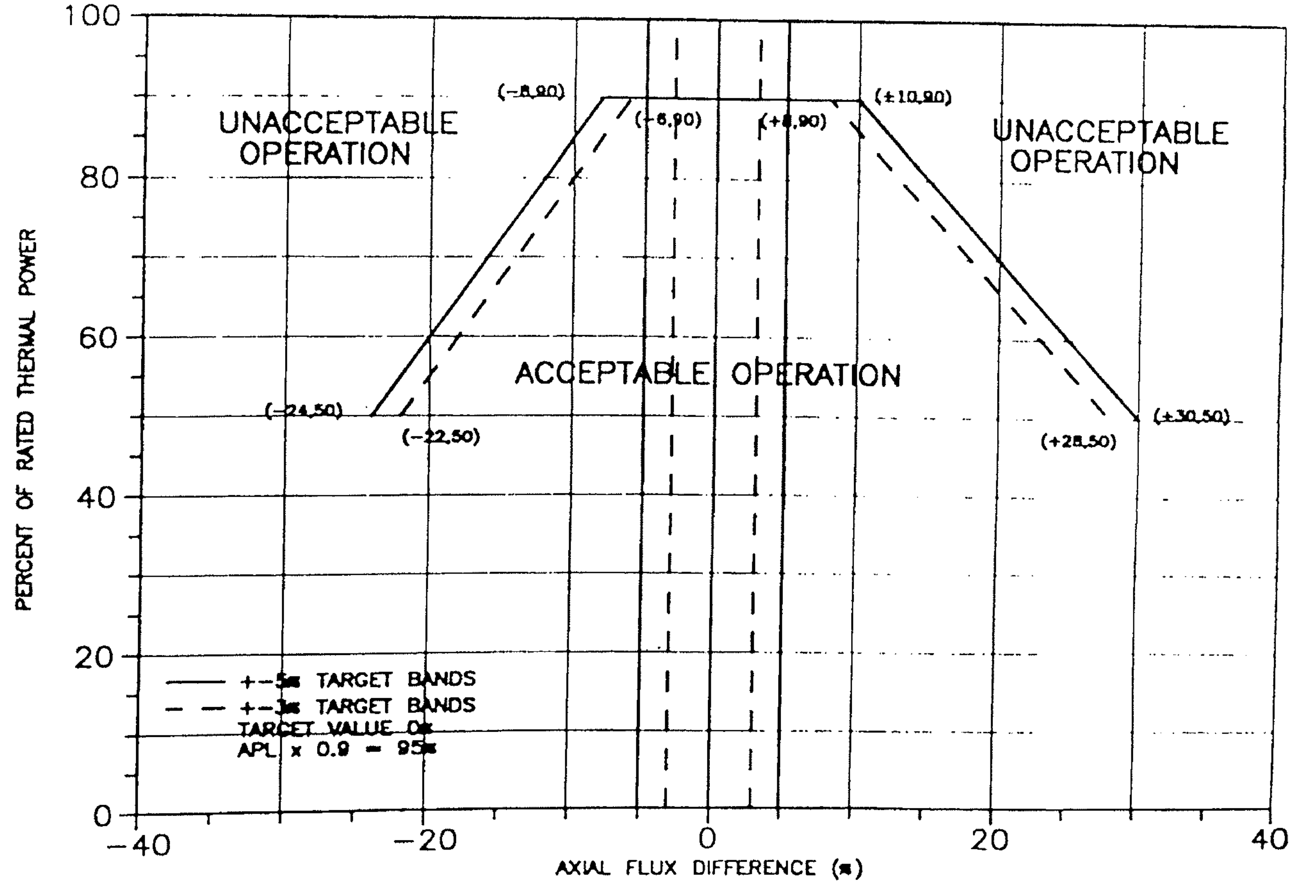
	N41	N42	N43	N44
Minimum AFD over Previous 8 hours	NPU0950	NPU0951	NPU0952	NPU0953
Maximum AFD over Previous 8 hours	NPU0954	NPU0955	NPU0956	NPU0957

Accumlated 24 Hour Penalty Points	NPU0904
Penalty Points at Last Execution of Program	NPU0941
Power Level at Last Execution of Program	NPU0939

ATTACHMENT 10.2
Page 1 of 5

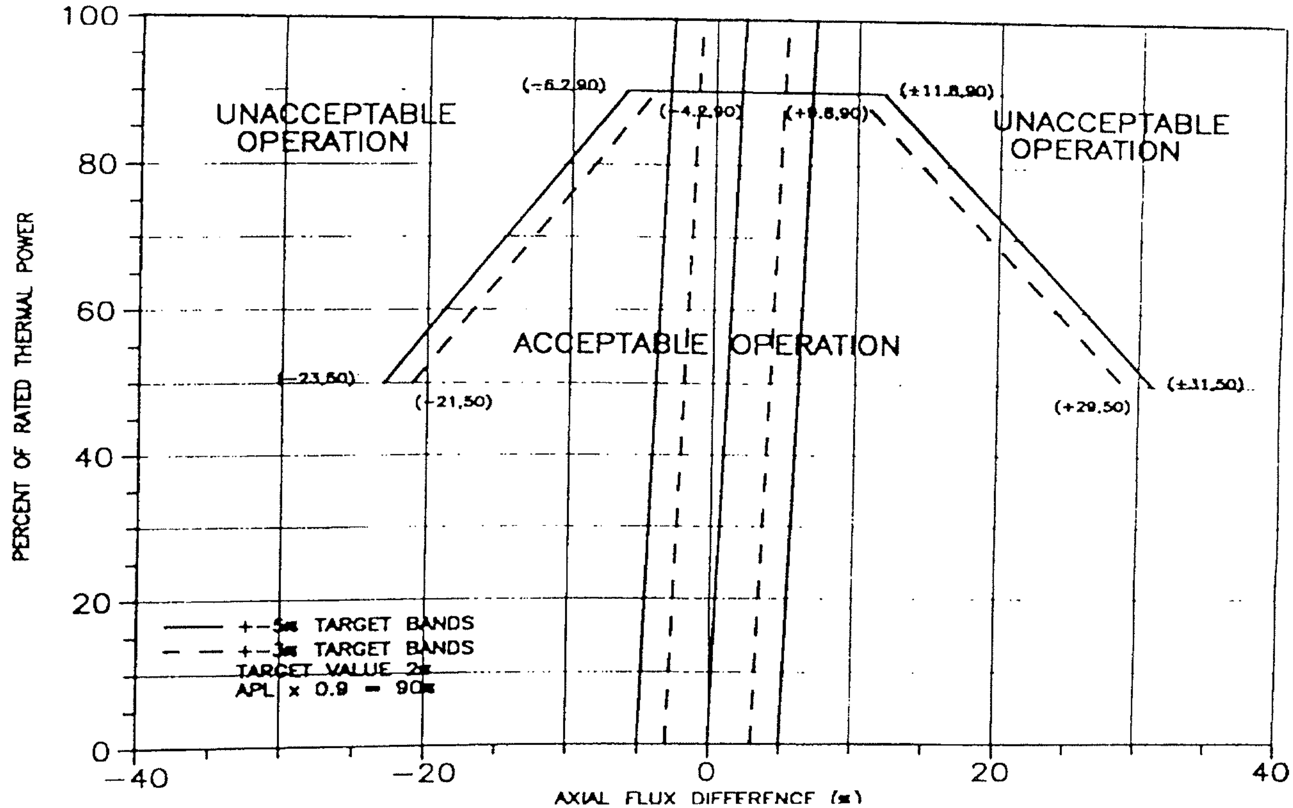
TARGET AND OPERATING BAND EXAMPLES

FIGURE 1



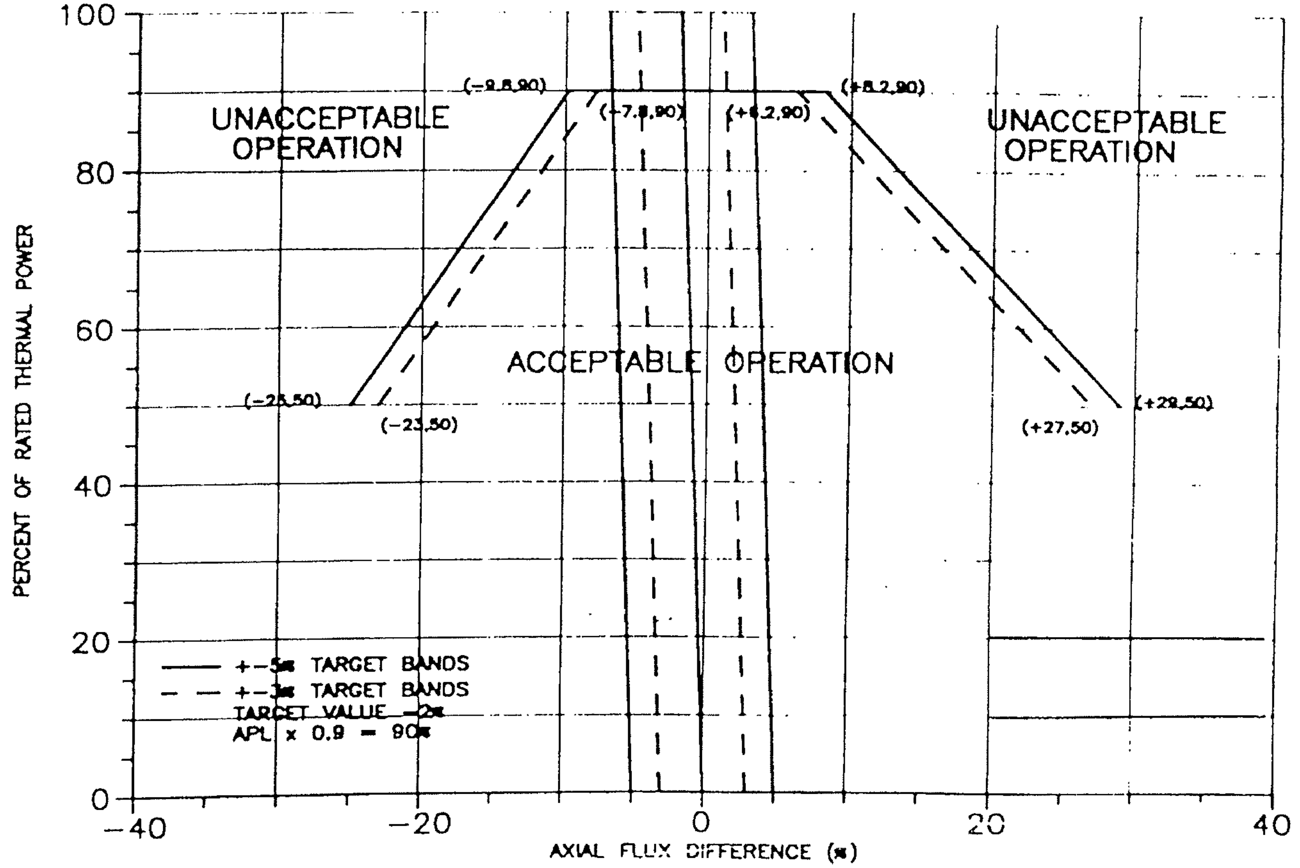
TARGET AND OPERATING BAND EXAMPLES

FIGURE 2



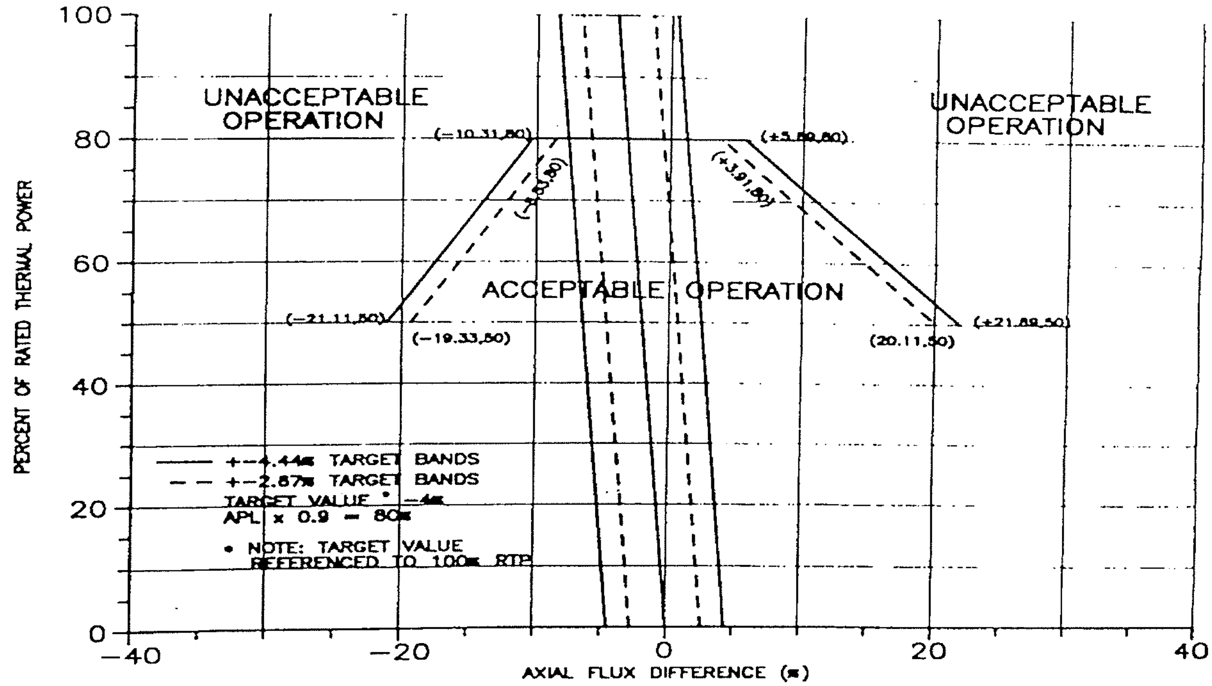
TARGET AND OPERATING BAND EXAMPLES

FIGURE 3



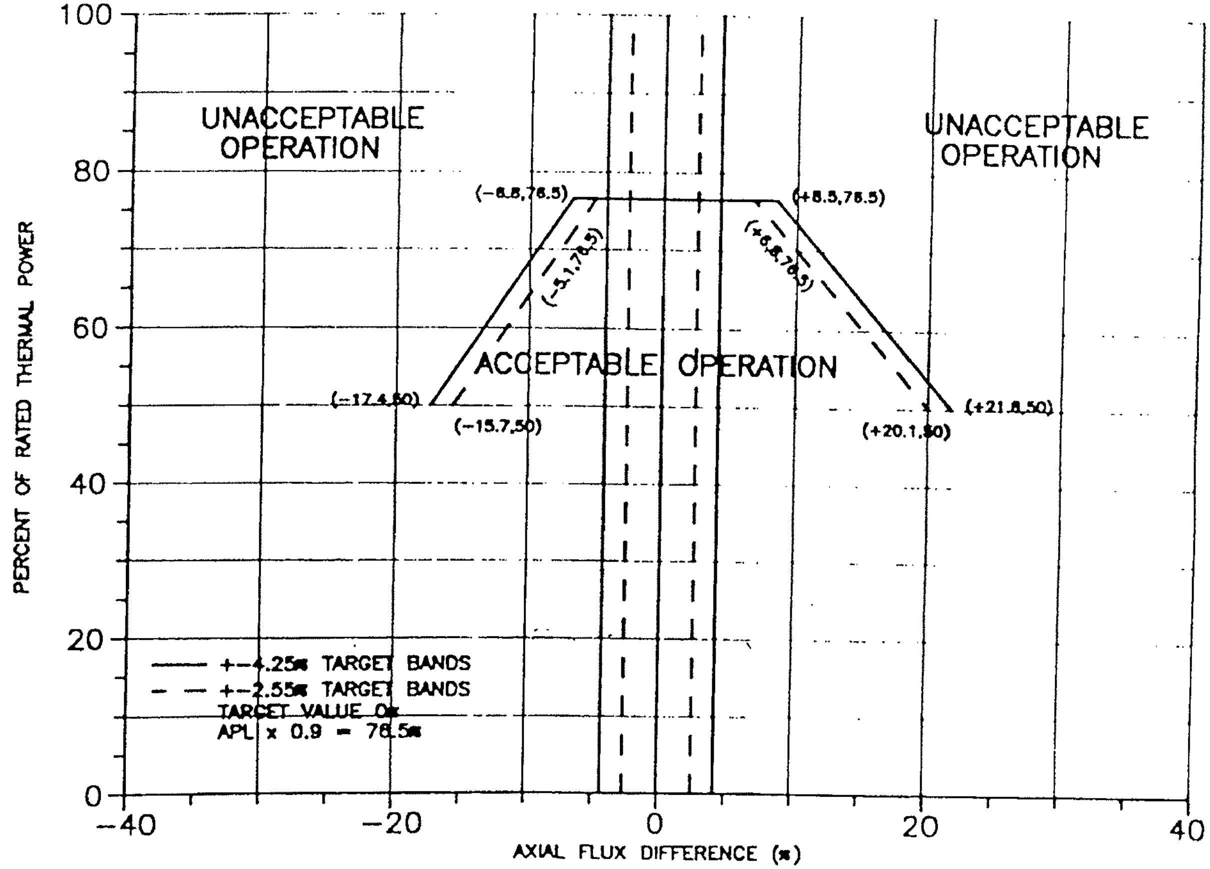
TARGET AND OPERATING BAND EXAMPLES

FIGURE 4



TARGET AND OPERATING BAND EXAMPLES

FIGURE 5



ERFIS CAOC WARNING/STATUS/ALARM MESSAGES

STATUS Messages - Denote a condition or message regarding a condition of interest to the Operator. These may include:

- POWER LEVEL CROSSED 15% - INCREASING - PENALTY ENABLED
- POWER LEVEL CROSSED 15% - DECREASING - PENALTY DISABLED
- POWER LEVEL CROSSED 50% - INCREASING - PENALTY RATE IS FULL
- POWER LEVEL CROSSED 50% - DECREASING - PENALTY RATE IS HALF -OPER BANDS DISABLED
- POWER LEVEL CROSSED 90%APL - INCREASING - OPER BANDS EQUAL TARGET BANDS
- POWER LEVEL CROSSED 90%APL - DECREASING - OPER BANDS RESTORED TO NORMAL
- CHANNEL #____ NOW OUT OF SERVICE
- CHANNEL #____ JUST RETURNED TO SERVICE
- CHANNEL #____ JUST CROSSED THE TARGET WARNING BAND. (decreasing)
- CHANNEL #____ JUST CROSSED THE OPER WARNING BAND. (decreasing)
- PENALTY POINT ACCUMULATION HAS BEGUN.
- PENALTY POINT ACCUMULATION HAS ENDED.

WARNING Messages - Denote a condition or message regarding a condition of impending Technical Specification violation. These may include:

- CHANNEL #____ JUST CROSSED THE TARGET WARNING BAND. (increasing)
- CHANNEL #____ JUST CROSSED THE TARGET BAND. (increasing)
- CHANNEL #__ JUST CROSSED THE OPER WARNING BAND. (increasing)
- CHANNEL #__ JUST CROSSED THE OPERATING BAND. (increasing)
- ALARM WHEN PENALTY LEVEL CROSSES 15 GOING UP.
- ALARM WHEN PENALTY LEVEL CROSSES 30 GOING UP.
- ALARM WHEN PENALTY LEVEL CROSSES 45 GOING UP.
- ALARM WHEN PENALTY LEVEL CROSSES 50 GOING UP.
- ALARM WHEN PENALTY LEVEL CROSSES 55 GOING UP.
- ALARM WHEN PENALTY LEVEL CROSSES 60 EITHER DIRECTION.

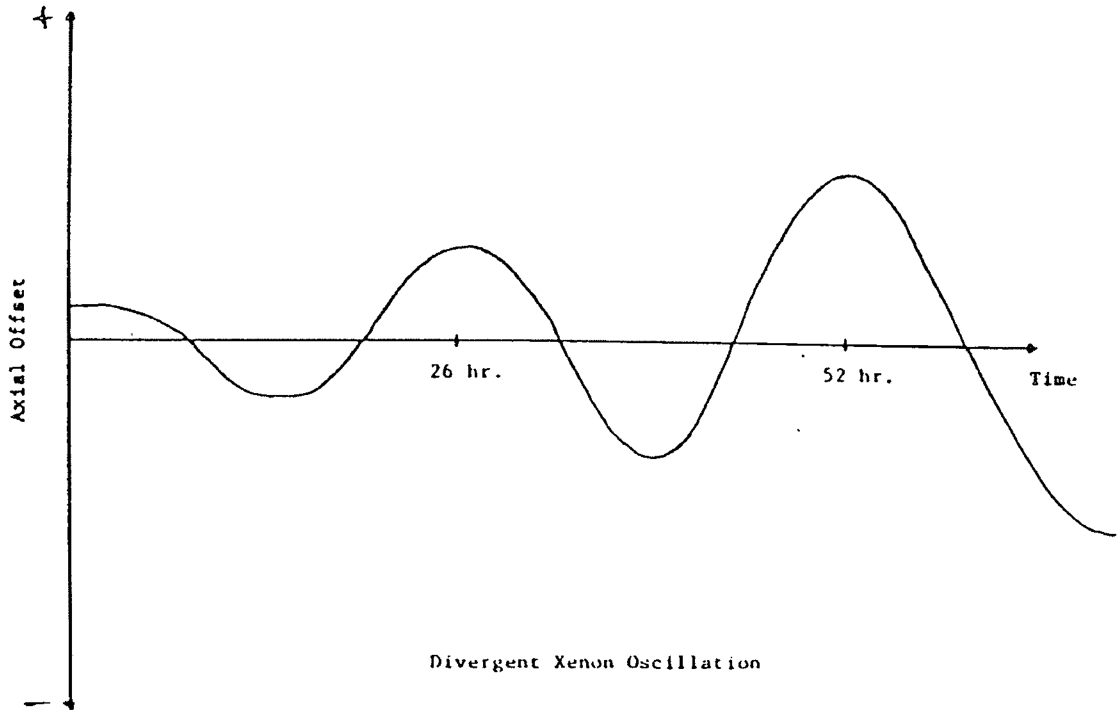
ALARM Messages - Denote a condition which violates PDC limits as set forth in plant Technical Specifications, namely:

- ALARM DUE TO 2 OR MORE CHANNELS OUTSIDE OF THE TARGET BAND WITH POWER ABOVE 90%FP OR 90%APL.
- ALARM DUE TO 2 OR MORE CHANNELS OUTSIDE OF THE OPERATING BAND WITH CORE POWER BETWEEN 50%FP AND 90%FP.
- ALARM DUE TO GREATER THAN 60 PENALTY POINTS AND CORE POWER ABOVE 50%FP.

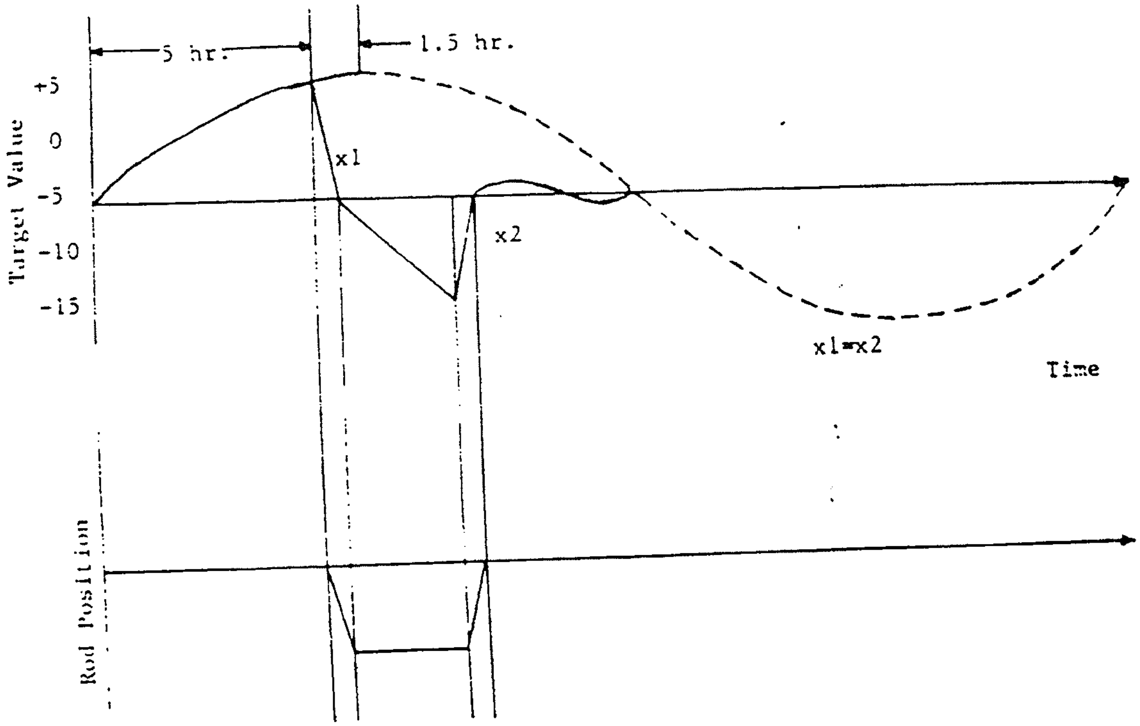
The following special symbols are printed immediately after the AFD value for a channel, if applicable:

- **** The AFD value for the channel has just crossed a band.
- * The AFD value for the channel has not crossed a band, but is still outside of at least one.
- ?? The channel is inoperable.

DIVERGENT AXIAL OSCILLATION



DIVERGENT AXIAL OSCILLATION



NOTE: To apply numbers to the above control maneuver, assume that the Target Value is -5%, the reactor power is 75% RTP and the APL is >100% RTP. The first peak is at +5 (the dotted line representing a natural divergent oscillation). At the point the control rods are inserted, the AFD is +4%, therefore, X1=9% [+4% - (-5%)]. Stop inserting control rods at -5% and allow the AFD to go to -14% [-5% - (-9%)] with no control rod motion. When the AFD reaches -14%, pull the control rods back to their original position.

ATTACHMENT 10.5
Page 1 of 1
MANUAL AFD MONITORING LOG

This revision is the latest revision available and has been verified against the Document Management System.

______________________(Print) ______________________ ____________
Name Signature Date

Date/Time	Power %RTP	N41 AFD	N42 AFD	N43 AFD	N44 AFD	Penalty Points This Interval	Total Penalty Points	Comments	Initials

SSO Review ______________________________ Date: ______________

Progress Energy

M
Multiple Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 3

PART 9

OST-010

POWER RANGE CALORIMETRIC DURING POWER OPERATION DAILY

REVISION 41

CAUTION

Performance of a calorimetric calculation is classified by OPS-NGGC-1306 as a Reactivity Related Activity (R3).

Power Range NIS Adjustments are classified as a Reactivity Manipulation (R2).

Performance of a calorimetric calculation is a PLP-037 CASE N/A activity. Power Range NIS Adjustments are a PLP-037 CASE THREE activity. (OPEX 443847)

SUMMARY OF CHANGES
PRR 370429
OST-010 Revision 41

STEP #	REVISION COMMENTS
Cover Page, Sections 9.1, 9.2 & 9.3	Added the appropriate PLP-037 and OPS-NGGC-1306 CASE LEVEL as required by PRO-NGGC-0201, Section 9.4.6. These case determinations are also tied to PRR 374083, PRR 452723 and OPEX 443847.
All Pages	Adjusted format, section numbering and line breaks in preparation for the Procedure Upgrade Project (PUP). This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1. Added new Section 3.0, Definitions, IAW PRO-NGGC-0201. This changes the numbering of all subsequent sections. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1. Changed management titles to agree with current position titles. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1. Replaced the word "increase" with "raise", "adjust up" and "amplify" as is grammatically correct for the sentence context. Added place keeping (check mark) blanks to the various actions steps in the REFERENCE USE sections. This is done in support of HUM-NGGC-0001 and PRO-NGGC-0201 requirements. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1. Added peer check action steps where needed and applicable IAW HUM-NGGC-0001, PRO-NGGC-0201 and OMM-001-2. This answers PRR 452723 and OPEX 443847.
Section 2.0, References	Re-structured section into functional groupings to reduce the appearance of clutter and improve cross-reference capabilities. Added the following new references: 2.1.4 – INPO SEN 228, 2.2.2 - HUM-NGGC-0001, 2.2.3 – CAP-NGGC-0200, 2.3.3 – ITS LCO 3.7.1, 2.3.5 – PLP-100, 2.3.9 – OMM-001-2, 2.3.16 – RNP-I/INST-1144, 2.3.17 – RNP-M/MECH-1616, 2.4.8 – NCR 315316, 2.4.9 – OPEX 443847 and 2.4.10 – NCR 460369. NCR's 315316 and 460369 along with OPEX 443847 are the driving force for this revision. The other new references are added in support of the corrective actions tied to these three items. These changes to Section 2.0 are editorial changes as defined in PRO-NGGC-0204, Section 9.4.1.
Section 3.0, Definitions	Defined the term "FWUFM" since it is used extensively in OST-010 but is not listed as an approved abbreviation in AP-007. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1.
Section 5.0, Prerequisites (old Section 3.0)	New Step 5.1, revision verification, with NOTE. Allows for the use of a laminated "working copy" similar to what is done for OP-301 for manual dilutions and borations. Step 5.3 with NOTE. (This is old step 3.2.) Defined the minimum required power level for performance as listed in ITS SR 3.3.1.2. MODE 1 is entered when >5% power but it is not possible to perform an accurate calorimetric below 15% power.

STEP #	REVISION COMMENTS
Section 6.0, Precautions & Limitations (P&L's) (old Section 5.0)	Moved some P&L's to improve use of paper (less wasted white space) and to place some into a more logical sequence. No change in wording, just change in sequence.
P&L 6.1	New P&L in support of OPS-NGGC-1306 and PRO-NGGC-0201. Defines the Reactivity Management requirements for the various performance sections.
P&L 6.2 (old P&L 5.7)	Redefined the PLP-037 requirements IAW OPEX 443847. Adjustments to a PR NIS drawer are a PLP-037 CASE THREE activity while the performance of the OST-010 data collection and calculation is CASE N/A.
P&L 6.11 (old P&L 5.8)	Adjusted based on inputs from NCR 460369 and NCR 315316.
New P&L 6.19	Defines and describes the requirements for PEER CHECKS as listed in HUM-NGGC-0001 and OMM-001-2. This answers PRR 452723 and OPEX 443847.
New P&L 6.20	Information drawn from NCR 315316 and NCR 460369. Answers PRR 370429. Defines the limitations on the Feedflow CALO along with examples of what can cause the stated problems.
Section 9.1 (old Section 8.1)	Moved some steps to improve the logical flow and sequence. No change in step content, just sequence.
New CAUTION prior to Step 9.1.1	Reminds the users that the performance of OST-012 requires power ≤2300 MWth. While not likely, it is possible that OST-010 is being attempted when ERFIS is functioning but not able to collect all data **AND** Unit 2 is still at ≈2339 MWth. Intent is to prevent a human performance error or ITS limit violation. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1.
New CAUTION prior to Step 9.1.2 (old step 8.1.2)	CAUTION is a restatement of P&L 6.9. Intent is to remind the users of the basis for the step. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1.
NOTE before Step 9.1.4.2	The first part of this NOTE was before old Step 8.1.4.3, this is a more logical place for this information. New materials added to the NOTE to assist with decision making during postulated low power or off-normal conditions. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1.
Step 9.1.4.3	Check that no more than TWO Feedwater Flow instrument are OOS. This answers NCR 460369.
New NOTE before Step 9.1.4.6	OMM-007, Attachment 10.7, contains all the various instrument inputs to the CALO program. Use of this attachment as a check list will help reduce the potential for human errors IF more than one CALO point is to be removed from processing. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1.
New CAUTION before Step 9.1.4.8 (old step 8.1.4.6)	Similar to the CAUTION before Step 9.1.1; reminds the users of the power limits within OST-012. Reminds the users of the power limits while FWUFM is OOS and references to P&L 6.2. Answers NCR 315316 and 460369. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1.

STEP #	REVISION COMMENTS
New CAUTION before Step 9.2.1.2.b (old step 8.2.1.2.b)	1st new caution reminds the users of the Reactor Thermal Power limits when FWUFM is OOS **AND** a calorimetric is required to be performed. 2nd new caution reminds the users to refer to P&L 6.20 if any Feed Flow Calorimetric input instrumentation is OOS. The answers NCR's 315316 and 460369. These are editorial changes as defined in PRO-NGGC-0204, Section 9.4.1.
Step 9.2.1.3 with NOTE before step and an EXAMPLE after the step (old step 8.2.1.3)	Expanded guidance and actions on the use of TARGET POWER. Intent is to minimize the potential for a human error trap if numbers other than 2339 or 2300 must be entered.
New NOTE before Step 9.2.1.5 (old step 8.2.1.5)	NOTE reminds the users of the expected response when not all SGBD is being measured; Steam Flow CALO will HALT. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1.
Step 9.2.3 with NOTE (old step 8.2.3)	Old NOTE was an action step stated as a NOTE. Reworded the step to ensure that 5 minutes is waited after manual data entry.
Step 9.3.3	New step driven by OPEX 443847 and OPS-NGGC-1306 concerning an R2 Reactivity Evolution.
New NOTE before Step 9.3.7.1 (old step 8.3.6.1)	Reminds the users to use diverse and redundant power indications while making NIS adjustments. This answers OPEX 443847. This is an editorial change as defined in PRO-NGGC-0204, Section 9.4.1.
New Step 9.4.3	Direction to record the TARGET POWER LEVEL used in Step 9.2.13.c **IF** the number was not 2339 or 2300 MWth. Ensure proper configuration control and documentation of off-normal situations.
New Step 9.4.5 with NOTE and new Step 9.4.6	Answers OPEX 443847. Direction to initiate an NCR for off-normal conditions. Ensure proper tracking, trending and evaluation of reactivity related problems.

TABLE OF CONTENTS

1.0 **PURPOSE**

1.1 This test is to ensure an accurate power range neutron indication by comparing the Power Range channel instrument readings to the calculated thermal power and to satisfy Improved Technical Specifications SR 3.3.1.2 TBL 3.3.1-1 Item 2a.

1.2 The procedure provides the steps needed to make minor instrument adjustments.

2.0 **REFERENCES**

2.1 NRC, INPO and Other Related Industry Documents

2.1.1 ASME Steam Tables

2.1.2 Technical Manual 728-790-18 - Westinghouse P.W.R. Systems, Nuclear Instrumentation System, Technical Manual

2.1.3 SOER 90-03, Nuclear Instrument Miscalibration

2.1.4 INPO SEN 228, Recurring Event, Reactor Overpower Condition – Improper Adjustment of Excore Power Range Channels During Power Increase

2.2 Nuclear Generation Group (NGG) Procedures and Documents

2.2.1 OPS-NGGC-1306, Reactivity Management Program

2.2.2 HUM-NGGC-0001, Human Performance Program

2.2.3 CAP-NGGC-0200, Condition Identification and Screening Process

2.3 Robinson Plant Procedures and Documents

2.3.1 H. B. Robinson Updated FSAR, Section 7

2.3.2 ITS LCO 3.3.1, Reactor Protection System (RPS) Instrumentation

2.3.3 ITS LCO 3.7.1, Main Steam Safety Valves (MSSVs)

2.3.4 PLP-037, Conduct of Infrequently Performed Tests or Evolutions and Pre-Job Briefs

2.3.5 PLP-100, Technical Requirements Manual, Section 3.25, Plant Calorimetric Measurement

2.3.6 TMM-113, Control of the Calorimetric

2.3.7 PIC-107, Power Level Indication At The Power Range

2.3.8 SD-010, Nuclear Instrumentation Systems

2.3.9 OMM-001-2, Shift Routines and Operating Practices

2.3.10 OMM-007, Equipment Inoperable Record

2.3.11 OMM-015, Operations Surveillance Testing

2.3.12 OST-012, Power Range Calorimetric During Power Operation (Manual)

2.3.13 SP-1359, Feedwater Flow and Steam Generator Moisture Carryover Lithium Tracer Test, 08-03095

2.3.14 RNP-I/INST-1124, ERFIS Steam Flow Automatic Calorimetric Uncertainty Calculation

2.3.15 RNP-I/INST-1125, ERFIS Feed Flow Automatic Calorimetric Uncertainty Calculation

2.3.16 RNP-I/INST-1144, ERFIS Feed Flow Secondary Calorimetric (Ultrasonic) Uncertainty Calculation

2.3.17 RNP-M/MECH-1616, Calculation Basis for the Continuous Calorimetric for H. B. Robinson Unit 2

2.4 Adverse Condition Reports (ACR's), Nuclear Condition Reports (NCR's) and Other Related Documents

2.4.1 Action Item No. 90-13; SER 89-23

2.4.2 CR 93-15019, OST-051 and OST-010 violate OMM-040 Readability Requirements

2.4.3 CR 96-01991, When Feeding The SG With The MDAFW Pumps

2.4.4 CR 96-01631, CT-494 for "C" S/G Pressure Channel

2.4.5 CR 97-01677, OE Evaluation of HLER 97-016 - Reactor Trip Auxiliary Feedwater Actuation

2.4.6 CR 98-01362, OE Evaluation of Westinghouse Technical Bulletin ESBU-TB-92-14-R1, Decalibration Effects Of Calorimetric Power Measurements On The NIS High Power Reactor Trip At Power Levels Less Than 70% RTP

2.4.7 CR 98-01570, NIS Calibration Improvement

2.4.8 NCR 315316, Inconsistent S/G Blowdown Flow Uncertainty Calculations

2.4.9 OPEX 443847, SEN 228, Recurring Event, Reactor Overpower Condition – Improper Adjustment of Excore Power Range Channels During Power Increase

2.4.10 NCR 460369, Revision Identifies Non-conservative Input in Calculation

2.5 Modifications (MOD's), Engineering Changes (EC's) and Other Related Documents

2.5.1 EC 47152, Ultrasonic Feedwater Flow Measurement

2.5.2 EC 48706, Develop Changes to ERFIS Calorimetric to Support FWUFM

2.5.3 EC 51454, Develop Changes to ERFIS Calorimetric to Implement Revision 2 of RNP-M/MECH-1616

3.0 **DEFINITIONS**

3.1 **FWUFM**: Feedwater Ultrasonic Flow Monitoring also known as Feedwater Ultrasonic Flow Meter. A precision process for continuous calculation of the calorimetric.

3.2 All other abbreviations and acronyms are consistent with those listed in AP-007, Generic Procedure Writer's Instructions.

4.0 **RESPONSIBILITIES** CHK (✓)

4.1 Operations is responsible for the performance, review and approval of this procedure.

5.0 **PREREQUISITES**

NOTE:	Section 9.3 is a CONTINUOUS USE section with required signatures that must be vaulted as directed in Section 10.2. All other sections of this procedure are REFERENCE USE sections with placekeeping check mark blanks. A laminated "working copy" may be used as long as the revision is verified as current prior to each use.

5.1 This procedure has been verified to be the most current revision available. ____

5.2 The Shift Manager has given permission to conduct this test. ____

NOTE:	A note in ITS SR 3.3.1.2 allows for up to 12 hours from the time of increasing Reactor Power above 15% until the first calorimetric is required.

5.3 Reactor Plant is operating at power (MODE 1) ≥15% Rated Thermal Power (RTP). ____

5.4 An ERFIS terminal is available. ____

6.0 PRECAUTIONS AND LIMITATIONS

6.1 Performance of a calorimetric calculation is classified by OPS-NGGC-1306 as a **Reactivity Related Activity (R3)**. The use of Section 9.3 to perform a Power Range NIS Adjustment is classified as a **Reactivity Manipulation (R2)**. The requirements of OPS-NGGC-1306 concerning a pre-job briefing and oversight should be reviewed prior to the performance of any NIS adjustments.

6.2 This procedure has been screened IAW PLP-037. The performance of the Calorimetric Calculations in Sections 9.1 and 9.2 are classified as CASE N/A. The performance of a Power Range NIS gain adjustment is classified as a CASE THREE activity. (OPEX 443847)

6.3 Steam Flow, Feed Flow, and Reactor Power should be held as constant as possible during data collection.

6.4 Any steps not applicable shall be marked N/A and the reason(s) noted in the Comments Section of the Certification and Review Form.

6.5 The Calorimetric Program has inherent inaccuracies that amplify in magnitude when less than 70% power. Reactor Engineering should be notified prior to adjusting any power range channel DOWN when less than 70% power to prevent the possibility of non-conservative indication. It is allowable to raise (adjust UP) indicated power to match calculated power. (CR 98-01362)

6.6 Reactor Engineering and the Manager - Operations will be notified prior to making any adjustments of ≥ 2% to a NI channel. (CR 98-01362)

6.7 Reactor Engineering or the Manager - Operations will be contacted for assistance prior to adjusting the NI's during any power or Xenon transient.

6.8 Rounding off the readings taken on the PR nuclear instruments shall be IAW the following guidelines: (CR 93-15019)

6.8.1 If indicated power is less than 100%, then round down to the nearest 0.5% increment (EXAMPLES: a reading of 99.7 would be recorded as 99.5, and 99.3 would be recorded as 99.0).

6.8.2 If indicated power is greater than 100%, then round up to the nearest 0.5% increment (EXAMPLES: a reading of 100.2 would be recorded as 100.5, and 100.6 would be recorded as 101).

6.9 To satisfy the Calorimetric Uncertainty Calculations, all loops must have at least two Steam Generator Pressure Transmitters in service.

6.10 TMM-113 includes a list of calorimetric inputs. If the validity of any point on this list is suspect, it should be removed from the calculation.

6.11 ERFIS simultaneously calculates calorimetrics using FWUFM, Feedwater Flow and Steam Flow. Logic built into the Continuous Calorimetric program (CALO) will cause the calculation to halt and the result to be "0" and labeled NCAL for most situations not allowed by the uncertainty calculations. The items below are not included in this logic check and must be verified by the operator.

- FWUFM CALO should be used whenever it is available.
- When FWUFM CALO is **NOT** available, then use the highest reading CALO with the following restriction :
- If all blowdown is **NOT** measured by operable Blowdown Bartons, then the Steam Flow CALO cannot be used.
- No more than two Feedwater Flow channel, one per Steam Generator for a maximum of two Steam Generators, may be Out of Service (OOS) (NCR 460369).
- Refer to Precautions & Limitation (P&L) 6.20 for additional information concerning the Steam Generator Blowdown Flow instrumentation and the Feed Flow Automatic Calorimetric.

6.12 If ERFIS indicates an error or gives a warning regarding the validity of any calorimetric data and the message can not be confirmed to be the result of valid plant conditions, Engineering should be contacted and the point removed from the calculation. ERFIS inputs deleted from calorimetric processing should not be restored to processing until the problem(s) requiring point deletion are corrected. Record results in Comments Section of Certification and Review Form.

6.13 Operation of any MDAFW Pump with AFW flow to an S/G will cause the calorimetric calculations to be non-conservative. Do not use the continuous calorimetric program when a MDAFW Pump is in service and flowing to an S/G. (CR 96-01991)

6.14 When adjusting an NI Power Range gain with another OOS, extreme care must be utilized. Any electronic spiking has the potential of causing a Reactor Protection System actuation. (CR 97-01677)

6.15 The continuous calorimetric program provides steady state calculations only and does not account for changing volumes or a change in stored energy. Additionally averaging routines built into the continuous calorimetric calculations will require as much as 5 minutes following a change in an input value for that change to be fully reflected in the display.

6.16 Removing blowdown flow transmitters from the calorimetric results in 0 being used for that loop blowdown flow and has the effect of instantaneously converting all actual blowdown flow to steam flow in the Feed Flow and FWUFM calorimetric calculations. This will make the FWUFM and Feed Flow Calorimetric programs to calculate a conservative, higher than actual, value for power. The Steam Flow calorimetric will STOP.

6.17 Indicating that all blowdown flow is not measured by checking the box: ALL BLOWDOWN FLOW BEING MEASURED-NO has no effect upon the FWUFM or the Feedwater Flow calorimetric. The Steam Flow Calorimetric will STOP. FWUFM Calorimetric and Feed Flow Calorimetric calculations will be conservative; the calculated power will be higher than actual power. Refer to Precautions & Limitation (P&L) 6.20 for additional information concerning the Steam Generator Blowdown Flow instrumentation and the Feed Flow Automatic Calorimetric.

6.18 When the letdown flow point CHF0134A is deleted from scan or CALO, it will read -9999.00 gallons per minute on the ERFIS CALO printout.

6.19 Steps requiring a manual data entry and the actions to adjust a Power Range NIS Gain potentiometer should be peer checked IAW HUM-NGGC-0001, Human Performance Program, and OMM-001-2, Shift Routines and Operating Practices. (OPEX 443847)

6.20 Reference 2.3.15, RNP-I/INST-1125, ERFIS Feed Flow Automatic Calorimetric Uncertainty Calculation, requires that the following instrumentation remain in an operable condition in order for the ERFIS Feed Flow Automatic Calorimetric (also known as the "Classic Calorimetric") to remain operable (References: NCR 315316 and NCR 460369):

6.20.1 Feedwater Temperature Elements TE-3004, Feedwater To Stm Gen A Temperature Element, TE-3005, Feedwater To Stm Gen B Temperature Element, and TE-3006, Feedwater To Stm Gen C Temperature Element. These are ERFIS points FWT0418A, FWT0438A and FWT0458A respectfully. **IF** any one of these temperature elements OR ERFIS points are OOS, the Feed Flow Automatic Calorimetric is OOS.

6.20.2 Steam Generator Blowdown (SGBD) flow instruments FIT-1328A, SGBD HTX "A" Flow Indicating Transmitter, FIT-1328B, SGBD HTX "B" Flow Indicating Transmitter, FIT-1328C, SGBD HTX "C" Flow Indicating Transmitter. These are ERFIS points MSF1407A, MSF1427A and MSF1447A respectively. **IF** any one of these flow indicating transmitter **OR** ERFIS points is not reading ALL SGBD for that respective Steam Generator, the Steam Flow Calorimetric is OOS while the FWUFM and Feedflow Calorimetrics are conservative in their calculations.

EXAMPLE 1: Due to problems with Steam Generator Chemistry, SGBD flow is split with 50 GPM per S/G going to the Condenser and an additional 50 GPM per S/G going to the Flash Tank. The flow to the Flash Tank is not monitored flow, thus, the Steam Flow Automatic Calorimetric is OOS.

EXAMPLE 2: ERFIS point MSF1407A is OOS due to a failed isolator power supply. SGBD flow on S/G "A" is being maintained at 35 GPM. FIT-1328A is still operable. The Steam Flow Automatic Calorimetric is OOS until MSF1407A is returned to service.

6.20.3 Feedwater Flow Transmitters FT-476, FW SG A Flow Transmitter (ERFIS Point FWF0403A), FT-477, FW SG A Flow Transmitter (FWF0404A), FT-486, FW SG B Flow Transmitter (FWF0423A), FT-487, FW SG B Flow Transmitter (FWF0424A), FT-496, FW SG C Flow Transmitter (FWF0443A), and FT-497, FW SG C Flow Transmitter (FWT0444A). No more than two channels, one per Steam Generator on a maximum of two Steam Generators, may be removed from service and still leave the Feed Flow Automatic Calorimetric operable.

EXAMPLE: Feed Flow Transmitter FT-476 is OOS for scheduled calibrations. An unexpected power supply failure in an ERFIS MUX Cabinet has caused FWF0423A to read NCAL. The RTGB indications are not affected by the ERFIS failure. The Feed Flow Calorimetric would still be considered operable in this condition. Any other failures of any other Feed Flow instruments will cause the Feed Flow Calorimetric to go OOS.

7.0 SPECIAL TOOLS AND EQUIPMENT

7.1 None Applicable

8.0 ACCEPTANCE CRITERIA

8.1 This test is acceptable if the indicated power level of each instrument channel is within 2% of calculated power. If the indicated power cannot be adjusted to within 2% of calculated power, the affected channel(s) shall be declared INOPERABLE.

8.2 The reviewing and approving authority may accept this test IAW provisions set forth in OMM-015.

REFERENCE USE

9.0 PROCEDURE

CHK (✓)

BEGIN R3 REACTIVITY EVOLUTION

9.1 Initial Conditions

NOTE:	This section of OST-010 has been screened in accordance with PLP-037 criteria and determined to be outside the bounds of an Infrequently Performed Test or Evolution.

CAUTION

The instrument uncertainties associated with OST-012, Power Range Calorimetric During Power Operation (Manual) Daily (If OST-010 Is Not Performed), limit calculated reactor power to ≤2300 MWth.

9.1.1 **IF** no ERFIS terminal is available **OR** ERFIS is not capable of obtaining data automatically, **THEN PERFORM** the calorimetric IAW OST-012. ____

CAUTION

To satisfy the Calorimetric Uncertainty Calculations, all loops must have at least two Steam Generator Pressure Transmitters in service. (Reference: Precaution & Limitation 6.9.)

9.1.2 **IF** any loop has only one Steam Generator Pressure transmitter in service, **THEN CONTACT** Engineering prior to proceeding. ____

CHK (✓)

NOTE:	The Continuous Calorimetric Program can be selected through the Nuclear Steam Supply System Menu on ERFIS. The direct entry ERFIS turn on code is CALO.

CAUTION

ERFIS simultaneously calculates calorimetrics using FWUFM, Feedwater Flow and Steam Flow. Logic built into the Continuous Calorimetric program (CALO) will cause the calculation to halt and the result to be "0" and labeled NCAL for most situations not allowed by the uncertainty calculations. The items below are not included in this logic check and must be verified by the operator.

- FWUFM CALO should be used whenever it is available.
- When FWUFM CALO is **NOT** available, then use the highest reading CALO with the following restriction:
- If all blowdown is **NOT** measured by operable Blowdown Bartons, then the Steam Flow CALO cannot be used.
- No more than **TWO** Feedwater Flow channels, one per Steam Generator, may be Out of Service (OOS) for the Feedwater Flow Calorimetric to be valid. (NCR 460369)

9.1.3 **VERIFY** the Continuous Calorimetric Program is being displayed on an ERFIS terminal. ____

CHK (✓)

9.1.4 **CHECK** the ERFIS point quality codes as follows:

1. **CLICK** on the INPUT INFORMATION button. This will display the CALORIMETRIC INPUT INFORMATION page. ____

> **NOTE:** ERFIS Points are expected to indicate a quality code of "OK." For quality codes that are SUSPECT, redundant indications should be viewed prior to removing an ERFIS point from scan.
>
> It is possible for an ERFIS Calorimetric input point to have a high or low warning (HWRN or LWRN) OR a high or low alarm (HALM or LALM) quality code when at low power levels. When these conditions exist, it is still possible for the Continuous Calorimetric Program to provide valid and acceptable results. Engineering should be consulted in these conditions prior to removing ERFIS points from service.
>
> Reference 2.3.6, TMM-113, includes a list of calorimetric inputs. If the validity of any point in this list is suspect, it should be removed from the calculation.

2. **REVIEW** the quality codes for the displayed ERFIS points on page 1 and page 2. ____
3. **CHECK** the operability of the Feedwater Flow channels as follows (NCR 460369):
   - **NO MORE THAN** two Feedwater Flow channels are OOS. ____
4. **IF** more than two Feedwater Flow channels are OOS **OR IF** any combination of OOS calorimetric related instrumentation is causing suspect ERFIS data, **THEN** contact Engineering prior to proceeding. ____

> **NOTE:** Deviation and warning messages are intended to alert the Control Room of off-normal conditions and/or potentially suspect instrumentation. Valid plant conditions such as low power operation, bypassing feedwater heaters, etc. can cause deviation and warning messages which do not cause the calorimetric to be invalid.

5. **IF** any deviations **OR** warning messages are received that can be attributed to valid plant conditions, **THEN DOCUMENT** the cause in the Comments section on the Certification and Review Form **AND CONTINUE** with this procedure. ____

9.1.4 (Continued)

CHK (✓)

NOTE:	OMM-007, Equipment Inoperable Record, contains an attachment entitled "EIR – Continuous Calorimetric Program Instrumentation." This attachment can serve as a useful checklist if multiple ERFIS points must be removed from CALO processing.

6. **IF** any of the ERFIS points with input to the Calorimetric to be performed have a quality code that is **NOT** OK **AND** the reason is not due to Low Power Operation, **THEN REMOVE** from scan as follows:

   a. **CLICK** on the DELETE INPUTS button. This will display the DELETE INPUT FROM CALORIMETRIC page. ____

   b. **SELECT** all of the ERFIS points which have a Quality Code other than OK **AND** the points that had warning or deviation messages due to invalid instrumentation. ____

   c. **PEER CHECK** that only the ERFIS points specified above are selected. ____

   d. **CLICK** on the ENTER DATA button. ____

   e. **IMPLEMENT** applicable OMM-007 EIR(s) as directed by SM/CRS. ____

7. **IF** any deviation or warning messages are received which can **NOT** be attributed to valid plant conditions **OR** invalid instrumentation, **THEN DISCONTINUE** use of the Continuous Calorimetric Program until the status of these points is resolved. ____

CAUTION

The instrument uncertainties associated with OST-012, Power Range Calorimetric During Power Operation (Manual) Daily (If OST-010 Is Not Performed), limit calculated reactor power to ≤2300 MWth. (Reference 2.3.6, TMM-113)

8. **IF** the results of the calorimetric program are suspect, **THEN PERFORM** OST-012 **AND COMPARE** results with continuous calorimetric calculations. ____

9. **CLICK** on the EXIT button. ____

REFERENCE USE

9.2 Calorimetric Performance CHK (✓)

> **NOTE:** This section of OST-010 has been screened in accordance with PLP-037 criteria and determined to be outside the bounds of an Infrequently Performed Test or Evolution.

9.2.1 **SELECT** the desired calorimetric as follows:

> **NOTE:** The VIEW button is used to swap the display between the three calorimetrics.

1. **CLICK** on the ENTER DATA button. This will display the CALORIMETRIC OPERATOR ENTRY page. ____

> **NOTE:** Logic built into the Continuous Calorimetric program will cause the calculation to halt **AND** the result to be "0" and labeled NCAL for most situations **NOT** allowed by the uncertainty calculations. The selection of the Calorimetric type is not included in this logic check and must be verified by the operator.

2. **SELECT** the type of calorimetric to use as follows:

a. **IF** FWUFM is available, **THEN SELECT** FWUFM. ____

> **CAUTION**
>
> TRM Section 3.25, Plant Calorimetric Measurement, Condition "B," limits Reactor Power to ≤2300 MWth when ITS SR 3.3.1.2 is required while FWUFM is OOS.
>
> Refer to Precaution & Limitation 6.20 IF **ANY** Feed Flow Calorimetric input instrumentation is OOS. (NCR 315316 and NCR 460369)

b. **IF** FWUFM is **NOT** available, **THEN PERFORM** the following:

1) **IF** all Blowdown is measured by operable Bartons, **THEN SELECT** the highest of Feed Flow **OR** Steam Flow. ____

2) **IF** all Blowdown is **NOT** measured by operable Bartons, **THEN SELECT** the Feed Flow Calorimetric. ____

9.2.1 (Continued)

CHK (✓)

NOTE:	Target Power does not affect CALO calculation. The target power level is an operator aide that will cause power limit warning alarms to actuate when this level is exceeded. The normal Target Power level with FWUFM in service is 2339 MWth. The normal Target Power level when using either the Feed Flow or Steam Flow Calorimetric program is 2300 MWth.

3. **ENTER** Target Power in MWth as follows:

   a. **IF** FWUFM is in service, **THEN** enter the number 2339. ____

   b. **IF** the Continuous Calorimetric Program to be used is either the Feed Flow Calorimetric **OR** Steam Flow Calorimetric, **THEN** enter the number 2300. ____

   c. **IF** a Target Power other than 2339 or 2300 MWth is required, **THEN** enter the Target Power. ____

EXAMPLE: A post-outage review of Main Steam Safety Valve testing documents reveals that Safety Valves SV1-1A, SV1-1B and SV1-1C are all misadjusted; their lift setting is outside the ITS required setting of 1085 PSIG ±3%. Per ITS LCO 3.7.1.B, the maximum allowed power level is ≤46% power. This equates to a maximum allowed target power of 1075.9 MWth (based on 2339 MWth maximum).

   d. **PEER CHECK** the Target Power number. ____

4. **IF** Excess Letdown is in service, **THEN** PERFORM the following:

   a. **SELECT** EXCESS LETDOWN IN SERVICE YES Box. ____

   b. **PEER CHECK** the EXCESS LETDOWN selection. ____

9.2.1 (Continued)

CHK (✓)

NOTE: Checking the ALL BLOWDOWN FW BEING MEASURED NO box will cause the Steam Flow Calorimetric to halt (stop calculating).

5. **IF** all Blowdown Flow is not being measured, **THEN PERFORM** the following:

   a. **CHECK** the ALL BLOWDOWN FW BEING MEASURED NO Box. ____

   b. **PEER CHECK** the BLOWDOWN MEASURED selection. ____

NOTE: With the MDAFW FEEDING ANY SG YES Box checked, clicking on the ENTER DATA button will halt CALO.

6. **IF** Motor Driven AFW is providing flow to any SG, **THEN PERFORM** the following:

   a. **CHECK** the MDAFW FEEDING ANY SG YES Box. ____

   b. **PEER CHECK** the MDAFW FEED selection. ____

7. **CLICK** on the ENTER DATA button. ____

9.2.2 **ENTER** NI drawer indications as follows:

1. **CLICK** on the PAGE 2 button. **SELECT** the desired Calorimetric Display. ____

NOTE: Power Range NI drawer indication readability shall be to half the smallest increment (division) on the meter face. (Example: 99.0, 99.5, 100.0, 100.5). (CR 93-15019)

2. **VERIFY** the values under the OPERATOR ENTERED NI POWERS line are the same as current NI drawer indications. ____

3. **PEER CHECK** the OPERATOR ENTERED NI POWERS. ____

4. **CLICK** on the ENTER DATA button. ____

5. **CLICK** on the REFRESH button. ____

6. **CLICK** on the EXIT button. ____

CHK (✓)

NOTE:	After manual data entry, it is recommended to wait at least five minutes before printing the calorimetric report. Reference to Precaution & Limitation 6.15.

9.2.3 **WHEN** a minimum of five (5) minutes have elapsed since the last manual data entry, **THEN PRINT** the calorimetric as follows:

1. **CLICK** on the REPORT button. ____
2. **SELECT** the desired report. This will cause the report to be printed. ____

9.2.4 **EVALUATE** the calorimetric results as follows:

1. **REVIEW** the DEVIATION: (SELECTED CALORIMETRIC POWER - ENTERED NI POWER) line on the printed report. ____

NOTE:	OPS-NGGC-1306 requires the verification of the validity of Thermal Power Calculations requiring a change greater than 2% before their use in adjusting gains on the excore detectors IAW OST-010.

2. **IF** any NI is deviated by greater than or equal to 2%, **THEN PERFORM** the following:
   - **NOTIFY** the SM AND the CRS. ____
   - **PERFORM** a backup calorimetric. ____
3. **IF** NI adjustment is required, **THEN GO TO** Section 9.3. ____
4. **IF** NI adjustment is **NOT** required, **THEN GO TO** Section 9.4. ____

END R3 REACTIVITY EVOLUTION

CONTINUOUS USE

9.3 Power Range NIS Adjustments (CR 98-01570) INIT

BEGIN R2 REACTIVITY EVOLUTION

9.3.1 This revision has been verified to be the latest revision available. ________ ____
Date

NOTE:	When entry into the Power Range drawer is not required, licensed Operators and I&C Technicians are authorized to make NIS adjustments, with SM approval. The Bases for ITS SR 3.3.1.2 contains the following statements: "If the Calorimetric exceeds the NIS channel output by > 2% RTP, the NIS is not declared inoperable, but must be adjusted. If the NIS channel output cannot be properly adjusted, the channel is declared inoperable. The NIS channel output shall be adjusted consistent with the calorimetric results if the absolute difference between the NIS channel output and the calorimetric is > 2% RTP. This section of OST-010 has been screened in accordance with PLP-037 criteria and determined to be a Case Three activity. (OPEX 443847)

CAUTION

When adjusting an NI Power Range gain with another OOS, extreme care must be utilized. Any electronic spiking has the potential of causing a Reactor Protection System actuation. (CR 97-01677)

The inherent inaccuracies in the Continuous Calorimetric Program amplify when power is less than 70%, which magnify the possibility of non-conservative operation. Therefore, adjusting NI's down should be minimized and should only be performed after consulting with Reactor Engineering. (CR 98-01362)

Reactor Engineering and the Manager - Operations should be contacted for assistance prior to adjusting the NI's during any power or Xenon transient.

9.3.2 **IF** it is desired to perform an NIS adjustment, **THEN OBTAIN** SM approval.

________________________________ ____
Shift Manager (signature)

INIT

9.3.3 The Reactivity Management requirements of OPS-NGGC-1306 have been reviewed **AND** the applicable actions taken. (OPEX 443847) ____

9.3.4 **IF** any Power Range NI needs to be adjusted by more than 2%, **THEN CONTACT** Reactor Engineering **AND** the Manager - Operations prior to the adjustment. ____

9.3.5 **IF** Reactor power is less than 70% **AND** it is desired to adjust NIS DOWN, **THEN CONTACT** Reactor Engineering for guidance regarding the amount of adjustment to make. ____

____
Engineer Contacted (Print Name)

9.3.6 **IF** entry into a Power Range drawer is required to accomplish the NIS adjustment, **THEN ADJUST** NIS using PIC-107, Power Level Indication at the Power Range. ____

9.3.7 **PERFORM** the following for each NI channel to be adjusted:

NOTE:	Diverse and redundant indications of Reactor Power should be monitored IAW OMM-001-2 while adjusting the Power Range indications. (OPEX 443847)

1. **IF** entry into a Power Range drawer is required to accomplish the NIS adjustment, **THEN N/A** the step(s) associated with the drawer(s) entered. ____

9.3.7 (Continued)

INIT

NOTE:	ERFIS indication should be used to monitor the Power Range adjustment when matching the indicated power level to the calorimetric's calculated value. The accuracy of ERFIS provides better indication when making small adjustments to indicated power levels.

		N-41	N-42	N-43	N-44
2.	**ADJUST** gain potentiometer until power level meter agrees with target value.	____	____	____	____
3.	**PEER CHECK** that the adjusted power level meter agrees with the target value.	____	____	____	____
4.	**WHEN** each gain potentiometer adjustment is complete, **THEN** PEER CHECK each potentiometer properly locked. (OMM-001-2 and OPEX 443847)	____	____	____	____

END R2 REACTIVITY EVOLUTION

Adjustment Performed by:

____ ____________ ____________

____ ____________ ____________
Title Date

Reviewed By: ____ ____________
Shift Technical Advisor Date

Approved By: ____ ____________
Shift Manager Date

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ILC-13 NRC JPM RO A1-2
Rev 0

Power Range Calorimetric During Power Operation

Concurred By: ______________________________ **Date:** ______________
Operations

Approved By: ______________________________ **Date:** ______________
Superintendent/Supervisor - Training

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: 01015102002, Perform a Power Range Calorimetric During Power Operation IAW OST-010

Alternate Path:

NO

JPM #: ILC-13 NRC JPM RO A1-1

Candidate RO

K/A	Rating (RO/SRO):
G 2.1.19	3.9
G 2.1.20	4.6

Task Standard:
Correctly performs a Power Range Calorimetric during Power Operation IAW OST-010 and adjust NI-44 to 100% power.

Preferred Evaluation Location:

Simulator __X__ Classroom ____

Preferred Evaluation Method:

Perform __X__ Simulate ____

References:

OST-010

OPS-NGGC-1306

Validation Time: 20 Minutes **Time Critical:** NO **Time Critical Time:** N/A

Candidate: ____________________
Name

SSN ____ - ____ - ____

	Overall Time	(N/A if not time critical) **Critical Time**
Start:	____	____
Finish:	____	____
Performance Time (min):	____	____

Performance Rating: circle one SAT UNSAT

Examiner: ____________ ____________ ______
Print Name Signature Date

COMMENTS:

QUESTION DOCUMENTATION:

Question:

Response:

SIMULATOR OPERATOR INSTRUCTIONS:

1. Initialize the simulator to IC-911
2. Go to RUN for a **minimum of 5 minutes** to allow the Calorimetric Program to update the four minute average and to ensure plant conditions are stable and then go to FREEZE.
3. Place simulator in RUN when directed by the examiner.

Tools/Equipment/Procedures Needed:

OST-010 with all Section 5.0, Prerequisites, signed off.

READ TO OPERATOR

DIRECTIONS TO CANDIDATE:

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 facilitate the examination and better enable me to assess your level of understanding, verbalize your actions and observations while performing the JPM. To indicate that you have completed your assigned task return the Candidate Cue Sheet I provided you.

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. Unit 1 is at 100 % RTP.
2. You are on-shift as the BOP
3. No equipment is out of service.

INITIATING CUES:

The CRS has directed you to perform OST-010, Power Range Calorimetric During Power Operation Daily, and to adjust all Power Range NI's that indicate greater than +/- 0.5% of 100%.

START TIME: __________

STEP 1: Candidate obtains copy of OST-010. **STANDARD:** Obtains copy of OST-010. **EXAMINER'S NOTE:** **Evaluator will provide a copy of OST-010 with Section 5.0, Prerequisites, signed off.** COMMENTS:	___ SAT ___ UNSAT
STEP 2: **IF** no ERFIS terminal is available **OR** ERFIS is not capable of obtaining data automatically, **THEN PERFORM** the calorimetric IAW OST-012. (Step 9.1.1) **STANDARD:** Candidate determines that step is N/A and places a "N/A" in the initial block. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 3: **IF** any loop has only one Steam Generator Pressure transmitter in service, **THEN CONTACT** Engineering prior to proceeding. (Step 9.1.2) **STANDARD:** Candidate determines that step is N/A and places a "N/A" in the initial block. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT

NOTE: The Continuous Calorimetric Program can be selected through the Nuclear Steam Supply System Menu on ERFIS. The direct entry ERFIS turn on code is CALO.

STEP 4: **VERIFY** the Continuous Calorimetric Program is being displayed on an ERFIS terminal. (Step 9.1.3) **STANDARD:** Candidate displays the Continuous Calorimetric Program through the Nuclear Steam Supply System Menu on ERFIS **OR** enters CALO directly into the ERFIS Turn On Code field. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 5: **CLICK** on the INPUT INFORMATION button. This will display the CALORIMETRIC INPUT INFORMATION page. (Step 9.1.4.1) **STANDARD:** Candidate clicks on the Input Information button. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 6: **REVIEW** the quality codes for the displayed ERFIS points on page 1 and page 2. (Step 9.1.4.2) **STANDARD:** Candidate reviews the quality codes on page 1 and page 2. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 7: **CHECK** the operability of the Feedwater Flow channels as follows (NCR 460369): • **NO MORE THAN** two Feedwater Flow channels are OOS. (Step 9.1.4.3) **STANDARD:** Candidate determines that NO feedwater flow channels are OOS. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 8: **IF** more than two Feedwater Flow channels are OOS **OR IF** any combination of OOS calorimetric related instrumentation is causing suspect ERFIS data, **THEN** contact Engineering prior to proceeding. (Step 9.1.4.4) **STANDARD:** Candidate determines that step is N/A and places a "N/A" in the initial block. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 9: **IF** any deviations **OR** warning messages are received that can be attributed to valid plant conditions, **THEN** DOCUMENT the cause in the Comments section on the Certification and Review Form **AND CONTINUE** with this procedure. (Step 9.1.4.5) **STANDARD:** Candidate determines that step is N/A and places a "N/A" in the initial block. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 10: **IF** any of the ERFIS points with input to the Calorimetric to be performed have a quality code that is **NOT** OK **AND** the reason is not due to Low Power Operation, **THEN REMOVE** from scan as follows: (Step 9.1.4.6) **STANDARD:** Candidate determines that step is N/A and places a "N/A" in the 6.a. – 6.e. initial blocks. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 11: **IF** any deviation or warning messages are received which can **NOT** be attributed to valid plant conditions **OR** invalid instrumentation, **THEN DISCONTINUE** use of the Continuous Calorimetric Program until the status of these points is resolved. (Step 9.1.4.7) **STANDARD:** Candidate determines that step is N/A and places a "N/A" in the initial block. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 12: **IF** the results of the calorimetric program are suspect, **THEN PERFORM** OST-012 **AND COMPARE** results with continuous calorimetric calculations. (Step 9.1.4.8) **STANDARD:** Candidate determines that step is N/A and places a "N/A" in the initial block. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 13: **CLICK** on the EXIT button. (Step 9.1.4.9) **STANDARD:** Candidate clicks on the EXIT button. **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 13: **CLICK** on the ENTER DATA button. This will display the CALORIMETRIC OPERATOR ENTRY page. (Step 9.2.1.1) **STANDARD:** Candidate clicks on the ENTER DATA button. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 14: **SELECT** the type of calorimetric to use as follows: **a.** **IF** FWUFM is available, **THEN SELECT** FWUFM. (Step 9.2.1.2.a) **STANDARD:** Candidate verifies that FWUFM is selected. Determines that step 9.2.1.2.b is N/A and places N/As in the appropriate initial blocks. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT

STEP 15: **ENTER** Target Power in MWth as follows: **a. IF** FWUFM is in service, **THEN** enter the number 2339. **b. IF** the Continuous Calorimetric Program to be used is either the Feed Flow Calorimetric **OR** Steam Flow Calorimetric, **THEN** enter the number 2300. **c. IF** a Target Power other than 2339 or 2300 MWth is required, **THEN** enter the Target Power. **d. PEER CHECK** the Target Power number. (Step 9.2.1.3) **STANDARD:** Candidate verifies that 2339 is entered for the Target Power and request a PEER CHECK. **EXAMINER'S NOTE:** **When/If requested acknowledge the request for a PEER CHECK and concur with actions taken.** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 16: **IF** Excess Letdown is in service, **THEN** PERFORM the following: **a. SELECT** EXCESS LETDOWN IN SERVICE YES Box. **b. PEER CHECK** the EXCESS LETDOWN selection. (Step 9.2.1.4) **STANDARD:** Candidate verifies that normal letdown is in service and determines that step is N/A and places a "N/A" in the initial blocks **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 17: **IF** all Blowdown Flow is not being measured, **THEN PERFORM** the following: **a. CHECK** the ALL BLOWDOWN FW BEING MEASURED NO Box. **b. PEER CHECK** the BLOWDOWN MEASURED selection. (Step 9.2.1.5) **STANDARD:** Candidate verifies that blowdown flow is being measured and determines that step is N/A and places a "N/A" in the initial blocks **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 18: **IF** Motor Driven AFW is providing flow to any SG, **THEN PERFORM** the following: **a. CHECK** the MDAFW FEEDING ANY SG YES Box. **b. PEER CHECK** the MDAFW FEED selection. (Step 9.2.1.6) **STANDARD:** Candidate verifies that no MDAFW pump is running and determines that step is N/A and places a "N/A" in the initial blocks **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 19: **CLICK** on the ENTER DATA button. (Step 9.2.1.7) **STANDARD:** Candidate clicks on the ENTER DATA button. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 20: **CLICK** on the PAGE 2 button. **SELECT** the desired Calorimetric Display. (Step 9.2.2.1) **STANDARD:** Candidate clicks on the PAGE 2 button and selects FWUFM Display. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
NOTE: Power Range NI drawer indication readability shall be to half the smallest increment (division) on the meter face. (Example: 99.0, 99.5, 100.0, 100.5). (CR 93-15019)	
STEP 21: **VERIFY** the values under the OPERATOR ENTERED NI POWERS line are the same as current NI drawer indications. (Step 9.2.2.2) **STANDARD:** Candidate reads Power Range NI drawer indications from all four drawers and modifies the data as necessary. NI-41, NI-42 and NI-43 indications are entered as 100% and NI-44 indication is entered as 101%. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT

STEP 22: **PEER CHECK** the OPERATOR ENTERED NI POWERS. (Step 9.2.2.3) **STANDARD:** Candidate requests a PEER CHECK of Operator Entered NI Powers. **EXAMINER'S NOTE:** **When/If requested, acknowledge the request for a PEER CHECK and concur with actions taken.** COMMENTS:	___ SAT ___ UNSAT
STEP 23: **CLICK** on the ENTER DATA button. (Step 9.2.2.4) **STANDARD:** Candidate clicks on the ENTER DATA button. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 24: **CLICK** on the REFRESH button. (Step 9.2.2.5) **STANDARD:** Candidate clicks on the REFRESH button. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT

STEP 25: **CLICK** on the EXIT button. (Step 9.2.2.6) **STANDARD:** Candidate clicks on the EXIT button. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT

NOTE: After manual data entry, it is recommended to wait at least five minutes before printing the calorimetric report. Reference to Precaution & Limitation 6.15.

STEP 26: **WHEN** a minimum of five (5) minutes have elapsed since the last manual data entry, **THEN PRINT** the calorimetric as follows: **1.** **CLICK** on the REPORT button. **2.** **SELECT** the desired report. This will cause the report to be printed. (Step 9.2.3) **STANDARD:** Candidate waits a minimum of 5 minutes and then clicks on the REPORT button. Candidate then selects the FWUFM Calorimetric Power Report. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT

STEP 27:	**EVALUATE** the calorimetric results as follows: 1. **REVIEW** the DEVIATION: (SELECTED CALORIMETRIC POWER - ENTERED NI POWER) line on the printed report. 2. **IF** any NI is deviated by greater than or equal to 2%, **THEN PERFORM** the following: – **NOTIFY** the SM AND the CRS. – **PERFORM** a backup calorimetric. 3. **IF** NI adjustment is required, **THEN GO TO** Section 9.3. 4. **IF** NI adjustment is NOT required, **THEN GO TO** Section 9.4. (Step 9.2.4)	**Critical Step** ___ SAT ___ UNSAT
STANDARD:	Candidate reviews the DEVIATION and determines that only NI-44 has a significant deviation. The DEVIATION is not greater than or equal to 2% so step 2 above is marked as N/A. Candidate determines that step 3 above is applicable due to the CRS direction given in the CUE to adjust any NI with a greater than +/- 5% deviation from 100%. Candidate transitions to Section 9.3 and N/As step 4 above.	
EXAMINER'S NOTE:	**If candidate requests to know if NI adjustment is required remind them to review the JPM CUE sheet.**	
COMMENTS:		

<u>STEP 28:</u> This revision has been verified to be the latest revision available. (Step 9.3.1) **<u>STANDARD</u>:** Candidate places the date in appropriate box and initials since procedure was previously confirmed to be the latest revision in Section 5.0, Prerequisites. **EXAMINER'S NOTE:** **NONE** <u>COMMENTS</u>:	___ SAT ___ UNSAT
<u>STEP 29:</u> **IF** it is desired to perform an NIS adjustment, **THEN OBTAIN** SM approval. (Step 9.3.2) **<u>STANDARD</u>:** Candidate obtains Shift Manager signature. **EXAMINER'S NOTE:** Inform the candidate that you are simulating the actions of the CRS/SM and sign name on the Shift Manager signature line. <u>COMMENTS</u>:	___ SAT ___ UNSAT
<u>STEP 30:</u> The Reactivity Management requirements of OPS-NGGC-1306 have been reviewed **AND** the applicable actions taken. (OPEX 443847) (Step 9.3.3) **<u>STANDARD</u>:** Candidate reviews OPS-NGGC-1306 and determines that no additional actions need to be taken. **EXAMINER'S NOTE:** Inform the candidate that the CRS and SM reviewed the requirements of OPS-NGGC-1306 and have determined that NO additional actions are necessary. <u>COMMENTS</u>:	___ SAT ___ UNSAT

STEP 31: **IF** any Power Range NI needs to be adjusted by more than 2%, **THEN CONTACT** Reactor Engineering **AND** the Manager - Operations prior to the adjustment. (Step 9.3.4) **STANDARD:** Candidate determines that adjustment is less than 2% and N/As this step. **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 32: **IF** Reactor power is less than 70% AND it is desired to adjust NIS DOWN, **THEN CONTACT** Reactor Engineering for guidance regarding the amount of adjustment to make. (Step 9.3.5) **STANDARD:** Candidate determines that reactor power is greater than 70% and N/As this step. **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 33: **IF** entry into a Power Range drawer is required to accomplish the NIS adjustment, **THEN ADJUST** NIS using PIC-107, Power Level Indication at the Power Range. (Step 9.3.6) **STANDARD:** Candidate determines that this step will remain open until it is determined whether adequate adjustment can be performed exterior to the drawer. **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT

NOTE: Diverse and redundant indications of Reactor Power should be monitored IAW OMM-001-2 while adjusting the Power Range indications. (OPEX 443847)

STEP 34: **IF** entry into a Power Range drawer is required to accomplish the NIS adjustment, **THEN N/A** the step(s) associated with the drawer(s) dentered. (Step 9.3.7.1) **STANDARD:** Candidate will determine that his step is N/A. **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT

NOTE: ERFIS indication should be used to monitor the Power Range adjustment when matching the indicated power level to the calorimetric's calculated value. The accuracy of ERFIS provides better indication when making small adjustments to indicated power levels.

STEP 35: **ADJUST** gain potentiometer until power level meter agrees with target value. (Step 9.3.7.2) **STANDARD:** Candidate adjusts the gain potentiometer on NI-44 while monitoring ERFIS Power Range indication. Candidate adjusts NI-44 indication to approximately 100% +/- 0.5%. **EXAMINER'S NOTE: NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT

STEP 36: **PEER CHECK** that the adjusted power level meter agrees with the target value. (Step 9.3.7.3) **STANDARD:** Candidate requests a PEER CHECK of adjusted power level. **EXAMINER'S NOTE: When / If requested, acknowledge request for PEER CHECK and concur with actions taken.** COMMENTS:	___ SAT ___ UNSAT
STEP 37: **WHEN** each gain potentiometer adjustment is complete, **THEN PEER CHECK** each potentiometer properly locked. (OMM-001-2 and OPEX 443847) (Step 9.3.7.4) **STANDARD:** Candidate requests a PEER CHECK of locked potentiometer. **EXAMINER'S NOTE: When / If requested, acknowledge request for PEER CHECK and concur with actions taken.** COMMENTS:	___ SAT ___ UNSAT
STEP 38: Candidate signs in the "Adjustment Performed by:" space provided. **STANDARD: Candidate signs in the "Adjustment Performed by:" space provided.** **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 39: **IF** any ERFIS points were recorded with Quality Codes other than OK **OR** had warning or deviation messages noted, **THEN** either **VALIDATE** the suspect values are appropriate through comparison with redundant information **OR REMOVE** the ERFIS point from scan. (Step 9.4.1) **STANDARD:** Candidate determines that this step is N/A. **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 40: **IF** Section 9.2 was performed, **THEN INITIAL** the appropriate lines on the CALORIMETRIC POWER REPORT, **AND COMPLETE** the Certification and Review Form. (Step 9.4.2) **STANDARD:** Candidate places initials in appropriate blanks on Page 1 and 2 of the Calorimetric Power Report (ERFIS printout) and completes the Calorimetric Measurement Certification and Review Form (page 3 of ERFIS printout). Candidate ensure his initials, name, date and time are entered in the appropriate spaces. YES is circled for Adjustment Performed with name, title and date information filled in appropriately. **EXAMINER'S NOTE: The YES for Test Satisfactory should be left for the Shift Technical Advisor to circle on his review, but does not constitute failure of JPM if circled by candidate.** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT

STEP 41: **IF** the Target Power level used in step 9.2.1.3.c is **NOT** 2339 **OR** 2300 MWth, **THEN RECORD** the Target Power level in the COMMENTS SECTION of the CALORIMETRIC POWER REPORT printout along with the reason for the Target Power level. (Step 9.4.3) **STANDARD:** Candidate determines that this step is N/A. **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 42: **IF** Power Range NIS adjustments were performed **THEN ROUTE** Section 9.3 with the CALORIMETRIC POWER REPORT for vaulting. (Step 9.4.4) **STANDARD:** Candidate determines Section 9.3 must be routed for review and approval along with the FWUFM Calorimetric Power Report and Calorimetric Measurement Certification and Review Form. **EXAMINER'S NOTE: NONE** COMMENTS: **END OF TASK**	___ SAT ___ UNSAT

Terminating Cue: When the candidate completes adjustment of NI-44 and completes all documentation required IAW OST-010.

TIME STOP: ________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. Unit 1 is at 100 % RTP.
2. You are on-shift as the BOP
3. No equipment is out of service.

INITIATING CUES:

The CRS has directed you to perform OST-010, Power Range Calorimetric During Power Operation Daily, and to adjust all Power Range NI's that indicate greater than +/- 0.5% of 100%.

REFERENCE USE

9.4 Post-Test Review and Documentation. CHK (✓)

9.4.1 **IF** any ERFIS points were recorded with Quality Codes other than OK **OR** had warning or deviation messages noted, **THEN** either **VALIDATE** the suspect values are appropriate through comparison with redundant information **OR REMOVE** the ERFIS point from scan. ____

9.4.2 **IF** Section 9.2 was performed, **THEN INITIAL** the appropriate lines on the CALORIMETRIC POWER REPORT, **AND COMPLETE** the Certification and Review Form. ____

9.4.3 **IF** the Target Power level used in step 9.2.1.3.c is **NOT** 2339 **OR** 2300 MWth, **THEN RECORD** the Target Power level in the COMMENTS SECTION of the CALORIMETRIC POWER REPORT printout along with the reason for the Target Power level. ____

9.4.4 **IF** Power Range NIS adjustments were performed **THEN ROUTE** Section 9.3 with the CALORIMETRIC POWER REPORT for vaulting. ____

CHK (✓)

NOTE:	An NCR initiated due to problems with the Calorimetric should be evaluated IAW TMM-113, Control of the Calorimetric, for a possible non-conservative condition **AND** IAW OPS-NGGC-1306, Reactivity Management Program, as a potential Reactivity Management Event. (OPEX 443847)

9.4.5 **IF** ANY of the following conditions were identified or encountered:

- A FWUFM Calorimetric could not be performed resulting in a unit load reduction in support of TRM Section 3.25, Plant Calorimetric Measurement;

  OR

- Calorimetric data input points were removed from service IAW Step 9.1.4.6 or Step 9.4.1 (data input problems not identified prior to the initiation of the test);

  OR

- Calorimetric deviation and/or warning messages were encountered **AND** the messages were not due to low power operation;

  OR

- OST-012 was required to be performed as directed by this procedure (unscheduled performance of the manual calorimetric);

  OR

- Engineering assistance was needed to help resolve suspect data;

THEN initiate an NCR IAW CAP-NGGC-0200, Condition Identification and Screening Process. ____

9.4.6 **IF** an NCR was initiated in Step 9.4.5, **THEN RECORD** the NCR number in the COMMENTS SECTION of the CALORIMETRIC POWER REPORT printout **AND** in the Control Room Log (AutoLog). ____

10.0 **RECORDS**

10.1 Performance of this procedure generates a CALORIMETRIC POWER REPORT which includes a Certification and Review Form for vaulting.

10.2 Performance of Section 9.3, Power Range NIS Adjustments, when performed, will be attached to the CALORIMETRIC POWER REPORT for vaulting.

11.0 **ATTACHMENTS**

None Applicable

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ILC-13 NRC JPM RO A2
Rev 0

Determine Proper Equipment Boundaries

Concurred By: ____________________________ **Date:** ________________

Operations

Approved By: ____________________________ **Date:** ________________

Superintendent/Supervisor - Training

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: 01110115901 Verify proper clearance boundaries and tag sequencing IAW OPS-NGGC-1301.

Alternate Path:

NO

JPM #: ILC-13 NRC JPM RO A2

Candidate: RO

K/A	Rating (RO/SRO):
G 2.2.41	3.5
G 2.2.13	4.1

Task Standard:

Determine the pump boundaries and power supply necessary to isolate the leakage from drain valve SI-888P.

Preferred Evaluation Location:

Simulator ______ Classroom ___X___

Preferred Evaluation Method:

Perform ___X___ Simulate _____

References:

P&ID 5379-01082 Sheet 2 of 5
EDP- 002
OPS-NGGC-1301

Validation Time: **20 Minutes** **Time Critical:** **NO** **Time Critical Time:** N/A

Candidate: ______________________
Name

SSN ____ - ____ - ____

(N/A if not time critical)

	Overall Time		Critical Time
Start:	________	Start:	________
Finish:	________	Finish:	________
Performance Time (min):	________		________

Performance Rating: circle one SAT UNSAT

Examiner: ______________________ ______________________ ________
Print Name Signature Date

COMMENTS:

QUESTION DOCUMENTATION:

Question:

Response:

Tools/Equipment/Procedures Needed:
P&ID 5379-01082 Sheet 2 of 5, Safety Injection System Flow Diagram
EDP- 002, 480V AC Busses
OPS-NGGC-1301, Equipment Clearance

READ TO OPERATOR

DIRECTIONS TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. 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 Operator Cue Sheet I provided you along with completed JPM material.

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. Unit 1 is at 100 % RTP.
2. During rounds the IAO identified that SI-888P, SI Pump C Drain, is experiencing excessive seat leakage.
3. A Work Order is being prepared to replace SI-888P with a new valve. The Work Order requests a clearance for SI-888P. The Work Order states that Maintenance will perform all venting and draining of the system and that Single Valve isolation is acceptable.

INITIATING CUES:

Using the provided references only, identify the pump boundary valves and motor breaker to expedite the component isolation and termination of the leakage.

