STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17.	**ISOLATE** SI pump flow to cold legs:	
	a. **CHECK** BOTH SI pumps ALIGNED for hot leg recirculation.	a. **PERFORM** the following: 1) **IF** one SI pump is aligned for hot leg recirculation, **THEN** **ENSURE** SI pump aligned to cold legs STOPPED. 2) **GO TO** Step 18.
	b. **CHECK** power AVAILABLE to SI pump cold leg injection valve FCV-63-22.	b. **DISPATCH** personnel to restore power to SI pump cold leg injection valve FCV-63-22, **USING** EA-201-1, 480 V Board Room Breaker Alignments. **WHEN** power available to FCV-63-22, **THEN** **CLOSE** SI pump cold leg injection valve FCV-63-22. **RETURN TO** procedure and step in effect.
	c. **CLOSE** SI pump cold leg injection valve FCV-63-22.	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18.	**RETURN TO** procedure and step in effect.	

END

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

B.1.e JPM 36

RETURN PRESSURIZER RELIEF TANK TO NORMAL

Original Signatures on File

PREPARED/ REVISED BY: _____ Date/ _____

VALIDATED BY: * _____ Date/ _____

APPROVED BY: _____ Date/ _____
(Operations Training Manager)

CONCURRED: ** _____ Date/ _____
(Operations Representative)

* Validation not required for minor enhancements, procedure Rev changes that do not affect the JPM, or individual step changes that do not affect the flow of the JPM.
** Operations Concurrence required for new JPMs and changes that affect the flow of the JPM (if not driven by a procedure revision).

NUCLEAR TRAINING

REVISION/USAGE LOG

REVISION NUMBER	DESCRIPTION OF REVISION	V	DATE	PAGES AFFECTED	PREPARED/ REVISED BY:
4	Transfer from WP. Procedure change to Rev. 4. Made a perform JPM, not a simulate JPM.	N	8/17/94	All	HJ Birch
pen/ink	Added dates to cover sheep.	N	10/26/95	1	HJ Birch
pen/ink	SO-68-5 Rev chg. Minor rewording of step 13. Add step to monitor RCDT level.	N	9/25/96	4,8	HJ Birch
pen/ink	Chgd initiating cues to direct prt drain first. To help flow thru procedures. Deleted step to reset Pri Wtr alarm. It no longer comes in.	N	1/9/97	4	HJ Birch
	SO-68-5 Rev chg	N	11/17/97	4	HJ Birch
pen/ink	SO-68-5 Rev chg. Added transition step to sect 8.2. Several step enhancements.	N	5/12/98	4-9	HJ Birch
5	Revised steps 17 and 18, added step 19 as a result of revisions to SO-68-5. Changes did not affect the flow of the JPM. Revised JA/TA task numbers. Revised K/A ratings. Reformatted critical steps.	N	9/18/98	All	JP Kearney
pen/ink	SO-68-5 Rev chg. Correct typo in Direction to trainee	N	8/21/00	4	SR Taylor
pen/ink	SO-68-5 Rev chg only no effect	N	12/13/00	4	W. R. Ramsey
6	Incorporated pen/ink changes	N	8/22/02	4	J P Kearney
Pen/ink	Updated references & IC#	N	11/17/03	2,4	T. E. Pitchford
7	Updated references. Minor format changes.	N	2/09/07	2,4	R. H. Evans

V - Specify if the JPM change will require another Validation (Y or N).
See cover sheet for criteria.

SEQUOYAH NUCLEAR PLANT
RO/SRO
JOB PERFORMANCE MEASURE

Task:
Pzr Vapor Space Accident (Return PRT to Normal)

JA/TA task # : 0070040101 0070050101 0680990101 (**RO**)
0070010102 (**SRO**)

K/A Ratings:
008AA1.08 (3.8/3.8) 007K4.01 (2.6/2.9)
007A2.01 (3.9/4.2) 007A2.02 (2.6/3.2)

Task Standard:
Pressurizer Relief Tank (PRT) parameters have been returned to within normal ranges; temperature ($\leq$ 155°F), pressure (1.5 - 6.5 psi), and level (~70%).

Evaluation Method : Simulator ___X___ In-Plant _____

==========

Performer: _____
NAME Start Time _____

Performance Rating : SAT _____ UNSAT _____ Performance Time _____ Finish Time _____

==========

Evaluator: _____/_____
SIGNATURE DATE

COMMENTS

_____

_____

_____

_____

_____

_____

_____

_____

_____

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Sequenced steps identified by an "s"
2. Any UNSAT requires comments
3. Acknowledge any associated alarms.
4. Initialize the simulator in **IC-96.**
5. NOTE: This JPM has been pre-shot in **IC # 96.** Should **IC # 96** be erased or fail to perform as expected then use the following set-up instructions:
   - Initialize Simulator in IC: #16. **ACTIVATE** MF RC05 at 5% to cause PCV-68-334 to leak through.
   - Allow PORV Tailpipe temperature to increase and bring in the alarm, then close FCV-68-333. **ACTIVATE** RF RCR04 to remove power from valve.
   - Activate the following OVERRIDES: **ZAOPI68301 10** [PRT pressure at 10 psi], **ZAOTI68309 130** [PRT temperature at ~ 180°F], and IOR **AN:OVRD[357] ON** & **AN:OVRD[2109] ON**
   - **(These will be deleted during the performance)**
   - Ensure FCV-81-12 is open.
6. Due to time restraints CUEs for PRT level and temperature will be given at appropriate times.