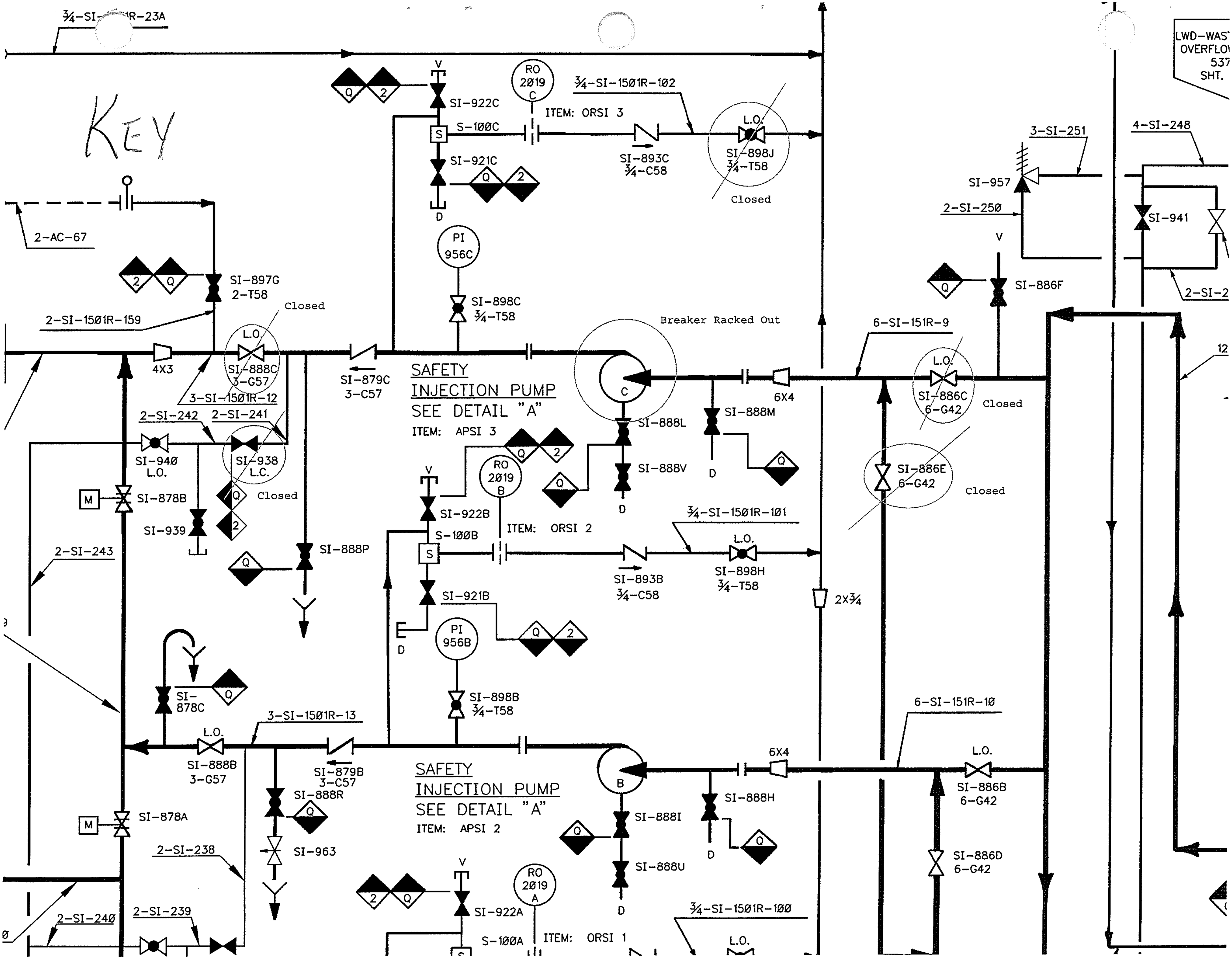
The Shift Manager has authorized Single Valve isolation for the work on SI-888P.

START TIME: __________

EXAMINER'S NOTE: This JPM consists of identifying the boundaries necessary to isolate the seat leakage path from SI-888P, SI Pump C Drain. The sequence of the component isolation is NOT required for performance of this JPM	
<u>**STEP 1:**</u> Review P&ID to determine component boundary valves. <u>**STANDARD**</u>**:** Candidate will use the provided plant drawing to identify the component boundary valves. **EXAMINER'S NOTE: P&ID 5379-01082 Sheet 2 of 5 and EDP-002 will be provided to the candidate to use to identify the component boundary valves.** <u>COMMENTS</u>:	___ SAT ___ UNSAT
<u>**STEP 2:**</u> Identify the pump boundary valves. <u>**STANDARD**</u>**:** The following valves are required to be verified in the selected positions to ensure that SI-888P is isolated such that it can be removed from the system with single valve isolation: • SI-886C, RWST TO SI PUMP "C" SUCTION - CLOSED • SI-898J, SI PUMP "C" MINIFLOW ISOLATION - CLOSED • SI-888C, SI PUMP "C" DISCHARGE - CLOSED • SI-938, SI PUMP "C" FULL FLOW TEST LINE ROOT ISOLATION - CLOSED • SI-886E, RHR HX OUTLIET TO SI PUMP "C" – CLOSED **EXAMINER'S NOTE: Vent and drains are NOT required to be included.** The Cue states that Maintenance will perform all venting and draining. <u>COMMENTS</u>:	<u>**Critical Step**</u> ___ SAT ___ UNSAT

STEP 3: Determine the power supply to SI Pump "C"	**Critical Step**
STANDARD: Candidate determines that SI Pump "C" power supply is breaker 52/23B – RACKED OUT **Not required for credit.** Switch that can be included is as follows: • RTGB Control Switch for SI Pump "C" - CAPPED	___ SAT ___ UNSAT
EXAMINER'S NOTE: SI Pump "C" power supply is located in EDP-002, Section 9.0, 480V-E2, Breaker 52/23B. **Power supply is also available on the RTGB on the pump control switch.** **EDP-002 was provided to candidate at beginning of JPM.**	
COMMENTS:	
END OF TASK	
Terminating Cue: Safety Injection Pump "C" valve boundaries and power supply have been identified as directed.	

TIME STOP: ________



KEY
¾-SI-1501R-23A
LWD-WAST
OVERFLO
537
SHT.
2-AC-67
SI-897G
2-T58
2-SI-1501R-159
Closed
L.O.
SI-888C
3-G57
4X3
3-SI-1501R-12
2-SI-242
2-SI-241
SI-940
L.O.
SI-938
L.C.
Closed
SI-878B
SI-939
2-SI-243
SI-888P
SI-878C
L.O.
SI-888B
3-G57
3-SI-1501R-13
SI-879B
3-C57
SI-888R
SI-963
SI-878A
2-SI-238
2-SI-239
2-SI-240
V
SI-922C
S-100C
SI-921C
D
RO
2019
C
ITEM: ORSI 3
¾-SI-1501R-102
SI-893C
¾-C58
SI-898J
¾-T58
Closed
PI
956C
SI-898C
¾-T58
SI-879C
3-C57
SAFETY
INJECTION PUMP
SEE DETAIL "A"
ITEM: APSI 3
Breaker Racked Out
SI-888L
SI-888V
SI-888M
6X4
RO
2019
B
ITEM: ORSI 2
SI-922B
S-100B
SI-921B
PI
956B
SI-898B
¾-T58
¾-SI-1501R-101
SI-893B
¾-C58
SI-898H
¾-T58
2X¾
SAFETY
INJECTION PUMP
SEE DETAIL "A"
ITEM: APSI 2
SI-888I
SI-888U
SI-888H
SI-922A
S-100A
RO
2019
A
ITEM: ORSI 1
¾-SI-1501R-100
6-SI-151R-9
SI-886C
6-G42
SI-886E
6-G42
SI-886F
6-SI-151R-10
SI-886B
6-G42
SI-886D
6-G42
3-SI-251
SI-957
2-SI-250
4-SI-248
SI-941
2-SI-2
12

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. Unit 1 is at 100 % RTP.
2. During rounds the IAO identified that SI-888P, SI Pump C Drain, is experiencing excessive seat leakage.
3. A Work Order is being prepared to replace SI-888P with a new valve. The Work Order requests a clearance for SI-888P. The Work Order states that Maintenance will perform all venting and draining of the system and that Single Valve isolation is acceptable.

INITIATING CUES:

Using the provided references only, identify the pump boundary valves and motor breaker to expedite the component isolation and termination of the leakage.

The Shift Manager has authorized Single Valve isolation for the work on SI-888P.

Progress Energy	R Reference Use

NUCLEAR GENERATION GROUP

STANDARD PROCEDURE

VOLUME 99

BOOK/PART 99

OPS-NGGC-1301

EQUIPMENT CLEARANCE

REVISION 30

NGG
Think Fleet.

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1.0 PURPOSE

This procedure provides methods to control hazardous energy and equipment status to provide protection for personnel and plant equipment during operation, maintenance, and modification activities. Provisions of the procedure ensure that the status of safety-related and other important equipment is independently verified when the equipment is restored to service.

This procedure also provides guidance for controlling the installation and removal of Grounding Devices.

1.1 Scope

- This procedure meets the requirements of ANSI N18.7 and 29 CFR 1910.269, and meets the intent of the Health and Safety Manual related to equipment clearance.
- This procedure outlines the steps necessary to "afford employees the same level of protection equivalent to that provided by the implementation of a personal lockout or tagout device" in accordance with OSHA 29 CFR 1910.269(d)(8)(ii), 29 CFR 1910.147(f)(3)(i) and 29 CFR 1910.146(a)(b).

2.0 REFERENCES

2.1 General References

1. ANSI N18.7 (ANS 3.2), Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants
2. **[R1]** 29 CFR 1910.269, Electric Power Generation, Transmission, and Distribution
3. 29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout)
4. 29 CFR 1910.146, Permit Required Confined Space
5. NGGM-PM-0007, Quality Assurance Program Manual
6. SAF-SUBS-00009, Lockout/Tagout
7. SAF-SUBS-0020, Power Generation, Distribution, and Transmission
8. SAF-SUBS-00048, Protective Grounding Guidelines
9. ADM-NGGC-0104, Work Implementation and Completion
10. OPS-NGGC-1000, Fleet Conduct of Operations
11. OPS-NGGC-1303, Independent Verification
12. OPS-NGGC-1309, System Drain, Fill and Vent Procedure
13. HUM-NGGC-0003, Conduct of Pre-Job Briefing/Post-Job Critiques

14. NGGM-IA-0003, Transmission Interface Agreement for Operation, Maintenance, and Engineering Activities at Nuclear Plants
15. MNT-NGGC-0007, Foreign Material Exclusion Program
16. FIR-NGGC-0003, Hot Work Permit
17. **[R2]** ANSI N45.2.9 - Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants
18. **[R3]** SOER 98-1, Safety System Status Control
19. TRN-NGGC-0502, Personal Qualification Data System
20. **[R18]** SOER 07-1, Reactivity Management
21. EPRI – Nuclear Maintenance Applications Center: Clearance and Tagging Guidelines for Nuclear Electric Generating Stations, Revision 1
22. **[R16]** GL 2008-01, Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems
23. **[R17]** SOER 2-05, Rev. 1, Gas Intrusion in Safety Systems
24. **[R26]** EC/ED 77173, Manual Ball/Plug Valve Handle Hole Drilling (Additional Measures)
25. SAF-NGGC-2175, Electrical Safety and Arc Flash Protection
26. OPS-NGGC-1308, Plant Status Control
27. EGR-NGGC-0012, Equipment Data Base
28. **[R45]** OE27792 Replacement AOV Air Regulators May Impact Valve Position for Tag-Out or Emergency Response
29. CR 458655, Auto Start Indication Lost With Auto Signal Sealed In- MR A1
30. **[R29]** SAF-NGGC-2174, Confined Space Entry procedure

2.2 Brunswick Nuclear Plant References

1. 0AP-013, Plant Equipment Control
2. **[R4]** SOER 85-5, Internal Flooding of Power Plant Buildings
3. **[R5]** LER 88-029
4. **[R6]** CR S-89-099
5. **[R7]** ER 87-39
6. **[R8]** ER 97-13-01
7. **[R9]** CR 98-00015-6
8. **[R10]** CR 98-01220-2
9. 0TPP-224, Miscellaneous Training Programs
10. **[R28]** CR 458655, Auto Start Indication Lost With Auto Signal Sealed In- MR A1
11. **[R35]** CAPR CR 280320, CO 146180, Incorrect Checklist Hung.

2.3 Crystal River Nuclear Plant References

1. CP-137, Fire & HELB Barrier Breaches
2. CP-341, Containment Penetration Control
3. AI-500, Operations Department Administrative Guidelines
4. CP-147, Control Complex Habitability Envelope (CCHE) Breaches
5. NOCS 01861, IE 78-31, Audit Clearance Log
6. **[R11]** NOCS 02556, IE 85-41 & 85-42, SRO Documentation of Independent Review
7. NOCS 05622, IE 85-26, Holder Notification of Boundary Changes
8. **[R50]** NOCS 05951, IE 83-23 and NUREG 0737, Restoration and Authorization of a C/O
9. NOCS 07398, IE 81-07, Ensure Control by Operations Department
10. **[R25]** NOCS 040004, NRC Violation 87-17-01, Restore Positions per Applicable Procedures
11. **[R21]** NOCS 040257, NRC Inspection Report 89-06-02, Direction for Partial Release of Clearances
12. **[R27]** NOCS 040610, NRC Inspection Report 90-24-01, Separate Restoration Column and Sequence
13. CR 49526, Contract Employee Received Electrical Shock
14. NOCS 062583, Letter to NRC 3F0797-09, Proceduralize Plant Practices
15. NOCS 062838, Letter to NRC 3F0398-26, Addition of Personnel Danger Tags
16. NCOR, Control of Equipment Outside of Clearance Boundary ("NOT" Tag)
17. **[R19]** CR 90037, FWP-2B Boundary Change Not Controlled IAW OPS-NGGC-1301
18. **[R34]** CAPR CR 133321, Valves Restored Improperly Following Maintenance
19. **[R31]** CR 329147, Expanded Clearance Boundary Task
20. **[R12]** NOCS 0100550, Letter to NRC 3F1008-05, Voids in ECCS system piping
21. **[R30]** CAPR CR 370494, Global Red Tags Lifted and Equipment Manipulated In Error
22. **[R32]** CR 361338-02, Clearances Affected by Temporary Power Installation
23. **[R36]** CAPR 106794-21, ACDP-3 BKR 14 Red Tag Obscured From View
24. **[R46]** NOCS 001974, IE Inspection 81-02
25. **[R47]** NOCS 004512 Letter to NRC 3F0179-01, Clearance for Fire Protection System Disarmament is Issued by the Shift Supervisor.
26. **[R48]** NOCS 094907, NEIL Manual IV.A 6, PG 706D, Impaired Protection Procedure
27. **[R49]** NOCS 040180, Letter to NRC 3F1088-11, Controlling Switching and Tagging

2.4 **Harris Nuclear Plant References**

1. AP-003, General Plant Personnel Safety and Housekeeping
2. OMM-001, Operations Administrative Requirements
3. OMM-014, Operation of the Work Coordination Center
4. OMM-024, Managing Liquid Waste Production
5. OP-156.02, AC Electrical Distribution
6. PLP-400, Post Maintenance Testing
7. EM-005, Temporary Power for Bus Outages
8. AP-401, Installation and Control of Temporary Power and Equipment
9. HNP Final Safety Analysis Report, Section 1.8
10. HNP Final Safety Analysis Report, Section 13.5.1.3
11. HTMI-013, Final Safety Analysis Report Commitments
12. 91H0813
13. 92H0154
14. 93H0255
15. 93H0960
16. ACFR 93-00195-4
17. ACFR 94-01316-4
18. CR 95-02387-8
19. **[R23]** Reply to Notice of Violations dated March 3, 1997, Serial HNP-97-039
20. **[R13]** Response to NRC, i.e. Report R11; 500-400/87-31 Violation A (SHF/10-13510E)
21. CR 102355, Individuals Not Signing on to Attachment 13
22. **[R14]** CR 76491, Personal Clearance Error
23. **[R33]** CAPR 479306, Unexpected Voltage Found During Clearance Activities
24. **[R37]** CAPR 79007-13, Problem Hanging Clearance for C CSIP
25. **[R38]** CR 73432, Clearance Not Adequate For Work on 1FD-17
26. **[R39]** CR 125013, Possible Breach of the RABEES Boundary
27. **[R40]** CR 334387, 'A' CT Pump Ran for 50 Minutes without a Suction Source
28. **[R44]** CAPR 141473-03, Leak on Valve 1CS-243 Following a CSIP Start

2.5 Robinson Nuclear Plant References

1. **[R22]** OMM-001, Operations - Conduct of Operations
2. OMM-004, Operations Work Procedure
3. OMM-007, Equipment Inoperable Record
4. PLP-033, Post Maintenance Testing (PMT) Program
5. **[R20]** PLP-049, Fuse Control Program
6. PLP-050, Plant Labeling and Stenciling
7. ADM-NGGC-0104, Work Implementation and Completion
8. SCR 90-005, Men At Work Red Tags
9. ACR 91-061, Insufficient Clearance for PM
10. **[R24]** ACR 91-237, Sequence for Hanging and Removing Tags
11. ACR 92-352, Insufficient Understanding of Clearance Process
12. ACR 94-00127, EDG "A" Starting during Local Clearance Removal
13. ACR 94-00459, Valve Positioned within Local Clearance Boundary
14. ACR 94-00686, Removal of Clearance Boundary Valve
15. ACR 94-01421, Vent/Drain Caps Removed for Clearances
16. CR 95-0143, Potential Containment Isolation Valve Misposition
17. CR 95-0011, Incorrect Clearance Restoration Position
18. CR 95-01090, Improper Use of Sleeving for System Venting/Draining
19. CR 95-01352, Contaminated Local Clearance Tag Accountability
20. CR 95-01354, HVH Unit Damper Maintenance
21. CR 95-02114, IST Evaluation of Maintenance Activities
22. CR 95-02144, Verifying Personnel on QCHL
23. CR 95-02373, QCHL Maintenance
24. CR 96-03104, Clearance Preparation Without Controlled Documents
25. RAIL 94-R0645, Control of Equipment Inoperable Records
26. PGM 94-036, Plant General Manager Memo Addressing Review of OSHA Regulations for Electric Utilities
27. **[R15]** CR 80320, AFW-39 Misposition, Non-Cited Violation
28. **[R41]** CAPR CR 80615, RO21 Self Assessment Issue # 1
29. **[R42]** CAPR 160702, Clearance Boundary not Adequate for Work on FE-10830
30. **[R43]** CR 197038, Secondary Transient during Clearance Restoration

3.0 DEFINITIONS

1. **Abandoned-In-Place Equipment:** Plant equipment that is not required to support any plant functions or operations and is no longer being maintained. These components are identified in the EDB (Status) as "Inactive".

2. **Additional Measures:**

   a. Additional measures are used to ensure that no single action could, by itself, challenge the clearance boundary. Only one such additional measure is needed to be applied for each tagged isolation device.

   b. In determining the need for the application of Additional Measures, consider accessibility. Accessibility is essentially the question of whether the device can be reached without performing additional steps for access. For example, a valve in the overhead that requires a ladder or lift to access is out of the traffic area and thus would not require an Additional Measure. Clearance preparers will determine whether additional measures are required.

   c. Additional measures are not required for components used to provide energy release paths, only for those used for isolation.
   Methods include but are not limited to the following:

      - Mechanical
         a) Manual valves restrained with a tie-wrap
         b) Remotely controlled valves blocked, the control power removed
         c) Valve handwheels locked.
         d) Two isolation points in series
         e) Handwheels removed, although this practice requires not removing the handwheel until the component has been verified. Consider this only when used for small handwheels that have no other practical means to secure. (example; ball valves)
         f) Release devices secured on valve operators designed with a positive-release type operator (example: some ball valves are designed with a squeeze-to-operate handle)
      - Electrical
         a) Operating devices secured with cable ties through the installed lockout device only if it prevents operation of the device.
         b) Breakers with a blockable shutter that have the shutter blocked
         c) Lock hasps used on breakers with lockable operating handles.
         d) Two isolation points in series
         e) Panel doors secured against single-person entry (e.g. with a labeled hasp signifying no single-person entry due to tagged components inside).

3. **Affected Employee:** Workers and holders that could be injured by the energy being injected who are not part of the work group associated with performing the External Energy Injection evolution.

4. **Checklist Notes:** Checklist Notes are used for operational information pertinent to performing the checklist. They are locked once the checklist is approved.

5. **Clearance (C/O):** Instructions used to remove equipment from service for personnel and equipment protection.

6. **Clearance Cross Reference:** A section within an Equipment Clearance that may be used to track work activities associated with work lists and other related clearances.

7. **Clearance Holder:**

   a. A Clearance Holder is an individual that has successfully completed the requirements of the Clearance Holder training program and maintains a current Clearance Holder Training Qualification in PQD: Duty Area HLDR/Qual. Group GG16 Qualification OPR1301N (Initial) or OPR1301N (Requal)

   b. A qualified individual accepting the clearance, as appropriate, for their assigned work task(s) by signing electronically in the computer, (except in the case where the computer is unavailable, the forms in this procedure may be used).

   c. For contractors and Progress Energy employees, the Clearance Holder qualified individual responsible for the work task(s) being performed shall perform the function of PCH and electronically accept the applicable clearance. This employee shall be responsible to maintain the Clearance Worker List, for all individuals working under his direction. The Clearance Worker Tool shall be maintained and updated for the duration of the task and included in the work order package for record retention at the completion of work tasks.

8. **Clearance Information Tags (CIT):** A tag or label used to indicate that a component is out of service or is affected by a clearance. Clearance Information Tags are not part of the clearance boundary needed for personnel and/or equipment protection.

9. **Clearance Order Special Instructions:**

a. Clearance Order Special Instructions relay pertinent information regarding the safety of the clearance. Clearance Order Special Instructions may also contain operational information regarding plant conditions and/or requirements. Information required to be reviewed by a holder prior to accepting the clearance (Safety), shall be at the front of the Special Instructions to ensure that the information is not overlooked.

b. List clearance safety information together and do not mix it in with plant operational information. Typical safety information includes:

- Notes regarding plant conditions that the clearance is relying on.
- Components or circuits remaining energized
- Valve handwheels not tagged
- Double valve isolation requirements not met
- Vent or drain path requirements not met
- System cannot be completely depressurized or drained
- Warnings when sumps or transfer canals are utilized for radiation shielding and a high radiation condition may occur if compromised.
- Any other pertinent information related to the safety of the clearance
- Type and magnitude of all energy sources being isolated
- Requirement to perform Zero Energy checks
- Confined space requirements

c. List operational information after all safety information. Typical operational information includes:

- Loss of function incurred by the clearance activities
- Components not restored to required position
- System alignment requirements to restore a system to service, when checklists fail to satisfy requirements. (i.e. Procedures used for restoration.)
- Independent Verification waiver approvals and alternate methods of verification.
- Documentation of replacement of damaged or lost tags
- Documentation of CR for clearance greater than 90 days
- Containment breach created by clearance activities
- Documentation whether Compensatory Measures (ITS, Fire Plan, Containment Penetration, and so forth) are required per applicable plant specific procedures, as required.

10. **Clearance Preparer:**

- An individual qualified to develop Clearance Orders and Checklists.
- An individual that has successfully completed the requirements of the Clearance Preparer Qualifications listed in Enclosure 7, Clearance Preparer Qualifications.
- Maintains a current Clearance Preparer Training Qualification in PQD. Qual. Group GN07/Qual. POQ0004N.

11. **Clearance Tags:** Red tags installed on boundary points that isolate equipment from hazards in order to permit work to be performed safely.

12. **Clearance Worker:**

    a. Contractors and Progress Energy employees who are not performing duties as a Clearance Holder must have received the OSHA required training for Authorized Employees before performing Clearance Worker functions under the supervision of a qualified Clearance Holder. [CAPR CR 102355]

    b. An individual signed on to ETO Clearance Worker Tool, and authorized to work inside the clearance boundary. Persons signed on to ETO Clearance Worker Tool are required to have received the OSHA required training for Authorized Employees. All Clearance Workers are required to accept and release clearances utilizing the electronic ETO Clearance Worker Tool or, if qualified to do so, may sign directly on to the Clearance Holders Panel as described in section 9.11.

    c. The Clearance Worker maintains a current Clearance Worker Training Qualification or Clearance Holder Qualification in PQD. Contractors and Non-Qualified Progress Energy Employees – Qual Group GN34/Qual. GNI0005N.

13. **Concurrent Verification (CV):**

    a. The act of checking a condition, such as component position, concurrent with the activities related to establishing the condition or component position.

    b. Specific evolutions or actions where an improper positioning of a component has a high probability of resulting in an immediate plant trip, Safety System actuation, personnel safety issue or could result in an immediate threat to safe and reliable plant operation.

    c. This definition is also synonymous with the term Concurrent Dual Verification. Examples of such evolutions are:

    - Lifting or landing leads
    - Fuse installation/removal
    - Ground installation/removal
    - Operating a valve, switch or breaker
    - Positioning a throttle valve to a specific position
    - Performing position verification of locked, sealed or secured valves which require a second position verification.
    - Valves with ball-screw actuators that have the potential for damage to the valve seat

14. **Condition Clearance:** A clearance created with the intent to maintain the plant in a desired mode or that takes credit for administrative control of a given plant condition to control the hazards for the planned work. This type clearance will contain at least one PAR type tag describing the condition which is to be maintained or controlled. For example; maintaining RCS Level less than 135 feet.

15. **Confined Space:** A space that meets ALL of the following criteria **[R29]:**

    - Is large enough and so configured that a person can bodily enter and perform assigned work.
    - Has limited or restricted means for entry or exit.
    - Is not designed for continuous human occupancy.

16. **Equipment Clearance:** A clearance that because of its plant impact, personnel risk or equipment risk, is administered by the Operation's organization. For example, removing a piece of safety related equipment from service that requires isolating support and interface systems.

17. **External Energy Injection:** The introduction of an external energy source that could create a hazard to workers within the boundaries of an active clearance order. Examples include meggering/hi-pot of motors, hydrolazing, hydrotesting, restoration of power for testing or control circuitry testing, barring engines, and filling and venting for leak testing. Temporary power installed within the boundary of a Clearance for other than the examples listed are not to be considered EEI and additional boundaries to isolate the power from the work area are established.

18. **Global Tags:** Tags shared by more than one Clearance Order. Global Tags cannot be lifted until all Clearance Orders requiring the boundary are lifted. Global Tags do not indicate a Clearance Order number on the tag.

19. **Grounding Device:** Equipment used to provide additional protection for personnel when working on electrical equipment. For example, ground straps or grounding breakers.

20. **Grounds Holder (GRH):** The Individual placing grounds and accepting the applicable Clearance Order electronically

21. **Ground Tag:** Orange tags installed on Grounding Devices for the purpose of identifying and tracking installed Grounding Devices.

22. **Group Tagout:** Multiple Clearance Workers performing assigned work task(s) under the directions of a Principal Clearance Holder.

23. **Hazardous Energy:** Any energy, including mechanical, pneumatic, hydraulic, electrical, chemical and thermal that could cause injury to employees. Danger is only present when energy may be released in quantities or at rates that could injure employees

24. **Holder's Safety Verification:**

    a. The Supervisor or Lead from each work group that will hold a clearance shall designate at least one person to perform a Holder's Safety Verification prior to any holders or workers commencing work on equipment removed from service by a clearance. The Holder's Safety Verification shall include a walk down to verify effective isolation of the component(s) to be worked on. This walk down shall include visual observation that the isolation points are adequate and appropriately tagged. Completion of the Holder's Safety Verification shall be documented in each Work Order Task prior to commencing work. When boundary changes are performed on clearance orders a Holder's Safety Verification on the new boundaries shall be performed prior to accepting the boundary change. The Holder's Safety Verification may commence prior to all tags being hung. Once the clearance is walked down, additional walk downs will not be necessary if the work extends through multiple shifts/crews, unless Boundary Changes occur. When a Boundary Change occurs, each task must be re-evaluated, by the Principal Holders, to ensure that the change does not reduce the level of safety and documented in each work order task.

    b. Direct observation of Clearance Tags may be waived by the work group supervisor for the following concerns, i.e.:

        - ALARA
        - Safety at Heights
        - Heat Stress
        - Confined Space

    c. If direct observation of Clearance Tags is waived, the work group supervisor or designee shall document in the applicable work order task(s) the reason for waiving this requirement.

25. **Independent Verification (IV):** The act of checking a condition, such as component position, separately from activities related to establishing the condition or component position. Verification of actions is by a qualified individual other than the person who established the condition or component position being verified.

26. **Independent/Concurrent Verifier:** An Independent/Concurrent Verifier is an individual that has successfully completed the requirements of the Independent Verifier training program and have operational knowledge of the systems and components they may encounter. These individuals can perform tag verification duties associated with Equipment Clearances.

    The Independent Verifier maintains a current Independent Verifier Training Qualification in PQD. Qual. Group GN31/Qual. POI0005N

27. **Model Clearance:** A clearance model is used as a template for subsequent clearances to support preventive maintenance work activities. The model can be used repetitively to create clearances for the same regularly scheduled preventive maintenance work activity on the same piece of equipment. Clearance models are not used to create clearances to support corrective maintenance work activities. A clearance model can be derived from a historical clearance or independently developed and must be authorized for use by an individual knowledgeable with the clearance process.

28. **"NOT" Tagged Components:** "NOT" Tagged components are devices (i.e. valves, breakers, switches and so forth) that may be manipulated while the clearance is hanging. They are used to ensure status control verification during clearance order lift. They are not to be used as a clearance boundary. They may be used to establish conditions required by the clearance (i.e. venting or draining). Workers are not required to be notified when processing a "NOT" Tag only checklist.

29. **OSHA Affected Employee:** An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

30. **OSHA Authorized Employee:** A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An OSHA Affected Employee becomes an OSHA Authorized Employee when that employee's duties include performing servicing or maintenance.

31. **Parameter Tag:** A Parameter Tag is a type of tag in Passport only used to delineate the System Conditions (such as RCS level less than 135 ft) being relied upon for hazardous energy protection. This type tag is not required to be printed or hung. This tag, on active clearances, will show in Condition Clearance reports.

32. **Principal Clearance Holder (PCH):** A designated Clearance Holder who has electronically accepted the clearance and who may be providing coordination between multiple Clearance Workers performing an assigned work task under a Group Tagout. The PCH will be identified on the "Contacts" panel of the clearance within the computer.

33. **Principal Equipment:** The pieces of equipment cleared for work. The equipment must be a valid piece of equipment from the Equipment Database.

34. **Release of Clearance:** Release occurs when personnel who have been working under a clearance release their right to work and their right to protection under the clearance.

35. **Requester:** Is an individual who initiates a clearance or a boundary change request.

36. **Tag Hanger / Lifter:** An individual qualified to manipulate equipment and hang and remove tags according to the provisions of this procedure. These individuals can perform tag hanging duties associated with Equipment Clearances.

    The Tag Hanger maintains a current Tag Hanger Training Qualification in PQD. Qual. Group GN06/Qual. POQ0003N

37. **Work Control Center (WCC):** An office located away from the Control Room where assigned personnel prepare, coordinate and track Equipment Clearances and perform other administrative functions related to coordination of plant activities.

38. **Zero Energy Checks:** Zero Energy Checks validate de-energization of components to be worked by checking that stored energy has been released and discharged rendering the machine or equipment safe. The verification may include visual inspection techniques (for example, visually checking a sightglass or vent/drain for the absence of fluid) or testing the component or equipment with an appropriate test Instrument (for example, a voltmeter or combustible gas/oxygen indicator). For equipment or systems that operate above ambient temperatures, the Zero Energy Check includes verification that the temperatures are acceptable for work to safely continue or appropriate PPE is identified that will eliminate the potential burn hazard.

4.0 RESPONSIBILITIES

4.1 Manager – Operations

1. Responsible for the administration of the clearance procedure
2. Ensure that periodic audits are performed on the clearance process.
3. Ensure an independent inspection of the clearance process is performed on an interval not to exceed annually. **[R1]**
4. Ensure all Operations Personnel are qualified at the task level required by this procedure prior to performing any associated actions.
5. Ensure charge codes are provided to operations staff for capturing clearance development on Capital Projects.

4.2 Manager – Maintenance

1. Ensure necessary Maintenance personnel are trained on the corporate requirements for the use and specification of Grounding Devices.
2. Ensure all Maintenance Personnel are qualified at the task level required by this procedure prior to performing any associated actions.

4.3 Manager – Security

1. Ensure necessary Security personnel are trained on the Clearance requirements when contacted by a Maintenance or Operation Supervisor to place access on Administrative Hold for an individual. The access hold will only be enforced until communications have occurred between the affected individual and a responsible supervisor. Following confirmation from a responsible supervisor, the individual's access may be restored to their previous security level.

4.4 Manager - Training

1. Develop a training program to qualify personnel on the clearance process and this procedure.
2. Provide training on the clearance process and this procedure.
3. Provide clearance retraining on an interval not to exceed two calendar years.

4.5 Supervisors

1. Ensure personnel within their work groups are qualified to perform duties related to the clearance process.
2. Ensure personnel under their supervision comply with the requirements of this procedure.
3. Ensure that a Holder's Safety Verification is completed prior to any holders or workers commencing work on equipment removed from service by a clearance.
4. Ensure the Holder's Safety Verification is documented in each Work Order Task being worked prior to any holders or workers commencing work.
5. Ensure Independent Verification (IV) is performed.
6. If plant needs dictate the release of a clearance, and all Clearance Holders/Workers have not signed off in the computer or Clearance Worker List, in the ETO Clearance Worker Tool, a Maintenance Supervisor or Operations Supervisor may release the clearance provided:
    - Supervisor has Security Profile of "TO-REL-OTHER"
    - The Clearance Holder/Worker who are not available have been verified to be off site, and reasonable efforts to contact those Clearance Workers have been made.
    - The Clearance Holder/Worker must be informed of clearance release prior to resuming work at the facility.
    - If unable to contact Holders/Workers, a Maintenance or Operations Supervisor shall contact Plant Access to ensure that the Holder/Worker is not on site and use Attachment 15, Release Documentation of a Clearance by Another Employee shall be used when it is confirmed that the Holder/Worker cannot be located or contacted.
    - If work could resume, in an area where access cannot be restricted by Security, additional actions will need to be taken to ensure that the worker does not resume work. Such actions could include locks or stationing of an individual at the work location.

5.0 PREREQUISITES

None

6.0 PRECAUTIONS, LIMITATIONS, AND NOTES

1. This procedure applies to both Power Block and Non-Power Block Equipment.
2. If Checklist Notes must be changed after approval then the checklist must be modified and re-approved.
3. The use of wire lifts on electronic devices not designed for routine lifting, such as relays, to establish a routine clearance boundary is to be avoided. **[R28]**

7.0 SPECIAL TOOLS AND EQUIPMENT

None

8.0 ACCEPTANCE CRITERIA

None

9.0 INSTRUCTIONS

9.1 General Administration

1. This procedure is not to be revised without concurrence of the NGG Clearance and Tagging Working Group. Any revision shall be reviewed by an OSHA Subject Matter Expert for Clearance and Tagging. The addendums for specific plants may be changed for that plant only based on unique plant design differences. The addendums are not to be used to administer different operating philosophies. If changes are made by the associated plants, a follow-up AR is to be generated to require the NGG Clearance and Tagging Working Group to evaluate changes for inclusion into the body of this procedure.
2. This procedure recognizes organizational differences. Even though some position titles may vary, the responsibilities and functions of the position itself should be relatively consistent. Refer to OPS-NGGC-1000, Fleet Conduct of Operations.
3. The clearance process is intended to be used when there is a potential for personnel injury or equipment damage associated with an activity. The clearance process is designed to maintain system configuration control but is not to be used solely for that purpose. Other site processes are used for configuration control purposes when the risk of personnel injury or equipment damage does not exist.
4. Clearances are not to be used with the sole intent of long-term disabling of equipment or in instances where a plant modification would be more appropriate.
5. When determining if a clearance is required, consider if there is a potential for personal injury or equipment damage from:
   - High temperature fluids or toxic chemicals?
   - Applied pressure forces?
   - Energized electrical components?
   - Maintenance on or in the vicinity of rotating equipment?
6. A clearance shall always be required for grounds.
7. CITs are not to be used as a clearance boundary. CITs are used for information only. They are used to indicate that a component is out of service or is affected by the clearance.
8. Clearance Information Tagged (CIT) equipment may be operated as follows:
   - When no specific equipment position is specified for the CIT tagged equipment, the equipment may be operated as necessary.
   - When a specific equipment position is specified for the CIT tagged equipment, the equipment may be operated after the Clearance is hung and verified as long as it is restored to its tagged position after manipulation.
9. When tagging of control switches is desired, CITs should be used if the switch does not form a part of the clearance boundary. For switches that are a part of the clearance boundary, a miniature Clearance Tag or a switch cap is used.

10. Tagging on control panels requires the use of tags small as possible to prevent totally obscuring plant status indications, controls, switches and labels.

11. Clearance tagged or ground tagged equipment is not to be operated for any purpose while under clearance. The following are exceptions to this requirement:
    - Verification of required valve position by the clearance Independent Verifier.
    - Additional torquing of boundary valves to gain adequate isolation. If personnel determine that torquing of boundary valves is needed, the WCC must be notified. The WCC will determine how best to perform and to document the additional valve torquing.

12. If tags are noticed to be damaged, missing, or have fallen off, the WCC shall be notified. The WCC will consider stopping work within a clearance boundary if Clearance Tags or Ground Tags are discovered missing on isolation boundaries. The WCC shall replace any Operations tags. **[R6]**

13. Clearance Tags and Ground Tags are used to indicate a piece of equipment is adequately isolated or de-energized to prevent equipment damage or personnel injury. Other devices such as locks may supplement the tag, but the Clearance Tag or Ground Tag is the primary means of control. If locks are used in conjunction with an Equipment Clearance, the WCC is to be notified. Provide the WCC with a method to disposition the lock in an emergency situation.

14. All employees who need a clearance for protection must personally sign on to the clearance, through electronic means (manual sign on acceptable if computer mainframe is down), for all associated assigned work tasks. An employee needs a clearance for protection if the individual is performing hands-on work where direct contact is being made with the piece of equipment removed from service by the clearance or if the individual must physically breach the equipment removed from service by the clearance. If only a visual inspection is being performed and the equipment removed from service by the clearance is not physically breached (i.e. looking inside a disassembled valve or open heat exchanger from the outside) then the individual does not need to be signed on to the clearance. If a component is removed from the system and work is being performed on that component while not attached to the system (on the floor or in the shop), then the individual does not need to be signed on to the clearance (however, the workers removing the component from the system and reinstalling it into the system do need to be signed on to the clearance.)

    Examples of when an employee must sign on to a clearance:
    - Performing decontamination activities or surveys directly on the shaft of a pump removed from service by a clearance
    - Inspecting an electrical connection removed from service by a clearance where the electrical connection must be physically contacted
    - Performing a visual inspection of a tank or heat exchanger removed from service by a clearance where physical entry into the tank or heat exchanger is required
    - Building scaffolding inside a component removed from service by a clearance

15. Clearance boundary valves shall be tagged. This is to prevent the possibility of a boundary valve being removed from the system because there is nothing identifying it as a clearance boundary valve. For valve operators that do not have handwheels, the operator shall be tagged. For example, a solenoid operated valve should be tagged locally in addition to removing power to the solenoid. Exceptions to this requirement are allowed for ALARA or safety concerns.

16. For systems that operate with temperatures greater than 200°F, pressures greater than 500 psig, caustic or acid systems (excluding boric acid):

    a. If plant design allows, then isolate from the work area by two in series closed valves when the system is to be breached.

    b. If plant design allows but double isolation is not used then M-SO permission shall be obtained to hang any clearance that meets the above requirements and does not use double valve isolation. This permission and a notification to the workers of the clearance boundary limitations shall be noted in the Clearance Order Special Instructions.

    c. If plant design does not allow double valve isolation to meet the above requirements, Then M-SO permission is not required, but a notification to the workers shall still be noted in the clearance Special Instructions.

17. When system configuration or system operating requirements does not permit the use of boundary isolation valve, the establishment of a freeze seal may be considered an adequate boundary.

18. System Conditions may be used as the clearance boundary.

    - Examples of system conditions that may be used as clearance boundaries are, but not limited to the following:

        1) Controlling Reactor Coolant Level

        2) Controlling Reactor Coolant Temperature

        3) Maintaining system alignments to comply with Technical specifications

        4) Use of a plug, bladder, or similar device as a boundary for system isolation when a device cannot be tagged directly or remotely

    - When system condition(s) are used, the specific condition(s) shall be identified in the Clearance Special Instructions along with the limits of the parameter involved and Contingency actions to be taken in the event a loss of the condition occurs. The contingency actions shall be clearly defined.

    - The system condition being used shall be identified by assigning it to a component with a Parameter Tag and used to delineate the System Conditions being relied upon for hazardous energy protection.

    - When system conditions are used for Condition Clearance boundaries the Operations Manager shall approve use of the Clearance and this approval shall be documented in the Special Instructions section of the clearance.

    - When a Condition Clearance is being used as an isolation boundary, a method of communication shall be discussed and agreed upon between Operations and Clearance Holders / Workers.

- A Condition Clearance status document indicating the Mode and/or Plant Conditions being relied on for Condition Clearances shall be posted in the Main Control Room (MCR) and Work Control Center (WCC).
- When Condition Clearances are distributed, the SRO distributing the clearance SHALL ensure that the Condition Clearance Report posted in the MCR and WCC is appropriately updated.

19. A clearance is not required for the following. NGGC/Site configuration control methods will be used to document component position.
    - Installation of test equipment, hoses, rigs and so forth when a local isolation is available.
    - Breaker maintenance when maintenance is restricted to the breaker.
    - Work on pneumatic components, if a local pneumatic isolation is available and the pneumatic component is not used for boundary isolation. Notify the WCC prior to positioning any pneumatic isolation valve(s).
20. Electrical components are normally de-energized by opening a breaker, operating a switch, or by pulling a fuse. In those cases where this is not feasible or desirable, it is permissible to lift leads or slide links as follows:
    1) If leads have to be lifted or links slid, it is preferred that the leads are lifted/links slid locally at the component and documented using OPS-NGGC-1308, Plant Status Control.
    2) Leads/links shall be Concurrently or Independently verified on those systems as required by site procedures.
    3) Clearance Tags shall be installed on the lifted leads/links if the leads/links are out of the direct control and oversight of the personnel performing the work and if the component is a boundary isolation device meeting the requirements for employee safety identified in SAF-NGGC-2175, Electrical Safety and ARC Flash Protection.
21. If electrical isolation cannot be performed, it is permissible to work on energized electrical components as allowed by site and corporate safety procedures.
22. Rotating generators with field current breakers open may still create a source of electrical energy that must be accounted for when developing a clearance.

23. For complex electrical clearances, where prints are inadequate or not available and/or input from shop personnel is requested to write a clearance: **[R33]**

    a. If shop input is requested, then two competent shop (and/or engineering) personnel shall independently determine clearance boundaries. They shall list the clearance specifications on and sign and date the bottom of Attachment 2, of OPS-NGGC-1301, Shop Support Clearance Boundaries.

        - Attachment 2, of OPS-NGGC-1301, Shop Support Clearance Boundaries Request Form, shall be maintained and transmitted along with the clearance.

    b. Zero energy checks will be performed as an additional verification of the clearance hang process. This will ensure adequate boundary isolation. If alternate indications are not available for the tag hanger to determine that the device de-energized the desired circuit/component then "CMT" type steps will be added to the initial hang checklist to ensure each required circuit/component is de-energized prior to the checklist being completed. These "CMT" type steps can be sequenced as needed for efficiency. The "CMT" type step shall identify the location and method of the zero energy check(s) to be performed. This may require input from maintenance during the checklist development stage. For these "CMT" type steps, the clearance preparer verifying the checklist will only be verifying that the method selected in the "CMT" type step is adequate for zero energy determination.

    c. The zero energy checks shall be performed by qualified technician/craft worker(s). Concurrent verification that the technician/craft worker is measuring the correct terminal points is required. The technician/craft worker shall initial the "Completed By" block on the Checklist and SHALL print their passport ID next to the step. The concurrent verifier will follow this same process. The clearance desk operator will enter the checklist completion information on the "TIMT222 – Checklist Completion screen" for each "CMT" type step prior to completing the checklist.

24. When system vents are left open and uncapped review the requirements of MNT-NGGC-0007, Foreign Material Exclusion Program.

25. When boundary valves leak by their seat and a complete draining cannot be accomplished, the WCC SRO and the Clearance Holder shall determine when conditions are safe to perform the required maintenance.

26. Systems with a history of not isolating securely when installing clearances are treated as follows:

    - To get a leak tight isolation for clearances on these systems, the boundary valves should be closed normally (with control switch if applicable).

    - If normal closure does not provide leak tight isolation the boundary valves may have to be manually operated through several partial open/close cycles to remove any solids that may have settled onto the seating surface.

    - For butterfly valves which are not isolating properly, it is possible to obtain a better isolation by turning the valve slightly in the open position in case the

valve closed slightly past the seat when the valve was shut. Maintenance assistance should be requested to accomplish this task.

- Significant difficulty in achieving isolation or problems with normal closure should be reported to System Engineer to ensure system operability is not affected.

27. Maintenance will be allowed on boundary isolation components provided that the work activity will not alter the ability of the boundary isolation component to perform its isolation function.
    - Examples of work activities that can be performed on boundary isolation devices are as follows:
        - Limit switch grease inspection
        - Flex conduit repairs
        - Re-lugging of wire connections
        - Electrical disconnect and reconnect of motor
        - Limitorque grease inspection for rising stem and gate valves
        - Anti-rotation device inspection
        - Work on breakers
28. Special consideration should be given to clearances that involve systems that are common to other units.
29. Station policy and scheduling practices should limit the use of External Energy Injection to the extent practical. If energy injection during work sequences is unavoidable, then the following limits on using External Energy Injection shall be followed:
    a. The activity should be performed in accordance with component-specific approved procedures or approved work plans. Attachment 16, External Energy Injection Form, will be used for all External Energy Injection evolutions. The work group performing the energy injection will perform Attachment 16 and the Attachment 16 should remain with the work package associated with the External Energy Injection.

    b. When a work authorization is granted that will inject energy into a clearance boundary, a Holder Lock should be placed on the affected clearances to prevent any holders from accepting the clearances for any other work covered by the clearances.
    - It is acceptable to allow Holders to accept a clearance by signing-in through the WCC Operators Login (Holder Lock shall not be removed) provided they are signed in on Attachment 16, External Energy Injection Form.

    c. The work group using the external energy is responsible for ensuring that energy being introduced will not jeopardize worker safety.

    d. The responsible work group designates a lead person to be responsible for all aspects of the External Energy Injection activity.

- The lead person should contact all supervision for all work in progress under the clearance to discuss the impact of the External Energy Injection on all work in progress.
- The lead person should ensure that all affected holders and workers that are not involved in the External Energy Injection activity sign off of the affected clearances. If it is not practical for all affected holders and workers to sign off of the clearances, then approvals will be obtained from the affected holder(s)/ worker(s) and documented on Attachment 16, External Energy Injection Form. For External Energy Injection, an affected employee is an individual that could be injured by the energy being injected and are not part of the work group associated with performing the External Energy Injection evolution.
- The lead must notify the WCC to remove the Holder's Lock when External Energy Injection is complete and it is safe for work to resume.

30. Station/Line Clearances are administered by System Operations. NGGM-IA-0003, Transmission Interface Agreement for Operation, Maintenance, and Engineering Activities at Nuclear Plants should be used to identify responsibility boundaries between Nuclear Plant Operations and System Operations.
31. Equipment Clearances will be maintained by the Operations Department.
32. For Equipment Clearances, the form used should be generated from a clearance computer program, or a copy from this procedure. The computer-generated form may not exactly match the form in this procedure, but the two forms should be similar and include similar information.
33. For clearances that involve the removal of fuses, where fuse information is available on the Parameters1 or Models tabs, use Attachment 11, Fuse Removal/Installation Guidance.
34. For devices having a remote operator, such as a valve reach rod, where both valve and reach rod have a handwheel and are accessible, the clearance should be written such that both mechanical devices are tagged. Tags for the valve handwheel may be excluded if radiation levels make entry into the area undesirable (as a guideline, anticipated dose greater than 10 mrem). If the valve handwheel is not tagged, it should be noted in the Special Instructions.
35. If use of freeze seal is required, follow the requirements outlined on Attachment 17, Freeze Seal Guideline.

36. Motor operated valves may be used as an isolation boundary point provided, after the valve has been positioned for the clearance, its power supply is isolated and tagged and the handwheel is tagged to indicate the valve position. The valve should not be manually engaged to check position. This will prevent inadvertent damage to the torque switch and/or valve seat, and prevents the drifting problem associated with some Limitorque operated valves. Since the valve position may not be available after the motor breaker is turned off, concurrent verification may be used to determine valve position before isolating the power supply. If the valve is determined to have seat leakage, it is permissible to manually engage the handwheel and torque the valve shut. Refer to site procedures for positioning and position verification associated with motor operated valves.

37. When Motor or Air Operated valve maintenance occurs where valve actuator removal is required, the system may need to be depressurized to prevent stem ejection from occurring. If the system is not depressurized, then an engineering evaluation of stem ejection characteristics for the valve should be performed prior to removing the actuator.

38. Systems, or portions of systems, and components that normally operate at temperatures and pressures above ambient, or systems under vacuum, should be vented and drained as necessary for the performance of work. Whenever possible, an atmospheric drain and/or vent between the work area and sources of pressure to the work area should be tagged in the open position with the cap/flange removed to release pressure in systems and to accommodate thermal expansion and contraction. If depressurization via vent and/or drain paths cannot be provided within the clearance boundary, other definitive measures should be taken to verify the system or component is adequately drained and depressurized. These measures include breaking of flanged connections, loosening of valve bonnets, removal of instrument tubing or other similar actions. If the system cannot be completely depressurized or drained, a comment should be included in the clearance Special Instructions.

39. When isolating high pressure pumps without suction relief protection, consider aligning a recirculation or drain flow path prior to shutting the suction valve to protect the pump suction from over-pressurization until the high pressure isolations can be verified to be holding.

40. Do not use “Abandoned-In-Place Equipment” as boundary isolations. If the only valve available for a proper boundary is abandoned (Inactive), Maintenance and Operation’s supervision must concur and this concurrence must be documented in the Special Instructions as a Caution.

41. If an Emergent Equipment Clearance is needed and the clearance computer program is unavailable, the appropriate attachments in the back of this procedure may be used to manually prepare the clearance.

    A Clearance Log Sheet (Attachment 1) will be filled out for tracking purposes starting with clearance number YY-XXXX. (YY = current year and XXXX will be sequential numbered starting at 0001). Once the computer system has been restored, all information should be entered into the computer.

    Any tags that are still hanging should be replaced with the computer generated tags.

    The manually generated clearance forms should be saved until the computer generated clearance has been closed and all pertinent information captured.

42. Specific Plant Addendums should be referenced for all employees working under this procedure.

43. Attachment 10, Clearance Process Checklist, is required to be used for all clearances generated in conjunction with this procedure.

44. The introduction of fluids, either gas or liquid, into a system within a clearance boundary may be performed by work groups other than Operations provided it is according to an approved procedure and with the concurrence of the CRS or SM. The location at which the fluid is to be introduced into the system shall be specified in the procedure.

45. Any approved clearance older than 6 months, must be evaluated to ensure that it meets the intent of the current revision to this procedure. If not, it must be re-written using the current revision.

46. When equipment that operates at temperatures above ambient is removed from service, it should be allowed to cool prior to starting work or precautionary measures, such as wearing the appropriate PPE, shall be taken to eliminate the potential burn hazard.

47. NGG Fleet Clearance Strategy

- The NGG has adopted, at all stations, several strategic elements that are important to ensure safe clearances exist, and to ensure a process exists that facilitates the efficient performance of maintenance tasks.
- Each site in the NGG fleet is committed to the following elements of this clearance strategy:
  - Global Tags will be the default computer method at all stations. Global Tags have proven to reduce the number of actual hang and lift activities which provide the best use of Operations resources and decreased dose. In addition, if used properly, the elimination of boundary modifications can be realized.
  - Maximizing the reliance on plant conditions that eliminate the hazard will be used at all stations. These system conditions make the system or component safe to work. This strategy protects the worker and reduces clearance activities that are not necessary. An example is the use of RCS level as a plant condition for installing nozzle dams on a PWR.
  - Use model clearances for PM's that are written against equipment.

9.2 Clearance Request

1. Notify the WCC personnel when a clearance is needed to support non-scheduled work.
2. Determine whether the work can be done without a C/O.
3. Determine whether the work can be done using a Personal C/O. (Reference OPS-NGGC-1301A, Personal Clearance.)
4. Submit a Clearance Request.
   a. Generate clearance request to describe the work being performed including any special instructions or requirements. (See examples in step 4c.)
   b. The following applicable items and any related information shall be included in each Work Order.
      - The equipment to be worked on and the conditions required for the work to be performed.
      - A detailed enough explanation of the work scope requirements to ensure adequate protection for personnel safety from the hazard. This shall include information as to how the system will be breached (mechanically, electrically, etc.)
      - Any information related to additional potential hazards associated with the work (e.g. system to be vented and drained to relieve pressure)
      - Identify applicable fuses or leads to be pulled/lifted associated with performing the maintenance
      - Identify applicable grounds and locations
      - Identify applicable boundary changes
      - Reference applicable drawings for performing the maintenance
      - Evaluate the work being performed and request isolation/control of fire protection systems if needed (i.e. CO2 and Halon)
      - Identify if partial procedures will be performed, including procedure/surveillance numbers and steps.

c. Examples of clearance requests:

- 1CC-10, inspect and repair. Need valve isolated, depressurized and drained to allow disassembly.
- Personnel are replacing CDV-185 with new. Hydraulically and electrically isolate valve from service. Do not isolate air supply to actuator such to permit valve stroke adjustment.
- Seal replacement on 'A' Safety Injection pump. Pump must be de-energized, hydraulically isolated, drained and vented.
- Pressurizer Relief Tank drain RC-523A will need to have the diaphragm replaced. This will require the valve to be isolated from the system, depressurized and drained to allow the bonnet to be removed for this work.
- Work to repair refrigerant leaks on control room refrigerant unit WCCU-1A. Starting power to compressor should be isolated when requested by Maintenance.
- 1CZ-8. PM-M0014 Limitorque Inspection. Electrical clearance required. Do not tag handwheel.

5. Supply EC drawings or required information on the task document references M104 panel (i.e., modifications) if current approved drawings are insufficient for determining isolation points.
6. Ensure a separate Work Order Task is provided for each desired expanded clearance boundary. An additional work order is not required in instances where the boundary will be collapsed to complete the work order. The Boundary Change process adequately controls work safely in these instances. (E.G. Additional tags are needed to provide an adequate clearance boundary for a given Work Order.) **[R31]**

9.3 Clearance Development: Preparation

1. The Clearance Preparer shall understand the scope of the maintenance activities and prepare a clearance ensuring that the administrative requirements of this procedure are met.
2. Applicable Work Orders should be listed on Principal Equipment panel.
3. Prepare and verify clearances to ensure safe operating conditions exist while equipment is being removed from service, maintained, and returned to service.
4. Define precautions and prerequisites to be observed prior to the installation and removal of a clearance.
5. Ensure the clearance boundary is adequate to provide personnel and equipment protection, and support the work requested.
6. Plant Clearances, that require installation of Temporary Power, shall be reviewed / evaluated to ensure that the Temporary Power will not introduce an external energy source within the Clearance boundaries. Additional Clearance boundaries shall be established to protect the work area prior to the Temporary Power installation if required.
7. A Model Clearance that is attached to a Model Work Order will generate a new Clearance and Checklist in the Plan status. These Clearances have the Work Order Task assigned by Passport and do not require a Clearance Request. The Clearance Preparer and Verifier must confirm the accuracy of the new Clearance by reviewing the Steplists, Checklists, and Special Instructions. If the Model Clearance is not accurate for the preventive maintenance activity, then it must be revised and re-authorized before it can be used to create a new clearance.
8. A Clearance Preparer can background a Clearance to create a new clearance to support maintenance work activities
9. Components that need to be manipulated as part of planned maintenance must be added to the clearance as "NOT" tags or ensured that other measures have been taken to ensure proper restoration.
10. If the Clearance Preparer is unfamiliar with the piping layout, then a field walk down should be performed. If the area is inaccessible, a Clearance Preparer familiar with the piping layout should be consulted.
11. If a Fuse is to be used as a boundary, and fuse information is available on the Parameters1 or Models tabs, then copies of Component Models and Parameters are to be included in the Clearance Package prior to clearance implementation. These can be retrieved from the TIMD030 Panel by clicking the "Models" and "Parameters1" tabs.
12. If temporary power is installed within the boundaries of an existing clearance or clearances, all affected clearances shall be evaluated and additional boundaries shall be added as required to protect the work area prior to the installation of temporary power. **[R32]**

13. When grounds are needed for additional measures of protection, generate a ground checklist of type GR to control the ground installation and removal. Grounds shall be installed and removed in accordance with Section 9.10 Installation/Removal. Grounds are not to be considered part of a clearance boundary. Grounds provide an additional measure of protection against induced voltages and dissipate energy within the boundaries of a Clearance. Remove all grounds when work activities are complete and prior to removal of any Clearance Tags associated with the electrical boundaries associated with the Grounding Device(s).

14. If it is anticipated that a component will be tagged by multiple clearances and the component is not in the Equipment Database (EDB), then add the component to the EDB in accordance with EGR-NGGC-0012 or other approved processes This will support the use of a Global Tag on the component. Due to human performance issues, it is not desirable to have multiple tags on a component. **[R30]**

15. If a component is not in the EDB and found to have multiple tags (non-global) hanging on it, then add the component to the EDB in accordance with EGR-NGGC-0012 or other approved processes as soon as practical to support the use of a global tag on the component. The clearances tagging the component are then to be evaluated for performing a boundary change to place a global tag on the valve and remove the non global-tags. **[R30]**

16. Identify Additional Measure components during preparation of clearance order and if applicable, the methods to control. (i.e. Lock, Secure, etc.)

17. The special instructions of each clearance shall include a note stating Zero Energy Checks are to be performed prior to commencing work. This note shall include the type and magnitude of all energy sources being isolated. This note shall be included in the Safety section of the Special Instructions. (See example)

EXAMPLE

Potential energy sources isolated by this clearance are; 4160VAC, 480VAC, 125VDC and 1000psig steam pressure that could be 900 °F. Perform appropriate Zero Energy checks prior to commencing work.

18. Clearances written for one unit that affect systems common to the another unit must be carefully evaluated to assure that conditions on both units allow the equipment/system to be removed from service.

19. Clearance impacts must be evaluated to ensure that affects on systems and components outside of the clearance boundary are identified and are acceptable, or properly dispositioned (i.e., evaluate affect of work on fire systems such as CO_2/Halon).

20. Attachment 9, Boundary Device Tagging Guidelines, should be used for proper tagging of clearance boundary devices. **[R14]**

21. The Clearance Preparer shall identify any significant loss of function incurred by clearance activities and document the loss of function in the clearance Special Instructions. Some potential examples of significant loss of function may include disabled annunciators, defeated protective relays, defeated trip functions, disabled indicators, disabled meters or gauges, masked annunciators, or loss of monitoring capabilities.

22. Ensure a Work Order task or Work Request has been created to facilitate venting of instrumentation upon returning a system to service following work that may have drained the instruments.

23. Perform system fill and vents according to site procedures and OPS-NGGC-1309, as applicable. When establishing a clearance boundary, the Clearance Preparer should ensure that the piping within the boundary can be adequately filled and vented via station fill and vent procedures during clearance restoration. If the proposed clearance boundary on an ECCS system will result in a fill and vent configuration different from that assumed in station fill and vent procedures, contact the appropriate system engineer and request an assessment to ensure a complete fill and vent can be accomplished. The assessment should ensure that voids introduced into the piping during maintenance can be eliminated or reduced to an acceptable size during fill and vent activities. This may include performing a UT to ensure systems are adequately filled and vented. **[R16, R 17, & R12]**

24. Use controlled copies of approved reference materials in the preparation and restoration of clearances. When a controlled document is not available, other means may be used as deemed appropriate. For example: performing a field walk down or using a technical manual. **[R25]**

25. Uncontrolled reference documents may be used in the preparation and restoration of clearances.(i.e., marked-up portions of drawings, System Description information, email resolutions, technical manuals, etc.) When uncontrolled documents are used they should be attached to the Clearance through the Documents panel for reference.

26. The Clearance Preparer shall evaluate the requested equipment against current or expected plant conditions and determine required lineups necessary to isolate and restore the component, using controlled and approved references. **[R5]**

27. When Reactor is less than 200°F, a clearance that creates a Containment breach should be documented with the containment compensatory plan listed in the Special Instructions.

28. Activities may be added to an active Equipment Clearance or an approved Equipment Clearance that contains an approved Checklist provided that two Clearance Preparer qualified individuals verify that the clearance boundary is adequate for the activity.

29. If a Work Order Task assigned to a Clearance is revised and the revision affects the clearance requirements, the Clearance boundaries must be verified to remain adequate by two qualified preparers, regardless of the Clearance status when the Task was changed. Document this verification for Clearances beyond the Plan status in the Special Instructions.

30. Any pertinent information should be listed in the clearance Special Instructions.

31. Ensure equipment restoration positions are correct in the Steps List when preparing the clearance restoration.

32. For a Condition Clearance, list "Condition Clearance" in the title.
    For instances where the title of the clearance cannot be changed (example: adding a Parameter Tag to an existing clearance), place this information in the Special Instructions under the clearance safety information. Condition Clearances may contain only Parameter Tags or a combination of Parameter Tags and other tags

33. When isolating components or equipment that are considered a confined space, hazards associated with flowable materials (materials such as steam, gas, etc which could create atmospheric hazards due to leakage of a single valve) will be considered isolated only by the use of the following techniques:

    a. Blanking or blinding

    b. Misaligning or removing sections of lines, pipes or duct

    c. And/or double valve isolation

        - When double valve isolation is used, a vent/bleed path must be established between the isolation valves to monitor for leak-by.

    The confined space must be identified as a permit required confined space if the clearance does not meet the above criteria. Furthermore, the confined space cannot be declassified until isolated in accordance with the above techniques. If a confined space is not isolated in accordance with the above techniques then annotate in special instructions that it is a permit-required confined space.

9.4 Clearance Development: Hang Checklist

1. Electrical power to a motor should be secured before cooling water and/or lubrication is secured and administratively controlled. If immediate equipment damage could result, then RED Tag the motor power before securing cooling water and/or lubrication.
2. To prevent moisture buildup on motor windings, motor heaters should remain energized unless actual motor work is to be performed. If the motor heaters are placed under clearance, prompt restoration of the heaters is desired to minimize the effect on the motor.
3. Specify the proper tagging sequence for installation, paying particular attention to removing systems from service in a sequence that will not cause personnel injury or equipment damage.
4. For systems where a pump or fan is affected by a clearance, the clearance should be installed and removed in the sequence listed in the table below to prevent damage to equipment. Deviations from the sequence and specific instructions below are allowed for safety, ALARA, or if the deviation would not impact personnel or equipment safety.

Clearance Installation	Clearance Removal
1. Secure pump/fan and hang a tag on its control switch.	1. Remove tags from handwheels of valves and reposition manual valves as required. For pumps, open the suction valve before opening the discharge valve.
2. Remove the power source for the pump/fan prime mover (open breaker, remove fuse, shut steam supply valve and so forth) and place tag on the power source.	2. Remove tags on power sources to valves and restore the power supply as required.
3. Reposition valves from control switches, as required by the clearance, and place tags on the control switches. Include tags for switches in alternate locations if applicable.	3. Remove tags from valve control switches and reposition valves as required.
4. Remove power source (electrical, air, hydraulic, and so forth) from valves, if applicable, and tag the power source removed.	4. Remove the tag from the power source for the pump/fan prime mover. Restore the power source as directed by restoration lineup.
5. Reposition manual valves as required by the clearance and place tag on handwheels of the valves covered by the clearance. For pumps, shut the discharge valve before shutting the suction valve.	5 Remove the tag on pump/fan control switch and reposition the switch as required.

9.5 **Clearance Development: Lift Checklist**

1. During Lift Checklist development, a Clearance Preparer shall determine:
   - Restoration positions. The restoration position should be based on current plant status / conditions. This may include reviewing applicable procedure steps and/or valve lineups to determine plant status.
   - Specify the proper restoration sequence, paying particular attention to restoring in an order to prevent personnel injury or equipment damage.
   - Independent Verification requirements using OPS-NGGC-1303
2. If relying on a system alignment for restoration, the procedure and section or valve lineup being relied on should be specified in the Special Instructions. **[R18]**

NOTES:
1. Boundary Change Checklists may be prepared prior to receiving Attachment 6, Boundary Change Form.
2. Steps 3.0 and 4.0 of Attachment 6 may be performed concurrently.
3. Hang and lifts shall be on separate checklists unless there are no holders.

9.6 **Clearance Development: Boundary Change**

1. Use Attachment 6, Boundary Change Form, for all boundary changes.
2. A Clearance Preparer shall develop a boundary change in accordance with Attachment 10 and identifies all affected clearance orders.
3. A second Clearance Preparer who is a Licensed Operator shall verify a boundary change is adequate.
4. Each boundary change shall be authorized by an SRO. This authorization is indicated by the Checklist Status being “Distributed” and indicates the SRO has verified the following:
   - Plant conditions are correct for the boundary change
   - The boundary change will not adversely impact plant operation
   - Applicable compensatory actions have been initiated
   - The Control Room has been notified, as necessary
5. The boundary change is then assigned to a Tag Hanger for implementation. The Tag Hanger shall initial each step and print their Passport short name at least once with their initials for each Checklist.
6. Workers and holders shall perform Zero Energy Checks after any change to the clearance.

7. **[Boundary Change Requester]** Perform Step 1.0 and 2.0 of Attachment 6, Boundary Change Form.
   a. If the boundary change is unplanned then generate a CR to document the challenge to the process. (Unplanned boundary changes can be defined as any boundary change for work that was not in the schedule at the T-3 week. CRs are not required during refueling outages, forced outage or emergent work having a priority of 1 or E.)
8. Prepare the Boundary Change and document on Step 3.0 of Attachment 6, Boundary Change Form.
   a. Place a Holders Acceptance Lock on the clearance prior to generating the Holders and Workers List to prevent additional Holders from accepting the Clearance Order.
9. Boundary Change notifications are performed as follows:
   a. Holders may-Sign Off of the affected clearance(s).
   b. If any Holder(s) will remain on the affected clearance(s) then:
      1) Print a Clearance Order Active Holders and Workers report with the Boundary Change Checklist.
      or prepare Attachment 6, Boundary Change Approvals table on page two of the Boundary Change Form.
      2) **[Boundary Change Requester]** Explain the intent and scope of the boundary change to all Clearance Holder(s) and Worker(s) and then obtain their initials on the printed report or prepared Boundary Change Approvals table.
      3) If a Holder or Worker cannot be located then contact a Maintenance Supervisor or Operations Supervisor to release the clearance per Subsection 4.5.6.
10. If the boundary change involves hanging tag(s) only then:
   a. Generate a Boundary Change (BC) hang checklist for tags to be hung.
   b. Hang the necessary tags and notify BC Requester when complete per Step 4.0 of Boundary Change Form.
   c. **[Boundary Change Requester]** Perform:
      1) Holder Safety Verification
      2) Zero Energy check(s) performed as necessary
   d. **[Boundary Change Requester**] Ensure notification of all holders and workers is complete.
   e. **[Boundary Change Requester]** Sign Step 5.0 of Boundary Change Form.
11. If the boundary change involves lifting tag(s) only then:
   a. Generate BC lift checklist for tags to be lifted.
   b. **[Boundary Change Requester]** Ensure notification of all holders and workers is complete.

c. **[Boundary Change Requester]** Complete Step 5.0 of Boundary Change Form.

d. Execute the BC checklist and remove the necessary tags per Step 6.0 of Boundary Change Form.

12. If a boundary change is requested to lift and hang multiple tags then:

    a. Generate the BC Hang Checklist and BC Lift Checklist for tags to be added and removed.

    b. Hang the necessary tags and notify BC Requester when complete per Step 4.0 of Boundary Change Form.

    c. **[Boundary Change Requester]** Perform:

        1) Holder Safety Verification

        2) Zero Energy check(s) performed as necessary.

    d. **[Boundary Change Requester]** Ensure notification of all holders and workers is complete.

    e. **[Boundary Change Requester]** Sign Step 5.0 of Boundary Change Form.

    f. Execute the BC checklist and Remove the necessary tags per Step 6.0 of Boundary Change Form.

13. Complete Step 7 of Attachment 6, Boundary Change Form.

9.7 Clearance Development: Checklist Routing

1. Applicable Work Orders should be listed on Principal Equipment.
2. Any pertinent information should be listed in the clearance Special Instructions.
3. When preparing a Clearance Order and/or checklist, ensure that the proper user ID is in the "prepared by" field prior to routing the checklist for approval.
4. When a Fuse is to be used as a boundary, and fuse information is available on the Parameters1 or Models tabs, then copies of Component Models and Parameters are to be included in the Clearance Package. Retrieve these from the TIMD030 Panel by clicking the "Models" and "Parameters1" tabs. This will enable the Tag Hanger/Lifter to ensure correct fuse is removed and re-installed.

NOTE:	All Hang activities require Verification.

5. Determine Independent Verification requirements for LIFT activities using guidance in OPS-NGGC-1303.
6. Verify that no outstanding deficiencies exists that affect a boundary valve's ability to adequately isolate the system.
    - From Windows START menu: Open "Programs>Business Apps>Passport Production>PassPort Information Web Portal"
    - Expand "Equipment Tag Out"
    - Select "Clearance Information"
    - Select "Prompted Reports"
    - Select "Clearance Work Order Conflicts"
    - Once Business Objects opens, enter Clearance Order number (include zeros), Plant Code (all capital letters) and Enter.
    - A report will be generated that will show any Work Orders (WO) and Request (WR) against components on the checklist. Each WO and WR must be addressed.
    - If Business Objects is unavailable, then perform other appropriate checks such as: EDB Portal or WR/WO check against individual boundary tags.
7. Checklists should be routed, per appropriate plant protocol, for approval.

9.8 Clearance Approval (Licensed Operator)

1. Clearance Approver shall perform an independent review of the clearance. References included by the Clearance Preparer may be used, but no marked up items are addressed until after a review of the task and the creation of an independent boundary has been completed.
2. Review Clearances to identify plant impact prior to approval. **[R11]**
3. Identify any required compensatory measures as a result of the clearance. Ensure that they are documented in the Special Instructions.
4. Shall verify that the clearance is adequate for the work activities, the boundary components are tagged correctly and the tagging sequence is correct.
5. Shall verify Technical Specification related equipment clearance orders approved by a Licensed Operator.
6. When Reactor is less than 200°F, a clearance that creates a containment breach shall be verified to have documentation of the containment compensatory plan in the Special Instruction. Ensure SM approval and document in Special Instruction.
7. Activities may be added to an Equipment Clearance or an approved Equipment Clearance that contains an Approved or greater Checklist provided that two Clearance Preparer qualified individuals verify that the clearance boundary is adequate for the activity.
8. If an approved checklist is modified, a second Clearance Preparer shall verify that the clearance is still adequate for the work activities, the boundary components are tagged correctly and the tagging sequence is correct.
9. Shall verify the restoration positions and restoration sequence are correct. The restoration position should be based on current plant status/ conditions. This may include reviewing applicable procedure steps and/or valve lineups to determine plant status. If relying on a system alignment for restoration, the procedure and section or valve lineup being relied on should be specified in the Special Instructions. **[R13, R18, and R34]**

9.9 Checklist Distribution and Completion

1. Before a clearance is issued for a component, system or electrical circuit, sources of energy that may cause personnel injury or equipment damage should be isolated from the work area. The temporary power log should be reviewed for possible sources. For example, when isolating a pump motor, the pump discharge and/or suction valves should be shut and tagged to prevent possible rotation due to fluid flow. In some cases it may not be practical or desirable to completely de-energize components within the work boundary. In these cases, components or circuits remaining energized will be clearly identified in the clearance Special Instructions.
2. Authorize installation and removal of Equipment Clearances.
3. Authorize a ground checklist indicating that it is appropriate to install the grounds.
4. Ensure that the correct plant configuration is established to support hanging or removing Equipment Clearances.
5. Coordinate hanging or removal of Equipment Clearances.
6. Ensure appropriate people are notified of the installation and removal of Equipment Clearances.
7. Ensure Master (working) checklists are printed during implementation of clearance order. Review copies may be printed for second checks and/or walkdowns. **[R35]**
8. If conflicts exist when distributing a checklist, then evaluate in accordance with Enclosure 5, Clearance Conflict Guideline. **[R30]**
9. After printing Clearance Tags, verify that the Checklist and Tags match. If any tag failed to print properly, reprint tag and dispose of the invalid tag.
10. If a distributed checklist needs to be modified for sequence changes, this does not require computer updating. Pen and ink changes, verified by another Clearance Preparer, are acceptable for sequence changes
11. If a distributed checklist is required to be modified then, perform the following:
    a. Roll checklist to Modify.
    b. Perform the applicable change(s) and verify that the clearance is still adequate for the work activities, the boundary components are tagged correctly and the tagging sequence is correct
    c. Note the changes that were made in the Special Instructions, along with who made the changes.
    d. Ensure that the changes are independently verified, note who performed the verification in the Special Instruction, and re-approve.
    e. Tag hanging and verification documentation shall be maintained, either by retaining both checklists or by transferring this documentation to the new checklist
    f. Additionally, a Licensed Operator or SRO shall approve the modifications to the checklist

NOTE: When authorizing clearances with Global Tags, the first checklist "Distributed" that includes the Global Tags will actually include the Global Tag hang actions. Subsequent checklists will assume that the Global Tags have already been hung. While any given clearance cannot be accepted until all required tags are actually hanging in the field, if Global Tags are used and not authorized in the proper sequence, clearance process and/or outage efficiency problems can arise.

12. Each Checklist shall be authorized by an SRO. This authorization is indicated by the Checklist Status being "Distributed" and indicates the SRO has verified the following: **[R20]**
    - Plant conditions are correct for the clearance.
    - Installation of the clearance will not adversely impact plant operation, including a determination that no conflicts exist with ongoing valve alignments or procedures. **[R46]**
    - Applicable Compensatory actions have been initiated.
    - The Control Room has been notified, as necessary, for Clearance Hanging or Removal.
    - Security has been notified for Equipment Coded S-1, S-2, S-3 or PSS.
    - Temporary Power Log has been verified to ensure all Temporary Power installed within the Clearance Boundary has been evaluated and additional boundaries established.
13. Once all tags are hung and verified and system conditions allow safe performance of the maintenance, the checklist shall be completed.
14. Once all Ground Tags are hung and verified and system conditions allow safe performance of the maintenance, the ground checklist shall be completed.
15. Prior to authorizing clearance removal, the SRO shall verify that grounds, if used, have been removed by verifying a Checklist for ground removal has been completed.

16. Prior to authorizing clearance removal:
    a. Verify that the Equipment Clearance is in a "RELEASED" status and all Release Codes or Work Order statuses indicate that the clearance is no longer needed prior to distributing the final lift checklist.
    b. SRO reviews the Checklist, the Special Instructions and any supporting procedures that will be used during the clearance removal.
17. Verify any work that was not performed has been removed from Equip/Task screen prior to distributing the final lift checklist.
18. Determine if the component that was drained has a heater associated with the drained portion. If so, a fill and vent shall be performed prior to energizing the heater.
19. When large portions of systems are removed from service and a complete system alignment is to be performed, it is permissible to remove a released clearance and leave the components position as is and rely on the required valve lineup to align and return the system to operation. Add a note to clearance Special Instructions when this is the method of clearance restoration. The procedure and section or valve lineup being relied on should be specified in the Special Instructions. **[R25]**
20. When removing a clearance, the Initiate a "Final Clearance Checklist" option in the computer should be used to ensure that all tags currently hanging are listed on the "Lift checklist". If a Boundary Change to a clearance has been performed, then the "Initiate a Final Clearance Checklist" option must be used. If the "Initiate a Final Clearance Checklist" option is not used, the Clearance Preparer shall verify that all tags currently hanging are listed on the "Lift" checklist to ensure that all tags are removed and the component/system is properly returned to service.
21. After authorization, the clearance will be assigned to a Tag Hanger/Lifter for clearance installation/removal.
22. Assign Equipment Clearances to qualified personnel for installation/removal.
23. ASSIGN an Independent Verifier to perform an Independent Verification on those systems required by site procedures.
24. Conduct Pre-Job Brief with Clearance Hanger/Lifter and Independent Verifier in accordance with HUM-NGGC-0003. Utilize Attachment 18, Clearance Briefing Checklist, to ensure all clearance related items are covered during the briefing.

25. Independent verification requirements may be waived by the CRS or SM under the following situations and conditions:

    - Excessive radiation exposures would result. As a guideline, an exposure of greater than 10 mrem to conduct the Independent Verification would be considered excessive. Individual situations should be determined on a case-by-case basis by the respective supervisor. In these situations, an alternate means of Independent Verification not involving radiation exposure (such as observing process parameters) should be used.
    - Entry into any area where personnel safety is compromised or jeopardized due to the presence of extreme temperatures (greater than 120°F), or other hazards potentially dangerous to health are present.
    - During clearance restoration when the system or components are not required to be operable. Prior to declaring the system or components operable, a lineup and Independent Verification is required.
    - Ensure the approval for waiving independent verification requirements shall be documented in the clearance Special Instructions.

26. The completed Clearance Forms should be verified to ensure they are correct, the equipment is realigned as required, the Clearance is removed from required documents and the OP valve/electrical lineups are updated, as necessary.

27. When the Clearance Order has been completed, compare paperwork to the computer information to ensure it is correct. Completed checklists are Vital Records and must be transmitted to Document Services.

28. For condition clearances, print the Condition Clearance report. This report will be maintained in Work Controls and Control Room during the time a Condition Clearance is hanging. This report shall be reviewed with operating shift at each turnover.

9.10 **Installation/Removal**

9.10.1 **Tag Hanger/Lifter**

1. Shall participate in a Pre-job Brief for hanging/lifting clearance
2. Notify the WCC any time questions or problems arise during the installation or removal of a clearance.
3. The Tag Hanger should verify that the alphanumeric component tag number on the tag matches the plant labeling.
4. If any discrepancy is found while hanging a clearance, the Tag Hanger should consult with the WCC to resolve the discrepancy.
5. The Tag Hanger or the person directing the Tag Hanger shall have the checklist or a copy during the installation or removal of the tags.
6. Clearance Tags and Ground Tags should be properly attached using a non-reusable cable tie capable of withstanding a minimum of 50 pounds. Use of miniature tags or switch caps is allowed for control boards.
7. If Clearance Tags and Ground Tags cannot be attached using a cable tie capable of withstanding a minimum of 50 pounds due to the physical design of the component, other means of attachment shall be substantial enough to prevent inadvertent or accidental removal.
8. Clearance Tags and Ground Tags should be installed in an obvious location on the component to clearly indicate that operation of that component is prohibited.
9. If the component is designed to accept a lock to prevent operation, the tag should be installed at the lock out point.
10. If the tag cannot be installed on the component, it should be installed as close as safely possible and in a location that is immediately obvious to anyone attempting to operate the device.
11. Position components in the sequence specified on the Clearance Checklist.
12. Position components as specified on the Clearance Checklist.

NOTE: Concurrent Verification is required for fuse removal.

13. If fuse removal/reinstallation is required, and fuse information is available on the Parameters1 or Models tabs, use Attachment 11, Fuse Removal/Installation Guidance.
    a. Ensure Concurrent Verification performed, as applicable.

14. If ground installation is required:
    - Ground installer(s) shall ensure the clearance boundaries are adequate for ground installation.
    - The individual(s) placing grounds shall accept the applicable Clearance Order electronically and identify themselves as a Grounds Holder (GRH) during the electronic sign on process, prior to ground installation and shall remain on the Clearance Order until ground removal tasks are completed.
    - The ground installer shall install the Grounding Devices according to corporate and site safety and grounding procedures. The ground installer will attach or remove the Ground Tags and initial the "Completed By" block on the Checklist. The ground installer shall print their Passport short name at least once with their initials for each Checklist.
    - Ground Tag Hanger/Lifter shall enter checklist completion information on the "TIMT222 – Checklist Completion screen" if Tag Hanger qualified. (Reference Step 9.10.1.22)
    - Installed grounds or the Ground Tags should remain visible from outside the cabinet or cubicle. If the grounds or the Ground Tags are not readily visible, a sign shall be posted indicating that grounds are installed inside.
    - Grounds installation requires Concurrent Verification.
    - Should the original Grounds Holder (GRH) be required to release the Clearance Order prior to the groups work being completed, he/she shall designate another Grounds Holder (GRH) to accept the Clearance Order and assume the responsibilities of the Grounds Holder (GRH). The new Grounds Holder (GRH) shall identify themselves as a Grounds Holder (GRH) during the electronic sign on process.
15. If an Additional Measure is to be installed on a Manual Ball/Plug valve and there is no practical way to install, generate a Work Request to have a hole drilled in the valve handle. Reference **[R26]**
16. If a component requiring an additional measure can not readily have the measure applied, generate a Work Request to have the component equipped to accept additional measure in the future.
17. If additional components are identified during hanging that require Additional Measures, identify the necessary measures and ensure that a note is added to the Special Instructions.

NOTE:	Concurrent Verification is required for verification of locked, sealed or secured valves, due to the inability of the verifier to manipulate component. Additional Measures-do not require verification.

18. Ensure Concurrent Verification performed, if applicable.
19. Install and remove tags according to this procedure.
20. Initial the "Completed By" block on the applicable Checklist signifying tag placement/removal and component positioning or the completion of any applicable "Comment" steps. Tag Hangers shall print their Passport short name at least once with their initials for each Checklist.
21. Tag Hanger/Lifter(s) will enter checklist completion information on the "TIMT222-Checklist Completion screen". **Exceptions**:
    - If circumstances exist where it is not prudent for the individual to complete the steps in passport, a SM or above may direct that the completion steps be performed by someone else. This approval must be documented in the Special Instruction.
    - When individuals performing "CMT" type or "GRD" type steps are not Tag Hanger qualified, the performer must print their passport ID next to the step and the clearance desk operator can enter checklist completion information on the "TIMT222-Checklist Completion screen".
22. Prior to removal of Clearance Tags, Operations shall visually inspect the readily accessible portions of the work area to determine that the system appears intact and ready to return to service.
23. If, during the removal of a clearance, the system integrity is not intact, it is permissible to reinstall the clearance using a Hang Checklist. The Lift Checklist should be annotated to indicate the tags were reinstalled.
24. If the clearance is not required to be verified, the tag lifter shall confirm that tags are accounted for and additional measures removed. Review all tags that were pulled. If any tags were contaminated, a notation should be made on the checklist.
25. If removing a Clearance Tag and another Clearance Tag or other site specific configuration control tag is in place which conflicts with the restoration position of the Clearance Tag to be removed, remove the Clearance Tag to be removed, leave the component in its as-found position, and indicate, on the clearance checklist, the Clearance Tag number or the number of the other site specific configuration control tag which controls the component's position.
26. If the ECCS, DH, or BS system boundaries are breached for maintenance activities, a UT (Ultrasonic Test) shall be performed as needed to verify the system is sufficiently full prior to returning it to service. **[R 12]**

9.10.2 **Independent/Concurrent Verifier**

1. Ensure that components are in the position required by the Clearance Checklist.
2. Ensure that tags are installed / removed on the components specified on the Clearance Checklist.
3. Initial in the "Verified By" block on the Checklist signifying proper verification
4. Shall print their Passport short name at least once with their initials for each Checklist
5. Ensure that the Ground Tags are installed. Initial in the "Verified By" block on the Checklist signifying proper verification. Independent Verifiers shall print their Passport short name at least once with their initials for each Checklist.
6. Ensure additional measures are installed / removed, if required. Only one such additional measure need be applied for each tagged isolation device. Additional measures do not require verification. (If the device used for Additional Measures can be reused, ensure that the device is secured at or near the component or returned to a proper storage location).
7. If an Additional Measure is to be installed on a Manual Ball/Plug valve and there is no practical way to install, generate a Work Request to have a hole drilled in the valve handle. Reference **[R26]**
8. If a component requiring an additional measure can not readily have the measure applied, generate a Work Request to have the component equipped to accept additional measure in the future.
9. Independent/Concurrent Verifier will enter checklist completion information on the "TIMT222 – Checklist Completion screen" unless any following exception applies:
    - If circumstances exist where it is not prudent for the individual to complete the steps in passport, then a SM or above may direct that the completion steps be performed by someone else. This approval must be documented in the Special Instruction.
    - When individuals performing "CMT" type or "GRD" type steps are not Tag Hanger qualified, then the performer must print their passport ID next to the step and the clearance desk operator can enter checklist completion information on the "TIMT222-Checklist Completion screen".
10. Notify WCC when checklists are completed.
11. Tags should be accounted for. Independent Verifier should review all tags that were pulled. If any tags were contaminated, a notation should be made on the checklist.

9.11 Clearance Acceptance

9.11.1 Clearance Workers and Holders

1. All Clearance Workers and Holders who need the clearance, for protection, shall accept the clearance for all Work Order Tasks being worked.
   - Individuals who are not qualified as a Clearance Holder sign on the Clearance Worker List, in the ETO Clearance Worker Tool, under the control of a PCH (Principal Clearance Holder).
   - Individuals qualified as Clearance Holder, but performing duties only as workers, are allowed to sign on the Clearance as a Holder or sign on the Clearance Worker Tool as a Worker.
2. All Clearance Workers and Holders shall verify the clearance boundary is adequate for their assigned work prior to accepting the clearance. (Adequate should mean that all applicable drawings, procedures and checklists have been reviewed.)
   - Prior to beginning work, the Clearance Workers shall be provided the opportunity (if desired) to observe or perform their own Zero Energy Check.
3. When a Clearance Worker and Holder accept a clearance, their sign-in signifies that the following has been met:
   - The Work Order Tasks they are responsible for that will be worked under the clearance are listed on Principal Equipment.
   - The clearance Special Instructions have been read and understood.
   - Their sign-in is equivalent to placing their individual tags on each energy isolating device.
4. Prior to commencing work, all Clearance Workers and Holders shall ensure the following:
   - Ensure the clearance boundary is adequate
   - A zero energy check has been performed and documented on their specific Work Order Task, either electronically or on the hardcopy document.
5. Zero Energy Checks shall be performed:
   - At the beginning of each shift before any work is started unless holder/worker remained sign into clearance since last zero energy check was performed.
   - When there is a potential for the accumulation of energy during a break
   - Prior to commencing work following any boundary change.
6. If grounds are needed, each individual is responsible for ensuring the grounds are properly installed prior to commencing the work.
   - Obtain a knowledgeable individual to assist in ground installation and removal, as required.

7. The last individual requiring grounds shall:
   - Coordinate removal of the grounds with all workers
   - Ensure GRH notifies WCC that grounds are to be removed
8. Each Clearance Worker and Holder shall review the status of all clearances they are responsible for prior to work start each shift. This review shall include any boundary changes that may have been performed and shall be part of the daily pre-job briefing.
9. The PCH shall sign off following transfer of the clearance to another PCH, if applicable.
10. Prior to agreeing with a clearance boundary change to remove tags, all workers and holders shall verify the equipment within the clearance boundary for which they are responsible is in a safe condition for the new boundary configuration.
11. All Holders and Workers shall ensure that a Release Code is supplied in the Release Reason of the Holders Panel.
    - Release Codes (others may be added by NIT after approval by the FAM):
      - CN Cancelled Work
      - CP Completed Work
      - PT Released to complete PMT
      - RP Released per Procedure
      - TR Transferred (Use only after another Holder has accepted Clearance for the associated task)
      - BC Boundary Change necessary.
      - OP Operations Request
      - ES End of Shift
12. Ensure components are operationally intact prior to releasing a clearance. If releasing the clearance to allow a Boundary Change, use Release Code "BC". This should ensure that the clearance order does not get inadvertently lifted.
13. Each Worker and Holder shall ensure the Work Order Tasks for which they are responsible are completed up to a point where the clearance order is no longer required for the safety of personnel and equipment prior to signing off a clearance for release.

14. Plant configuration control will be maintained by the clearance process as follows:
    - Equipment may be operated within a clearance boundary as directed by an approved procedure.
    - Equipment that has tag(s) attached is not to be removed from the system. Hinged covers that have tags attached may be opened provided that the tags do not specifically prohibit opening. Bolted-on covers that are tagged are not to be completely removed from the system in which they are attached.
    - Clearance Workers shall accept a clearance electronically, unless the computer is unavailable, which would require hard copy of the appropriate attachment.
    - Clearance Workers are to notify the WCC as soon as possible when a clearance problem is identified. Problems shall be resolved prior to work start. If problems arise during work activities, which introduce a personnel or equipment risk, the work shall be halted and equipment placed in a safe condition until the problems are resolved.

9.11.2 **Principal Clearance Holder (PCH)**

1. Shall accept a clearance for a specific work order task. Prior to accepting the clearance, the PCH shall review the clearance, including the Special Instructions, and determine that their assigned work task(s) are adequately covered by the clearance.
2. Shall be responsible for the performance of Zero Energy Checks prior to commencing work. The PCH shall provide the opportunity for the Workers to observe or perform the Zero Energy Checks once they have accepted the Clearance and before they begin work.
3. Shall ensure the notification to all workers of Boundary Changes.
4. Shall initiate and have administrative control of the ETO Clearance Worker Tool, ensuring that all individual Clearance Workers, including Holders signed on in Passport, and those signed on the Clearance, who are performing tasks under a Group Tagout have electronically signed on prior to beginning work under the clearance. The ETO Clearance Worker Tool requires a separate report for each work order task controlled by the PCH.
5. Is responsible for remaining aware of hazardous energy sources that may affect the individual Clearance Workers during their work and communicate any change to the clearance boundary or changes to the clearance status to the individual Clearance Workers

6. Shall ensure a pre-job brief is performed for all workers they are responsible for. Pre-job briefs are required for the following conditions; prior to work start (accepting clearance), work scope changes, and clearance boundary change. The pre-job brief shall include a review of clearances required for work. HUM-NGGC-0003, Conduct of Pre-Job Briefings/Post-Job Critiques, Attachment 2, Standard Pre-Job Brief Checklist shall be used and maintained with work package or applicable clearance.

    a. The PCH will ensure each worker and holder participates in a review of the isolation points and understands the clearance boundary.

7. Shall ensure all personnel that accept the clearance for a specific work order task understand the clearance boundary, provide opportunity for them to walk down the clearance boundary, offer them the opportunity to observe and/or perform the Zero Energy Checks, as well as ask questions regarding the boundary, as necessary.

8. PCHs are responsible for ensuring that all workers have signed off of the Clearance when work is complete.

9. As Work Order Tasks are completed, each PCH shall ensure work tasks on the Principal Equipment and Tasks screen are complete for the Work Order Tasks they are assigned, or if a work task is not complete but no longer requires the clearance boundary notify the WCC of any restrictions for placing the equipment in service, then release the clearance.

10. A PCH will release the clearance when the Clearance Workers have completed their work task(s) requiring the clearance, all applicable tools are removed, all personnel are clear of the clearance boundary, and all individual Clearance Workers have signed off the associated Clearance, or the Clearance Worker List in the ETO Clearance Worker Tool.

11. Should plant needs dictate release of a clearance, and all Clearance Holders/Workers have not signed off in computer or Clearance Worker List, in the ETO Clearance Worker Tool, the PCH should contact a Maintenance Supervisor or Operations Supervisor to release the clearance per Step 4.5.6.

9.11.3 **Boundary Changes**

1. Boundary Changes should be planned as part of the work management process. Unplanned boundary changes can be defined as any boundary change for work that was not in the schedule at the T-3 week. The requester of an unplanned boundary change shall be directed to generate a CR to document the challenge to the process unless the unplanned boundary is requested during refueling outages, forced outage or emergent work having a priority of 1 or E.

2. The Requester should notify the WCC of the need for a clearance boundary change. The request should include the reason for the boundary change and a description of the requested change. Attachment 6, Boundary Change Form, shall be used for all boundary changes. **[R19]**

3. Boundary changes include the addition and/or lifting of tags. Boundary changes are processed by creating Checklists. Ground installation and removal are not considered as boundary changes. **[R21]**

4. All Clearance Holders and Workers will sign-off of the Clearance or they will document their approval of a Boundary Change or be removed from the clearance per Step 4.5.6 prior to a Boundary Change being implemented involving tag lifting.

5. Should plant needs dictate release of a clearance, and all Clearance Holders/Workers have not signed off in computer or Clearance Worker List, in the ETO Clearance Worker Tool, the PCH should contact a Maintenance Supervisor or Operations Supervisor to release the clearance per Subsection 4.5 of this procedure.

6. The Requester shall sign Section 5.0 of Attachment 6, Boundary Change Form. This signature signifies that for:

   - **Tag Removal:** All Holders and Workers have been notified and understand the boundary change. Work has been stopped or suspended, as necessary. All holders and workers have signed off the clearance or their approval of the boundary change has been obtained by their initialing of the "Clearance Order Active Holders and Workers" report or "Boundary Change Approvals" list in this attachment. Otherwise, they have been removed from the clearance under Step 4.5.6. This signature also signifies that if removing tags, the boundary change may be executed.

   - **For Tag Addition:** Holder Safety Verification and Zero Energy Checks have been performed after tags were hung.

   This section may be signed for the requester in their absence by a supervisor that has verified the requirements of Section 5.

7. The Requester or a responsible PCH will accept the boundary change.

8. The Requester is responsible for notifying the appropriate employees that the boundary change is complete, brief the impact of the boundary change with Principal Clearance Holders, perform zero energy checks, and inform them that work may resume following their signing back on to the Clearance Order and Holder's Safety Verification.

9.12 **Audits**

NOTE:	Audits may be suspended during Refueling Outages providing that an audit is completed within thirty days of the completion of the Outage. M-SO approval is required to suspend the audits.
NOTE:	Inspectors are not to audit clearances with which they have had involvement

1. Quarterly, the M-SO should ensure an audit of the Equipment Clearances is performed. The audit should consist of the following:
   - The audit should include physical verification that the tags for clearances in effect greater than 30 days are in place and undamaged and that components are in the position listed on the Checklist. **[R22]**
   - Clearances in High Radiation Areas or Locked High Radiation Areas are excluded from this audit.
   - Damaged, illegible or missing tags shall be reprinted and replaced. The Checklist should be reprinted to allow documentation of the hanging and verification of the replacement tag. A comment should be entered in the Clearance Special Instructions explaining the replacement. This tag replacement should be noted on the Attachment 8, Equipment Clearance Audit Form.
   - The physical check should be performed by an Independent Verifier.
   - Audit discrepancies and corrective action should be noted on the Attachment 8, Equipment Clearance Audit Form and reviewed by the M-SO. (Computer generated form containing equivalent information may be attached in lieu of filling out the tables for items 1, 2 and 3.)
   - A Nuclear Condition Report (CR) should be generated or verified to exist for each clearance that has been in effect for greater than two months. The purpose of the CR is to have the Responsible Engineer evaluate system impact and determine the solution to long-term material deficiencies. The CR number should be noted in the Clearance Special Instructions. **[R23]**
   - Clearances that have been in effect for greater than three months shall be listed on the Attachment 8, Equipment Clearance Audit Form. The SM shall determine if any alternate methods should be used to resolve longstanding clearances.
   - The Equipment Clearance Audit Form should be routed to the SM for approval. The SM should ensure that the Scheduling department is notified to evaluate the need to incorporate long-standing equipment deficiencies in the scheduling process.

2. An annual inspection of the Clearance Process is to be performed as required by 29 CFR 1910.147 and 29 CFR 1910.269. This inspection shall be performed by an Operator or Clearance Holder qualified in accordance with this procedure, and shall consist of the following elements: **[R1]**

    - A review of Independent Verifications performed of each clearance as per Section 9.8 to comply with the clearance inspection requirement.
    - A review of Attachment 2 of HUM-NGGC-0003 performed with the clearance workers to comply with the interview portion.
    - A review of OPS-NGGC-1301 to determine compliance with 29 CFR 1910.269(d)(8)(ii) and 29CFR 1910.147(f)(3)(i).
    - A review of a representative sample of open clearances for compliance with OPS-NGGC-1301.
    - Field interviews with employees to review personnel responsibilities under the clearance process. Group meetings between the inspector and clearance qualified personnel constitutes compliance with this requirement.
    - Field observations to determine compliance with applicable personnel safety-related work practices.
    - Identification, documentation, and correction of any deviation or inadequacy, and communication of such to all personnel.

9.13 **Clearance and Tagging Performance Indicator Process**

1. Clearance and Tagging Performance Indicator Process

   a. Overall performance can be monitored using a no-fault, graded approach to clearance and tagging events and near misses. Since the clearance and tagging process has defense in depth against process failure, a graded approach is being used. Program failure occurs if personnel are exposed to hazards from the unexpected release of energy.

   b. The first is an overall process performance indicator, based primarily on events where process shortfalls up to total process failure are detected during process execution. In addition, it provides standard performance improvement methodologies and responses to events that occur.

   c. The second is a process that is intended to generate awareness of the quality and efficiency of the process as it is being executed at a single site. These types of instances are categorized as Severity Level 4 events. A summary of all Severity Level 4 events should be reviewed by the NGG Clearance and Tagging Working Group to determine if any process changes are needed to improve the program.

2. Terms and Definitions

   - See 1301 Job Aid Folder for Severity Level details and definitions.

3. Responsibilities

   - The NGG Clearance and Tagging Working Group should control the content of the Clearance and Tagging Performance Indicators, with guidance from the Operations Managers.
   - The NGG Clearance and Tagging Working Group should initiate action as appropriate based on trends observed in one or more performance indicators.
   - On an annual periodicity the NGG Clearance and Tagging Working Group shall perform a Common Cause Analysis, or Self-Assessment of fleet Low Level and High Level Clearance and Tagging errors. This includes a review of Severity Level 4 events for potential process improvements.
   - The NGG Clearance and Tagging Working Group should use these performance indicators as a means of measuring performance between sites.
   - The Clearance and Tagging Working Group shall conduct a conference call to review and bin SL-4 events for adverse trends once per quarter. [CR439609]
   - When a Severity Level 1 or 2 Event occurs in the fleet, the affected site will implement a standard response, as detailed in Attachment 14, Event Response Guidelines.

10.0 RECORDS

1. Clearances on equipment are Vital non-permanent records.
   The following clearance related documents are Vital Records.
   - Computer generated Equipment Clearance Checklist.
   - Attachment 8, Equipment Clearance Audit Form
   - Attachment 6, Boundary Change Form
   - Attachment 15, Release Documentation of a Clearance by Another Employee
2. Attachment 16, External Energy Injection Form, is a QA record.
   The attachment and all approval sheets shall be maintained with the Work Order Package.

HARRIS NUCLEAR PLANT SPECIFIC ADDENDUM 3

1. Motor operated valves using Limitorque Operators, under the following conditions, have experienced problems with the valves drifting open:
   - Operator is in manual.
   - Valve is shut.
   - Valve is a globe valve.
   - A high pressure is present beneath the disc.
   - Valve has a fast operating time (less than 10 sec)
2. The anomaly occurs because the drive gear train is disengaged when in the manual mode. With the high pressure under the seat and the fast operating time with no stem locking feature, the valve operator has insufficient resistance to prevent valves from drifting. An alternative clearance valve or a means for holding valves with these conditions should be used when using such valves for isolation. The following valves have been identified as susceptible to valve drift:

HNP:

1CS-182	*1CS-240*	*1CS-382*	*1CS-472*	*1CS-752*
1CS-196	*1CS-278*	*1CS-423*	*1CS-745*	*1CS-753*
1CS-210	*1CS-341*	*1CS-470*	*1CS-746*	

3. Breaker tagging:
   - When tagging 480 Volt Molded Case Circuit breakers in Motor Control Centers, include clearance steps/positions to ensure that electrical checks are performed to ensure that the breaker is open, prior to making the clearance ready for acceptance. If the breaker is verified to be removed from its cubicle, then these checks are not required.
4. When a system is breached, if a significant increase in pressure occurs in the system (such as a pump start or system heat-up), the system should be periodically checked for an increase in leakage.

HARRIS NUCLEAR PLANT SPECIFIC ADDENDUM 3

5. The following is a list of EPT-250 and EPT-251 throttle valves. If these valves must be used for Equipment Clearance boundary isolations their positions must be recorded to the nearest tenth of a turn and repositioning these valves will require the performance of EPT- 250 and/or EPT-251 unless all of the following conditions are met: [CR 95-02555-2]
    a. An approved procedure required the documentation of the as-found position and ensures the valve is returned to its original position.
    b. The valve position markings are aligned when manipulation is complete.
    c. System operability is controlled during valve manipulation.
    d. System Engineer is notified to perform EPT-250 and/or EPT-251 if any discrepancy exists.
        - EPT-250
            - 1SW-58, CCW Hx 1A SW Inlet Isol
            - 1SW-70, CCW Hx 1A SW Outlet
            - 1SW-73, WC2-1A SW Outlet Isol
            - 1SW-119, AH-2 & 3 SW Return Header Isol
            - 1SW-1492, ESW Strainer 1A Backflush Outlet
        - EPT-251
            - 1SW-256, CCW Hx 1B SW Inlet Isol
            - 1SW-266, CCW Hx 1B SW Outlet
            - 1SW-136, WC2-1B SW Outlet Isol
            - 1SW-120, AH-1 & 4 SW Return Header Isol
            - 1SW-1493, ESW Strainer 1B Backflush Outlet
6. When verifying the physical location of fuses, use the EMDRAC (1364 series) drawings. CWD'S refer to the location of the termination locations only.

HARRIS NUCLEAR PLANT SPECIFIC ADDENDUM 3

7. All Limitorque SMB-00/SB-00 motor operated valves, if manually operated, are required to be stroked electrically from the control switch to be declared operable. All of the applicable SMB-00/SB-00 valves are listed in OMM-014, Operation of the Work Coordination Center, Attachment 7 (95H0426)

8. When draining non-contaminated systems inside the RAB, measures must be taken to prevent these systems from being drained to the Radioactive Floor Drain or Equipment Drains Systems. The "Special Instructions" section of the clearance should specify the required drain routing, including any special equipment requirements, to ensure that non-contaminated systems are drained to the Secondary Waste System, or the HVAC Condensate Drains System. These non-contaminated systems include, but are not limited to NSW, ESW, CCW, ESCW, NESCW, FP, PW, FW, AFW, and DW. (Ref. OMM-024)

9. High pressure systems (greater than 500 psig) with single isolation shall include a plan for leaving a recirculation path/drain path open prior to isolating both the suction and discharge valves so that a determination can be made if components on the high pressure side are holding prior to completing the clearance. Clearance boundary isolation valves for work on high pressure systems with single isolation valves should be capable of performing adequate isolation. A review of Work Management System (WMS) is required to verify that no outstanding deficiencies exist that affect a boundary valve's ability to adequately isolate the system. **[R37]**

HARRIS NUCLEAR PLANT SPECIFIC ADDENDUM 3

10. The following valves may be required for clearance boundaries but do not meet the requirements of OPS-NGGC-1301.

Item	Description	Consideration	Reference
1CE-819:002	Condensate Polishing Demineralizer 1F-NNS Valves typically used for Clearance purposes	Valve has an air accumulator. To fail shut, isolate opening air but leave closing air valve open.	1364-7383, 1364-7389, 1364-7385, EHT
1CE-818:002			
1CE-702:002			
1CE-703:002			
1CE-813:003			
1CE-803:002	Condensate Polishing Demineralizer 1E-NNS Valves typically used for Clearance purposes		
1CE-802:002			
1CE-700:002			
1CE-701:002			
1CE-797:003			
1CE-787:002	Condensate Polishing Demineralizer 1D-NNS Valves typically used for Clearance purposes		
1CE-786:002			
1CE-698:002			
1CE-699:002			
1CE-781:003			
1CE-771:002	Condensate Polishing Demineralizer 1C-NNS Valves typically used for Clearance purposes		
1CE-770:002			
1CE-696:002			
1CE-697:002			
1CE-765:003			
1CE-755:002	Condensate Polishing Demineralizer 1B-NNS Valves typically used for Clearance purposes		
1CE-754:002			
1CE-694:002			
1CE-695:002			
1CE-749:003			
1CE-739:002	Condensate Polishing Demineralizer 1A-NNS Valves typically used for Clearance purposes		
1CE-738:002			
1CE-692:002			
1CE-693:002			
1CE-733:003			

HARRIS NUCLEAR PLANT SPECIFIC ADDENDUM 3

11. When circuit breakers as listed in PLP-400, Post Maintenance Testing, are racked out and then racked back in (for example, clearances) then the breaker must be cycled to start the component to verify the breakers are properly racked in. If the component cannot be started at that time due to plant conditions, then verify an EIR exists for the breaker that lists OP-156.02, AC Electrical Distribution, Attachment 11, 52S/MOC Device testing, as the PMT. **[R3]**

12. If clearance involves draining a tank with continuous influent (such as the RAB Floor Drain Tank), the tank level should be periodically monitored to verify the influent is not exceeding the capacity of the drain. A comment should be placed in the special instructions of the clearance to alert the holder that the tank has continuous input. This is to guard against the influent rate iCReasing or clogging of the drain maintaining the tank level. **[R38]**

13. If a clearance involves venting or draining, the locations of the vents and drains should be evaluated to ensure that no Ventilation or Containment Boundaries have been violated (i.e, RABEES, Control Room Ventilation, Containment Closure, etc.). If violation of the boundaries cannot be avoided, ensure compensatory measures are taken as required by plant procedures. **[R39]**

14. If a clearance involves isolating an electrical supply to a component, the Clearance Writer must review both the EM-005, Temporary Power for Bus Outages, and AP-401, Installation and Control of Temporary Power and Equipment, logs for potential additional power sources.

15. If a clearance involves the Diesel Driven Fire Pump, placing the selector switch to OFF and tagging the electrical control circuit is not adequate to prevent a potential start/rotation from the DC powered starting circuit. The DC power should be removed from this pump by lifting and tagging the motor starter negative (-) lead to prevent inadvertent start/rotation.

16. If an approved clearance is revised such that additional components are added to the boundary, then the Work Week Manager should be notified. The potential exist that the proposed change could affect plant risk level.

17. Installation or removal of clearance tags from the Main Control Board and AEP-1 will be performed by licensed operators. **[R40]**

BOUNDARY DEVICE TAGGING GUIDELINES

NOTE:	This attachment should be used as a guideline for the typical restrictions and Tagout methods for the types of components listed. It is not all inclusive. Deviations from these Tagout Methods are allowed when component design and application allow for other methods that will also provide adequate isolation.

Boundary Device	Restrictions	Tagout Method
☐Manually Operated Valve	☐Butterfly valves are prone to leak by seat. Monitor for seat leakage. ☐Plug valves are prone to leak. Monitor for leakage.	☐Place tag on handwheel ☐If the valve has a remote operator such as a reach rod, it should be tagged
☐Manual Throttle Valve	☐Normally not used as a boundary device ☐If a test (flow balance) is required to restore valve position, evaluate if the test can be performed during anticipated plant conditions prior to using valve as a boundary ☐Documentation of original valve position should be as accurate as indications or positioning will allow	☐Record valve position, angle, percent open or number of turns in the restored position in Step Instructions and/or Special Instructions ☐Place tag on handwheel
☐Solenoid Operated Valve	☐Target Rock Solenoid Operated valves should not be used (See Ref Page 6 of 6) ☐Use only if valve fails closed ☐Evaluate for other components that are powered from same circuit	☐Place tag on power supply ☐A tag should be placed on the valve to prevent inadvertent violation of the boundary

BOUNDARY DEVICE TAGGING GUIDELINES

Boundary Device	Restrictions	Tagout Method
☐Motor Operated Valve	☐Some Limitorque operated valves are prone to drift if in manual ☐If primary use of valve is flow control, monitor for seat leakage ☐If manual torquing is required, un-torque valve prior to stroking electrically	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on power supply ☐Place tag on valve handwheel that indicates valve position (handwheel should only be manually engaged if leak by is present ☐If torque, refer to site procedures for additional requirements
☐Hydraulic Operated Valve (Fails Closed)	☐Evaluate on a case by case basis to determine if valve can perform adequately as a boundary device	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on power supply to hydraulic pump ☐If the operator has a handwheel or other manual positioning device that could open the valve, it should also be tagged ☐If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary
Hydraulic Operated Valve (Fails Open) [R 28.1]	☐Normally not used as a boundary device ☐Either a manual positioning device or a mechanical gag is required (SOER 85-5) ☐Evaluate on a case by case basis to determine if valve can perform adequately as a boundary device	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on power supply to hydraulic pump ☐If the operator has a handwheel or other manual positioning device it should be tagged ☐If a mechanical gag is installed, it should be tagged ☐If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary

BOUNDARY DEVICE TAGGING GUIDELINES

Boundary Device	Restrictions	Tagout Method
☐Hydraulic Operated Valve (Fails As Is)	☐Normally not used as a boundary device ☐Either a manual positioning device or a mechanical gag is required ☐Evaluate on a case by case basis to determine if valve can perform adequately as a boundary device	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on power supply to hydraulic pump ☐If the operator has a handwheel or other manual positioning device it should be tagged ☐If a mechanical gag is installed, it should be tagged ☐If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary
☐Pneumatic/Air Operated Valve (Fails Open) **[R45]**	☐Normally not be used as a boundary device ☐Either a manual positioning device or a mechanical gag is required (SOER 85-5) ☐If a valve fails open on loss of air, isolation of the air supply will cause the valve actuator to work against the gag (gagged closed). If possible, do not isolate air to the valve.	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐If work is to be performed on valve pneumatic system, place tag on pneumatic supply ☐If work is to be performed on valve pneumatic system, ensure that the pneumatics are vented from the operator and leave vent path open ☐If work is to be performed on valve pneumatic system, if a solenoid can be de-energized to vent the pneumatics from the operator, the solenoid may be de-energized and tagged ☐If the operator has a handwheel or other manual positioning device, it should be tagged ☐If a mechanical gag is installed, it should be tagged ☐If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary

BOUNDARY DEVICE TAGGING GUIDELINES

Boundary Device	Restrictions	Tagout Method
☐ Pneumatic/Air Operated Valve (Fails Closed)	☐ A "fails closed" valve is a valve that closes by spring pressure when the air is vented off the valve. No air pressure remains present to keep the valve closed. If a valve uses air pressure to keep it closed, follow the requirements below for a "pressure balanced" valve – a manual positioning device or mechanical gag is required. ☐ If primary use of valve is flow control, monitor for seat leakage ☐ Ensure air is completely bled off downstream of regulator by observing regulator pressure gauge bleeds to zero as petcock valve opened. Request maintenance assistance to relieve air pressure by loosening tubing or fittings. **[R45]**	☐ Position valve from control switch ☐ Place a CIT or Clearance Tag on control switch as required ☐ Place tag on pneumatic supply to valve ☐ Ensure that the pneumatics are vented from the operator and leave vent path open ☐ If a solenoid can be de-energized to vent the pneumatics from the operator, the solenoid **should** be de-energized and tagged ☐ If the operator has a handwheel or other manual positioning device that could open the valve, it should also be tagged ☐ If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary
☐ Pneumatic/Air Operated Valve (Fails As Is or Pressure Balanced)	☐ Normally not used as a boundary device ☐ Either a manual positioning device or a mechanical gag is required ☐ Ensure air is completely bled off downstream of regulator by observing regulator pressure gauge bleeds to zero as petcock valve opened. Request maintenance assistance to relieve air pressure by loosening tubing or fittings.	☐ Position valve from control switch ☐ Place a CIT or Clearance Tag on control switch as required ☐ Place tag on pneumatic supply to valve ☐ Ensure that the pneumatics are vented from the operator and leave vent path open ☐ If a solenoid can be de-energized to vent the pneumatics from the operator, the solenoid may be de-energized and tagged ☐ If the operator has a handwheel or other manual positioning device, it should be tagged ☐ If a mechanical gag is installed, it should be tagged ☐ If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary

BOUNDARY DEVICE TAGGING GUIDELINES

Boundary Device	Restrictions	Tagout Method
☐Rack IN/OUT Breaker (6.9 kV, 4160 volt or 480 volt)	☐"Racked Out" is interpreted as either at the Racked Out position or removed from the cubicle. ☐Control Power may be left on when the need is identified and evaluated as safe.	☐Secure component/Open breaker ☐Place a CIT or Clearance Tag on control switch as required ☐Tag control power if required ☐Tag breaker as "Racked Out" ☐If the breaker is equipped with a locking device, the tag shall be hung on the locking device
☐MCC Breaker	☐Not required unless work is performed on the load	☐Secure component/Open breaker ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on breaker at the lockout device, if equipped ☐For concurrent downstream and cubicle work, an evaluation of the appropriate tagging methods, such as tagging overloads removed or leads lifted and control switches, is required ☐When opening MCC breakers, the Tag Hanger should verify a change of state. This can be done by feel, sound and/or other positive means of indication that the breaker opened. ☐When valve MCC breakers are restored in the clearance process, a comment should be included to describe the expected MCC indication (red when the breaker is turned on and the valve is expected to be open, or green when the breaker is turned on and the valve is expected to remain shut) to be checked when the breaker is energized.
☐Distribution Panel Breaker	☐If a permanent lockout device does not exist use of a portable or removable lockout device is recommended	☐Place tag on breaker

BOUNDARY DEVICE TAGGING GUIDELINES

Boundary Device	Restrictions	Tagout Method
☐ Control Power 6.9 kV, 4160Volt	☐ Tagging only the Control Power is acceptable for equipment protection ONLY, unless maintenance is limited to only the Control Power Circuit. ☐ The breaker must be OPEN with the closing springs DISCHARGED.	☐ Tag Control Power ☐ Tag fuses and/or knife switches
☐ Lighting Panel Breaker	☐ If a permanent lockout device does not exist use of a portable or removable lockout device is recommended ☐ Use of other tag attachment may be used per Step 9.10.1.7	☐ Place tag on breaker
☐ Lifted Lead/Sliding Link	☐ Use breakers and fuses when possible ☐ Adhere to site and corporate safety requirements. ☐ Evaluate other circuits that may be affected during the lead lift ☐ Links that slide vertically where gravity could cause the link to reclose should not be used as an isolation point unless a positive method to block the link is established	☐ If lifted/opened at component, document with NGGC/Site configuration control methods ☐ If lifted/opened at a location other than the component, hang a tag on each lifted lead/sliding link ☐ If component is a boundary device, tag each lifted lead/sliding link ☐ Sliding links should be tightened when open ☐ Use a cover or other device to attach tag to link post ☐ Tag lifted leads directly

- Target Rock reference:
  - Information Notice No. 82-41, "Failure of Safety/Relief Valves to Open at a BWR" Information Notice No. 83-39, "Failure of Safety/Relief Valves to Open at a BWR – Interim Report"
  - Information Notice No. 83-82, "Failure of Safety/Relief Valves to Open at a BWR – Final Report"
  - Information Notice No. 86-12, "Target Rock Two-Stage SRV Setpoint Drift" & Information Notice No. 88-30
  - Target Rock Two-Stage SRV Setpoint Drift Update"

CLEARANCE PROCESS CHECKLIST [R3]

NOTE: Initial or N/A once item has been addressed. Items which are not applicable for the particular clearance may be N/A'd. For example, filling and venting would not be applicable for an electrical only clearance so the item may be N/A'd. Items which have two columns for place keeping, the Verifier completes the right column. Pages may be printed multiple times for multiple Checklists, Scope Adds and/or Boundary Changes.

HANG CHECKLIST – CLEARANCE PREPARER and VERIFIER		
Clearance Request/Work Order have enough details to determine a safe clearance boundary. This is N/A for Clearances generated automatically from Approved Model Work Orders.		
System drawings, Operating Procedures, Electrical Load List and other required documents reviewed.		
Double valve isolation criteria addressed.		
Components that must be manipulated by workers are "NOT" Tagged, unless controlled by Work Order.		
Print "Models" and "Parameters" (from Equipment Data Base) to be included for fuse removal.		
Existing/Anticipated temporary power does not interfere with or violate the Clearance boundary.		
Automatic functions (either being removed or which could actuate) have been addressed.		
Vent and drain paths administratively controlled. At least one Red Tagged when possible.		
Work Orders/Requests (deficiencies affecting isolation ability) against boundary valves evaluated.		
Hang sequence addresses depressurizing system, high to low energy, discharge valves first then suction.		
If clearance affects ITS, Fire Plan, Containment, etc., this is documented in the Special Instructions, including applicable compensatory measures.		
Flow-path isolation addressed if a potential exists for rotation during maintenance.		
If clearance involves confined space then confined space requirements are addressed.		
Ground devices, freeze seals, hot taps, fuses, and leads are identified with locations on a marked up drawing. Attach or include documents in the Clearance Order package.		
Special Instructions contain required information, including safety precautions, plant effects, precautions and prerequisites, loss of function, isolated potential energy sources including magnitude and any other pertinent information.		
Work Order Task(s) or WR exists to facilitate venting of drained instrumentation at Clearance lift.		
Additional Measures requirements have been addressed.		
Components on the Checklist have the appropriate action (Hang or Lift), appropriate position (RACOUT, OFFLOC, etc) correct tag designation (CIT, RED, NOT, etc).		
Live-Dead-Live Checks requirements included for 480V MCC Breakers.		
Boundary allows for Fill & Vent during restoration.		

HANG CHECKLIST – DISTRIBUTION BY SRO	
T-Power Log reviewed to ensure no violation of clearance boundary.	
Flow-path isolation for rotation concerns addressed.	
Plant conditions support Hang C/L. No conflicts with ongoing valve alignments or procedures.	
Conflicts evaluated in accordance with Enclosure 5.	
Verify Checklist steps and tags match.	
Review Special Instructions and Checklist.	
Necessary compensatory actions have been initiated. LCOs activated.	
Control Room notified of clearance hang.	
Security notified for equipment coded S-1, S-2, S-3, or PSS.	
Check for Temp EC's	
Checklist Distributed and Mode Condition Reports updated if applicable	

CLEARANCE PROCESS CHECKLIST

CHECKLIST PERFORMANCE	
CHECKLIST #:	
Conduct a Pre-job Brief per HUM-NGGC-0003. Ensure all items in Attachment 18, Clearance Briefing Checklist, are covered during the briefing.	
* Passport short name printed at least once on the Checklist.	
* Hang – If other configuration control tag is in place which conflicts with checklist position, consult WCC.	
* Hang – Install tags at lock out point.	
* Hang – Additional Measures requirements. Items not pre-identified, but at risk, communicate to WCC.	
* Hang – If Ground tags used, ensure visible or ensure posting indicating Grounds installed.	
* Lift – Removing Additional Measures.	
* Lift – Ensure system appears intact and ready to return to service.	
* Lift – If Grounds are used, ensure Ground signs removed.	
* Lift – Actions to take if other configuration control tag is in place which conflicts with the restoration position of the checklist.	
* Lift – Confirm necessary tags accounted for.	
* Communicate pertinent pre-job information to others involved. For example, if asking Control Room Operators to hang/lift an Information Tag, discuss with them relevant pre-job items.	
* Notify WCC when checklist is complete & if checklist is ready to be completed. i.e., draining complete.	
CHECKLIST – COMPLETION	
Hardcopy Checklist filled out appropriately.	
Special Instructions reviewed.	
Checklist set to Complete (ensure draining complete and any previous issues resolved).	

WORK ORDER SCOPE ADD – PREPARER and VERIFIER		
SCOPE ADD FOR WORK ORDER#:		
Clearance Request/Work Order have enough details to determine a safe Clearance boundary.		
System drawings, Operating Procedures, Electrical Load List and other required documents reviewed.		
Components that must be manipulated by workers are "NOT" Tagged, unless controlled by Work Order.		
If scope add works on/replaces a positionable component, a "NOT" tag has been added to the Clearance.		
Flow-path isolation addressed if a potential exists for rotation during maintenance.		
Work Order Task exists to facilitate venting of drained instrumentation at Clearance lift.		
Special Instructions updated as necessary.		

CLEARANCE PROCESS CHECKLIST

CLEARANCE BOUNDARY CHANGE – PREPARER and VERIFIER		
BOUNDARY CHANGE CHECKLIST #:		
Checklist type BC used.		
Attachment 6 Boundary Change Form initiated. Details understood and implemented in the Checklist.		
Holder Lock applied		
Notify requester to generate CR for unplanned Boundary Changes to document the challenge.		
System drawings, Operating Procedures, Electrical Load List and drawings, and other required documents reviewed. CR365286		
Double valve isolation criteria addressed.		
Copy of Component Models (from Equipment data) included for fuse removal/installation.		
Existing/Anticipated temporary power does not interfere with or violate the clearance boundary.		
Automatic functions (either being removed/restored or which could actuate) have been addressed.		
Vent and drain paths administratively controlled. At least one Red Tagged when possible.		
Work Orders/Requests (deficiencies affecting isolation ability) against boundary valves evaluated.		
Checklist sequencing appropriate.		
If Boundary Change affects ITS, Fire Plan, Containment, etc., this is documented in the Special Instructions, including applicable compensatory measures.		
Flow-path isolation addressed if a potential exists for rotation during maintenance.		
Ground devices, freeze seals, hot taps, fuses, and leads are identified with locations on a marked up drawing. Attach or include documents in the Clearance package.		
Special Instructions have been updated with any additional information.		
Additional Measures requirements have been addressed.		
Components on the checklists have the appropriate action (Hang or Lift), appropriate position (RACOUT, OFFLOC, etc) correct tag designation (CIT, RED, NOT, etc).		
Live-Dead-Live Checks requirements included for 480V MCC Breakers.		
CLEARANCE BOUNDARY CHANGE – DISTRIBUTION BY SRO		
All Holders and Workers have Released the Clearance with the appropriate Release Code or have signed for approval of the boundary change as per Attachment 6.		
T-Power Log reviewed to ensure no violation of Clearance boundary.		
Flow-path isolation for rotation concerns addressed.		
Plant configuration/conditions support B/C. No conflicts with ongoing valve alignments or procedures.		
Conflicts evaluated in accordance with Enclosure 5.		
Verify Checklist and tags match.		
Review Special Instructions and Checklist.		
Necessary compensatory actions have been initiated. LCOs activated.		
Control Room notified of Boundary Change.		
Security notified for equipment coded S-1, S-2, S-3, or PSS.		
Boundary Change Distributed.		
BOUNDARY CHANGE CHECKLIST – COMPLETION		
Hardcopy Checklist filled out appropriately.		
Special Instructions reviewed.		
Checklist set to Complete (ensure draining complete and any previous issues resolved).		
Requester notified Boundary Change Checklist Complete.		
Continue on with Attachment 6 Boundary Change Form.		

CLEARANCE PROCESS CHECKLIST

FINAL LIFT CHECKLIST – PREPARER and VERIFIER		
Restoration positions are based on applicable procedures for current plant status/conditions. If not, place note in Special Instructions/Step Notes as to what will ensure Plant Status Control maintained.		
Restoration sequence with consideration to boundary vs. vent/drain, component locations, fill and vent prior to breaker restoration, etc.		
Craft support for fill and vent of transmitters, landing of leads, etc.		
Comment Steps and Special Instructions used to ensure proper restoration/system configuration.		
Automatic functions which may occur when power restored addressed.		
Information valuable to proper restoration added to Special Instructions. **[R16]**		
Independent Verification requirements verified.		
FINAL LIFT CHECKLIST – DISTRIBUTION BY SRO		
Clearance in a Released status.		
Verify no "BC" type release codes or that the affected work has been subsequently completed.		
All Work Order tasks are Complete or Release Codes support Clearance removal.		
If grounds were installed, grounds have been removed by previous Ground Checklist.		
Review Special Instructions.		
Review Final Lift Checklist.		
Review supporting procedures to be used during Checklist removal.		
Ensure Work Orders not performed are removed from Equip/Task Panel.		
Checklist performs fill and vent prior to energizing equipment.		
Plant conditions/configuration support Clearance lift.		
Required notifications made (Control Room, shop support, etc.).		
Conflicts addressed IAW Enclosure 5		
Final Lift menu option used for creating Final Lift checklist.		
Final Lift Checklist Distributed.		
CLEARANCE COMPLETION		
Computer updated with all information from hard copies of Clearance.		
Equipment/system returned to service or steps taken to ensure return to service, to include steps to restore from LCO, EIR, etc actions.		
Clearance set to status Closed.		

- Completed Attachment 10 Checklist may be discarded after completion.

Progress Energy

I
INFORMATION
USE

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 3

PART 12

EDP-002

480V AC BUSSES

REVISION 15

SUMMARY OF CHANGES

PRR: 00436557

EDP-002 REV. 15

SECT/PAGE	REVISION COMMENTS
5.0	CMPT NO. 31C – Deleted wording of "PAP West Building and" from Load Title and all of the EDBS Load Tag No. per EC 75079

TABLE OF CONTENTS

1.0 **480V-1**

480V-1 POWER SUPPLY: NORMAL - 4160V BUS 2 (52/13)LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
1A	**PT'S & METERING EQUIPMENT (*)** N/A	N/A	N/A
1B	**STATION SERVICE TRANSFORMER 2A TO 480V BUS 1** 480V-1	894	52/1B
2A	**BLANK** N/A	N/A	N/A
2B	**FEED TO 480V BUS 1** 480V-1	893	52/2B
2C	**PRESSURIZER HEATER BACK-UP GROUP A** BACKUP-GP-A	131	52/2C
3A	**FEED TO MCC-1** MCC-1	N/A	52/3A
3B	**CV POLAR CRANE BACKUP POWER SUPPLY** POLAR-CRN	1766	52/3B
3C	**FEED TO PP-63** PP-63	N/A	52/3C
4A	**BLANK** N/A	N/A	N/A
4B	**CONSTRUCTION FACILITIES MAIN DISCONNECT** CONST-FAC-DISC-SW	N/A	52/4B
4C	**SPENT FUEL PIT COOLING PUMP B** SFPC-PMP-B	225	52/4C
5A	**METERING EQUIPMENT (**)** N/A	N/A	N/A
5B	**480V BUS 1-2A TIE** 480V-1, 2A	935	52/5B
5C	**CONDENSER VACUUM PUMP A** VCM-PMP-A	757	52/5C

* Compartment 1A also contains one ground relay, one undervoltage relay, one AC voltmeter, one voltmeter selector switch, one ground indication, and one ground detection reset.

** Compartment 5A also contains the Spent Fuel Pit "B" total run time meter and the Vacuum Pump "A" total run time meter.

2.0 **480V-2A**

480V-2A POWER SUPPLY: NORMAL - 4160V BUS 1 (52/4) LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
6A	**FEED TO MCC-7** MCC-7	N/A	52/6A
6B	**PRESSURIZER HEATER BACK-UP GROUP B** BACKUP-GP-B	132	52/6B
6C	**TURBINE BUILDING CRANE** TURBINE-CRANE	N/A	52/6C
7A	**FEED TO MCC-2** MCC-2	N/A	52/7A
7B	**SPARE** N/A	N/A	52/7B
7C	**CV POLAR CRANE NORMAL POWER SUPPLY** POLAR-CRN	1766	52/7C
8A	**PT'S & METERING EQUIPMENT (*)** N/A	N/A	N/A
8B	**STATION SERVICE TRANSFORMER 2B TO 480V BUS 2A** 480V-2A	936	52/8B
8C	**BLANK** N/A	N/A	N/A

* Compartment 8A also contains one AC voltmeter, one undervoltage relay, and one voltmeter selector switch.

3.0 480V-2B

480V-2B POWER SUPPLY: NORMAL - 4160V BUS 1 (52/4)LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
9A	**PT'S & METERING EQUIPMENT (*)** N/A	N/A	N/A
9B	**STATION SERVICE TRANSFORMER 2B TO 480V BUS 2B** 480V-2B	937	52/9B
9C	**BLANK** N/A	N/A	N/A
10A	**BLANK** N/A	N/A	N/A
10B	**ROD DRIVE MOTOR GENERATOR SET A** MG-SET-A	71	52/10B
10C	**PRESSURIZER HEATER CONTROL GROUP** CONTROL-GP	130	52/10C
11A	**FEED TO MCC-3** MCC-3	N/A	52/11A
11B	**STATION AIR COMPRESSOR** SA-CMP	589	52/11B
11C	**FEED TO MCC-20** MCC-20	1257	52/11C
12A	**METERING EQUIPMENT (**)** N/A	N/A	N/A
12B	**480V BUS 2B-3 TIE** 480V-2B, 3	938	52/12B
12C	**BLANK** N/A	N/A	N/A

* Compartment 9A also contains one ground relay, one undervoltage relay, one AC voltmeter, one voltmeter selector switch, one ground indication, and one ground detection reset.

** Compartment 12A also contains the Station Air Compressor total run time meter and the Vacuum Pump "B" total run time meter, and a spare total run time meter.

4.0 **480V-3**

480V-3 POWER SUPPLY: NORMAL - 4160V BUS 3 (52/15) LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
13A	**SPARE** (Reserved by EC 53926) N/A	1796	52/13A
13B	**FEED TO MCC-4** MCC-4	N/A	52/13B
13C	**SPENT FUEL PIT COOLING PUMP A** SFPC-PMP-A	227	52/13C
14A	**ROD DRIVE MOTOR GENERATOR SET B** MG-SET-B	73	52/14A
14B	**BLANK** N/A	N/A	N/A
14C	**MOTOR DRIVEN FIRE PUMP** MTR-FIRE-PMP	585	52/14C
15A	**CONDENSER VACUUM PUMP B (*)** VCM-PMP-B	759	52/15A
15B	**FEED TO 480V BUS 3** 480V-3	898B	52/15B
15C	**BLANK** N/A	N/A	N/A
16A	**PT'S & METERING EQUIPMENT (**)** N/A	N/A	N/A
16B	**STATION SERVICE TRANSFORMER 2C TO 480V BUS 3 & 480V BUS DS** 480V-3, 480V-DS	899	52/16B

* Compartment 15A also contains one lockout reset button.

** Compartment 16A also contains ground relay, one undervoltage relay, one AC voltmeter, one voltmeter selector switch, one ground indication, and one ground detection reset.

5.0 **480V-4**

480V-4 POWER SUPPLY: NORMAL - 4160V BUS 4 (52/28) LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	LOAD TITLE EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
30A	PT's & METERING EQUIPMENT (*) N/A	1040A	N/A
30B	STATION SERVICE TRANSFORMER 2D TO 480V BUS 4 480V-4	1040C	52/30B
30C	FEED TO MCC-11 MCC-11	1040D	52/30C
31A	FEED TO MCC-13 MCC-13	1040E	52/31A
31B	FEED TO MCC-12 MCC-12	1040F	52/31B
31C	SECURITY POWER SUPPLY	1040G	52/31C
31D	FEED TO MCC-14 MCC-14	1040H	52/31D

* Compartment 30A also contains one ground relay, one undervoltage relay, one AC voltmeter, one voltmeter selector switch, and one circuit breaker control switch.

6.0 **480V-5**

480V-5 POWER SUPPLY: NORMAL - 4160V BUS 5 (52/32)LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
36A	**FEED TO MCC-17** MCC-17	N/A	52/36A
36B	**RADWASTE BUILDING HVS-50 PRE-HEATER** HVS-50-PRE-HTR	1325	52/36B
36C	**FEED TO PP-74** PP-74	N/A	52/36C
36D	**SPARE** N/A	N/A	52/36D
37A	**PT'S & METERING EQUIPMENT (*)** N/A	1342	N/A
37B	**STATION SERVICE TRANSFORMER 2E TO 480V BUS 5** 480V-5	1342	52/37B
37C	**FEED TO MCC-15** MCC-15	N/A	52/37C
37D	**NEUTRAL GROUNDING RESISTOR** 480V-5-NGR	1342	N/A

* Compartment 37A also contains one undervoltage relay, one undervoltage aux relay, one overvoltage relay, one ground indication, one reset, one voltmeter, one main control switch, and one ammeter.

7.0 **480V-DS**

480V-DS POWER SUPPLY: NORMAL - 4160V BUS 3 (52/15)LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
32A	**FEED TO 480V BUS DS** 480V-DS	1015	52/32A
32B	**DEDICATED SHUTDOWN DIESEL GENERATOR TO 480V BUS DS (ALT POWER)** 480V-DS	1016	52/32B
33A	**CONTROL POWER TRANSFORMER (*)** CPT/480V-DS	N/A	N/A
33B	**SERVICE WATER PUMP D (ALT POWER)** SW-PMP-D	834C	52/33B
33C	**COMPONENT COOLING WATER PUMP A** CCW-PMP-A	201	52/33C
33D	**RESIDUAL HEAT REMOVAL PUMPS (ALT POWER)** RHR-PMP-A, B	1752	52/33D
34A	**POTENTIAL TRANSFORMER** PT/480V-DS	N/A	N/A
34B	**CHARGING PUMP A** CHG-PMP-A	161	52/34B
34C	**FEED TO MCC-5 (ALT POWER)** MCC-5	N/A	52/34C
34D	**FEED TO PP-51** PP-51	N/A	52/34D

* Compartment 33A also contains the Charging Pump A total run time meter and the Component Cooling Water Pump A total run time meter.

8.0 480V-E1

480V-E1 POWER SUPPLY: NORMAL - 4160V BUS 2 (52/13)LOCATION: E-1/E-2 ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
17A	**PT'S & METERING EQUIPMENT (*)** N/A	N/A	N/A
17B	**EMERGENCY DIESEL GENERATOR A TO 480V BUS E-1** 480V-E1	890	52/17B
18A	**PT'S & METERING EQUIPMENT (**)** N/A	N/A	N/A
18B	**STATION SERVICE TRANSFORMER 2F TO 480V BUS E-1** 480V-E1	892	52/18B
19A	**CV SPRAY PUMP A** CV-SPRAY-PMP-A	287	52/19A
19B	**CV RECIRC FAN, HVH-1** HVH-1	511	52/19B
19C	**SERVICE WATER PUMP B** SW-PMP-B	832	52/19C
20A	**AUX FEEDWATER PUMP A** AFW-PMP-A	651	52/20A
20B	**SERVICE WATER PUMP A** SW-PMP-A	831	52/20B
20C	**CV RECIRC FAN, HVH-2** HVH-2	512	52/20C
21A	**FEED TO MCC-5 (NORM POWER) & MCC-16** MCC-5, MCC-16	1187	52/21A
21B	**CHARGING PUMP B** CHG-PMP-B	162B	52/21B
21C	**SAFETY INJECTION PUMP A** SI-PMP-A	237	52/21C
22A	**RESIDUAL HEAT REMOVAL PUMP A** RHR-PMP-A	214	52/22A
22B	**480V BUS E-1 SUPPLY TO SI PUMP B** 480V-E1, E2	891	52/22B
22C	**COMPONENT COOLING WATER PUMP B** CCW-PMP-B	205	52/22C

* Compartment 17A also contains two amp meters, two amp meter switches, one volt meter, one volt meter switch, two undervoltage relays, four overcurrent relays, and two auxiliary relays.

** Compartment 18A also contains eight run time meters, three degraded grid relays, one degraded grid trip signal, three test switches, and one degraded grid voltage switch.

9.0 **480V-E2**

480V-E2 POWER SUPPLY: NORMAL - 4160V BUS 3 (52/15)LOCATION: E-1/E-2 ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
23A	**CHARGING PUMP C** CHG-PMP-C	163B	52/23A
23B	**SAFETY INJECTION PUMP C** SI-PMP-C	239	52/23B
23C	**FEED TO MCC-6** MCC-6	1188	52/23C
24A	**SERVICE WATER PUMP C** SW-PMP-C	833	52/24A
24B	**CV RECIRC FAN, HVH-4** HVH-4	514	52/24B
24C	**AUX FEEDWATER PUMP B** AFW-PMP-B	655	52/24C
25A	**CV RECIRC FAN, HVH-3** HVH-3	513	52/25A
25B	**SERVICE WATER PUMP D (NORMAL SUPPLY)** SW-PMP-D	834B	52/25B
25C	**CV SPRAY PUMP B** CV-SPRAY-PMP-B	290	52/25C
26A	**FEED TO MCC-18** MCC-18	1189	52/26A
26B	**RESIDUAL HEAT REMOVAL PUMP B** RHR-PMP-B	216	52/26B
26C	**COMPONENT COOLING WATER PUMP C** CCW-PMP-C	209	52/26C
27A	**PT'S & METERING EQUIPMENT (*)** N/A	N/A	N/A
27B	**EMERGENCY DIESEL GENERATOR B TO 480V BUS E-2** 480V-E2	895	52/27B

480V-E2 POWER SUPPLY: NORMAL - 4160V BUS 3 (52/15) LOCATION: E-1/E-2 ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
28A	**PT'S & METERING EQUIPMENT (**)** N/A	N/A	N/A
28B	**STATION SERVICE TRANSFORMER 2G TO 480V BUS E-2** 480V-E2	896	52/28B
29A	**TIE BUS** N/A	N/A	N/A
29B	**480V BUS E-2 SUPPLY TO SI PUMP B** 480V-E2, E1	896	52/29B
29C	**SAFETY INJECTION PUMP B** SI-PMP-B	238	52/29C

* Compartment 27A also contains two amp meters, two amp meter switches, one volt meter, one volt meter switch, and two undervoltage relays.

** Compartment 28A also contains eight run time meters, three degraded grid relays, one degraded grid trip signal, three test switches, and one degraded grid voltage switch.

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ILC-13 NRC JPM RO A3
Rev 0

Calculate Low Dose Path

Concurred By: ______________________________ **Date:** ________________
Operations

Approved By: ______________________________ **Date:** ________________
Superintendent/Supervisor - Training

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Alternate Path:

NO

JPM #: ILC-13 NRC JPM RO A3

Candidate RO

K/A	Rating (RO/SRO):
G 2.3.4	3.2

Task Standard:
Determine the appropriate path and number of workers to keep dose ALARA and determine if any dose limits are exceeded.

Preferred Evaluation Location: Simulator ____ Classroom __X__

Preferred Evaluation Method: Perform __X__ Simulate ____

References:

DOS-NGGC-0004, Administrative Dose Limits

Validation Time: 20 Minutes Time Critical: NO Time Critical Time: N/A

Candidate: ______________________ Name

SSN ___ - ___ - ___

(N/A if not time critical)

	Overall Time	Critical Time
Start:	________	________
Finish:	________	________
Performance Time (min):	________	________

Performance Rating: circle one SAT UNSAT

Examiner: ____________________ ____________________ __________
Print Name Signature Date

COMMENTS:

QUESTION DOCUMENTATION:

Question:

Response:

Tools/Equipment/Procedures Needed:

Calculator and Paper

DOS-NGGC-0004, Administrative Dose Limits (if requested)

READ TO OPERATOR

DIRECTIONS TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. 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 Operator Cue Sheet I provided you along with completed JPM material.

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. The plant shutdown 24 hours ago for a Forced Outage.
2. HVH-9A motor has failed and must be replaced prior to plant startup.
3. A team has been assembled to determine options for successful job performance while maintaining overall dose ALARA
4. Only two personnel are available that are qualified to perform the necessary work. They are Duke Energy Employees and have received NO dose from Non-Duke Energy plants. Worker A has a current annual dose of 1895 mrem and Worker B has a current annual dose of 1845 mrem.

SELECTION	PATH – A	PATH - B
Pathway Dose Rate	450 mR/hr	240 mR/hr
Pathway Transit Time to Job Site (minutes)	1 person – 10 2 people – 4	1 person – 18 2 people – 10
Job Site Dose Rate	120 mR/hr	
Job Site Work Duration (minutes)	1 person – 60 2 people – 25	
Pathway Transit Time from Job Site (minutes)	1 person – 10 2 people - 4	1 person - 18 2 people - 10

INITIATING CUES:

Using the data given, determine the recommended path to the job site, the number of workers necessary to effectively complete the job and keep radiation dose ALARA, the dose each worker will receive and if any dose limits will be exceeded.

START TIME: __________

EXAMINER'S NOTE: Performance Steps may be performed in any order.	
STEP 1: Determine Transit dose to the job site for 1 worker via PATH A. **STANDARD:** Determines that 1 worker transiting via PATH A will receive 75 mRem entering the job site. (450 mR/hr) x (1hr/60 min.) x 10 min. = 75 mRem **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 2: Determine Transit dose to the job site for 2 workers via PATH A. **STANDARD:** Determines that 2 workers transiting via PATH A will receive 60 mRem entering the job site. (450 mR/hr) x (1hr/60 min.) x 4 min. x 2 people = 60 mRem **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 3: Determine work site dose for 1 worker. **STANDARD:** Determines that 1 worker performing job will receive 120 mrem. (120 mR/hr) x (1hr/60min) x 60 min. = 120 mrem **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 4: Determine work site dose for 2 workers. **STANDARD:** Determines that 2 workers performing job will receive 100 mrem. (120 mR/hr) x (1hr/60min) x 25 min. x 2 people = 100 mrem **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 5: Determine dose received by 1 worker to exit work site via PATH A. **STANDARD:** Determines that 1 worker transiting via PATH A will receive 75 mRem exiting the job site. (450 mR/hr) x (1hr/60 min.) x 10 min. = 75 mRem **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 6: Determine dose received by 2 workers to exit work site via PATH A. **STANDARD:** Determines that 2 workers transiting via PATH A will receive 60 mRem exiting the job site. (450 mR/hr) x (1hr/60 min.) x 4 min. x 2 people = 60 mRem **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 7: Determine dose received for entire job if PATH A is used.

Critical Step

STANDARD: Determines that to perform job using PATH A will result in 270 mrem for 1 worker and 220 mrem for 2 workers.

1 worker: 75 + 120 + 75 = 270 mrem

2 workers: 60 + 100 + 60 = 220 mrem (110 mRem to each worker)

___ SAT

___ UNSAT

EXAMINER'S NOTE: **NONE**

COMMENTS:

STEP 8: Determine Transit dose to the job site for 1 worker via PATH B.

STANDARD: Determines that 1 worker transiting via PATH B will receive mRem entering the job site.
(240 mR/hr) x (1hr/60 min.) x 18 min. = 72 mRem

___ SAT

EXAMINER'S NOTE: **NONE**

___ UNSAT

COMMENTS:

STEP 9: Determine Transit dose to the job site for 2 workers via PATH B.

___ SAT

STANDARD: Determines that 2 workers transiting via PATH B will receive 80 mRem entering the job site.
(240 mR/hr) x (1hr/60 min.) x 10 min. x 2 people = 80 mRem

___ UNSAT

EXAMINER'S NOTE: **NONE**

COMMENTS:

STEP 10: Determine dose received by 1 worker to exit work site via PATH B. **STANDARD:** Determines that 1 worker transiting via PATH B will receive 72 mRem exiting the job site. (240 mR/hr) x (1hr/60 min.) x 18 min. = 72 mRem **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 11: Determine dose received by 2 workers to exit work site via PATH B. **STANDARD:** Determines that 2 workers transiting via PATH B will receive 80 mRem exiting the job site. (240 mR/hr) x (1hr/60 min.) x 10 min. x 2 people = 80 mRem **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 12: Determine dose received for entire job if PATH B is used. **STANDARD:** Determines that to perform job using PATH B will result in 270 mrem for 1 worker and 220 mrem for 2 workers. 1 worker: 72 + 120 + 72 = 264 mrem 2 workers: 80 + 100 + 80 = 260 mrem (120 mRem to each worker) **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT

STEP 13: Determine the recommended path taken and number of workers utilized to keep radiation dose ALARA and the dose each worker will receive. **STANDARD:** Candidate determines that the lowest dose is received by using **2 workers** transiting to and from the job site using **PATH A.** Using this PATH the workers will receive **110 mrem** each. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 14: Determine if any dose limits will be exceeded. **STANDARD:** YES, the Duke Energy Administrative Dose Limit of 2 Rem will be exceeded by Work A. **EXAMINER'S NOTE:** **NONE** COMMENTS: **END OF TASK**	**Critical Step** ___ SAT ___ UNSAT
Terminating Cue: Candidate determines lowest dose received, PATH used and if any dose limits will be exceeded.	

TIME STOP: ________

ANSWER KEY

SELECTION	PATH – A	PATH - B
Pathway Dose Rate	450 mR/hr	240 mR/hr
Pathway Transit Time to Job Site (minutes)	1 person – 10 2 people – 4	1 person – 18 2 people – 10
Job Site Dose Rate	120 mR/hr	
Job Site Work Duration (minutes)	1 person – 60 2 people – 25	
Pathway Transit Time from Job Site (minutes)	1 person – 10 2 people - 4	1 person - 18 2 people - 10
Recommended PATH	PATH – A	
Number of Workers	2	
Dose Received by each worker	110 mrem	
Worker(s) that will exceed any dose limit	Worker A will exceed the Duke Energy (Legacy Progress Energy) Administrative Annual Dose Limit of 2 Rem.	

Excerpt from DOS-NGGC-0004, Administrative Dose Limits

9.3 Progress Energy Annual Administrative Dose Limits

9.3.1 0.5 rem Progress Energy dose if non-Progress Energy dose for the current year has not been determined. No dose extension is permitted.

*9.3.2 **2 rem** Progress Energy dose not to exceed 4 rem total dose if non-Progress Energy dose for the current year has been determined.*

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. The plant shutdown 24 hours ago for a Forced Outage.
2. HVH-9A motor has failed and must be replaced prior to plant startup.
3. A team has been assembled to determine options for successful job performance while maintaining overall dose ALARA
4. Only two personnel are available that are qualified to perform the necessary work. They are Duke Energy Employees and have received NO dose from Non-Duke Energy plants. Worker A has a current annual dose of 1895 mrem and Worker B has a current annual dose of 1845 mrem.

<table>
<tr><td>SELECTION</td><td>PATH – A</td><td>PATH - B</td></tr>
<tr><td>Pathway Dose Rate</td><td>450 mR/hr</td><td>240 mR/hr</td></tr>
<tr><td>Pathway Transit Time to Job Site (minutes)</td><td>1 person – 10
2 people – 4</td><td>1 person – 18
2 people – 10</td></tr>
<tr><td>Job Site Dose Rate</td><td colspan="2">120 mR/hr</td></tr>
<tr><td>Job Site Work Duration (minutes)</td><td colspan="2">1 person – 60
2 people – 25</td></tr>
<tr><td>Pathway Transit Time from Job Site (minutes)</td><td>1 person – 10
2 people - 4</td><td>1 person - 18
2 people - 10</td></tr>
<tr><td>Recommended PATH</td><td colspan="2"></td></tr>
<tr><td>Number of Workers</td><td colspan="2"></td></tr>
<tr><td>Dose Received by each worker</td><td colspan="2"></td></tr>
<tr><td>Worker(s) that will exceed any dose limit</td><td colspan="2"></td></tr>
</table>

INITIATING CUES:

Using the data given, determine the recommended path to the job site, the number of workers necessary to effectively complete the job and keep radiation dose ALARA, the dose each worker will receive and if any dose limits will be exceeded.

x Progress Energy	R Reference Use

NUCLEAR GENERATION GROUP

STANDARD PROCEDURE

Volume 99

Book/Part 99

DOS-NGGC-0004

ADMINISTRATIVE DOSE LIMITS

REVISION 12

NGG
Think Fleet.

TABLE OF CONTENTS

1.0 PURPOSE

This procedure establishes the method for increasing or decreasing administrative dose limits from the default values in Total Exposure during non-emergency operations.

R2.1 This procedure details the occupational radiation dose limits established by the Nuclear Regulatory Commission and the administrative dose limits set by Progress Energy.

2.0 REFERENCES

R2.1 2.1 10 CFR Part 20, Standards for Protection Against Radiation

2.2 DOS-NGGC-0002, Dosimetry Issuance

2.3 Total Exposure User Reference and Training Guide

2.4 NGGM-PM-0002, Radiation Control & Protection Manual

3.0 DEFINITIONS

N/A

4.0 RESPONSIBILITIES

4.1 Radiation Control Personnel

4.1.1 Process administrative dose limit change requests.

4.1.2 Update Total Exposure.

4.2 Superintendent - Radiation Protection

Approve or cancel all requests.

4.3 Site Vice President or Designee

Approve all requests to exceed any administrative dose limits except during declared emergencies.

5.0 PREREQUISITES

N/A

6.0 PRECAUTIONS AND LIMITATIONS

N/A

7.0 SPECIAL TOOLS AND EQUIPMENT

N/A

8.0 ACCEPTANCE CRITERIA

N/A

9.0 INSTRUCTIONS

R2.1 9.1 Adult Occupational Dose Limits

9.1.1 Whole Body - The more limiting of a total effective dose equivalent equal to 5 rem or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye equal to 50 rem.

9.1.2 Skin - A shallow dose equivalent equal to 50 rem.

9.1.3 Lens of Eye - A lens dose equivalent equal to 15 rem.

9.1.4 Extremities - A shallow dose equivalent equal to 50 rem.

9.2 Occupational Dose to Minors

Minors shall not be employed to work in radiation control areas, although they may enter as visitors.

9.3 Progress Energy Annual Administrative Dose Limits

9.3.1 0.5 rem Progress Energy dose if non-Progress Energy dose for the current year has not been determined. No dose extension is permitted.

9.3.2 2 rem Progress Energy dose not to exceed 4 rem total dose if non-Progress Energy dose for the current year has been determined.

9.4 Progress Energy Lifetime Administrative Dose Limits

NOTE:	The following is not required if site management does not require prior years dose history to be documented.

9.4.1 Dose in rem should not exceed the individual's age in years as of the end of the year.

9.4.2 If the cumulative lifetime dose (TEDE) in rem upon employment or as of the beginning of the year, whichever is later, exceeds an individual's age in years, then an administrative limit of 0.5 rem per year on Progress Energy dose shall be imposed.

9.5 Emergency Exposure to Radiation

Exposure to radiation during emergencies is not covered in this procedure. GO TO NGGM-PM-0002, Radiation Control & Protection Manual.

9.6 Planned Special Exposure

Planned special exposures are not covered in this procedure. GO TO NGGM-PM-0002, Radiation Control & Protection Manual.

9.7 Administrative Dose Limit Changes

9.7.1 Ensure Attachment 1, Administrative Dose Limit Change Request, or equivalent has been completed and signed by the individual and Progress Energy supervisor or Progress Energy contract representative for contract employees.

1. A written request signed by an authorized representative of the individual's employer containing the individual's name, SSN, and authorized annual dose limit may be used in lieu of Attachment 1 when changing the administrative dose limit to a value less than the default value in Total Exposure.

2. An authorized representative of the contractor must sign any change request that would allow the individual to exceed employer dose limits previously provided to Progress Energy in writing.

9.7.2 If required by site management, then ensure the individual's current year and prior years dose history has been documented on a Form 4 in accordance with Reference 2.2.

9.7.3 If secondary dosimeter results for the current monitoring period exceed 500 mrem, then ensure the individual's primary dosimeter has been sent for processing.

9.7 Administrative Dose Limit Changes

NOTE:	Attachment 1 shall be completed before Attachment 2 is signed.

9.7.4 Initiate the change request by completing Attachment 2, Administrative Dose Limit Change or equivalent.

9.7.5 Notify radiation control supervision when the change request is ready for approval.

NOTE:	Supervision may give verbal approval by phone and an authorized Designee may complete the approval process on their behalf. In this case, Supervision should later sign Attachment 2 to authenticate their verbal approval.

9.7.6 Obtain Superintendent - Radiation Protection or authorized designee, approval for any increase or decrease in the administrative dose limit from the defaults listed in Steps 9.1, 9.2, and 9.3.

9.7.7 Obtain Site Vice President or designee approval to exceed any administrative dose limits.

9.7.8 Update Administrative dose changes in Total Exposure.

10.0 RECORDS

Submit the following QA Records for processing:

- Attachment 1, Administrative Dose Limit Change Request
- Attachment 2, Manual Administrative Dose Limit Change form
- Employer dose limit authorization letters, if applicable

ATTACHMENT 1
Sheet 1 of 1
Administrative Dose Limit Change Request

Name:_______________________________________ SSN:_______________

Reason for increase/decrease (circle one):____________________________________

____

____

Requested annual dose limit: __________ or Requested available dose:__________

Individual: ____________________ Date: ________________

Progress Energy Supervision: ____________________ Date: ________________

Contract Supervision: ____________________ Date: ________________

(Form DOS-NGGC-0004-1-12)
QA Record

Manual Administrative Dose Limit Change

TE Entry	

Name: ______________________ SSN: ______________

> **NOTE:** Steps 1 - 3 are not required if site management does not require prior years dose history to be documented.

		Dose (mrem)
1.	Lifetime administrative limit (age at end of year X 1000)	_______
2.	Lifetime dose (including current year)	_______
3.	Lifetime available dose (1 - 2).	_______
4.	Current year non-Progress energy dose	_______
5.	Current year Progress Energy dose	_______
6.	Current year total dose (4 + 5).	_______
7.	Current annual administrative limit	_______
8.	Current annual available dose (7 - 6).	_______
9.	New annual administrative limit (shall be < 5000 mrem).	_______
10.	New annual available dose (9 - 6).	_______

Calculations Performed By: ______________________ Date: __________

Approval:

Superintendent - Radiation Protection approval is required for any increase or decrease in the administrative dose limit from the defaults listed in Steps 9.1, 9.2, and 9.3.

Site Vice President approval is required to authorize any of the following:

- An annual Progress Energy dose exceeding 2000 mrem (Line 5 + Line 10)
- An annual total dose exceeding 4000 mrem (Line 6 + Line 10 > 4000).
- A Progress Energy annual dose that would cause the lifetime dose to exceed the individual's age in years as of the end of the calendar year (Line 2 + Line 10 > Line 1). **(See note above.)**
- An annual dose greater than 500 mrem if the lifetime dose upon employment or at the start of the calendar year exceeds the individual's age in years (Line 5 + Line 10 > 500 **and** Line 3 $\leq$ 0).

Superintendent - Radiation Protection (or designee): ____________________ Date: ______

Site Vice President (or designee): ______________________________ Date:______

(Form DOS-NGGC-0004-2-12)

QA Record

REVISION SUMMARY

The following changes were made in this revision (PRR# 395758):

- Section 10.0, changed “vital” to “QA” (395758)
- Attachment 1 changed “vital” to “QA” Revised form number. (395758)
- Attachment 2 changed “vital” to “QA” Revised form number. (395758)

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ILC-13 NRC JPM SRO A1-1
Rev 0

Determine Power Distribution Flux Limits

Concurred By: ______________________________ **Date:** ________________
Operations

Approved By: ______________________________ **Date:** ________________
Superintendent/Supervisor - Training

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: 01083100401, Determine Operator Actions if the ERFIS Computer Becomes Inoperable IAW OMM-001-11.
02110104001, Apply Technical Specifications for Safety limits and Limiting Conditions for Operation IAW ITS.

Alternate Path:

NO

JPM #:

ILC-13 NRC JPM SRO A1-1

Candidate

SRO

K/A	Rating (RO/SRO):
G 2.1.7	4.7

Task Standard:

Perform a MANUAL Calculation of Penalty Points IAW FMP-009, Power Distribution Control and determine any ITS Surveillance requirements and LCOs (if applicable).

Preferred Evaluation Location:

Simulator _____ Classroom __X__

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

FMP-009, Power Distribution Control

ITS Books

Validation Time: 20 Minutes Time Critical: NO Time Critical Time: N/A

Candidate:

____
Name

SSN ____ - ____ - ____

	Overall Time	(N/A if not time critical) Critical Time
Start:		
Finish:		
Performance Time (min):		

Performance Rating: circle one SAT UNSAT

Examiner:

____________ ____________ ________
Print Name Signature Date

COMMENTS:

QUESTION DOCUMENTATION:

Question:

Response:

Tools/Equipment/Procedures Needed:

Calculator

FMP-009, Power Distribution Control

FMP-009, Attachment 10.5 filled out

ITS Books

READ TO OPERATOR

DIRECTIONS TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. 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 Operator Cue Sheet I provided you along with completed JPM material.

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. The plant is at 70% RTP with power ascension halted due to the Xenon transient in progress.
2. PDC-3 program is inoperable.
3. FMP-009 Attachment 10.5 has been provided.
4. 100% Target Value is + 2%
5. Target Band = +/- 5%

INITIATING CUES:

1. **Perform a MANUAL Calculation of Penalty Points IAW FPM-009, Power Distribution Control. (Assume that you are performing the calculations at the time the data was recorded.)**
2. **Determine the following:**
   a. **Determine if applicable Power Distribution Surveillance Requirements based on Initial Conditions are being met. (if applicable)**
   b. **Determine if any ITS LCOs are applicable based on Initial Conditions and Calculation of Penalty Points. (if applicable)**

START TIME: __________

TEP 1: Candidate will calculate the corrected target value for the reduced power levels provided in Attachment 10.5

Critical Step

STANDARD: Candidate calculates the target value as a percentage of power level as follows: (Target Value = +2% at 100% RTP
25% = 2 x 0.25 = 0.5%
35% = 2 x 0.35 = 0.7%
45% = 2 x 0.45 = 0.9%
50% = 2 x 0.5 = 1.0%
60% = 2 x 0.6 = 1.2%
70% = 2 x 0.7 = 1.4%

___ SAT

___ UNSAT

EXAMINER'S NOTE: The candidate will take the above calculated target values and establish a target band by adding +/- 5%.

EQUATIONS AND ERFIS POINTS USED TO CALCULATE TARGET VALUES

Target Value (P) = Target Value$_{ref}$ * P/P$_{ref}$

where: Target Value (P) = Target Value at power P;
Target Value$_{ref}$ = Target Value during flux map;
P = Current power level; and,
P$_{ref}$ = Power level during flux map.

Parameter	N41	N42	N43	N44
Target Value (P)	N/A	N/A	N/A	N/A
Target Value$_{ref}$	NPK1603	NPK1604	NPK1605	NPK1606
P	NIN0041M	NINOO42M	NIN0043M	NIN0044M
P$_{ref}$	NPK1608	NPK1609	NPK1610	NPK1611

COMMENTS:

STEP 2:	Determine the Power Range Channels that are outside of the target band for the data given. (Target bands are +/- 5%)	**Critical Step**
STANDARD:	25% RTP, All indications are inside of the target band. (-4.5 to +5.5).	___ SAT
	35% RTP, NI-41 is outside of the target band. (-4.3 to +5.7)	
	45% RTP, NI-41 and NI-42 are outside of the target band and penalty point accumulation begins at 0.5 minute penalty for each minute of power operation with AFD outside the target band. (-4.1 to +5.9)	___ UNSAT
	50% RTP, NI-41 and NI-42 are outside of the target band and 15 penalty points have been accumulated. (-4.0 to +6.0)	
	60% RTP, NI-41 and NI-42 are outside of the target band and penalty point accumulation has increased to 1 minute penalty point for every minute outside the target band. (-3.8 to +6.2)	
	70% RTP (1430 reading), NI-41 and NI-42 are outside of the target band and penalty point accumulation continues at 1 penalty point for every minute outside the target band. (-3.6 to +6.4)	
	70% RTP (1500 reading), NI-41 and NI-42 are outside of the target band and penalty point accumulation continues at 1 penalty point for every minute outside the target band. (-3.6 to +6.4)	
EXAMINER'S NOTE:	**NONE**	
COMMENTS:		

STEP 3:	Determine the penalty points accumulated during each 30 minute interval and the cumulative total penalty points.	**Critical Step**
STANDARD:	At 1200 hours, 0 penalty points for the interval and 0 total penalty points. No NI is currently outside the target band. At 1230 hours, 0 penalty points for the interval and 0 total penalty points. NI-41 is the only NI outside of the target band. Requires two NIs outside of target band to collect penalty points. At 1300 hours, 0 penalty points for the interval and 0 total penalty points. NI-41 and NI-42 are outside of the target band. Penalty point accumulation has begun at 0.5 minute penalty points for every 1 minute of power operation outside of the target band while reactor power is less than 50%. At 1330 hours, 15 penalty points for the interval and 15 total penalty points. NI-41 and NI-42 outside of Target Band. 15 penalty points have been accumulated between 1300 and 1330 due to point accumulation at 0.5 minute penalty points for every 1 minute outside of target band for 30 minutes and reactor power <50%. At 1400 hours, 30 penalty points for the interval and 45 total penalty points. NI-41 and NI-42 outside of Target Band. 30 penalty points have been accumulated between 1330 and 1400 due to point accumulation at 1 minute penalty point for every 1 minute outside of target band for 30 minutes and reactor power ≥ 50%. At 1430 hours, 30 penalty points for the interval and 75 total penalty points. NI-41 and NI-42 outside of Target Band. 30 penalty points have been accumulated between 1400 and 1430 due to point accumulation at 1 minute penalty point for every 1 minute outside of target band for 30 minutes and reactor power ≥ 50%. At 1500 hours, 30 penalty points for the interval and 105 total penalty points. NI-41 and NI-42 outside of Target Band. 30 penalty points have been accumulated between 1430 and 1500 due to point accumulation at 1 minute penalty point for every 1 minute outside of target band for 30 minutes and reactor power ≥ 50%.	___ SAT ___ UNSAT
EXAMINER'S NOTE:	NONE	
COMMENTS:		

STEP 4: Determine whether ITS Surveillance requirements have been met. **STANDARD:** SR 3.2.3.2 is required due to the AFD monitor alarm being inoperable. SR 3.2.3.2 requires that AFD is verified within limits and is being logged every 1 hour. The SR was met since AFD was verified within limits since recorded every 30 minutes. **EXAMINER'S NOTE: SR 3.2.3.2 requires that AFW be verified within limits and log AFD for each OPERABLE excore channel once within 1 hour and every 1 hour thereafter when Thermal Power < 90% RTP or 0.9 APL, whichever is less.** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 5: Determine any operational restrictions or ITS requirements due to the information provided and calculated data. **STANDARD:** Candidate determines that ITS 3.2.3 Condition C was met at time 1430 due to exceeding greater than 1 hour of cumulative penalty points. (At 1430 a total of 75 penalty points had been accumulated.) Candidate determines that ITS 3.2.3 Condition D was met at time 1500 due to required Action and associated Completion Time for Condition C not met. (Condition C required that Thermal Power be reduced to less than 50% within 30 minutes.) **EXAMINER'S NOTE:** NONE COMMENTS: **END OF TASK**	**Critical Step** ___ SAT ___ UNSAT

Terminating Cue: Penalty points have been manually calculated and applicable ITS LCO and ITS SR have been identified.

TIME STOP: ________

ANSWER KEY

This revision is the latest revision available and has been verified against the Document Management System.

J. L. Smith (Print) ______________________ **Today**

Name **Signature** **Date**

Date/Time	Power %RTP	N41 AFD	N42 AFD	N43 AFD	N44 AFD	Penalty Points This Interval	Total Penalty Points	Comments	Initials
1200	25	5.4	5.4	5.3	5.3	**0**	**0**	**Target = 0.5 (-4.5 to +5.5)**	
1230	35	5.8	5.6	5.5	5.5	**0**	**0**	**Target = 0.7 (-4.3 to +5.7)**	
1300	45	6.1	6.0	5.7	5.6	**0**	**0**	**Target = 0.9 (-4.1 to +5.9)**	
1330	50	6.3	6.1	5.8	5.7	**15**	**15**	**Target = 1.0 (-4.0 to +6.0)**	
1400	60	6.7	6.5	6.1	6.0	**30**	**45**	**Target = 1.2 (-3.8 to +6.2)**	
1430	70	7.1	6.9	6.3	6.2	**30**	**75**	**Target = 1.4 (-3.6 to +6.4)**	
1500	70	6.6	6.5	5.9	5.8	**30**	**105**	**Target = 1.4 (-3.6 to +6.4)**	

SSO Review: ______________________ **Date:** ____________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. The plant is at 70% RTP with power ascension halted due to the Xenon transient in progress.
2. PDC-3 program is inoperable.
3. FMP-009 Attachment 10.5 has been provided.
4. 100% Target Value is + 2%
5. Target Band = +/- 5%

INITIATING CUES:

1. **Perform a MANUAL Calculation of Penalty Points IAW FPM-009, Power Distribution Control. (Assume that you are performing the calculations at the time the data was recorded.)**
2. **Determine the following:**
   a. **Determine if applicable Power Distribution Surveillance Requirements based on Initial Conditions are being met. (if applicable)**
   b. **Determine if any ITS LCOs are applicable based on Initial Conditions and Calculation of Penalty Points. (if applicable)**

ATTACHMENT 10.5

MANUAL AFD MONITORING LOG

This revision is the latest revision available and has been verified against the Document Management System.

J. L. Smith (Print)		Today
Name	Signature	Date

Date/Time	Power %RTP	N41 AFD	N42 AFD	N43 AFD	N44 AFD	Penalty Points This Interval	Total Penalty Points	Comments	Initials
1200	25	5.4	5.4	5.3	5.3				
1230	35	5.8	5.6	5.5	5.5				
1300	45	6.1	6.0	5.7	5.6				
1330	50	6.3	6.1	5.8	5.7				
1400	60	6.7	6.5	6.1	6.0				
1430	70	7.1	6.9	6.3	6.2				
1500	70	6.6	6.5	5.9	5.8				

SSO Review: ______________________ Date: ____________

Progress Energy

R
Reference Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 6
PART 5

FMP-009

POWER DISTRIBUTION CONTROL

REVISION 17

SUMMARY OF CHANGES
PRR 207424

REVISION #	REVISION COMMENTS
17	Convert to WORD XP Change CP&L to Progress Energy Format to current procedure format Change NRCS to Document Management System

TABLE OF CONTENTS

1.0 PURPOSE

1.1 To provide instructions and guidance to ensure that the core axial power distribution is maintained within the limits established in Technical Specifications (ITS) LCO 3.2.3, SR 3.2.3.1 and SR 3.2.3.2

1.2 To provide instructions for identifying, monitoring and controlling divergent axial oscillations.

1.3 To satisfy Technical Specification (ITS) SR 3.2.3.2

2.0 REFERENCES

2.1 Technical Specifications (ITS) 1.1, LCO 3.2.3, SR 3.2.3.1, SR 3.2.3.2, SR 3.2.3.3

2.2 FMP-001, Core Operating Limits Report (COLR)

2.3 XN-76-40(A), Exxon Nuclear Power Distribution Control For Pressurized Water Reactors, September 1976

2.4 XN-NF-77-57 and XN-NF-77-57 Supplement 1 (A), Exxon Nuclear Power Distribution Control for Pressurized Water Reactors Phase II, May 1981

2.5 XN-NF-77-57 Supplement 2(A) and XN-NF-77-57 Supplement 2 Addendum 1 (A), Exxon Nuclear Power Distribution Control for Pressurized Water Reactors Phase II, October 1982

2.6 ANF-88-054(P), PDC-3: Advanced Nuclear Fuels Corporation Power Distribution Control for Pressurized Water Reactors and Application of PDC-3 to H.B. Robinson Unit 2, July 1988

2.7 EST-003, Incore/Excore Detector Calibration

2.8 SCM-003, Plant Computer Systems Database Control Procedure

2.9 UFSAR 1.5.3, 3.1.1.2.2, 3.1.2.7, 4.3.1.6, 4.3.2.2, 4.3.2.6, 4.3.3.3, 4.4.3.1, 7.2.1.1.2, 7.2.1.1.7, 7.7.1.5, 7.7.1.6

2.10 EC 47211 ERFIS Data Concentrator replacement.

2.11 EC 47160 NSS and BOP Analysis to Support Appendix K Uprate

3.0 RESPONSIBILITIES

3.1 Reactor Engineering is responsible for performing flux maps every 31 Effective Full Power Days (EFPDs) to determine the Target Axial Flux Difference (AFD) values, the Target Band values and the Allowable Power Level (APL) value in accordance with Technical Specifications (ITS) SR 3.2.3.3 and LCO 3.2.3. Reactor Engineering is also responsible for ensuring that the Control Room Status Board and the ERFIS CAOC software is updated to reflect the correct Target AFD values, Target Band values and APL value. Reactor Engineering is also responsible for ensuring the ERFIS CAOC software is updated to reflect the correct Incore/Excore calibration constants.

3.2 The Control Operator is responsible for maintaining the AFD within the limits specified in Technical Specifications (ITS) LCO 3.2.3 and SR 3.2.3.1 and the COLR. The Control Operator is also responsible for logging the AFD in accordance with Technical Specification (ITS) SR 3.2.3.2 when the AFD Alarms are inoperable.

3.3 The Superintendent - Shift Operations is responsible for reviewing the Manual AFD Monitoring Log.

4.0 PREREQUISITES

N/A

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Any Technical Specification Required Action regarding reactor power limitations, including the setting of trip setpoints, should be based on a Rated Thermal Power (RTP) of 2339 MW_{th}. A trip setpoint based on a 2300 MW_{th} would satisfy Technical Specification requirements; however, if a trip setpoint is based on an RTP of 2300 MW_{th}, then the actual trip would occurr at a lower indicated power when operating based on a 2339 MW_{th} RTP.

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

N/A

8.0 **PROCEDURE**

8.1 Definitions

8.1.1 Axial Flux Difference (AFD)
The Axial Flux Difference (AFD) is defined as the difference in normalized flux signals between the top and bottom halves of a two section excore neutron detector (ITS 1.1). This parameter is synonymous with Delta Flux, Indicated Flux Difference, ΔI, %ΔI, %Δ Flux and Δq. AFD can also be related to core Axial Offset (AO) using the following equation:

AFD = AO * Power Level/Rated Thermal Power.

AFD relates the power in the top of the core to the power in the bottom of the core as seen by the excore NIS Power Range detectors. A separate AFD value is calculated for each NIS Power Range channel. The equations and ERFIS Point IDs used in calculating AFD for each of the four Power Range channels are shown in ATTACHMENT 10.1. It should be noted that the ERFIS AFD is calculated once per minute and is based on 1 minute average values for V(top), V(bottom) and P.

8.1.2 Target Value (TV)
The Target Value, also known as the Target Flux Difference, is the value of AFD determined in conjunction with the measurement of $F_Q^V(Z)$ under equilibrium conditions within 31 EFPD after each refueling and every 31 EFPD thereafter (ITS SR 3.2.3.3). During startup and power ascension following each refueling, the Target Value may be based on design predictions until equilibrium conditions for long term operation are reached. Like AFD, the Target Value is power dependent (examples of the variation of Target Value with power are provided in ATTACHMENT 10.2). A separate Target Value is calculated for each NIS Power Range channel. The Target Value for a Power Range channel is generally the average ERFIS AFD value recorded for that channel during the course of the flux map. The equations and ERFIS Point IDs used in calculating the power dependent Target Value for each of the four Power Range channels are shown in ATTACHMENT 10.1.

8.1.3 Allowable Power Level (APL)
The Allowable Power Level is the limit placed on reactor power due to the $F_Q^V(Z)$ peaking factor. The APL is used in applying the AFD target flux and operational limit curves (ITS LCO 3.2.3). The equation for determining the APL is provided in Technical Specification (ITS) LCO 3.2.3. The effect of APL on the Target Bands and Operating Bands can be seen in ATTACHMENT 10.2

8.1.4 Target Bands (TB)
The Target Bands establish a region of operation around the Target Value in which the AFD may vary without adversely affecting the axial power distribution or the axial xenon distribution. The allowable values of the Target Band are provided in the COLR for each cycle. The allowable Target Band values are currently ±3% and ±5%. If the APL is less than 90% RTP, then the values of the Target Bands are reduced to account for the effects of the reduced APL; however, they are still referred to as the ±3% and ±5% Target Bands in order to maintain a consistent nomenclature under all operating conditions. Since the Target Band moves with the Target Value, separate Upper and Lower Target Bands are calculated for each NIS Power Range channel (examples of the variation of the Target Bands with power and with APL are provided in ATTACHMENT 10.2). The equations and ERFIS Point IDs used in calculating the Target Bands for each of the four Power Range channels are shown in ATTACHMENT 10.1.

8.1.5 Operating Bands (OB)

The Operating Bands establish a region of acceptable operation outside of the Target Bands in which the AFD may vary for a short time period without adversely affecting the axial power distribution or the axial xenon distribution. The Operating Bands are only applicable to operation at power levels between 50% RTP and 90% RTP (or 90% APL if the APL is less than 100% RTP). The allowable values of the Operating Bands are provided in the COLR for each cycle. The Operating Bands use the same nomenclature as the Target Bands (i.e. ±3% and ±5% Operating Bands). The ±3% Operating Bands are used with the ±3% Target Bands and the ±5% Operating Bands are used with the ±5% Target Bands. If the APL is less than 90% RTP, then the values of the Operating Bands are reduced to account for the effects of the reduced APL; however, they are still referred to as the ±3% and ±5% Operating Bands in order to maintain a consistent nomenclature under all operating conditions. If 0.9*APL is less than 90% RTP, then the top of the Operating Bands is limited to 0.9*APL. The Operating Bands, like Target Bands, move with the Target Value (examples of the variation of the Operating Bands with power and APL are provided in ATTACHMENT 10.2). Separate Upper and Lower Operating Bands are calculated for each NIS Power Range channel. The equations and ERFIS Point IDs used in calculating the Operating Bands for each of the four Power Range channels are shown in ATTACHMENT 10.1.