Validation Time: CR. 17 mins **Local** _____

Tools/Equipment/Procedures Needed:
1-SO-68-5 Section 8.2 & 8.4.

References:

	Reference	Title	Rev No.
1.	1-SO-68-5	Reactor Coolant System	**17**

==========

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. 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.

INITIAL CONDITIONS:

Unit 1 is at 100% power, steady state. Pressurizer pressure controls in automatic.
Pressurizer sprays in automatic.
PORV PCV-68-334 is partially opened but the block valve has been closed and de-energized.
The valve is no longer leaking through.
1A Rx Coolant Drain Tank pump is inoperable.

INITIATING CUES:

You are the Unit 1 CRO and are to cool the PRT and then, if necessary, drain the PRT to within normal parameters.
Notify the US when the PRT parameters have been returned to the normal conditions.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 1.: Obtain correct procedure to return PRT parameter(s) to normal. STANDARD: Operator obtains a copy of 1-SO-68-5 Sections 8.2 & 8.4. . COMMENTS: **NOTE: The operator may choose to pump the PRT level down first, start at step 5 of the JPM in that case.**	___ SAT ___ UNSAT Start Time____
NOTE: This portion is performed using Section 8.4 of the SO. STEP 2.: [1] **ENSURE [FCV-81-12] OPEN.** STANDARD: Operator verifies that FCV-81-12 is open by red light on. COMMENTS:	___ SAT ___ UNSAT
STEP 3.: [2] **OPEN [1-FCV-68-303]** by placing **[1-HS-68-303A]** to **OPEN** position. **NOTE: When FCV-68-303 is opened, THEN delete ZAOTI68309 and AN:OVRD[2109] 0verrides** STANDARD: Operator takes hand switch HS-68-303A on M-5 to OPEN. Handswitch indicates valve is open by red light "ON". **This step is critical to add primary water to the PRT for cooling.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 4.: [3] **IF** PRT level increases to ≥ 88% or PRT temperature decreases to ≤ 120°F **THEN** **CLOSE [1-FCV-68-303]** ***Cue:*** ***PRT level is 91%.*** ***PRT temp is as indicated.*** STANDARD: Operator monitors PRT level on LI-68-300 and temperature on TI-68-309, then places FCV-68-303 in the closed position and verifies green light ON. **This step is critical to prevent overfilling the PRT.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 5.: [4] **IF** PRT level is ≥ 88% **THEN** **GO TO** section 8.2 or 8.3 of this instruction, AND **RETURN** to step **[1]** of this section if further temperature reduction is needed. STANDARD: Operator goes to section 8.2 (1A RCDT pump is inop) COMMENTS:	___ SAT ___ UNSAT
EVALUATOR NOTE The following step evaluate section 8.2	
STEP 6.: [1] **VERIFY** RCDT pumps aligned for service in accordance with valve check list 1-77-1.02. ***Cue:*** ***NO deviations.*** STANDARD: Operator checks status log to ensure no deviations exist. COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 7.: [2] **STATION** AUO at panel 0-L-2. ***Cue:*** ***Role play the Rad Waste AUO. State that you are at 0-L-2 panel and will stay here and wait on your instructions.*** STANDARD Operator ensures an AUO is stationed at 0-L-2 panel. COMMENTS:	___ SAT ___ UNSAT
STEP 8.: [3] **IF** RCDT level >20%, **THEN** **PUMP** down RCDT level in accordance with Appendix C of this Instruction. ***Cue:*** ***Role play the Rad Waste AUO. State that you are at 0-L-2 panel and the level in Unit 1 RCDT is 18%.*** STANDARD: Operator checks with an AUO at 0-L-2 panel and ensures level is < 20% COMMENTS:	___ SAT ___ UNSAT
STEP 9.: [4] **ENSURE [1- FCV-77-9]** and **[1-FCV-77-10]** are **OPEN.** STANDARD: Operator verifies FCV-77-9 and FCV-77-10 open on panel M-15 (red lights on handswitches ON) COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 10.: [5] **ENSURE [1-HS-77-6A]** for RCDT Pump B is in the **PULL-P-AUTO** position. ***Cue:*** ***Rad waste Operator informs UO that RCDT Pump "B" is in P-AUTO and that the level in the Unit 1 RCDT is still 18%.*** STANDARD: Operator contacts Rad Waste Operator and verifies HS-77-6A for RCDT Pump B is in P-AUTO. COMMENTS:	___ SAT ___ UNSAT
STEP 11.: [6] **OPEN [1- FCV-68-305]** Nitrogen Supply to PRT. STANDARD: Operator verifies FCV-68-305 open on panel 1 M-5 (red lights on handswitches ON). **This step is critical to align Nitrogen to the PRT.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 12.: [7] **PLACE [1-HS-68-310A]** in the **OPEN** position, **AND** **VERIFY [1-FCV-68-310] OPENS** ***Cue:*** ***When operator opens FCV-68-310 and the operator contacts the Rad Waste operator, then state to the operator the B RCDT pump has started.*** STANDARD: Operator ensures FCV-68-310 open on panel 1-M-5, red light. **This step is critical to drain the PRT to normal level.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 13.: [8] **ENSURE** RCDT Pump B **STARTS.** ***Cue:*** ***RCDT pump B is running.*** STANDARD: Operator checks with Rad Waste AUO to ensure RCDT pump B starts. COMMENTS:	___ SAT ___ UNSAT
STEP 14.: [9] **IF** PRT pressure drops < 1.5 psig, **THEN...** **NOTE:** **30 seconds after FCV-68-310 is open, DELETE ZAOPI68301 & AN:OVRD[357}** ***Cue:*** ***PRT pressure is constant ~ 6.5 psig. "*** STANDARD: Operator monitors PRT pressure with PI-68-301 on 1-M-5. COMMENTS:	___ SAT ___ UNSAT
STEP 15.: [10] **IF** at any time while pumping down the PRT the RCDT level approaches 50%, **THEN..** ***Cue:*** ***When AUO contacted, State: I will monitor RCDT level, Stop RCDT pump and notify you to close FCV-68-310 if RCDT approaches 50%.*** STANDARD: Operator notifies AUO of this step. COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 16.: **[11] IF** returning from Appendix C, **THEN** STANDARD: Operator N/A's step. COMMENTS:	___ SAT ___ UNSAT
STEP 17.: **[12] WHEN** PRT level reaches desired level, **THEN** **STOP** "B" RCDT. ***Cue:*** ***When the operator begins to monitor level on LI-68-300, Tell the operator that "PRT level has decreased to 70%".*** ***Cue:*** ***When operator requests AUO to stop RCDT pump 1B, Tell him "RCDT pump 1B is stopped and HS is in Pull-P-Auto".*** STANDARD: Operator verifies level, and has the Rad Waste Operator STOP RCDT Pump 1B and place HS in Pull-P-Auto. **This step is critical to prevent pumping down PRT to below normal level.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 18.: **[13] CLOSE [1-FCV-68-310].** ***Cue:*** ***If operator asks, PRT Level is 70%, Temp is 110°F, and Press is 6.5 psig.*** STANDARD: Operator closes with HS-68-310A and verifies closed on panel 1-M-5 (green lights on handswitches ON). **This step is critical to return system to normal alignment.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 19.: **[14] PLACE [1-HS-77-6A]** RCDT pump B in **PULL-P-AUTO** position at 0-L-2 panel. ***CUE:*** ***When operator requests AUO to place the HS for RCDT pump 1B, Tell him "RCDT pump 1B HS is in Pull-P-Auto".*** STANDARD: Operator has the Rad Waste Operator place HS in Pull-P-Auto. COMMENTS:	___ SAT ___ UNSAT
STEP 20.: **[15] CLOSE [1-FCV-68-305].** STANDARD: Operator closes with HS-68-305A and verifies closed on panel 1-M-5 (green lights on handswitches ON). COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 21.:	Inform the US/SRO that the PRT parameters have been returned to within normal operating conditions/ranges.	___ SAT ___ UNSAT Stop Time____
STANDARD:	Operator informs the US/SRO that the PRT parameters have been returned to within normal operating conditions/ranges.	
COMMENTS:		