8.1.6 Penalty Points

Penalty Points are used to track the amount of time that operation outside of the Target Bands has occurred. Penalty point accumulation only occurs when two or more operable Power Range channels indicate that AFD is outside of the Target Bands. Penalty points are related to time of operation outside of the Target Bands through the following relations:

≥50% RTP: 1 Penalty Point= 1 minute outside the Target Bands
<50% RTP: 1 Penalty Point= 2 minutes outside the Target Bands

Penalty points are eliminated by operation within the Target Bands at the same rates at which they were accumulated. The ERFIS Point ID used to track penalty point accumulation is shown in ATTACHMENT 10.1.

8.1.7 Target Warning Bands (TWB)
The Target Warning Bands are provided to alert the Operator that the AFD for one or more NIS Power Range channels is approaching the Target Bands (examples of the Target Warning Bands are provided in ATTACHMENT 10.2). Separate upper and lower Target Warning Bands are calculated for each NIS Power Range channel. The equations and ERFIS Point IDs used in calculating the Target Warning Bands for each of the four Power Range channels are shown in ATTACHMENT 10.1.

8.1.8 Operating Warning Band (OWB)
The Operating Warning Bands are provided to alert the Operator that the AFD for one or more NIS Power Range channels is approaching the Operating Bands (examples of the Operating Warning Bands are provided in ATTACHMENT 10.2). Separate upper and lower Operating Warning Bands are calculated for each NIS Power Range channel. The equations and ERFIS Point IDs used in calculating the Operating Warning Bands for each of the four Power Range channels are shown in ATTACHMENT 10.1.

8.2 Power Distribution Control Methodology

8.2.1 The Power Distribution Control (PDC) methodology for controlling the core axial power distribution tries to avoid the "building-in" of adverse axial power distributions during plant operations by maintaining a relatively constant power shape based on the equilibrium conditions encountered throughout a given core cycle. Maintaining a relatively constant axial power shape ensures that the $F_Q^V(Z)$ peaking factor limit will not be exceeded. Since the "building-in" of adverse power shapes is a function of power level, the restrictions on deviation from the Target Value also vary with power level.

8.2.2 The Operator can use the RTGB AFD meters or the ERFIS AFD point IDs to monitor the status of AFD. Spurious alarms and any other applicable comments relating to AFD monitoring should be entered in the Control Operator's narrative log, when necessary.

8.2.3 The AFD is considered to be outside of the Target Bands or Operating Bands when the AFD for two operable Power Range channels exceed their Target Bands or Operating Bands.

8.2.4 At power levels ≥90% RTP (or 0.9*APL, whichever is less), the AFD must be maintained within the Target Bands. If the AFD is outside of the Target Bands then the AFD must be returned to within the Target Bands within 15 minutes or power must be reduced below 90% RTP (or 0.9*APL, whichever is less) within 30 minutes (Technical Specification (ITS) LCO 3.2.3 Conditions A and B). Penalty Points are accumulated while the AFD is outside the Target Bands.

8.2.5 At power levels <90% RTP (or 0.9*APL, whichever is less) but ≥50% RTP, the AFD may deviate from the Target Bands as long as the total number of Penalty Points incurred over the previous 24 hours does not exceed 60 Penalty Points. The AFD must be maintained within the Operating Bands. If the number of accumulated Penalty Points exceeds 60 or if the AFD is outside of the Operating Bands then power must be reduced below 50% RTP within 30 minutes (Technical Specification (ITS) LCO 3.2.3 Condition C). If power is not reduced below 50% RTP within 30 minutes then power must be reduced below 15% RTP within 9 hours (ITS LCO 3.2.3 Condition D)

8.2.6 At power levels <50% RTP, the AFD may deviate from the Target Bands since adverse power shapes at lower power levels are sufficiently accounted for by the F(ΔI) input to the Overtemperature ΔT (OTΔT) and Overpower ΔT (OPΔT) Reactor Protection setpoints. A power increase to ≥50% RTP is permitted only if the accumulation of Penalty Points within the previous 24 hour period does not exceed 60 points.

8.2.7 At power levels <15% RTP, AFD monitoring is not required by the Technical Specifications (ITS LCO 3.2.3). The ERFIS CAOC program does not perform any AFD calculations below 15% power in order to prevent extraneous alarms during periods when the instrumentation noise levels are significant and power operations is minimal.

8.2.8 Certain evolutions such as Incore/Excore calibrations require the AFD to be outside of the Target Bands. Deviation from the Target Bands for a limited amount of time is permitted by the Technical Specifications provided the AFD is maintained within the Operating Bands (Technical Specifications (ITS) LCO 3.2.3).

8.3 ERFIS Monitoring of AFD

8.3.1 Normal Operation
During normal operation above 15% power, the ERFIS CAOC software program calculates the following values for each of the four NIS Power Range channels once per minute:

1. AFD;
2. Target Value for the current power level;
3. Upper and Lower Target Bands for the current power level;
4. Upper and Lower Operating Bands for the current power level;
5. Upper and Lower Target Warning Bands for the current power level; and,
6. Upper and Lower Operating Warning Bands for the current power level.

The CAOC software program compares the calculated AFD for each Power Range channel to that channel's Target Warning Bands, Target Bands, Operating Warning Bands and Operating Bands. If a Power Range channel crosses one or more of the bands, the ERFIS CAOC program informs the Operator of the condition by providing a message on the ERFIS alarm screen and a report on the Control Room printer and if necessary by actuating the appropriate annunciators on the RTGB (APP-005-D6, Δ FLUX WARNING/STATUS and APP-005-E4, Δ FLUX ALARM). The ERFIS CAOC reports that are printed on the Control Room printer are retained as part of the operating logs.

8.3.1 (Continued)

The ERFIS CAOC software program automatically accumulates Penalty Points at the appropriate rate based on power level if two or more operable Power Range channels are outside of their Target Bands. The program also automatically subtracts penalty points at the appropriate rate if the AFD is within the Target Band and the required time since the points were accumulated (24 hours) has elapsed.

8.3.2 ERFIS CAOC Alarms
If the calculated AFD for any channel is outside of any of the bands for that channel then an alarm is generated via annunciators APP-005-D6 and/or APP-005-E4. The specific cause of the alarm (i.e. the identification of the channel and the band that has been exceeded) is displayed on the ERFIS alarm screen and a report is printed on the Control Room printer. Examples of the types of warning/status/alarms messages are shown in ATTACHMENT 10.3.

8.3.3 ERFIS CAOC Shift Summary Report
A Shift Summary Report is printed on the Control Room printer at 0730, 1530, and 2330 hours. The Shift Summary Report is intended to provide information on the change in AFD with time to allow the Operator or Reactor Engineer to easily detect axial oscillations or instrument calibration problems.

The Shift Summary Report lists the AFD for each of the four channels at the time of the report as well as the Minimum AFD and Maximum AFD each of the channels reached during the eight hour period preceding the report. The report also lists the values for the Target Bands, Target Warning Bands, Operating Bands and Operating Warning Bands for each channel at the time of the report. The report has blanks for the Operator to record the AFD indication from the RTGB meters in order to verify that the RTGB indicated AFD is within 2% of the ERFIS calculated AFD. A deviation between the RTGB indicated AFD and the ERFIS calculated AFD of greater that 2% is not expected and would warrant further investigation to determine if an ERFIS or NIS problem exists. The Shift Summary Report is retained as part of the normal operating logs.

8.3.4 Removing a Channel From Service in CAOC

A NIS Power Range channel may be removed from service in the ERFIS CAOC program by removing that channel's instantaneous % power point from scan. This will generate an APP-005-D6, Δ FLUX WARNING, alarm with the following description displayed on the CAOC alarm report:

CHANNEL #__ NOW OUT OF SERVICE.

A Power Range channel may be returned to service in the ERFIS CAOC program by restoring that channel's instantaneous % power point to scan. This will generate an APP-005-D6, FLUX STATUS, alarm with the following description displayed on the CAOC alarm report:

CHANNEL #__ JUST RETURNED TO SERVICE.

The ERFIS point IDs used in removing channels from service and restoring channels to service are as follows:

NIS CHANNEL	CAOC CHANNEL	ERFIS POINT ID
N41	#1	NIN0041A
N42	#2	NIN0042A
N43	#3	NIN0043A
N44	#4	NIN0044A

8.3.5 Demand AFD Report Disabling Alarms and Penalty Logging
During certain activities such as Incore/Excore calibrations or other maintenance or calibration activities involving the Power Range channels, it may be necessary to demand an AFD printout, disable the alarm function and/or Penalty Point logging function of the ERFIS CAOC computer program to provide immediate information or to prevent extraneous alarms and/or inadvertent accumulation of Penalty Points.

To initiate any of these ERFIS functions select TOC AFD4. The current state of these functions is reflected in the "Current State" column in the lower part of the display. Select the button appropriate for the desired function to toggle the desired state in the "New State" column. The "New State" indication will update in the lower part of the screen to reflect the selected condition. Toggle the buttons as appropriate to enable or disable logging and alarming or to demand an AFD printout. Once the desired states have been input, select the "Update". Button to execute the new states. The AFD demand print will only print once and the CAOC program will set the "Current State" to Off automatically. The Alarm and logging states will remain until new states are input and Update Button is selected. Disabling of the Alarm or Penalty Point Logging functions is treated as removing the AFD monitoring program from service and manual monitoring of AFD is required in accordance with Technical Specification (ITS) SR 3.2.3.2. An alternative to disabling the Alarm and Penalty Point Logging functions during Incore/Excore calibrations and other maintenance activities is to allow the Penalty Points to be accumulated and remove any invalid points after completion of the calibration as described in 8.3.7.

8.3.6 ERFIS Out Of Service
If the ERFIS computer, the CAOC software program or the RTGB annunciators which provide AFD monitoring (APP-005-D6 or APP-005-E4) are inoperable then manual monitoring of AFD is required in accordance with Technical Specification (ITS) SR 3.2.3.2. Manual monitoring is described in Section 8.4.

8.3.7 ERFIS Computer Restart

Whenever the ERFIS computer is restarted, the Operator should verify that the Penalty Point "file" is accurate and should manually update the file if necessary. Several options are available to perform this verification/updating.

1. If no Penalty Points had been accumulated prior to ERFIS being out of service and no Penalty Points were accumulated while ERFIS was out of service, then check that ERFIS Point ID NPU0941 reflects 0 Penalty Points or, if desired, perform the following to view the contents of the Penalty Time Buffer:

   a. Type in the turn on code "CAOCEDIT" or select the TOC from the ERFIS NSSS menu.

   b. Enter the desired beginning time to start browsing at the selected time in the Penalty Point Buffer.;

   c. Use the "-Time", "+Time", "-1 hour", "+1 hour" buttons to sequence forward and backward through the Penalty Point Buffer;

   d. Select "Exit" when finished.

2. If invalid Penalty Point data is present in the Penalty Point buffer and no valid Penalty Points have been accumulated in the previous 24 hours then the entire 24 hour Penalty Point buffer may be initialized to "No Penalty" by performing the following:

   a. Type in the turn on code "AFD1";or select the TOC from the ERFIS NSSS menu.

   b. Click on the initialization box and then select the "initialize" button to begin clearing the penalty point buffer.

   c. When the confirmation message is displayed select "yes" to continue or "no". If "yes" is selected, a confirmation message that the penalty point buffer has been cleared will be displayed and the program will automatically exit. If "no" then select "Exit" to close the window.

8.3.7 (Continued)

3. If valid Penalty Points had been accumulated prior to ERFIS being out of service but no Penalty Points were accumulated while ERFIS was out of service and ERFIS was out of service for less than 24 hours then perform the following to retain the earlier valid Penalty Point data and insert "No Penalty" into the buffer for the period of time that ERFIS was out of service:

   a. Type in the turn on code "AFD2";or select the TOC from the ERFIS NSSS menu

   b. Enter the time that ERFIS went out of service as the "Restart Begin Time"

   c. Enter "0" in the "Restart penalty rate" and then select the "Restart" button.

   d. When the confirmation message is displayed select "yes" to continue or "no". If "yes" is selected, a confirmation message that the Penalty point Buffer" has been restarted will be displayed and the program will automatically exit. If "no" then select "Exit" to close the window.

4. If valid Penalty Points were accumulated while ERFIS was out of service then perform the following to manually update any or all of the 24 hour Penalty Time buffer:

   a. Type in the turn on code "CAOCEDIT";or select the TOC from the ERFIS NSSS menu.

   b. Using data from ATTACHMENT 10.5, enter the time at which the penalty update block is to begin;

   c. Using data from ATTACHMENT 10.5, enter the time the penalty update block is to end;

8.3.7.4 (Continued)

d. Using data from ATTACHMENT 10.5, enter the appropriate penalty rate for the update block from the following choices:

PENALTY VALUE	PENALTY RATE	POWER
0	No Penalty	Any
1	½ Penalty Point per minute	<50%
2	1 Penalty Point per minute	>50%

e. If desired, the penalty buffer can be updated on a minute by minute basis with the "CAOCEDIT" TOC, ELSE go to step f.

1) Type in the turn on code "CAOCEDIT" or select the TOC from the ERFIS NSSS menu.

2) Enter the desired beginning time to start browsing at the selected time in the penalty point buffer;

3) Use the "-Time", "+Time", "- hour" "+ hour" buttons to sequence forward and backward through the penalty point buffer.

4) Enter the desired penalty rate for the desired hour/minute as needed using data from Attachment 10.5 and the above penalty point value table used in step d.

f. When finished with a block or individual hour/minute update, validate the updated penalty time entries by browsing through the buffer as describded in step g above. If the penalty point data is correct, then select the "Update Buffer" button to incorporate the update.

g. Select the "Exit" button to close the window

8.3.8 ERFIS CAOC Program Constants
Except for the ERFIS Point IDs described above which are provided for the Operator's use, all changes to CAOC program constants should be performed in accordance with SCM-003.

8.4 Manual Monitoring of AFD

8.4.1 If the ERFIS computer, the CAOC software program or the RTGB annunciators which provide AFD monitoring (APP-005-D6 or APP-005-E4) are inoperable then manual monitoring of AFD is required in accordance with Technical Specification (ITS) SR 3.2.3.2.

8.4.2 If the Thermal Power is ≥90% RTP or 0.9*APL, whichever is less, then the AFD indicated on the RTGB meters must be verified to be within limits and must be logged on ATTACHMENT 10.5 within 15 minutes of the alarms becoming inoperable and every 15 minutes thereafter.

8.4.3 If the Thermal Power is <90% RTP or 0.9*APL, whichever is less, then the AFD indicated on the RTGB meters must be verified to be within limits and must be logged on ATTACHMENT 10.5 within 1 hour of the alarms becoming inoperable and every 1 hour thereafter.

8.4.4 If two or more operable excore channels indicate that AFD is outside of the Target Band then the applicable Actions of Technical Specifications (ITS) LCO 3.2.3 must be completed and the resultant Penalty Points must be logged on ATTACHMENT 10.5 in accordance with the following rates:

POWER LEVEL	PENALTY POINT RATE
≥ 50% RTP	1 Point/minute
<50% RTP	1/2 Point/minute

8.4.5 If the total number of Penalty Points exceeds 60 in a 24 hour period, then the applicable Actions of Technical Specifications (ITS) LCO 3.2.3 must be completed.

8.4.6 Penalty point are eliminated 24 hours after accumulation by operation within the Target Bands at the same rate at which they were accumulated. Elimination of penalty points is denoted by a negative (-) value on ATTACHMENT 10.5.

8.5 Divergent Axial Oscillation Control

> **NOTE:** UFSAR Sections 1.5.3, 3.1.2.7 and 7.7.1.6 state that procedures are available for the Operator to control axial oscillations. This section provides those procedures.

8.5.1 Axial oscillations can be induced by changes in power level, control rod movement, or a combination of both. A sudden change in either will cause some change in flux shape with a resulting redistribution of xenon concentrations in the core. This will invariably start a xenon oscillation in the axial direction.

8.5.2 Axial oscillations are easily started by control rod motion. The flux shape is very dependent on control rod position due to the high neutron absorption of the control rods. Improper use of the control rods at any time can create very serious oscillations. On the other hand, control rods are the best method for manually controlling a xenon oscillation; therefore, use extreme care when making extensive control rod movement. The control bank should be moved slowly and action taken prior to reaching any limit. Attempt to maintain the control rods retracted as far as is practical during steady-state and power ramp conditions to minimize the "pinching" effect of the control bank.

8.5.3 Depending on the core conditions and Operator actions, an axial oscillation can be dampened out or amplified until it becomes divergent. The most serious axial oscillation is the divergent oscillation. Its amplitude increases with each cycle if left to oscillate naturally and can be increased in size by control rod motion if not carefully applied.

8.5.4 The most important factor in control of a divergent oscillation is the timing of the oscillation. The core oscillates axially with a period of 26 hours; that is, it takes 26 hours for the same point on the sinusoidal wave to reoccur (see ATTACHMENT 10.4). The wave may be halved and quartered down to 6.5 hour intervals where the oscillation goes from maximum AFD to Target Value, Target Value to minimum AFD, etc. Once the timing of the oscillation has been determined, the following control procedure may be used to stop or reduce the oscillation to a minimum:

> **NOTE:** ATTACHMENT 10.4 provides an illustration of the control procedure.
>
> If the oscillation has just begun, an accurate timing determination may be difficult. If the Target Value is known accurately, the control rods should be inserted 5 hours after crossing the Target Value in the positive direction since the equilibrium AFD to peak AFD time is 6.5 hours.
>
> If sufficient rod worth is present, the procedure may be performed in reverse by withdrawing control rods 1.5 hours before the minimum AFD.
>
> The control rod insertion is best done slightly early rather than late since if the insertion is done late an amplification might result which is undesirable.
>
> If after returning the control rods to the initial position the oscillation continues upward, then the control rods were returned to normal too soon. If a downward swing starts, then the control rods were left in too long.
>
> A way of approximating the proper insertion time is to consider it 11.5 hours after the last minimum AFD.
>
> Do not allow the power level to change during the control rod maneuvers since this may induce additional unwanted oscillations which will eventually have to be dampened.
>
> If the core is divergent, the least disturbance may become significant after 1 or 2 periods of oscillation. Therefore, if the control procedure does not work effectively, additional control measures should be taken as soon as practical.
>
> The procedure for control of divergent oscillations can also be effectively applied to very large convergent oscillations where there is a possibility of exceeding control rod insertion limits if normal methods were used.

8.5.4 (Continued)

1. At 1.5 hours before the most positive peak, determine the AFD from ERFIS or the AFD meters and insert the control rods using dilution until the AFD reaches the Target Value;
2. Determine the change in AFD caused by the control rod insertion (AFD before insertion - Target Value);
3. Maintain a constant control rod position and allow AFD to decrease;
4. When AFD is lower than the Target Value by the amount determined in Step 8.5.4.2, withdraw control rods to their original position using boration.

9.0 RECORDS

ATTACHMENT 10.5 must be sent to the vault as a QA record

10.0 ATTACHMENTS

10.1 ERFIS CAOC Software And AFD Related Parameters

10.2 Target and Operating Band Examples

10.3 ERFIS CAOC Warning/Status/Alarm Messages

10.4 Divergent Axial Oscillation

10.5 Manual AFD Monitoring Log

ERFIS CAOC SOFTWARE AND AFD RELATED PARAMETERS

EQUATIONS AND ERFIS POINTS USED TO CALCULATE AXIAL FLUX DIFFERENCE (AFD)

$$AFD = \frac{V(top) - V(bottom)}{V(top) + V(bottom)} * K * P$$

where:

- V(top) = Voltage representing the core power as seen by a NIS Power Range channel top detector;
- V(bottom)= Voltage representing the core power as seen by a NIS Power Range channel bottom detector;
- K = Incore/Excore calibration constant determined in accordance with EST-003.
- P = Power Level (%) at the time of the calculation.

Parameter	N41	N42	N43	N44
AFD	NPU0900	NPU0901	NPU0902	NPU0903
V(top)	NIN0051M	NIN0053M	NIN0055M	NIN0057M
V(bottom)	NIN0052M	NIN0054M	NIN0056M	NIN0058M
K	NPK1612	NPK1613	NPK1614	NPK1615
P	NIN0041M	NIN0042M	NIN0043M	NIN0044M

EQUATIONS AND ERFIS POINTS USED TO CALCULATE TARGET VALUES

$$\text{Target Value (P)} = \text{Target Value}_{ref} * P/P_{ref}$$

where:

- Target Value (P) = Target Value at power P;
- Target $Value_{ref}$ = Target Value during flux map;
- P = Current power level; and,
- P_{ref} = Power level during flux map.

Parameter	N41	N42	N43	N44
Target Value (P)	N/A	N/A	N/A	N/A
Target $Value_{ref}$	NPK1603	NPK1604	NPK1605	NPK1606
P	NIN0041M	NINOO42M	NIN0043M	NIN0044M
P_{ref}	NPK1608	NPK1609	NPK1610	NPK1611

ERFIS CAOC SOFTWARE AND AFD RELATED PARAMETERS

EQUATIONS AND ERFIS POINTS USED TO CALCULATE TARGET BAND VALUES

APL $\geq$ 90% RTP TB Low Limit = TV - TB Value
TB High Limit = TV + TB Value

APL < 90% RTP TB Low Limit = TV - [TB Value * (APL/100)]
TB High Limit = TV + [TB Value * (APL/100)]
where: TV(P) =Target Value
TB Value = Selected Target Band value ($\pm$3% or $\pm$5%)
APL = Allowable Power Level

Parameter	N41	N42	N43	N44
Target Band Low Limit	NPU0905	NPU0906	NPU0907	NPU0908
Target Band High Limit	NPU0909	NPU0910	NPU0911	NPU0912
Target Band Value	NPK1620	NPK1620	NPK1620	NPK1620
APL	NPK0320	NPK0320	NPK0320	NPK0320

EQUATIONS AND ERFIS POINTS USED TO CALCULATE TARGET WARNING BAND VALUES

TWB Low Limit = TB Low Limit + TWB Value
TWB High Limit = TB High Limit - TWB Value

where: TWB = Target Warning Band; and,
TB = Target Band.

Parameter	N41	N42	N43	N44
TWB Low Limit	NPU0913	NPU0914	NPU0915	NPU0916
TWB High Limit	NPU0917	NPU0918	NPU0919	NPU0920
TB Low Limit	NPU0905	NPU0906	NPU0907	NPU0908
TB High Limit	NPU0909	NPU0910	NPU0911	NPU0912
TWB Value	NPK1622	NPK1622	NPK1622	NPK1622

ERFIS CAOC SOFTWARE AND AFD RELATED PARAMETERS

EQUATIONS AND ERFIS POINTS USED TO CALCULATE OPERATING BAND VALUES

5% OB, APL≥90% RTP: Upper OB = TV + 0.5 * [110 - (P/PL * 100)]
Lower OB = TV - 0.4 * [110 - (P/PL *100)]

5% OB, APL<90% RTP: Upper OB=TV+ {0.5 * [110 -(P/PL*100)]*(APL/100)}
Lower OB= TV - {0.4 * [110 - (P/PL*100)]*(APL/100)}

3% OB, APL≥90% RTP: Upper OB = TV + 0.5 *[106 - (P/PL * 100)]
Lower OB = TV - 0.4 * [105 - (P/PL *100)]

3% OB, APL<90% RTP: Upper OB=TV + {0.5*[106-(P/PL*100)]*(APL/100)}
Lower OB= TV - {0.4 * [105 -(P/PL*100)]*(APL/100)}

where: OB = Operating Band;
TV =Target Value;
P = Average NIS Power Range power expressed as % RTP;
PL = The lesser of 100% RTP or APL; and,
APL = Allowable Power Level

Parameter	N41	N42	N43	N44
Operating Band Low Limit	NPU0921	NPU0922	NPU0923	NPU0924
Operating Band High Limit	NPU0925	NPU0926	NPU0927	NPU0928
P	NIN0041M	NIN0042M	NIN0043M	NIN0044M
APL	NPK0320	NPK0320	NPK0320	NPK0320

EQUATIONS AND ERFIS POINTS USED TO CALCULATE OPERATING WARNING BAND VALUES

OWB Low Limit = OB Low Limit + OW Envelope Value
OWB High Limit = OB High Limit - OW Envelope Value

where: OWB = Operating Warning Band; and,
OB = Operating Band.

Parameter	N41	N42	N43	N44
OWB Low Limit	NPU0929	NPU0930	NPU0931	NPU0932
OWB High Limit	NPU0933	NPU0934	NPU0935	NPU0936
OB Low Limit	NPU0921	NPU0922	NPU0923	NPU0924
OB High Limit	NPU0925	NPU0926	NPU0927	NPU0928
OW Envelope Value	NPK1616	NPK1616	NPK1616	NPK1616

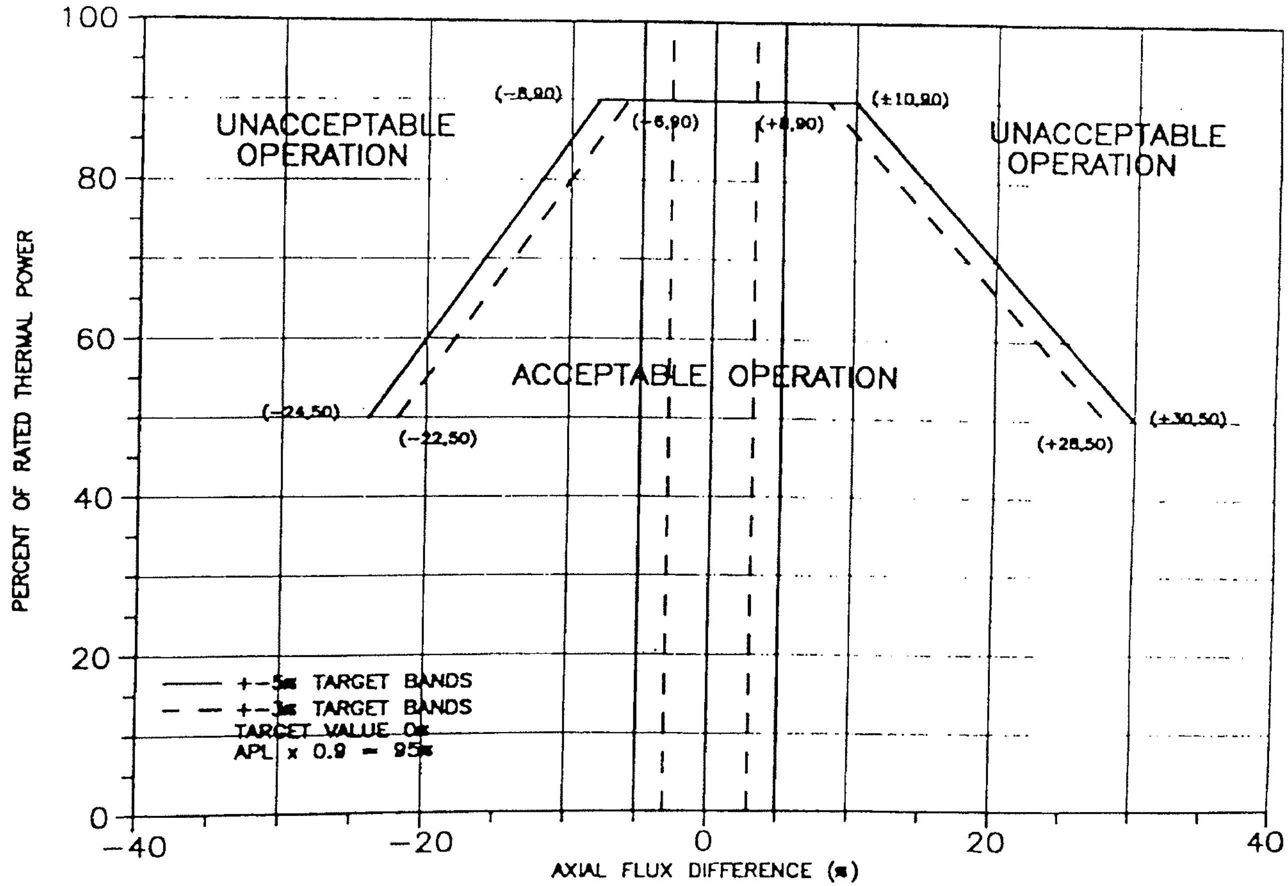
ERFIS CAOC SOFTWARE AND AFD RELATED PARAMETERS

	N41	N42	N43	N44
Minimum AFD over Previous 8 hours	NPU0950	NPU0951	NPU0952	NPU0953
Maximum AFD over Previous 8 hours	NPU0954	NPU0955	NPU0956	NPU0957

Accumlated 24 Hour Penalty Points	NPU0904
Penalty Points at Last Execution of Program	NPU0941
Power Level at Last Execution of Program	NPU0939

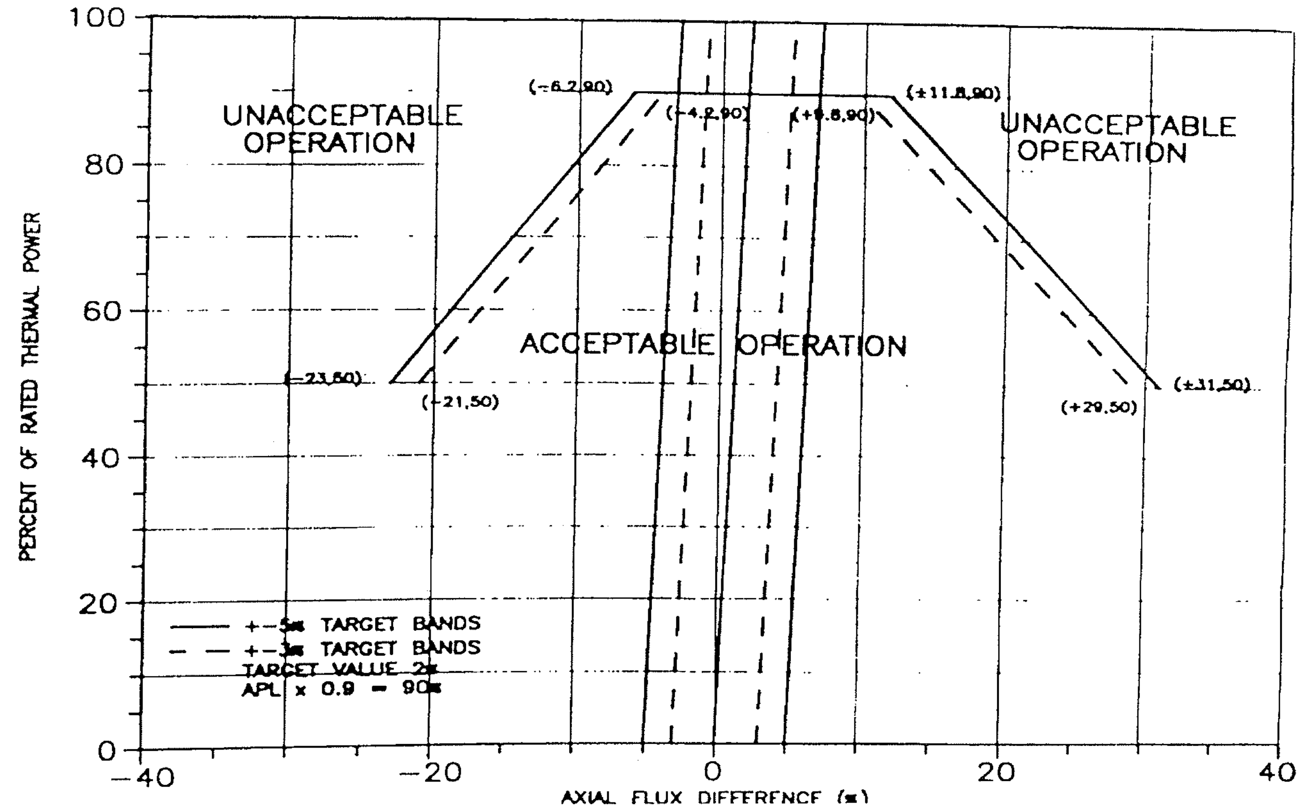
ATTACHMENT 10.2
Page 1 of 5
TARGET AND OPERATING BAND EXAMPLES

FIGURE 1



TARGET AND OPERATING BAND EXAMPLES

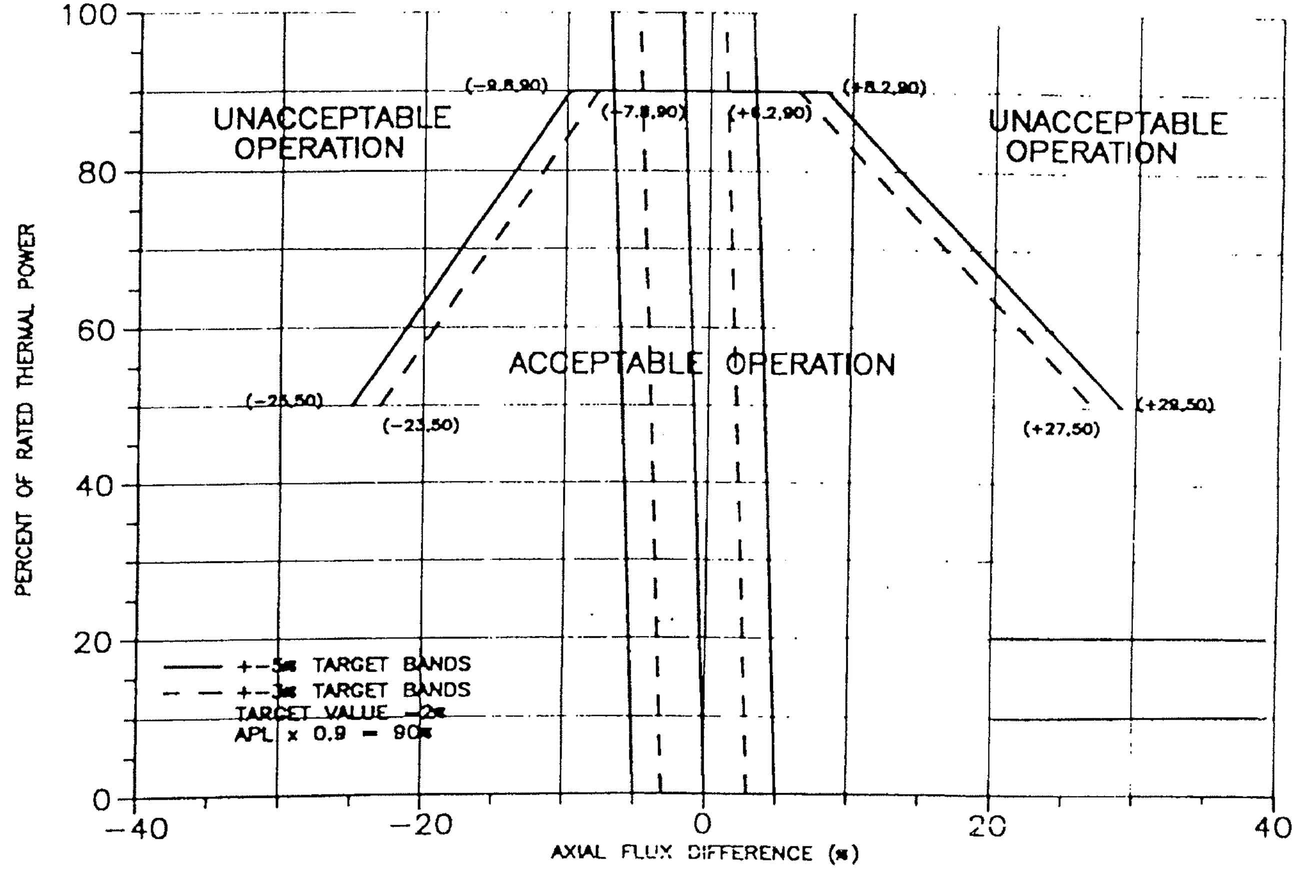
FIGURE 2



ATTACHMENT 10.2
Page 3 of 5

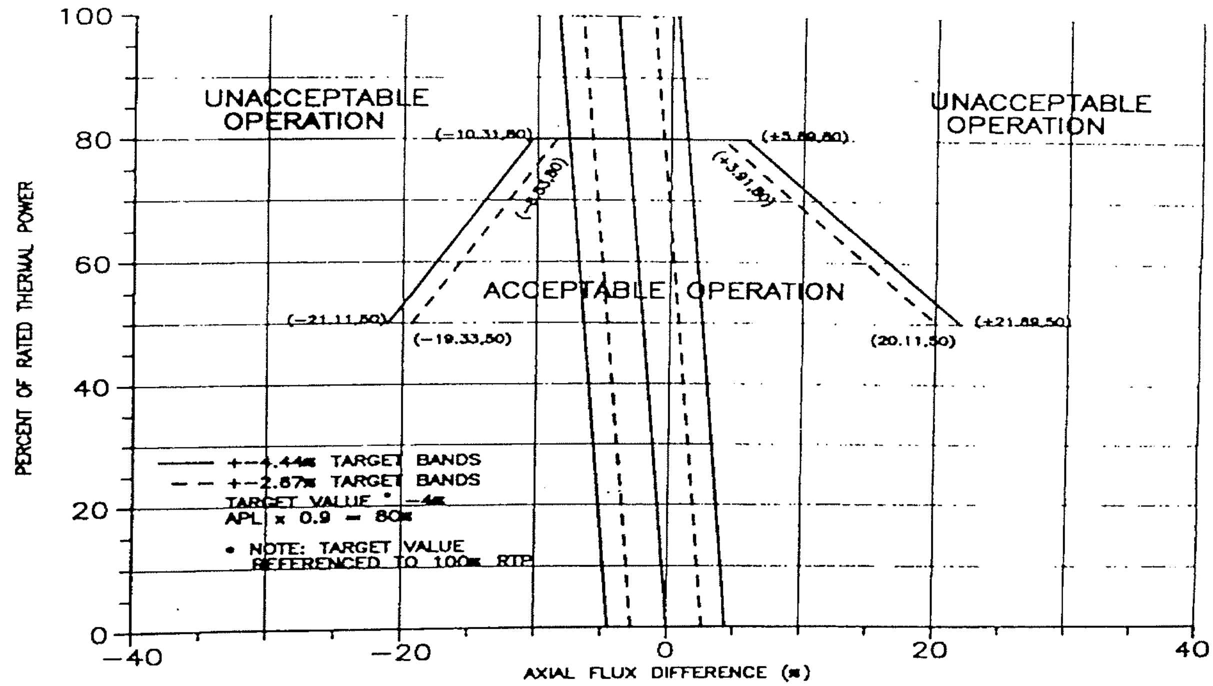
TARGET AND OPERATING BAND EXAMPLES

FIGURE 3



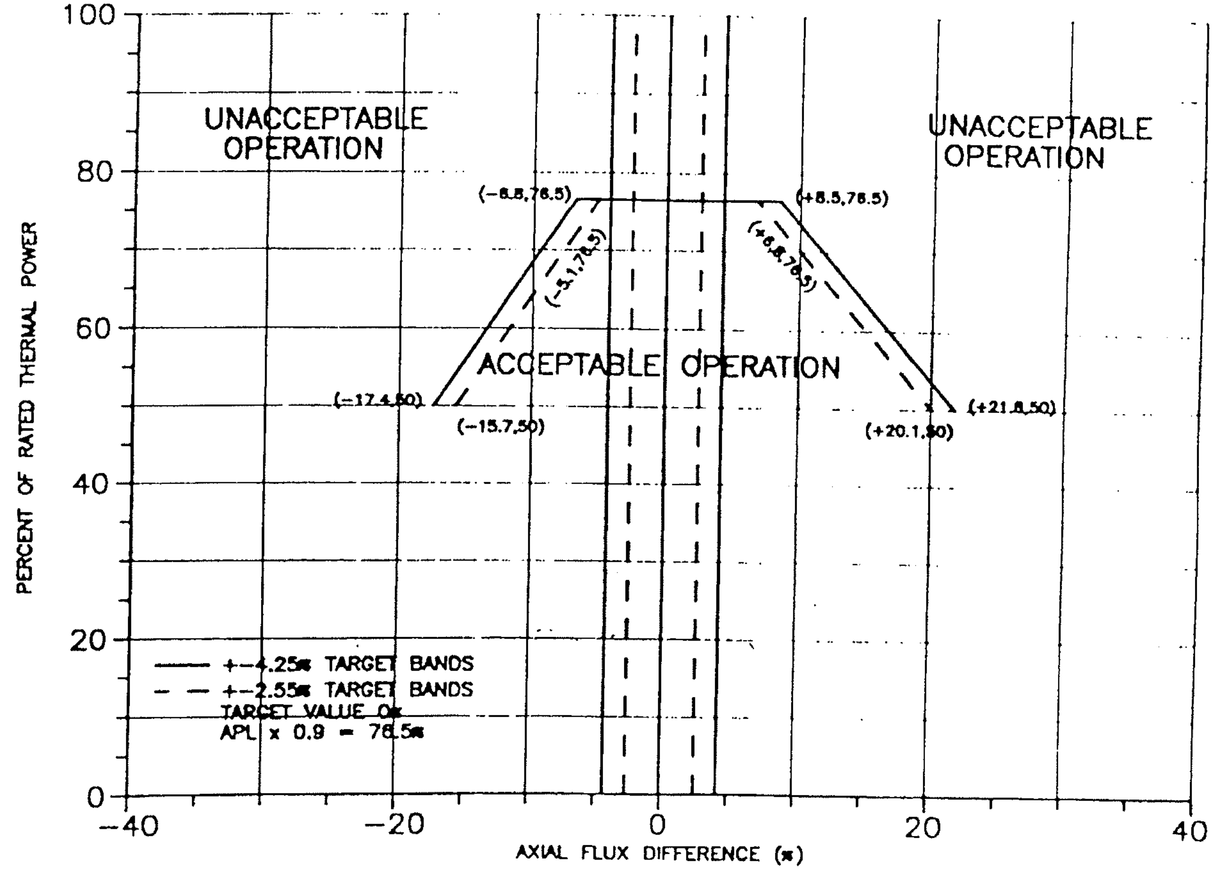
TARGET AND OPERATING BAND EXAMPLES

FIGURE 4



ATTACHMENT 10.2
Page 5 of 5
TARGET AND OPERATING BAND EXAMPLES

FIGURE 5



ERFIS CAOC WARNING/STATUS/ALARM MESSAGES

STATUS Messages - Denote a condition or message regarding a condition of interest to the Operator. These may include:

- POWER LEVEL CROSSED 15% - INCREASING - PENALTY ENABLED
- POWER LEVEL CROSSED 15% - DECREASING - PENALTY DISABLED
- POWER LEVEL CROSSED 50% - INCREASING - PENALTY RATE IS FULL
- POWER LEVEL CROSSED 50% - DECREASING - PENALTY RATE IS HALF -OPER BANDS DISABLED
- POWER LEVEL CROSSED 90%APL - INCREASING - OPER BANDS EQUAL TARGET BANDS
- POWER LEVEL CROSSED 90%APL - DECREASING - OPER BANDS RESTORED TO NORMAL
- CHANNEL #____ NOW OUT OF SERVICE
- CHANNEL #____ JUST RETURNED TO SERVICE
- CHANNEL #____ JUST CROSSED THE TARGET WARNING BAND. (decreasing)
- CHANNEL #____ JUST CROSSED THE OPER WARNING BAND. (decreasing)
- PENALTY POINT ACCUMULATION HAS BEGUN.
- PENALTY POINT ACCUMULATION HAS ENDED.

WARNING Messages - Denote a condition or message regarding a condition of impending Technical Specification violation. These may include:

- CHANNEL #____ JUST CROSSED THE TARGET WARNING BAND. (increasing)
- CHANNEL #____ JUST CROSSED THE TARGET BAND. (increasing)
- CHANNEL #__ JUST CROSSED THE OPER WARNING BAND. (increasing)
- CHANNEL #__ JUST CROSSED THE OPERATING BAND. (increasing)
- ALARM WHEN PENALTY LEVEL CROSSES 15 GOING UP.
- ALARM WHEN PENALTY LEVEL CROSSES 30 GOING UP.
- ALARM WHEN PENALTY LEVEL CROSSES 45 GOING UP.
- ALARM WHEN PENALTY LEVEL CROSSES 50 GOING UP.
- ALARM WHEN PENALTY LEVEL CROSSES 55 GOING UP.
- ALARM WHEN PENALTY LEVEL CROSSES 60 EITHER DIRECTION.

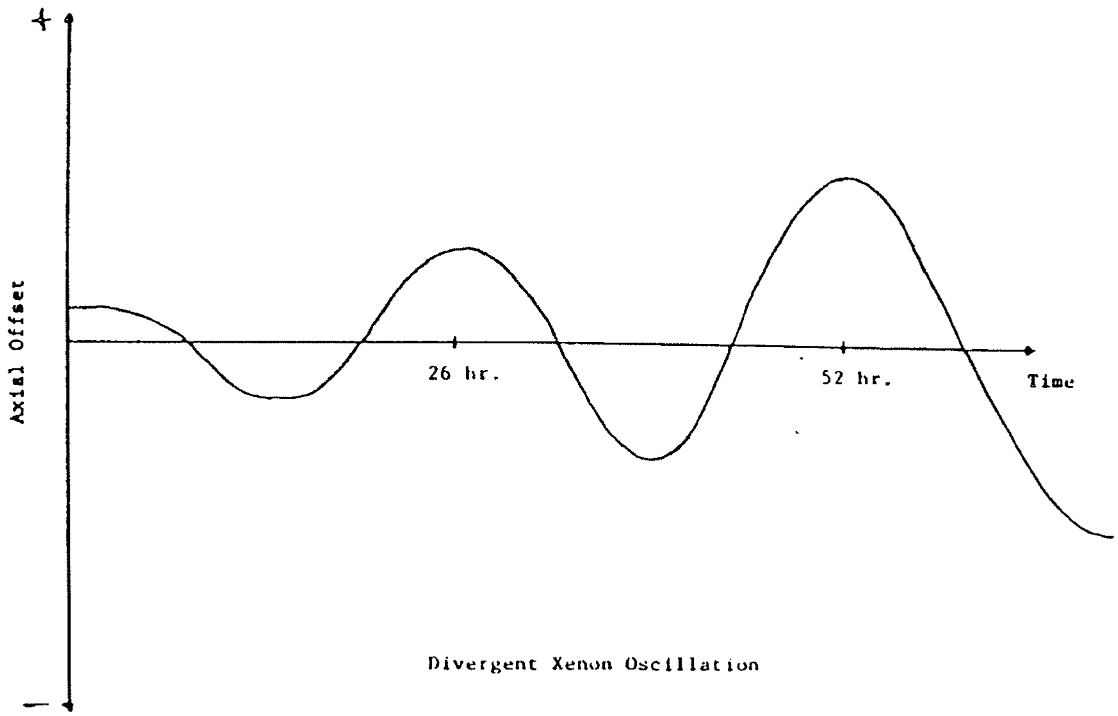
ALARM Messages - Denote a condition which violates PDC limits as set forth in plant Technical Specifications, namely:

- ALARM DUE TO 2 OR MORE CHANNELS OUTSIDE OF THE TARGET BAND WITH POWER ABOVE 90%FP OR 90%APL.
- ALARM DUE TO 2 OR MORE CHANNELS OUTSIDE OF THE OPERATING BAND WITH CORE POWER BETWEEN 50%FP AND 90%FP.
- ALARM DUE TO GREATER THAN 60 PENALTY POINTS AND CORE POWER ABOVE 50%FP.

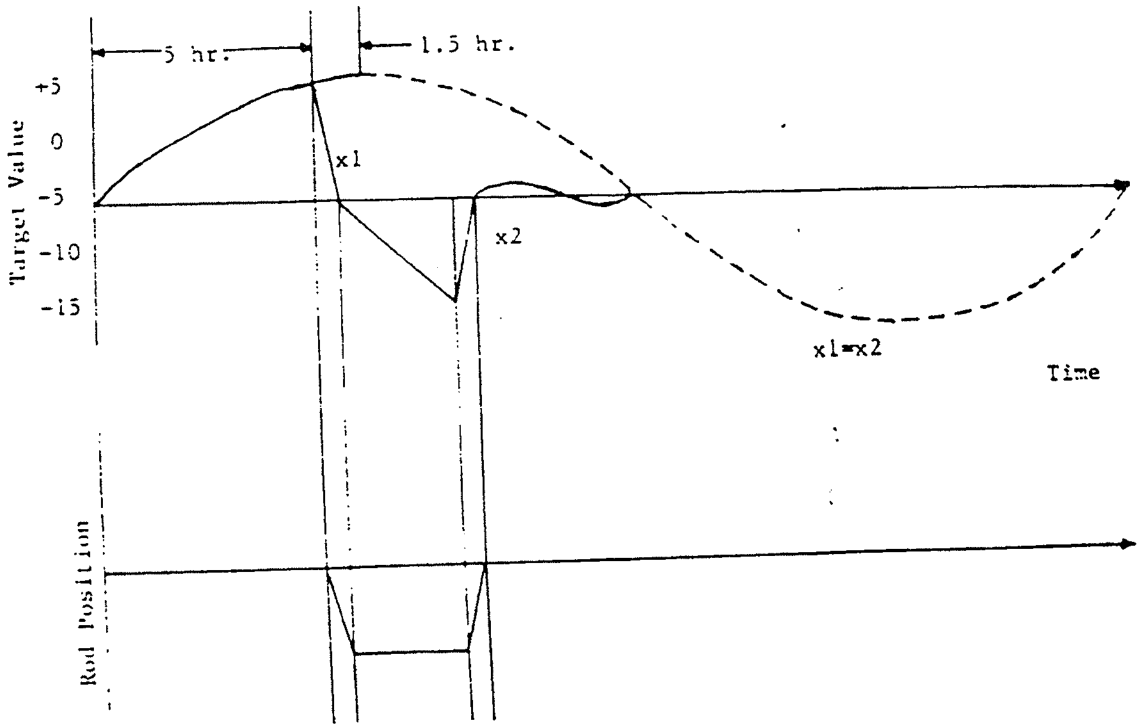
The following special symbols are printed immediately after the AFD value for a channel, if applicable:

- **** The AFD value for the channel has just crossed a band.
- * The AFD value for the channel has not crossed a band, but is still outside of at least one.
- ?? The channel is inoperable.

DIVERGENT AXIAL OSCILLATION



DIVERGENT AXIAL OSCILLATION



NOTE: To apply numbers to the above control maneuver, assume that the Target Value is -5%, the reactor power is 75% RTP and the APL is >100% RTP. The first peak is at +5 (the dotted line representing a natural divergent oscillation). At the point the control rods are inserted, the AFD is +4%, therefore, X1=9% [+4% - (-5%)]. Stop inserting control rods at -5% and allow the AFD to go to -14% [-5% - (-9%)] with no control rod motion. When the AFD reaches -14%, pull the control rods back to their original position.

ATTACHMENT 10.5
Page 1 of 1

MANUAL AFD MONITORING LOG

This revision is the latest revision available and has been verified against the Document Management System.

______________________(Print) ______________________ __________
Name Signature Date

Date/Time	Power %RTP	N41 AFD	N42 AFD	N43 AFD	N44 AFD	Penalty Points This Interval	Total Penalty Points	Comments	Initials

SSO Review ______________________ Date: __________

3.2 POWER DISTRIBUTION LIMITS

3.2.3 AXIAL FLUX DIFFERENCE (AFD) (PDC-3 Axial Offset Control Methodology)

LCO 3.2.3 The AFD:

a. Shall be maintained within the target band about the target flux difference. The allowable values of the target band are specified in the COLR.

---------------------------NOTE---------------------------
The AFD shall be considered outside the target band when two or more OPERABLE excore channels indicate AFD to be outside the target band.
----

b. May deviate outside the target band with THERMAL POWER < 90% RTP or 0.9 APL, whichever is less, but ≥ 50% RTP, provided AFD is within the acceptable operation limits and cumulative penalty deviation time is ≤ 1 hour during the previous 24 hours. The acceptable operation limits are specified in the COLR.

---------------------------NOTES---------------------------
1. Penalty deviation time shall be accumulated on the basis of a 1 minute penalty deviation for each 1 minute of power operation with AFD outside the target band.

2. The Allowable Power Level (APL) is the limitation placed on THERMAL POWER for the purposes of applying the AFD target flux and operational limit curves. The APL is as follows:

   APL = minimum over Z of $(100\%)(F_Q^{RTP}(Z))(K(Z))/F_Q^V(Z)$
----

c. May deviate outside the target band with THERMAL POWER < 50% RTP.

---------------------------NOTE---------------------------
Penalty deviation time shall be accumulated on the basis of a 0.5 minute penalty deviation for each 1 minute of power operation with AFD outside the target band.

APPLICABILITY: MODE 1 with THERMAL POWER > 15% RTP.

----------------------------NOTE----------------------------
A total of 16 hours of operation may be accumulated with AFD outside the target band without penalty deviation time during surveillance of power range channels in accordance with SR 3.3.1.6, provided AFD is maintained within acceptable operation limits.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. THERMAL POWER ≥ 90% RTP or 0.9 APL, whichever is less. AND AFD not within the target band.	A.1 Restore AFD to within target band.	15 minutes
B. Required Action and associated Completion Time of Condition A not met.	B.1 Reduce THERMAL POWER to < 90% RTP or 0.9 APL, whichever is less.	15 minutes

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ---------NOTE-------- Required Action C.1 and C.2 must be completed whenever Condition C is entered. --------------------- THERMAL POWER < 90% RTP or 0.9 APL, whichever is less, and ≥ 50% RTP with cumulative penalty deviation time > 1 hour during the previous 24 hours. <u>OR</u> THERMAL POWER < 90% RTP or 0.9 APL, whichever is less, and ≥ 50% RTP with AFD not within the acceptable operation limits.	C.1 Reduce THERMAL POWER to < 50% RTP. <u>AND</u> C.2 Restore cumulative penalty deviation time to less than 1 hour.	30 minutes Prior to increasing THERMAL POWER to ≥ 50% RTP
D. ---------NOTE-------- Required Action D.1 must be completed whenever Condition D is entered. --------------------- Required Action and associated Completion Time for Condition C not met.	D.1 Reduce THERMAL POWER to < 15% RTP.	9 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.3.1	Verify AFD is within limits for each OPERABLE excore channel.	7 days
SR 3.2.3.2	------------------NOTE------------------ Assume logged values of AFD exist during the preceding time interval. --------------------------------------- Verify AFD is within limits and log AFD for each OPERABLE excore channel.	-----NOTE----- Only required to be performed if AFD monitor alarm is inoperable -------------- Once within 15 minutes and every 15 minutes thereafter when THERMAL POWER ≥ 90% RTP or 0.9 APL, whichever is less <u>AND</u> Once within 1 hour and every 1 hour thereafter when THERMAL POWER < 90% RTP or 0.9 APL, whichever is less

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.2.3.3	------------------NOTE------------------ 1. The initial target flux difference after each refueling may be determined from design predictions. 2. The target flux difference shall be determined in conjunction with the measurement of $F_Q(Z)$ in accordance with SR 3.2.1.1. -- Determine, by measurement, the target flux difference of each OPERABLE excore channel.	Once within 31 EFPD after each refueling <u>AND</u> 31 EFPD thereafter

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ILC-13 NRC JPM SRO A1-2
Rev 0

Review a set of Hot Ops Logs

Concurred By: ______________________________ **Date:** ________________
Operations

Approved By: ______________________________ **Date:** ________________
Superintendent/Supervisor - Training

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: 02110114401, Interpret and Ensure Compliance with Plant Administrative Procedures during Normal and Off Normal Plant Operations IAW OPS-NGGC-1000

Alternate Path:

NO

JPM #: ILC-13 NRC JPM SRO A1-1

Candidate SRO

K/A	Rating (RO/SRO):
G 2.1.25	4.2
G2.1.18	3.8

Task Standard:

Correctly reviews Hot Ops Log, identifying all deficiencies. Initiates required actions IAW Tech. Specs, TRM, etc.

Preferred Evaluation Location:

Simulator _____ Classroom ___X___

Preferred Evaluation Method:

Perform ___X___ Simulate _____

References:

Hot Operations Log
ITS Books
OPS-NGGC-1000, Fleet Conduct of Operations

Validation Time: 20 Minutes **Time Critical: NO** **Time Critical Time:** N/A

Candidate:

____
Name

SSN ____ - ____ - ____

	Overall Time	(N/A if not time critical) Critical Time
Start:	________	________
Finish:	________	________
Performance Time (min):	________	________

Performance Rating: circle one SAT UNSAT

Examiner: _________________________ _________________________ __________
Print Name Signature Date

COMMENTS:

QUESTION DOCUMENTATION:

Question:

Response:

Tools/Equipment/Procedures Needed:

Hot Ops Logs

ITS / TRM Books

Station Curve Book

OPS-NGGC-1000, Fleet Conduct of Operations

OST-051, Reactor Coolant System Leakage Evaluation (as requested)

OP-202, Safety Injection and CV Spray System (as requested)

READ TO OPERATOR

DIRECTIONS TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. 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 Operator Cue Sheet I provided you along with completed JPM material.

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. Unit 1 is at 100 % RTP.
2. You are on-shift as the CRS.

INITIATING CUES:

The RO has just completed his 1600 Hot Ops Log readings. The SM has directed you to review the logs in accordance with OMM-01-011, Logkeeping, and OPS-NGGC-1000, Fleet Conduct of Operations.

START TIME: __________

EXAMINER'S NOTE: ONLY GIVE THE CANDIDATE CUE SHEET #1. CUE SHEET #2 WILL BE DISTRIBUTED AS NEEDED.	
STEP 1: Candidate obtains copy of Hot Ops Log. **STANDARD:** Obtains Log **EXAMINER'S NOTE: Evaluator will provide a completed Hot Ops Log to the candidate.** COMMENTS:	___ SAT ___ UNSAT
STEP 2: Reviews readings as applicable on log. **STANDARD:** Correctly determines parameter to required specification. **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT
Evaluator Note: The following Critical Steps may be performed in any order.	

<u>STEP 3:</u> Identifies readings on Accumulator "B" level indicators LI-924 / 926 that are greater than or equal to 74%.	**<u>Critical Step</u>**
<u>STANDARD</u>: Informs evaluator of readings OR annotates with a note that the readings are greater than or equal to 74% due to Note (1) which states the following "If accumulator volume increases to 74% AND IS <u>NOT</u> the result of addition from the RWST, then refer to ITS SR 3.5.1.4." The candidate places a note identifying the deficiency in the "Comment" section of log or notifies evaluator that he would require the RO to make a note. The candidate will refer to ITS SR 3.5.1.4. Further evaluation will be required to determine if ≥ 70 gallons increase has occurred that is not the result of addition from the refueling water storage tank. **(Provide Candidate with Cue Sheet #2)** Candidate determines that Accumulator Boron sample will be required to verify concentration is between 1950 and 2400 ppm. Contacts E&RC to perform a sample of "B" SI Accumulator. **EXAMINER'S NOTE:** Only provide candidate(s) with Cue sheet #2 if they ask for additional information concerning the "B" SI Accumulator level rise. Candidate may request a copy of OST-051 and / or OP-202 to determine the conversion of % level change to gallons for the "B" SI accumulator. <u>COMMENTS</u>:	___ SAT ___ UNSAT

STEP 4: Identifies Out of Spec reading on BAST "A" level indicator LI-106. **STANDARD:** Informs evaluator of OOS reading OR places a circle around OOS readings (or places a number with circle beside the OOS reading). Places a note identifying the deficiency in the "Comments" section of log or notifies the evaluator that he would require the RO to make a note. Refers to TRM 3.6 and Station Curve Book (Curve 8.18). Determines that the actual volume in "A" BAST is greater than the TRM requirement of 3080 gallons. (Actual volume is 41(52.36) + 1024 = 3170.8 gallons) Candidate may also determine that the combine volume is approximately 7000 to 7100 gallons. **EXAMINER'S NOTE: NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 5: Identifies Out of Spec reading on PWST Level indicator LI-1941. **STANDARD:** Informs evaluator of OOS reading OR places a circle around OOS readings (or places a number with circle beside the OOS reading). Places a note identifying the deficiency in the "Comments" section of log or notifies the evaluator that he would require the RO to make a note. Candidate reviews Note (2) and determines that the level is less than 45% and reviews Station Curve 8.9 to evaluate TRM 3.6 applicability. Candidate identifies a note on Station Curve 8.9 that states a level of 39.2% is the Minimum Allowable Level to Meet Technical Specification 3.2.2.e. Candidate must realize that this is referencing old CTS that are now a requirement of TRM 3.6. Candidate determines that that at 41% the PWST contains greater than 30,000 gallons of water and thus the TRM 3.6 requirement is met. **EXAMINER'S NOTE:** NONE COMMENTS: **END OF TASK**	**Critical Step** ___ SAT ___ UNSAT

Terminating Cue: When the candidate completes review of a set of Hot Ops Logs and initiates required action.

TIME STOP: ________

CANDIDATE CUE SHEET #1
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. Unit 1 is at 100 % RTP.
2. You are on-shift as the CRS.

INITIATING CUES:

The RO has just completed his 1600 Hot Ops Log readings. The SM has directed you to review the logs in accordance with OMM-01-011, Logkeeping, and OPS-NGGC-1000, Fleet Conduct of Operations.

CANDIDATE CUE SHEET #2
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

UE:

Review of previous shift narrative logs identified that approximately 72 hours ago "B" SI Accumulator had been drained in accordance with OP-202, Safety Injection and CV Spray System, to a level of 65%. No additions from the RWST have been made since the draining evolution.

STEP 4: Identifies Out of Spec reading on BAST "A" level indicator LI-106. **TANDARD:** Informs evaluator of OOS reading OR places a circle around OOS readings (or places a number with circle beside the OOS reading). Places a note identifying the deficiency in the "Comments" section of log or notifies the evaluator that he would require the RO to make a note. Refers to TRM 3.6 and Station Curve Book (Curve 8.18). Determines that the actual volume in "A" BAST is greater than the TRM requirement of 3080 gallons. (Actual volume is 41(52.36) + 1024 = 3170.8 gallons) Candidate may also determine that the combine volume is approximately 7000 to 7100 gallons. **EXAMINER'S NOTE: NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 5: Identifies Out of Spec reading on PWST Level indicator LI-1941. **STANDARD:** Informs evaluator of OOS reading OR places a circle around OOS readings (or places a number with circle beside the OOS reading). Places a note identifying the deficiency in the "Comments" section of log or notifies the evaluator that he would require the RO to make a note. Candidate reviews Note (2) and determines that the level is less than 45% and reviews Station Curve 8.9 to evaluate TRM 3.6 applicability. Candidate identifies a note on Station Curve 8.9 that states a level of 39.2% is the Minimum Allowable Level to Meet Technical Specification 3.2.2.e. Candidate must realize that this is referencing old CTS that are now a requirement of TRM 3.6. Candidate determines that that at 41% the PWST contains greater than 30,000 gallons of water and thus the TRM 3.6 requirement is met. **EXAMINER'S NOTE:** NONE COMMENTS: **END OF TASK**	**Critical Step** ___ SAT ___ UNSAT

Terminating Cue: When the candidate completes review of a set of Hot Ops Logs and initiates required action.

TIME STOP: ________

H.B. ROBINSON STEAM [   ]TRIC PLANT UNIT NO. 2
HOT OPERATIONS LOG

Date. Today

This Revision has been verified to be the latest revision available. (@ V:\Operations\Ops-Logs OR the original in the log notebook in the Control Room)

Jeff Jones (Print) Jeff Jones Today
Name Signature Date

00-07 CO Jeff Jones BOP Scott Flowers STA Bob Witing SM (2) T.B. Mann
07-19 CO Toth Catman BOP Bill Brown STA Joe Kall SM (2)
19-24 CO BOP STA SM (2)

KEY

HOURLY LOG REVIEW	INIT		INIT
0100	JJ	1300	TC
0200	JJ	1400	TC
0300	JJ	1500	TC
0400	JJ	1600	TC
0500	JJ	1700	
0600	JJ	1800	
0700	TC	1900	
0800	TC	2000	
0900	TC	2100	
1000	TC	2200	
1100	TC	2300	
1200	TC	2400	

DEMAND HOURS REPORT	ON LINE HOURS	OFF LINE IN DEMAND	OFF LINE NO DEMAND
#2 GENERATOR			
#2 REACTOR			
A DIESEL ENGINE			
A DIESEL GENERATOR			
B DIESEL ENGINE			
B DIESEL GENERATOR			

OIL REPORT (Ending 2400 of Log Date)	
1-NO. TIMES RX CRITICAL	
2-NO. TIMES RX SHUTDOWN	
3-DFOST LEVEL PREV MIDNIGHT	23320 GAL
4-OIL BURNED TODAY A&B EDG	GAL
5-BALANCE (3 – 4)	GAL
6-OIL RECEIVED TODAY DFOST	GAL
7-FINAL 2400 DFOST LEVEL (1)	GAL
8-OIL BURNED TODAY DSDG	GAL
9-OIL RECEIVED TODAY DSDG	GAL

(1) Record actual gallons in DFOST.
(2) Includes verification that ALL hourly logs for this shift are printed and reviewed (CR 98-01984)

Approved for use: D. Foster 05/30/2012 05/31/2012
Manager - Operations Date Effective Date

KEY

TIME	REACTOR VESSEL LEAKOFF TEMP.	SAFETY INJECTION ACCUMULATOR LEVELS (1)						CV TEMP	BORIC ACID TANK LEVELS (2)	
		A		B		C			A	B
	TI-401 °F	LI-920 MIN 64 MAX 78 %	LI-922 MIN 64 MAX 78 %	LI-924 MIN 64 MAX 78 %	LI-926 MIN 64 MAX 78 %	LI-928 MIN 64 MAX 78 %	LI-930 MIN 64 MAX 78 %	TI-950B MAX 120 °F	LI-106 MAX 90% MIN 42% %	LI-108 MAX 90% MIN 42% %
0400	88.0	70	71	73	72	71	71	95	42	55
0800	88.0	70	71	74 (1)	73	71	71	95	42	55
1200	88.0	70	71	74 (1)	73	71	71	96	41 (2)	55
1600	87.5	71	71	75 (1)	74 (1)	71	71	96	41 (2)	55
2000										
2400										

(1) If Accumulator volume increases to 74% AND IS NOT the result of addition from the RWST, then refer to ITS SR 3.5.1.4.
(2) Maintain an administrative MAX of 80%. Sustained level above 80% but less than 90% is permissible, but may result in spurious level alarms.

Comments: (1) ADD NOTE Concerning 'B' SI Accum. Level Rise. ITS SR 3.5.1.4 Requires sample w/in 6 hrs.
(2) ADD NOTE Concerning 'A' BAST Level. Determines Adequate Volume is Avail. to meet TRM 3.6.

KEY

H.B. ROBINSON STEAM [illegible]TRIC PLANT UNIT NO. 2

KEY

TIME	PRIMARY WATER TOTALIZER	BORIC ACID TOTALIZER	HOTWELL LEVEL (1)	PWST LEVEL (2)	GEN. HYDROGEN PRESSURE (3)	GEN. HYDROGEN PURITY	HAGAN ROOM TEMP (4a&b)	BOP CHECK OPS WATCH LIST SPREADSHEET (V:\Shared\Operations\ Ops-logs\ Ops Watch List xslx) (5)
	YIC-114 GAL	YIC-113 GAL	LI-1417A MAX 56 MIN 49 INCHES	LI-1941 MAX 93 MIN 45 %	MAX 75 MIN 71 PSIG	MIN 90 %	MAX 78 °F	INIT
0400	40374	2735.5	50	47	73	97	69	JJ
0800	40414	2735.5	50	46	73	96	69	TC
1200	40430	2785.5	51	41 ①	73	96	68	TC
1600	40430	2785.5	51	41 ①	73	96	69	TC
2000								
2400								

(1) ESR 98-00358 recommends Hotwell level be normally maintained at 49" to 52" to minimize Condensate dissolved oxygen.
(2) 45% MIN will maintain greater than 30K gal available. (Ref. Plant Curve 8.9)
(3) Reference Curve 7.3, MAX. AND MIN. LIMITS IAW APP-016.
(4a) If temperature reaches 78°F, ensure proper operation of HVA-2 AND ACC-2A AND ACC-2B, if HVA-2 AND ACC-2A AND ACC-2B are not available INITIATE operation of HVA-4 AND ACC-4 IAW OP-906.
(4b) If ACC-2A AND ACC-2B AND HVA-4 AND ACC-4 are not available NOTIFY Engineering AND EVALUATE the need for installation of Temporary Hagan Room cooling per SPP-045.
(4c) If temperature reaches 82°F, THEN INITIATE an NCR to address potential operability concern of Hagan Room equipment AND NOTIFY Engineering.
(5) Investigate, report, and resolve abnormal trends.

Comments: ① ADD NOTE CONCERNING PWST Level LOW OOS.

KEY

H.B. ROBINSON STEAM [illegible]TRIC PLANT UNIT NO. 2

KEY

TIME	CONTROL ROOM ERFIS SCREENS: CORRECT DATE AND TIME (1)	CONTROL ROOM INDICATOR REVIEW (2)	LPMS CHECKS (3)	FR-154A		
	INIT	INIT	INIT	PEN 1 MAX 3.2 GPM (4)	PEN 2 MAX 3.2 GPM (4)	PEN 3 MAX 3.2 GPM (4)
0400	AA	AA	[redacted]	1.83	1.85	1.94
0800	TC	TC		2.10	2.13	2.21
1200	TC	TC		1.91	1.93	1.97
1600	TC	TC		1.91	1.92	1.98
2000						
2400						

(1) Reference ACR's 94-00085 and 94-01148. The ERFIS Clock is updated via the LAN. The LAN clock is updated via the National Institute of Science and Technology (NIST). ALL ERFIS Screens should show the same time. The ERFIS Clock is the official time, by which the Control Room Clock should be set when needed.
(2) STA Review once per shift, RO OR BOP review at all other times. Check every RTGB indicator for proper indication and adverse trends (ENHN 243140). The STA walkdown includes a switch Position Check referencing the "Shiftly Control Room Switch Position Check" Log.
(3) Notify STA to monitor LPMS IAW OP-007. (CR 95-01471
(4) If leakoff exceeds 3.2 gpm, then refer to OP-101.

Comments: ______________________________

KEY

KEY

END OF SHIFT CHECKS (1)

TIME	OP-925, COLD WEATHER OPERATION, IN EFFECT				PAPER CHART RECORDERS: MARK TIME, INITIAL AND DATE	NON-ERFIS CRT RECORDERS OPERATIONAL	RO OR BOP PERFORM COMPARISON OF ERFIS PRINTOUTS TO RTGB (2)	KEYS INSERTED IN PCV-455C AND PCV 456 PWR ISOL SWITCHES	ERFIS PRINTOUT QUALITY CODE REVIEW (3)
	< 42°F	< 35°F	< 22°F	< 18°F	INIT	INIT	INIT	INIT	INIT
19-07	N/A	N/A	N/A	N/A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
07-19	N/A	N/A	N/A	N/A	TC	TC	TC	TC	

(1) Initial for each applicable check when it is completed. Mark as "N/A" those checks not applicable.
(2) Reference OMM-001-11.
(3) Notify SM/CRS of any UNEXPLAINED "BAD" Quality Codes. SM/CRS will decide whether the "BAD" Quality Code should be reported to IT Plant Section immediately or during normal business hours. Call Ext. 1883 to connect to IT Plant Section on-call pager.

COMMENTS: ____________________

KEY

CANDIDATE CUE SHEET #2
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

UE:

Review of previous shift narrative logs identified that approximately 72 hours ago "B" SI Accumulator had been drained in accordance with OP-202, Safety Injection and CV Spray System, to a level of 65%. No additions from the RWST have been made since the draining evolution.

CANDIDATE CUE SHEET #1
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. Unit 1 is at 100 % RTP.
2. You are on-shift as the CRS.

INITIATING CUES:

The RO has just completed his 1600 Hot Ops Log readings. The SM has directed you to review the logs in accordance with OMM-01-011, Logkeeping, and OPS-NGGC-1000, Fleet Conduct of Operations.

H.B. ROBINSON STEAM ELECTRIC PLANT UNIT NO. 2

HOT OPERATIONS LOG

Date: TODAY

This Revision has been verified to be the latest revision available. (@ V:\Operations\Ops-Logs OR the original in the log notebook in the Control Room)

JEFF JONES (Print) [illegible] TODAY

Name / Signature / Date

	CO		BOP		STA		SM
00-07 CO	[illegible]	BOP	[illegible]	STA	[illegible]	SM (2)	T. B. [illegible]
07-19 CO	[illegible]	BOP	[illegible]	STA	[illegible]	SM (2)	
19-24 CO		BOP		STA		SM (2)	

HOURLY LOG REVIEW	INIT		INIT
0100	[illegible]	1300	TC
0200	[illegible]	1400	TC
0300	[illegible]	1500	TC
0400	[illegible]	1600	TC
0500	[illegible]	1700	
0600	[illegible]	1800	
0700	TC	1900	
0800	TC	2000	
0900	TC	2100	
1000	TC	2200	
1100	TC	2300	
1200	TC	2400	

DEMAND HOURS REPORT	ON LINE HOURS	OFF LINE IN DEMAND	OFF LINE NO DEMAND
#2 GENERATOR			
#2 REACTOR			
A DIESEL ENGINE			
A DIESEL GENERATOR			
B DIESEL ENGINE			
B DIESEL GENERATOR			

OIL REPORT (Ending 2400 of Log Date)		
1-NO. TIMES RX CRITICAL		
2-NO. TIMES RX SHUTDOWN		
3-DFOST LEVEL PREV MIDNIGHT	23320	GAL
4-OIL BURNED TODAY A&B EDG		GAL
5-BALANCE (3 – 4)		GAL
6-OIL RECEIVED TODAY DFOST		GAL
7-FINAL 2400 DFOST LEVEL (1)		GAL
8-OIL BURNED TODAY DSDG		GAL
9-OIL RECEIVED TODAY DSDG		GAL

(1) Record actual gallons in DFOST.
(2) Includes verification that ALL hourly logs for this shift are printed and reviewed (CR 98-01984)

Approved for use: D. Foster — Manager - Operations; 05/30/2012 — Date; 05/31/2012 — Effective Date

TIME	REACTOR VESSEL LEAKOFF TEMP.	SAFETY INJECTION ACCUMULATOR LEVELS (1)						CV TEMP	BORIC ACID TANK LEVELS (2)	
		A		B		C			A	B
	TI-401 °F	LI-920 MIN 64 MAX 78 %	LI-922 MIN 64 MAX 78 %	LI-924 MIN 64 MAX 78 %	LI-926 MIN 64 MAX 78 %	LI-928 MIN 64 MAX 78 %	LI-930 MIN 64 MAX 78 %	TI-950B MAX 120 °F	LI-106 MAX 90% MIN 42% %	LI-108 MAX 90% MIN 42% %
0400	88.0	70	71	73	72	71	71	95	42	55
0800	88.0	70	71	74	73	71	71	95	42	55
1200	88.0	70	71	74	73	71	71	96	41	55
1600	87.5	71	71	75	74	71	71	96	41	55
2000										
2400										

(1) If Accumulator volume increases to 74% AND IS NOT the result of addition from the RWST, then refer to ITS SR 3.5.1.4.
(2) Maintain an administrative MAX of 80%. Sustained level above 80% but less than 90% is permissible, but may result in spurious level alarms.

Comments:

H.B. ROBINSON STEAM [illegible]CTRIC PLANT UNIT NO. 2

TIME	PRIMARY WATER TOTALIZER	BORIC ACID TOTALIZER	HOTWELL LEVEL (1)	PWST LEVEL (2)	GEN. HYDROGEN PRESSURE (3)	GEN. HYDROGEN PURITY	HAGAN ROOM TEMP (4a&b)	BOP CHECK OPS WATCH LIST SPREADSHEET (V:\Shared\Operations\ Ops-logs\ Ops Watch List.xslx) (5)
	YIC-114 GAL	YIC-113 GAL	LI-1417A MAX 56 MIN 49 INCHES	LI-1941 MAX 93 MIN 45 %	MAX 75 MIN 71 PSIG	MIN 80 %	MAX 78 °F	INIT
0400	40374	2735.5	50	47	73	97	69	[illegible]
0800	40414	2735.5	50	46	73	96	69	TC
1200	40430	2785.5	51	41	73	96	68	TC
1600	40430	2785.5	51	41	73	96	69	TC
2000								
2400								

(1) ESR 98-00358 recommends Hotwell level be normally maintained at 49" to 52" to minimize Condensate dissolved oxygen.
(2) 45% MIN will maintain greater than 30K gal available. (Ref. Plant Curve 8.9)
(3) Reference Curve 7.3, MAX. AND MIN. LIMITS IAW APP-018.
(4a) If temperature reaches 78°F, ensure proper operation of HVA-2 AND ACC-2A AND ACC-2B, if HVA-2 AND ACC-2A AND ACC-2B are not available INITIATE operation of HVA-4 AND ACC-4 IAW OP-906.
(4b) If ACC-2A AND ACC-2B AND HVA-4 AND ACC-4 are not available NOTIFY Engineering AND EVALUATE the need for installation of Temporary Hagan Room cooling per SPP-045.
(4c) If temperature reaches 82°F, THEN INITIATE an NCR to address potential operability concern of Hagan Room equipment AND NOTIFY Engineering.
(5) Investigate, report, and resolve abnormal trends.

Comments: ______________________________

TIME	CONTROL ROOM ERFIS SCREENS: CORRECT DATE AND TIME (1)	CONTROL ROOM INDICATOR REVIEW (2)	LPMS CHECKS (3)	FR-154A		
	INIT	INIT	INIT	PEN 1 MAX 3.2 GPM (4)	PEN 2 MAX 3.2 GPM (4)	PEN 3 MAX 3.2 GPM (4)
0400	gg	gg	[redacted]	1.83	1.85	1.94
0800	TC	TC	[redacted]	2.10	2.13	2.21
1200	TC	TC	[redacted]	1.91	1.93	1.97
1600	TC	TC	[redacted]	1.91	1.92	1.98
2000			[redacted]			
2400						

(1) Reference ACR's 94-00086 and 94-01148. The ERFIS Clock is updated via the LAN. The LAN clock is updated via the National Institute of Science and Technology (NIST). ALL ERFIS Screens should show the same time. The ERFIS Clock is the official time, by which the Control Room Clock should be set when needed.
(2) STA Review once per shift, RO OR BOP review at all other times. Check every RTGB indicator for proper indication and adverse trends (ENHN 243140). The STA walkdown includes a switch Position Check referencing the "Shiftly Control Room Switch Position Check" Log.
(3) Notify STA to monitor LPMS IAW OP-007. (CR 95-01471
(4) If leakoff exceeds 3.2 gpm, then refer to OP-101.

Comments: ______

END OF SHIFT CHECKS (1)

TIME	OP-925, COLD WEATHER OPERATION, IN EFFECT				PAPER CHART RECORDERS: MARK TIME, INITIAL AND DATE INIT	NON-ERFIS CRT RECORDERS OPERATIONAL INIT	RO OR BOP PERFORM COMPARISON OF ERFIS PRINTOUTS TO RTGB (2) INIT	KEYS INSERTED IN PCV-455C AND PCV 456 PWR ISOL SWITCHES INIT	ERFIS PRINTOUT QUALITY CODE REVIEW (3) INIT
	< 42°F	< 35°F	< 22°F	< 18°F					
19-07	N/A	N/A	N/A	N/A	JJ	JJ	JJ	JJ	JJ
07-19	N/A	N/A	N/A	N/A	TC	TC	TC	TC	

(1) Initial for each applicable check when it is completed. Mark as "N/A" those checks not applicable.
(2) Reference OMM-001-11.
(3) Notify SM/CRS of any UNEXPLAINED "BAD" Quality Codes. SM/CRS will decide whether the "BAD" Quality Code should be reported to IT Plant Section immediately or during normal business hours. Call Ext. 1883 to connect to IT Plant Section on-call pager.

COMMENTS: ______________________________

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

LCO 3.5.1 Three ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with pressurizer pressure > 1000 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours
B. One valve identified in SR 3.5.1.5 with control power restored.	B.1 Verify control power or air is removed to all valves identified in SR 3.5.2.1 and SR 3.5.2.7.	Immediately
	<u>AND</u>	
	B.2 Remove control power to valve.	4 hours
C. One accumulator inoperable for reasons other than Condition A.	C.1 Restore accumulator to OPERABLE status.	4 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A or B not met.	D.1 Be in MODE 3. AND D.2 Reduce pressurizer pressure to ≤ 1000 psig.	6 hours 12 hours
E. Two or more accumulators inoperable.	E.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.1.1	Verify each accumulator isolation valve is fully open.	Once prior to removing power from the valve operator
SR 3.5.1.2	Verify borated water volume in each accumulator is ≥ 825 ft^3 and ≤ 841 ft^3.	12 hours
SR 3.5.1.3	Verify nitrogen cover pressure in each accumulator is ≥ 600 psig and ≤ 660 psig.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.1.4	Verify boron concentration in each accumulator is ≥ 1950 ppm and ≤ 2400 ppm.	31 days AND -----NOTE------ Only required to be performed for affected accumulators -------------- Once within 6 hours after each solution volume increase of ≥ 70 gallons that is not the result of addition from the refueling water storage tank
SR 3.5.1.5	Verify control power is removed from each accumulator isolation valve operator.	31 days

3.6 CHEMICAL AND VOLUME CONTROL SYSTEM (CVCS) - BORIC ACID AND PRIMARY WATER STORAGE TANK

TRMS 3.6 (CTS 3.2.2.b, c, e, and f) The following portions of the CVCS shall be OPERABLE:

a. Both boric acid transfer pumps;

b. The boric acid tanks together containing a total minimum volume of 3080 gallons of 20,000 ppm to 22,500 ppm boron solution at temperature of $\geq$ 145°F;

c. Two channels of heat tracing for the flow path from the boric acid tanks; and

d. The Primary Water Storage Tank containing $\geq$ 30,000 gallons of water.

APPLICABILITY: MODES 1, 2, 3, and 4.

COMPENSATORY MEASURES

CONDITION	REQUIRED COMPENSATORY MEASURE	COMPLETION TIME
A. One boric acid transfer pump inoperable.	A.1 Restore boric acid transfer pump to OPERABLE status.	72 hours
B. One channel of heat tracing inoperable.	B.1 Restore channel of heat tracing to OPERABLE status.	72 hours

(continued)

COMPENSATORY MEASURES (continued)

CONDITION	REQUIRED COMPENSATORY MEASURE	COMPLETION TIME
C. All pathways from Boric Acid Storage Tanks inoperable.	C.1 Initiate action to restore inoperable component to OPERABLE Status.	24 hours
D. Required compensatory measure and completion time of CONDITION A or B or C not met OR Requirements of TRMS not met for reasons other than CONDITION A or B or C.	D.1 Initiate action to restore inoperable component to OPERABLE Status.	Immediately
	AND	
	D.2 Initiate a Condition Report in accordance with the Corrective Action Program.	Immediately
	AND	
	D.3 Identify any compensatory action to be taken while the inoperability persists.	7 days

TEST REQUIREMENTS

TEST		FREQUENCY
TR 3.6.1 (CTS Table 4.1.2 item 4)	Perform boron concentration analysis of boric acid tank sample.	-----NOTES--- 1. The maximum time between tests may be 5 days. 2. TR 3.0.2 is not applicable. --------------- 2 days per week

ROBINSON NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 9

OST-051

REACTOR COOLANT SYSTEM LEAKAGE EVALUATION (EVERY 72 HOURS DURING STEADY STATE OPERATION AND WITHIN 12 HOURS AFTER REACHING STEADY STATE OPERATION)

REVISION 46

ATTACHMENT 10.1
Page 1 of 2

LEAKAGE EVALUATION DATA SHEET

REF STEP	ITEM	VCT LVL (5) LI-115 or LI-112	PZR LVL (5) LI-459A or LI-460	RCS TEMP (5) T_{avg} ≥540°F TR-408 T_{avg} <540°F TR-413	PZR RELIEF TANK (1) (7) LI-470	ACCUM "A" (5) (6) LI-920 or LI-922	ACCUM "B" (5) (6) LI-924 or LI-926	ACCUM "C" (5) (6) LI-928 or LI-930	RCS DRAIN TANK LI-1003 (2)	CHARGING PUMP LEAK OFF COLL. TANK LIC-200 (3)	TIME
8.1.5	Initial Values	in	%	°F	Date/Time ______ % gal(1)	%	%	%	Date/Time ______ % gal(2)	% gal(3)	
8.1.7.2	Final Values	in	%	°F	Date/Time ______ % gal(1)	%	%	%	Date/Time ______ % gal(2)	% gal(3)	
8.1.8	Difference (+/-)	in	%		gal	%	%	%	gal	gal	min(4)
Multiplier		23.99 gal/in	50.56 gal/%			7 gal/%	7 gal/%	7 gal/%			
8.1.8	Change in Volume (gals)										

Comments____

Progress Energy	**M** **Multiple Use**

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 3

PART 2

OP-202

SAFETY INJECTION AND CONTAINMENT VESSEL SPRAY SYSTEM

REVISION 94

5.9 To provide NPSH for the SI Pumps, the RWST level shall be maintained greater than 9 percent. (SOER 97-01, Rec 3b)

5.10 The SI Accumulators alarms and setpoints are as follows:

- High Level Alarm 75 percent
- Low Level Alarm 67 percent
- High Pressure Alarm 646 psig
- Low Pressure Alarm 614 psig

5.11 An SI pump should **NOT** be operated on miniflow recirculation (minimum flow only) for more than 30 minutes.

5.12 The principles of **ALARA** shall be used in planning and performing work and operations in the Radiation Control Area.

5.13 The Dedicated Operator utilized for filling SI Accumulators shall be any active licensed individual other than the Reactor Operator on watch, and shall remain at the RTGB until the filling evolution is complete.

5.14 Draining or filling the SI Accumulators can result in rapid indicated level changes due to the narrow span (approx. 14 inches) associated with the SI Accumulator level instruments and should be closely monitored.

5.15 If any SI Accumulator level rises greater than 10% (70 gal) when the RCS pressure is >1000 psig, then the affected accumulator shall be sampled within the next 6 hours. (ITS SR 3.5.1.4)

5.16 Do **NOT** open more than one SI Accumulator Vent valve at a time when the SI Accumulators are required to be operable to prevent invalidating the LOCA Analysis. (Westinghouse Memo CPL-96-210)

INIT

8.2 Normal Operation

8.2.1 Filling the Safety Injection Accumulators

1. Initial Conditions

   a. This revision has been verified to be the latest revision available. ________ Date ____

   b. A Safety Injection Pump is available for filling the SI Accumulator(s). ____

   c. An SI Accumulator needs to be refilled **OR** the level raised to restore or maintain the TECH SPECS limit of 61.5 percent. ____

   d. **IF** RCS pressure is less than 650 psig, **THEN VERIFY** the accumulator discharge valve(s) (SI-865A/B/C, DISCH) of the accumulator(s) to be filled are **CLOSED.** ____

   e. A licensed Dedicated Operator is available to fill the SI Accumulator(s) and isolate the accumulator(s) makeup flowpath if a Safety Injection actuation occurs. ____

   f. **IF** Refueling Water Purification is in progress, **THEN PERFORM** the following:

      1) **STOP** the Refueling Water Purification Pump. ____

      2) **CLOSE** SFPC-805B, RWST RETURN. ____

8.2.1 (continued) INIT

2. Instructions

a. **CHECK OPEN** SI-856A, SI PUMP RECIRC. ____

b. **CHECK OPEN** SI-856B, SI PUMP RECIRC. ____

c. **VERIFY** the Control Power Defeat switch for SI-869 is in the NORMAL position. ____

NOTE: Based upon the numerous indications available to the Dedicated Operator of an SI actuation at the RTGB and the immediate response to isolate the SI Accumulator flowpath, an LCO declaration for SI Pump **OR** SI Flowpath Operability is **NOT** required.

The following step is a continuous action step which shall be performed when the stated condition is met.

d. **IF** an SI actuation is received during filling, **THEN IMMEDIATELY CLOSE** the applicable SI Accumulator makeup valve **AND PERFORM** Step 8.2.1.2.m to restore the SI System lineup. ____

e. **OPEN** SI-869, SI HOT LEG HDR. ____

f. **START** an SI Pump. ____

NOTE: If the cooling unit for the train of the SI pump started is **NOT** operable, the opposite train unit can be started by placing its AUTO/RUN switch on the power supply breaker to RUN.

g. **VERIFY** at least one SI Pump Area Cooling unit (HVH-6A **OR** HVH-6B **OR** both) is operating. ____

8.2.1.2 (Continued) INIT

NOTE:	The following are pressure and level limits/alarms for the SI Accumulators:	
	- High Pressure Alarm	646 psig
	- Normal Operating Pressure	630 psig
	- High Level Alarm	75 percent
	- Low Level Alarm	67 percent

CAUTION

Filling the SI Accumulators can result in rapid indicated level changes due to the narrow span (approx. 14 inches) associated with the SI Accumulator level instruments and should be closely monitored.

h. **IF** SI Accumulator “A” is to be filled, **THEN PERFORM** the following:

1) **OPEN** SI-851A, MAKEUP. ____

2) **MONITOR** the level and pressure of SI Accumulator “A”. ____

3) **WHEN** desired level is obtained, **THEN CLOSE** SI-851A. ____

i. **IF** SI Accumulator “B” is to be filled, **THEN PERFORM** the following:

1) **OPEN** SI-851B, MAKEUP. ____

2) **MONITOR** the level and pressure of SI Accumulator “B”. ____

3) **WHEN** desired level is obtained, **THEN CLOSE** SI-851B. ____

8.2.1.2 (Continued) INIT VERI

j. **IF** SI Accumulator "C" is to be filled, **THEN PERFORM** the following:

1) **OPEN** SI-851C, MAKEUP. ____

2) **MONITOR** the level and pressure of SI Accumulator "C". ____

3) **WHEN** desired level is obtained, **THEN CLOSE** SI-851C. ____

k. **STOP** the operating SI Pump. ____

l. **VERIFY** both SI Pump Area Cooling units are OFF:

1) HVH-6A ____

2) HVH-6B ____

m. **CLOSE** SI-869, SI HOT LEG HDR. ____ ____

NOTE:	In Mode 1, 2 **OR** 3 the Control Power Defeat switch for SI-869 should be in the DEFEAT position. In Mode 5 **OR** 6 the Control Power Defeat switch for SI-869 should be in the NORMAL position. In Mode 4 the position of the Control Power Defeat switch for SI-869 is determined by GP-002 **OR** GP-007.

n. **VERIFY** the Control Power Defeat switch for SI-869 in the position determined by plant status:

DEFEAT / NORMAL ____ ____
(Circle one)

8.2.1.2 (Continued) INIT

o. **IF** the Refueling Water Purification Pump was stopped in Step 8.2.1.1.f, **THEN PERFORM** the following:

1) **OPEN** SFPC-805B, RWST RETURN. ____

2) **START** the Refueling Water Purification Pump. ____

CAUTION
If any SI Accumulator level rises by 10% (70 gal) when the RCS pressure is greater than 1000 psig, then the affected accumulator is required to be sampled to verify boron concentration is greater than or equal to 2000 ppm and less than or equal to 2400 ppm within the next 6 hours. (ITS SR 3.5.1.4 and Bases)

p. **IF** the RCS pressure is greater than 1000 psig **AND** any SI Accumulator level was raised by 10% (70 gal.), **THEN REQUEST** E&C to sample the affected SI Accumulator(s) for boron concentration. ____

q. **IF** SI Accumulator sample(s) were required in the previous step, **THEN RECORD** the affected SI Accumulator(s) boron sample results below: (N/A those **NOT** required to be sampled)

SI Accum "A" boron concentration __________ppm ____

SI Accum "B" boron concentration __________ppm ____

SI Accum "C" boron concentration __________ppm ____

	Initials	Name (Print)	Date
Performed By:	______	____________________	__________
	______	____________________	__________
	______	____________________	__________

Approved By: ______________________________ __________
Shift Manager Date

INIT

8.2.2 Draining the Safety Injection Accumulators

1. Initial Conditions

   a. This revision has been verified to be the latest revision available. ________ Date ____

   b. The Reactor Coolant Drain Tank is aligned IAW OP-701 **AND** is ready to receive drains from the SI Accumulators. ____

   c. An SI Accumulator needs the level lowered. ____

8.2.2 (continued) INIT

2. Instructions

> **NOTE:** The following are pressure and level alarms/limits for the SI Accumulators if the RCS Pressure is >1000 psig: (ITS LCO 3.5.1)
>
> - Low Pressure Alarm 614 psig
> - Minimum Operating Pressure 600 psig
> - Low Level Alarm 67 percent
> - Minimum Operating Level 61.5 percent

> **CAUTION**
>
> If any SI Accumulator level rises by 10% (70 gal) when the RCS pressure is greater than 1000 psig, then the affected accumulator is required to be sampled to verify boron concentration is greater than or equal to 2000 ppm and less than or equal to 2400 ppm within the next 6 hours. (ITS SR 3.5.1.4 and Bases)

a. **IF** the RCS pressure is greater than 1000 psig **AND** the cumulative level rises for the affected SI Accumulator was less than 10% since last sample, **THEN RECORD** the cumulative level rise identified **AND PERFORM** steps 8.2.2.2.d through 8.2.2.2.f as applicable.
(N/A Accumulators **NOT** affected)

SI Accumulator "A" _____ %
SI Accumulator "B" _____ %
SI Accumulator "C" _____ % _____

b. **IF** the RCS pressure is greater than 1000 psig **AND** either cumulative SI Accumulator level rise was greater than or equal to 10% since the last sample **OR** the cumulative level rise can **NOT** be determined, **THEN NOTIFY** the Chemistry technician to sample the affected SI Accumulator(s) PRIOR to reducing the Accumulator level. _____

8.2.2.2 (Continued) INIT

c. **IF** SI Accumulator sample(s) were required in the previous step, **THEN RECORD** the affected SI Accumulator(s) boron sample results below: (N/A those **NOT** required to be sampled)

SI Accum "A" boron concentration __________ppm ______

SI Accum "B" boron concentration __________ppm ______

SI Accum "C" boron concentration __________ppm ______

NOTE:	If the RCS pressure is greater than 1000 psig, then the SI Accumulators should be maintained between the high and low level alarm setpoints (67% to 75%) in the following steps.

CAUTION
Draining the SI Accumulators can result in rapid indicated level changes due to the narrow span (approx. 14 inches) associated with the SI Accumulator level instruments and should be closely monitored.

d. **IF** SI Accumulator "A" is to be drained, **THEN PERFORM** the following:

1) **OPEN** SI-852A, DRAIN. _____

2) **MONITOR** the level and pressure of SI Accumulator "A". _____

3) **WHEN** the desired level is obtained, **THEN CLOSE** SI-852A. _____

4) **RECORD** final level for SI Accumulator "A" __________% _____

8.2.2.2 (Continued) INIT

e. **IF** SI Accumulator "B" is to be drained, **THEN PERFORM** the following:

1) **OPEN** SI-852B, DRAIN. ____

2) **MONITOR** the level and pressure of SI Accumulator "B". ____

3) **WHEN** the desired level is obtained, **THEN CLOSE** SI-852B. ____

4) **RECORD** final level for SI Accumulator "B" __________% ____

f. **IF** SI Accumulator "C" is to be drained, **THEN PERFORM** the following:

1) **OPEN** SI-852C, DRAIN. ____

2) **MONITOR** the level and pressure of SI Accumulator "C". ____

3) **WHEN** the desired level is obtained, **THEN CLOSE** SI-852C. ____

4) **RECORD** final level for SI Accumulator "C" __________% ____

	Initials	Name (Print)	Date
Performed By:	______	______________________	__________
	______	______________________	__________
	______	______________________	__________

Approved By: ______________________________ __________
Shift Manager Date

3.6 CHEMICAL AND VOLUME CONTROL SYSTEM (CVCS) - BORIC ACID AND PRIMARY WATER STORAGE TANK

TRMS 3.6 (CTS 3.2.2.b, c, e, and f)

The following portions of the CVCS shall be OPERABLE:

a. Both boric acid transfer pumps;

b. The boric acid tanks together containing a total minimum volume of 3080 gallons of 20,000 ppm to 22,500 ppm boron solution at temperature of $\geq$ 145°F;

c. Two channels of heat tracing for the flow path from the boric acid tanks; and

d. The Primary Water Storage Tank containing $\geq$ 30,000 gallons of water.

APPLICABILITY: MODES 1, 2, 3, and 4.

COMPENSATORY MEASURES

CONDITION	REQUIRED COMPENSATORY MEASURE		COMPLETION TIME
A. One boric acid transfer pump inoperable.	A.1	Restore boric acid transfer pump to OPERABLE status.	72 hours
B. One channel of heat tracing inoperable.	B.1	Restore channel of heat tracing to OPERABLE status.	72 hours

(continued)

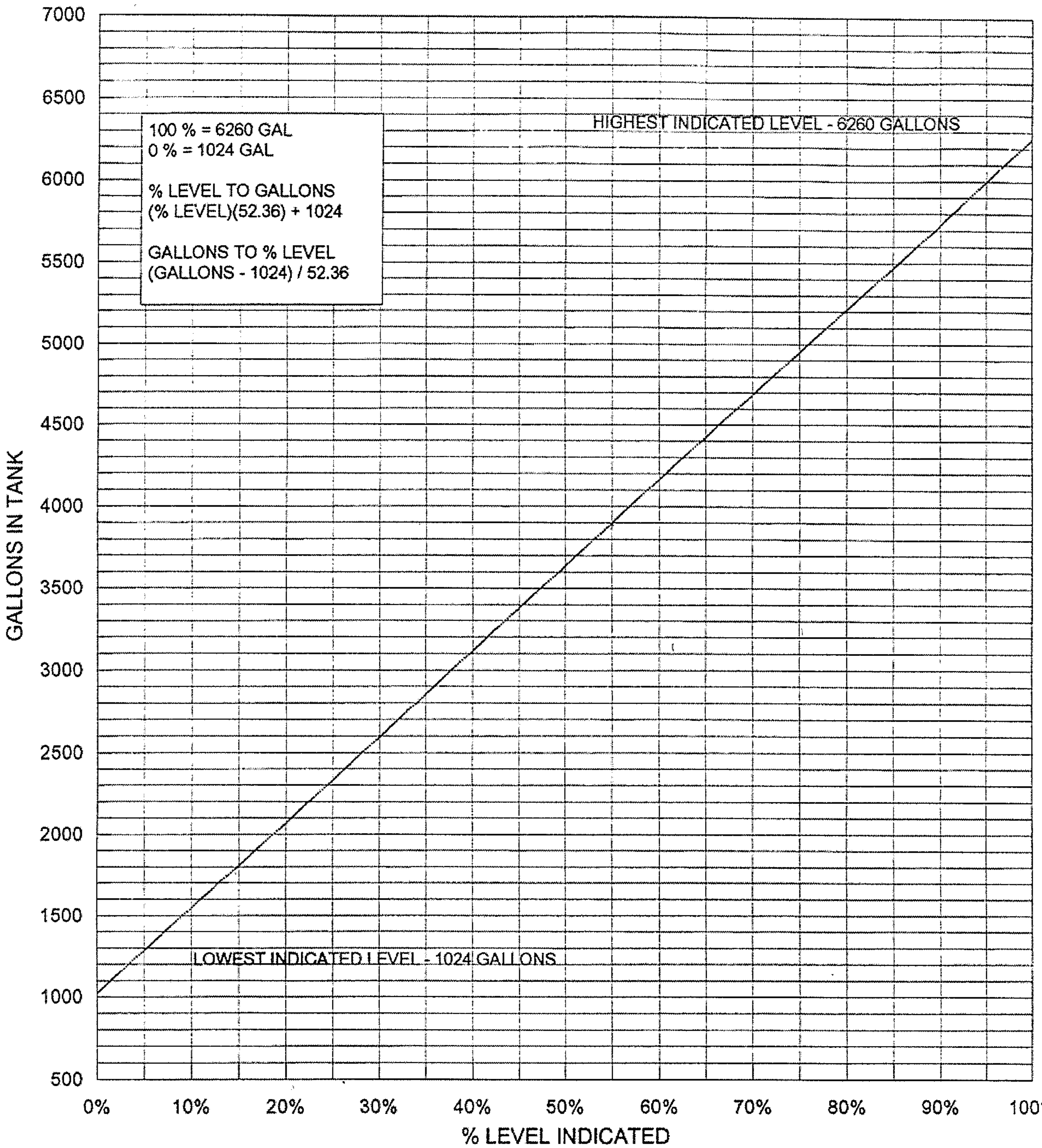
COMPENSATORY MEASURES (continued)

CONDITION	REQUIRED COMPENSATORY MEASURE	COMPLETION TIME
C. All pathways from Boric Acid Storage Tanks inoperable.	C.1 Initiate action to restore inoperable component to OPERABLE Status.	24 hours
D. Required compensatory measure and completion time of CONDITION A or B or C not met OR Requirements of TRMS not met for reasons other than CONDITION A or B or C.	D.1 Initiate action to restore inoperable component to OPERABLE Status. AND D.2 Initiate a Condition Report in accordance with the Corrective Action Program. AND D.3 Identify any compensatory action to be taken while the inoperability persists.	Immediately Immediately 7 days

TEST REQUIREMENTS

TEST		FREQUENCY
TR 3.6.1 (CTS Table 4.1.2 item 4)	Perform boron concentration analysis of boric acid tank sample.	-----NOTES--- 1. The maximum time between tests may be 5 days. 2. TR 3.0.2 is not applicable. --------------- 2 days per week

Station Curve 8.18 Boric Acid Storage Tanks

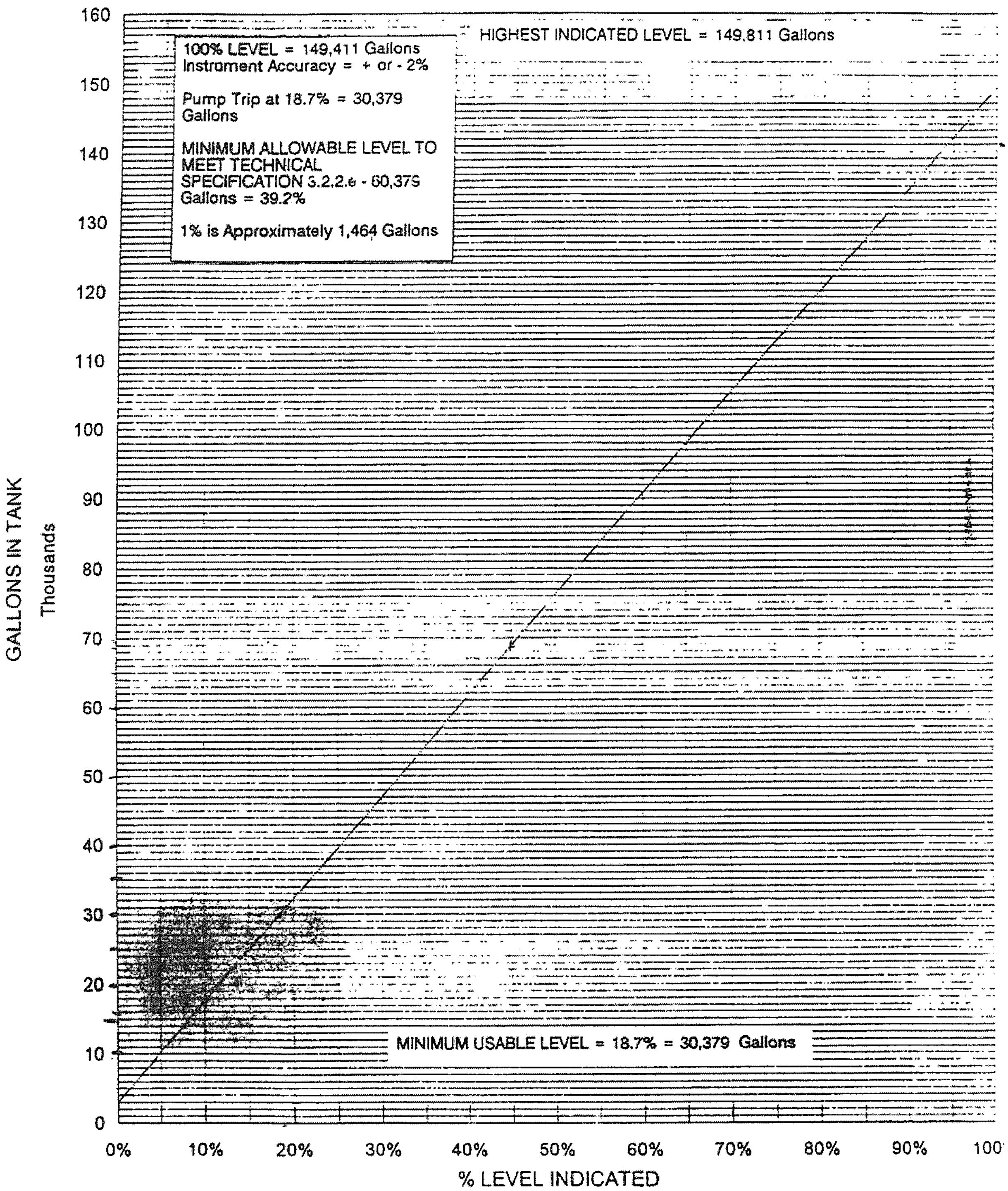


Curve Calculation: RNP-M/MECH-1570

Drawn by: Norman P. Gauett Date: 6/9/94

Checked by: Mitchell R. Olinger Date: 6/10/94

Station Curve 8.9 Primary Water Storage Tank



Curve Calculation - RNP-M/MECH-1587

Drawn by: Norman P. [signature] Date: 1/3/95

Checked by: [signature] Date: 1/3/95

REV 55

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ILC-13 NRC JPM SRO A2
Rev 0

Determine Proper Equipment Boundaries and Post Maintenance Test Requirements

Concurred By: ______________________________ **Date:** ______________
Operations

Approved By: ______________________________ **Date:** ______________
Superintendent/Supervisor - Training

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: 01110115901 Verify proper clearance boundaries and tag sequencing IAW OPS-NGGC-1301.
01006103802 Perform the SI System Annual Integrity Test IAW OST-155

Alternate Path:

NO

JPM #: ILC-13 NRC JPM SRO A2

Candidate SRO

K/A	Rating (RO/SRO):
G 2.2.41	3.9
G 2.2.13	4.3
G 2.2.21	4.1

Task Standard:

Determine the pump boundaries and power supply necessary to isolate the leakage from drain valve SI-888P and identify the required Post Maintenance Testing Requirements.

Preferred Evaluation Location:

Simulator ______ Classroom __X__

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

P&ID 5379-01082 Sheet 2 of 5	EDP- 002	TMM-004
OPS-NGGC-1301	PLP-033	PLP-111

Validation Time: **30 Minutes** **Time Critical:** **NO** **Time Critical Time:** N/A

Candidate: ______________________
Name

SSN ____ - ____ - ____

	Overall Time	Critical Time (N/A if not time critical)
Start:	________	________
Finish:	________	________
Performance Time (min):	________	________

Performance Rating: SAT UNSAT
circle one

Examiner: ______________________ | ______________________ ________

Print Name Signature Date

COMMENTS:

QUESTION DOCUMENTATION:

Question:

Response:

Tools/Equipment/Procedures Needed:
P&ID 5379-01082 Sheet 2 of 5, Safety Injection System Flow Diagram
EDP- 002, 480V AC Busses
OPS-NGGC-1301, Equipment Clearance
PLP-033, Post-Maintenance Testing (PMT) Program
PLP-111, Leak Reduction Program
TMM-004, Inservice Testing Program

READ TO OPERATOR

DIRECTIONS TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. 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 Operator Cue Sheet I provided you along with completed JPM material.

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. Unit 1 is at 100 % RTP.
2. During rounds the IAO identified that SI-888P, SI Pump C Drain, is experiencing excessive seat leakage.
3. A Work Order is being prepared to replace SI-888P with a new valve. The Work Order requests a clearance for SI-888P. The Work Order states that Maintenance will perform all venting and draining of the system and that Single Valve isolation is acceptable.

INITIATING CUES:

Using the provided references only, identify the pump boundary valves and motor breaker to expedite the component isolation and termination of the leakage.

The Shift Manager has authorized Single Valve isolation for the work on SI-888P.

The Shift Manager has also directed you to determine the required Post Maintenance Testing requirements (PMT) for the replacement valve including the specific procedure number(s), if applicable, that will be used to document the test results. (Identify PMT for Valve ONLY.)

START TIME: __________

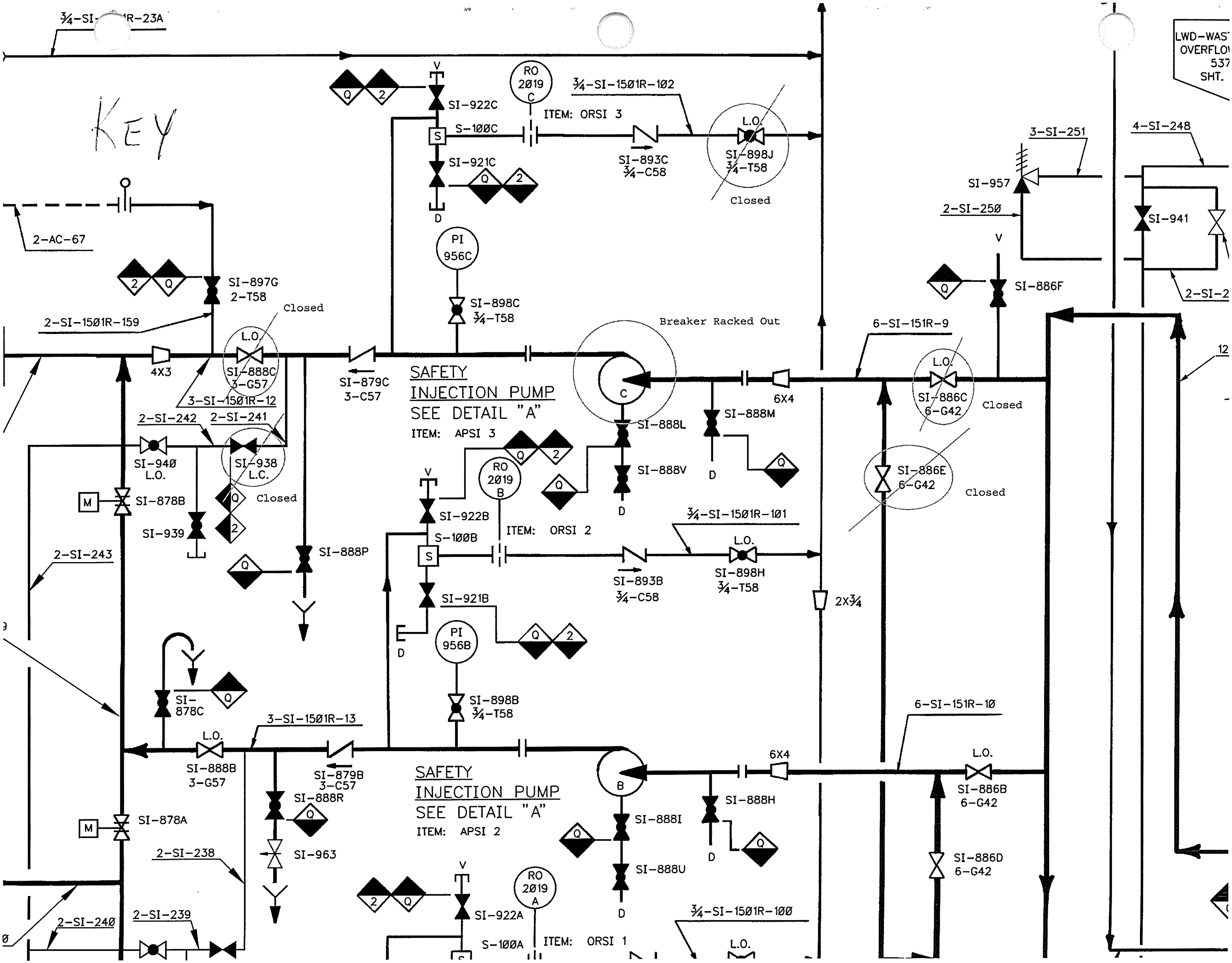
XAMINER'S NOTE: This JPM consists of identifying the boundaries necessary to isolate the seat leakage path from SI-888P, SI Pump C Drain. The sequence of the component isolation is NOT required for performance of this JPM	
<u>STEP 1:</u> Review P&ID to determine component boundary valves. **<u>STANDARD</u>:** Candidate will use the provided plant drawing to identify the component boundary valves. **EXAMINER'S NOTE: P&ID 5379-01082 Sheet 2 of 5, EDP-002 and OPS-NGGC-1301 will be provided to the candidate to use to identify the component boundary valves.** <u>COMMENTS</u>:	___ SAT ___ UNSAT
<u>STEP 2:</u> Identify the pump boundary valves. **<u>STANDARD</u>:** The following valves are required to be verified in the selected positions to ensure that SI-888P is isolated such that it can be removed from the system with single valve isolation: • SI-886C, RWST TO SI PUMP "C" SUCTION - CLOSED • SI-898J, SI PUMP "C" MINIFLOW ISOLATION - CLOSED • SI-888C, SI PUMP "C" DISCHARGE - CLOSED • SI-938, SI PUMP "C" FULL FLOW TEST LINE ROOT ISOLATION - CLOSED • SI-886E, RHR HX OUTLIET TO SI PUMP "C" – CLOSED **EXAMINER'S NOTE: Vent and drains are NOT required to be included.** The Cue states that Maintenance will perform all venting and draining. <u>COMMENTS</u>:	**<u>Critical Step</u>** ___ SAT ___ UNSAT

STEP 3: Determine the power supply to SI Pump "C"	**Critical Step**
STANDARD: Candidate determines that SI Pump "C" power supply is breaker 52/23B – RACKED OUT **Not required for credit.** Switch that can be included is as follows: • RTGB Control Switch for SI Pump "C" - CAPPED	___ SAT ___ UNSAT
EXAMINER'S NOTE: SI Pump "C" power supply is located in EDP-002, Section 9.0, 480V-E2, Breaker 52/23B. **Power supply is also available on the RTGB on the pump control switch.** **EDP-002 was provided to candidate at beginning of JPM.**	
COMMENTS:	

STEP 4:	Determine the required Post Maintenance Test requirements for the replacement valve.	**Critical Step**
STANDARD:	Candidate refers to PLP-033 and determines the following PMT is required: • **Exercise (stroke) check** • **Seat leakage test** Since the valve is in a system listed in PLP-111, then the candidate should specify that the valve leakage will be documented in **PLP-111.** The stroke check can be documented in the applicable maintenance procedure, included in the work task's written instructions, or a separate PMT work order task. **Not required for credit.** Addition PMT that may be listed. • Visually observe the valve to verify proper operation and positive isolation	___ SAT ___ UNSAT
EXAMINER'S NOTE:	**As requested, provide the candidates with PLP-033, Post-Maintenance Testing (PMT) Program, PLP-111, Leak Reduction Program, and TMM-004, Inservice Testing Program**	
COMMENTS:		
	END OF TASK	

Terminating Cue: Safety Injection Pump "C" valve boundaries and power supply have been identified and PMT identified.

TIME STOP: ________


KEY
¾-SI-1501R-23A
2-AC-67
2-SI-1501R-159
4X3
SI-897G
2-T58
Closed
L.O.
SI-888C
3-G57
3-SI-1501R-12
2-SI-242
2-SI-241
SI-940
L.O.
SI-938
L.C.
Closed
SI-939
SI-878B
M
2-SI-243
SI-888P
SI-922C
S-100C
SI-921C
RO
2019
C
ITEM: ORSI 3
¾-SI-1501R-102
SI-893C
¾-C58
SI-898J
¾-T58
Closed
PI
956C
SI-898C
¾-T58
SI-879C
3-C57
SAFETY
INJECTION PUMP
SEE DETAIL "A"
ITEM: APSI 3
Breaker Racked Out
SI-888L
SI-888V
SI-888M
6X4
6-SI-151R-9
SI-886C
6-G42
Closed
SI-886E
6-G42
Closed
SI-886F
SI-922B
S-100B
RO
2019
B
ITEM: ORSI 2
SI-921B
PI
956B
¾-SI-1501R-101
SI-893B
¾-C58
SI-898H
¾-T58
2X¾
SI-957
3-SI-251
2-SI-250
4-SI-248
SI-941
2-SI-2
LWD-WAST
OVERFLO
537
SHT.
12
SI-878C
3-SI-1501R-13
SI-888B
3-G57
SI-879B
3-C57
SI-888R
SI-963
SI-878A
2-SI-238
2-SI-239
2-SI-240
SI-898B
¾-T58
SAFETY
INJECTION PUMP
SEE DETAIL "A"
ITEM: APSI 2
SI-888I
SI-888U
SI-888H
6X4
6-SI-151R-10
SI-886B
6-G42
SI-886D
6-G42
SI-922A
S-100A
RO
2019
A
ITEM: ORSI 1
¾-SI-1501R-100

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. Unit 1 is at 100 % RTP.
2. During rounds the IAO identified that SI-888P, SI Pump C Drain, is experiencing excessive seat leakage.
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The Shift Manager has authorized Single Valve isolation for the work on SI-888P.

The Shift Manager has also directed you to determine the required Post Maintenance Testing requirements (PMT) for the replacement valve including the specific procedure number(s), if applicable, that will be used to document the test results. (Identify PMT for Valve ONLY.)

Progress Energy	R Reference Use

NUCLEAR GENERATION GROUP

STANDARD PROCEDURE

VOLUME 99

BOOK/PART 99

OPS-NGGC-1301

EQUIPMENT CLEARANCE

REVISION 30

NGG Think Fleet.

TABLE OF CONTENTS

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides methods to control hazardous energy and equipment status to provide protection for personnel and plant equipment during operation, maintenance, and modification activities. Provisions of the procedure ensure that the status of safety-related and other important equipment is independently verified when the equipment is restored to service.

This procedure also provides guidance for controlling the installation and removal of Grounding Devices.

1.1 Scope

- This procedure meets the requirements of ANSI N18.7 and 29 CFR 1910.269, and meets the intent of the Health and Safety Manual related to equipment clearance.
- This procedure outlines the steps necessary to "afford employees the same level of protection equivalent to that provided by the implementation of a personal lockout or tagout device" in accordance with OSHA 29 CFR 1910.269(d)(8)(ii), 29 CFR 1910.147(f)(3)(i) and 29 CFR 1910.146(a)(b).

2.0 REFERENCES

2.1 General References

1. ANSI N18.7 (ANS 3.2), Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants
2. **[R1]** 29 CFR 1910.269, Electric Power Generation, Transmission, and Distribution
3. 29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout)
4. 29 CFR 1910.146, Permit Required Confined Space
5. NGGM-PM-0007, Quality Assurance Program Manual
6. SAF-SUBS-00009, Lockout/Tagout
7. SAF-SUBS-0020, Power Generation, Distribution, and Transmission
8. SAF-SUBS-00048, Protective Grounding Guidelines
9. ADM-NGGC-0104, Work Implementation and Completion
10. OPS-NGGC-1000, Fleet Conduct of Operations
11. OPS-NGGC-1303, Independent Verification
12. OPS-NGGC-1309, System Drain, Fill and Vent Procedure
13. HUM-NGGC-0003, Conduct of Pre-Job Briefing/Post-Job Critiques

14. NGGM-IA-0003, Transmission Interface Agreement for Operation, Maintenance, and Engineering Activities at Nuclear Plants
15. MNT-NGGC-0007, Foreign Material Exclusion Program
16. FIR-NGGC-0003, Hot Work Permit
17. **[R2]** ANSI N45.2.9 - Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants
18. **[R3]** SOER 98-1, Safety System Status Control
19. TRN-NGGC-0502, Personal Qualification Data System
20. **[R18]** SOER 07-1, Reactivity Management
21. EPRI – Nuclear Maintenance Applications Center: Clearance and Tagging Guidelines for Nuclear Electric Generating Stations, Revision 1
22. **[R16]** GL 2008-01, Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems
23. **[R17]** SOER 2-05, Rev. 1, Gas Intrusion in Safety Systems
24. **[R26]** EC/ED 77173, Manual Ball/Plug Valve Handle Hole Drilling (Additional Measures)
25. SAF-NGGC-2175, Electrical Safety and Arc Flash Protection
26. OPS-NGGC-1308, Plant Status Control
27. EGR-NGGC-0012, Equipment Data Base
28. **[R45]** OE27792 Replacement AOV Air Regulators May Impact Valve Position for Tag-Out or Emergency Response
29. CR 458655, Auto Start Indication Lost With Auto Signal Sealed In- MR A1
30. **[R29]** SAF-NGGC-2174, Confined Space Entry procedure

2.2 Brunswick Nuclear Plant References

1. 0AP-013, Plant Equipment Control
2. **[R4]** SOER 85-5, Internal Flooding of Power Plant Buildings
3. **[R5]** LER 88-029
4. **[R6]** CR S-89-099
5. **[R7]** ER 87-39
6. **[R8]** ER 97-13-01
7. **[R9]** CR 98-00015-6
8. **[R10]** CR 98-01220-2
9. 0TPP-224, Miscellaneous Training Programs
10. **[R28]** CR 458655, Auto Start Indication Lost With Auto Signal Sealed In- MR A1
11. **[R35**] CAPR CR 280320, CO 146180, Incorrect Checklist Hung.

2.3 Crystal River Nuclear Plant References

1. CP-137, Fire & HELB Barrier Breaches
2. CP-341, Containment Penetration Control
3. AI-500, Operations Department Administrative Guidelines
4. CP-147, Control Complex Habitability Envelope (CCHE) Breaches
5. NOCS 01861, IE 78-31, Audit Clearance Log
6. **[R11]** NOCS 02556, IE 85-41 & 85-42, SRO Documentation of Independent Review
7. NOCS 05622, IE 85-26, Holder Notification of Boundary Changes
8. **[R50]** NOCS 05951, IE 83-23 and NUREG 0737, Restoration and Authorization of a C/O
9. NOCS 07398, IE 81-07, Ensure Control by Operations Department
10. **[R25]** NOCS 040004, NRC Violation 87-17-01, Restore Positions per Applicable Procedures
11. **[R21]** NOCS 040257, NRC Inspection Report 89-06-02, Direction for Partial Release of Clearances
12. **[R27]** NOCS 040610, NRC Inspection Report 90-24-01, Separate Restoration Column and Sequence
13. CR 49526, Contract Employee Received Electrical Shock
14. NOCS 062583, Letter to NRC 3F0797-09, Proceduralize Plant Practices
15. NOCS 062838, Letter to NRC 3F0398-26, Addition of Personnel Danger Tags
16. NCOR, Control of Equipment Outside of Clearance Boundary ("NOT" Tag)
17. **[R19]** CR 90037, FWP-2B Boundary Change Not Controlled IAW OPS-NGGC-1301
18. **[R34]** CAPR CR 133321, Valves Restored Improperly Following Maintenance
19. **[R31]** CR 329147, Expanded Clearance Boundary Task
20. **[R12]** NOCS 0100550, Letter to NRC 3F1008-05, Voids in ECCS system piping
21. **[R30]** CAPR CR 370494, Global Red Tags Lifted and Equipment Manipulated In Error
22. **[R32]** CR 361338-02, Clearances Affected by Temporary Power Installation
23. **[R36]** CAPR 106794-21, ACDP-3 BKR 14 Red Tag Obscured From View
24. **[R46]** NOCS 001974, IE Inspection 81-02
25. **[R47]** NOCS 004512 Letter to NRC 3F0179-01, Clearance for Fire Protection System Disarmament is Issued by the Shift Supervisor.
26. **[R48]** NOCS 094907, NEIL Manual IV.A 6, PG 706D, Impaired Protection Procedure
27. **[R49]** NOCS 040180, Letter to NRC 3F1088-11, Controlling Switching and Tagging

2.4 **Harris Nuclear Plant References**

1. AP-003, General Plant Personnel Safety and Housekeeping
2. OMM-001, Operations Administrative Requirements
3. OMM-014, Operation of the Work Coordination Center
4. OMM-024, Managing Liquid Waste Production
5. OP-156.02, AC Electrical Distribution
6. PLP-400, Post Maintenance Testing
7. EM-005, Temporary Power for Bus Outages
8. AP-401, Installation and Control of Temporary Power and Equipment
9. HNP Final Safety Analysis Report, Section 1.8
10. HNP Final Safety Analysis Report, Section 13.5.1.3
11. HTMI-013, Final Safety Analysis Report Commitments
12. 91H0813
13. 92H0154
14. 93H0255
15. 93H0960
16. ACFR 93-00195-4
17. ACFR 94-01316-4
18. CR 95-02387-8
19. **[R23]** Reply to Notice of Violations dated March 3, 1997, Serial HNP-97-039
20. **[R13]** Response to NRC, i.e. Report R11; 500-400/87-31 Violation A (SHF/10-13510E)
21. CR 102355, Individuals Not Signing on to Attachment 13
22. **[R14]** CR 76491, Personal Clearance Error
23. **[R33]** CAPR 479306, Unexpected Voltage Found During Clearance Activities
24. **[R37]** CAPR 79007-13, Problem Hanging Clearance for C CSIP
25. **[R38]** CR 73432, Clearance Not Adequate For Work on 1FD-17
26. **[R39]** CR 125013, Possible Breach of the RABEES Boundary
27. **[R40]** CR 334387, 'A' CT Pump Ran for 50 Minutes without a Suction Source
28. **[R44]** CAPR 141473-03, Leak on Valve 1CS-243 Following a CSIP Start

2.5 Robinson Nuclear Plant References

1. **[R22]** OMM-001, Operations - Conduct of Operations
2. OMM-004, Operations Work Procedure
3. OMM-007, Equipment Inoperable Record
4. PLP-033, Post Maintenance Testing (PMT) Program
5. **[R20]** PLP-049, Fuse Control Program
6. PLP-050, Plant Labeling and Stenciling
7. ADM-NGGC-0104, Work Implementation and Completion
8. SCR 90-005, Men At Work Red Tags
9. ACR 91-061, Insufficient Clearance for PM
10. **[R24]** ACR 91-237, Sequence for Hanging and Removing Tags
11. ACR 92-352, Insufficient Understanding of Clearance Process
12. ACR 94-00127, EDG "A" Starting during Local Clearance Removal
13. ACR 94-00459, Valve Positioned within Local Clearance Boundary
14. ACR 94-00686, Removal of Clearance Boundary Valve
15. ACR 94-01421, Vent/Drain Caps Removed for Clearances
16. CR 95-0143, Potential Containment Isolation Valve Misposition
17. CR 95-0011, Incorrect Clearance Restoration Position
18. CR 95-01090, Improper Use of Sleeving for System Venting/Draining
19. CR 95-01352, Contaminated Local Clearance Tag Accountability
20. CR 95-01354, HVH Unit Damper Maintenance
21. CR 95-02114, IST Evaluation of Maintenance Activities
22. CR 95-02144, Verifying Personnel on QCHL
23. CR 95-02373, QCHL Maintenance
24. CR 96-03104, Clearance Preparation Without Controlled Documents
25. RAIL 94-R0645, Control of Equipment Inoperable Records
26. PGM 94-036, Plant General Manager Memo Addressing Review of OSHA Regulations for Electric Utilities
27. **[R15]** CR 80320, AFW-39 Misposition, Non-Cited Violation
28. **[R41]** CAPR CR 80615, RO21 Self Assessment Issue # 1
29. **[R42]** CAPR 160702, Clearance Boundary not Adequate for Work on FE-10830
30. **[R43]** CR 197038, Secondary Transient during Clearance Restoration

3.0 DEFINITIONS

1. **Abandoned-In-Place Equipment:** Plant equipment that is not required to support any plant functions or operations and is no longer being maintained. These components are identified in the EDB (Status) as "Inactive".

2. **Additional Measures:**

   a. Additional measures are used to ensure that no single action could, by itself, challenge the clearance boundary. Only one such additional measure is needed to be applied for each tagged isolation device.

   b. In determining the need for the application of Additional Measures, consider accessibility. Accessibility is essentially the question of whether the device can be reached without performing additional steps for access. For example, a valve in the overhead that requires a ladder or lift to access is out of the traffic area and thus would not require an Additional Measure. Clearance preparers will determine whether additional measures are required.

   c. Additional measures are not required for components used to provide energy release paths, only for those used for isolation.
   Methods include but are not limited to the following:

   - Mechanical
     - a) Manual valves restrained with a tie-wrap
     - b) Remotely controlled valves blocked, the control power removed
     - c) Valve handwheels locked.
     - d) Two isolation points in series
     - e) Handwheels removed, although this practice requires not removing the handwheel until the component has been verified. Consider this only when used for small handwheels that have no other practical means to secure. (example; ball valves)
     - f) Release devices secured on valve operators designed with a positive-release type operator (example: some ball valves are designed with a squeeze-to-operate handle)
   - Electrical
     - a) Operating devices secured with cable ties through the installed lockout device only if it prevents operation of the device.
     - b) Breakers with a blockable shutter that have the shutter blocked
     - c) Lock hasps used on breakers with lockable operating handles.
     - d) Two isolation points in series
     - e) Panel doors secured against single-person entry (e.g. with a labeled hasp signifying no single-person entry due to tagged components inside).

3. **Affected Employee:** Workers and holders that could be injured by the energy being injected who are not part of the work group associated with performing the External Energy Injection evolution.

4. **Checklist Notes:** Checklist Notes are used for operational information pertinent to performing the checklist. They are locked once the checklist is approved.

5. **Clearance (C/O):** Instructions used to remove equipment from service for personnel and equipment protection.

6. **Clearance Cross Reference:** A section within an Equipment Clearance that may be used to track work activities associated with work lists and other related clearances.

7. **Clearance Holder:**

   a. A Clearance Holder is an individual that has successfully completed the requirements of the Clearance Holder training program and maintains a current Clearance Holder Training Qualification in PQD: Duty Area HLDR/Qual. Group GG16 Qualification OPR1301N (Initial) or OPR1301N (Requal)

   b. A qualified individual accepting the clearance, as appropriate, for their assigned work task(s) by signing electronically in the computer, (except in the case where the computer is unavailable, the forms in this procedure may be used).

   c. For contractors and Progress Energy employees, the Clearance Holder qualified individual responsible for the work task(s) being performed shall perform the function of PCH and electronically accept the applicable clearance. This employee shall be responsible to maintain the Clearance Worker List, for all individuals working under his direction. The Clearance Worker Tool shall be maintained and updated for the duration of the task and included in the work order package for record retention at the completion of work tasks.

8. **Clearance Information Tags (CIT):** A tag or label used to indicate that a component is out of service or is affected by a clearance. Clearance Information Tags are not part of the clearance boundary needed for personnel and/or equipment protection.

9. **Clearance Order Special Instructions:**

   a. Clearance Order Special Instructions relay pertinent information regarding the safety of the clearance. Clearance Order Special Instructions may also contain operational information regarding plant conditions and/or requirements. Information required to be reviewed by a holder prior to accepting the clearance (Safety), shall be at the front of the Special Instructions to ensure that the information is not overlooked.

   b. List clearance safety information together and do not mix it in with plant operational information. Typical safety information includes:

      - Notes regarding plant conditions that the clearance is relying on.
      - Components or circuits remaining energized
      - Valve handwheels not tagged
      - Double valve isolation requirements not met
      - Vent or drain path requirements not met
      - System cannot be completely depressurized or drained
      - Warnings when sumps or transfer canals are utilized for radiation shielding and a high radiation condition may occur if compromised.
      - Any other pertinent information related to the safety of the clearance
      - Type and magnitude of all energy sources being isolated
      - Requirement to perform Zero Energy checks
      - Confined space requirements

   c. List operational information after all safety information. Typical operational information includes:

      - Loss of function incurred by the clearance activities
      - Components not restored to required position
      - System alignment requirements to restore a system to service, when checklists fail to satisfy requirements. (i.e. Procedures used for restoration.)
      - Independent Verification waiver approvals and alternate methods of verification.
      - Documentation of replacement of damaged or lost tags
      - Documentation of CR for clearance greater than 90 days
      - Containment breach created by clearance activities
      - Documentation whether Compensatory Measures (ITS, Fire Plan, Containment Penetration, and so forth) are required per applicable plant specific procedures, as required.

10. **Clearance Preparer:**

- An individual qualified to develop Clearance Orders and Checklists.
- An individual that has successfully completed the requirements of the Clearance Preparer Qualifications listed in Enclosure 7, Clearance Preparer Qualifications.
- Maintains a current Clearance Preparer Training Qualification in PQD. Qual. Group GN07/Qual. POQ0004N.

11. **Clearance Tags:** Red tags installed on boundary points that isolate equipment from hazards in order to permit work to be performed safely.

12. **Clearance Worker:**

    a. Contractors and Progress Energy employees who are not performing duties as a Clearance Holder must have received the OSHA required training for Authorized Employees before performing Clearance Worker functions under the supervision of a qualified Clearance Holder. [CAPR CR 102355]

    b. An individual signed on to ETO Clearance Worker Tool, and authorized to work inside the clearance boundary. Persons signed on to ETO Clearance Worker Tool are required to have received the OSHA required training for Authorized Employees. All Clearance Workers are required to accept and release clearances utilizing the electronic ETO Clearance Worker Tool or, if qualified to do so, may sign directly on to the Clearance Holders Panel as described in section 9.11.

    c. The Clearance Worker maintains a current Clearance Worker Training Qualification or Clearance Holder Qualification in PQD. Contractors and Non-Qualified Progress Energy Employees – Qual Group GN34/Qual. GNI0005N.

13. **Concurrent Verification (CV):**

    a. The act of checking a condition, such as component position, concurrent with the activities related to establishing the condition or component position.

    b. Specific evolutions or actions where an improper positioning of a component has a high probability of resulting in an immediate plant trip, Safety System actuation, personnel safety issue or could result in an immediate threat to safe and reliable plant operation.

    c. This definition is also synonymous with the term Concurrent Dual Verification. Examples of such evolutions are:

    - Lifting or landing leads
    - Fuse installation/removal
    - Ground installation/removal
    - Operating a valve, switch or breaker
    - Positioning a throttle valve to a specific position
    - Performing position verification of locked, sealed or secured valves which require a second position verification.
    - Valves with ball-screw actuators that have the potential for damage to the valve seat

14. **Condition Clearance:** A clearance created with the intent to maintain the plant in a desired mode or that takes credit for administrative control of a given plant condition to control the hazards for the planned work. This type clearance will contain at least one PAR type tag describing the condition which is to be maintained or controlled. For example; maintaining RCS Level less than 135 feet.

15. **Confined Space:** A space that meets ALL of the following criteria **[R29]:**

    - Is large enough and so configured that a person can bodily enter and perform assigned work.
    - Has limited or restricted means for entry or exit.
    - Is not designed for continuous human occupancy.

16. **Equipment Clearance:** A clearance that because of its plant impact, personnel risk or equipment risk, is administered by the Operation's organization. For example, removing a piece of safety related equipment from service that requires isolating support and interface systems.

17. **External Energy Injection:** The introduction of an external energy source that could create a hazard to workers within the boundaries of an active clearance order. Examples include meggering/hi-pot of motors, hydrolazing, hydrotesting, restoration of power for testing or control circuitry testing, barring engines, and filling and venting for leak testing. Temporary power installed within the boundary of a Clearance for other than the examples listed are not to be considered EEI and additional boundaries to isolate the power from the work area are established.

18. **Global Tags:** Tags shared by more than one Clearance Order. Global Tags cannot be lifted until all Clearance Orders requiring the boundary are lifted. Global Tags do not indicate a Clearance Order number on the tag.

19. **Grounding Device:** Equipment used to provide additional protection for personnel when working on electrical equipment. For example, ground straps or grounding breakers.

20. **Grounds Holder (GRH):** The Individual placing grounds and accepting the applicable Clearance Order electronically

21. **Ground Tag:** Orange tags installed on Grounding Devices for the purpose of identifying and tracking installed Grounding Devices.

22. **Group Tagout:** Multiple Clearance Workers performing assigned work task(s) under the directions of a Principal Clearance Holder.

23. **Hazardous Energy:** Any energy, including mechanical, pneumatic, hydraulic, electrical, chemical and thermal that could cause injury to employees. Danger is only present when energy may be released in quantities or at rates that could injure employees

24. **Holder's Safety Verification:**

    a. The Supervisor or Lead from each work group that will hold a clearance shall designate at least one person to perform a Holder's Safety Verification prior to any holders or workers commencing work on equipment removed from service by a clearance. The Holder's Safety Verification shall include a walk down to verify effective isolation of the component(s) to be worked on. This walk down shall include visual observation that the isolation points are adequate and appropriately tagged. Completion of the Holder's Safety Verification shall be documented in each Work Order Task prior to commencing work. When boundary changes are performed on clearance orders a Holder's Safety Verification on the new boundaries shall be performed prior to accepting the boundary change. The Holder's Safety Verification may commence prior to all tags being hung. Once the clearance is walked down, additional walk downs will not be necessary if the work extends through multiple shifts/crews, unless Boundary Changes occur. When a Boundary Change occurs, each task must be re-evaluated, by the Principal Holders, to ensure that the change does not reduce the level of safety and documented in each work order task.

    b. Direct observation of Clearance Tags may be waived by the work group supervisor for the following concerns, i.e.:

        - ALARA
        - Safety at Heights
        - Heat Stress
        - Confined Space

    c. If direct observation of Clearance Tags is waived, the work group supervisor or designee shall document in the applicable work order task(s) the reason for waiving this requirement.

25. **Independent Verification (IV):** The act of checking a condition, such as component position, separately from activities related to establishing the condition or component position. Verification of actions is by a qualified individual other than the person who established the condition or component position being verified.

26. **Independent/Concurrent Verifier:** An Independent/Concurrent Verifier is an individual that has successfully completed the requirements of the Independent Verifier training program and have operational knowledge of the systems and components they may encounter. These individuals can perform tag verification duties associated with Equipment Clearances.

    The Independent Verifier maintains a current Independent Verifier Training Qualification in PQD. Qual. Group GN31/Qual. POI0005N

27. **Model Clearance:** A clearance model is used as a template for subsequent clearances to support preventive maintenance work activities. The model can be used repetitively to create clearances for the same regularly scheduled preventive maintenance work activity on the same piece of equipment. Clearance models are not used to create clearances to support corrective maintenance work activities. A clearance model can be derived from a historical clearance or independently developed and must be authorized for use by an individual knowledgeable with the clearance process.

28. **"NOT" Tagged Components:** "NOT" Tagged components are devices (i.e. valves, breakers, switches and so forth) that may be manipulated while the clearance is hanging. They are used to ensure status control verification during clearance order lift. They are not to be used as a clearance boundary. They may be used to establish conditions required by the clearance (i.e. venting or draining). Workers are not required to be notified when processing a "NOT" Tag only checklist.

29. **OSHA Affected Employee:** An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

30. **OSHA Authorized Employee:** A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An OSHA Affected Employee becomes an OSHA Authorized Employee when that employee's duties include performing servicing or maintenance.

31. **Parameter Tag:** A Parameter Tag is a type of tag in Passport only used to delineate the System Conditions (such as RCS level less than 135 ft) being relied upon for hazardous energy protection. This type tag is not required to be printed or hung. This tag, on active clearances, will show in Condition Clearance reports.

32. **Principal Clearance Holder (PCH):** A designated Clearance Holder who has electronically accepted the clearance and who may be providing coordination between multiple Clearance Workers performing an assigned work task under a Group Tagout. The PCH will be identified on the "Contacts" panel of the clearance within the computer.

33. **Principal Equipment:** The pieces of equipment cleared for work. The equipment must be a valid piece of equipment from the Equipment Database.

34. **Release of Clearance:** Release occurs when personnel who have been working under a clearance release their right to work and their right to protection under the clearance.

35. **Requester:** Is an individual who initiates a clearance or a boundary change request.

36. **Tag Hanger / Lifter:** An individual qualified to manipulate equipment and hang and remove tags according to the provisions of this procedure. These individuals can perform tag hanging duties associated with Equipment Clearances.

    The Tag Hanger maintains a current Tag Hanger Training Qualification in PQD. Qual. Group GN06/Qual. POQ0003N

37. **Work Control Center (WCC):** An office located away from the Control Room where assigned personnel prepare, coordinate and track Equipment Clearances and perform other administrative functions related to coordination of plant activities.

38. **Zero Energy Checks:** Zero Energy Checks validate de-energization of components to be worked by checking that stored energy has been released and discharged rendering the machine or equipment safe. The verification may include visual inspection techniques (for example, visually checking a sightglass or vent/drain for the absence of fluid) or testing the component or equipment with an appropriate test Instrument (for example, a voltmeter or combustible gas/oxygen indicator). For equipment or systems that operate above ambient temperatures, the Zero Energy Check includes verification that the temperatures are acceptable for work to safely continue or appropriate PPE is identified that will eliminate the potential burn hazard.

4.0 RESPONSIBILITIES

4.1 Manager – Operations

1. Responsible for the administration of the clearance procedure
2. Ensure that periodic audits are performed on the clearance process.
3. Ensure an independent inspection of the clearance process is performed on an interval not to exceed annually. **[R1]**
4. Ensure all Operations Personnel are qualified at the task level required by this procedure prior to performing any associated actions.
5. Ensure charge codes are provided to operations staff for capturing clearance development on Capital Projects.

4.2 Manager – Maintenance

1. Ensure necessary Maintenance personnel are trained on the corporate requirements for the use and specification of Grounding Devices.
2. Ensure all Maintenance Personnel are qualified at the task level required by this procedure prior to performing any associated actions.

4.3 Manager – Security

1. Ensure necessary Security personnel are trained on the Clearance requirements when contacted by a Maintenance or Operation Supervisor to place access on Administrative Hold for an individual. The access hold will only be enforced until communications have occurred between the affected individual and a responsible supervisor. Following confirmation from a responsible supervisor, the individual's access may be restored to their previous security level.

4.4 Manager - Training

1. Develop a training program to qualify personnel on the clearance process and this procedure.
2. Provide training on the clearance process and this procedure.
3. Provide clearance retraining on an interval not to exceed two calendar years.

4.5 Supervisors

1. Ensure personnel within their work groups are qualified to perform duties related to the clearance process.
2. Ensure personnel under their supervision comply with the requirements of this procedure.
3. Ensure that a Holder's Safety Verification is completed prior to any holders or workers commencing work on equipment removed from service by a clearance.
4. Ensure the Holder's Safety Verification is documented in each Work Order Task being worked prior to any holders or workers commencing work.
5. Ensure Independent Verification (IV) is performed.
6. If plant needs dictate the release of a clearance, and all Clearance Holders/Workers have not signed off in the computer or Clearance Worker List, in the ETO Clearance Worker Tool, a Maintenance Supervisor or Operations Supervisor may release the clearance provided:
   - Supervisor has Security Profile of "TO-REL-OTHER"
   - The Clearance Holder/Worker who are not available have been verified to be off site, and reasonable efforts to contact those Clearance Workers have been made.
   - The Clearance Holder/Worker must be informed of clearance release prior to resuming work at the facility.
   - If unable to contact Holders/Workers, a Maintenance or Operations Supervisor shall contact Plant Access to ensure that the Holder/Worker is not on site and use Attachment 15, Release Documentation of a Clearance by Another Employee shall be used when it is confirmed that the Holder/Worker cannot be located or contacted.
   - If work could resume, in an area where access cannot be restricted by Security, additional actions will need to be taken to ensure that the worker does not resume work. Such actions could include locks or stationing of an individual at the work location.

5.0 PREREQUISITES

None

6.0 PRECAUTIONS, LIMITATIONS, AND NOTES

1. This procedure applies to both Power Block and Non-Power Block Equipment.
2. If Checklist Notes must be changed after approval then the checklist must be modified and re-approved.
3. The use of wire lifts on electronic devices not designed for routine lifting, such as relays, to establish a routine clearance boundary is to be avoided. **[R28]**

7.0 SPECIAL TOOLS AND EQUIPMENT

None

8.0 ACCEPTANCE CRITERIA

None

9.0 INSTRUCTIONS

9.1 General Administration

1. This procedure is not to be revised without concurrence of the NGG Clearance and Tagging Working Group. Any revision shall be reviewed by an OSHA Subject Matter Expert for Clearance and Tagging. The addendums for specific plants may be changed for that plant only based on unique plant design differences. The addendums are not to be used to administer different operating philosophies. If changes are made by the associated plants, a follow-up AR is to be generated to require the NGG Clearance and Tagging Working Group to evaluate changes for inclusion into the body of this procedure.
2. This procedure recognizes organizational differences. Even though some position titles may vary, the responsibilities and functions of the position itself should be relatively consistent. Refer to OPS-NGGC-1000, Fleet Conduct of Operations.
3. The clearance process is intended to be used when there is a potential for personnel injury or equipment damage associated with an activity. The clearance process is designed to maintain system configuration control but is not to be used solely for that purpose. Other site processes are used for configuration control purposes when the risk of personnel injury or equipment damage does not exist.
4. Clearances are not to be used with the sole intent of long-term disabling of equipment or in instances where a plant modification would be more appropriate.
5. When determining if a clearance is required, consider if there is a potential for personal injury or equipment damage from:
    - High temperature fluids or toxic chemicals?
    - Applied pressure forces?
    - Energized electrical components?
    - Maintenance on or in the vicinity of rotating equipment?
6. A clearance shall always be required for grounds.
7. CITs are not to be used as a clearance boundary. CITs are used for information only. They are used to indicate that a component is out of service or is affected by the clearance.
8. Clearance Information Tagged (CIT) equipment may be operated as follows:
    - When no specific equipment position is specified for the CIT tagged equipment, the equipment may be operated as necessary.
    - When a specific equipment position is specified for the CIT tagged equipment, the equipment may be operated after the Clearance is hung and verified as long as it is restored to its tagged position after manipulation.
9. When tagging of control switches is desired, CITs should be used if the switch does not form a part of the clearance boundary. For switches that are a part of the clearance boundary, a miniature Clearance Tag or a switch cap is used.

10. Tagging on control panels requires the use of tags small as possible to prevent totally obscuring plant status indications, controls, switches and labels.
11. Clearance tagged or ground tagged equipment is not to be operated for any purpose while under clearance. The following are exceptions to this requirement:
    - Verification of required valve position by the clearance Independent Verifier.
    - Additional torquing of boundary valves to gain adequate isolation. If personnel determine that torquing of boundary valves is needed, the WCC must be notified. The WCC will determine how best to perform and to document the additional valve torquing.
12. If tags are noticed to be damaged, missing, or have fallen off, the WCC shall be notified. The WCC will consider stopping work within a clearance boundary if Clearance Tags or Ground Tags are discovered missing on isolation boundaries. The WCC shall replace any Operations tags. **[R6]**
13. Clearance Tags and Ground Tags are used to indicate a piece of equipment is adequately isolated or de-energized to prevent equipment damage or personnel injury. Other devices such as locks may supplement the tag, but the Clearance Tag or Ground Tag is the primary means of control. If locks are used in conjunction with an Equipment Clearance, the WCC is to be notified. Provide the WCC with a method to disposition the lock in an emergency situation.
14. All employees who need a clearance for protection must personally sign on to the clearance, through electronic means (manual sign on acceptable if computer mainframe is down), for all associated assigned work tasks. An employee needs a clearance for protection if the individual is performing hands-on work where direct contact is being made with the piece of equipment removed from service by the clearance or if the individual must physically breach the equipment removed from service by the clearance. If only a visual inspection is being performed and the equipment removed from service by the clearance is not physically breached (i.e. looking inside a disassembled valve or open heat exchanger from the outside) then the individual does not need to be signed on to the clearance. If a component is removed from the system and work is being performed on that component while not attached to the system (on the floor or in the shop), then the individual does not need to be signed on to the clearance (however, the workers removing the component from the system and reinstalling it into the system do need to be signed on to the clearance.)

    Examples of when an employee must sign on to a clearance:
    - Performing decontamination activities or surveys directly on the shaft of a pump removed from service by a clearance
    - Inspecting an electrical connection removed from service by a clearance where the electrical connection must be physically contacted
    - Performing a visual inspection of a tank or heat exchanger removed from service by a clearance where physical entry into the tank or heat exchanger is required
    - Building scaffolding inside a component removed from service by a clearance

15. Clearance boundary valves shall be tagged. This is to prevent the possibility of a boundary valve being removed from the system because there is nothing identifying it as a clearance boundary valve. For valve operators that do not have handwheels, the operator shall be tagged. For example, a solenoid operated valve should be tagged locally in addition to removing power to the solenoid. Exceptions to this requirement are allowed for ALARA or safety concerns.

16. For systems that operate with temperatures greater than 200°F, pressures greater than 500 psig, caustic or acid systems (excluding boric acid):

    a. If plant design allows, then isolate from the work area by two in series closed valves when the system is to be breached.

    b. If plant design allows but double isolation is not used then M-SO permission shall be obtained to hang any clearance that meets the above requirements and does not use double valve isolation. This permission and a notification to the workers of the clearance boundary limitations shall be noted in the Clearance Order Special Instructions.

    c. If plant design does not allow double valve isolation to meet the above requirements, Then M-SO permission is not required, but a notification to the workers shall still be noted in the clearance Special Instructions.

17. When system configuration or system operating requirements does not permit the use of boundary isolation valve, the establishment of a freeze seal may be considered an adequate boundary.

18. System Conditions may be used as the clearance boundary.

    - Examples of system conditions that may be used as clearance boundaries are, but not limited to the following:

        1) Controlling Reactor Coolant Level

        2) Controlling Reactor Coolant Temperature

        3) Maintaining system alignments to comply with Technical specifications

        4) Use of a plug, bladder, or similar device as a boundary for system isolation when a device cannot be tagged directly or remotely

    - When system condition(s) are used, the specific condition(s) shall be identified in the Clearance Special Instructions along with the limits of the parameter involved and Contingency actions to be taken in the event a loss of the condition occurs. The contingency actions shall be clearly defined.

    - The system condition being used shall be identified by assigning it to a component with a Parameter Tag and used to delineate the System Conditions being relied upon for hazardous energy protection.

    - When system conditions are used for Condition Clearance boundaries the Operations Manager shall approve use of the Clearance and this approval shall be documented in the Special Instructions section of the clearance.

    - When a Condition Clearance is being used as an isolation boundary, a method of communication shall be discussed and agreed upon between Operations and Clearance Holders / Workers.

- A Condition Clearance status document indicating the Mode and/or Plant Conditions being relied on for Condition Clearances shall be posted in the Main Control Room (MCR) and Work Control Center (WCC).
- When Condition Clearances are distributed, the SRO distributing the clearance SHALL ensure that the Condition Clearance Report posted in the MCR and WCC is appropriately updated.

19. A clearance is not required for the following. NGGC/Site configuration control methods will be used to document component position.
    - Installation of test equipment, hoses, rigs and so forth when a local isolation is available.
    - Breaker maintenance when maintenance is restricted to the breaker.
    - Work on pneumatic components, if a local pneumatic isolation is available and the pneumatic component is not used for boundary isolation. Notify the WCC prior to positioning any pneumatic isolation valve(s).
20. Electrical components are normally de-energized by opening a breaker, operating a switch, or by pulling a fuse. In those cases where this is not feasible or desirable, it is permissible to lift leads or slide links as follows:
    1) If leads have to be lifted or links slid, it is preferred that the leads are lifted/links slid locally at the component and documented using OPS-NGGC-1308, Plant Status Control.
    2) Leads/links shall be Concurrently or Independently verified on those systems as required by site procedures.
    3) Clearance Tags shall be installed on the lifted leads/links if the leads/links are out of the direct control and oversight of the personnel performing the work and if the component is a boundary isolation device meeting the requirements for employee safety identified in SAF-NGGC-2175, Electrical Safety and ARC Flash Protection.
21. If electrical isolation cannot be performed, it is permissible to work on energized electrical components as allowed by site and corporate safety procedures.
22. Rotating generators with field current breakers open may still create a source of electrical energy that must be accounted for when developing a clearance.

23. For complex electrical clearances, where prints are inadequate or not available and/or input from shop personnel is requested to write a clearance: **[R33]**

    a. If shop input is requested, then two competent shop (and/or engineering) personnel shall independently determine clearance boundaries. They shall list the clearance specifications on and sign and date the bottom of Attachment 2, of OPS-NGGC-1301, Shop Support Clearance Boundaries.

        - Attachment 2, of OPS-NGGC-1301, Shop Support Clearance Boundaries Request Form, shall be maintained and transmitted along with the clearance.

    b. Zero energy checks will be performed as an additional verification of the clearance hang process. This will ensure adequate boundary isolation. If alternate indications are not available for the tag hanger to determine that the device de-energized the desired circuit/component then "CMT" type steps will be added to the initial hang checklist to ensure each required circuit/component is de-energized prior to the checklist being completed. These "CMT" type steps can be sequenced as needed for efficiency. The "CMT" type step shall identify the location and method of the zero energy check(s) to be performed. This may require input from maintenance during the checklist development stage. For these "CMT" type steps, the clearance preparer verifying the checklist will only be verifying that the method selected in the "CMT" type step is adequate for zero energy determination.

    c. The zero energy checks shall be performed by qualified technician/craft worker(s). Concurrent verification that the technician/craft worker is measuring the correct terminal points is required. The technician/craft worker shall initial the "Completed By" block on the Checklist and SHALL print their passport ID next to the step. The concurrent verifier will follow this same process. The clearance desk operator will enter the checklist completion information on the "TIMT222 – Checklist Completion screen" for each "CMT" type step prior to completing the checklist.

24. When system vents are left open and uncapped review the requirements of MNT-NGGC-0007, Foreign Material Exclusion Program.

25. When boundary valves leak by their seat and a complete draining cannot be accomplished, the WCC SRO and the Clearance Holder shall determine when conditions are safe to perform the required maintenance.

26. Systems with a history of not isolating securely when installing clearances are treated as follows:

    - To get a leak tight isolation for clearances on these systems, the boundary valves should be closed normally (with control switch if applicable).

    - If normal closure does not provide leak tight isolation the boundary valves may have to be manually operated through several partial open/close cycles to remove any solids that may have settled onto the seating surface.

    - For butterfly valves which are not isolating properly, it is possible to obtain a better isolation by turning the valve slightly in the open position in case the

valve closed slightly past the seat when the valve was shut. Maintenance assistance should be requested to accomplish this task.

- Significant difficulty in achieving isolation or problems with normal closure should be reported to System Engineer to ensure system operability is not affected.

27. Maintenance will be allowed on boundary isolation components provided that the work activity will not alter the ability of the boundary isolation component to perform its isolation function.

    - Examples of work activities that can be performed on boundary isolation devices are as follows:

        - Limit switch grease inspection
        - Flex conduit repairs
        - Re-lugging of wire connections
        - Electrical disconnect and reconnect of motor
        - Limitorque grease inspection for rising stem and gate valves
        - Anti-rotation device inspection
        - Work on breakers

28. Special consideration should be given to clearances that involve systems that are common to other units.

29. Station policy and scheduling practices should limit the use of External Energy Injection to the extent practical. If energy injection during work sequences is unavoidable, then the following limits on using External Energy Injection shall be followed:

    a. The activity should be performed in accordance with component-specific approved procedures or approved work plans. Attachment 16, External Energy Injection Form, will be used for all External Energy Injection evolutions. The work group performing the energy injection will perform Attachment 16 and the Attachment 16 should remain with the work package associated with the External Energy Injection.

    b. When a work authorization is granted that will inject energy into a clearance boundary, a Holder Lock should be placed on the affected clearances to prevent any holders from accepting the clearances for any other work covered by the clearances.

        - It is acceptable to allow Holders to accept a clearance by signing-in through the WCC Operators Login (Holder Lock shall not be removed) provided they are signed in on Attachment 16, External Energy Injection Form.

    c. The work group using the external energy is responsible for ensuring that energy being introduced will not jeopardize worker safety.

    d. The responsible work group designates a lead person to be responsible for all aspects of the External Energy Injection activity.

- The lead person should contact all supervision for all work in progress under the clearance to discuss the impact of the External Energy Injection on all work in progress.
- The lead person should ensure that all affected holders and workers that are not involved in the External Energy Injection activity sign off of the affected clearances. If it is not practical for all affected holders and workers to sign off of the clearances, then approvals will be obtained from the affected holder(s)/ worker(s) and documented on Attachment 16, External Energy Injection Form. For External Energy Injection, an affected employee is an individual that could be injured by the energy being injected and are not part of the work group associated with performing the External Energy Injection evolution.
- The lead must notify the WCC to remove the Holder's Lock when External Energy Injection is complete and it is safe for work to resume.

30. Station/Line Clearances are administered by System Operations. NGGM-IA-0003, Transmission Interface Agreement for Operation, Maintenance, and Engineering Activities at Nuclear Plants should be used to identify responsibility boundaries between Nuclear Plant Operations and System Operations.
31. Equipment Clearances will be maintained by the Operations Department.
32. For Equipment Clearances, the form used should be generated from a clearance computer program, or a copy from this procedure. The computer-generated form may not exactly match the form in this procedure, but the two forms should be similar and include similar information.
33. For clearances that involve the removal of fuses, where fuse information is available on the Parameters1 or Models tabs, use Attachment 11, Fuse Removal/Installation Guidance.
34. For devices having a remote operator, such as a valve reach rod, where both valve and reach rod have a handwheel and are accessible, the clearance should be written such that both mechanical devices are tagged. Tags for the valve handwheel may be excluded if radiation levels make entry into the area undesirable (as a guideline, anticipated dose greater than 10 mrem). If the valve handwheel is not tagged, it should be noted in the Special Instructions.
35. If use of freeze seal is required, follow the requirements outlined on Attachment 17, Freeze Seal Guideline.

36. Motor operated valves may be used as an isolation boundary point provided, after the valve has been positioned for the clearance, its power supply is isolated and tagged and the handwheel is tagged to indicate the valve position. The valve should not be manually engaged to check position. This will prevent inadvertent damage to the torque switch and/or valve seat, and prevents the drifting problem associated with some Limitorque operated valves. Since the valve position may not be available after the motor breaker is turned off, concurrent verification may be used to determine valve position before isolating the power supply. If the valve is determined to have seat leakage, it is permissible to manually engage the handwheel and torque the valve shut. Refer to site procedures for positioning and position verification associated with motor operated valves.

37. When Motor or Air Operated valve maintenance occurs where valve actuator removal is required, the system may need to be depressurized to prevent stem ejection from occurring. If the system is not depressurized, then an engineering evaluation of stem ejection characteristics for the valve should be performed prior to removing the actuator.

38. Systems, or portions of systems, and components that normally operate at temperatures and pressures above ambient, or systems under vacuum, should be vented and drained as necessary for the performance of work. Whenever possible, an atmospheric drain and/or vent between the work area and sources of pressure to the work area should be tagged in the open position with the cap/flange removed to release pressure in systems and to accommodate thermal expansion and contraction. If depressurization via vent and/or drain paths cannot be provided within the clearance boundary, other definitive measures should be taken to verify the system or component is adequately drained and depressurized. These measures include breaking of flanged connections, loosening of valve bonnets, removal of instrument tubing or other similar actions. If the system cannot be completely depressurized or drained, a comment should be included in the clearance Special Instructions.

39. When isolating high pressure pumps without suction relief protection, consider aligning a recirculation or drain flow path prior to shutting the suction valve to protect the pump suction from over-pressurization until the high pressure isolations can be verified to be holding.

40. Do not use "Abandoned-In-Place Equipment" as boundary isolations. If the only valve available for a proper boundary is abandoned (Inactive), Maintenance and Operation's supervision must concur and this concurrence must be documented in the Special Instructions as a Caution.

41. If an Emergent Equipment Clearance is needed and the clearance computer program is unavailable, the appropriate attachments in the back of this procedure may be used to manually prepare the clearance.

    A Clearance Log Sheet (Attachment 1) will be filled out for tracking purposes starting with clearance number YY-XXXX. (YY = current year and XXXX will be sequential numbered starting at 0001). Once the computer system has been restored, all information should be entered into the computer.

    Any tags that are still hanging should be replaced with the computer generated tags.

    The manually generated clearance forms should be saved until the computer generated clearance has been closed and all pertinent information captured.

42. Specific Plant Addendums should be referenced for all employees working under this procedure.

43. Attachment 10, Clearance Process Checklist, is required to be used for all clearances generated in conjunction with this procedure.

44. The introduction of fluids, either gas or liquid, into a system within a clearance boundary may be performed by work groups other than Operations provided it is according to an approved procedure and with the concurrence of the CRS or SM. The location at which the fluid is to be introduced into the system shall be specified in the procedure.

45. Any approved clearance older than 6 months, must be evaluated to ensure that it meets the intent of the current revision to this procedure. If not, it must be re-written using the current revision.

46. When equipment that operates at temperatures above ambient is removed from service, it should be allowed to cool prior to starting work or precautionary measures, such as wearing the appropriate PPE, shall be taken to eliminate the potential burn hazard.

47. NGG Fleet Clearance Strategy

- The NGG has adopted, at all stations, several strategic elements that are important to ensure safe clearances exist, and to ensure a process exists that facilitates the efficient performance of maintenance tasks.
- Each site in the NGG fleet is committed to the following elements of this clearance strategy:
    - Global Tags will be the default computer method at all stations. Global Tags have proven to reduce the number of actual hang and lift activities which provide the best use of Operations resources and decreased dose. In addition, if used properly, the elimination of boundary modifications can be realized.
    - Maximizing the reliance on plant conditions that eliminate the hazard will be used at all stations. These system conditions make the system or component safe to work. This strategy protects the worker and reduces clearance activities that are not necessary. An example is the use of RCS level as a plant condition for installing nozzle dams on a PWR.
    - Use model clearances for PM's that are written against equipment.

9.2 Clearance Request

1. Notify the WCC personnel when a clearance is needed to support non-scheduled work.
2. Determine whether the work can be done without a C/O.
3. Determine whether the work can be done using a Personal C/O. (Reference OPS-NGGC-1301A, Personal Clearance.)
4. Submit a Clearance Request.
   a. Generate clearance request to describe the work being performed including any special instructions or requirements. (See examples in step 4c.)
   b. The following applicable items and any related information shall be included in each Work Order.
      - The equipment to be worked on and the conditions required for the work to be performed.
      - A detailed enough explanation of the work scope requirements to ensure adequate protection for personnel safety from the hazard. This shall include information as to how the system will be breached (mechanically, electrically, etc.)
      - Any information related to additional potential hazards associated with the work (e.g. system to be vented and drained to relieve pressure)
      - Identify applicable fuses or leads to be pulled/lifted associated with performing the maintenance
      - Identify applicable grounds and locations
      - Identify applicable boundary changes
      - Reference applicable drawings for performing the maintenance
      - Evaluate the work being performed and request isolation/control of fire protection systems if needed (i.e. CO2 and Halon)
      - Identify if partial procedures will be performed, including procedure/surveillance numbers and steps.

c. Examples of clearance requests:

- 1CC-10, inspect and repair. Need valve isolated, depressurized and drained to allow disassembly.
- Personnel are replacing CDV-185 with new. Hydraulically and electrically isolate valve from service. Do not isolate air supply to actuator such to permit valve stroke adjustment.
- Seal replacement on 'A' Safety Injection pump. Pump must be de-energized, hydraulically isolated, drained and vented.
- Pressurizer Relief Tank drain RC-523A will need to have the diaphragm replaced. This will require the valve to be isolated from the system, depressurized and drained to allow the bonnet to be removed for this work.
- Work to repair refrigerant leaks on control room refrigerant unit WCCU-1A. Starting power to compressor should be isolated when requested by Maintenance.
- 1CZ-8. PM-M0014 Limitorque Inspection. Electrical clearance required. Do not tag handwheel.

5. Supply EC drawings or required information on the task document references M104 panel (i.e., modifications) if current approved drawings are insufficient for determining isolation points.

6. Ensure a separate Work Order Task is provided for each desired expanded clearance boundary. An additional work order is not required in instances where the boundary will be collapsed to complete the work order. The Boundary Change process adequately controls work safely in these instances. (E.G. Additional tags are needed to provide an adequate clearance boundary for a given Work Order.) **[R31]**

9.3 Clearance Development: Preparation

1. The Clearance Preparer shall understand the scope of the maintenance activities and prepare a clearance ensuring that the administrative requirements of this procedure are met.
2. Applicable Work Orders should be listed on Principal Equipment panel.
3. Prepare and verify clearances to ensure safe operating conditions exist while equipment is being removed from service, maintained, and returned to service.
4. Define precautions and prerequisites to be observed prior to the installation and removal of a clearance.
5. Ensure the clearance boundary is adequate to provide personnel and equipment protection, and support the work requested.
6. Plant Clearances, that require installation of Temporary Power, shall be reviewed / evaluated to ensure that the Temporary Power will not introduce an external energy source within the Clearance boundaries. Additional Clearance boundaries shall be established to protect the work area prior to the Temporary Power installation if required.
7. A Model Clearance that is attached to a Model Work Order will generate a new Clearance and Checklist in the Plan status. These Clearances have the Work Order Task assigned by Passport and do not require a Clearance Request. The Clearance Preparer and Verifier must confirm the accuracy of the new Clearance by reviewing the Steplists, Checklists, and Special Instructions. If the Model Clearance is not accurate for the preventive maintenance activity, then it must be revised and re-authorized before it can be used to create a new clearance.
8. A Clearance Preparer can background a Clearance to create a new clearance to support maintenance work activities
9. Components that need to be manipulated as part of planned maintenance must be added to the clearance as "NOT" tags or ensured that other measures have been taken to ensure proper restoration.
10. If the Clearance Preparer is unfamiliar with the piping layout, then a field walk down should be performed. If the area is inaccessible, a Clearance Preparer familiar with the piping layout should be consulted.
11. If a Fuse is to be used as a boundary, and fuse information is available on the Parameters1 or Models tabs, then copies of Component Models and Parameters are to be included in the Clearance Package prior to clearance implementation. These can be retrieved from the TIMD030 Panel by clicking the "Models" and "Parameters1" tabs.
12. If temporary power is installed within the boundaries of an existing clearance or clearances, all affected clearances shall be evaluated and additional boundaries shall be added as required to protect the work area prior to the installation of temporary power. **[R32]**

13. When grounds are needed for additional measures of protection, generate a ground checklist of type GR to control the ground installation and removal. Grounds shall be installed and removed in accordance with Section 9.10 Installation/Removal. Grounds are not to be considered part of a clearance boundary. Grounds provide an additional measure of protection against induced voltages and dissipate energy within the boundaries of a Clearance. Remove all grounds when work activities are complete and prior to removal of any Clearance Tags associated with the electrical boundaries associated with the Grounding Device(s).

14. If it is anticipated that a component will be tagged by multiple clearances and the component is not in the Equipment Database (EDB), then add the component to the EDB in accordance with EGR-NGGC-0012 or other approved processes This will support the use of a Global Tag on the component. Due to human performance issues, it is not desirable to have multiple tags on a component. **[R30]**

15. If a component is not in the EDB and found to have multiple tags (non-global) hanging on it, then add the component to the EDB in accordance with EGR-NGGC-0012 or other approved processes as soon as practical to support the use of a global tag on the component. The clearances tagging the component are then to be evaluated for performing a boundary change to place a global tag on the valve and remove the non global-tags. **[R30]**

16. Identify Additional Measure components during preparation of clearance order and if applicable, the methods to control. (i.e. Lock, Secure, etc.)

17. The special instructions of each clearance shall include a note stating Zero Energy Checks are to be performed prior to commencing work. This note shall include the type and magnitude of all energy sources being isolated. This note shall be included in the Safety section of the Special Instructions. (See example)

EXAMPLE
Potential energy sources isolated by this clearance are; 4160VAC, 480VAC, 125VDC and 1000psig steam pressure that could be 900 °F. Perform appropriate Zero Energy checks prior to commencing work.

18. Clearances written for one unit that affect systems common to the another unit must be carefully evaluated to assure that conditions on both units allow the equipment/system to be removed from service.

19. Clearance impacts must be evaluated to ensure that affects on systems and components outside of the clearance boundary are identified and are acceptable, or properly dispositioned (i.e., evaluate affect of work on fire systems such as CO_2/Halon).

20. Attachment 9, Boundary Device Tagging Guidelines, should be used for proper tagging of clearance boundary devices. **[R14]**

21. The Clearance Preparer shall identify any significant loss of function incurred by clearance activities and document the loss of function in the clearance Special Instructions. Some potential examples of significant loss of function may include disabled annunciators, defeated protective relays, defeated trip functions, disabled indicators, disabled meters or gauges, masked annunciators, or loss of monitoring capabilities.

22. Ensure a Work Order task or Work Request has been created to facilitate venting of instrumentation upon returning a system to service following work that may have drained the instruments.

23. Perform system fill and vents according to site procedures and OPS-NGGC-1309, as applicable. When establishing a clearance boundary, the Clearance Preparer should ensure that the piping within the boundary can be adequately filled and vented via station fill and vent procedures during clearance restoration. If the proposed clearance boundary on an ECCS system will result in a fill and vent configuration different from that assumed in station fill and vent procedures, contact the appropriate system engineer and request an assessment to ensure a complete fill and vent can be accomplished. The assessment should ensure that voids introduced into the piping during maintenance can be eliminated or reduced to an acceptable size during fill and vent activities. This may include performing a UT to ensure systems are adequately filled and vented. **[R16, R 17, & R12]**

24. Use controlled copies of approved reference materials in the preparation and restoration of clearances. When a controlled document is not available, other means may be used as deemed appropriate. For example: performing a field walk down or using a technical manual. **[R25]**

25. Uncontrolled reference documents may be used in the preparation and restoration of clearances.(i.e., marked-up portions of drawings, System Description information, email resolutions, technical manuals, etc.) When uncontrolled documents are used they should be attached to the Clearance through the Documents panel for reference.

26. The Clearance Preparer shall evaluate the requested equipment against current or expected plant conditions and determine required lineups necessary to isolate and restore the component, using controlled and approved references. **[R5]**

27. When Reactor is less than 200°F, a clearance that creates a Containment breach should be documented with the containment compensatory plan listed in the Special Instructions.

28. Activities may be added to an active Equipment Clearance or an approved Equipment Clearance that contains an approved Checklist provided that two Clearance Preparer qualified individuals verify that the clearance boundary is adequate for the activity.

29. If a Work Order Task assigned to a Clearance is revised and the revision affects the clearance requirements, the Clearance boundaries must be verified to remain adequate by two qualified preparers, regardless of the Clearance status when the Task was changed. Document this verification for Clearances beyond the Plan status in the Special Instructions.

30. Any pertinent information should be listed in the clearance Special Instructions.

31. Ensure equipment restoration positions are correct in the Steps List when preparing the clearance restoration.

32. For a Condition Clearance, list "Condition Clearance" in the title.
    For instances where the title of the clearance cannot be changed (example: adding a Parameter Tag to an existing clearance), place this information in the Special Instructions under the clearance safety information. Condition Clearances may contain only Parameter Tags or a combination of Parameter Tags and other tags

33. When isolating components or equipment that are considered a confined space, hazards associated with flowable materials (materials such as steam, gas, etc which could create atmospheric hazards due to leakage of a single valve) will be considered isolated only by the use of the following techniques:

    a. Blanking or blinding

    b. Misaligning or removing sections of lines, pipes or duct

    c. And/or double valve isolation

        - When double valve isolation is used, a vent/bleed path must be established between the isolation valves to monitor for leak-by.

    The confined space must be identified as a permit required confined space if the clearance does not meet the above criteria. Furthermore, the confined space cannot be declassified until isolated in accordance with the above techniques. If a confined space is not isolated in accordance with the above techniques then annotate in special instructions that it is a permit-required confined space.

9.4 Clearance Development: Hang Checklist

1. Electrical power to a motor should be secured before cooling water and/or lubrication is secured and administratively controlled. If immediate equipment damage could result, then RED Tag the motor power before securing cooling water and/or lubrication.
2. To prevent moisture buildup on motor windings, motor heaters should remain energized unless actual motor work is to be performed. If the motor heaters are placed under clearance, prompt restoration of the heaters is desired to minimize the effect on the motor.
3. Specify the proper tagging sequence for installation, paying particular attention to removing systems from service in a sequence that will not cause personnel injury or equipment damage.
4. For systems where a pump or fan is affected by a clearance, the clearance should be installed and removed in the sequence listed in the table below to prevent damage to equipment. Deviations from the sequence and specific instructions below are allowed for safety, ALARA, or if the deviation would not impact personnel or equipment safety.