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

DIRECTION TO TRAINEE:

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

INITIAL CONDITIONS:

Unit 1 is at 100% power, steady state. Pressurizer pressure controls in automatic.

Pressurizer sprays in automatic.

PORV PCV-68-334 is partially opened but the block valve has been closed and de-energized.

The valve is no longer leaking through.

1A Rx Coolant Drain Tank pump is inoperable.

INITIATING CUES:

You are the Unit 1 CRO and are to cool the PRT and then, if necessary, drain the PRT to within normal parameters.

Notify the US when the PRT parameters have been returned to the normal conditions

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

SYSTEM OPERATING INSTRUCTION

1-SO-68-5

PRESSURIZER RELIEF TANK

Revision **17**

QUALITY RELATED

PREPARED/PROOFREAD BY: JUDY VARNER

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: D. A. PORTER

EFFECTIVE DATE: 05/09/2006

LEVEL OF USE: **CONTINUOUS USE**

REVISION

DESCRIPTION: Revised to incorporate PCF 007. Added steps in section 8.9 to allow purging PRT with either Hydrogen or Nitrogen on VCT.

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TABLE OF CONTENTS

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1.0 INTRODUCTION

1.1 Purpose

To provide instructions for the operation of the Pressurizer Relief Tank (PRT).

1.2 Scope

A. Placing the PRT in service.

B. Increasing the PRT level.

C. Decreasing the PRT level.

D. Reducing the temperature of the PRT.

E. Increasing the pressure of the PRT.

F. Reducing the pressure of the PRT.

G. Gravity draining PRT to the Containment Floor and Equipment Drain Sump (RBF & EDS).

H. Reducing the O_2 Concentration in the PRT in Mode 5 or 6.

I. Purging the PRT in Modes 1 thru 4.

2.0 REFERENCES

2.1 Performance References

None

2.2 Developmental References

A. SOI-68.1, *Reactor Coolant System*

B. 0-MI-MXX-068-006.0, *Venting of Pressurizer, Pressurizer Relief Tank, and Reactor Head*

C. SPP-10.3, *Verification Program*

D. TVA Drawing
   1. 47W813-1
   2. 47W819-1
   3. 47W830-1
   4. 47W830-6

E. FSAR
   1. Section 5.5

3.0 PRECAUTIONS AND LIMITATIONS

A. During normal operation, PRT water temperature should not exceed 120°F.

B. Maintaining 3 to 6 psig N_2 gas blanket on the PRT will prevent the formation of explosive hydrogen-oxygen mixtures.

C. The PRT concentration of oxygen shall be limited to less than or equal to 2% by volume whenever the hydrogen concentration exceeds 4% by volume.

D. Over filling the PRT to solid water condition during oxygen reduction per Section 8.8 may result in failure of the PRT rupture disc.

E. The PRT pressure should be maintained < 7.5 psig during normal operation. (Except during the performance of section 8.9).