Clearance Installation	Clearance Removal
1. Secure pump/fan and hang a tag on its control switch.	1. Remove tags from handwheels of valves and reposition manual valves as required. For pumps, open the suction valve before opening the discharge valve.
2. Remove the power source for the pump/fan prime mover (open breaker, remove fuse, shut steam supply valve and so forth) and place tag on the power source.	2. Remove tags on power sources to valves and restore the power supply as required.
3. Reposition valves from control switches, as required by the clearance, and place tags on the control switches. Include tags for switches in alternate locations if applicable.	3. Remove tags from valve control switches and reposition valves as required.
4. Remove power source (electrical, air, hydraulic, and so forth) from valves, if applicable, and tag the power source removed.	4. Remove the tag from the power source for the pump/fan prime mover. Restore the power source as directed by restoration lineup.
5. Reposition manual valves as required by the clearance and place tag on handwheels of the valves covered by the clearance. For pumps, shut the discharge valve before shutting the suction valve.	5 Remove the tag on pump/fan control switch and reposition the switch as required.

9.5 **Clearance Development: Lift Checklist**

1. During Lift Checklist development, a Clearance Preparer shall determine:
   - Restoration positions. The restoration position should be based on current plant status / conditions. This may include reviewing applicable procedure steps and/or valve lineups to determine plant status.
   - Specify the proper restoration sequence, paying particular attention to restoring in an order to prevent personnel injury or equipment damage.
   - Independent Verification requirements using OPS-NGGC-1303
2. If relying on a system alignment for restoration, the procedure and section or valve lineup being relied on should be specified in the Special Instructions. **[R18]**

NOTES:	1. Boundary Change Checklists may be prepared prior to receiving Attachment 6, Boundary Change Form.
	2. Steps 3.0 and 4.0 of Attachment 6 may be performed concurrently.
	3. Hang and lifts shall be on separate checklists unless there are no holders.

9.6 **Clearance Development: Boundary Change**

1. Use Attachment 6, Boundary Change Form, for all boundary changes.
2. A Clearance Preparer shall develop a boundary change in accordance with Attachment 10 and identifies all affected clearance orders.
3. A second Clearance Preparer who is a Licensed Operator shall verify a boundary change is adequate.
4. Each boundary change shall be authorized by an SRO. This authorization is indicated by the Checklist Status being "Distributed" and indicates the SRO has verified the following:
   - Plant conditions are correct for the boundary change
   - The boundary change will not adversely impact plant operation
   - Applicable compensatory actions have been initiated
   - The Control Room has been notified, as necessary
5. The boundary change is then assigned to a Tag Hanger for implementation. The Tag Hanger shall initial each step and print their Passport short name at least once with their initials for each Checklist.
6. Workers and holders shall perform Zero Energy Checks after any change to the clearance.

7. **[Boundary Change Requester]** Perform Step 1.0 and 2.0 of Attachment 6, Boundary Change Form.
   a. If the boundary change is unplanned then generate a CR to document the challenge to the process. (Unplanned boundary changes can be defined as any boundary change for work that was not in the schedule at the T-3 week. CRs are not required during refueling outages, forced outage or emergent work having a priority of 1 or E.)
8. Prepare the Boundary Change and document on Step 3.0 of Attachment 6, Boundary Change Form.
   a. Place a Holders Acceptance Lock on the clearance prior to generating the Holders and Workers List to prevent additional Holders from accepting the Clearance Order.
9. Boundary Change notifications are performed as follows:
   a. Holders may-Sign Off of the affected clearance(s).
   b. If any Holder(s) will remain on the affected clearance(s) then:
      1) Print a Clearance Order Active Holders and Workers report with the Boundary Change Checklist.
      or prepare Attachment 6, Boundary Change Approvals table on page two of the Boundary Change Form.
      2) **[Boundary Change Requester]** Explain the intent and scope of the boundary change to all Clearance Holder(s) and Worker(s) and then obtain their initials on the printed report or prepared Boundary Change Approvals table.
      3) If a Holder or Worker cannot be located then contact a Maintenance Supervisor or Operations Supervisor to release the clearance per Subsection 4.5.6.
10. If the boundary change involves hanging tag(s) only then:
    a. Generate a Boundary Change (BC) hang checklist for tags to be hung.
    b. Hang the necessary tags and notify BC Requester when complete per Step 4.0 of Boundary Change Form.
    c. **[Boundary Change Requester]** Perform:
       1) Holder Safety Verification
       2) Zero Energy check(s) performed as necessary
    d. **[Boundary Change Requester]** Ensure notification of all holders and workers is complete.
    e. **[Boundary Change Requester]** Sign Step 5.0 of Boundary Change Form.
11. If the boundary change involves lifting tag(s) only then:
    a. Generate BC lift checklist for tags to be lifted.
    b. **[Boundary Change Requester]** Ensure notification of all holders and workers is complete.

c. **[Boundary Change Requester]** Complete Step 5.0 of Boundary Change Form.

d. Execute the BC checklist and remove the necessary tags per Step 6.0 of Boundary Change Form.

12. If a boundary change is requested to lift and hang multiple tags then:

    a. Generate the BC Hang Checklist and BC Lift Checklist for tags to be added and removed.

    b. Hang the necessary tags and notify BC Requester when complete per Step 4.0 of Boundary Change Form.

    c. **[Boundary Change Requester]** Perform:

        1) Holder Safety Verification

        2) Zero Energy check(s) performed as necessary.

    d. **[Boundary Change Requester]** Ensure notification of all holders and workers is complete.

    e. **[Boundary Change Requester]** Sign Step 5.0 of Boundary Change Form.

    f. Execute the BC checklist and Remove the necessary tags per Step 6.0 of Boundary Change Form.

13. Complete Step 7 of Attachment 6, Boundary Change Form.

9.7 Clearance Development: Checklist Routing

1. Applicable Work Orders should be listed on Principal Equipment.
2. Any pertinent information should be listed in the clearance Special Instructions.
3. When preparing a Clearance Order and/or checklist, ensure that the proper user ID is in the "prepared by" field prior to routing the checklist for approval.
4. When a Fuse is to be used as a boundary, and fuse information is available on the Parameters1 or Models tabs, then copies of Component Models and Parameters are to be included in the Clearance Package. Retrieve these from the TIMD030 Panel by clicking the "Models" and "Parameters1" tabs. This will enable the Tag Hanger/Lifter to ensure correct fuse is removed and re-installed.

NOTE:	All Hang activities require Verification.

5. Determine Independent Verification requirements for LIFT activities using guidance in OPS-NGGC-1303.
6. Verify that no outstanding deficiencies exists that affect a boundary valve's ability to adequately isolate the system.
    - From Windows START menu: Open "Programs>Business Apps>Passport Production>PassPort Information Web Portal"
    - Expand "Equipment Tag Out"
    - Select "Clearance Information"
    - Select "Prompted Reports"
    - Select "Clearance Work Order Conflicts"
    - Once Business Objects opens, enter Clearance Order number (include zeros), Plant Code (all capital letters) and Enter.
    - A report will be generated that will show any Work Orders (WO) and Request (WR) against components on the checklist. Each WO and WR must be addressed.
    - If Business Objects is unavailable, then perform other appropriate checks such as: EDB Portal or WR/WO check against individual boundary tags.
7. Checklists should be routed, per appropriate plant protocol, for approval.

9.8 Clearance Approval (Licensed Operator)

1. Clearance Approver shall perform an independent review of the clearance. References included by the Clearance Preparer may be used, but no marked up items are addressed until after a review of the task and the creation of an independent boundary has been completed.
2. Review Clearances to identify plant impact prior to approval. **[R11]**
3. Identify any required compensatory measures as a result of the clearance. Ensure that they are documented in the Special Instructions.
4. Shall verify that the clearance is adequate for the work activities, the boundary components are tagged correctly and the tagging sequence is correct.
5. Shall verify Technical Specification related equipment clearance orders approved by a Licensed Operator.
6. When Reactor is less than 200°F, a clearance that creates a containment breach shall be verified to have documentation of the containment compensatory plan in the Special Instruction. Ensure SM approval and document in Special Instruction.
7. Activities may be added to an Equipment Clearance or an approved Equipment Clearance that contains an Approved or greater Checklist provided that two Clearance Preparer qualified individuals verify that the clearance boundary is adequate for the activity.
8. If an approved checklist is modified, a second Clearance Preparer shall verify that the clearance is still adequate for the work activities, the boundary components are tagged correctly and the tagging sequence is correct.
9. Shall verify the restoration positions and restoration sequence are correct. The restoration position should be based on current plant status/ conditions. This may include reviewing applicable procedure steps and/or valve lineups to determine plant status. If relying on a system alignment for restoration, the procedure and section or valve lineup being relied on should be specified in the Special Instructions. **[R13, R18, and R34]**

9.9 Checklist Distribution and Completion

1. Before a clearance is issued for a component, system or electrical circuit, sources of energy that may cause personnel injury or equipment damage should be isolated from the work area. The temporary power log should be reviewed for possible sources. For example, when isolating a pump motor, the pump discharge and/or suction valves should be shut and tagged to prevent possible rotation due to fluid flow. In some cases it may not be practical or desirable to completely de-energize components within the work boundary. In these cases, components or circuits remaining energized will be clearly identified in the clearance Special Instructions.
2. Authorize installation and removal of Equipment Clearances.
3. Authorize a ground checklist indicating that it is appropriate to install the grounds.
4. Ensure that the correct plant configuration is established to support hanging or removing Equipment Clearances.
5. Coordinate hanging or removal of Equipment Clearances.
6. Ensure appropriate people are notified of the installation and removal of Equipment Clearances.
7. Ensure Master (working) checklists are printed during implementation of clearance order. Review copies may be printed for second checks and/or walkdowns. **[R35]**
8. If conflicts exist when distributing a checklist, then evaluate in accordance with Enclosure 5, Clearance Conflict Guideline. **[R30]**
9. After printing Clearance Tags, verify that the Checklist and Tags match. If any tag failed to print properly, reprint tag and dispose of the invalid tag.
10. If a distributed checklist needs to be modified for sequence changes, this does not require computer updating. Pen and ink changes, verified by another Clearance Preparer, are acceptable for sequence changes
11. If a distributed checklist is required to be modified then, perform the following:
    a. Roll checklist to Modify.
    b. Perform the applicable change(s) and verify that the clearance is still adequate for the work activities, the boundary components are tagged correctly and the tagging sequence is correct
    c. Note the changes that were made in the Special Instructions, along with who made the changes.
    d. Ensure that the changes are independently verified, note who performed the verification in the Special Instruction, and re-approve.
    e. Tag hanging and verification documentation shall be maintained, either by retaining both checklists or by transferring this documentation to the new checklist
    f. Additionally, a Licensed Operator or SRO shall approve the modifications to the checklist

NOTE:	When authorizing clearances with Global Tags, the first checklist "Distributed" that includes the Global Tags will actually include the Global Tag hang actions. Subsequent checklists will assume that the Global Tags have already been hung. While any given clearance cannot be accepted until all required tags are actually hanging in the field, if Global Tags are used and not authorized in the proper sequence, clearance process and/or outage efficiency problems can arise.

12. Each Checklist shall be authorized by an SRO. This authorization is indicated by the Checklist Status being "Distributed" and indicates the SRO has verified the following: **[R20]**
    - Plant conditions are correct for the clearance.
    - Installation of the clearance will not adversely impact plant operation, including a determination that no conflicts exist with ongoing valve alignments or procedures. **[R46]**
    - Applicable Compensatory actions have been initiated.
    - The Control Room has been notified, as necessary, for Clearance Hanging or Removal.
    - Security has been notified for Equipment Coded S-1, S-2, S-3 or PSS.
    - Temporary Power Log has been verified to ensure all Temporary Power installed within the Clearance Boundary has been evaluated and additional boundaries established.
13. Once all tags are hung and verified and system conditions allow safe performance of the maintenance, the checklist shall be completed.
14. Once all Ground Tags are hung and verified and system conditions allow safe performance of the maintenance, the ground checklist shall be completed.
15. Prior to authorizing clearance removal, the SRO shall verify that grounds, if used, have been removed by verifying a Checklist for ground removal has been completed.

16. Prior to authorizing clearance removal:

    a. Verify that the Equipment Clearance is in a "RELEASED" status and all Release Codes or Work Order statuses indicate that the clearance is no longer needed prior to distributing the final lift checklist.

    b. SRO reviews the Checklist, the Special Instructions and any supporting procedures that will be used during the clearance removal.

17. Verify any work that was not performed has been removed from Equip/Task screen prior to distributing the final lift checklist.

18. Determine if the component that was drained has a heater associated with the drained portion. If so, a fill and vent shall be performed prior to energizing the heater.

19. When large portions of systems are removed from service and a complete system alignment is to be performed, it is permissible to remove a released clearance and leave the components position as is and rely on the required valve lineup to align and return the system to operation. Add a note to clearance Special Instructions when this is the method of clearance restoration. The procedure and section or valve lineup being relied on should be specified in the Special Instructions. **[R25]**

20. When removing a clearance, the Initiate a "Final Clearance Checklist" option in the computer should be used to ensure that all tags currently hanging are listed on the "Lift checklist". If a Boundary Change to a clearance has been performed, then the "Initiate a Final Clearance Checklist" option must be used. If the "Initiate a Final Clearance Checklist" option is not used, the Clearance Preparer shall verify that all tags currently hanging are listed on the "Lift" checklist to ensure that all tags are removed and the component/system is properly returned to service.

21. After authorization, the clearance will be assigned to a Tag Hanger/Lifter for clearance installation/removal.

22. Assign Equipment Clearances to qualified personnel for installation/removal.

23. ASSIGN an Independent Verifier to perform an Independent Verification on those systems required by site procedures.

24. Conduct Pre-Job Brief with Clearance Hanger/Lifter and Independent Verifier in accordance with HUM-NGGC-0003. Utilize Attachment 18, Clearance Briefing Checklist, to ensure all clearance related items are covered during the briefing.

25. Independent verification requirements may be waived by the CRS or SM under the following situations and conditions:

    - Excessive radiation exposures would result. As a guideline, an exposure of greater than 10 mrem to conduct the Independent Verification would be considered excessive. Individual situations should be determined on a case-by-case basis by the respective supervisor. In these situations, an alternate means of Independent Verification not involving radiation exposure (such as observing process parameters) should be used.
    - Entry into any area where personnel safety is compromised or jeopardized due to the presence of extreme temperatures (greater than 120°F), or other hazards potentially dangerous to health are present.
    - During clearance restoration when the system or components are not required to be operable. Prior to declaring the system or components operable, a lineup and Independent Verification is required.
    - Ensure the approval for waiving independent verification requirements shall be documented in the clearance Special Instructions.

26. The completed Clearance Forms should be verified to ensure they are correct, the equipment is realigned as required, the Clearance is removed from required documents and the OP valve/electrical lineups are updated, as necessary.

27. When the Clearance Order has been completed, compare paperwork to the computer information to ensure it is correct. Completed checklists are Vital Records and must be transmitted to Document Services.

28. For condition clearances, print the Condition Clearance report. This report will be maintained in Work Controls and Control Room during the time a Condition Clearance is hanging. This report shall be reviewed with operating shift at each turnover.

9.10 **Installation/Removal**

9.10.1 **Tag Hanger/Lifter**

1. Shall participate in a Pre-job Brief for hanging/lifting clearance
2. Notify the WCC any time questions or problems arise during the installation or removal of a clearance.
3. The Tag Hanger should verify that the alphanumeric component tag number on the tag matches the plant labeling.
4. If any discrepancy is found while hanging a clearance, the Tag Hanger should consult with the WCC to resolve the discrepancy.
5. The Tag Hanger or the person directing the Tag Hanger shall have the checklist or a copy during the installation or removal of the tags.
6. Clearance Tags and Ground Tags should be properly attached using a non-reusable cable tie capable of withstanding a minimum of 50 pounds. Use of miniature tags or switch caps is allowed for control boards.
7. If Clearance Tags and Ground Tags cannot be attached using a cable tie capable of withstanding a minimum of 50 pounds due to the physical design of the component, other means of attachment shall be substantial enough to prevent inadvertent or accidental removal.
8. Clearance Tags and Ground Tags should be installed in an obvious location on the component to clearly indicate that operation of that component is prohibited.
9. If the component is designed to accept a lock to prevent operation, the tag should be installed at the lock out point.
10. If the tag cannot be installed on the component, it should be installed as close as safely possible and in a location that is immediately obvious to anyone attempting to operate the device.
11. Position components in the sequence specified on the Clearance Checklist.
12. Position components as specified on the Clearance Checklist.

NOTE: Concurrent Verification is required for fuse removal.

13. If fuse removal/reinstallation is required, and fuse information is available on the Parameters1 or Models tabs, use Attachment 11, Fuse Removal/Installation Guidance.
    a. Ensure Concurrent Verification performed, as applicable.

14. If ground installation is required:
    - Ground installer(s) shall ensure the clearance boundaries are adequate for ground installation.
    - The individual(s) placing grounds shall accept the applicable Clearance Order electronically and identify themselves as a Grounds Holder (GRH) during the electronic sign on process, prior to ground installation and shall remain on the Clearance Order until ground removal tasks are completed.
    - The ground installer shall install the Grounding Devices according to corporate and site safety and grounding procedures. The ground installer will attach or remove the Ground Tags and initial the "Completed By" block on the Checklist. The ground installer shall print their Passport short name at least once with their initials for each Checklist.
    - Ground Tag Hanger/Lifter shall enter checklist completion information on the "TIMT222 – Checklist Completion screen" if Tag Hanger qualified. (Reference Step 9.10.1.22)
    - Installed grounds or the Ground Tags should remain visible from outside the cabinet or cubicle. If the grounds or the Ground Tags are not readily visible, a sign shall be posted indicating that grounds are installed inside.
    - Grounds installation requires Concurrent Verification.
    - Should the original Grounds Holder (GRH) be required to release the Clearance Order prior to the groups work being completed, he/she shall designate another Grounds Holder (GRH) to accept the Clearance Order and assume the responsibilities of the Grounds Holder (GRH). The new Grounds Holder (GRH) shall identify themselves as a Grounds Holder (GRH) during the electronic sign on process.
15. If an Additional Measure is to be installed on a Manual Ball/Plug valve and there is no practical way to install, generate a Work Request to have a hole drilled in the valve handle. Reference **[R26]**
16. If a component requiring an additional measure can not readily have the measure applied, generate a Work Request to have the component equipped to accept additional measure in the future.
17. If additional components are identified during hanging that require Additional Measures, identify the necessary measures and ensure that a note is added to the Special Instructions.

NOTE:	Concurrent Verification is required for verification of locked, sealed or secured valves, due to the inability of the verifier to manipulate component. Additional Measures-do not require verification.

18. Ensure Concurrent Verification performed, if applicable.
19. Install and remove tags according to this procedure.
20. Initial the "Completed By" block on the applicable Checklist signifying tag placement/removal and component positioning or the completion of any applicable "Comment" steps. Tag Hangers shall print their Passport short name at least once with their initials for each Checklist.
21. Tag Hanger/Lifter(s) will enter checklist completion information on the "TIMT222-Checklist Completion screen". **Exceptions**:
    - If circumstances exist where it is not prudent for the individual to complete the steps in passport, a SM or above may direct that the completion steps be performed by someone else. This approval must be documented in the Special Instruction.
    - When individuals performing "CMT" type or "GRD" type steps are not Tag Hanger qualified, the performer must print their passport ID next to the step and the clearance desk operator can enter checklist completion information on the "TIMT222-Checklist Completion screen".
22. Prior to removal of Clearance Tags, Operations shall visually inspect the readily accessible portions of the work area to determine that the system appears intact and ready to return to service.
23. If, during the removal of a clearance, the system integrity is not intact, it is permissible to reinstall the clearance using a Hang Checklist. The Lift Checklist should be annotated to indicate the tags were reinstalled.
24. If the clearance is not required to be verified, the tag lifter shall confirm that tags are accounted for and additional measures removed. Review all tags that were pulled. If any tags were contaminated, a notation should be made on the checklist.
25. If removing a Clearance Tag and another Clearance Tag or other site specific configuration control tag is in place which conflicts with the restoration position of the Clearance Tag to be removed, remove the Clearance Tag to be removed, leave the component in its as-found position, and indicate, on the clearance checklist, the Clearance Tag number or the number of the other site specific configuration control tag which controls the component's position.
26. If the ECCS, DH, or BS system boundaries are breached for maintenance activities, a UT (Ultrasonic Test) shall be performed as needed to verify the system is sufficiently full prior to returning it to service. **[R 12]**

9.10.2 **Independent/Concurrent Verifier**

1. Ensure that components are in the position required by the Clearance Checklist.
2. Ensure that tags are installed / removed on the components specified on the Clearance Checklist.
3. Initial in the "Verified By" block on the Checklist signifying proper verification
4. Shall print their Passport short name at least once with their initials for each Checklist
5. Ensure that the Ground Tags are installed. Initial in the "Verified By" block on the Checklist signifying proper verification. Independent Verifiers shall print their Passport short name at least once with their initials for each Checklist.
6. Ensure additional measures are installed / removed, if required. Only one such additional measure need be applied for each tagged isolation device. Additional measures do not require verification. (If the device used for Additional Measures can be reused, ensure that the device is secured at or near the component or returned to a proper storage location).
7. If an Additional Measure is to be installed on a Manual Ball/Plug valve and there is no practical way to install, generate a Work Request to have a hole drilled in the valve handle. Reference **[R26]**
8. If a component requiring an additional measure can not readily have the measure applied, generate a Work Request to have the component equipped to accept additional measure in the future.
9. Independent/Concurrent Verifier will enter checklist completion information on the "TIMT222 – Checklist Completion screen" unless any following exception applies:
    - If circumstances exist where it is not prudent for the individual to complete the steps in passport, then a SM or above may direct that the completion steps be performed by someone else. This approval must be documented in the Special Instruction.
    - When individuals performing "CMT" type or "GRD" type steps are not Tag Hanger qualified, then the performer must print their passport ID next to the step and the clearance desk operator can enter checklist completion information on the "TIMT222-Checklist Completion screen".
10. Notify WCC when checklists are completed.
11. Tags should be accounted for. Independent Verifier should review all tags that were pulled. If any tags were contaminated, a notation should be made on the checklist.

9.11 Clearance Acceptance

9.11.1 Clearance Workers and Holders

1. All Clearance Workers and Holders who need the clearance, for protection, shall accept the clearance for all Work Order Tasks being worked.
   - Individuals who are not qualified as a Clearance Holder sign on the Clearance Worker List, in the ETO Clearance Worker Tool, under the control of a PCH (Principal Clearance Holder).
   - Individuals qualified as Clearance Holder, but performing duties only as workers, are allowed to sign on the Clearance as a Holder or sign on the Clearance Worker Tool as a Worker.
2. All Clearance Workers and Holders shall verify the clearance boundary is adequate for their assigned work prior to accepting the clearance. (Adequate should mean that all applicable drawings, procedures and checklists have been reviewed.)
   - Prior to beginning work, the Clearance Workers shall be provided the opportunity (if desired) to observe or perform their own Zero Energy Check.
3. When a Clearance Worker and Holder accept a clearance, their sign-in signifies that the following has been met:
   - The Work Order Tasks they are responsible for that will be worked under the clearance are listed on Principal Equipment.
   - The clearance Special Instructions have been read and understood.
   - Their sign-in is equivalent to placing their individual tags on each energy isolating device.
4. Prior to commencing work, all Clearance Workers and Holders shall ensure the following:
   - Ensure the clearance boundary is adequate
   - A zero energy check has been performed and documented on their specific Work Order Task, either electronically or on the hardcopy document.
5. Zero Energy Checks shall be performed:
   - At the beginning of each shift before any work is started unless holder/worker remained sign into clearance since last zero energy check was performed.
   - When there is a potential for the accumulation of energy during a break
   - Prior to commencing work following any boundary change.
6. If grounds are needed, each individual is responsible for ensuring the grounds are properly installed prior to commencing the work.
   - Obtain a knowledgeable individual to assist in ground installation and removal, as required.

7. The last individual requiring grounds shall:
   - Coordinate removal of the grounds with all workers
   - Ensure GRH notifies WCC that grounds are to be removed
8. Each Clearance Worker and Holder shall review the status of all clearances they are responsible for prior to work start each shift. This review shall include any boundary changes that may have been performed and shall be part of the daily pre-job briefing.
9. The PCH shall sign off following transfer of the clearance to another PCH, if applicable.
10. Prior to agreeing with a clearance boundary change to remove tags, all workers and holders shall verify the equipment within the clearance boundary for which they are responsible is in a safe condition for the new boundary configuration.
11. All Holders and Workers shall ensure that a Release Code is supplied in the Release Reason of the Holders Panel.
    - Release Codes (others may be added by NIT after approval by the FAM):
      - CN Cancelled Work
      - CP Completed Work
      - PT Released to complete PMT
      - RP Released per Procedure
      - TR Transferred (Use only after another Holder has accepted Clearance for the associated task)
      - BC Boundary Change necessary.
      - OP Operations Request
      - ES End of Shift
12. Ensure components are operationally intact prior to releasing a clearance. If releasing the clearance to allow a Boundary Change, use Release Code "BC". This should ensure that the clearance order does not get inadvertently lifted.
13. Each Worker and Holder shall ensure the Work Order Tasks for which they are responsible are completed up to a point where the clearance order is no longer required for the safety of personnel and equipment prior to signing off a clearance for release.

14. Plant configuration control will be maintained by the clearance process as follows:
    - Equipment may be operated within a clearance boundary as directed by an approved procedure.
    - Equipment that has tag(s) attached is not to be removed from the system. Hinged covers that have tags attached may be opened provided that the tags do not specifically prohibit opening. Bolted-on covers that are tagged are not to be completely removed from the system in which they are attached.
    - Clearance Workers shall accept a clearance electronically, unless the computer is unavailable, which would require hard copy of the appropriate attachment.
    - Clearance Workers are to notify the WCC as soon as possible when a clearance problem is identified. Problems shall be resolved prior to work start. If problems arise during work activities, which introduce a personnel or equipment risk, the work shall be halted and equipment placed in a safe condition until the problems are resolved.

9.11.2 **Principal Clearance Holder (PCH)**

1. Shall accept a clearance for a specific work order task. Prior to accepting the clearance, the PCH shall review the clearance, including the Special Instructions, and determine that their assigned work task(s) are adequately covered by the clearance.
2. Shall be responsible for the performance of Zero Energy Checks prior to commencing work. The PCH shall provide the opportunity for the Workers to observe or perform the Zero Energy Checks once they have accepted the Clearance and before they begin work.
3. Shall ensure the notification to all workers of Boundary Changes.
4. Shall initiate and have administrative control of the ETO Clearance Worker Tool, ensuring that all individual Clearance Workers, including Holders signed on in Passport, and those signed on the Clearance, who are performing tasks under a Group Tagout have electronically signed on prior to beginning work under the clearance. The ETO Clearance Worker Tool requires a separate report for each work order task controlled by the PCH.
5. Is responsible for remaining aware of hazardous energy sources that may affect the individual Clearance Workers during their work and communicate any change to the clearance boundary or changes to the clearance status to the individual Clearance Workers

Subsection 9.11 Clearance Acceptance (Cont'd)

6. Shall ensure a pre-job brief is performed for all workers they are responsible for. Pre-job briefs are required for the following conditions; prior to work start (accepting clearance), work scope changes, and clearance boundary change. The pre-job brief shall include a review of clearances required for work. HUM-NGGC-0003, Conduct of Pre-Job Briefings/Post-Job Critiques, Attachment 2, Standard Pre-Job Brief Checklist shall be used and maintained with work package or applicable clearance.
    a. The PCH will ensure each worker and holder participates in a review of the isolation points and understands the clearance boundary.
7. Shall ensure all personnel that accept the clearance for a specific work order task understand the clearance boundary, provide opportunity for them to walk down the clearance boundary, offer them the opportunity to observe and/or perform the Zero Energy Checks, as well as ask questions regarding the boundary, as necessary.
8. PCHs are responsible for ensuring that all workers have signed off of the Clearance when work is complete.
9. As Work Order Tasks are completed, each PCH shall ensure work tasks on the Principal Equipment and Tasks screen are complete for the Work Order Tasks they are assigned, or if a work task is not complete but no longer requires the clearance boundary notify the WCC of any restrictions for placing the equipment in service, then release the clearance.
10. A PCH will release the clearance when the Clearance Workers have completed their work task(s) requiring the clearance, all applicable tools are removed, all personnel are clear of the clearance boundary, and all individual Clearance Workers have signed off the associated Clearance, or the Clearance Worker List in the ETO Clearance Worker Tool.
11. Should plant needs dictate release of a clearance, and all Clearance Holders/Workers have not signed off in computer or Clearance Worker List, in the ETO Clearance Worker Tool, the PCH should contact a Maintenance Supervisor or Operations Supervisor to release the clearance per Step 4.5.6.

9.11.3 **Boundary Changes**

1. Boundary Changes should be planned as part of the work management process. Unplanned boundary changes can be defined as any boundary change for work that was not in the schedule at the T-3 week. The requester of an unplanned boundary change shall be directed to generate a CR to document the challenge to the process unless the unplanned boundary is requested during refueling outages, forced outage or emergent work having a priority of 1 or E.
2. The Requester should notify the WCC of the need for a clearance boundary change. The request should include the reason for the boundary change and a description of the requested change. Attachment 6, Boundary Change Form, shall be used for all boundary changes. **[R19]**
3. Boundary changes include the addition and/or lifting of tags. Boundary changes are processed by creating Checklists. Ground installation and removal are not considered as boundary changes. **[R21]**
4. All Clearance Holders and Workers will sign-off of the Clearance or they will document their approval of a Boundary Change or be removed from the clearance per Step 4.5.6 prior to a Boundary Change being implemented involving tag lifting.
5. Should plant needs dictate release of a clearance, and all Clearance Holders/Workers have not signed off in computer or Clearance Worker List, in the ETO Clearance Worker Tool, the PCH should contact a Maintenance Supervisor or Operations Supervisor to release the clearance per Subsection 4.5 of this procedure.
6. The Requester shall sign Section 5.0 of Attachment 6, Boundary Change Form. This signature signifies that for:
   - **Tag Removal:** All Holders and Workers have been notified and understand the boundary change. Work has been stopped or suspended, as necessary. All holders and workers have signed off the clearance or their approval of the boundary change has been obtained by their initialing of the "Clearance Order Active Holders and Workers" report or "Boundary Change Approvals" list in this attachment. Otherwise, they have been removed from the clearance under Step 4.5.6. This signature also signifies that if removing tags, the boundary change may be executed.
   - **For Tag Addition:** Holder Safety Verification and Zero Energy Checks have been performed after tags were hung.

   This section may be signed for the requester in their absence by a supervisor that has verified the requirements of Section 5.
7. The Requester or a responsible PCH will accept the boundary change.
8. The Requester is responsible for notifying the appropriate employees that the boundary change is complete, brief the impact of the boundary change with Principal Clearance Holders, perform zero energy checks, and inform them that work may resume following their signing back on to the Clearance Order and Holder's Safety Verification.

9.12 **Audits**

NOTE:	Audits may be suspended during Refueling Outages providing that an audit is completed within thirty days of the completion of the Outage. M-SO approval is required to suspend the audits.
NOTE:	Inspectors are not to audit clearances with which they have had involvement

1. Quarterly, the M-SO should ensure an audit of the Equipment Clearances is performed. The audit should consist of the following:
   - The audit should include physical verification that the tags for clearances in effect greater than 30 days are in place and undamaged and that components are in the position listed on the Checklist. **[R22]**
   - Clearances in High Radiation Areas or Locked High Radiation Areas are excluded from this audit.
   - Damaged, illegible or missing tags shall be reprinted and replaced. The Checklist should be reprinted to allow documentation of the hanging and verification of the replacement tag. A comment should be entered in the Clearance Special Instructions explaining the replacement. This tag replacement should be noted on the Attachment 8, Equipment Clearance Audit Form.
   - The physical check should be performed by an Independent Verifier.
   - Audit discrepancies and corrective action should be noted on the Attachment 8, Equipment Clearance Audit Form and reviewed by the M-SO. (Computer generated form containing equivalent information may be attached in lieu of filling out the tables for items 1, 2 and 3.)
   - A Nuclear Condition Report (CR) should be generated or verified to exist for each clearance that has been in effect for greater than two months. The purpose of the CR is to have the Responsible Engineer evaluate system impact and determine the solution to long-term material deficiencies. The CR number should be noted in the Clearance Special Instructions. **[R23]**
   - Clearances that have been in effect for greater than three months shall be listed on the Attachment 8, Equipment Clearance Audit Form. The SM shall determine if any alternate methods should be used to resolve longstanding clearances.
   - The Equipment Clearance Audit Form should be routed to the SM for approval. The SM should ensure that the Scheduling department is notified to evaluate the need to incorporate long-standing equipment deficiencies in the scheduling process.

2. An annual inspection of the Clearance Process is to be performed as required by 29 CFR 1910.147 and 29 CFR 1910.269. This inspection shall be performed by an Operator or Clearance Holder qualified in accordance with this procedure, and shall consist of the following elements: **[R1]**

   - A review of Independent Verifications performed of each clearance as per Section 9.8 to comply with the clearance inspection requirement.
   - A review of Attachment 2 of HUM-NGGC-0003 performed with the clearance workers to comply with the interview portion.
   - A review of OPS-NGGC-1301 to determine compliance with 29 CFR 1910.269(d)(8)(ii) and 29CFR 1910.147(f)(3)(i).
   - A review of a representative sample of open clearances for compliance with OPS-NGGC-1301.
   - Field interviews with employees to review personnel responsibilities under the clearance process. Group meetings between the inspector and clearance qualified personnel constitutes compliance with this requirement.
   - Field observations to determine compliance with applicable personnel safety-related work practices.
   - Identification, documentation, and correction of any deviation or inadequacy, and communication of such to all personnel.

9.13 **Clearance and Tagging Performance Indicator Process**

1. Clearance and Tagging Performance Indicator Process

    a. Overall performance can be monitored using a no-fault, graded approach to clearance and tagging events and near misses. Since the clearance and tagging process has defense in depth against process failure, a graded approach is being used. Program failure occurs if personnel are exposed to hazards from the unexpected release of energy.

    b. The first is an overall process performance indicator, based primarily on events where process shortfalls up to total process failure are detected during process execution. In addition, it provides standard performance improvement methodologies and responses to events that occur.

    c. The second is a process that is intended to generate awareness of the quality and efficiency of the process as it is being executed at a single site. These types of instances are categorized as Severity Level 4 events. A summary of all Severity Level 4 events should be reviewed by the NGG Clearance and Tagging Working Group to determine if any process changes are needed to improve the program.

2. Terms and Definitions

    - See 1301 Job Aid Folder for Severity Level details and definitions.

3. Responsibilities

    - The NGG Clearance and Tagging Working Group should control the content of the Clearance and Tagging Performance Indicators, with guidance from the Operations Managers.
    - The NGG Clearance and Tagging Working Group should initiate action as appropriate based on trends observed in one or more performance indicators.
    - On an annual periodicity the NGG Clearance and Tagging Working Group shall perform a Common Cause Analysis, or Self-Assessment of fleet Low Level and High Level Clearance and Tagging errors. This includes a review of Severity Level 4 events for potential process improvements.
    - The NGG Clearance and Tagging Working Group should use these performance indicators as a means of measuring performance between sites.
    - The Clearance and Tagging Working Group shall conduct a conference call to review and bin SL-4 events for adverse trends once per quarter. [CR439609]
    - When a Severity Level 1 or 2 Event occurs in the fleet, the affected site will implement a standard response, as detailed in Attachment 14, Event Response Guidelines.

10.0 **RECORDS**

1. Clearances on equipment are Vital non-permanent records.
   The following clearance related documents are Vital Records.

   - Computer generated Equipment Clearance Checklist.
   - Attachment 8, Equipment Clearance Audit Form
   - Attachment 6, Boundary Change Form
   - Attachment 15, Release Documentation of a Clearance by Another Employee

2. Attachment 16, External Energy Injection Form, is a QA record.
   The attachment and all approval sheets shall be maintained with the Work Order Package.

HARRIS NUCLEAR PLANT SPECIFIC ADDENDUM 3

1. Motor operated valves using Limitorque Operators, under the following conditions, have experienced problems with the valves drifting open:
   - Operator is in manual.
   - Valve is shut.
   - Valve is a globe valve.
   - A high pressure is present beneath the disc.
   - Valve has a fast operating time (less than 10 sec)
2. The anomaly occurs because the drive gear train is disengaged when in the manual mode. With the high pressure under the seat and the fast operating time with no stem locking feature, the valve operator has insufficient resistance to prevent valves from drifting. An alternative clearance valve or a means for holding valves with these conditions should be used when using such valves for isolation. The following valves have been identified as susceptible to valve drift:

HNP:

1CS-182	*1CS-240*	*1CS-382*	*1CS-472*	*1CS-752*
1CS-196	*1CS-278*	*1CS-423*	*1CS-745*	*1CS-753*
1CS-210	*1CS-341*	*1CS-470*	*1CS-746*	

3. Breaker tagging:
   - When tagging 480 Volt Molded Case Circuit breakers in Motor Control Centers, include clearance steps/positions to ensure that electrical checks are performed to ensure that the breaker is open, prior to making the clearance ready for acceptance. If the breaker is verified to be removed from its cubicle, then these checks are not required.
4. When a system is breached, if a significant increase in pressure occurs in the system (such as a pump start or system heat-up), the system should be periodically checked for an increase in leakage.

HARRIS NUCLEAR PLANT SPECIFIC ADDENDUM 3

5. The following is a list of EPT-250 and EPT-251 throttle valves. If these valves must be used for Equipment Clearance boundary isolations their positions must be recorded to the nearest tenth of a turn and repositioning these valves will require the performance of EPT- 250 and/or EPT-251 unless all of the following conditions are met: [CR 95-02555-2]
   a. An approved procedure required the documentation of the as-found position and ensures the valve is returned to its original position.
   b. The valve position markings are aligned when manipulation is complete.
   c. System operability is controlled during valve manipulation.
   d. System Engineer is notified to perform EPT-250 and/or EPT-251 if any discrepancy exists.
      - EPT-250
        - 1SW-58, CCW Hx 1A SW Inlet Isol
        - 1SW-70, CCW Hx 1A SW Outlet
        - 1SW-73, WC2-1A SW Outlet Isol
        - 1SW-119, AH-2 & 3 SW Return Header Isol
        - 1SW-1492, ESW Strainer 1A Backflush Outlet
      - EPT-251
        - 1SW-256, CCW Hx 1B SW Inlet Isol
        - 1SW-266, CCW Hx 1B SW Outlet
        - 1SW-136, WC2-1B SW Outlet Isol
        - 1SW-120, AH-1 & 4 SW Return Header Isol
        - 1SW-1493, ESW Strainer 1B Backflush Outlet
6. When verifying the physical location of fuses, use the EMDRAC (1364 series) drawings. CWD'S refer to the location of the termination locations only.

HARRIS NUCLEAR PLANT SPECIFIC ADDENDUM 3

7. All Limitorque SMB-00/SB-00 motor operated valves, if manually operated, are required to be stroked electrically from the control switch to be declared operable. All of the applicable SMB-00/SB-00 valves are listed in OMM-014, Operation of the Work Coordination Center, Attachment 7 (95H0426)

8. When draining non-contaminated systems inside the RAB, measures must be taken to prevent these systems from being drained to the Radioactive Floor Drain or Equipment Drains Systems. The "Special Instructions" section of the clearance should specify the required drain routing, including any special equipment requirements, to ensure that non-contaminated systems are drained to the Secondary Waste System, or the HVAC Condensate Drains System. These non-contaminated systems include, but are not limited to NSW, ESW, CCW, ESCW, NESCW, FP, PW, FW, AFW, and DW. (Ref. OMM-024)

9. High pressure systems (greater than 500 psig) with single isolation shall include a plan for leaving a recirculation path/drain path open prior to isolating both the suction and discharge valves so that a determination can be made if components on the high pressure side are holding prior to completing the clearance. Clearance boundary isolation valves for work on high pressure systems with single isolation valves should be capable of performing adequate isolation. A review of Work Management System (WMS) is required to verify that no outstanding deficiencies exist that affect a boundary valve's ability to adequately isolate the system. **[R37]**

HARRIS NUCLEAR PLANT SPECIFIC ADDENDUM 3

10. The following valves may be required for clearance boundaries but do not meet the requirements of OPS-NGGC-1301.

Item	Description	Consideration	Reference
1CE-819:002	Condensate Polishing Demineralizer 1F-NNS Valves typically used for Clearance purposes	Valve has an air accumulator. To fail shut, isolate opening air but leave closing air valve open.	1364-7383, 1364-7389, 1364-7385, EHT
1CE-818:002			
1CE-702:002			
1CE-703:002			
1CE-813:003			
1CE-803:002	Condensate Polishing Demineralizer 1E-NNS Valves typically used for Clearance purposes		
1CE-802:002			
1CE-700:002			
1CE-701:002			
1CE-797:003			
1CE-787:002	Condensate Polishing Demineralizer 1D-NNS Valves typically used for Clearance purposes		
1CE-786:002			
1CE-698:002			
1CE-699:002			
1CE-781:003			
1CE-771:002	Condensate Polishing Demineralizer 1C-NNS Valves typically used for Clearance purposes		
1CE-770:002			
1CE-696:002			
1CE-697:002			
1CE-765:003			
1CE-755:002	Condensate Polishing Demineralizer 1B-NNS Valves typically used for Clearance purposes		
1CE-754:002			
1CE-694:002			
1CE-695:002			
1CE-749:003			
1CE-739:002	Condensate Polishing Demineralizer 1A-NNS Valves typically used for Clearance purposes		
1CE-738:002			
1CE-692:002			
1CE-693:002			
1CE-733:003			

HARRIS NUCLEAR PLANT SPECIFIC ADDENDUM 3

11. When circuit breakers as listed in PLP-400, Post Maintenance Testing, are racked out and then racked back in (for example, clearances) then the breaker must be cycled to start the component to verify the breakers are properly racked in. If the component cannot be started at that time due to plant conditions, then verify an EIR exists for the breaker that lists OP-156.02, AC Electrical Distribution, Attachment 11, 52S/MOC Device testing, as the PMT. **[R3]**
12. If clearance involves draining a tank with continuous influent (such as the RAB Floor Drain Tank), the tank level should be periodically monitored to verify the influent is not exceeding the capacity of the drain. A comment should be placed in the special instructions of the clearance to alert the holder that the tank has continuous input. This is to guard against the influent rate iCReasing or clogging of the drain maintaining the tank level. **[R38]**
13. If a clearance involves venting or draining, the locations of the vents and drains should be evaluated to ensure that no Ventilation or Containment Boundaries have been violated (i.e, RABEES, Control Room Ventilation, Containment Closure, etc.). If violation of the boundaries cannot be avoided, ensure compensatory measures are taken as required by plant procedures. **[R39]**
14. If a clearance involves isolating an electrical supply to a component, the Clearance Writer must review both the EM-005, Temporary Power for Bus Outages, and AP-401, Installation and Control of Temporary Power and Equipment, logs for potential additional power sources.
15. If a clearance involves the Diesel Driven Fire Pump, placing the selector switch to OFF and tagging the electrical control circuit is not adequate to prevent a potential start/rotation from the DC powered starting circuit. The DC power should be removed from this pump by lifting and tagging the motor starter negative (-) lead to prevent inadvertent start/rotation.
16. If an approved clearance is revised such that additional components are added to the boundary, then the Work Week Manager should be notified. The potential exist that the proposed change could affect plant risk level.
17. Installation or removal of clearance tags from the Main Control Board and AEP-1 will be performed by licensed operators. **[R40]**

BOUNDARY DEVICE TAGGING GUIDELINES

NOTE: This attachment should be used as a guideline for the typical restrictions and Tagout methods for the types of components listed. It is not all inclusive. Deviations from these Tagout Methods are allowed when component design and application allow for other methods that will also provide adequate isolation.

Boundary Device	Restrictions	Tagout Method
☐Manually Operated Valve	☐Butterfly valves are prone to leak by seat. Monitor for seat leakage. ☐Plug valves are prone to leak. Monitor for leakage.	☐Place tag on handwheel ☐If the valve has a remote operator such as a reach rod, it should be tagged
☐Manual Throttle Valve	☐Normally not used as a boundary device ☐If a test (flow balance) is required to restore valve position, evaluate if the test can be performed during anticipated plant conditions prior to using valve as a boundary ☐Documentation of original valve position should be as accurate as indications or positioning will allow	☐Record valve position, angle, percent open or number of turns in the restored position in Step Instructions and/or Special Instructions ☐Place tag on handwheel
☐Solenoid Operated Valve	☐Target Rock Solenoid Operated valves should not be used (See Ref Page 6 of 6) ☐Use only if valve fails closed ☐Evaluate for other components that are powered from same circuit	☐Place tag on power supply ☐A tag should be placed on the valve to prevent inadvertent violation of the boundary

BOUNDARY DEVICE TAGGING GUIDELINES

Boundary Device	Restrictions	Tagout Method
☐Motor Operated Valve	☐Some Limitorque operated valves are prone to drift if in manual ☐If primary use of valve is flow control, monitor for seat leakage ☐If manual torquing is required, un-torque valve prior to stroking electrically	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on power supply ☐Place tag on valve handwheel that indicates valve position (handwheel should only be manually engaged if leak by is present ☐If torque, refer to site procedures for additional requirements
☐Hydraulic Operated Valve (Fails Closed)	☐Evaluate on a case by case basis to determine if valve can perform adequately as a boundary device	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on power supply to hydraulic pump ☐If the operator has a handwheel or other manual positioning device that could open the valve, it should also be tagged ☐If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary
Hydraulic Operated Valve (Fails Open) [R 28.1]	☐Normally not used as a boundary device ☐Either a manual positioning device or a mechanical gag is required (SOER 85-5) ☐Evaluate on a case by case basis to determine if valve can perform adequately as a boundary device	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on power supply to hydraulic pump ☐If the operator has a handwheel or other manual positioning device it should be tagged ☐If a mechanical gag is installed, it should be tagged ☐If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary

BOUNDARY DEVICE TAGGING GUIDELINES

Boundary Device	Restrictions	Tagout Method
☐Hydraulic Operated Valve (Fails As Is)	☐Normally not used as a boundary device ☐Either a manual positioning device or a mechanical gag is required ☐Evaluate on a case by case basis to determine if valve can perform adequately as a boundary device	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on power supply to hydraulic pump ☐If the operator has a handwheel or other manual positioning device it should be tagged ☐If a mechanical gag is installed, it should be tagged ☐If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary
☐Pneumatic/Air Operated Valve (Fails Open) **[R45]**	☐Normally not be used as a boundary device ☐Either a manual positioning device or a mechanical gag is required (SOER 85-5) ☐If a valve fails open on loss of air, isolation of the air supply will cause the valve actuator to work against the gag (gagged closed). If possible, do not isolate air to the valve.	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐If work is to be performed on valve pneumatic system, place tag on pneumatic supply ☐If work is to be performed on valve pneumatic system, ensure that the pneumatics are vented from the operator and leave vent path open ☐If work is to be performed on valve pneumatic system, if a solenoid can be de-energized to vent the pneumatics from the operator, the solenoid may be de-energized and tagged ☐If the operator has a handwheel or other manual positioning device, it should be tagged ☐If a mechanical gag is installed, it should be tagged ☐If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary

BOUNDARY DEVICE TAGGING GUIDELINES

Boundary Device	Restrictions	Tagout Method
☐Pneumatic/Air Operated Valve (Fails Closed)	☐A "fails closed" valve is a valve that closes by spring pressure when the air is vented off the valve. No air pressure remains present to keep the valve closed. If a valve uses air pressure to keep it closed, follow the requirements below for a "pressure balanced" valve – a manual positioning device or mechanical gag is required. ☐If primary use of valve is flow control, monitor for seat leakage ☐Ensure air is completely bled off downstream of regulator by observing regulator pressure gauge bleeds to zero as petcock valve opened. Request maintenance assistance to relieve air pressure by loosening tubing or fittings. **[R45]**	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on pneumatic supply to valve ☐Ensure that the pneumatics are vented from the operator and leave vent path open ☐If a solenoid can be de-energized to vent the pneumatics from the operator, the solenoid **should** be de-energized and tagged ☐If the operator has a handwheel or other manual positioning device that could open the valve, it should also be tagged ☐If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary
☐ Pneumatic/Air Operated Valve (Fails As Is or Pressure Balanced)	☐Normally not used as a boundary device ☐Either a manual positioning device or a mechanical gag is required ☐Ensure air is completely bled off downstream of regulator by observing regulator pressure gauge bleeds to zero as petcock valve opened. Request maintenance assistance to relieve air pressure by loosening tubing or fittings.	☐Position valve from control switch ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on pneumatic supply to valve ☐Ensure that the pneumatics are vented from the operator and leave vent path open ☐If a solenoid can be de-energized to vent the pneumatics from the operator, the solenoid may be de-energized and tagged ☐If the operator has a handwheel or other manual positioning device, it should be tagged ☐If a mechanical gag is installed, it should be tagged ☐If the operator does not have a handwheel or other manual positioning device, tag the operator to prevent inadvertent violation of the boundary

BOUNDARY DEVICE TAGGING GUIDELINES

Boundary Device	Restrictions	Tagout Method
☐Rack IN/OUT Breaker (6.9 kV, 4160 volt or 480 volt)	☐"Racked Out" is interpreted as either at the Racked Out position or removed from the cubicle. ☐Control Power may be left on when the need is identified and evaluated as safe.	☐Secure component/Open breaker ☐Place a CIT or Clearance Tag on control switch as required ☐Tag control power if required ☐Tag breaker as "Racked Out" ☐If the breaker is equipped with a locking device, the tag shall be hung on the locking device
☐MCC Breaker	☐Not required unless work is performed on the load	☐Secure component/Open breaker ☐Place a CIT or Clearance Tag on control switch as required ☐Place tag on breaker at the lockout device, if equipped ☐For concurrent downstream and cubicle work, an evaluation of the appropriate tagging methods, such as tagging overloads removed or leads lifted and control switches, is required ☐When opening MCC breakers, the Tag Hanger should verify a change of state. This can be done by feel, sound and/or other positive means of indication that the breaker opened. ☐When valve MCC breakers are restored in the clearance process, a comment should be included to describe the expected MCC indication (red when the breaker is turned on and the valve is expected to be open, or green when the breaker is turned on and the valve is expected to remain shut) to be checked when the breaker is energized.
☐Distribution Panel Breaker	☐If a permanent lockout device does not exist use of a portable or removable lockout device is recommended	☐Place tag on breaker

BOUNDARY DEVICE TAGGING GUIDELINES

Boundary Device	Restrictions	Tagout Method
☐ Control Power 6.9 kV, 4160Volt	☐ Tagging only the Control Power is acceptable for equipment protection ONLY, unless maintenance is limited to only the Control Power Circuit. ☐ The breaker must be OPEN with the closing springs DISCHARGED.	☐ Tag Control Power ☐ Tag fuses and/or knife switches
☐ Lighting Panel Breaker	☐ If a permanent lockout device does not exist use of a portable or removable lockout device is recommended ☐ Use of other tag attachment may be used per Step 9.10.1.7	☐ Place tag on breaker
☐ Lifted Lead/Sliding Link	☐ Use breakers and fuses when possible ☐ Adhere to site and corporate safety requirements. ☐ Evaluate other circuits that may be affected during the lead lift ☐ Links that slide vertically where gravity could cause the link to reclose should not be used as an isolation point unless a positive method to block the link is established	☐ If lifted/opened at component, document with NGGC/Site configuration control methods ☐ If lifted/opened at a location other than the component, hang a tag on each lifted lead/sliding link ☐ If component is a boundary device, tag each lifted lead/sliding link ☐ Sliding links should be tightened when open ☐ Use a cover or other device to attach tag to link post ☐ Tag lifted leads directly

- Target Rock reference:
  - Information Notice No. 82-41, “Failure of Safety/Relief Valves to Open at a BWR” Information Notice No. 83-39, “Failure of Safety/Relief Valves to Open at a BWR – Interim Report”
  - Information Notice No. 83-82, “Failure of Safety/Relief Valves to Open at a BWR – Final Report”
  - Information Notice No. 86-12, “Target Rock Two-Stage SRV Setpoint Drift” & Information Notice No. 88-30
  - Target Rock Two-Stage SRV Setpoint Drift Update”

CLEARANCE PROCESS CHECKLIST [R3]

NOTE: Initial or N/A once item has been addressed. Items which are not applicable for the particular clearance may be N/A'd. For example, filling and venting would not be applicable for an electrical only clearance so the item may be N/A'd. Items which have two columns for place keeping, the Verifier completes the right column. Pages may be printed multiple times for multiple Checklists, Scope Adds and/or Boundary Changes.

HANG CHECKLIST – CLEARANCE PREPARER and VERIFIER		
Clearance Request/Work Order have enough details to determine a safe clearance boundary. This is N/A for Clearances generated automatically from Approved Model Work Orders.		
System drawings, Operating Procedures, Electrical Load List and other required documents reviewed.		
Double valve isolation criteria addressed.		
Components that must be manipulated by workers are "NOT" Tagged, unless controlled by Work Order.		
Print "Models" and "Parameters" (from Equipment Data Base) to be included for fuse removal.		
Existing/Anticipated temporary power does not interfere with or violate the Clearance boundary.		
Automatic functions (either being removed or which could actuate) have been addressed.		
Vent and drain paths administratively controlled. At least one Red Tagged when possible.		
Work Orders/Requests (deficiencies affecting isolation ability) against boundary valves evaluated.		
Hang sequence addresses depressurizing system, high to low energy, discharge valves first then suction.		
If clearance affects ITS, Fire Plan, Containment, etc., this is documented in the Special Instructions, including applicable compensatory measures.		
Flow-path isolation addressed if a potential exists for rotation during maintenance.		
If clearance involves confined space then confined space requirements are addressed.		
Ground devices, freeze seals, hot taps, fuses, and leads are identified with locations on a marked up drawing. Attach or include documents in the Clearance Order package.		
Special Instructions contain required information, including safety precautions, plant effects, precautions and prerequisites, loss of function, isolated potential energy sources including magnitude and any other pertinent information.		
Work Order Task(s) or WR exists to facilitate venting of drained instrumentation at Clearance lift.		
Additional Measures requirements have been addressed.		
Components on the Checklist have the appropriate action (Hang or Lift), appropriate position (RACOUT, OFFLOC, etc) correct tag designation (CIT, RED, NOT, etc).		
Live-Dead-Live Checks requirements included for 480V MCC Breakers.		
Boundary allows for Fill & Vent during restoration.		

HANG CHECKLIST – DISTRIBUTION BY SRO	
T-Power Log reviewed to ensure no violation of clearance boundary.	
Flow-path isolation for rotation concerns addressed.	
Plant conditions support Hang C/L. No conflicts with ongoing valve alignments or procedures.	
Conflicts evaluated in accordance with Enclosure 5.	
Verify Checklist steps and tags match.	
Review Special Instructions and Checklist.	
Necessary compensatory actions have been initiated. LCOs activated.	
Control Room notified of clearance hang.	
Security notified for equipment coded S-1, S-2, S-3, or PSS.	
Check for Temp EC's	
Checklist Distributed and Mode Condition Reports updated if applicable	

CLEARANCE PROCESS CHECKLIST

CHECKLIST PERFORMANCE	
CHECKLIST #:	
Conduct a Pre-job Brief per HUM-NGGC-0003. Ensure all items in Attachment 18, Clearance Briefing Checklist, are covered during the briefing.	
* Passport short name printed at least once on the Checklist.	
* Hang – If other configuration control tag is in place which conflicts with checklist position, consult WCC.	
* Hang – Install tags at lock out point.	
* Hang – Additional Measures requirements. Items not pre-identified, but at risk, communicate to WCC.	
* Hang – If Ground tags used, ensure visible or ensure posting indicating Grounds installed.	
* Lift – Removing Additional Measures.	
* Lift – Ensure system appears intact and ready to return to service.	
* Lift – If Grounds are used, ensure Ground signs removed.	
* Lift – Actions to take if other configuration control tag is in place which conflicts with the restoration position of the checklist.	
* Lift – Confirm necessary tags accounted for.	
* Communicate pertinent pre-job information to others involved. For example, if asking Control Room Operators to hang/lift an Information Tag, discuss with them relevant pre-job items.	
* Notify WCC when checklist is complete & if checklist is ready to be completed. i.e., draining complete.	
CHECKLIST – COMPLETION	
Hardcopy Checklist filled out appropriately.	
Special Instructions reviewed.	
Checklist set to Complete (ensure draining complete and any previous issues resolved).	

WORK ORDER SCOPE ADD – PREPARER and VERIFIER		
SCOPE ADD FOR WORK ORDER#:		
Clearance Request/Work Order have enough details to determine a safe Clearance boundary.		
System drawings, Operating Procedures, Electrical Load List and other required documents reviewed.		
Components that must be manipulated by workers are "NOT" Tagged, unless controlled by Work Order.		
If scope add works on/replaces a positionable component, a "NOT" tag has been added to the Clearance.		
Flow-path isolation addressed if a potential exists for rotation during maintenance.		
Work Order Task exists to facilitate venting of drained instrumentation at Clearance lift.		
Special Instructions updated as necessary.		

CLEARANCE PROCESS CHECKLIST

CLEARANCE BOUNDARY CHANGE – PREPARER and VERIFIER		
BOUNDARY CHANGE CHECKLIST #:		
Checklist type BC used.		
Attachment 6 Boundary Change Form initiated. Details understood and implemented in the Checklist.		
Holder Lock applied		
Notify requester to generate CR for unplanned Boundary Changes to document the challenge.		
System drawings, Operating Procedures, Electrical Load List and drawings, and other required documents reviewed. CR365286		
Double valve isolation criteria addressed.		
Copy of Component Models (from Equipment data) included for fuse removal/installation.		
Existing/Anticipated temporary power does not interfere with or violate the clearance boundary.		
Automatic functions (either being removed/restored or which could actuate) have been addressed.		
Vent and drain paths administratively controlled. At least one Red Tagged when possible.		
Work Orders/Requests (deficiencies affecting isolation ability) against boundary valves evaluated.		
Checklist sequencing appropriate.		
If Boundary Change affects ITS, Fire Plan, Containment, etc., this is documented in the Special Instructions, including applicable compensatory measures.		
Flow-path isolation addressed if a potential exists for rotation during maintenance.		
Ground devices, freeze seals, hot taps, fuses, and leads are identified with locations on a marked up drawing. Attach or include documents in the Clearance package.		
Special Instructions have been updated with any additional information.		
Additional Measures requirements have been addressed.		
Components on the checklists have the appropriate action (Hang or Lift), appropriate position (RACOUT, OFFLOC, etc) correct tag designation (CIT, RED, NOT, etc).		
Live-Dead-Live Checks requirements included for 480V MCC Breakers.		
CLEARANCE BOUNDARY CHANGE – DISTRIBUTION BY SRO		
All Holders and Workers have Released the Clearance with the appropriate Release Code or have signed for approval of the boundary change as per Attachment 6.		
T-Power Log reviewed to ensure no violation of Clearance boundary.		
Flow-path isolation for rotation concerns addressed.		
Plant configuration/conditions support B/C. No conflicts with ongoing valve alignments or procedures.		
Conflicts evaluated in accordance with Enclosure 5.		
Verify Checklist and tags match.		
Review Special Instructions and Checklist.		
Necessary compensatory actions have been initiated. LCOs activated.		
Control Room notified of Boundary Change.		
Security notified for equipment coded S-1, S-2, S-3, or PSS.		
Boundary Change Distributed.		
BOUNDARY CHANGE CHECKLIST – COMPLETION		
Hardcopy Checklist filled out appropriately.		
Special Instructions reviewed.		
Checklist set to Complete (ensure draining complete and any previous issues resolved).		
Requester notified Boundary Change Checklist Complete.		
Continue on with Attachment 6 Boundary Change Form.		

CLEARANCE PROCESS CHECKLIST

FINAL LIFT CHECKLIST – PREPARER and VERIFIER		
Restoration positions are based on applicable procedures for current plant status/conditions. If not, place note in Special Instructions/Step Notes as to what will ensure Plant Status Control maintained.		
Restoration sequence with consideration to boundary vs. vent/drain, component locations, fill and vent prior to breaker restoration, etc.		
Craft support for fill and vent of transmitters, landing of leads, etc.		
Comment Steps and Special Instructions used to ensure proper restoration/system configuration.		
Automatic functions which may occur when power restored addressed.		
Information valuable to proper restoration added to Special Instructions. **[R16]**		
Independent Verification requirements verified.		
FINAL LIFT CHECKLIST – DISTRIBUTION BY SRO		
Clearance in a Released status.		
Verify no "BC" type release codes or that the affected work has been subsequently completed.		
All Work Order tasks are Complete or Release Codes support Clearance removal.		
If grounds were installed, grounds have been removed by previous Ground Checklist.		
Review Special Instructions.		
Review Final Lift Checklist.		
Review supporting procedures to be used during Checklist removal.		
Ensure Work Orders not performed are removed from Equip/Task Panel.		
Checklist performs fill and vent prior to energizing equipment.		
Plant conditions/configuration support Clearance lift.		
Required notifications made (Control Room, shop support, etc.).		
Conflicts addressed IAW Enclosure 5		
Final Lift menu option used for creating Final Lift checklist.		
Final Lift Checklist Distributed.		
CLEARANCE COMPLETION		
Computer updated with all information from hard copies of Clearance.		
Equipment/system returned to service or steps taken to ensure return to service, to include steps to restore from LCO, EIR, etc actions.		
Clearance set to status Closed.		

- Completed Attachment 10 Checklist may be discarded after completion.

Progress Energy

I
INFORMATION USE

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 3

PART 12

EDP-002

480V AC BUSSES

REVISION 15

SUMMARY OF CHANGES

PRR: 00436557

EDP-002 REV. 15

SECT/PAGE	REVISION COMMENTS
5.0	CMPT NO. 31C – Deleted wording of “PAP West Building and” from Load Title and all of the EDBS Load Tag No. per EC 75079

TABLE OF CONTENTS

1.0 480V-1

480V-1 POWER SUPPLY: NORMAL - 4160V BUS 2 (52/13)LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
1A	**PT'S & METERING EQUIPMENT (*)** N/A	N/A	N/A
1B	**STATION SERVICE TRANSFORMER 2A TO 480V BUS 1** 480V-1	894	52/1B
2A	**BLANK** N/A	N/A	N/A
2B	**FEED TO 480V BUS 1** 480V-1	893	52/2B
2C	**PRESSURIZER HEATER BACK-UP GROUP A** BACKUP-GP-A	131	52/2C
3A	**FEED TO MCC-1** MCC-1	N/A	52/3A
3B	**CV POLAR CRANE BACKUP POWER SUPPLY** POLAR-CRN	1766	52/3B
3C	**FEED TO PP-63** PP-63	N/A	52/3C
4A	**BLANK** N/A	N/A	N/A
4B	**CONSTRUCTION FACILITIES MAIN DISCONNECT** CONST-FAC-DISC-SW	N/A	52/4B
4C	**SPENT FUEL PIT COOLING PUMP B** SFPC-PMP-B	225	52/4C
5A	**METERING EQUIPMENT (**)** N/A	N/A	N/A
5B	**480V BUS 1-2A TIE** 480V-1, 2A	935	52/5B
5C	**CONDENSER VACUUM PUMP A** VCM-PMP-A	757	52/5C

* Compartment 1A also contains one ground relay, one undervoltage relay, one AC voltmeter, one voltmeter selector switch, one ground indication, and one ground detection reset.

** Compartment 5A also contains the Spent Fuel Pit "B" total run time meter and the Vacuum Pump "A" total run time meter.

2.0 **480V-2A**

480V-2A POWER SUPPLY: NORMAL - 4160V BUS 1 (52/4) LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
6A	**FEED TO MCC-7** MCC-7	N/A	52/6A
6B	**PRESSURIZER HEATER BACK-UP GROUP B** BACKUP-GP-B	132	52/6B
6C	**TURBINE BUILDING CRANE** TURBINE-CRANE	N/A	52/6C
7A	**FEED TO MCC-2** MCC-2	N/A	52/7A
7B	**SPARE** N/A	N/A	52/7B
7C	**CV POLAR CRANE NORMAL POWER SUPPLY** POLAR-CRN	1766	52/7C
8A	**PT'S & METERING EQUIPMENT (*)** N/A	N/A	N/A
8B	**STATION SERVICE TRANSFORMER 2B TO 480V BUS 2A** 480V-2A	936	52/8B
8C	**BLANK** N/A	N/A	N/A

* Compartment 8A also contains one AC voltmeter, one undervoltage relay, and one voltmeter selector switch.

3.0 **480V-2B**

480V-2B POWER SUPPLY: NORMAL - 4160V BUS 1 (52/4)LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	LOAD TITLE EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
9A	**PT'S & METERING EQUIPMENT (*)** N/A	N/A	N/A
9B	**STATION SERVICE TRANSFORMER 2B TO 480V BUS 2B** 480V-2B	937	52/9B
9C	**BLANK** N/A	N/A	N/A
10A	**BLANK** N/A	N/A	N/A
10B	**ROD DRIVE MOTOR GENERATOR SET A** MG-SET-A	71	52/10B
10C	**PRESSURIZER HEATER CONTROL GROUP** CONTROL-GP	130	52/10C
11A	**FEED TO MCC-3** MCC-3	N/A	52/11A
11B	**STATION AIR COMPRESSOR** SA-CMP	589	52/11B
11C	**FEED TO MCC-20** MCC-20	1257	52/11C
12A	**METERING EQUIPMENT (**)** N/A	N/A	N/A
12B	**480V BUS 2B-3 TIE** 480V-2B, 3	938	52/12B
12C	**BLANK** N/A	N/A	N/A

* Compartment 9A also contains one ground relay, one undervoltage relay, one AC voltmeter, one voltmeter selector switch, one ground indication, and one ground detection reset.

** Compartment 12A also contains the Station Air Compressor total run time meter and the Vacuum Pump "B" total run time meter, and a spare total run time meter.

4.0 **480V-3**

480V-3 POWER SUPPLY: NORMAL - 4160V BUS 3 (52/15) LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
13A	**SPARE** (Reserved by EC 53926) N/A	1796	52/13A
13B	**FEED TO MCC-4** MCC-4	N/A	52/13B
13C	**SPENT FUEL PIT COOLING PUMP A** SFPC-PMP-A	227	52/13C
14A	**ROD DRIVE MOTOR GENERATOR SET B** MG-SET-B	73	52/14A
14B	**BLANK** N/A	N/A	N/A
14C	**MOTOR DRIVEN FIRE PUMP** MTR-FIRE-PMP	585	52/14C
15A	**CONDENSER VACUUM PUMP B (*)** VCM-PMP-B	759	52/15A
15B	**FEED TO 480V BUS 3** 480V-3	898B	52/15B
15C	**BLANK** N/A	N/A	N/A
16A	**PTS & METERING EQUIPMENT (**)** N/A	N/A	N/A
16B	**STATION SERVICE TRANSFORMER 2C TO 480V BUS 3 & 480V BUS DS** 480V-3, 480V-DS	899	52/16B

* Compartment 15A also contains one lockout reset button.

** Compartment 16A also contains ground relay, one undervoltage relay, one AC voltmeter, one voltmeter selector switch, one ground indication, and one ground detection reset.

5.0 **480V-4**

480V-4 POWER SUPPLY: NORMAL - 4160V BUS 4 (52/28) LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	LOAD TITLE EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
30A	PT's & METERING EQUIPMENT (*) N/A	1040A	N/A
30B	STATION SERVICE TRANSFORMER 2D TO 480V BUS 4 480V-4	1040C	52/30B
30C	FEED TO MCC-11 MCC-11	1040D	52/30C
31A	FEED TO MCC-13 MCC-13	1040E	52/31A
31B	FEED TO MCC-12 MCC-12	1040F	52/31B
31C	SECURITY POWER SUPPLY	1040G	52/31C
31D	FEED TO MCC-14 MCC-14	1040H	52/31D

* Compartment 30A also contains one ground relay, one undervoltage relay, one AC voltmeter, one voltmeter selector switch, and one circuit breaker control switch.

6.0 **480V-5**

480V-5 POWER SUPPLY: NORMAL - 4160V BUS 5 (52/32)LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
36A	**FEED TO MCC-17** MCC-17	N/A	52/36A
36B	**RADWASTE BUILDING HVS-50 PRE-HEATER** HVS-50-PRE-HTR	1325	52/36B
36C	**FEED TO PP-74** PP-74	N/A	52/36C
36D	**SPARE** N/A	N/A	52/36D
37A	**PT'S & METERING EQUIPMENT (*)** N/A	1342	N/A
37B	**STATION SERVICE TRANSFORMER 2E TO 480V BUS 5** 480V-5	1342	52/37B
37C	**FEED TO MCC-15** MCC-15	N/A	52/37C
37D	**NEUTRAL GROUNDING RESISTOR** 480V-5-NGR	1342	N/A

* Compartment 37A also contains one undervoltage relay, one undervoltage aux relay, one overvoltage relay, one ground indication, one reset, one voltmeter, one main control switch, and one ammeter.

7.0 **480V-DS**

480V-DS POWER SUPPLY: NORMAL - 4160V BUS 3 (52/15)LOCATION: 4160V SWITCHGEAR ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
32A	**FEED TO 480V BUS DS** 480V-DS	1015	52/32A
32B	**DEDICATED SHUTDOWN DIESEL GENERATOR TO 480V BUS DS (ALT POWER)** 480V-DS	1016	52/32B
33A	**CONTROL POWER TRANSFORMER (*)** CPT/480V-DS	N/A	N/A
33B	**SERVICE WATER PUMP D (ALT POWER)** SW-PMP-D	834C	52/33B
33C	**COMPONENT COOLING WATER PUMP A** CCW-PMP-A	201	52/33C
33D	**RESIDUAL HEAT REMOVAL PUMPS (ALT POWER)** RHR-PMP-A, B	1752	52/33D
34A	**POTENTIAL TRANSFORMER** PT/480V-DS	N/A	N/A
34B	**CHARGING PUMP A** CHG-PMP-A	161	52/34B
34C	**FEED TO MCC-5 (ALT POWER)** MCC-5	N/A	52/34C
34D	**FEED TO PP-51** PP-51	N/A	52/34D

* Compartment 33A also contains the Charging Pump A total run time meter and the Component Cooling Water Pump A total run time meter.

8.0 480V-E1

480V-E1 POWER SUPPLY: NORMAL - 4160V BUS 2 (52/13)LOCATION: E-1/E-2 ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
17A	**PT'S & METERING EQUIPMENT (*)** N/A	N/A	N/A
17B	**EMERGENCY DIESEL GENERATOR A TO 480V BUS E-1** 480V-E1	890	52/17B
18A	**PT'S & METERING EQUIPMENT (**)** N/A	N/A	N/A
18B	**STATION SERVICE TRANSFORMER 2F TO 480V BUS E-1** 480V-E1	892	52/18B
19A	**CV SPRAY PUMP A** CV-SPRAY-PMP-A	287	52/19A
19B	**CV RECIRC FAN, HVH-1** HVH-1	511	52/19B
19C	**SERVICE WATER PUMP B** SW-PMP-B	832	52/19C
20A	**AUX FEEDWATER PUMP A** AFW-PMP-A	651	52/20A
20B	**SERVICE WATER PUMP A** SW-PMP-A	831	52/20B
20C	**CV RECIRC FAN, HVH-2** HVH-2	512	52/20C
21A	**FEED TO MCC-5 (NORM POWER) & MCC-16** MCC-5, MCC-16	1187	52/21A
21B	**CHARGING PUMP B** CHG-PMP-B	162B	52/21B
21C	**SAFETY INJECTION PUMP A** SI-PMP-A	237	52/21C
22A	**RESIDUAL HEAT REMOVAL PUMP A** RHR-PMP-A	214	52/22A
22B	**480V BUS E-1 SUPPLY TO SI PUMP B** 480V-E1, E2	891	52/22B
22C	**COMPONENT COOLING WATER PUMP B** CCW-PMP-B	205	52/22C

* Compartment 17A also contains two amp meters, two amp meter switches, one volt meter, one volt meter switch, two undervoltage relays, four overcurrent relays, and two auxiliary relays.

** Compartment 18A also contains eight run time meters, three degraded grid relays, one degraded grid trip signal, three test switches, and one degraded grid voltage switch.

9.0 480V-E2

480V-E2 POWER SUPPLY: NORMAL - 4160V BUS 3 (52/15)LOCATION: E-1/E-2 ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
23A	**CHARGING PUMP C** CHG-PMP-C	163B	52/23A
23B	**SAFETY INJECTION PUMP C** SI-PMP-C	239	52/23B
23C	**FEED TO MCC-6** MCC-6	1188	52/23C
24A	**SERVICE WATER PUMP C** SW-PMP-C	833	52/24A
24B	**CV RECIRC FAN, HVH-4** HVH-4	514	52/24B
24C	**AUX FEEDWATER PUMP B** AFW-PMP-B	655	52/24C
25A	**CV RECIRC FAN, HVH-3** HVH-3	513	52/25A
25B	**SERVICE WATER PUMP D (NORMAL SUPPLY)** SW-PMP-D	834B	52/25B
25C	**CV SPRAY PUMP B** CV-SPRAY-PMP-B	290	52/25C
26A	**FEED TO MCC-18** MCC-18	1189	52/26A
26B	**RESIDUAL HEAT REMOVAL PUMP B** RHR-PMP-B	216	52/26B
26C	**COMPONENT COOLING WATER PUMP C** CCW-PMP-C	209	52/26C
27A	**PT'S & METERING EQUIPMENT (*)** N/A	N/A	N/A
27B	**EMERGENCY DIESEL GENERATOR B TO 480V BUS E-2** 480V-E2	895	52/27B

480V-E2 POWER SUPPLY: NORMAL - 4160V BUS 3 (52/15) LOCATION: E-1/E-2 ROOM			
CMPT NO.	**LOAD TITLE** EDBS LOAD TAG NO.	CWD NO.	BKR EDBS NO.
28A	**PT'S & METERING EQUIPMENT (**)** N/A	N/A	N/A
28B	**STATION SERVICE TRANSFORMER 2G TO 480V BUS E-2** 480V-E2	896	52/28B
29A	**TIE BUS** N/A	N/A	N/A
29B	**480V BUS E-2 SUPPLY TO SI PUMP B** 480V-E2, E1	896	52/29B
29C	**SAFETY INJECTION PUMP B** SI-PMP-B	238	52/29C

* Compartment 27A also contains two amp meters, two amp meter switches, one volt meter, one volt meter switch, and two undervoltage relays.

** Compartment 28A also contains eight run time meters, three degraded grid relays, one degraded grid trip signal, three test switches, and one degraded grid voltage switch.

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 1

PART 2

PLP-033

POST-MAINTENANCE TESTING (PMT) PROGRAM

REVISION 57

MANUAL VALVES
(Does **NOT** include SECTION XI VALVES)

1.0 Manual Valve Replacement

1. Exercise (stroke) check*
2. Seat leakage test, IF limits are specified

2.0 Manual Valve Maintenance

1. For valve packing maintenance (packing adjustments only):
    a. Exercise (stroke) check
    b. Seat leakage test, IF limits are specified.
2. For maintenance of internals (disc, seat, bonnet, stem, packing replacement)
    a. Exercise (stroke) check*
    b. Seat leakage test, IF limits are specified.

3.0 **IF** maintenance is performed on a system listed in PLP-111, **THEN VERIFY** PLP-111 leak check is documented on the PMT sheet.

4.0 Notes for Manual Valve Maintenance

1. No testing is required following painting, cleaning, or other cosmetic maintenance.
2. VISUALLY observe the valve to verify proper operation and positive isolation.
3. *When PMT requires the valve be stroked, it can be documented one of three ways (CR 99-00500):
    a. Valve can be stroked per the applicable procedure used to perform the maintenance. Example: MMM-046, CM-053, CM-750, etc.

    OR

    b. Valve stroking can be included within the work order task's written instructions,

    OR

    c. A PMT work order task.

    If the valve is stroked by either 3.a. or 3.b., with the right permissions, then stroking and documenting with an attached PMT work order task is **NOT** required.

Progress Energy	R Reference Use

ROBINSON NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 1

PART 2

PLP-111

LEAK REDUCTION PROGRAM

REVISION 14

SUMMARY OF CHANGES
PRR 00470639
PLP-111, Revision 14

STEP / SECTION	REVISION COMMENTS
Step 8.4.1	Added information about when a PMT completion is required. (PRR 00470639) (Editorial Change)
Step 8.4.2	Added information to the step about when alternate testing may be used when initial conditions of the PMT cannot be met. (PRR 00470639) (Editorial Change)

TABLE OF CONTENTS

1.0 PURPOSE

1.1 The purpose of this procedure is to establish a Leakage Reduction Program for the applicable systems/components located outside of Containment and to delineate responsibilities for the implementation and maintenance of the program as required by Improved Technical Specifications Section 5.5.2, and Technical Requirements Manual Section 5.5.2.

1.1.1 The leak reduction program shall include preventive maintenance, periodic visual inspections and integrated leak test requirements for each specified system at an 18 month interval.

1.1.2 The preventive maintenance and periodic visual inspection portion of the program will consist of the daily inspections performed by Operations, system walkdowns performed by RES, inspections performed by Maintenance during the performance of routine PMs/CMs, Chemistry Sampling, and HP surveys.

1.1.3 Integrated Leak Test will be performed by Operations, by specified procedures. The inspections will be conducted on an 18 month interval.

1.1.4 The systems included in the leak reduction program are as follows:

1. Residual Heat Removal System
2. Containment Spray System
3. Safety Injection System
4. Chemical and Volume Control System
5. Gaseous Waste System
6. Liquid Waste Disposal System
7. Post Accident Containment Venting System
8. Primary Sampling System

1.2 This procedure provides the guidance to ensure proper post maintenance testing is performed for corrective and preventive maintenance on systems covered by this program.

2.0 REFERENCES

2.1 Improved Technical Specifications Section 5.5.2

2.2 Technical Requirements Manual Sections 3.23 and 5.5.2

2.3 OST-104, Chemical and Volume Control System Integrity Test

2.4 OST-105, Chemical and Volume Control System - Purification System Integrity Test

2.5 OST-106, Chemical and Volume Control System - Boron Recycle System (CVCS Holdup Tanks) Integrity Test

2.6 OST-155, Safety Injection System Integrity Test

2.7 OST-156, Safety Injection and Containment Spray Systems Suction Lines Leak Test

2.8 EST-140, Leak Test For ECCS Boundary Valves

2.9 OST-254, Residual Heat Removal System and RHR Loop Sampling System Leak Test

2.10 OST-355, Containment Spray System Integrity Test

2.11 OST-451, Liquid Waste Disposal System Integrity Test

2.12 OST-452, Waste Gas System Integrity Test

2.13 OST-907, Post Accident Containment Venting System Leak Reduction Program

2.14 OST-909, Sampling System Integrity Test

2.15 OPS-NGGC-1000, Fleet Conduct of Operations

2.16 HPP-001, Radiologically Controlled Area Surveillance Program

2.17 CP-003, Systems Sampling Procedure

2.18 EGR-NGGC-0026, System Walkdown Procedure

2.19 OST-013, Weekly Checks and Operations

2.20 CR 95-00839, Control Room Ventilation Operability with Excessive ECCS Recirculation Loop Leakage

2.21 PLP-037, Conduct of Infrequently Performed Tests or Evolutions and Pre-Job Briefs

2.22 CR 98-00755, ECCS Leakage Methodology

2.23 CR 12644, Leakage Exceeding Component Leakage Limit

2.24 SOER 98-1, Safety System Status (Credit taken for PMT requirements in this procedure to address recommendation #1b)

2.25 PLP-033, Post Maintenance Testing (PMT) Program

2.26 ADM-NGGC-0104, Work Management Process

2.27 Letter from E. E. Utley (CP&L) to Harold Denton (NRC) (File: NG-3514, Serial: GD-79-3306) "Lessons Learned Short Term" (Post TMI Requirements) regarding CP&L implementation of Item 2.1.6.a

2.28 HBR License DPR-23, Amendment 207 (Reference LDCR 06-0007, Changes to TRM 3.23, Post Accident Recirculation Heat Removal System Leakage, and EC 47161, Rev 3)

2.29 NCR 00263544, PLP-111 Improvements

3.0 RESPONSIBILITIES

3.1 Operations

3.1.1 Operations is responsible for over all program coordination.

3.1.2 Operations is responsible for procedures as needed (example OSTs) for the tests that measure and check the leakage on the systems as listed in Section 1.1.4.

3.1.3 Operations will perform Integrity Tests at the specified frequency for the systems listed in Section 1.1.4. These procedures will identify and measure the leakage on the systems in Section 1.1.4 and initiate corrective action per ADM-NGGC-0104 to correct the identified leaks.

3.1.4 Operations is responsible for performing post-maintenance testing on these identified systems and ensuring that leakage is reduced as low as practical after maintenance has been completed. Additional information for post-maintenance leakage test requirements is located in Attachment 10.5, General PMT Guidelines.

3.1.5 Operations is responsible for ensuring Attachment 10.1, Leakage Evaluation Flowchart, is performed when a leak is identified on the systems listed in Section 1.1.4.

3.1.6 Operations is responsible for completing the following as applicable when scheduled integrity tests are completed and when identified leaks have been repaired and performing Quarterly Reviews to check status of repairs:

- Attachment 10.2, ECCS Recirculation Loop Leakage
- Attachment 10.3, Non-ECCS Liquid Leakage
- Attachment 10.4, Gaseous Leakage

3.1.7 Operations is responsible for maintaining Attachments 10.1, 10.2, and 10.3, **AND** performing quarterly review of these attachments.

3.2 Maintenance

3.2.1 Maintenance will be responsible for performing repairs on items identified by this program.

3.3 Engineering

3.3.1 Engineering, with Operations support is responsible for determining leakage is as low as practical, when leakage can **NOT** be reduced to zero.

3.4 E&C

3.4.1 Chemistry personnel are responsible for chemical sampling per CP-003.

3.4.2 Chemistry personnel will look for leaks while performing sampling activities and initiate corrective actions per ADM-NGGC-0104.

3.5 RC

3.5.1 RC is responsible for conducting routine radiological surveys per HPP-001.

3.5.2 RC will perform HPP-001 in the established areas and at the established frequency. When performing a survey, if a leak is identified as a source of contamination, then the following steps shall be taken:

1. The leak will be contained

2. The area will be posted

3.6 General

3.6.1 Plant personnel will look for leaks on systems during normal plant tours and rounds and initiate corrective action per ADM-NGGC-0104.

3.6.2 Plant personnel will notify the Control Room when leaks on components outside containment are identified on systems listed in step 1.1.4.

4.0 PREREQUISITES

N/A

5.0 PRECAUTIONS AND LIMITATIONS

5.1 The principles of **ALARA** shall be used in planning and performing work and operations in the Radiation Control Area.

5.2 This procedure has been screened in accordance with PLP-037 criteria and determined to be outside the bounds of an Infrequently Performed Test or Evolution.

5.3 Attachment 10.1 should **NOT** be used when leaks are identified during normally scheduled surveillance tests. These tests direct the actions to be taken when leaks are identified.

5.4 Gaseous leakage will be identified by visual observation of the effects of air leakage on leak test solution.

6.0 SPECIAL TOOLS AND EQUIPMENT

6.1 Special tools and equipment are specified in the respective test procedure.

6.2 To perform leakage measurements required by Attachment 10.1, the following equipment is required:

6.2.1 A container of sufficient size to collect leakage

6.2.2 Graduated cylinder

6.2.3 Calibrated Stop Watch

6.2.4 Leak Check Solution

7.0 ACCEPTANCE CRITERIA

7.1 ECCS Recirculation Loop System

The ECCS Recirculation Loop System includes the following: Safety Injection System, Safety Injection and Containment Spray Systems Suction Lines, Residual Heat Removal System, RHR Loop Sampling System, and Containment Spray System.

NOTE:	The goal of the Maintenance Rule is to balance the risks associated with unavailability against the expected increase in future system reliability.

7.1.1 The maximum allowable leakage from the recirculation heat removal system components (Leakage from the most recent OST-155, OST-156, OST-254, and OST-355 plus any additional identified ECCS Recirculation Loop Leakage) shall **NOT** exceed one gallon per hour.

7.1.2 Repairs shall be made as required to maintain leakage within the acceptance criteria in 7.1.1 above.

7.1.3 If repairs are **NOT** completed, the Reactor shall remain shut down and depressurized until repairs are effected and the acceptance criteria in 7.1.1 is satisfied.

7.1.4 With the plant at power, if repairs are **NOT** completed which reduce the leakage from the recirculation heat removal system components to less than one gallon per hour within 7 days, the reactor shall be shut down and depressurized until repairs are effected and the acceptance criterion in 7.1.1 above is satisfied.

7.1.5 Total Recirculation Loop Leakage exceeding two gallons per hour, requires the initiation of an Operability Determination IAW OPS-NGGC-1305 to determine if Control Room Ventilation is inoperable. (CR 95-00839)

7.1.6 Leakage less than the one gallon per hour shall be reduced to as low as practical. In situations where leakage can't be reduced to zero, Operations and RES will determine if leakage is as low as practical.

7.2 Non-ECCS Recirculation Loop Systems

7.2.1 Non-ECCS Recirculation Loop Systems outside containment that would or could contain highly radioactive fluids during a serious transient or accident: Chemical and Volume Control System, Primary Sampling System, Waste Gas System, Liquid Waste Disposal System, and Post Accident Containment Venting System shall meet the following requirements:

1. Leakage shall be reduced to as low as practical. In situations where leakage can't be reduced to zero, Operations and RES will determine if leakage is as low as practical.

8.0 **INSTRUCTIONS**

8.1 General

The leak reduction program shall include actions to maintain leakage as low as practical on the systems covered by the program. Included in this program are the requirements for preventive maintenance, periodic visual inspections, and integrated leak test requirements for each specified system at an 18 month interval. In addition to these aspects of the program, Post Maintenance Testing (PMT) provides actions to maintain leakage as low as practical.

8.2 Liquid Leak Reduction

8.2.1 The preventive maintenance and periodic visual inspection portion of the program will consist of the daily and weekly inspections performed by Operations, inspections during performance of surveillance tests on the systems covered by the program, system walkdowns performed by RES, inspections performed by Maintenance during the performance of routine PMs/CMs, Chemistry Sampling, and RC surveys.

1. When liquid leaks are identified during preventive maintenance or periodic visual inspections on any of the systems covered by this program, the Control Room will use Attachment 10.1, Leakage Evaluation Flowchart, to assist in ensuring the appropriate actions are taken to address identified leaks.

2. Attachment 10.2, ECCS Recirculation Loop Leakage, **OR** 10.3, Non-ECCS Liquid Leakage, will be completed documenting the new total leakage.

3. ECCS Recirculation Loop components on which leakage can **NOT** be reduced to zero will be documented on Attachment 10.2, ECCS Recirculation Loop Leakage.

8.2.2 Integrated Liquid Leak Test will be performed by Operations, by specified procedures. The inspections will be conducted on an 18 month interval. These tests are scheduled using STSS.

1. Integrated Liquid Leak Tests provide specific actions to be taken in response to **NOT** meeting the acceptance criteria of the tests. Attachment 10.1 is **NOT** required to be used when performing scheduled Integrated Liquid Leak Tests.

8.2.2 (Continued)

2. When Integrated Liquid Leak Tests are completed, Attachment 10.2, ECCS Recirculation Loop Leakage, **OR** 10.3, Non-ECCS Liquid Leakage, will be completed documenting the new total leakage.

3. Components found leaking during ECCS Recirculation loop Integrity Tests which can **NOT** be reduced to zero will be documented on Attachment 10.2, ECCS Recirculation Loop Leakage.

4. When completion of an Integrated Leak Test tests an item listed on Attachment 10.2, ECCS Recirculation Loop Leakage, **OR** 10.3, Non-ECCS Liquid Leakage, and leakage is zero, the item will be removed from the Other Sources listed.

8.3 Gaseous Leak Reduction

8.3.1 The preventive maintenance and periodic visual inspection portion of the program will consist of the daily and weekly inspections performed by Operations, inspections during performance of surveillance tests on the systems covered by the program, system walkdowns performed by RES, inspections performed by Maintenance during the performance of routine PMs/CMs, Chemistry Sampling, and RC surveys.

1. When gaseous leaks are identified during preventive maintenance or periodic visual inspections on any of the gaseous systems covered by this program, corrective actions will be initiated per ADM-NGGC-0104, repairs made, and Post Maintenance testing performed.

2. When gaseous leaks are identified and leakage can **NOT** be reduced to zero, a new Attachment 10.4, Gaseous Leakage, will be completed documenting the new leaking component.

8.3.2 Integrated Gaseous Leak Test will be performed by Operations, by specified procedures. The inspections will be conducted on an 18 month interval. These tests are scheduled using STSS.

1. Integrated Gaseous Leak Tests provide specific actions to be taken in response to **NOT** meeting the acceptance criteria of the tests.

2. When Integrated Gaseous Leak Tests are completed, a new Attachment 10.4, Gaseous Leakage, will be completed.

3. When completion of an Integrated Gaseous Leak Test tests an item listed on Attachment 10.4, Gaseous Leakage, the item will be removed from the Other Sources.

8.4 Post Maintenance Testing

Post Maintenance Testing (PMT) ensures that leakage on systems covered by this program are reduced to as low as practical.

8.4.1 Components on systems covered by the leakage reduction program require a documented leak check on the PMT sheet. The "general" leak check allowance in OMM-001-2 for returning systems to service following maintenance shall **NOT** be used. PMT completion is required to be timely and should occur as soon as Plant Conditions and Risk Impact allow within the current T-5 schedule window.

8.4.2 Attachment 10.5, General PMT Guidelines, provides general guidelines for the conduct of PMT and contains alternate testing for cases where the initial conditions for Integrity Testing performance as PMT can NOT be met. (PLP-033 does NOT require Integrity Test performance as PMT).

8.5 Completing Attachments

8.5.1 Attachment 10.1, Leakage Evaluation Flowchart:

1. This Attachment is used whenever a leak is identified on any of the following systems when **NOT** performing Integrity Tests:
   a. Residual Heat Removal System
   b. Containment Spray System
   c. Safety Injection System
   d. Chemical and Volume Control System
   e. Gaseous Waste System
   f. Liquid Waste Disposal System
   g. Post Accident Containment Venting System
   h. Primary Sampling System

2. Entry into Attachment 10.1, Leakage Evaluation Flowchart, can also be made when performing PMT for scheduled activities and leaks are identified.

3. Attachment 10.1, Leakage Evaluation Flowchart, is entered at the top left and followed by responding to the questions asked. Answers to the Yes/No questions will be circled to keep track of actions taken. When looping back in the flowchart, the second set of answers should be circled and annotated with a 2 to signify the second time.

4. Attachment 10.1, Leakage Evaluation Flowchart, ensures that the following are performed:
   a. Leakage is measured, corrected for pressure (quantified) if necessary, added to existing leakage from current Attachment 10.2, ECCS Recirculation Loop Leakage, **OR** 10.3, Non-ECCS Liquid Leakage, and compared with leakage limits if applicable.
   b. Ensures entry into any applicable LCOs.
   c. Ensures corrective actions are initiated.
   d. Ensures PMT is performed.
   e. Ensures any post maintenance leakage is documented on a new Attachment 10.2, ECCS Recirculation Loop Leakage, **OR** 10.3, Non-ECCS Liquid Leakage, if leakage is **NOT** zero.

8.5.2 Attachment 10.2, ECCS Recirculation Loop Leakage

1. Attachment 10.2 is completed at the following times:

    a. When an ECCS Recirculation Loop OST is performed.

    b. When an ECCS Recirculation Loop component is found leaking.

    c. When leakage values are determined to change during the performance of the quarterly check of components listed.

    d. When a component listed on the Attachment 10.2 is repaired and no longer leaks.

2. Several components in the ECCS Recirculation Loop OSTs are leak checked by more than one of the OSTs to insure the upstream and downstream side of the component is leak checked at the proper pressure. If leakage is identified on the same component in more than one OST which results in exceeding the one gallon per hour limit, an Operability Determination should be initiated to determine the actual component leakage based on location of leakage and which OST the leakage was identified. (CR 98-00755)

3. Attachment 10.2 aids in ensuring that the one gallon per hour ECCS Recirculation Loop Leakage limit is **NOT** exceeded.

4. When completing Attachment 10.2, total leakage will be converted from ml/min to gallons per hour using the provided calculation.

5. Attachment 10.2 is normally completed by the STA, reviewed by the Shift Manager, copied, and sent to the vault.

8.5.3 Attachment 10.3, Non-ECCS Liquid Leakage

1. Attachment 10.3 is completed at the following times:

    a. When an Integrity Test is performed on Chemical and Volume Control System, Liquid Waste Disposal System, or Primary Sampling System.

    b. When a component in the Chemical and Volume Control System, Liquid Waste Disposal System, or Primary Sampling System is found leaking.

    c. When a component listed on Attachment 10.3 is repaired and no longer leaks.

2. Attachment 10.3 is normally completed by the STA, reviewed by the Shift Manager, copied, and sent to the vault.

8.5.4 Attachment 10.4, Gaseous Leakage

1. Attachment 10.4 is completed at the following times:

    a. When an Integrity Test is performed on the Gaseous portion of the Chemical and Volume Control System, Primary Sampling System, Gaseous Waste System, or Post Accident Containment Venting System.

    b. When a component in the Gaseous portion of the Chemical and Volume Control System, Primary Sampling System, Gaseous Waste System, or Post Accident Containment Venting System was found leaking and leakage is **NOT** stopped by corrective maintenance.

    c. When a component listed on the attachment is repaired and no longer leaks.

2. Attachment 10.4 is normally completed by the STA, reviewed by the Shift Manager, copied, and sent to the vault.

8.5.5 Attachment 10.5, General PMT Guidelines

1. Attachment 10.5 is used to provide guidance for PMT on components covered under the Leakage Reduction Program.

8.6 Quarterly Review of Attachments 10.1, 10.2, and 10.3

8.6.1 Quarterly, a review of Attachments 10.1, 10.2, **AND** 10.3 shall be performed to check the status of repair of leaks identified on all active copies of Attachment 10.1. Attachments 10.2 and 10.3 should be checked to ensure all leaking components identified on Attachment 10.1 are also included on Attachment 10.2 **OR** 10.3 as applicable.

9.0 RECORDS

9.1 Copies of completed Attachment 10.1, Leakage Evaluation Flowcharts, **AND** Attachment 10.2, ECCS Recirculation Loop Leakage, will be maintained in the OST Leak Test Data Book in the Control Room.

9.2 Copies of completed Attachment 10.2, ECCS Recirculation Loop Leakage, will be forwarded to the Supervisor Reactor Systems.

9.3 Completed attachments are QA records and should be retained as permanent records per RDC-NGGC-0001.

10.0 ATTACHMENTS

10.1 Leakage Evaluation Flowchart

10.2 ECCS Recirculation Loop Leakage

10.3 Non-ECCS Liquid Leakage

10.4 Gaseous Leakage

10.5 General PMT Guidelines

LEAKAGE EVALUATION FLOWCHART

This revision has been verified to be the latest revision available.

________________________(Print) ________________________ ________

Name Signature Date

Component: ________________________

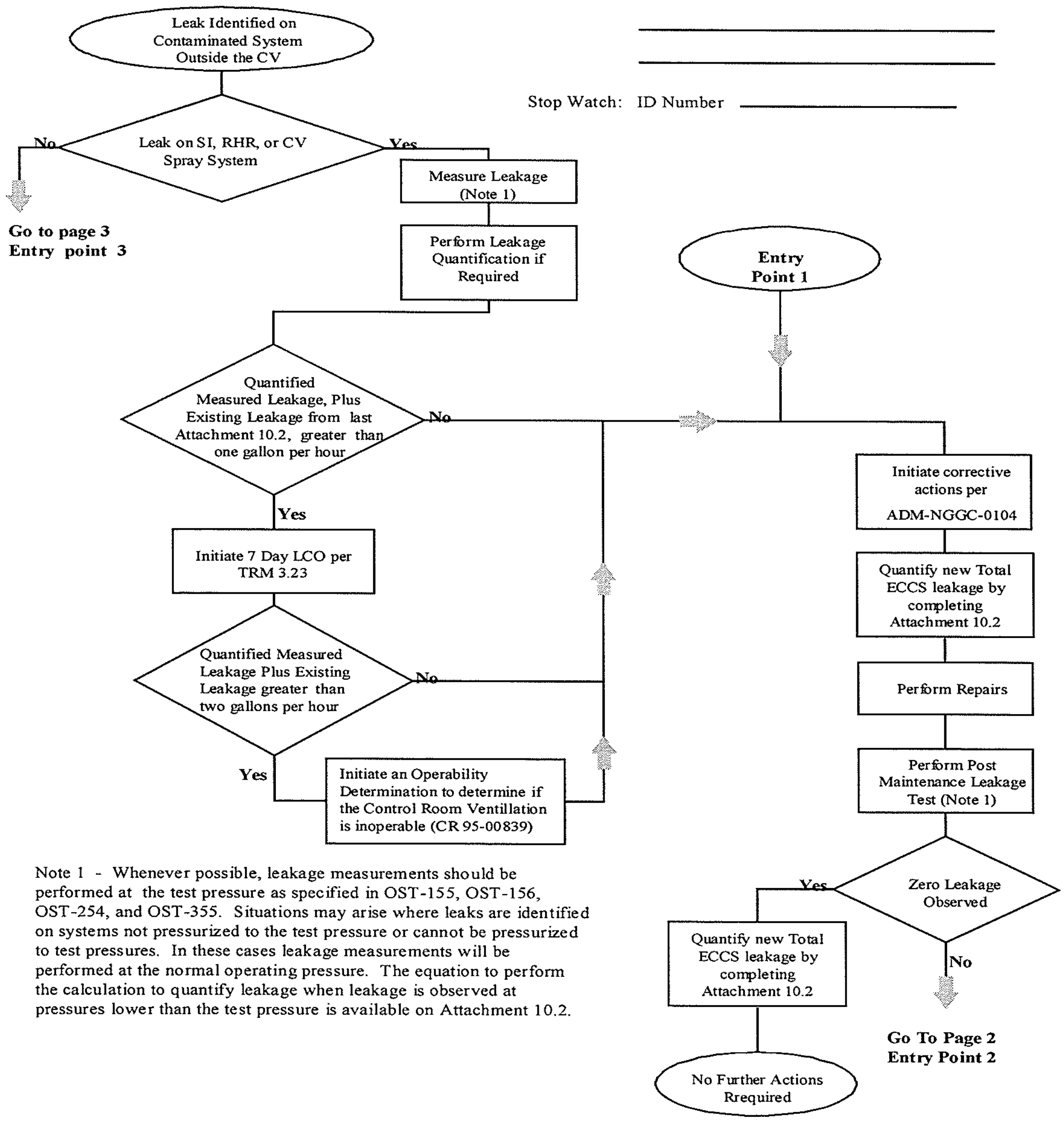
____

____

____

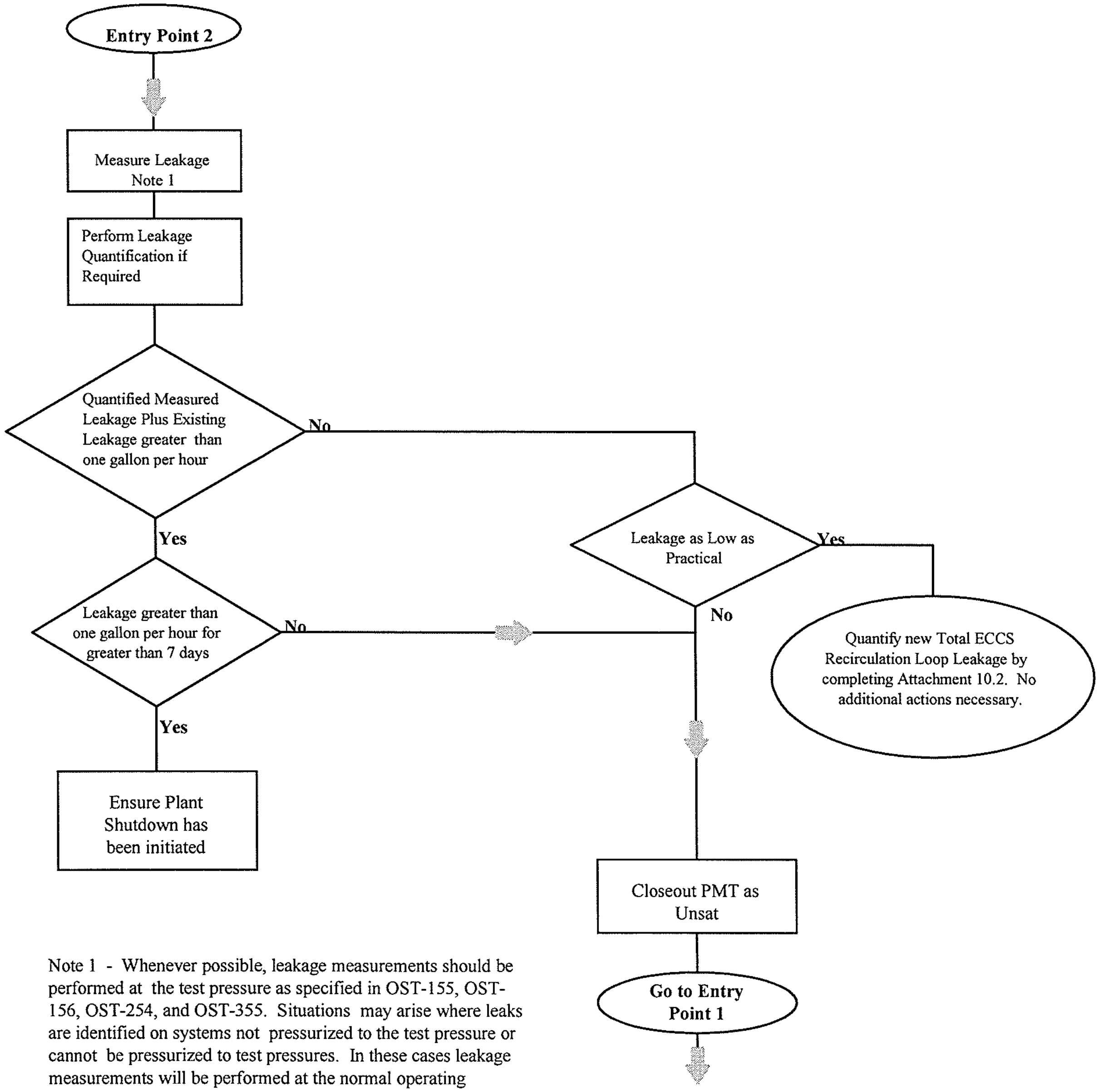
____

Stop Watch: ID Number ________________



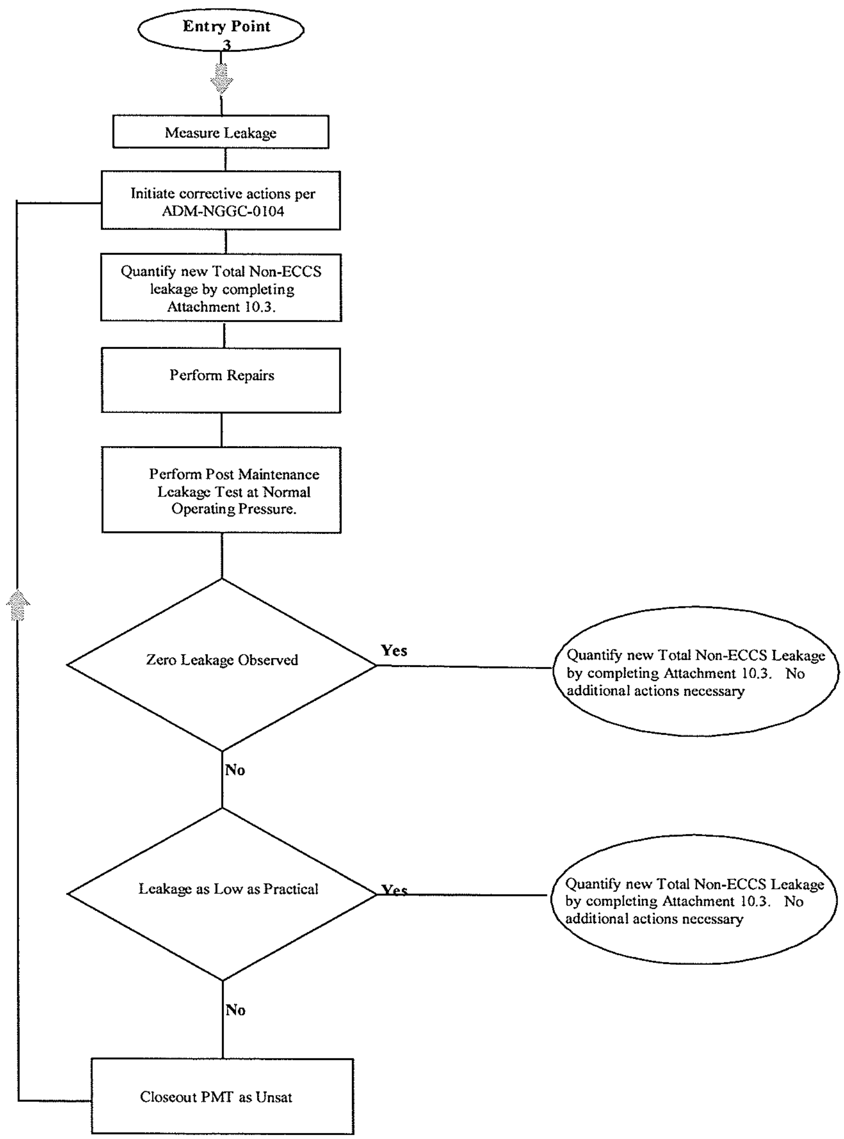
Note 1 - Whenever possible, leakage measurements should be performed at the test pressure as specified in OST-155, OST-156, OST-254, and OST-355. Situations may arise where leaks are identified on systems not pressurized to the test pressure or cannot be pressurized to test pressures. In these cases leakage measurements will be performed at the normal operating pressure. The equation to perform the calculation to quantify leakage when leakage is observed at pressures lower than the test pressure is available on Attachment 10.2.

ATTACHMENT 10.1
Page 2 of 3
LEAKAGE EVALUATION FLOWCHART



Note 1 - Whenever possible, leakage measurements should be performed at the test pressure as specified in OST-155, OST-156, OST-254, and OST-355. Situations may arise where leaks are identified on systems not pressurized to the test pressure or cannot be pressurized to test pressures. In these cases leakage measurements will be performed at the normal operating pressure. The equation to perform the calculation to quantify leakage when leakage is observed at pressures lower than the test pressure is available on Attachment 10.2.

LEAKAGE EVALUATION FLOWCHART



ECCS RECIRCULATION LOOP LEAKAGE

This revision has been verified to be the latest revision available.

____________________ (Print) ____________________ ________

Name Signature Date

SOURCES OF LEAKAGE	DATE PERFORMED	QUANTITY OF LEAKAGE
OST-155 LIST: __________ __________ __________		ml/min
OST-156 Note 1 LIST: __________ __________ __________		ml/min
OST-254 LIST: __________ __________ __________		ml/min
OST-355 LIST: __________ __________ __________		ml/min
TOTAL FROM OTHER SOURCES (See Page 2)		________ ml/min
TOTAL ECCS RECIRCULATION LOOP LEAKAGE		ml/min
TOTAL ECCS RECIRCULATION LOOP LEAKAGE		Note 2 gallons/hour

Note 1: OST-156 includes leakage from EST-140.

Note 2: Total Recirculation Loop Leakage exceeding two gallons per hour, requires the initiation of an Operability Determination IAW OPS-NGGC-1305 to determine if Control Room Ventilation is inoperable. (CR 95-00839)

ECCS RECIRCULATION LOOP LEAKAGE

OTHER SOURCES	MEASURED LEAKAGE ml/min	CALCULATED LEAKAGE (Note 3)	W/O	DATE
TOTAL	N/A		N/A	

Note 3: Calculated leakage is leakage value resulting from the calculations equating measured leakage collected at a pressure lower than the "TEST" pressure to leakage at "TEST" pressure.

ECCS RECIRCULATION LOOP LEAKAGE

To "Quantify" leakage measured at pressures below the test pressure perform the following calculation:

$$\text{Quantified Leakage} = \text{Measured Leakage} \times \sqrt{\frac{\text{Test Pressure (Note 4)}}{\text{Actual Pressure}}}$$

To convert ml/min total leakage to Gallons Per Hour perform the following calculation:

________ ml/min x 0.01585 = __________ gallons/hour

Completed By: ______________________________ Date:___________

Approved By: _______________________________ Date:__________
Shift Manager

Note 4: For the purpose of calculating Quantified Leakage from other sources when other than the test pressure specified in the OSTs, the following shall be used as the "Test Pressure" in the calculation based on the location of the leak:

SYSTEM	SUCTION PRESSURE	DISCHARGE PRESSURE
Safety Injection	200 psig	1720 psig
Containment Spray	200 psig	450 psig
Residual Heat Removal	60 psig	200 psig

These values have been established based on maximum pressure established during Accident Conditions of Small and Large Break LOCA, and during re-circulation mode of operation. Suction pressure for RHR is based on design CV pressure, since RHR is taking suction from CV sump + Sump to RHR pumps elevation differences. Pressure increase associated with elevation differences between sump level following LOCA, and RHR pump elevation is 15 psig, and is applied to the suction of RHR. Suction pressure for SI and CV Spray is based on RHR discharge pressure. Discharge pressure is based on Suction pressure + differential pressure of the respective pumps only.

References:

1. Containment Design Pressure 42 psig, UFSAR Chapter 6.2
2. TM 728-800-08, Safety Injection
3. IST 2002 database for CV Spray and RHR manufacturing pump curves
4. RNP-M/MECH-1622, LOCA Containment Flood Depth, rev. 0
5. NCR 00374374, PLP-111 Improvement Evaluation

ATTACHMENT 10.3

NON-ECCS LIQUID LEAKAGE

This revision has been verified to be the latest revision available.

_______________ (Print) _______________ __________

Name Signature Date

SOURCES OF LEAKAGE	DATE PERFORMED	QUANTITY OF LEAKAGE
OST-104 LIST: __________ __________ __________ __________		ml/min
OST-105 LIST: __________ __________ __________ __________		ml/min
OST-106 LIST: __________ __________ __________ __________		ml/min
OST-451 LIST: __________ __________ __________ __________		ml/min
OST-909 LIST: __________ __________ __________ __________		ml/min
OTHER SOURCES LIST: __________ __________ __________ __________ __________ __________	__________ __________ __________ __________ __________ __________	______ ml/min ______ ml/min ______ ml/min ______ ml/min ______ ml/min ______ ml/min
TOTAL LIQUID LEAKAGE		ml/min

Completed By: ______________________ Date:__________

Approved By: ______________________ Date:__________
Shift Manager

File a copy in the OST Leak Test Data Book in the Control Room.
Original will be sent to the vault.

ATTACHMENT 10.4

GASEOUS LEAKAGE

This revision has been verified to be the latest revision available.

____________________ (Print) ____________________ ________

Name Signature Date

PRESENT SYSTEM COMPONENTS WITH GAS LEAKAGE	DATE PERFORMED
OST-104 **COMPONENTS:** __________ __________ __________ __________	
OST-452 **COMPONENTS:** __________ __________ __________ __________	
OST-907 **COMPONENTS:** __________ __________ __________ __________	
OST-909 **COMPONENTS:** __________ __________ __________ __________	
OTHER SOURCES **COMPONENTS:** __________ __________	
OTHER SOURCES **COMPONENTS:** __________ __________	
OTHER SOURCES **COMPONENTS:** __________ __________	

Completed By: ____________________ Date:________

Approved By: ____________________ Date:________
Shift Manager

File a copy in the OST Leak Test Data Book in the Control Room.
Original will be sent to the vault.

GENERAL PMT GUIDELINES

1.0 The following guidelines cover PMT on systems covered by the leakage reduction program.

1.1 PLP-033 does **NOT** require Integrity Test performance as PMT.

1.2 Leaks identified during Integrity Test performance which exceed the acceptance criteria will be repaired as soon as possible and retested using the Integrity Test. This ensures Integrity Test acceptance criteria is met and allows for documenting as left leakage.

1.3 Components on systems covered by the leakage reduction program require a documented leak check on the PMT sheet. The "general" leak check allowance in OMM-001-2 for returning systems to service following maintenance shall **NOT** be used. PLP-111 leakage checks are **NOT** required following removal of ECCS pump test gauges provided I&C verifies no leakage after normal gauge is placed in service.

2.0 The following are system specific guidelines for performing PMT. These guidelines can be used following corrective maintenance as specified in Attachment 10.1 or following scheduled activities such as gauge calibrations.

2.1 Chemical and Volume Control System - Items covered under OST-104

2.1.1 To perform leakage checks on the Charging Pumps, the pump must be in service providing Charging and Seal Injection flows at normal operating pressure (RCS at 2235 psig).

2.1.2 To perform leakage checks on common Charging or Seal Injection components the system must be in service at normal operating pressure.

2.1.3 To perform leakage checks on the Seal Leakoff Tank Pumps and piping, the Seal Leakoff Tank Pumps must be operating. (Charging Pump packing leakage that is collected by the seal leakoff collection system is **NOT** "external" leakage **AND** is **NOT** to be included in Attachment 10.1 calculations.)

2.1.4 To perform leakage checks (Gaseous and Liquid) on the VCT and associated piping, the VCT must have normal operating pressure and level.

GENERAL PMT GUIDELINES

2.1 (Continued)

2.1.5 To perform other leakage checks such as Seal Water Return and Non-Regenerative Heat Exchangers, the components must be in service at normal operating pressure.

2.1.6 To perform leakage checks on any other components, the component will be at normal operating pressure.

2.2 Chemical and Volume Control System - Items covered under OST-105

2.2.1 To perform a leakage check on components on the inservice demineralizer, letdown will be in service at normal operating pressure.

2.2.2 To perform a leakage check on other components, use OST-105 to establish the test conditions.

2.3 Chemical and Volume Control System - Items covered under OST-106

2.3.1 To perform a leakage check on the CVCS Holdup Tanks, the tanks will have a normal water level and pressure.

2.3.2 To perform leakage checks on the CVCS Holdup Tank Recirculation Pump and the Gas Stripper Feed Pumps and associated piping, use OST-106 to establish the test conditions unless the pump is already in operation.

2.4 Safety Injection System - Items covered by OST-155 when the initial conditions for OST-155 can **NOT** be met.

2.4.1 To perform leakage checks on the SI Pump or down stream components, the SI Pump will be run on recirculation. This includes items on the SI Cold Leg header up to the SI-870 valves and items on the SI Hot Leg header up to SI-869. The SI Pump Recirculation strainer and associated valves are included. This does **NOT** include the SI Test line components which are isolated.

2.4.2 Performing leakage checks on the suction side of the SI Pumps will be covered in the next section, Items covered by OST-156.

GENERAL PMT GUIDELINES

2.5 Safety Injection and Containment Spray Suction Lines - Items covered by OST-156 when the initial conditions for OST-156 can **NOT** be met.

2.5.1 To perform the post maintenance leakage check, the components will be leak checked at the existing pressure (RWST head). Leaks on the suction side of the SI, CV Spray, and RHR Pumps identified at RWST head will be leak checked using the RWST. Repaired components which do **NOT** have zero leakage will require leakage to be quantified by calculation.

2.6 Residual Heat Removal and RHR Loop Sampling System - Items covered by OST-254 when the initial conditions for OST-254 can **NOT** be met.

2.6.1 To perform leakage checks on the RHR Pumps or downstream components, the RHR Pump to be tested will be run on recirculation. For common components either RHR Pump will be run on recirculation and the component leak checked. Repaired components which do **NOT** have zero leakage will require leakage to be quantified by calculation.

2.6.2 Performing leakage checks on the RHR Pump suction side components is covered in the Items covered by OST-156 section. Repaired components which do **NOT** have zero leakage will require leakage to be quantified by calculation.

2.6.3 The RHR Loop Sampling portion of the system is isolated except when RHR is in service. There should be no leaks identified. Leaks identified when the RHR Loop Sampling System is in service will be tested with the RHR System in service at > 350 psig. OST-254 will be used.

2.7 Containment Spray System - Items covered by OST-355. OST-355 can be performed at power, but will require entry into Required Action statement for ITS LCO 3.6.6.

2.7.1 Spray Pumps and discharge components up to the SI-880 valves can be leak checked during normal recirculation operation of the Spray pumps.

2.7.2 Components downstream of the SI-880 valves will require the use of OST-355 to perform leakage tests.

GENERAL PMT GUIDELINES

2.7 (Continued)

2.7.3 The following components can be leak checked during Spray Pump operation. Repaired components which do **NOT** have zero leakage will require leakage to be quantified by calculation.

1. SI-835A&B
2. SI-892H&F
3. FE-944, SI-896F&N, FI-944 and piping, SI-892J, and SI-842

2.7.4 Performing leakage checks on the suction side of the Spray Pumps is covered in the Items covered by OST-156 section.

2.8 Liquid Waste Disposal System - Items covered by OST-451

2.8.1 Use OST-451 to perform PMT leak checks on components. This will ensure that the conditions are established to operate the required equipment to perform leak checks.

2.9 Waste Gas System - Items covered by OST-452.

2.9.1 Use OST-452 to perform leakage checks. This will ensure that components are tested at the proper pressure and components which require special lineups are properly tested.

2.10 Post Accident Containment Venting System - Items covered by OST-907.

2.10.1 Components of this system are **NOT** normally pressurized during normal operations. To perform leakage checks on the system use OST-907.

2.11 Sampling System - Items covered by OST-909

2.11.1 Use OST-909 to perform leakage checks. This will ensure that components are tested at the proper pressure and components which require special lineups are properly tested.

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ILC-13 NRC JPM SRO A3
Rev 0

Calculate Low Dose Path

Concurred By: ______________________________ **Date:** ________________
Operations

Approved By: ______________________________ **Date:** ________________
Superintendent/Supervisor - Training

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Alternate Path:

NO

JPM #:

ILC-13 NRC JPM SRO A3

Candidate

SRO

K/A	Rating (RO/SRO):
G 2.3.4	3.7

Task Standard:

Determine the appropriate path and number of workers to keep dose ALARA and determine if any dose limits are exceeded.

Preferred Evaluation Location:

Simulator _____ Classroom ___X___

Preferred Evaluation Method:

Perform ___X___ Simulate _____

References:

DOS-NGGC-0004, Administrative Dose Limits

Validation Time: 20 Minutes **Time Critical:** NO **Time Critical Time:** N/A

Candidate: ______________________ (N/A if not time critical)

Name

		Overall Time		Critical Time
SSN - -	Start:		Start:	
	Finish:		Finish:	
Performance Rating: circle one SAT UNSAT	**Performance Time** (min):			

Examiner: ______________________ ______________________ __________

Print Name Signature Date

COMMENTS:

QUESTION DOCUMENTATION:

Question:

Response:

Tools/Equipment/Procedures Needed:

Calculator and Paper

DOS-NGGC-0004, Administrative Dose Limits (if requested)

READ TO OPERATOR

DIRECTIONS TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. 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 Operator Cue Sheet I provided you along with completed JPM material.

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. The plant shutdown 24 hours ago for a Forced Outage.
2. HVH-9A motor has failed and must be replaced prior to plant startup.
3. A team has been assembled to determine options for successful job performance while maintaining overall dose ALARA
4. Only two personnel are available that are qualified to perform the necessary work. They are Duke Energy Employees and have received NO dose from Non-Duke Energy plants. Worker A has a current annual dose of 1895 mrem and Worker B has a current annual dose of 1845 mrem.

SELECTION	PATH – A	PATH - B
Pathway Dose Rate	450 mR/hr	240 mR/hr
Pathway Transit Time to Job Site (minutes)	1 person – 10 2 people – 4	1 person – 18 2 people – 10
Job Site Dose Rate	120 mR/hr	
Job Site Work Duration (minutes)	1 person – 60 2 people – 25	
Pathway Transit Time from Job Site (minutes)	1 person – 10 2 people - 4	1 person - 18 2 people - 10

INITIATING CUES:

Using the data given, determine the recommended path to the job site, the number of workers necessary to effectively complete the job and keep radiation dose ALARA, the dose each worker will receive and if any dose limits will be exceeded.

START TIME: __________

EXAMINER'S NOTE: Performance Steps may be performed in any order.	
STEP 1: Determine Transit dose to the job site for 1 worker via PATH A. **STANDARD:** Determines that 1 worker transiting via PATH A will receive 75 mRem entering the job site. (450 mR/hr) x (1hr/60 min.) x 10 min. = 75 mRem **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 2: Determine Transit dose to the job site for 2 workers via PATH A. **STANDARD:** Determines that 2 workers transiting via PATH A will receive 60 mRem entering the job site. (450 mR/hr) x (1hr/60 min.) x 4 min. x 2 people = 60 mRem **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 3: Determine work site dose for 1 worker. **STANDARD:** Determines that 1 worker performing job will receive 120 mrem. (120 mR/hr) x (1hr/60min) x 60 min. = 120 mrem **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 4: Determine work site dose for 2 workers. **STANDARD:** Determines that 2 workers performing job will receive 100 mrem. (120 mR/hr) x (1hr/60min) x 25 min. x 2 people = 100 mrem **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 5: Determine dose received by 1 worker to exit work site via PATH A. **STANDARD:** Determines that 1 worker transiting via PATH A will receive 75 mRem exiting the job site. (450 mR/hr) x (1hr/60 min.) x 10 min. = 75 mRem **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 6: Determine dose received by 2 workers to exit work site via PATH A. **STANDARD:** Determines that 2 workers transiting via PATH A will receive 60 mRem exiting the job site. (450 mR/hr) x (1hr/60 min.) x 4 min. x 2 people = 60 mRem **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 7: Determine dose received for entire job if PATH A is used. **STANDARD:** Determines that to perform job using PATH A will result in 270 mrem for 1 worker and 220 mrem for 2 workers. 1 worker: 75 + 120 + 75 = 270 mrem 2 workers: 60 + 100 + 60 = 220 mrem (110 mRem to each worker) **EXAMINER'S NOTE: NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 8: Determine Transit dose to the job site for 1 worker via PATH B. **STANDARD:** Determines that 1 worker transiting via PATH B will receive mRem entering the job site. (240 mR/hr) x (1hr/60 min.) x 18 min. = 72 mRem **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 9: Determine Transit dose to the job site for 2 workers via PATH B. **STANDARD:** Determines that 2 workers transiting via PATH B will receive 80 mRem entering the job site. (240 mR/hr) x (1hr/60 min.) x 10 min. x 2 people = 80 mRem **EXAMINER'S NOTE: NONE** COMMENTS:	___ SAT ___ UNSAT

STEP 10: Determine dose received by 1 worker to exit work site via PATH B. **STANDARD:** Determines that 1 worker transiting via PATH B will receive 72 mRem exiting the job site. (240 mR/hr) x (1hr/60 min.) x 18 min. = 72 mRem **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 11: Determine dose received by 2 workers to exit work site via PATH B. **STANDARD:** Determines that 2 workers transiting via PATH B will receive 80 mRem exiting the job site. (240 mR/hr) x (1hr/60 min.) x 10 min. x 2 people = 80 mRem **EXAMINER'S NOTE:** **NONE** COMMENTS:	___ SAT ___ UNSAT
STEP 12: Determine dose received for entire job if PATH B is used. **STANDARD:** Determines that to perform job using PATH B will result in 270 mrem for 1 worker and 220 mrem for 2 workers. 1 worker: 72 + 120 + 72 = 264 mrem 2 workers: 80 + 100 + 80 = 260 mrem (120 mRem to each worker) **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT

STEP 13: Determine the recommended path taken and number of workers utilized to keep radiation dose ALARA and the dose each worker will receive. **STANDARD:** Candidate determines that the lowest dose is received by using **2 workers** transiting to and from the job site using **PATH A.** Using this PATH the workers will receive **110 mrem** each. **EXAMINER'S NOTE:** **NONE** COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 14: Determine if any dose limits will be exceeded. **STANDARD:** YES, the Duke Energy Administrative Dose Limit of 2 Rem will be exceeded by Work A. **EXAMINER'S NOTE:** **NONE** OMMENTS: **END OF TASK**	**Critical Step** ___ SAT ___ UNSAT
Terminating Cue: Candidate determines lowest dose received, PATH used and if any dose limits will be exceeded.	

TIME STOP: ________

ANSWER KEY

SELECTION	PATH – A	PATH - B
Pathway Dose Rate	450 mR/hr	240 mR/hr
Pathway Transit Time to Job Site (minutes)	1 person – 10 2 people – 4	1 person – 18 2 people – 10
Job Site Dose Rate	120 mR/hr	
Job Site Work Duration (minutes)	1 person – 60 2 people – 25	
Pathway Transit Time from Job Site (minutes)	1 person – 10 2 people - 4	1 person - 18 2 people - 10
Recommended PATH	PATH – A	
Number of Workers	2	
Dose Received by each worker	110 mrem	
Worker(s) that will exceed any dose limit	Worker A will exceed the Duke Energy (Legacy Progress Energy) Administrative Annual Dose Limit of 2 Rem.	

Excerpt from DOS-NGGC-0004, Administrative Dose Limits
9.3 Progress Energy Annual Administrative Dose Limits

9.3.1 0.5 rem Progress Energy dose if non-Progress Energy dose for the current year has not been determined. No dose extension is permitted.

*9.3.2 **2 rem** Progress Energy dose not to exceed 4 rem total dose if non-Progress Energy dose for the current year has been determined.*

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the candidate there are NO time critical steps in this JPM.

INITIAL CONDITIONS:

1. The plant shutdown 24 hours ago for a Forced Outage.
2. HVH-9A motor has failed and must be replaced prior to plant startup.
3. A team has been assembled to determine options for successful job performance while maintaining overall dose ALARA
4. Only two personnel are available that are qualified to perform the necessary work. They are Duke Energy Employees and have received NO dose from Non-Duke Energy plants. Worker A has a current annual dose of 1895 mrem and Worker B has a current annual dose of 1845 mrem.

SELECTION	PATH – A	PATH - B
Pathway Dose Rate	450 mR/hr	240 mR/hr
Pathway Transit Time to Job Site (minutes)	1 person – 10 2 people – 4	1 person – 18 2 people – 10
Job Site Dose Rate	120 mR/hr	
Job Site Work Duration (minutes)	1 person – 60 2 people – 25	
Pathway Transit Time from Job Site (minutes)	1 person – 10 2 people - 4	1 person - 18 2 people - 10
Recommended PATH		
Number of Workers		
Dose Received by each worker		
Worker(s) that will exceed any dose limit		

INITIATING CUES:

Using the data given, determine the recommended path to the job site, the number of workers necessary to effectively complete the job and keep radiation dose ALARA, the dose each worker will receive and if any dose limits will be exceeded.

x Progress Energy

R
Reference
Use

NUCLEAR GENERATION GROUP

STANDARD PROCEDURE

Volume 99

Book/Part 99

DOS-NGGC-0004

ADMINISTRATIVE DOSE LIMITS

REVISION 12

NGG
Think Fleet.

TABLE OF CONTENTS

1.0 PURPOSE

This procedure establishes the method for increasing or decreasing administrative dose limits from the default values in Total Exposure during non-emergency operations.

R2.1 This procedure details the occupational radiation dose limits established by the Nuclear Regulatory Commission and the administrative dose limits set by Progress Energy.

2.0 REFERENCES

R2.1 2.1 10 CFR Part 20, Standards for Protection Against Radiation

2.2 DOS-NGGC-0002, Dosimetry Issuance

2.3 Total Exposure User Reference and Training Guide

2.4 NGGM-PM-0002, Radiation Control & Protection Manual

3.0 DEFINITIONS

N/A

4.0 RESPONSIBILITIES

4.1 Radiation Control Personnel

4.1.1 Process administrative dose limit change requests.

4.1.2 Update Total Exposure.

4.2 Superintendent - Radiation Protection

Approve or cancel all requests.

4.3 Site Vice President or Designee

Approve all requests to exceed any administrative dose limits except during declared emergencies.

5.0 PREREQUISITES

N/A

6.0 PRECAUTIONS AND LIMITATIONS

N/A

7.0 SPECIAL TOOLS AND EQUIPMENT

N/A

8.0 ACCEPTANCE CRITERIA

N/A

9.0 INSTRUCTIONS

R2.1 9.1 Adult Occupational Dose Limits

9.1.1 Whole Body - The more limiting of a total effective dose equivalent equal to 5 rem or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye equal to 50 rem.

9.1.2 Skin - A shallow dose equivalent equal to 50 rem.

9.1.3 Lens of Eye - A lens dose equivalent equal to 15 rem.

9.1.4 Extremities - A shallow dose equivalent equal to 50 rem.

9.2 Occupational Dose to Minors

Minors shall not be employed to work in radiation control areas, although they may enter as visitors.

9.3 Progress Energy Annual Administrative Dose Limits

9.3.1 0.5 rem Progress Energy dose if non-Progress Energy dose for the current year has not been determined. No dose extension is permitted.

9.3.2 2 rem Progress Energy dose not to exceed 4 rem total dose if non-Progress Energy dose for the current year has been determined.

9.4 Progress Energy Lifetime Administrative Dose Limits

NOTE:	The following is not required if site management does not require prior years dose history to be documented.

9.4.1 Dose in rem should not exceed the individual's age in years as of the end of the year.

9.4.2 If the cumulative lifetime dose (TEDE) in rem upon employment or as of the beginning of the year, whichever is later, exceeds an individual's age in years, then an administrative limit of 0.5 rem per year on Progress Energy dose shall be imposed.

9.5 Emergency Exposure to Radiation

Exposure to radiation during emergencies is not covered in this procedure. GO TO NGGM-PM-0002, Radiation Control & Protection Manual.

9.6 Planned Special Exposure

Planned special exposures are not covered in this procedure. GO TO NGGM-PM-0002, Radiation Control & Protection Manual.

9.7 Administrative Dose Limit Changes

9.7.1 Ensure Attachment 1, Administrative Dose Limit Change Request, or equivalent has been completed and signed by the individual and Progress Energy supervisor or Progress Energy contract representative for contract employees.

1. A written request signed by an authorized representative of the individual's employer containing the individual's name, SSN, and authorized annual dose limit may be used in lieu of Attachment 1 when changing the administrative dose limit to a value less than the default value in Total Exposure.

2. An authorized representative of the contractor must sign any change request that would allow the individual to exceed employer dose limits previously provided to Progress Energy in writing.

9.7.2 If required by site management, then ensure the individual's current year and prior years dose history has been documented on a Form 4 in accordance with Reference 2.2.

9.7.3 If secondary dosimeter results for the current monitoring period exceed 500 mrem, then ensure the individual's primary dosimeter has been sent for processing.

9.7 Administrative Dose Limit Changes

NOTE:	Attachment 1 shall be completed before Attachment 2 is signed.

9.7.4 Initiate the change request by completing Attachment 2, Administrative Dose Limit Change or equivalent.

9.7.5 Notify radiation control supervision when the change request is ready for approval.

NOTE:	Supervision may give verbal approval by phone and an authorized Designee may complete the approval process on their behalf. In this case, Supervision should later sign Attachment 2 to authenticate their verbal approval.

9.7.6 Obtain Superintendent - Radiation Protection or authorized designee, approval for any increase or decrease in the administrative dose limit from the defaults listed in Steps 9.1, 9.2, and 9.3.

9.7.7 Obtain Site Vice President or designee approval to exceed any administrative dose limits.

9.7.8 Update Administrative dose changes in Total Exposure.

10.0 RECORDS

Submit the following QA Records for processing:

- Attachment 1, Administrative Dose Limit Change Request
- Attachment 2, Manual Administrative Dose Limit Change form
- Employer dose limit authorization letters, if applicable

ATTACHMENT 1
Sheet 1 of 1
Administrative Dose Limit Change Request

Name:______________________________________ SSN:________________

Reason for increase/decrease (circle one):___________________________________

____

____

Requested annual dose limit: __________ or Requested available dose:___________

Individual: ____________________ Date: ________________

Progress Energy Supervision: ____________________ Date: ________________

Contract Supervision: ____________________ Date: ________________

(Form DOS-NGGC-0004-1-12)
QA Record

ATTACHMENT 2

Manual Administrative Dose Limit Change

TE Entry	

Name: ______________________ SSN: ______________

> **NOTE:** Steps 1 - 3 are not required if site management does not require prior years dose history to be documented.

Dose (mrem)

1. Lifetime administrative limit (age at end of year X 1000) .. . . ______
2. Lifetime dose (including current year) . . . . ______
3. Lifetime available dose (1 - 2). . . . . ______

4. Current year non-Progress energy dose . . . . ______
5. Current year Progress Energy dose . . . . ______
6. Current year total dose (4 + 5). . . . . ______

7. Current annual administrative limit .. . . ______
8. Current annual available dose (7 - 6). . . . . ______

9. New annual administrative limit (shall be < 5000 mrem). . . . . ______
10. New annual available dose (9 - 6). . . . . ______

Calculations Performed By: ____________________ Date: __________

Approval:

Superintendent - Radiation Protection approval is required for any increase or decrease in the administrative dose limit from the defaults listed in Steps 9.1, 9.2, and 9.3.

Site Vice President approval is required to authorize any of the following:

- An annual Progress Energy dose exceeding 2000 mrem (Line 5 + Line 10)
- An annual total dose exceeding 4000 mrem (Line 6 + Line 10 > 4000).
- A Progress Energy annual dose that would cause the lifetime dose to exceed the individual's age in years as of the end of the calendar year (Line 2 + Line 10 > Line 1). **(See note above.)**
- An annual dose greater than 500 mrem if the lifetime dose upon employment or at the start of the calendar year exceeds the individual's age in years (Line 5 + Line 10 > 500 **and** Line 3 $\leq$ 0).

Superintendent - Radiation Protection (or designee): __________________ Date: ______

Site Vice President (or designee): ____________________________ Date:______

(Form DOS-NGGC-0004-2-12)

QA Record

REVISION SUMMARY

The following changes were made in this revision (PRR# 395758):

- Section 10.0, changed "vital" to "QA" (395758)
- Attachment 1 changed "vital" to "QA" Revised form number. (395758)
- Attachment 2 changed "vital" to "QA" Revised form number. (395758)

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ILC-13 NRC JPM SRO A4
Rev 0

Perform an Emergency Action Level Classification and Recommended Protective Actions

Concurred By:	______________________ Operations	**Date:**	____________
Concurred By:	______________________ EP	**Date:**	____________
Approved By:	______________________ Superintendent/Supervisor - Training	**Date:**	____________

LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: 02109100201, Analyze Indications to Determine That an Emergency Plan Event is in Progress and Classify the Event IAW EAL Matrix for Cold, Hot, and All Conditions.

Alternate Path:

No

JPM #: ILC-13 NRC JPM SRO A4

Candidate: SRO

K/A	Rating (RO/SRO):
G 2.4.41	4.6
G 2.4.44	4.4

Task Standard:

Identifies GENERAL EMERGENCY status (Loss of 3 FPBs) and PARs completed satisfactorily.

Preferred Evaluation Location:

Simulator ______ Classroom ___X___

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

EMERGENCY-ACTION-LEVEL-MATRIX-SH1 (ALL CONDITIONS MATRIX)
EMERGENCY-ACTION-LEVEL-MATRIX-SH3 (COLD CONDITIONS MATRIX)
EPCLA-04
EPCLA-01

Validation Time: **30** Minutes. **Time Critical:** Yes **Time Critical Time:** 15 Minutes (For EAL Classification Only)

Candidate: ______________________
Name

SSN ____ - ____ - ____

	Overall Time	(N/A if not time critical) **Critical Time**
Start:	________	________
Finish:	________	________
Performance Time (min):	________	________

Performance Rating: SAT UNSAT
circle one

Examiner: ______________________ ______________________ __________
Print Name Signature Date

COMMENTS:

QUESTION DOCUMENTATION:

Question:

Response:

Tools/Equipment/Procedures Needed: Provide the candidates with the following:

EMERGENCY-ACTION-LEVEL-MATRIX-SH1 (ALL CONDITIONS MATRIX)
EMERGENCY-ACTION-LEVEL-MATRIX-SH2 (HOT CONDITIONS MATRIX)
EMERGENCY-ACTION-LEVEL-MATRIX-SH3 (COLD CONDITIONS MATRIX)
EPCLA-04 and EPCLA-01

DIRECTIONS TO CANDIDATE:

When I tell you to begin, you are to classify an event IAW the EAL MATRIX. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you and report the EAL to be declared if any.

CANDIDATE INFORMATION:

Inform the Operator that this is a time critical JPM.

INITIAL CONDITIONS:

1. The "A" CV Spray Pump is under clearance for motor replacement.
2. The Reactor tripped with an Auto Safety Injection Actuation signal present.
3. The BOP just announced that Breaker 52/28B, Station Service Transformer 2G to 480V Bus E-2, has tripped and "B" EDG has failed to Auto-Start.
4. Radiation monitors as follows:
    - R-2 Containment Area Radiation Monitor — 75 R/hr (ALARMING)
    - R-7 In-Core Room Area Radiation Monitor — 66 R/hr (ALARMING)
    - R-32A Containment High Range — 105 R/hr (ALARMING)
    - R-32B Containment High Range — 110 R/hr (ALARMING)
    - R-11 Containment Particulate Process Monitor — 25K CPM (Aligned to CV)
    - R-12 Containment Gas Process Monitor — 1K CPM (Aligned to CV)
    - All other radiation monitors reading normal
5. Core Exit Thermocouples reading approximately 320°F and stable.
6. RCS Wide Range Pressure is 37 psig and stable.
7. Containment pressure is 30 psig and stable.
8. Containment water level 250 inches and rising.
9. All plant equipment and systems operable and functioning correctly unless otherwise noted above.

INITIATING CUES:

You are the CRS and the SM is not available. Classify this event IAW the EAL MATRIX. Mark the EAL MATRIX appropriately.

START TIME: _______ **TIME CRITICAL START TIME:** ___________

EXAMINER'S NOTE: ONLY PROVIDE THE CANDIDATE(s) WITH HANDOUT A FOR THIS PORTION OF THE JPM.	
STEP 1: Obtain the EAL Matrixes **STANDARD:** Candidate states where to obtain the copies. **EXAMINER'S CUE:** If the Matrixes are normally available where this JPM is being performed, provide the Matrixes, otherwise allow the candidate to use the controlled copy Matrixes. **EXAMINER'S NOTE:** NONE COMMENTS:	___ SAT ___ UNSAT
STEP 2: The "A" CV Spray Pump is tagged out of service for motor replacement **STANDARD:** Candidate determines the single CV Spray pump OOS does not affect the EAL. **EXAMINER'S CUE:** Table F-1 Fission Product Barrier Matrix, Containment Barrier Potential Loss DOES NOT apply. Containment pressure >10psig with <one full train of depressurization equipment operating Note: One Containment Spray System train and one Containment Cooling System train comprise one full train of depressurization equipment. **EXAMINER'S NOTE:** NONE COMMENTS:	___ SAT ___ UNSAT

STEP 3: Plant tripped with a safety injection in progress. **STANDARD:** Candidate determines SI in-progress post reactor trip does not provide enough information to make an EAL declaration. **EXAMINER'S CUE:** NONE **EXAMINER'S NOTE:** NONE COMMENTS:	___ SAT ___ UNSAT
STEP 4: The BOP just announced that Breaker 52/28B, Station Service Transformer 2G to 480V Bus E-2, has tripped and "B" EDG has failed to Auto-Start. **STANDARD:** Candidate determines that E-2 deenergized removes 2nd train of CV Spray and only one train CV HVAC running with CV pressure >10 PSIG **EXAMINER'S CUE:** Table F-1 Fission Product Barrier Matrix, Containment Barrier Potential Loss Does Apply Containment Pressure >10 PSIG with < one full train of depressurization equipment operating **EXAMINER'S NOTE:** 1 Containment Barrier Potential Loss COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 5: R-2 Containment Area Radiation Monitor 75 R/hr (ALARMING) R-7 In-Core Room Area Radiation Monitor 66 R/hr (ALARMING) **STANDARD:** Candidate determines R-2 and R-7 do not exceed EAL setpoints. **EXAMINER'S CUE:** NONE **EXAMINER'S NOTE:** NONE COMMENTS:	___ SAT ___ UNSAT

STEP 6: R-32A Containment High Range 105 R/hr (ALARMING) R-32B Containment High Range 110 R/hr (ALARMING) **STANDARD:** Candidate determines this indicates a Potential Loss of Containment Barrier **EXAMINER'S CUE:** Table F-1 Fission Product Barrier Matrix, Reactor Coolant System Barrier, Loss **DOES** apply. Containment High Range Radiation Monitor R-32A or R-32B > 5 Rem/Hr Table F-1 Fission Product Barrier Matrix, Fuel Cladding Barrier, Loss **DOES** apply. Containment High Range Radiation Monitor R-32A or R-32B > 100 Rem/Hr **EXAMINER'S NOTE:** 1 RCS Barrier Loss 1 Fuel Cladding Barrier Loss COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 9: Declare the highest EAL classification identified within 15 minutes **STANDARD:** Candidate declares **General Emergency: FG1.1**. Loss of any two barriers and potential loss of third barrier within 15 minutes of start time. **EXAMINER'S CUE:** NONE **EXAMINER'S NOTE:** RCS Barrier Loss Fuel Clad Barrier Loss Containment Barrier Potential Loss COMMENTS: **TIME CRITICAL STOP TIME: ___________**	**Critical Step** ___ SAT ___ UNSAT

EXAMINER'S CUE: IF CANDIDATE DOES DETERMINE EAL CLASSIFICATION TO BE A GENERAL EMERGENCY, GIVE THE CANDIDATE HANDOUT B AND DIRECT THE CANDIDATE TO NOW DETERMINE PROTECTIVE ACTION RECOMMENDATIONS BASED ON THIS EVENT.

IF CANDIDATE DOES NOT DETERMINE EAL CLASSIFICATION TO BE A GENERAL EMERGENCY, INFORM THE CANDIDATE THE JPM IS TERMINATED.

STEP 10: Candidate determines that Protective Action Recommendations are determined in accordance with EPCLA-01, Attachment 10.1, Protective Action Recommendations. **STANDARD:** Candidate utilizes EPCLA-01, Attachment 10.1, Protective Action Recommendations, to determine PARs **EXAMINER'S CUE:** NONE **EXAMINER'S NOTE:** Candidate was be provided with EPCLA-01 prior to beginning the JPM. COMMENTS:	___ SAT ___ UNSAT
STEP 11: Candidate determines that the required PARs based on information given. **STANDARD:** Candidate determines to evacuate 2 miles around and 5 miles downwind AND advise the remaining sectors to shelter and listen to EAS. **EXAMINER'S CUE:** NONE **EXAMINER'S NOTE:** NONE COMMENTS:	**Critical Step** ___ SAT ___ UNSAT
STEP 12: Based on wind direction candidate determines which sectors are potentially affected. **STANDARD:** Candidate determines that sectors A-0, A-1, A-2, B-1, B-2, E-1 and E-2 are potentially affected. **EXAMINER'S CUE:** NONE **EXAMINER'S NOTE:** Page 5 of EPCLA-01 Att. 10.1 COMMENTS:	**Critical Step** ___ SAT ___ UNSAT

STEP 13: Determine which sectors are to be evacuated and which are to be sheltered.

STANDARD: Using the table on Page 6 of EPCLA-01 Att. 10.1 the candidate determines the following.

Place a √ in the appropriate block for each sector.			
Radius	**Sector**	**Evacuate**	**Shelter**
2-Mile	A-0	√	
5-Mile	A-1	√	
10-Mile	A-2		√
5-Mile	B-1	√	
10-Mile	B-2		√
5-Mile	C-1		√
10-Mile	C-2		√
5-Mile	D-1		√
10-Mile	D-2		√
5-Mile	E-1	√	
10-Mile	E-2		√

Evacuate Sectors: A-0, A-1, B-1, E-1

Shelter Sectors: A-2, B-2, C-1, C-2, D-1, D-2, E-2

EXAMINER'S CUE: NONE

EXAMINER'S NOTE: Page 6 of EPCLA-01 Att. 10.1

COMMENTS:

END OF TASK

Critical Step

___ SAT

___ UNSAT

Terminating Cue: Candidate has determined the Protective Action Recommendations.

TIME STOP: ___________

HANDOUT B

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the Candidate that this portion of the JPM is NOT time critical.

INITIAL CONDITIONS:

- **All conditions from Handout A remain in effect.**
- **Wind Direction is from 220°.**
- **Wind Speed is 18 mph.**
- **Core damage assessments are not yet available.**
- **Emergency Dose Projections are not yet available.**
- **CV Hydrogen gas concentration is less than 1%.**

INITIATING CUES:

Determine the Protective Action Recommendations based on this event in accordance with EPCLA-01.

HANDOUT A

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

CANDIDATE INFORMATION:

Inform the Operator that **this IS a time critical JPM.**

INITIAL CONDITIONS:

1. The "A" CV Spray Pump is under clearance for motor replacement.
2. The Reactor tripped with an Auto Safety Injection Actuation signal present.
3. The BOP just announced that Breaker 52/28B, Station Service Transformer 2G to 480V Bus E-2, has tripped and "B" EDG has failed to Auto-Start.
4. Radiation monitors as follows:
   - R-2 Containment Area Radiation Monitor 75 R/hr (ALARMING)
   - R-7 In-Core Room Area Radiation Monitor 66 R/hr (ALARMING)
   - R-32A Containment High Range 105 R/hr (ALARMING)
   - R-32B Containment High Range 110 R/hr (ALARMING)
   - R-11 Containment Particulate Process Monitor 25K CPM (Aligned to CV)
   - R-12 Containment Gas Process Monitor 1K CPM (Aligned to CV)
   - All other radiation monitors reading normal
5. Core Exit Thermocouples reading approximately 320°F and stable.
6. RCS Wide Range Pressure is 37 psig and stable.
7. Containment pressure is 30 psig and stable.
8. Containment water level 250 inches and rising.
9. All plant equipment and systems operable and functioning correctly unless otherwise noted above.

INITIATING CUES:

You are the CRS and the SM is not available. Classify this event IAW the EAL MATRIX. Mark the EAL MATRIX appropriately.

This JPM IS Time Critical

Progress Energy

	R **Reference Use**

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 2

PART 5

EPCLA-01

EMERGENCY CONTROL

REVISION 35

SUMMARY OF CHANGES PRR 563481	
SECTION	**REVISION COMMENTS**
2.32	Added EPRAD-03, Dose Projections to the Reference Section.
2.33	Added NRC RIS Issue Summary 2008-26, Clarified Requirements of Title 10CFR50.54(y) When Implementing 10CFR50.54(x) to Depart From a License Condition or Technical Specification to the Reference Section to provide clarification of step 5.4.2.
5.10.3	Added "Actions that have been completed by the previous SEC are not required to be repeated when the emergency classification changes or the SEC position is transferred to a different qualified individual." to prevent duplication of effort when classifications or personnel change.
Att 10.1	This attachment, which is a flowchart for Protective Action Recommendations (PARs), was revised to relocate detailed information associated with decision blocks in the second part of the PAR flowchart (old page 4 of 7) to the appropriate decision block at the beginning of the flowchart (new page 2 of 6). The verbiage has not changed, only the location of the information. This will improve the decision process and user-friendliness by having the needed information on a single page rather than on multiple pages without changing intent. (PRRs 563481 and 564867) (NCR 562180)
Att 10.2	Attachment deleted and information was relocated to the Emergency Classification Attachments. (10.4 – 10.7). Remaining attachments renumbered.

SUMMARY OF CHANGES PRR 563481	
SECTION	**REVISION COMMENTS**
Att 10.5 (old) Att 10.4 (new) Unusual Event	This attachment, which provides guidance for actions necessary to support emergency classification of an Unusual Event, has been overhauled and streamlined. These changes include editorial corrections; relocating the instructions to activate the Emergency Response Data System (ERDS) to a new attachment; adding a step to direct dose projections be performed if a release is in progress; inclusion of the Emergency Notification Form; changes to the selection of information to include in the site announcements; providing alternate locations for the Emergency Communicator (EC) to report if unable to reach the Control Room; providing the Site Emergency Coordinator – Control Room with options for a substitute Emergency Communicator if the assigned EC is not available or able to report to the Control Room, for clarification; and deleting information describing staffing the emergency response facilities to assist with backfeed logistics if the Start-up transformer is lost, backfeed through the auxiliary transformer is possible, and only one emergency diesel is powering it's respective diesel, because this information is no longer applicable due to transition to the NEI 99-01 EAL Scheme. In addition to the changes to the Unusual Event Attachment, the information from the previous Att 10.2, SEC Checklist was added to this attachment. The attachment was modified for each specific classification and updated as follows: 1) added a Note to direct the user to page 3 if the checklist had been completed previously, 2) moved the table with activation requirements to the top and deleted information related to the other classification, 3) added the option to direct the CR-EC to an alternate location if needed, 4) deleted the Event Classification line, 5) added the requirement to activate ERDS within 1 hour, if needed and referenced the new attachment for ERDS activation, 6) relocated the information concerning time requirements for accountability into a NOTE, 7) removed reference to PARs since that is required only in a General Emergency, 8) separated the evacuation location options for improved readability, 9) added a title line "Referenced Procedures" prior to the list of procedures; and 10) deleted checkbox referencing Emergency Communicator Forms in EPNOT-01, because this information is located in EPNOT-01. Sections were reformatted, as necessary, to streamline actions required by the SEC to improve user-friendliness. (PRRs 542585, 548387, 553173, and 563481) (NCRs 537496, 542583 and 542877)

SUMMARY OF CHANGES PRR 563481	
SECTION	**REVISION COMMENTS**
Att 10.6 (old) Att 10.5 (new) Alert	This attachment, which provides guidance for actions necessary to support emergency classification of an Alert, has been overhauled and streamlined. These changes include editorial corrections; relocating the instructions to activate the Emergency Response Data System (ERDS) to a new attachment; adding a step to direct dose projections be performed if a release is in progress; inclusion of the Emergency Notification Form; changes to the selection of information to include in the site announcements; providing alternate locations for the Emergency Communicator (EC) to report if unable to reach the Control Room; and providing the Site Emergency Coordinator – Control Room with options for a substitute Emergency Communicator if the assigned EC is not available or able to report to the Control Room, for clarification. In addition to the changes to the Alert Attachment, the information from the previous Att 10.2, SEC Checklist was added to this attachment. The attachment was modified for each specific classification and updated as follows: 1) added a Note to direct the user to page 3 if the checklist had been completed previously, 2) moved the table with activation requirements to the top and deleted information related to the other classification, 3) added the option to direct the CR-EC to an alternate location if needed, 4) deleted the Event Classification line, 5) added the requirement to activate ERDS within 1 hour, if needed and referenced the new attachment for ERDS activation, 6) relocated the information concerning time requirements for accountability into a NOTE, 7) removed reference to PARs since that is required only in a General Emergency, 8) separated the evacuation location options for improved readability, 9) added a title line "Referenced Procedures" prior to the list of procedures; and 10) deleted checkbox referencing Emergency Communicator Forms in EPNOT-01, because this information is located in EPNOT-01. Sections were reformatted, as necessary, to streamline actions required by the SEC to improve user-friendliness. (PRRs 542585, 548387, 553173, and 563481) (NCRs 537496, 542583 and 542877)

SUMMARY OF CHANGES PRR 563481	
SECTION	**REVISION COMMENTS**
Att 10.7 (old) Att 10.6 (new) Site Area Emergency	This attachment, which provides guidance for actions necessary to support emergency classification of a Site Area Emergency, has been overhauled and streamlined. These changes include editorial corrections; relocating the instructions to activate the Emergency Response Data System (ERDS) to a new attachment; adding a step to direct dose projections be performed if a release is in progress; inclusion of the Emergency Notification Form; changes to the selection of information to include in the site announcements; providing alternate locations for the Emergency Communicator (EC) to report if unable to reach the Control Room; and providing the Site Emergency Coordinator – Control Room with options for a substitute Emergency Communicator if the assigned EC is not available or able to report to the Control Room, for clarification. In addition to the changes to the Site Area Emergency Attachment, the information from the previous Att 10.2, SEC Checklist was added to this attachment. The attachment was modified for each specific classification and updated as follows: 1) added a Note to direct the user to page 3 if the checklist had been completed previously, 2) moved the table with activation requirements to the top and deleted information related to the other classification, 3) added the option to direct the CR-EC to an alternate location if needed, 4) deleted the Event Classification line, 5) added the requirement to activate ERDS within 1 hour, if needed and referenced the new attachment for ERDS activation, 6) relocated the information concerning time requirements for accountability into a NOTE, 7) removed reference to PARs since that is required only in a General Emergency, 8) separated the evacuation location options for improved readability, 9) added a title line "Referenced Procedures" prior to the list of procedures; and 10) deleted checkbox referencing Emergency Communicator Forms in EPNOT-01, because this information is located in EPNOT-01. Sections were reformatted, as necessary, to streamline actions required by the SEC to improve user-friendliness. (PRRs 542585, 548387, 553173, and 563481) (NCRs 537496, 542583 and 542877)

SUMMARY OF CHANGES PRR 563481	
SECTION	**REVISION COMMENTS**
Att 10.8 (old) Att 10.7 (new) General Emergency	This attachment, which provides guidance for actions necessary to support emergency classification of a General Emergency, has been overhauled and streamlined. These changes include editorial corrections; relocating the instructions to activate the Emergency Response Data System (ERDS) to a new attachment; adding a step to direct dose projections be performed if a release is in progress; inclusion of the Emergency Notification Form; changes to the selection of information to include in the site announcements; providing alternate locations for the Emergency Communicator (EC) to report if unable to reach the Control Room; and providing the Site Emergency Coordinator – Control Room with options for a substitute Emergency Communicator if the assigned EC is not available or able to report to the Control Room, for clarification. In addition to the changes to the General Emergency Attachment, the information from the previous Att 10.2, SEC Checklist was added to this attachment. The attachment was modified for each specific classification and updated as follows: 1) added a Note to direct the user to page 3 if the checklist had been completed previously, 2) moved the table with activation requirements to the top and deleted information related to the other classification, 3) added the option to direct the CR-EC to an alternate location if needed, 4) deleted the Event Classification line, 5) added the requirement to activate ERDS within 1 hour, if needed and referenced the new attachment for ERDS activation, 6) relocated the information concerning time requirements for accountability into a NOTE, 7) separated the evacuation location options for improved readability,8) added a title line "Referenced Procedures" prior to the list of procedures; and 9) deleted checkbox referencing Emergency Communicator Forms in EPNOT-01, because this information is located in EPNOT-01. Sections were reformatted, as necessary, to streamline actions required by the SEC to improve user-friendliness. (PRRs 542585, 548387, 553173, and 563481) (NCRs 537496, 542583 and 542877)
Att 10.9 (old) Att 10.8 (new)	Added "**IF** a radiological release is in progress, **THEN DIRECT** the performance of dose projections using EPRAD-03, Dose Projections. (NCR 537496)

SUMMARY OF CHANGES PRR 563481	
SECTION	**REVISION COMMENTS**
Att 10.10 (old)	Deleted the attachment because the actions to take in the event of an airborne threat are located in AOP-034, Security Events. Reference to AOP-034 is included in each of the Emergency Classification attachments (10.4 – 10.7). Renumbered the following attachments.
Att 10.10 (new)	This is a new attachment that provides instructions on the activation of the Emergency Response Data System (ERDS). This section was created to support the changes made to Att 10.4 – 10.7. The instructions for the activation of ERDS were previously located in each of these attachments. As a result, each classification attachment contained duplicate information. As part of the streamlining process these instructions were removed from each classification attachment and located in a new attachment. PRR 552078

TABLE OF CONTENTS

1.0 PURPOSE

1.1 To provide consolidated guidance for classifying emergencies from the Control Room or Technical Support Center (TSC).

1.2 To implement and direct site response to emergency situations, as required by the Robinson Emergency Plan.

2.0 REFERENCES

2.1 NUREG-0654 II.D

2.2 10CFR50.47(b)(4)

2.3 10CFR72.32 (d)

2.4 ALL Conditions EAL Matrix

2.5 HOT Conditions EAL Matrix

2.6 COLD Conditions EAL Matrix

2.7 EAL Technical Bases Document

2.8 OMM-003, Fire Protection Pre-Plans

2.9 FP-001, Fire Emergency

2.10 SEC-NGGC-2141, Fitness For Duty, Unscheduled Work Call Outs

2.11 PLP-007, Robinson Emergency Plan

2.12 EPNOT-01, CR/EOF Emergency Communicator

2.13 EPSPA-02, First Aid and Medical Care

2.14 AOP-034, Security Events

2.15 EPSPA-01, Evacuation and Accountability

2.16 EPSPA-03, Administration of Potassium Iodide

2.17 EPOSC-01, Operational Support Center Leader

2.18 EPOSC-04, Emergency Work Control

2.19 AOP-030, NRC Reporting Requirements

2.20 RNP-RA/98-0014, Response to NRC Inspection Report No. 50-261/97-13

2.21 RNP-RA/05-0082, Response to NRC Bulletin 2005-02, Emergency Preparedness and Response Actions for Security-Based Events

2.22 NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants

2.23 EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, U.S. Environmental Protection Agency, Washington, D.C., May 1992

2.24 NRC Regulatory Issue Summary 2005-08, Range of Protective Actions For Nuclear Power Plant Incidents

2.25 NRC Interim Compensatory Measures Order, Section B.5.b

2.26 NRC Regulatory Issue Summary 2007-02, Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events

2.27 NEI 99-01 Revision 4, Methodology for Development of Emergency Action Levels

2.28 CAPR 258209, GE Declaration during Graded Exercise

2.29 EMG-NGGC-0005, Activation Of The Emergency Response Organization Notification System

2.30 EPEOF-10, Recovery Manager And Recovery Operations

2.31 NSIR/DPR-ISG-01, Interim Staff Guidance

2.32 EPRAD-03, Dose Projections

2.33 NRC RIS Issue Summary 2008-26, Clarified Requirements of Title 10CFR50.54(y) When Implementing 10CFR50.54(x) to Depart From a License Condition or Technical Specification

3.0 RESPONSIBILITIES

3.1 The Site Emergency Coordinator (SEC) has immediate and unilateral authority to implement this procedure.

3.2 The SEC may not delegate:

3.2.1 The decision to notify offsite authorities;

3.2.2 Making offsite Protective Action Recommendations (PAR);

3.2.3 Classifying or terminating the emergency;

3.2.4 Authorizing exposures in excess of 10 CFR 20 limits during a declared emergency.

3.3 The Shift Manager will:

3.3.1 Classify events, in accordance with the EALs.

3.4 The SEC will:

3.4.1 Implement this procedure upon recognizing off normal conditions.

3.4.2 Coordinate combined response, until relieved by another qualified SEC.

3.5 The responsibility to notify offsite authorities, make offsite Protective Action Recommendations and terminate an emergency transfers to the Emergency Response Manager (ERM) upon activation of the Emergency Operations Facility (EOF).

3.6 The SEC may authorize exposure in excess of routine yearly limits for saving of life or protecting valuable equipment, per EPOSC-04, Emergency Work Control.

3.7 The SEC is the decision maker to determine if an **Emergency Release** (radioactive) is in progress. An Emergency Release affects or has the potential to affect offsite environments. To assist in this determination, the definition of a gaseous **Emergency Release** (radioactive) is any of the below:

3.7.1 An approved monitored release was occurring, **AND** the reading on the radiation monitor designated to monitor this release increases due to the event.

3.7.2 Any release due to the event that was not previously approved.

3.7.3 Anytime a primary-to-secondary leak causes an emergency declaration, a release should be considered "in progress".

A liquid Emergency Release is any of the following:

3.7.4 An approved monitored release was in progress and the reading on the radiation monitor designated to monitor this release increases but does not isolate on an alarm signal.

3.7.5 The rupture of a system which releases radioactive liquids into an area that affects or has the potential to affect an offsite environment.

4.0 PREREQUISITES

4.1 In the judgment of the Shift Manager or CRS, an off-normal condition exists.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Procedure steps which have been previously implemented as the result of earlier classifications need not be repeated, unless warranted by changing conditions, for example, sounding of the site evacuation alarm for both Site Area Emergency and General Emergency.

5.2 To the extent practical, emergency response activities should be accomplished in parallel to expedite notification of offsite agencies.

5.2.1 Notifications should be made per EPNOT-01, CR/EOF Emergency Communicator.

5.3 Time is of the essence when conducting and approving dose projections. Dose projection results may escalate or preclude emergency declarations. [CAPR 258209]

5.4 Dynamic situations which arise in an emergency condition may require that steps be performed out of sequence or alternate methods devised to accomplish the intent of the step.

5.4.1 Deviations which do not violate license requirements may be approved by the SEC or ERM.

5.4.2 Deviations which violate license requirements shall be implemented, per 10 CFR 50.54 (x, y, and z). This requires approval, as a minimum, by a licensed Senior Reactor Operator (SRO). Approval may be obtained by a person in a position of authority greater than the licensed SRO.

5.5 **IF** electronic documents are not available, **THEN** use manual methods.

5.6 Only valid indications should be used for determination of EALs. **IF** the validity of instrumentation is suspect, **THEN** attempts should be made to ensure the information used is accurate.

5.7 Dose projections are used during the evaluation of EALs. They are to be reviewed and approved by the Radiological Control Manager (RCM) upon activation of the EOF and then immediately communicated to the SEC.

5.8 Emergency Classifications

5.8.1 It is the expectation that the time between when indications exist that an EAL threshold has been exceeded and declaration of the event will not exceed 15 minutes, unless extraordinary conditions prevail.

5.8.2 For EAL thresholds that specify duration of the off-normal condition, the declaration process shall run concurrently with the specified threshold duration. 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. (NSIR/DPR-ISG-01)

5.8.3 Although the majority of the EALs provide very specific thresholds, the SEC must remain alert to events or conditions that lead to the conclusion that exceeding the EAL threshold is imminent.

5.8.4 **IF** in the judgment of the SEC, an imminent situation is at hand, **THEN** the classification should be made as if the threshold has been exceeded.

5.9 **IF** conditions warrant the issuance of offsite Protective Action Recommendations (PARs), **THEN** the classification of General Emergency is required.

5.10 While In a Classified Emergency:

5.10.1 Emergency response personnel shall continuously review the Emergency Action Levels and Fission Product Barrier Thresholds to ensure appropriate event classification.

5.10.2 If an Emergency Action Level threshold is exceeded for an emergency classification higher than currently declared, the Site Emergency Coordinator shall re-classify the event to the appropriate level and initiate all required notifications.

5.10.3 Actions that have been completed by the previous SEC are not required to be repeated when the emergency classification changes or the SEC position is transferred to a different qualified individual.

5.11 Transitory Events, Spikes and Spurious Indications

5.11.1 There may be cases in which a plant condition that exceeded an EAL threshold was not recognized at the time of occurrence, but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable, and the guidance of NUREG-1022 should be applied.

5.11.2 In the case of a “spike” in a plant indication or event which rapidly exceeds and then decreases below an Emergency Action Level threshold, entry into the Emergency Plan or escalation to a higher classification "in retrospect" is not appropriate, unless the “spike” is indicative of continuing degrading conditions which will lead to an escalated emergency classification level. Examples include momentary steam generator level shrink following reactor trip or brief wind gusts in excess of classifiable levels.

5.11.3 Spurious alarms or parameters, which are known to be invalid indicators of actual plant conditions or of the emergency classification, should not be used to declare emergency classifications.

5.12 Downgrading an Emergency

5.12.1 Downgrading of an emergency can be accomplished by declaring the lower emergency class whenever the plant conditions improve to satisfy the affected emergency action levels.

5.12.2 The following guidelines apply when downgrading an Emergency:

1. **IF** the Position of Emergency Response Manager is activated, **THEN** the ERM should be consulted before downgrading occurs, although the final decision rests with the Site Emergency Coordinator.

2. **IF** the NRC Director of Site Operations position is activated, **THEN** this individual should be consulted before downgrading occurs, although the final decision rests with the Site Emergency Coordinator

3. **IF** offsite protective action recommendations have been made, **THEN** the Site Emergency Coordinator shall consult with the Emergency Response Manager if the position is activated, **AND** consult with state and county authorities, prior to downgrading. It is recommended that any offsite protective action recommendations be completed prior to downgrading of a General Emergency.

4. For Alert **OR** higher classifications, unless the conditions causing emergency action levels are very quickly resolved (less than approximately 30 minutes), downgrading should not occur until after the Technical Support Center is activated.

5. **IF** the process of activating the TSC is in progress, **THEN** downgrading should NOT occur until after TSC activation.

5.13 Recovery actions should follow guidance provided within PLP-007, Robinson Emergency Plan and EPEOF-10, Recovery Manager and Recovery Operations, on Recovery.

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

N/A

8.0 **INSTRUCTIONS**

8.1 Declarations

CAUTION
Time is of the essence when conducting and approving dose projections. Dose projection results may escalate or preclude emergency declarations. [CAPR 258209]

8.1.1 **IF** at any time a General Emergency declaration is warranted, **THEN** the Site Emergency Coordinator/ Shift Manager is to immediately declare a General Emergency **AND** carry out the actions specified by the procedure.

8.1.2 **IF** an event is recognized warranting other than a General Emergency, **THEN** the SEC/Shift Manager is to continue evaluating all applicable EALs to ensure the highest level of emergency warranted is declared.

NOTE:	All classifications are to be based upon VALID indications, reports or conditions. Indications, reports or conditions are considered VALID when they are verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment. Blanks are provided for place keeping only, logs are the official record.

8.2 **WHEN** indications of abnormal conditions or events exist, **THEN VERIFY** the symptoms/indications **AND COMPARE** the Emergency Action Levels and Fission Product Barrier Thresholds.

8.3 **IDENTIFY** the highest applicable emergency classification level (if multiple EALs are exceeded) for which an EAL has been met or exceeded considering the following:

8.3.1 **EVALUATE** ALL Conditions EAL Matrix under all conditions. _____

8.3.2 **IF** Reactor Coolant temperature is > 200 °F, **THEN EVALUATE** HOT Conditions EAL Matrix. _____

8.3.3 **IF** Reactor Coolant temperature is $\leq$ 200 °F, **THEN EVALUATE** COLD Conditions EAL Matrix. _____

8.3.4 **ANNOUNCE** to Control Room personnel that you are assuming the position of SEC. _____

8.3.5 **IF** the EOF is activated, **THEN** review and complete Attachment 10.3. ______

8.3.6 **IF** an Unusual Event has been declared, **THEN PROCEED** to Attachment 10.4 for an Unusual Event. ______

8.3.7 **IF** an Alert has been declared, **THEN PROCEED** to Attachment 10.5 for an Alert. ______

8.3.8 **IF** a Site Area Emergency has been declared, **THEN PROCEED** to Attachment 10.6 for a Site Area Emergency. ______

8.3.9 **IF** a General Emergency has been declared, **THEN PROCEED** to Attachment 10.7 for a General Emergency. ______

9.0 RECORDS

9.1 Records generated during a declared emergency should be forwarded to the Emergency Preparedness Unit.

10.0 ATTACHMENTS

10.1 PROTECTIVE ACTION RECOMMENDATIONS

10.2 EMERGENCY NOTIFICATION FORM DATA

10.3 TURNOVER/BRIEFING CHECKLIST

10.4 UNUSUAL EVENT

10.5 ALERT

10.6 SITE AREA EMERGENCY

10.7 GENERAL EMERGENCY

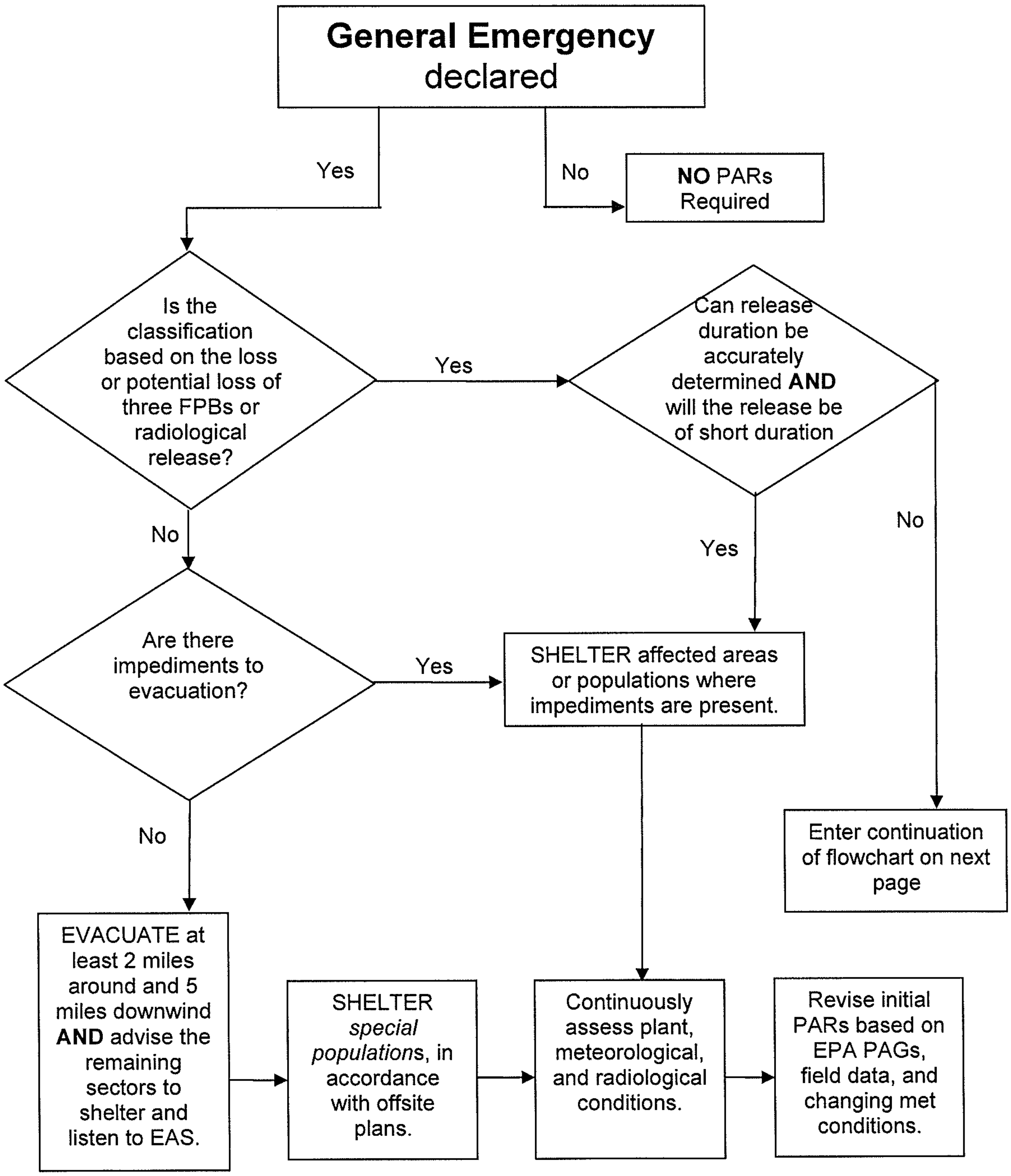
10.8 CR EMERGENCY CONTROL QUICK START GUIDE

10.9 LIST OF TOXIC, ASPHYXIANT and FLAMMABLE GASES

10.10 ERDS ACTIVATION

PROTECTIVE ACTION RECOMMENDATIONS

FLOWCHART



PROTECTIVE ACTION RECOMMENDATIONS

NOTE: Accidents which result in a direct release pathway to the environment (for example, a faulted and ruptured S/G with water level below the tube bundles, S/G Narrow Range < 25% normal containment conditions or < 40% adverse containment conditions, and a relief valve open would provide such a pathway) will most likely be thyroid dose limiting. For circumstances involving this type of accident sequence:

a. Consider **any** Fuel Cladding Barrier loss sufficient to warrant the determination that substantial core damage has occurred.
b. Consider **any** RCS Barrier loss sufficient to warrant the determination that a significant loss of reactor coolant has occurred

Enter PARs from flowchart on previous page

YES

Condition 1 - Substantial Core Damage Imminent or has occurred

a. Core damage estimates greater than 1% Melt.
b. Core Exit Thermocouples readings > 2300 degrees F°.
c. Core uncovered > 30 minutes.
d. **IF** accident results in a direct release pathway to the environment **THEN** refer to above NOTE.