F. The PRT rupture discs are rated at 85 psig.

G. The level in the PRT should be maintained at 70%. If the level increases to 88%, then decreasing level to 70% is necessary. If the level decreases to 55%, then increasing level to 70% is needed when the PRT is required to be operable.

H. Completely draining the PRT may result in gas binding the RCDT pumps.

I. Water intrusion into the waste gas vent header is possible during PRT venting operations with PRT level high. This could affect RCP seal leakoff flows and the vent capability of tanks which vent to waste gas vent header.

J. PRT level indications or alarms are not available in the Aux Control Room, thus PRT level manipulations and feed & bleed processes are unavailable.

Date_____

4.0 PREREQUISITE ACTIONS

NOTE Throughout this Instruction, where an **IF/THEN** statement exists, the step should be **N/A** if condition does not exist.

[1] **ENSURE** Instruction to be used is a copy of the effective version. _____

[2] **ENSURE** Precautions and Limitations, Section 3.0 have been reviewed. _____

[3] **ENSURE** Attachment 1, Power Checklist 1-68-5.01 is complete. _____

[4] **ENSURE** Attachment 2, Valve Checklist 1-68-5.02 is complete. _____

[5] **VERIFY** primary water is available to fill and cool the PRT (N/A if primary water will not be used). _____

[6] **VERIFY** Waste Disposal System is available to receive liquid from PRT. _____

[7] **VERIFY** vent header in service to receive gases from the PRT (N/A if PRT will not be vented to vent header). _____

[8] **VERIFY** low pressure N_2 system is in service (N/A if nitrogen will not be used). _____

[9] **ENSURE** each performer documents their name and initials:

Print Name	Initials

[10] **INDICATE** below which performance section of this Instruction will be used and the reason for this performance:

☐ 5.0 STARTUP/STANDBY READINESS

☐ 8.0 INFREQUENT OPERATION

REASON: _____

Date_____

5.0 STARTUP/STANDBY READINESS

[1] **VERIFY** PRT has normal operating level of ~ 70%. _____

[2] **IF** PRT level needs adjusting, **THEN**

REFER TO Section 8.1, 8.2, or 8.3, **AND**

ADJUST level as necessary. _____

[3] **IF** PRT pressure needs adjusting, **THEN**

REFER TO Section 8.5 or 8.6, **AND**

ADJUST pressure as necessary. _____

END OF TEXT

6.0 NORMAL OPERATION

None.

7.0 SHUTDOWN

None.

Date_____

8.0 INFREQUENT OPERATION

8.1 Increasing PRT Level

[1] **ENSURE** a primary water pump is running. _____

[2] **ENSURE** **[1-FCV-81-12]** primary water containment isolation valve is **OPEN**. _____

[3] **OPEN** **[1-FCV-68-303]** PRT makeup valve. _____

[4] **MAINTAIN** PRT pressure between 3 and 6 psig by operating **[1-PCV-301]** PRT vent valve. _____

NOTE Normal PRT level is approximately 70%.

[5] **WHEN** PRT level increases to desired level (not to exceed 88%), **THEN**

CLOSE **[1-FCV-68-303]**. _____ 1st _____ IV

[6] **ENSURE** **[1-PCV-68-301]** PRT vent valve **CLOSED**. _____ 1st _____ IV

END OF TEXT

Date_____

8.2 Reducing PRT Level Using B RCDT Pump

CAUTION 1 **Pump damage could occur if suction is lost while pumping water > 175°F.**

CAUTION 2 **RCDT pump 1B will NOT automatically stop on low level in PRT OR closure of FCV-68-310.**

NOTE RCDT pump B will Auto start when 1-FCV-68-310, PRT drain to RCDT opens.

[1] **VERIFY** RCDT pumps aligned for service in accordance with Valve Checklist 1-77-1.02. _____

NOTE An AUO at panel 0-L-2 in communication with a MCR UO is needed to perform this Instruction.

[2] **STATION** an AUO at panel 0-L-2. _____

[3] **IF** RCDT level > 20%, **THEN**

PUMP down RCDT level in accordance with Appendix C of this Instruction. _____

[4] **ENSURE** **[1-FCV-77-9]** and **[1-FCV-77-10]** RCDT pump outlet isolation valves are **OPEN**. _____

[5] **ENSURE** **[1-HS-77-6A]** for RCDT pump B is in the **PULL-P-AUTO** position. _____

[6] **OPEN** **[1-FCV-68-305]** Nitrogen Supply to PRT. _____

[7] **PLACE** **[1-HS-68-310A]** in the **OPEN** position, **AND**

VERIFY **[1-FCV-68-310]** **OPENS**. _____

[8] **ENSURE** RCDT pump B **STARTS**. _____

Date_____

8.2 Reducing PRT Level Using B RCDT Pump (Continued)

[9] **IF** PRT pressure drops < 1.5 psig, **THEN**

COMPLETE the following:

[a] **STOP** 'B' RCDT pump at 0-L-2, **AND**

CLOSE [1-FCV-68-310]. _____

[b] **WHEN** PRT pressure returns to normal, **THEN**

OPEN [1-FCV-68-310], **AND**

VERIFY RCDT pump B **STARTS**. _____

CAUTION **The RCDT level is to be maintained < 50% while 1-FCV-68-310 is open to prevent inadvertent opening of 1-LCV-77-415 which could cause overfilling of RCDT from the PRT.**

[10] **IF** at any time while pumping down the PRT the RCDT level approaches 50%, **THEN**

PERFORM the following before continuing the PRT level reduction:

[a] **PLACE [1-HS-77-6A]** RCDT pump B in the **PULL-TO-LOCK** position. _____

[b] **CLOSE [1-FCV-68-310]**. _____

[c] **GO TO** Appendix C of this Instruction for RCDT level reduction and return to Step **[11]** of Section 8.2. _____

Date_____

8.2 Reducing PRT Level Using B RCDT Pump (Continued)

[11] **IF** returning from Appendix C, **THEN**

PERFORM the following:

[a] **PLACE [1-HS-77-6A]** RCDT pump B in **PULL-P-AUTO** position. _____

[b] **OPEN [1-FCV-68-310]**. _____

[12] **WHEN** PRT reaches desired level, **THEN**

STOP 'B' RCDT pump. _____

[13] **CLOSE [1-FCV-68-310]**. _____ 1st _____ IV

[14] **PLACE [1-HS-77-6A]** RCDT pump 'B' in **PULL-P-AUTO** position at 0-L-2 panel. _____ 1st _____ IV

[15] **CLOSE [1-FCV-68-305]** Nitrogen Supply to PRT. _____ 1st _____ IV

END OF TEXT

Date_____

8.3 Reducing PRT Level Using A RCDT Pump

CAUTION 1 **Pump damage could occur if suction is lost while pumping water > 175°F.**

CAUTION 2 **RCDT pump 1A will NOT automatically stop on low level in PRT OR closure of FCV-68-310.**

NOTE RCDT pump A operates automatically with 1-LCV-77-415 from the RCDT only.

[1] **VERIFY** RCDT pumps aligned for service in accordance with Valve Checklist 1-77-1.02. _____

[2] **IF** RCDT level > 20%, **THEN**

PUMP down RCDT level in accordance with Appendix C of this Instruction. _____

NOTE Communications will have to be established between MCR, Radwaste (0-L-2), and switchgear for "A" RCDT pump.

[3] **STATION** an AUO at panel 0-L-2. _____

[4] **STATION** an AUO at Switchgear for "A" RCDT pump. _____

[5] **ENSURE [1-FCV-77-9]** and **[1-FCV-77-10]** RCDT pump outlet isolation valves are OPEN. _____

[6] **OPEN [1-FCV-68-305]** Nitrogen Supply to PRT. _____

[7] **PLACE [1-HS-77-6A]** RCDT Pump B in **PULL-TO-LOCK**. _____

[8] **PLACE** transfer switch XS-77-4 on 1A-A Reactor Vent Board compartment 2C to **AUX** position. _____

[9] **PLACE [1-HS-68-310A]** in the **OPEN** position, **AND**

VERIFY [1-FCV-68-310] OPENS. _____

Date_____

8.3 Reducing PRT Level Using A RCDT Pump (Continued)

[10] **PLACE [1-HS-77-4D]** RCDT Pump A, in the **START** position (at switchgear). _____

[11] **IF** PRT pressure drops < 1.5 psig, **THEN**

STOP RCDT pump A. _____

[12] **WHEN** PRT pressure returns to normal, **THEN**

PLACE [1-HS-77-4D] RCDT pump A to the **START** position (at switchgear). _____

CAUTION **The RCDT level is to be maintained < 50% while 1-FCV-68-310 is open to prevent inadvertent opening of 1-LCV-77-415 which could cause overfilling of RCDT from PRT.**

[13] **IF** at any time while pumping down the PRT the RCDT level approaches 50%, **THEN**

PERFORM the following before continuing the PRT level reduction:

[a] **PLACE [1-HS-77-4D]** RCDT pump A in the **STOP** position. _____

[b] **CLOSE [1-FCV-68-310]**. _____

[c] **OPEN [1-LCV-77-415]**. _____

[d] **START** RCDT pump "A" with 1-HS-77-4D, _____

AND

REDUCE RCDT level to approximately 20%. _____

[e] **WHEN** RCDT level is approximately 20%,

THEN

STOP RCDT pump "A" with 1-HS-77-4D. _____

[f] **ENSURE [1-LCV-77-415]** closed. _____

Date_____

8.3 Reducing PRT Level Using A RCDT Pump (Continued)

[14] **IF** resuming PRT level reduction, **THEN**

PERFORM the following:

[a] **OPEN [1-FCV-68-310]**. _____

[b] **PLACE [1-HS-77-4D]** RCDT pump A in **START**. _____

[15] **WHEN** PRT reaches desired level, **THEN**

[a] **STOP** RCDT pump A _____

[b] **PLACE** in **PULL-P-AUTO** _____ 1st _____ IV

[16] **CLOSE [1-FCV-68-310]**. _____ 1st _____ IV

[17] **PLACE** transfer switch XS-77-4 to **NORMAL** position, _____ 1st _____ IV

AND

VERIFY wire seal reinstalled. _____ 1st _____ IV

[18] **IF** desired, **THEN**

PLACE [1-HS-77-6A] RCDT Pump B in **PULL-P-AUTO**. _____ 1st _____ IV

[19] **CLOSE [1-FCV-68-305]** Nitrogen Supply to PRT. _____ 1st _____ IV

END OF TEXT

Date_____

NOTE May need an extra copy of this Instruction.