NO

YES

Condition 2 - A significant loss of reactor coolant imminent or has occurred.

a. Containment Radiation Monitors reading >10,000 R/hr with no containment spray or >4,000 R/hr with containment spray on.
b. Containment hydrogen gas concentration >1%.
c. Rapid vessel depressurization.
d. A large break loss of coolant accident.
e. **IF** accident results in a direct release pathway to the environment **THEN** refer to above NOTE.

NO

YES

Condition 3 Containment Failure (Primary or S/G) imminent or has occurred.

a. A release of radioactivity cannot be maintained below General Emergency EAL criteria.
b. Primary Containment pressure cannot be maintained below the design basis pressure of 42 psig.
c. Primary containment H_2 gas concentration cannot be maintained below combustible limits of 4% by volume.
d. Faulted/ruptured steam generator with a relief valve open.

NO

YES

Evacuate 5 Mile Radius & 10 Miles Downwind. Shelter All Remaining Sectors.

EVACUATE at least 2 miles around and 5 miles downwind **AND** advise the remaining sectors to shelter and listen to EAS.

PROTECTIVE ACTION RECOMMENDATIONS

GUIDANCE

1. The remaining sectors should be advised to go indoors and monitor the Emergency Alert System (EAS).

2. Sheltering of all sectors should be considered if evacuation poses a higher risk to the public health and safety. The following are examples of these conditions: A General Emergency has been declared and inclement weather is imminent, or a security event with no emergency release.

3. Sheltering should be considered for short term releases. **IF** the release duration cannot be readily or accurately determined, **AND** dose or plant conditions warrant, **THEN** evacuation should be recommended.

4. The offsite agencies are ultimately responsible for making PAR decisions. However when known impediments, i.e. weather conditions, known route restrictions, etc., will hamper evacuation recommendations, then sheltering should be considered.

5. Maximizing the effectiveness of sheltering should be considered. An example of this is:

    a. The use of qualitative methods for determining the effectiveness of sheltering (certain plant or radiological conditions exist that may increase or decrease dose) **OR**

    b. The use of quantitative methods for determining the effectiveness of sheltering (comparison of sheltering versus evacuation doses).

6. A protective action recommendation may not be reduced from the initial recommendation for any sector until the release is terminated, and the decision is coordinated with the state and counties.

7. A protective action required for any portion of a sector requires that action be implemented for the entire sector.

8. Containment monitors can provide indication of both core damage and RCS Barrier loss. Monitor values used to determine a specific amount of core damage are dependent on plant conditions, power history and time after shutdown. Monitor readings used to quantify an amount of damage or coolant leakage should be complimented by other indications and engineering judgment.

PROTECTIVE ACTION RECOMMENDATIONS
EPA PROTECTIVE ACTION GUIDE (PAGS)

FOR THE EARLY PHASE*

NOTE:	Protective Action Recommendations (PARs) should be extended to the point (**beyond the 10 mile EPZ**, as necessary) where protective action guideline doses (i.e., $\geq$ 1 Rem TEDE or $\geq$ 5 Rem CDE (thyroid)) **WILL NOT** be exceeded.

PROTECTIVE ACTION	PAG	COMMENTS
Evacuate	1 Rem TEDE	**IF** the Total Effective Dose Equivalent (TEDE) dose within a sector whose PAR is Shelter exceeds the PAG, **THEN** change the PAR for that sector to evacuate. (NCR 00144287)
Evacuate	5 Rem CDE	**IF** the Committed Dose Equivalent (CDE) dose to the thyroid within a sector whose PAR is Shelter exceeds the PAG, **THEN** change the PAR for that sector to evacuate. (NCR 00144287)

*The Early Phase is the time between the beginning of an incident and when the incident source and releases have been brought under control.

PROTECTIVE ACTION RECOMMENDATIONS

NOTE: Conditions identified represent most limiting conditions. For determining sectors to Shelter / Evacuate, either the table below or the sector map may be used.

(EVACUATION TIME IN MINUTES)[2]

WIND FROM	POTENTIALLY[1] AFFECTED SECTORS	WINTER WEEKDAY, FAIR WEATHER	WINTER WEEKNIGHT, FAIR WEATHER	SUMMER WEEKDAY, FAIR WEATHER	WINTER WEEKDAY, ADVERSEW EATHER
North (>328° - ≤ 015°)	A-0, B-1, B-2, C-1, C-2, D-1, D-2	225	180	210	295
Northeast (>015° - ≤ 078°)	A-0, C-1, C-2, D-1, D-2, E-1, E-2	225	180	210	295
East (>078° - ≤ 112°)	A-0, D-1, D-2, E-1, E-2	225	180	210	295
Southeast (>112° - ≤ 157°)	A-0, A-1, A-2, D-1, E-1, E-2	225	180	210	295
South (>157° - ≤ 202°)	A-0, A-1, A-2, B-1, B-2, E-1, E-2	225	180	210	295
Southwest (>202° - ≤ 247°)	A-0, A-1, A-2, B-1, B-2, E-1, E-2	225	180	210	295
West (>247° - ≤ 292°)	A-0,A-1, A-2, B-1, B-2, C-1, C-2	225	180	210	295
Northwest (>292° - ≤ 328°)	A-0, B-1, B-2, C-1, C-2, D-2	225	180	210	295
	ALL ZONES (10 MILE RADIUS)	240	180	215	315

1. Minimum recommendation for General Emergency is A-0 (2 mile radius) and affected (downwind) 5 mile radius sectors. The remaining sectors should be advised to shelter and monitor the Emergency Alert System (EAS).

2. Times listed are estimates based on evacuation times listed in the Emergency Plan.

PROTECTIVE ACTION RECOMMENDATIONS

(ENF Line 5 B & C)

Place a √ in the appropriate block for each sector.			
Radius	**Sector**	**Evacuate**	**Shelter**
2-Mile	A-0		
5-Mile	A-1		
10-Mile	A-2		
5-Mile	B-1		
10-Mile	B-2		
5-Mile	C-1		
10-Mile	C-2		
5-Mile	D-1		
10-Mile	D-2		
5-Mile	E-1		
10-Mile	E-2		

(ENF Line 5 D) **Consider the use of KI (Potassium Iodide) in accordance with State plans and policy.** (circle one) **YES** **NO**

(ENF Line 5 E) **Other** (specify): ____

____

Recommended By / Date / Time: ______________________________ / __________ / ______
RCD OR RCM

Approved By / Date / Time: ______________________________ / __________ / ________
SEC OR ERM

EMERGENCY NOTIFICATION FORM DATA

The following data needs to be provided to the Emergency Operations Facility (EOF) for all emergency classification changes, release status changes, release significance changes, plant condition changes, reactor trips, and during each briefing between facilities. See following page for assistance in determining the categorization of ENF Lines 6 - 8.

(ENF LINE)

- **EMERGENCY CLASSIFICATION:**

  ___A- UNUSUAL EVENT ___B- ALERT ___C- SITE AREA EMERGENCY

  ___D- GENERAL EMERGENCY

BASED ON EAL #_______________ EAL DESCRIPTION: ____________________________________

____

____

6. EMERGENCY RELEASE: ___ A- None ___B- Is Occurring ___C- Has Occurred

7. RELEASE SIGNIFICANCE:

___A- Not applicable ___B- Within normal operating limits

___C- Above normal operating limits ___D- Under evaluation

8. EVENT PROGNOSIS: ___A- Improving ___B- Stable ___C- Degrading

10. ___A- DECLARATION ___B_ TERMINATION Time ___________ Date _____/______/_______

12. Unit Status: U2 _______% Power Shutdown at Time _________ Date _____/______/_______

EMERGENCY NOTIFICATION FORM DATA

"Emergency Release is Occurring OR has Occurred"

Emergency release is defined as:

- An approved monitored release was occurring, and the reading on the radiation monitor designated to monitor this release increases due to the event.
- Any release due to the event that was not previously approved.
- Anytime a primary to secondary leak causes an emergency declaration, a release should be considered "is occurring".

"Release Significance"

- IF no emergency release has occurred, THEN select Not Applicable.
- IF an emergency release is in progress or has occurred, AND the release significance has not been determined (no dose projection completed), THEN select *Under Evaluation*.
- IF a dose projection has been completed; THEN IF the projected dose rate at the site boundary is below 25 mRem TEDE AND 75 mRem Thyroid CDE, THEN mark Line 7 as *Within Normal Operating Limits.* Otherwise mark Line 7 as *Above Normal Operating Limits.*

"Event Prognosis"

- *Degrading* – There is a probable escalation of the emergency classification, continued deterioration of plant conditions, or an increase in protective action recommendations.
- *Stable* – There are no expected changes in emergency classifications, plant conditions, or protective action recommendations.
- *Improving* – There is a probable downgrade in emergency classification; plant systems are being returned to service; or a probable reduction in protective action recommendations.

TURNOVER / BRIEFING CHECKLIST

Date/Time:____________ (Use ERFIS time)

A) Emergency Classification

Time Declared: _________ (24 hr)

❑ Unusual Event ❑ Alert
❑ Site Area ❑ General

Provide a brief summary of the event and mitigating actions in progress:

EAL: ________________________________

B) Fission Product Barrier Status

	Fuel	RCS	Cnmt
Intact:	❑	❑	❑
Potential Loss:	❑	❑	❑
Loss:	❑	❑	❑

C) Plant Conditions

❑ On-Line ❑ At Power: ______%
❑ Off-Line ❑ Cooling Down
❑ Cold Shutdown

Time of Rx Shutdown: _________ (24 hr)

Prognosis
❑ Stable ❑ Improving ❑ Degrading

Describe plant and recent activities ______________

Describe equipment, instrument, or other problems including equipment that is out of service due to clearance, failures or other conditions:

ERDS Status: ❑ On-Line ❑ Off-Line
ERFIS Status: ❑ On-Line ❑ Off-Line

D) Radiological Release

❑ None ❑ Controlled
❑ Is Occurring ❑ Uncontrolled
❑ Has Occurred ❑ Below PAGs
❑ Above PAGs

Time Started: __________ (24 hr)
Time Stopped: __________ (24 hr)
Noble Gas: __________ Ci/sec
Iodines: __________ Ci/sec
Projected Duration: __________ hours

Environmental Monitoring Team activities:

E) Personnel Status

Missions in plant: ❑ No ❑ Yes

Location of in-plant teams/personnel:________

Injuries (No._____): ❑ No ❑ Yes
Contamination(s): ❑ No ❑ Yes
Over Exposure(s): ❑ No ❑ Yes
❑ Minor ❑ Major

Details (names of injured, status of family notification):

F) Offsite Assistance Requested

❑ None
❑ Medical _______ (24 hr)
❍ Ambulance
❑ Darlington Fire Department _______ (24 hr)
❑ Shaw AFB Fire Department _______ (24 hr)
❑ Darlington County Sheriff _______ (24 hr)
❑ S.L.E.D. _______ (24 hr)
❑ F.B.I. _______ (24 hr)
❑ Non-RNP Progress Energy support. _______ (24 hr)

TURNOVER / BRIEFING CHECKLIST

Date/Time:____________ (Use ERFIS time)

G) Onsite Protective Actions

- ❑ None
- ❑ Assembly/Accountability ________________
- ❑ Local Area(s) Evacuated ________________
- ❑ Protected Area Evacuated
- ❑ Site Evacuated
- ❑ Potassium Iodide Issued
- ❑ Employee Info Phone #: (800) 858-0036

H) Offsite Notifications (last issued)

State/County	Time: ________	(24 hr)
NRC (TSC after T/O)	Time: ________	(24 hr)
News Release	Time: ________	(24 hr)
Hospital	Time: ________	(24 hr)
INPO	Time: ________	(24 hr)
ANI	Time: ________	(24 hr)

I) Security/Fire (this section only required for security events or large scale fires)

- ❑ N/A
- ❑ Security Event
  - ○ Ground
  - ○ Air
  - ○ Water
- ❑ Fire Event
  - ○ Aircraft
  - ○ Explosion
  - ○ Other _____

Area Threatened: ________________________

Command Post Location: ________________

Incident Commander: ________________

Off-site Agency Support: ________________

Personnel Staging: ________________

Equipment Staging: ________________

J) PARs

❑ None

(Circle the affected sectors)

❑ Evacuate: A-0 A-1 B-1 C-1 D-1 E-1 A-2 B-2 C-2 D-2 E-2

❑ Shelter: A-0 A-1 B-1 C-1 D-1 E-1 A-2 B-2 C-2 D-2 E-2

❑ Consideration of the use of KI

K) Offsite Facility Activation Status

❑ Darlington County EOC:	_______	(24 hr)
❑ Chesterfield County EOC:	_______	(24 hr)
❑ Lee County EOC:	_______	(24 hr)
❑ State EOC:	_______	(24 hr)
❑ NRC Incident Response Center:	_______	(24 hr)

L) Offsite Actions/Response

- ❑ None
- ❑ Evacuations (Circle the affected sectors)
  - ○ A-0 A-1 B-1 C-1 D-1 E-1 A-2 B-2 C-2 D-2 E-2
  - ○ Schools
  - ○ Daycares
  - ○ Hospitals
  - ○ Assisted Living
  - ○ Lake
  - ○ Other: ________________
- ❑ Shelter: (Circle the affected sectors)
  - ○ A-0 A-1 B-1 C-1 D-1 E-1 A-2 B-2 C-2 D-2 E-2
- ❑ KI administered to the General Public
- ❑ Sirens Activated: ________ (24 hr)
- ❑ EAS Activated: ________ (24 hr)

M) Facility Activation Status

If TSC is not ready for activation, can the TSC accept responsibility for:

Notification to NRC: ❑ N/A ❑ No ❑ Yes

If EOF is not yet ready for activation, can the EOF accept responsibility for:

Emergency Communicator Communications to State and Counties (ENF must still be approved by SEC)

❑ No ❑ Yes

Dose Assessment ❑ No ❑ Yes

❑ EOF Fully Activated:	_______	(24 hr)
❑ TSC Fully Activated:	_______	(24 hr)
❑ OSC Fully Activated:	_______	(24 hr)
❑ JIC Fully Activated:	_______	(24 hr)
❑ RERF Fully Activated:	_______	(24 hr)

Additional comments should be recorded on the reverse side or in electronic logging.

UNUSUAL EVENT

CONTROL ROOM SEC CHECKLIST

NOTE:	Proceed to page 3 of this attachment if the checklist was completed previously

Classification	Facility Activation	Site Evacuation	ERDS Activation
Unusual Event	SEC Decision	SEC Decision	SEC Decision

- ☐ Time Event Declared: ____________ Notification Due By: ____________
- ☐ Direct the CR-EC to report to the Control Room or alternate location to support emergency notification activities.
- ☐ Make site-wide PA Announcement about the event.
- ☐ WebEOC – User = SSO/SEC-CR – No Password – Select EN form – Select Create Draft
- ☐ If conditions warrant, call the Shift RC Tech to the Main Control Room to perform Habitability analyses.
- ☐ Activate ERDS within 1 hour, if needed, using Attachment 10.10.

NOTE: To meet regulatory requirements, accountability for personnel inside the protected area is required within 30 minutes of the declaration of a SAE or GE. This includes names of missing personnel. If accountability is delayed due to adverse site conditions (e.g., hostile action), accountability must be completed as promptly as is practical once the site is secure.

- ☐ For Site Evacuation;
  - o Wind from 135 to 340 evacuate to Admin Building Lower Level,
  - o Wind from 341 to 134 evacuate to the South End of Building 110 next to the lake.
- ☐ Complete Emergency Notification Form – Approve and Fax.
- ☐ Emergency Communicator Performs ENF and NRC Notifications.
- ☐ Prepare for facility turnover to the TSC, using EPCLA-01, Attachment 10.3.

<u>Referenced Procedures</u>
EPNOT-01 – CR/EOF Emergency Communicator
EPSPA-01 – Evacuation and Accountability
EPSPA-02 – First Aid and Medical Care
EPSPA-03 – Administration of Potassium Iodine
EPCLA-04 – Emergency Action Level Technical Bases Document
EPOSC-04 – Emergency Work Control

Emergency Notification Form Information

"Emergency Release is Occurring OR has Occurred"
Emergency release is defined as:

- An approved monitored release was occurring, and the reading on the radiation monitor designated to monitor this release increases due to the event.
- Any release due to the event that was not previously approved.
- Anytime a primary to secondary leak causes an emergency declaration, a release should be considered "is occurring".

"Release Significance"

- IF no emergency release has occurred, THEN select Not Applicable.
- IF an emergency release is in progress or has occurred, AND the release significance has not been determined (no dose projection completed), THEN select *Under Evaluation*.
- IF a dose projection has been completed; THEN IF the projected dose rate at the site boundary is below 25 mRem TEDE AND 75 mRem Thyroid CDE, THEN mark Line 7 as *Within Normal Operating Limits*. Otherwise mark Line 7 as *Above Normal Operating Limits*.

"Event Prognosis"

- *Degrading* – There is a probable escalation of the emergency classification, continued deterioration of plant conditions, or an increase in protective action recommendations.
- *Stable* – There are no expected changes in emergency classifications, plant conditions, or protective action recommendations.
- *Improving* – There is a probable downgrade in emergency classification; plant systems are being returned to service; or a probable reduction in protective action recommendations.

UNUSUAL EVENT

NOTE:	The steps in this attachment may be performed in any order or concurrently.

CAUTION

The Shift Manager/SEC may NOT direct other individuals to perform the following actions:

- The decision to notify offsite authorities;
- Classifying or terminating the emergency
- Authorizing exposures in excess of 10CFR20 limits during a declared emergency

1. **DIRECT** the Emergency Communicator (EC) to immediately report to the Control Room or alternate location if access to the Control Room is not possible. Options may include the WCC, TSC or EOF.

2. **IF** the EC is not available, **THEN DESIGNATE** an alternate qualified individual such as another AO, the CRS or SM.

3. **INFORM** the crew that an UNUSUAL EVENT has been declared.

NOTE:	PA announcements will remain the responsibility of the Control Room.

4. **DIRECT** the "VLC" switch be placed in “Emergency".

NOTE: Assembly of non-essential personnel is not required at an UNUSUAL EVENT. Consider hazards that may exist onsite to determine if assembly is needed or personnel should shelter in place. Safety of plant personnel is the priority.

If the ERO will be activated, then activations should occur within five (5) minutes of the emergency classification.

The SEC **OR** the EC can contact Security for activation of the ERO.

5. **IF** activation of the ERO is necessary, **THEN INITIATE** actions to activate the ERO, using EMG-NGGC-0005 and EPNOT-01.

   a. **IF** the emergency is a Security event, **THEN DIRECT** the EC to activate the ERO.

   b. **IF** the emergency is for other reasons, **THEN DIRECT** Security to activate the ERO.

6. **PROVIDE** the following to be used for activation.

   a. Emergency Classification: UNUSUAL EVENT

   b. **IF** facility activation is desired, **THEN DESIGNATE** the location the ERO will report to by circling

      i. Onsite (Normal) Facility

      ii. Remote (Rail Road Avenue) Facility

   c. **DESIGNATE** the type of Notification by circling

      i. Emergency

      ii. Drill/Training

7. **OBTAIN** wind direction.

NOTE: Shift Manager/Site Emergency Coordinator may select any of the announcement options or create a message at his/her discretion.

CAUTION
Consider hazards on-site, such as toxic gas, when deciding an assembly location.
During a security event, delaying the announcement to staff the facilities and moving non-essential personnel until movement is safe will provide an additional measure of protection for site personnel.

8. **PREPARE** site wide announcement **AND SELECT** an assembly area if needed.

   a. **DETERMINE** the appropriate Emergency Response Facilities based on habitability and accessibility **AND SELECT** in step 10.

   b. **IF** assembly of non-essential personnel is desired**, THEN DETERMINE** the location based on wind direction **AND SELECT** in Step 10.

      i. Winds from 135 to 340 degrees - Interior lower level Unit 2 Administrative Building.

      ii. Winds from 341 to 134 degrees - South end of Building 110 next to Lake Robinson.

   c. **DETERMINE** if non-essential personnel should shelter in place.

NOTE: To avoid confusion, a site evacuation should only be initiated once. This announcement can be made by the SEC or EC.

9. **IF** assembly is desired**, THEN DIRECT** the site evacuation alarm to be sounded for 5 seconds and repeated as necessary.

10. **ANNOUNCE**:

Attention all personnel, attention all personnel, at ___________ (state time of declaration) an UNUSUAL EVENT has been declared.

a. ***No facility activation is required.***

b. ***All Emergency Response personnel report to:***

☐ **the normal ERO facilities.**

☐ **the Remote Emergency Response Facility.**

☐ ***All non-essential personnel remain clear of the emergency response facilities*** (and, if necessary, the areas near the event location)."

☐ ***All non-essential Personnel report to***

☐ **Interior Lower Level of the Unit 2 Administrative Building**

☐ **South End of Building 110 next to Lake Robinson immediately.**"

☐ ***All non-essential Personnel shelter in place***

Use of the Public Address System is restricted to emergency communications only"

11. **IF** assembly of non-essential personnel was directed, THEN **REPEAT** the sounding of the site evacuation alarm.

12. **REPEAT** the announcement created in Step 10.

13. **IF** a radiological release is in progress, **THEN DIRECT** the performance of dose projections using EPRAD-03, Dose Projections.

UNUSUAL EVENT

NOTE: A copy of the ENF is provided at the end of this attachment should WebEOC become unavailable.

14. **OPEN** electronic Emergency Notification Form (ENF) in WebEOC.

    a. **SELECT** Start/Programs/Emergency Preparedness/RNP/WebEOC.

    b. **SELECT** "SSO/SEC-CR" as the user.

    c. Password is not required.

    d. **SELECT** "OK".

    e. **SELECT** "HBR Actual" for an emergency.

    f. **SELECT** "EN Form" under "Plugins".

    g. **SELECT** "Create Draft".

NOTE: A peer check of the completed ENF is recommended prior to distribution to the offsite agencies.

15. **COMPLETE** the ENF.

16. **DIRECT** EC to review ENF with the offsite agencies.

17. **IF** requested, **THEN DIRECT** the activation of ERDS within 1 hour of the classification in accordance with Attachment 10.10.

18. **PREPARE** for the Facility Turnover, using EPCLA-01, Attachment 10.3.

UNUSUAL EVENT
Guidance

1. Determine if there are any personnel injuries.
   a. Give priority to lifesaving activities over radiological exposure control; authorize exposures in excess of normal limits, if required.
   b. Refer to EPSPA-02, “First Aid and Medical Care”, for additional guidance on first aid and transportation of contaminated injured personnel.
2. Determine if onsite protective actions are necessary by evaluating radiological, chemical, and other situations which may require evacuation or sheltering.
   a. For events involving an offsite toxic OR flammable hazard, additional information and suggested protective actions for onsite personnel can be obtained from the state/county emergency management/response agencies responding to the hazardous incident, i.e., contact Darlington’s 911 Dispatch Center or Emergency Management Division for additional information on accidents in their area. (NCR 00140579)
   b. For events involving an offsite toxic gas, when sheltering in place is warranted, ensure a Site-Wide PA announcement is made to secure ventilation systems IAW EPSPA-01.

NOTE:	Reference AOP-034, “Security Events” for guidance and the actions to take for aircraft threats.

3. For security events consider the following:
   a. Local Evacuation of personnel from target sets (including Security personnel).
   b. Site Evacuation by opening (while continuing to defend) security gates.
   c. Dispersal of Licensed Operators.
   d. Sheltering personnel in structures away from potential site targets.
   e. Arrangements for accounting for personnel after the threat.
   f. ERO Augmentation at the Remote Emergency Response Facility.
   g. Evaluate possible severe weather protective actions. (NCR # 22292)
4. If evacuation or sheltering is necessary, then implement EPSPA-01, “Evacuation and Accountability.”

5. If administration of potassium iodide is necessary, then implement EPSPA-03, "Administration of Potassium Iodide."

6. Request any offsite assistance necessary;

   a. The Unit 2 Control Room OR Security should contact Darlington County 911 Center for fire, police, or ambulance service. Logistics personnel may contact the 911 Center, if Control Room staff is unable to request assistance.

   b. Contact other agencies, as necessary; selected offsite agency numbers are maintained in the Emergency Response Organization (ERO) Phone Book.

7. Activate the appropriate Emergency Response Facilities (ERFs).

   a. For an UNUSUAL EVENT, no activation is required. Facilities may be activated at the discretion of the SEC.

   b. Select the location based on habitability and accessibility

      i. The EOF, TSC, OSC, and JIC are the normal ERFs

      ii. The back-up TSC and EOF is the Remote Emergency Response Facility (RERF) in Hartsville.

      iii. The back-up OSC, as defined in EPOSC-01, "Operational Support Center Leader", is the TSC or it may be the RERF.

   c. The Remote Facility may be activated for any event, but normally would be activated for Security Events where reporting to the site may not be safe for the ERO.

   d. If an assembly of non-essential personnel is requested, or if hazards require sheltering onsite and it will not jeopardize the safety of plant personnel, then pick a location to assemble personnel based on appropriate upwind direction. (see EPSPA-01, "Evacuation and Accountability" for alternate shelter locations).

      i. Winds from 135 to 340 degrees - Interior lower level Unit 2 Administrative Building.

      ii. Winds from 341 to 134 degrees - South end of Building 110 next to Lake Robinson.

8. Follow up notifications to offsite agencies are required at least every 30-60 minutes.
9. Initiate electronic logging.
10. Direct shift personnel to mitigate the emergency conditions.
11. If the dispatch of personnel may cause excessive exposure due to unknown or elevated radiological conditions, then refer to EPOSC-04, "Emergency Work Control", for additional guidance regarding personnel emergency exposure control and team dispatch.
12. Continue to assess the plant status against the EALs to confirm, upgrade, or downgrade the emergency classification.
13. Additional information for completion of the Emergency Notification Form is located in EPNOT-01,"CR/EOF Emergency Communicator."
14. If the state or county facilities have been activated, then they shall be consulted prior to any downgrade of emergency classification.
15. If not previously completed, then using the EPCLA-01, Attachment 10.3, perform a turnover with the TSC SEC and the EOF.
16. Perform PA announcements periodically to update personnel in the field of any changing plant conditions.
17. If plant conditions permit, then coordinate with any offsite agencies, which have activated, and terminate the emergency.

NOTE:	Termination is a change in classification and has a 15 minute notification time requirement.

a. If the event is being terminated, then direct the Emergency Communicator to make termination notifications to all agencies.

NOTE:	The following step is not required if ERDS has not been activated.

b. If NOT previously terminated by the Nuclear Regulatory Commission (NRC), then coordinate the termination of ERDS.

c. Termination of the event should be communicated by Everbridge using termination codes in EMG-NGGC-0005 or EPNOT-01.

d. Perform PA announcement that the event has been terminated.

e. Notify EP staff to clear WEBEOC ENF queue as soon as practical.

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

1. [A] DRILL [B] ACTUAL EVENT MESSAGE # ______

2. [A] INITIAL [B] FOLLOW-UP NOTIFICATION: TIME______ DATE____/____/____ AUTHENTICATION # ______

3. SITE: ________________ Confirmation Phone # (____)__________

4. **EMERGENCY CLASSIFICATION:** [A] UNUSUAL EVENT EMERGENCY [B] ALERT [C] SITE AREA EMERGENCY [D] GENERAL

BASED ON EAL #__________ EAL DESCRIPTION: ______________________________

5. **PROTECTIVE ACTION RECOMMENDATIONS**: [A] NONE

[B] EVACUATE ______________________________

[C] SHELTER ______________________________

[D] CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.

[E] OTHER ______________________________

6. **EMERGENCY RELEASE**: [A] None [B] Is Occurring [C] Has Occurred

7. RELEASE SIGNIFICANCE: [A] Not applicable [B] Within normal operating limits [C] Above normal operating limits [D] Under evaluation

8. EVENT PROGNOSIS: [A] Improving [B] Stable [C] Degrading

9. METEOROLOGICAL DATA: Wind Direction* from ______ degrees Wind Speed* ______mph

(*May not be available for Initial Notifications) Precipitation* ______ Stability Class* [A] [B] [C] [D] [E] [F] [G]

10. [A] DECLARATION [B] TERMINATION Time __________ Date ____/____/____

11. AFFECTED UNIT(S): [1] [2] [3] [All]

12. UNIT STATUS: (Unaffected Unit(s) Status Not Required for Initial Notifications)

U1 _____% Power Shutdown at Time __________ Date ___/___/___

U2 _____% Power Shutdown at Time __________ Date ___/___/___

U3 _____% Power Shutdown at Time __________ Date ___/___/___

13. REMARKS: ______________________________

FOLLOW-UP INFORMATION (Lines 14 through 16 Not Required for Initial Notifications)

EMERGENCY RELEASE DATA. NOT REQUIRED IF LINE 6 A IS SELECTED.

14. RELEASE CHARACTERIZATION: TYPE: [A] Elevated [B] Mixed [C] Ground UNITS: [A] Ci [B] Ci/sec [C] µCi/sec

MAGNITUDE: Noble Gases:________ Iodines:________ Particulates:________ Other: ________

FORM: [A] Airborne Start Time ________ Date ___/___/___Stop Time ________ Date ___/___/___

[B] Liquid Start Time ________ Date ___/___/___Stop Time ________ Date ___/___/___

15. PROJECTION PARAMETERS: Projection period: ______Hours Estimated Release Duration ______Hours

Projection performed: **Time** ________ **Date** ___/___/___

16. PROJECTED DOSE:

DISTANCE	TEDE (mRem)	Adult Thyroid CDE (mRem)
Site boundary	________	________
2 Miles	________	________
5 Miles	________	________
10 Miles	________	________

17. APPROVED BY: ______________ Title ______________ **Time** ________ **Date**___/___/___

NOTIFIED BY:______________ RECEIVED BY: ______________ Time ________ Date ___/___/___

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE NUMBER ______

GOVERNMENT AGENCIES NOTIFIED

NOTIFICATION: TIME ________ DATE ___________ [Get Time/Date] AUTHENTICATION#________ [Get Authentication Code]

10.1.1.1 Name: ________________________ Date/Time: ____________ Agency: **Chesterfield County EOC**

10.1.1.2 Name: ________________________ Date/Time: ____________ Agency: **Chesterfield County WP**

10.1.1.3 Name: ________________________ Date/Time: ____________ Agency: **Darlington County EOC**

10.1.1.4 Name: ________________________ Date/Time: ____________ Agency: **Darlington County WP**

10.1.1.5 Name: ________________________ Date/Time: ____________ Agency: **Lee County EOC**

10.1.1.6 Name: ________________________ Date/Time: ____________ Agency: **Lee County WP**

10.1.1.7 Name: ________________________ Date/Time: ____________ Agency: **NRC Resident Inspector**

10.1.1.8 Name: ________________________ Date/Time: ____________ Agency: **NRC (via ETS or Bell Phone)**

10.1.1.9 Name: ________________________ Date/Time: ____________ Agency: **State of SC BWP**

10.1.1.10 Name: ________________________ Date/Time: ____________ Agency: **State of SC WP**

[Save] [Send Form]

ALERT

CONTROL ROOM SEC CHECKLIST

NOTE:	Proceed to page 3 of this attachment if the checklist was completed previously

Classification	Facility Activation	Site Evacuation	ERDS Activation
Alert	Mandatory	Encouraged	Mandatory

Time Event Declared: ______________ Notification Due By: _______________

☐ Direct the CR-EC to report to the Control Room or alternate location to support emergency notification activities.

☐ Make site-wide PA Announcement about the event.

☐ WebEOC – User = SSO/SEC-CR – No Password – Select EN form – Select Create Draft

☐ If conditions warrant, call the Shift RC Tech to the Main Control Room to perform Habitability analyses.

☐ Activate ERDS within 1 hour, if needed, using Attachment 10.10.

NOTE:	To meet regulatory requirements, accountability for personnel inside the protected area is required within 30 minutes of the declaration of a SAE or GE. This includes names of missing personnel. If accountability is delayed due to adverse site conditions (e.g., hostile action), accountability must be completed as promptly as is practical once the site is secure.

☐ For Site Evacuation;

- o Wind from 135 to 340 evacuate to Admin Building Lower Level,
- o Wind from 341 to 134 evacuate to the South End of Building 110 next to the lake.

☐ Complete Emergency Notification Form – Approve and Fax.

☐ Emergency Communicator Performs ENF and NRC Notifications.

☐ Prepare for facility turnover to the TSC, using EPCLA-01, Attachment 10.3.

<u>Referenced Procedures</u>
EPNOT-01 – CR/EOF Emergency Communicator
EPSPA-01 – Evacuation and Accountability
EPSPA-02 – First Aid and Medical Care
EPSPA-03 – Administration of Potassium Iodine
EPCLA-04 – Emergency Action Level Technical Bases Document
EPOSC-04 – Emergency Work Control

Emergency Notification Form Information

"Emergency Release is Occurring OR has Occurred"
Emergency release is defined as:

- An approved monitored release was occurring, and the reading on the radiation monitor designated to monitor this release increases due to the event.
- Any release due to the event that was not previously approved.
- Anytime a primary to secondary leak causes an emergency declaration, a release should be considered "is occurring".

"Release Significance"

- IF no emergency release has occurred, THEN select Not Applicable.
- IF an emergency release is in progress or has occurred, AND the release significance has not been determined (no dose projection completed), THEN select *Under Evaluation*.
- IF a dose projection has been completed; THEN IF the projected dose rate at the site boundary is below 25 mRem TEDE AND 75 mRem Thyroid CDE, THEN mark Line 7 as *Within Normal Operating Limits*. Otherwise mark Line 7 as *Above Normal Operating Limits*.

"Event Prognosis"

- *Degrading* – There is a probable escalation of the emergency classification, continued deterioration of plant conditions, or an increase in protective action recommendations.
- *Stable* – There are no expected changes in emergency classifications, plant conditions, or protective action recommendations.
- *Improving* – There is a probable downgrade in emergency classification; plant systems are being returned to service; or a probable reduction in protective action recommendations.

ALERT

NOTE:	The steps in this attachment may be performed in any order or concurrently.

CAUTION

The Shift Manager/SEC may NOT direct other individuals to perform the following actions:

- The decision to notify offsite authorities
- Classifying or terminating the emergency
- Authorizing exposures in excess of 10CFR20 limits during a declared emergency

1. **DIRECT** the Emergency Communicator (EC) to immediately report to the Control Room or alternate location if access to the Control Room is not possible. Options may include the WCC, TSC or EOF.

2. **IF** the EC is not available, **THEN DESIGNATE** an alternate qualified individual such as another AO, the CRS or SM.

3. **INFORM** the crew that an ALERT has been declared.

NOTE:	PA announcements will remain the responsibility of the Control Room.

4. **DIRECT** the "VLC" switch be placed in "Emergency".

NOTE: Assembly of non-essential personnel is not required at an ALERT. Consider hazards that may exist onsite to determine if assembly is needed or personnel should shelter in place. Safety of plant personnel is the priority.

If the ERO will be activated, then activations should occur within five (5) minutes of the emergency classification.

The SEC **OR** the EC can contact Security for activation of the ERO.

5. **IF** activation of the ERO is necessary, **THEN INITIATE** actions to activate the ERO, using EMG-NGGC-0005 and EPNOT-01.

    a. **IF** the emergency is a Security event, **THEN DIRECT** the EC to activate the ERO.

    b. **IF** the emergency is for other reasons, **THEN DIRECT** Security to activate the ERO.

ALERT

6. **PROVIDE** the following to be used for activation.

   a. Emergency Classification: ALERT

   b. **IF** facility activation is desired, **THEN DESIGNATE** the location the ERO will report to by circling

      i. Onsite (Normal) Facility)

      ii. Remote (Rail Road Avenue) Facility)

   c. **DESIGNATE** the type of Notification by circling

      i. Emergency

      ii. Drill/Training

7. **OBTAIN** wind direction.

CAUTION
Consider hazards on-site, such as toxic gas, when deciding an assembly location. During a security event, delaying the announcement to staff the facilities and moving non-essential personnel until movement is safe will provide an additional measure of protection for site personnel.

8. **PREPARE** site wide announcement

   a. **DETERMINE** the appropriate Emergency Response Facilities based on habitability and accessibility **AND SELECT** in step 10.

   b. **IF** assembly of non-essential personnel is desired**, THEN DETERMINE** the location based on wind direction. **AND SELECT** in step 10.

      i. Winds from 135 to 340 degrees - Interior lower level Unit 2 Administrative Building.

      ii. Winds from 341 to 134 degrees - South end of Building 110 next to Lake Robinson.

   c. **DETERMINE** if non-essential personnel should shelter in place.

ALERT

NOTE: To avoid confusion, a site evacuation should only be initiated once. This announcement can be made by the SEC or EC.

9. **IF** assembly is desired**, THEN DIRECT** the site evacuation alarm to be sounded for 5 seconds and repeated as necessary.

10. **ANNOUNCE**:
Attention all personnel, attention all personnel, at ___________ (state time of declaration) an ALERT has been declared. All Emergency Response personnel report to:

    - ☐ **the normal ERO facilities.**
    - ☐ **the Remote Emergency Response Facility..**

- ☐ ***All non-essential personnel remain clear of the emergency response facilities.*** (and, if necessary, the areas near the event location)."

- ☐ ***All non-essential Personnel report to***

    - ☐ **The Interior Lower Level of the Unit 2 Administrative Building.**
    - ☐ **The South End of Building 110 next to Lake Robinson immediately.**

- ☐ ***All non-essential personnel shelter in place.***

Use of the Public Address System is restricted to emergency communications only.

11. **IF assembly of non-essential personnel was directed, THEN REPEAT the sounding of the site evacuation alarm.**

ALERT

NOTE: A copy of the ENF is provided at the end of this attachment should WebEOC become unavailable.

12. **OPEN** electronic Emergency Notification Form (ENF) in WebEOC.

    - ☐ **SELECT** Start/Programs/Emergency Preparedness/RNP/WebEOC.
    - ☐ **SELECT** "SSO/SEC-CR" as the user.
    - ☐ Password is not required.
    - ☐ **SELECT** "OK".
    - ☐ **SELECT** "HBR Actual" for an emergency.
    - ☐ **SELECT** "EN Form" under "Plugins".
    - ☐ **SELECT** "Create Draft".

NOTE: A peer check of the completed ENF is recommended prior to distribution to the offsite agencies.

13. **COMPLETE** the ENF.
14. **DIRECT** EC to review ENF with the offsite agencies.
15. **DIRECT** activation of ERDS within 1 hour of the classification in accordance with Attachment 10.10 if needed.
16. **PREPARE** for the Facility Turnover, using EPCLA-01, Attachment 10.3..

ALERT

Guidance

1. Determine if there are any personnel injuries.

   a. Give priority to lifesaving activities over radiological exposure control; authorize exposures in excess of normal limits, if required.

   b. Refer to EPSPA-02, "First Aid and Medical Care", for additional guidance on first aid and transportation of contaminated injured personnel.

2. Determine if onsite protective actions are necessary by evaluating radiological, chemical, and other situations which may require evacuation or sheltering.

   a. For events involving an offsite toxic OR flammable hazard, additional information and suggested protective actions for onsite personnel can be obtained from the state/county emergency management/response agencies responding to the hazardous incident, i.e., contact Darlington's 911 Dispatch Center or Emergency Management Division for additional information on accidents in their area. (NCR 00140579)

   b. For events involving an offsite toxic gas, when sheltering in place is warranted, ensure a Site-Wide PA announcement is made to secure ventilation systems IAW EPSPA-01.

> **NOTE:** Reference AOP-034, "Security Events" for guidance and the actions to take for aircraft threats.

3. For security events consider the following:

   a. Local Evacuation of personnel from target sets (including Security personnel).

   b. Site Evacuation by opening (while continuing to defend) security gates.

   c. Dispersal of Licensed Operators.

   d. Sheltering personnel in structures away from potential site targets.

   e. Arrangements for accounting for personnel after the threat.

   f. ERO Augmentation at the Remote Emergency Response Facility.

   g. Evaluate possible severe weather protective actions. (NCR # 22292)

4. If evacuation or sheltering is necessary, then implement EPSPA-01, "Evacuation and Accountability."

Guidance

5. If administration of potassium iodide is necessary, then implement EPSPA-03, "Administration of Potassium Iodide."

6. Request any offsite assistance necessary;

   a. The Unit 2 Control Room OR Security should contact Darlington County 911 Center for fire, police, or ambulance service. Logistics personnel may contact the 911 Center, if Control Room staff is unable to request assistance.

   b. Contact other agencies, as necessary; selected offsite agency numbers are maintained in the Emergency Response Organization (ERO) Phone Book.

7. Activate the appropriate Emergency Response Facilities (ERFs).

   a. Select the location based on habitability and accessibility.

      i. The EOF, TSC, OSC, and JIC are the normal ERFs.

      ii. The back-up TSC and EOF is the Remote Emergency Response Facility (RERF)in Hartsville.

      iii. The Remote Facility may be activated for any event, but normally would be activated for Security Events where reporting to the site may not be safe for the ERO.

   b. The back-up OSC, as defined in EPOSC-01,"Operational Support Center Leader", is the TSC, or it may be the RERF.

   c. If an assembly of non-essential personnel is requested, or if hazards require sheltering onsite, and it will not jeopardize the safety of plant personnel, then pick a location to assemble personnel based on appropriate upwind direction. (see EPSPA-01, "Evacuation and Accountability" for alternate shelter locations).

      i. Winds from 135 to 340 degrees - Interior lower level Unit 2 Administrative Building.

      ii. Winds from 341 to 134 degrees - South end of Building 110 next to Lake Robinson

8. Follow up notifications to offsite agencies are required at least every 30-60 minutes.

9. Initiate electronic logging.

Guidance

10. Direct shift personnel to mitigate the emergency conditions.

11. If the dispatch of personnel may cause excessive exposure due to unknown or elevated radiological conditions, then refer to EPOSC-04, "Emergency Work Control", for additional guidance regarding personnel emergency exposure control and team dispatch.

12. Continue to assess the plant status against the EALs to confirm, upgrade, or downgrade the emergency classification.

13. Additional information for completion of the Emergency Notification Form is located in EPNOT-01,"CR/EOF Emergency Communicator."

14. Forms for recording data are located in EPNOT-01,"CR/EOF Emergency Communicator."

15. If the State or County facilities have been activated, then they shall be consulted prior to any downgrade of emergency classification.

16. If not previously completed, then using EPCLA-01, Attachment 10.3, perform a turnover with the TSC SEC and the EOF.

17. Perform PA announcements periodically to update personnel in the field of any changing plant conditions.

18. If plant conditions permit, then coordinate with any offsite agencies, which have activated, and terminate the emergency.

NOTE:	Termination is a change in classification and has a 15 minute notification time requirement.

a. If the event is being terminated, then direct the Emergency Communicator to make termination notifications to all agencies.

b. If NOT previously terminated by the Nuclear Regulatory Commission (NRC), then coordinate the termination of ERDS.

c. Termination of the event should be communicated by Everbridge using termination codes in EMG-NGGC-0005 or EPNOT-01.

d. Perform PA announcement that the event has been terminated.

e. Notify EP staff to clear WEBEOC ENF queue as soon as practical.

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

1. A DRILL B ACTUAL EVENT MESSAGE # _______
2. A INITIAL B FOLLOW-UP NOTIFICATION: TIME________ DATE_____/_____/_____ AUTHENTICATION # ________
3. SITE: ____________________ Confirmation Phone # (____)______________

4. **EMERGENCY CLASSIFICATION:** A UNUSUAL EVENT B ALERT C SITE AREA EMERGENCY D GENERAL EMERGENCY

BASED ON EAL #_____________ EAL DESCRIPTION: ____

____

____

5. **PROTECTIVE ACTION RECOMMENDATIONS:** A NONE

B EVACUATE ____

C SHELTER ____

D CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.

E OTHER____

6. **EMERGENCY RELEASE:** A None B Is Occurring C Has Occurred

7. RELEASE SIGNIFICANCE: A Not applicable B Within normal operating limits C Above normal operating limits D Under evaluation
8. EVENT PROGNOSIS: A Improving B Stable C Degrading
9. METEOROLOGICAL DATA: Wind Direction* from _______ degrees Wind Speed* _______mph
(*May not be available for Initial Notifications) Precipitation* _______ Stability Class* A B C D E F G

10. A DECLARATION B TERMINATION Time _______________ Date _____/______/_______

11. AFFECTED UNIT(S): 1 2 3 All

12. UNIT STATUS:
(Unaffected Unit(s) Status Not Required for Initial Notifications)
U1 _____% Power Shutdown at Time _____________ Date ___/_____/____
U2 _____% Power Shutdown at Time _____________ Date ___/_____/____
U3 _____% Power Shutdown at Time _____________ Date ___/_____/____

13. REMARKS: ____

____

FOLLOW-UP INFORMATION (Lines 14 through 16 Not Required for Initial Notifications)

EMERGENCY RELEASE DATA. NOT REQUIRED IF LINE 6 A IS SELECTED.

14. RELEASE CHARACTERIZATION: TYPE: A Elevated B Mixed C Ground UNITS: A Ci B Ci/sec C µCi/sec
MAGNITUDE: Noble Gases:__________ Iodines:___________ Particulates:__________ Other: ____________
FORM: A Airborne Start Time __________ Date ___/_____/____Stop Time _________ Date ___/_____/____
B Liquid Start Time __________ Date ___/_____/____Stop Time _________ Date ___/_____/____

15. PROJECTION PARAMETERS: Projection period: ________Hours Estimated Release Duration ________Hours
Projection performed: **Time** _________ **Date** ___/____/____

16. PROJECTED DOSE:

DISTANCE	TEDE (mRem)	Adult Thyroid CDE (mRem)
Site boundary		
2 Miles		
5 Miles		
10 Miles		

17. APPROVED BY: ______________________ Title __________________ **Time** _________ **Date**___/_____/____
NOTIFIED BY:________________ RECEIVED BY: __________________ Time _________ Date ___/_____/____

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE NUMBER ______

GOVERNMENT AGENCIES NOTIFIED

NOTIFICATION: TIME ________ DATE ___________ [Get Time/Date] AUTHENTICATION#________ [Get Authentication Code]

10.1.1.11	Name: ______________________	Date/Time: __________	Agency: **Chesterfield County EOC**
10.1.1.12	Name: ______________________	Date/Time: __________	Agency: **Chesterfield County WP**
10.1.1.13	Name: ______________________	Date/Time: __________	Agency: **Darlington County EOC**
10.1.1.14	Name: ______________________	Date/Time: __________	Agency: **Darlington County WP**
10.1.1.15	Name: ______________________	Date/Time: __________	Agency: **Lee County EOC**
10.1.1.16	Name: ______________________	Date/Time: __________	Agency: **Lee County WP**
10.1.1.17	Name: ______________________	Date/Time: __________	Agency: **NRC Resident Inspector**
10.1.1.18	Name: ______________________	Date/Time: __________	Agency: **NRC (via ETS or Bell Phone)**
10.1.1.19	Name: ______________________	Date/Time: __________	Agency: **State of SC BWP**
10.1.1.20	Name: ______________________	Date/Time: __________	Agency: **State of SC WP**

[Save] [Send Form]

SITE AREA EMERGENCY

CONTROL ROOM SEC CHECKLIST

NOTE:	Proceed to page 3 of this attachment if the checklist was completed previously

Classification	Facility Activation	Site Evacuation	ERDS Activation
Site Area Emergency	Mandatory	Mandatory	Mandatory

Time Event Declared: ____________ Notification Due By: _____________

- ☐ Direct the CR-EC to report to the Control Room or alternate location to support emergency notification activities.
- ☐ Make site-wide PA Announcement about the event.
- ☐ WebEOC – User = SSO/SEC-CR – No Password – Select EN form – Select Create Draft
- ☐ If conditions warrant, call the Shift RC Tech to the Main Control Room to perform Habitability analyses.
- ☐ Activate ERDS within 1 hour, if needed, using Attachment 10.10.

NOTE:	To meet regulatory requirements, accountability for personnel inside the protected area is required within 30 minutes of the declaration of a SAE or GE. This includes names of missing personnel. If accountability is delayed due to adverse site conditions (e.g., hostile action), accountability must be completed as promptly as is practical once the site is secure.

- ☐ For Site Evacuation;
  - o Wind from 135 to 340 evacuate to Admin Building Lower Level,
  - o Wind from 341 to 134 evacuate to the South End of Building 110 next to the lake.
- ☐ Complete Emergency Notification Form – Approve and Fax.
- ☐ Emergency Communicator Performs ENF and NRC Notifications.
- ☐ Prepare for facility turnover to the TSC, using EPCLA-01, Attachment 10.3.

<u>Referenced Procedures</u>
EPNOT-01 – CR/EOF Emergency Communicator
EPSPA-01 – Evacuation and Accountability
EPSPA-02 – First Aid and Medical Care
EPSPA-03 – Administration of Potassium Iodine
EPCLA-04 – Emergency Action Level Technical Bases Document
EPOSC-04 – Emergency Work Control

Emergency Notification Form Information

"Emergency Release is Occurring OR has Occurred"
Emergency release is defined as:
- An approved monitored release was occurring, and the reading on the radiation monitor designated to monitor this release increases due to the event.
- Any release due to the event that was not previously approved.
- Anytime a primary to secondary leak causes an emergency declaration, a release should be considered "is occurring".

"Release Significance"
- IF no emergency release has occurred, THEN select Not Applicable.
- IF an emergency release is in progress or has occurred, AND the release significance has not been determined (no dose projection completed), THEN select *Under Evaluation*.
- IF a dose projection has been completed; THEN IF the projected dose rate at the site boundary is below 25 mRem TEDE AND 75 mRem Thyroid CDE, THEN mark Line 7 as *Within Normal Operating Limits*. Otherwise mark Line 7 as *Above Normal Operating Limits*.

"Event Prognosis"
- *Degrading* – There is a probable escalation of the emergency classification, continued deterioration of plant conditions, or an increase in protective action recommendations.
- *Stable* – There are no expected changes in emergency classifications, plant conditions, or protective action recommendations.
- *Improving* – There is a probable downgrade in emergency classification; plant systems are being returned to service; or a probable reduction in protective action recommendations.

SITE AREA EMERGENCY

NOTE: The steps in this attachment may be performed in any order or concurrently.

CAUTION

The Shift Manager/SEC may NOT direct other individuals to perform the following actions:

- The decision to notify offsite authorities
- Classifying or terminating the emergency
- Authorizing exposures in excess of 10CFR20 limits during a declared emergency

1. **DIRECT** the Emergency Communicator (EC) to immediately report to the Control Room or alternate location if access to the Control Room is not possible. Options may include the WCC, TSC or EOF.
2. **IF** the EC is not available, **THEN DESIGNATE** an alternate qualified individual such as another AO, the CRS or SM.
3. **INFORM** the crew that an SITE AREA EMERGENCY has been declared.

NOTE: PA announcements will remain the responsibility of the Control Room.

4. **DIRECT** the "VLC" switch be placed in "Emergency".

NOTE: Evacuation of non-essential personnel is required at a SITE AREA EMERGENCY. Consider hazards that may exist onsite to determine if personnel should assemble at one of the designated locations or shelter in place. Safety of plant personnel is the priority.

If the ERO will be activated, then activations should occur within five (5) minutes of the emergency classification.

The SEC **OR** the EC can contact Security for activation of the ERO.

5. **INITIATE** actions to activate the ERO, using EMG-NGGC-0005 and EPNOT-01.
   a. **IF** the emergency is a Security event, **THEN DIRECT** the EC to activate the ERO.
   b. **IF** the emergency is for other reasons, **THEN DIRECT** Security to activate the ERO.

6. **PROVIDE** the following to be used for activation.

   a. Emergency Classification: SITE AREA EMERGENCY

   b. **DESIGNATE** the location the ERO will report to by circling

      i. Onsite (Normal) Facility

      ii. Remote (Rail Road Avenue) Facility

   c. **DESIGNATE** the type of Notification by circling

      i. Emergency

      ii. Drill/Training

7. **OBTAIN** wind direction.

CAUTION
Consider hazards on-site, such as toxic gas, when deciding an assembly location. During a security event, delaying the announcement to staff the facilities and moving non-essential personnel until movement is safe will provide an additional measure of protection for site personnel.

8. **PREPARE** site wide announcement

   a. **DETERMINE** the appropriate Emergency Response Facility based on habitability and accessibility **AND SELECT** in step 10.

   b. **IF** assembly of non-essential personnel is desired**, THEN DETERMINE** the location based on wind direction. **AND SELECT** in Step 10.

      i. Winds from 135 to 340 degrees - Interior lower level Unit 2 Administrative Building.

      ii. Winds from 341 to 134 degrees - South end of Building 110 next to Lake Robinson

   c. **DETERMINE** if non-essential personnel should shelter in place.

SITE AREA EMERGENCY

CAUTION
Site evacuation is mandatory at the declaration of a Site Area Emergency – unless doing so will jeopardize the safety of personnel.

NOTE: To avoid confusion, a site evacuation should only be initiated once. This announcement can be made by the SEC or EC.

9. **DIRECT** the site evacuation alarm to be sounded for 5 seconds and repeated as necessary.

10. **ANNOUNCE**:

Attention all personnel, attention all personnel, at ___________ (state time of declaration) an SITE AREA EMERGENCY has been declared. All Emergency Response personnel report to:_

- ☐ **the normal ERO facilities**
- ☐ **the Remote Emergency Response Facility**.

☐ ***All non-essential personnel remain clear of the emergency response facilities*** (and, if necessary, the areas near the event location).

☐ ***All non-essential Personnel report to_***

- ☐ **Interior Lower Level of the Unit 2 Administrative Building**
- ☐ **South End of Building 110 next to Lake Robinson immediately.**

☐ ***All non-essential personnel shelter in place.***

Use of the Public Address System is restricted to emergency communications only"

11. **SOUND** the site evacuation alarm and repeat the announcement created in Step 10.

12. **IF** a radiological release is in progress, **THEN DIRECT** the performance of dose projections using EPRAD-03, Dose Projections.

SITE AREA EMERGENCY

NOTE:	A copy of the ENF is provided at the end of this attachment should WebEOC become unavailable.

13. **OPEN** electronic Emergency Notification Form (ENF) in WebEOC.

    a. **SELECT** Start/Programs/Emergency Preparedness/RNP/WebEOC.

    b. **SELECT** "SSO/SEC-CR" as the user.

    c. Password is not required.

    d. **SELECT** "OK".

    e. **SELECT** "HBR Actual" for an emergency.

    f. **SELECT** "EN Form" under "Plugins".

    g. **SELECT** "Create Draft".

NOTE:	A peer check of the completed ENF is recommended prior to distribution to the offsite agencies.

14. **COMPLETE** the ENF

15. **DIRECT** EC to review ENF with the offsite agencies.

16. **DIRECT** activation of ERDS with 1 hour in accordance with Attachment 10.10 if needed.

17. **PREPARE** for the Facility Turnover, EPCLA-01, Attachment 10.3.

SITE AREA EMERGENCY
Guidance

1. **DETERMINE** if there are any personnel injuries.

    a. Give priority to lifesaving activities over radiological exposure control; authorize exposures in excess of normal limits, if required.

    b. Refer to EPSPA-02, "First Aid and Medical Care", for additional guidance on first aid and transportation of contaminated injured personnel.

2. **DETERMINE** if onsite protective actions are necessary by evaluating radiological, chemical, and other situations which may require evacuation or sheltering.

    a. For events involving an offsite toxic OR flammable hazard, additional information and suggested protective actions for onsite personnel can be obtained from the state/county emergency management/response agencies responding to the hazardous incident, i.e., contact Darlington's 911 Dispatch Center or Emergency Management Division for additional information on accidents in their area. (NCR 00140579)

    b. For events involving an offsite toxic gas, when sheltering in place is warranted, ensure a Site-Wide PA announcement is made to secure ventilation systems IAW EPSPA-01.

NOTE:	Reference AOP-034, "Security Events" for guidance and the actions to take for aircraft threats.

3. For security events consider the following:

    a. Local Evacuation of personnel from target sets (including Security personnel).

    b. Site Evacuation by opening (while continuing to defend) security gates.

    c. Dispersal of Licensed Operators.

    d. Sheltering personnel in structures away from potential site targets.

    e. Arrangements for accounting for personnel after the threat.

    f. ERO Augmentation at the Remote Emergency Response Facility.

    g. Evaluate possible severe weather protective actions. (NCR # 22292)

SITE AREA EMERGENCY
Guidance

4. If evacuation or sheltering is necessary, then implement EPSPA-01, "Evacuation and Accountability."

5. If administration of potassium iodide is necessary, then implement EPSPA-03, "Administration of Potassium Iodide."

6. Request any offsite assistance necessary;

   a. The Unit 2 Control Room OR Security should contact Darlington County 911 Center for fire, police, or ambulance service. Logistics personnel may contact the 911 Center if Control Room staff is unable to request assistance.

   b. Contact other agencies, as necessary; selected offsite agency numbers are maintained in the Emergency Response Organization (ERO) Phone Book.

7. Activate the appropriate Emergency Response Facilities (ERFs).

   a. Select the location based on habitability and accessibility

      i. The EOF, TSC, OSC, and JIC are the normal ERFs.

      ii. The back-up TSC and EOF is the Remote Emergency Response Facility (RERF) in Hartsville

      iii. The Remote Facility may be activated for any event, but normally would be activated for Security Events where reporting to the site may not be safe for the ERO

      iv. The back-up OSC as defined in EPOSC-01,"Operational Support Center Leader" is the TSC or it may be the RERF.

   b. Site evacuation is mandatory at the declaration of a Site Area Emergency – unless doing so will jeopardize the safety of personnel. Select a location to assemble personnel based on appropriate upwind direction. (see EPSPA-01, "Evacuation and Accountability", for alternate shelter locations)

      i. Winds from 135 to 340 degrees - Interior lower level Unit 2 Administrative Building.

      ii. Winds from 341 to 134 degrees - South end of Building 110 next to Lake Robinson.

SITE AREA EMERGENCY
Guidance

8. Follow up notifications to offsite agencies are required at least every 30-60 minutes.
9. Initiate electronic logging.
10. Direct shift personnel to mitigate the emergency conditions.
11. If the dispatch of personnel may cause excessive exposure due to unknown or elevated radiological conditions, then refer to EPOSC-04, "Emergency Work Control", for additional guidance regarding personnel emergency exposure control and team dispatch.
12. Continue to assess the plant status against the EALs to confirm, upgrade, or downgrade the emergency classification.
13. Additional information for completion of the Emergency Notification Form is located in EPNOT-01,"CR/EOF Emergency Communicator."
14. Forms for recording data are located in EPNOT-01,"CR/EOF Emergency Communicator."
15. If the State or County facilities have been activated, then they shall be consulted prior to any downgrade of emergency classification.
16. If not previously completed, then using the EPCLA-01, Attachment 10.3, perform a turnover with the TSC SEC and the EOF.
17. Perform PA announcements periodically to update personnel in the field of any changing plant conditions.
18. If plant conditions permit, then coordinate with any offsite agencies, which have activated, and terminate the emergency.

NOTE:	Termination is a change in classification and has a 15 minute notification time requirement.

a. If the event is being terminated, then direct the Emergency Communicator to make termination notifications to all agencies.
b. If not previously terminated by the Nuclear Regulatory Commission (NRC), then coordinate the termination of ERDS.
c. Terminate the event should be communicated by Everbridge using termination codes in EMG-NGGC-0005 or EPNOT-01.
d. Perform PA announcement that the event has been terminated.
e. Notify EP staff to clear WEBEOC ENF queue as soon as practical

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

1. [A] DRILL [B] ACTUAL EVENT MESSAGE # _______

2. [A] INITIAL [B] FOLLOW-UP NOTIFICATION: TIME________ DATE_____/_____/_____ AUTHENTICATION # ________

3. SITE: ____________________ Confirmation Phone # (____)_______________

4. **EMERGENCY CLASSIFICATION**: [A] UNUSUAL EVENT [B] ALERT [C] SITE AREA EMERGENCY [D] GENERAL EMERGENCY
BASED ON EAL #______________ EAL DESCRIPTION: ____

5. **PROTECTIVE ACTION RECOMMENDATIONS**: [A] NONE
[B] EVACUATE ____
[C] SHELTER ____
[D] CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.
[E] OTHER ____

6. **EMERGENCY RELEASE**: [A] None [B] Is Occurring [C] Has Occurred

7. RELEASE SIGNIFICANCE: [A] Not applicable [B] Within normal operating limits [C] Above normal operating limits [D] Under evaluation

8. EVENT PROGNOSIS: [A] Improving [B] Stable [C] Degrading

9. METEOROLOGICAL DATA: Wind Direction* from _______ degrees Wind Speed* _______mph
(*May not be available for Initial Notifications) Precipitation* _______ Stability Class* [A] [B] [C] [D] [E] [F] [G]

10. [A] DECLARATION [B] TERMINATION Time ________________ Date _____/______/_______

11. AFFECTED UNIT(S): [1] [2] [3] [All]

12. UNIT STATUS: U1 _____% Power Shutdown at Time _____________ Date ___/_____/____
(Unaffected Unit(s) Status Not Required for Initial Notifications) U2 _____% Power Shutdown at Time _____________ Date ___/_____/____
U3 _____% Power Shutdown at Time _____________ Date ___/_____/____

13. REMARKS: ____

FOLLOW-UP INFORMATION (Lines 14 Through 16 Not Required for Initial Notifications)
EMERGENCY RELEASE DATA. NOT REQUIRED IF LINE 6 A IS SELECTED.

14. RELEASE CHARACTERIZATION: TYPE: [A] Elevated [B] Mixed [C] Ground UNITS: [A] Ci [B] Ci/sec [C] µCi/sec
MAGNITUDE: Noble Gases:__________ Iodines:___________ Particulates:__________ Other: ____________
FORM: [A] Airborne Start Time __________ Date ___/_____/____Stop Time _________ Date ___/_____/____
[B] Liquid Start Time __________ Date ___/_____/____Stop Time _________ Date ___/_____/____

15. PROJECTION PARAMETERS: Projection period: ________Hours Estimated Release Duration ________Hours
Projection performed: Time _________ Date ___/_____/____

16. PROJECTED DOSE:

DISTANCE	TEDE (mRem)	Adult Thyroid CDE (mRem)
Site boundary		
2 Miles		
5 Miles		
10 Miles		

17. APPROVED BY: ______________________ Title __________________ **Time** _________ **Date**___/_____/____

NOTIFIED BY:________________ RECEIVED BY: __________________ Time _________ Date ___/_____/____

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE NUMBER ______

GOVERNMENT AGENCIES NOTIFIED

NOTIFICATION: TIME ________ DATE ___________ Get Time/Date AUTHENTICATION#________ Get Authentication Code

10.1.1.21 Name: ______________________ Date/Time: ____________ Agency: **Chesterfield County EOC**

10.1.1.22 Name: ______________________ Date/Time: ____________ Agency: **Chesterfield County WP**

10.1.1.23 Name: ______________________ Date/Time: ____________ Agency: **Darlington County EOC**

10.1.1.24 Name: ______________________ Date/Time: ____________ Agency: **Darlington County WP**

10.1.1.25 Name: ______________________ Date/Time: ____________ Agency: **Lee County EOC**

10.1.1.26 Name: ______________________ Date/Time: ____________ Agency: **Lee County WP**

10.1.1.27 Name: ______________________ Date/Time: ____________ Agency: **NRC Resident Inspector**

10.1.1.28 Name: ______________________ Date/Time: ____________ Agency: **NRC (via ETS or Bell Phone)**

10.1.1.29 Name: ______________________ Date/Time: ____________ Agency: **State of SC BWP**

10.1.1.30 Name: ______________________ Date/Time: ____________ Agency: **State of SC WP**

Save Send Form

GENERAL EMERGENCY

CONTROL ROOM SEC CHECKLIST

NOTE:	Proceed to page 3 of this attachment if the checklist was completed previously

Classification	**Facility Activation**	**Site Evacuation**	**ERDS Activation**
General Emergency	Mandatory	Mandatory	Mandatory

Time Event Declared: ____________ Notification Due By: ____________

- ☐ Direct the CR-EC to report to the Control Room or alternate location to support emergency notification activities.
- ☐ Make site-wide PA Announcement about the event.
- ☐ WebEOC – User = SSO/SEC-CR – No Password – Select EN form – Select Create Draft
- ☐ If conditions warrant, call the Shift RC Tech to the Main Control Room to perform Habitability analyses.
- ☐ Activate ERDS within 1 hour, if needed, using Attachment 10.10.

NOTE:	To meet regulatory requirements, accountability for personnel inside the protected area is required within 30 minutes of the declaration of a SAE or GE. This includes names of missing personnel. If accountability is delayed due to adverse site conditions (e.g., hostile action), accountability must be completed as promptly as is practical once the site is secure.

- ☐ For Site Evacuation;
  - o Wind from 135 to 340 evacuate to Admin Building Lower Level,
  - o Wind from 341 to 134 evacuate to the South End of Building 110 next to the lake.
- ☐ Complete Emergency Notification Form – Approve and Fax.
- ☐ Emergency Communicator Performs ENF and NRC Notifications.
- ☐ Prepare for facility turnover to the TSC, using EPCLA-01, Attachment 10.3.

<u>Referenced Procedures</u>
EPNOT-01 – CR/EOF Emergency Communicator
EPSPA-01 – Evacuation and Accountability
EPSPA-02 – First Aid and Medical Care
EPSPA-03 – Administration of Potassium Iodine
EPCLA-04 – Emergency Action Level Technical Bases Document
EPOSC-04 – Emergency Work Control

EMERGENCY NOTIFICATION FORM INFORMATION

"Emergency Release is Occurring OR has Occurred"

Emergency release is defined as:

- An approved monitored release was occurring, and the reading on the radiation monitor designated to monitor this release increases due to the event.
- Any release due to the event that was not previously approved.
- Anytime a primary to secondary leak causes an emergency declaration, a release should be considered "is occurring".

"Release Significance"

- IF no emergency release has occurred, THEN select Not Applicable.
- IF an emergency release is in progress or has occurred, AND the release significance has not been determined (no dose projection completed), THEN select *Under Evaluation.*
- IF a dose projection has been completed; THEN IF the projected dose rate at the site boundary is below 25 mRem TEDE AND 75 mRem Thyroid CDE, THEN mark Line 7 as *Within Normal Operating Limits.* Otherwise mark Line 7 as *Above Normal Operating Limits.*

"Event Prognosis"

- *Degrading* – There is a probable escalation of the emergency classification, continued deterioration of plant conditions, or an increase in protective action recommendations.
- *Stable* – There are no expected changes in emergency classifications, plant conditions, or protective action recommendations.
- *Improving* – There is a probable downgrade in emergency classification; plant systems are being returned to service; or a probable reduction in protective action recommendations.

GENERAL EMERGENCY

NOTE:	The steps in this attachment may be performed in any order or concurrently. Protective Action Recommendation (PAR) required for a GENERAL EMERGENCY classification.

CAUTION

The Shift Manager/SEC may NOT direct other individuals to perform the following actions:

- The decision to notify offsite authorities
- Making offsite Protective Action Recommendations (PARs)
- Classifying or terminating the emergency
- Authorizing exposures in excess of 10CFR20 limits during a declared emergency

1. **DIRECT** the Emergency Communicator (EC) to immediately report to the Control Room or alternate location if access to the Control Room is not possible. Options may include the WCC, TSC or EOF.
2. **IF** the EC is not available, **THEN DESIGNATE** an alternate qualified individual such as another AO, the CRS or SM.
3. **INFORM** the crew that a GENERAL EMERGENCY has been declared.

NOTE:	PA announcements will remain the responsibility of the Control Room.

4. **DIRECT** the "VLC" switch be placed in "Emergency".

NOTE:	Evacuation of non-essential personnel is required at a GENERAL EMERGENCY. Consider hazards that may exist onsite to determine if personnel should assemble at one of the designated locations or shelter in place. Safety of plant personnel is the priority. If the ERO will be activated, then activations should occur within five (5) minutes of the emergency classification. The SEC **OR** the EC can contact Security for activation of the ERO.

5. **INITIATE** actions to activate the ERO, using EMG-NGGC-0005 and EPNOT-01.
   a. **IF** the emergency is a Security event, **THEN DIRECT** the EC to activate the ERO.
   b. **IF** the emergency is for other reasons, **THEN DIRECT** Security to activate the ERO.

GENERAL EMERGENCY

6. **PROVIDE** the following to be used for activation.

   a. Emergency Classification: GENERAL EMERGENCY

   b. **DESIGNATE** the location the ERO will report to by circling

      i. Onsite (Normal) Facility

      ii. Remote (Rail Road Avenue) Facility

   c. **DESIGNATE** the type of Notification by circling

      i. Emergency

      ii. Drill/Training

7. **OBTAIN** wind direction.

CAUTION
Consider hazards on-site, such as toxic gas, when deciding an assembly location. Discretion should be exercised when announcing the cause of the emergency due to a security event. During a security event, delaying the announcement to staff the facilities and moving non-essential personnel until movement is safe will provide an additional measure of protection for site personnel.

8. **PREPARE** site wide announcement

   a. **DETERMINE** the appropriate Emergency Response Facilities based on habitability and accessibility **AND SELECT** in step 10.

   b. **IF** assembly of non-essential personnel is desired**, THEN DETERMINE** the location based on wind direction. **AND SELECT** in step 10.

      i. Winds from 135 to 340 degrees - Interior lower level Unit 2 Administrative Building.

      ii. Winds from 341 to 134 degrees - South end of Building 110 next to Lake Robinson.

   c. **DETERMINE** if non-essential personnel should shelter in place.

GENERAL EMERGENCY

CAUTION

Site evacuation is mandatory at the declaration of a General Emergency – unless doing so will jeopardize the safety of personnel.

NOTE: To avoid confusion, a site evacuation should only be initiated once.

This announcement can be made by the SEC or EC.

9. **DIRECT** the site evacuation alarm to be sounded for 5 seconds and repeated as necessary.

10. **ANNOUNCE**:

Attention all personnel, attention all personnel, at ___________ (state time of declaration) a GENERAL EMERGENCY has been declared. "All Emergency Response personnel report to:

- ☐ **the normal ERO facilities /**
- ☐ **the Remote Emergency Response Facility**.

☐ ***All non-essential personnel remain clear of the emergency response facilities*** (and, if necessary, the areas near the event location)."

☐ ***All non-essential Personnel report to***

- ☐ **Interior Lower Level of the Unit 2 Administrative Building /**
- ☐ **South End of Building 110 next to Lake Robinson immediately.**

☐ ***All non-essential personnel shelter in place.***

Use of the Public Address System is restricted to emergency communications only"

11. **SOUND** the site evacuation alarm and repeat the announcement from step 10.

12. **IF** a radiological release is in progress, **THEN DIRECT** the performance of dose projections using EPRAD-03, Dose Projections.

GENERAL EMERGENCY

13. **DETERMINE** the appropriate Protective Action Recommendation (PAR) using the information provided in Attachment 10.1

    a. **RECORD** the PAR on the Emergency Notification Form.

NOTE:	A copy of the ENF is provided at the end of this attachment should WebEOC become unavailable.

14. **OPEN** electronic Emergency Notification Form (ENF) in WebEOC.

    a. **SELECT** Start/Programs/Emergency Preparedness/RNP/WebEOC.

    b. **SELECT** "SSO/SEC-CR" as the user.

    c. Password is not required.

    d. **SELECT** "OK".

    e. **SELECT** "HBR Actual" for an emergency.

    f. **SELECT** "EN Form" under "Plugins".

    g. **SELECT** "Create Draft".

NOTE:	A peer check of the completed ENF is recommended prior to distribution to the offsite agencies.

15. **COMPLETE** the ENF

16. **DIRECT** Emergency Communicator to review ENF with the offsite agencies.

17. **DIRECT** activation of ERDS within 1 hour of the classification in accordance with Attachment 10.10 if needed.

18. **PREPARE** for the Facility Turnover, using EPCLA-01, Attachment 10.3.

GENERAL EMERGENCY

Guidance

1. Determine if there are any personnel injuries;

    a. Give priority to lifesaving activities over radiological exposure control; authorize exposures in excess of normal limits, if required.

    b. Refer to EPSPA-02, "First Aid and Medical Care", for additional guidance on first aid and transportation of contaminated injured personnel.

2. Determine if onsite protective actions are necessary by evaluating radiological, chemical, and other situations which may require evacuation or sheltering.

    a. For events involving an offsite toxic OR flammable hazard, additional information and suggested protective actions for onsite personnel can be obtained from the state/county emergency management/response agencies responding to the hazardous incident, i.e., contact Darlington's 911 Dispatch Center or Emergency Management Division for additional information on accidents in their area. (NCR 00140579)

    b. For events involving an offsite toxic gas, when sheltering in place is warranted, ensure a Site-Wide PA announcement is made to secure ventilation systems IAW EPSPA-01.

NOTE:	Reference AOP-034, "Security Events" for guidance and the actions to take for aircraft threats.

3. For security events consider the following:

    a. Local Evacuation of personnel from target sets (including Security personnel).

    b. Site Evacuation by opening (while continuing to defend) security gates.

    c. Dispersal of Licensed Operators

    d. Sheltering personnel in structures away from potential site targets.

    e. Arrangements for accounting for personnel after the threat.

    f. ERO Augmentation at the Remote Emergency Response Facility.

    g. Evaluate possible severe weather protective actions. (NCR # 22292)

4. If evacuation or sheltering is necessary, then implement EPSPA-01, "Evacuation and Accountability."

5. If administration of potassium iodide is necessary, then implement EPSPA-03, “Administration of Potassium Iodide.”

6. Request any offsite assistance necessary;

    a. The Unit 2 Control Room OR Security should contact Darlington County 911 Center for fire, police, or ambulance service. Logistics personnel may contact the 911 Center if Control Room staff is unable to request assistance.

    b. Contact other agencies, as necessary; selected offsite agency numbers are maintained in the Emergency Response Organization (ERO) Phone Book.

7. Activate the appropriate Emergency Response Facilities (ERFs).

    a. Select the location based on habitability and accessibility.

        i. The EOF, TSC, OSC, and JIC are the normal ERFs.

        ii. The back-up TSC and EOF is the Remote Emergency Response Facility (RERF)in Hartsville.

        iii. The Remote Facility may be activated for any event, but normally would be activated for Security Events where reporting to the site may not be safe for the ERO.

    b. The back-up OSC, as defined in EPOSC-01,“Operational Support Center Leader”, is the TSC, or it may be the RERF.

    c. Site evacuation is mandatory at the declaration of a General Emergency. Select a location to assemble personnel based on appropriate upwind direction. (see EPSPA-01, “Evacuation and Accountability” for alternate shelter locations)

        i. Winds from 135 to 340 degrees - Interior lower level Unit 2 Administrative Building.

        ii. Winds from 341 to 134 degrees - South end of Building 110 next to Lake Robinson.

GENERAL EMERGENCY
Guidance

8. Follow up notifications to offsite agencies are required at least every 30-60 minutes.

9. INITIATE electronic logging.

10. Direct shift personnel to mitigate the emergency conditions.

    a. If the dispatch of personnel may cause excessive exposure due to unknown or elevated radiological conditions, then refer to EPOSC-04, "Emergency Work Control", for additional guidance regarding personnel emergency exposure control and team dispatch.

11. Forms for recording data are located in EPNOT-01,"CR/EOF Emergency Communicator."

12. Continue to assess the plant status against the EALs to confirm or downgrade the emergency classification.

13. If the State or County facilities have been activated, then they shall be consulted prior to any downgrade of emergency classification.

14. If not previously completed, then using EPCLA-01, Attachment 10.3, perform a turnover with the TSC SEC and the EOF.

15. Perform PA announcements periodically to update personnel in the field of any changing plant conditions.

16. If plant conditions permit, then coordinate with any offsite agencies, which have activated, and terminate the emergency.

NOTE:	Termination is a change in classification and has a 15 minute notification time requirement.

    a. If the event is being terminated, then direct the Emergency Communicator to make termination notifications to all agencies.

    b. If not previously terminated by the Nuclear Regulatory Commission (NRC), then coordinate the termination of ERDS.

    c. Termination of the event should be communicated by Everbridge using termination codes in EMG-NGGC-0005 or EPNOT-01.

    d. Perform PA announcement that the event has been terminated.

    e. Notify EP staff to clear WEBEOC ENF queue as soon as practical.

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

1. [A] DRILL [B] ACTUAL EVENT MESSAGE # _______
2. [A] INITIAL [B] FOLLOW-UP NOTIFICATION: TIME_______ DATE____/____/_____ AUTHENTICATION # ________
3. SITE: ____________________ Confirmation Phone # (____)____________

4. **EMERGENCY CLASSIFICATION:** [A] UNUSUAL EVENT [B] ALERT [C] SITE AREA EMERGENCY [D] GENERAL EMERGENCY

BASED ON EAL #____________ EAL DESCRIPTION: ____

____

____

5. **PROTECTIVE ACTION RECOMMENDATIONS**: [A] NONE
   - [B] EVACUATE ____
   - [C] SHELTER ____
   - [D] CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.
   - [E] OTHER____

6. **EMERGENCY RELEASE:** [A] None [B] Is Occurring [C] Has Occurred

7. RELEASE SIGNIFICANCE: [A] Not applicable [B] Within normal operating limits [C] Above normal operating limits [D] Under evaluation
8. EVENT PROGNOSIS: [A] Improving [B] Stable [C] Degrading
9. METEOROLOGICAL DATA: Wind Direction* from _______ degrees Wind Speed* _______mph

(*May not be available for Initial Notifications) Precipitation* _______ Stability Class* [A] [B] [C] [D] [E] [F] [G]

10. [A] DECLARATION [B] TERMINATION Time _______________ Date _____/______/_______
11. AFFECTED UNIT(S): [1] [2] [3] [All]
12. UNIT STATUS:
    (Unaffected Unit(s) Status Not Required for Initial Notifications)
    - U1 _____% Power Shutdown at Time _____________ Date ___/_____/____
    - U2 _____% Power Shutdown at Time _____________ Date ___/_____/____
    - U3 _____% Power Shutdown at Time _____________ Date ___/_____/____
13. REMARKS: ____

____

<u>FOLLOW-UP INFORMATION (Lines 14 Through 16 Not Required for Initial Notification</u>

EMERGENCY RELEASE DATA. NOT REQUIRED IF LINE 6 A IS SELECTED.

14. RELEASE CHARACTERIZATION: TYPE: [A] Elevated [B] Mixed [C] Ground UNITS: [A] Ci [B] Ci/sec [C] µCi/sec

MAGNITUDE: Noble Gases:__________ Iodines:___________ Particulates:__________ Other: ___________

FORM: [A] Airborne Start Time __________ Date ___/_____/____Stop Time _________ Date ___/_____/____

[B] Liquid Start Time __________ Date ___/_____/____Stop Time _________ Date ___/_____/____

15. PROJECTION PARAMETERS: Projection period: ________Hours Estimated Release Duration ________Hours

Projection performed: **Time _________ Date ___/_____/____**

16. PROJECTED DOSE:

DISTANCE	TEDE (mRem)	Adult Thyroid CDE (mRem)
Site boundary	____________	____________
2 Miles	____________	____________
5 Miles	____________	____________
10 Miles	____________	____________

17. APPROVED BY: ____________________ Title _______________ Time _________ Date___/_____/____

NOTIFIED BY:________________ RECEIVED BY: _______________ Time _________ Date ___/_____/____

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE NUMBER ______

GOVERNMENT AGENCIES NOTIFIED

NOTIFICATION: TIME ________ DATE ___________ Get Time/Date AUTHENTICATION#________ Get Authentication Code

10.1.1.31 Name: ________________________________ Date/Time: ______________ Agency: **Chesterfield County EOC**

10.1.1.32 Name: ________________________________ Date/Time: ______________ Agency: **Chesterfield County WP**

10.1.1.33 Name: ________________________________ Date/Time: ______________ Agency: **Darlington County EOC**

10.1.1.34 Name: ________________________________ Date/Time: ______________ Agency: **Darlington County WP**

10.1.1.35 Name: ________________________________ Date/Time: ______________ Agency: **Lee County EOC**

10.1.1.36 Name: ________________________________ Date/Time: ______________ Agency: **Lee County WP**

10.1.1.37 Name: ________________________________ Date/Time: ______________ Agency: **NRC Resident Inspector**

10.1.1.38 Name: ________________________________ Date/Time: ______________ Agency: **NRC (via ETS or Bell Phone)**

10.1.1.39 Name: ________________________________ Date/Time: ______________ Agency: **State of SC BWP**

10.1.1.40 Name: ________________________________ Date/Time: ______________ Agency: **State of SC WP**

Save Send Form

CR EMERGENCY CONTROL QUICK START GUIDE

NOTE:	This is a summary level guide and does not replace the procedure steps.

1. Implement EALs as necessary. It is the expectation that the time between exceeding an EAL and declaration of event will not exceed 15 minutes, unless extraordinary conditions prevail. Annotate time of the off normal condition. Continue through the Matrix until a General Emergency has been identified, or until the Matrix has been reviewed. _____

2. Direct an Emergency Communicator to report to the Control Room at this time. This will support communication activities and augmentation of the ERO. _____

3. Proceed to AP-030, "NRC Reporting Requirements", if there is no event classification. _____

4. Declare the highest event classification identified by announcing the event to the Control Room and that you are assuming role as the SEC. This ends the 15 minute clock for the event declaration, and starts the 15 minute clock to notify the appropriate State and County agencies. Announce classification to the Site, as directed in this procedure. _____

5. **IF** a radiological release is in progress, **THEN DIRECT** the performance of dose projections using EPRAD-03, Dose Projections.

6. Fill out the Emergency Notification Form. Detailed instructions are in EPNOT-01, "CR/EOF Emergency Communicator."

7. Develop, approve, and FAX/communicate the Emergency Notification Form. Notify State and County agencies via Selective Signaling System or an alternate means. The notification clock stops after the first voice contact is established with an approved form. First contact is considered complete after site identification, type of message, and emergency classification is provided to the agency. This is the time entered on the Emergency Notification Form of EPNOT-01, "CR/EOF Emergency Communicator." _____

8. Assess EALs for changing plant conditions. _____

LIST OF TOXIC, ASPHYXIANT AND FLAMMABLE GASES

The following is a list of toxic and flammable gases **AND** asphyxiants that are normally stored in bulk quantities within the Protected **AND** Vital areas. While this list is not all-inclusive, it is provided to aid in classification.

NOTE:	Oxygen itself is not flammable, but is treated as a flammable gas, because its presence increases the flammability of materials. In the below list, 1 indicates those gasses which are Flammable, and 2 indicates those gasses which are toxic.

Flammable Gas (1) or Toxic (2)

Acetylene (1, 2)
Oxygen (1)
Propane (1, 2)
Hydrogen (1)
Ammonia (1, 2)
P-10 Gas, used in portal monitors (1)
Ethanolamine (1, 2)
Methoxypropylamine (1, 2)
Dimethylamine (1, 2)

Asphyxiants, such as those listed below, displace oxygen **AND** may become toxic in large quantities.

Asphyxiant Gas

Nitrogen
Argon
Carbon Dioxide
Halon
Helium Freon - Genetron Dichlorodifluoromethane
Freon - R-22, Chlorodifluoromethane

NOTE:	The release of all the Freon – Type R-22 Refrigerant from a single train of equipment in the Control Room HVAC Room has been evaluated, per Engineering Calculation RNP-M/HVAC-1016. This evaluation has determined that the release of all the R-22 Refrigerant from a single train does **NOT** represent the release of a toxic gas into a vital area for the purposes of EAL classification.

ERDS Activation

1. **DISPLAY** the ERDS activation application, using one of the following methods

   i. Using a LAN PC in the Control Room, **CHOOSE** *Start > RNP ERDS Activation.* ______

   OR

   ii. Using a Business LAN PC outside the Control Room, **CHOOSE** *Start > NGG OSI-PI Displays > RNP Qualified > Operations tab > ERDS Activation.* ______

   OR

   iii. Using a Business LAN PC outside the Control Room Room, **CHOOSE** *Start > Programs > Business Apps > PI System > RNP QPIM > Operations tab > ERDS Activation.* ______

2. **IF** the ERDS is not currently transmitting, **THEN PERFORM** the following: ______

   a. When presented with the ERDS Status Control Screen, **SELECT** the "*Click to Activate*" button. ______

   b. When presented with a confirmation dialog box, **SELECT** "*Yes*" to activate ERDS. ______

NOTE:	Contact NIT if the Mode or ERDS Status lights remain yellow for a period exceeding 2 minutes.

   c. **VERIFY** the light beside the Mode selection Transitions from red to green. ______

   d. **VERIFY** the ERDS status transitions to "*Transmitting*" AND displays a current time/date stamp with a green indicating light. ______

   e. **VERIFY** the ERDS Status "*Messages Sent*" parameter has begun to increment. This indicates that data sets are being provided to the NRC. ______

ERDS Activation

CAUTION
ERDS data must be provided to the NRC either electronically or manually.

3. **MONITOR** ERDS periodically to ensure transmission continues. ______

4. After ERDS is transmitting data, buttons at the bottom of the activation screen may be used to close the window or transition to the ERDS Data sheet to view the data. ______

5. **IF** either Mode or ERDS Status lights remain yellow for a period exceeding 5 minutes, **THEN** ERDS is not providing data to the NRC.

   a. **SELECT** "*Click to Deactivate*" button. ______

   b. **IF** ERDS data is NOT transmitting, **THEN INITIATE** measures to send ERDS data manually to the NRC upon activation of the TSC. **USE** the forms in EPNOT-01 designated for recording ERDS data. ______