8.4 Reducing the Temperature of the PRT

[1] **ENSURE [1-FCV-81-12] OPEN.** _____

[2] **OPEN [1-FCV-68-303]** by placing **[1-HS-68-303A]** to **OPEN** position. _____

[3] **IF** PRT level increases to ≥ 88% or PRT temperature decreases ≤ 120°F, **THEN**

CLOSE [1-FCV-68-303] . _____ 1st _____ IV

[4] **IF** PRT level is ≥ 88%, **THEN**

GO TO section 8.2 or 8.3 of this Instruction, **AND**

RETURN to step **[1]** of this section if further temperature reduction is needed. _____

END OF TEXT

Date_____

8.5 Increasing the Pressure of the PRT

[1] **OPEN [1-FCV-68-305]** Nitrogen Supply to PRT. _____

[2] **WHEN [1-PI-68-301]** is between 3 to 6 psig,
THEN

CLOSE [1-FCV-68-305] Nitrogen Supply to PRT. _____ _____
1st IV

END OF TEXT

Date_____

8.6 Reducing the Pressure of the PRT

[1] **STATION** AUO at panel 0-L-2 to monitor vent header pressure and start Waste Gas Compressor (WGC) if necessary. _____

[2] **OPEN [1-PCV-68-301]**. _____

[3] **WHEN [1-PI-68-301]** is between 3 to 6 psig, **THEN**

CLOSE [1-PCV-68-301]. _____ 1st _____ IV

NOTE: Step **[4]** may be repeated if it is suspected that water remains in waste gas vent header and additional venting is necessary.

[4] **IF** the PRT pressure will not drop while venting or water is suspected to be in waste gas vent header, **THEN**

PERFORM the following:

[a] **NOTIFY** U-1 and U-2 SRO that vent header is about to be vented and to monitor AB area radiation monitors and 0-RM-90-101, AB vent monitor. ☐

[b] **OPEN [0-LCV-77-403],** Loop Dr LCV (653' U1 pipe chase), for 15 seconds, **THEN CLOSE**. _____

[c] **OPEN [0-LCV-77-404],** Loop Dr LCV (653' U1 pipe chase), for 15 seconds, **THEN CLOSE**. _____

[d] **OPEN [0-LCV-77-405]**, Loop Dr LCV (669' U2 pipe chase) for 15 seconds, **THEN CLOSE**. _____

END OF TEXT

Date_____

8.7 Gravity Draining PRT to the Containment Floor and Equipment Drain Sump (RBF & EDS)

CAUTION **Completely draining PRT may result in gas binding RCDT pumps.**

[1] **OBTAIN** permission from US to drain PRT to RBF & EDS. _____

[2] **ENSURE** the following RCDT control switches in the **PULL-TO-LOCK** position:

A. **[1-HS-77-4A]** RCDT PUMP 1A. _____

B. **[1-HS-77-6A]** RCDT PUMP 1B. _____

[3] **PLACE [1-HS-77-415]** RCDT pump suction in the **CLOSE** position **AND**

ENSURE [1-LCV-77-415] remains **CLOSED**.
(switch is spring return to auto) _____

[4] **IF** both of the following conditions exist:

- Pressurizer PORVs OPEN,
- RCS is vented to atmosphere,

THEN
MARK Steps **[5]** and **[6]** as N/A. _____

NOTE: If Step **[4]** is N/A, then either Step **[5]** or Step **[6]** must be performed to prevent drawing a vacuum in PRT while draining.

[5] **IF** all of the following conditions exist:

- Pressurizer PORVs are CLOSED,
- PRT is NOT vented to atmosphere,
- It is desired to use Nitrogen as cover gas,

THEN
OPEN [1-FCV-68-305] Nitrogen Supply to PRT. _____

Date_____

8.7 Gravity Draining PRT to the Containment Floor and Equipment Drain Sump (RBF & EDS) (Continued)

[6] **IF** all of the following conditions exist:

- PRT has been purged and vented to atmosphere,
- PRT manual vent to be used as a vent path,
- 1-68-573 flange is removed,

THEN
ENSURE [1-68-573] PRT Manual Vent OPEN. _____

[7] **OPEN [1-FCV-68-310]** PRT to RCDT suction header. _____

[8] **OPEN [1-FCV-77-3]** RCDT to RBF & EDS. _____

[9] **IF** high level alarm Illuminates on RCDT during this operation, **THEN**

[a] **CLOSE [1-FCV-68-310]** _____

AND

DRAIN RCDT to ~20% level. _____

[b] **WHEN** RCDT level is in the normal range, **THEN**

ENSURE [1-LCV-77-415] is **CLOSED** _____

AND

OPEN [1-FCV-68-310] to resume PRT draining. _____

[10] **WHEN** it is no longer desired to transfer PRT to RBF & EDS, **THEN**

CLOSE [1-FCV-77-3]. _____ 1st _____ IV

[11] **CLOSE [1-FCV-68-310]**. _____ 1st _____ IV

Date_____

8.7 Gravity Draining PRT to the Containment Floor and Equipment Drain Sump (RBF & EDS) (Continued)

[12] ENSURE [1-FCV-68-305] Nitrogen Supply to PRT is **CLOSED**.

_____ 1st _____ IV

[13] IF manual vent used as vent path is step **[6]**,
THEN

ENSURE [1-68-573] PRT Manual Vent **CLOSED**.

_____ 1st _____ IV

NOTE RCDT suction piping may be gas bound if PRT was drained completely.

[14] IF PRT was drained completely,
THEN

EVALUATE need to prime the RCDT pumps using 1-SO-77-1, *Reactor Coolant Drain Tank.*

_____

[15] ENSURE [1-HS-77-415] RCDT pump suction in **AUTO**.

_____ 1st _____ IV

[16] PLACE the following control switches to the **PULL-P-AUTO** position.

A. **[1-HS-77-4A]** RCDT pump 1A.

_____ 1st _____ IV

B. **[1-HS-77-6A]** RCDT pump 1B.

_____ 1st _____ IV

END OF TEXT

Date_____

8.8 Reducing the O_2 Concentration in the PRT in Mode 5 or 6

NOTE 1 Local AUO assistance will be needed to perform this Instruction.

NOTE 2 Several copies of Appendices A and B may be needed to complete this Instruction.

NOTE 3 This Instruction can only be performed in modes 5 and 6.

NOTE 4 Step [1] may be NA'd if flange has been previously removed and hose installed.

[1] **REQUEST** Mechanical Maintenance to REMOVE blind flange from **[1-68-573]** and to INSTALL a temporary hose. _____

[2] **IF** reducing PRT oxygen concentration utilizing RCDT pump "B", **THEN**

PERFORM Appendix A to reduce the PRT O_2 concentration. _____

[3] **IF** reducing PRT oxygen concentration utilizing RCDT pump "A", **THEN**

PERFORM Appendix B to reduce the PRT O_2 concentration. _____

[4] **ENSURE [1-PCV-68-304]** PRT N2 pressure regulator maintains ~ 6.5 psig. _____

[5] **CLOSE [1-FCV-68-305]** nitrogen inlet isolation valve. _____ 1st _____ IV

[6] **ENSURE [1- FCV-68-308]** gas analyzer FCV **CLOSED**. _____ 1st _____ IV

[7] **ENSURE [1-68-573]** PRT vent is **CLOSED**. _____

[8] **REQUEST** Mechanical Maintenance to remove hose from **[1-68-573]**, **AND**

INSTALL blind flange. _____

[9] **ENSURE [1- 68-573]** PRT vent to atmosphere **CLOSED** AND Blind Flange **INSTALLED.** _____ 1st _____ IV

END OF TEXT

Date_____

8.9 Purging the PRT

CAUTION **If PRT temperature is >130°F (1-TI-68-309), this procedure can NOT be performed.**

NOTE 1 This section purges the PRT by increasing pressure to ~ 15 psig then decreasing pressure to ~ 5 psig. Number of times pressure will be increased and decreased will be determined by Chem Lab.

NOTE 2 O_2 concentration for inservice Waste Gas Decay Tank should be monitored during this process.

NOTE 3 When PRT is vented to the RCDT, pressure will increase to near PRT pressure.

NOTE 4 Two or three gas decay tanks will be required for this purge.

NOTE 5 VCT pressure must be maintained ≥ 25 psig when purging PRT.

[1] **IF** desired to raise PRT level to just below high level alarm,
THEN
PERFORM Section 8.1. _____

[2] **IF** hydrogen aligned to VCT,
THEN
ADJUST [1-PCV-62-120] VCT Hydrogen Blanket,
to maintain ≥ 25 psig. (on top of VCT room) _____

[3] **IF** Nitrogen aligned to VCT,
THEN
ADJUST [1-PCV-62-119] VCT Nitrogen Blanket,
to maintain ≥ 25 psig. (on top of VCT room) _____

[4] **ADJUST [1-PCV-68-304]** setpoint to ~ 15 psig.
(located in 690 pipe chase northeast corner) _____

NOTE 1-XA-55-5A window D1 is an expected alarm when this process increases pressure > 8 psig.

[5] **OPEN [1-FCV-68-305]** Nitrogen Supply to PRT. _____

[6] **WHEN [1-PI-68-301]** is ~ 15 psig, **THEN**

CLOSE [1-FCV-68-305] Nitrogen Supply to PRT. _____

Date_____

8.9 Purging the PRT (Continued)

[7] **STATION** AUO at panel 0-L-2 to **MONITOR** Vent Header pressure ☐.

NOTE 1-XA-55-5B window A2, B2, C2, & D2 are expected alarm when PRT is vented to the vent header due to increased pressure on RCDT.

[8] **OPERATE** Waste Gas Compressor as necessary. ☐

[9] **OPEN [1-PCV-68-301]**, PRT Vent header PCV. _____

[10] **WHEN [1-PI-68-301]** is ~ 5 psig, **THEN**
CLOSE [1-PCV-68-301], PRT Vent header PCV. _____

[11] **REPEAT** steps **[5]** thru **[10]** as directed by Chem Lab. _____

[12] **VERIFY [1-PCV-68-305] CLOSED**, Nitrogen to PRT. _____ IV

[13] **VERIFY [1-PCV-68-301] CLOSED**, PRT Vent header PCV. _____ IV

[14] **RETURN [1-PCV-68-304]** setpoint to ~ 6.5 psig
(located in 690 pipe chase northeast corner) _____ 1st _____ CV

[15] **IF** using Hydrogen, **THEN**
ADJUST [1-PCV-62-120] VCT Hydrogen Blanket,
to maintain approximately 17-20 psig. (on top of VCT room) _____

[16] **IF** using Nitrogen, **THEN**
ADJUST [1-PCV-62-119] VCT Nitrogen Blanket,
to maintain approximately 17-20 psig. (on top of VCT room) _____

[17] **NOTIFY** Chem Lab that PRT purge has been completed. _____

END OF TEXT

9.0 RECORDS

Completed copies of all sections, Appendices, and attachments shall be transmitted to the Operations Superintendent's Secretary.

APPENDIX A
Page 1 of 4
Date_____

PRT O_2 CONCENTRATION REDUCTION USING RCDT PUMP B

CAUTION **Over filling the PRT to solid water condition may result in failure of the PRT rupture disc.**

[1] **ENSURE [1-FCV-68-305]** nitrogen inlet isolation valve is **CLOSED**. _____

[2] **ENSURE [1-PCV-68-301]** PRT vent valve to vent header is **CLOSED**. _____

[3] **ENSURE [1-68-573]** PRT vent to atmosphere is **OPEN**. _____

[4] **OPEN [1-FCV-68-303]** primary water supply to PRT. _____

[5] **VERIFY [1-LI-68-300]** PRT level indicator on 1-M-4 shows increase. _____

[6] **VERIFY** PRT high level alarm comes in at ~ 88%. _____

[7] **WHEN** water level reaches 98%, as indicated on **[1-LI-68-300]**, **THEN**

CLOSE [1-FCV-68-303]. _____ 1st _____ IV

[8] **CLOSE [1-68-573]** PRT vent to atmosphere. _____

[9] **OPEN [1-FCV-68-305]** nitrogen inlet isolation valve. _____

[10] **VERIFY** RCDT pumps aligned for service in accordance with Valve Checklist 1-77-1.02. _____

NOTE An AUO at panel 0-L-2 in communication with a MCR UO is needed to perform this Instruction.

[11] **STATION** an AUO at panel 0-L-2. _____

[12] **ENSURE [1-FCV-77-9]** and **[1-FCV-77-10]** RCDT pump outlet isolation valves are **OPEN**. _____

Date_____

[13] **IF** filling and venting of RCDT suction line or pumps **IS NOT** required, **THEN**

GO TO step **[20]** and N/A steps **[14]** through **[19]**. _____

[14] **PLACE** control switches in the **PULL-TO-LOCK** position:,

A. **[1-HS-77-4A]** RCDT pump 1A. _____

B. **[1-HS-77-6A]** RCDT pump 1B. _____

NOTE Steps **[15]** through **[19]** fill and vent the RCDT pump suction header. Step **[20]** starts the O_2 concentration reduction.

[15] **PLACE [1-HS-68-310A]** in the **OPEN** position, **AND**

VERIFY [1-FCV-68-310] opens. _____

NOTE Opening 1-FCV-77-3 allows suction header to be vented to Cntmt Floor & Equip. Drain Sump.

[16] **OPEN [1-FCV-77-3]** RCDT to RBF&EDS isolation. _____

[17] **WHEN** a drop in PRT level is observed, **THEN**

CLOSE [1-FCV-77-3]. _____

[18] **IF** RCDT or suction line from RCDT has been drained and is ready to be filled, **THEN**

[a] **OPEN [1-LCV-77-415]** while **MONITORING** RCDT and PRT levels. _____

[b] **WHEN** a drop in PRT level is observed and/or RCDT level increases or is at desired level, **THEN**

CLOSE [1-LCV-77-415]. _____

[19] **CLOSE [1-FCV-68-310]**. _____

Date_____

CAUTION 1 **Pump damage could occur if suction is lost while pumping water > 175°F.**

CAUTION 2 **RCDT pump 1A will NOT automatically stop on low level in PRT OR closure of FCV-68-310.**

NOTE RCDT Pump B will Auto start when 1-FCV-68-310, PRT drain to RCDT opens.

[20] **ENSURE** control switches are in the **P-AUTO** position:

A. **[1-HS-77-4A]** RCDT pump 1A. _____ 1st _____ IV

B. **[1-HS-77-6A]** RCDT pump 1B. _____ 1st _____ IV

[21] **PLACE [1-HS-68-310A]** in the **OPEN** position,
AND

VERIFY [1-FCV-68-310] opens. _____

[22] **ENSURE** RCDT Pump B **STARTS**. _____

[23] **IF** PRT pressure drops < 1.5 psig, **THEN**

COMPLETE the following:

[a] **STOP** 'B' RCDT pump at 0-L-2, _____
AND

CLOSE [1-FCV-68-310]. _____

[b] **WHEN** PRT pressure returns to normal, **THEN**

OPEN [1-FCV-68-310], _____

AND

VERIFY RCDT pump B **STARTS**. _____

Date_____

[24] **WHEN** PRT reaches desired level, **THEN**

STOP RCDT Pump B. _____

[25] **CLOSE [1-FCV-68-310]**. _____ _____
1st IV

[26] **DIRECT** Chem Lab to obtain grab sample of the PRT atmosphere for oxygen concentration. _____

[27] **IF** PRT O_2 concentration is > 2% by volume, **THEN**

RETURN to step **[1]** of this Appendix. _____

[28] **IF** PRT O_2 concentration is < 2% by volume, **THEN**

RETURN to step **[4]** Section 8.8 of this Instruction. _____

END OF TEXT

Date_____

PRT O_2 CONCENTRATION REDUCTION USING RCDT PUMP A

CAUTION **Over filling the PRT to solid water condition may result in failure of the PRT rupture disc.**

[1] **ENSURE [1-FCV-68-305]** nitrogen inlet isolation valve is **CLOSED**. _____

[2] **ENSURE [1-PCV-68-301]** PRT vent valve to vent header is **CLOSED**. _____

[3] **ENSURE [1-68-573]** PRT vent to atmosphere is **OPEN**. _____

[4] **OPEN [1-FCV-68-303]** primary water supply to PRT. _____

[5] **VERIFY [1-LI-68-300]** PRT level indicator on 1-M-4 shows increase. _____

[6] **VERIFY** PRT high level alarm comes in at ~ 88%. _____

[7] **WHEN** water level reaches 98%, as indicated on **[1-LI-68-300]**, **THEN**

CLOSE [1-FCV-68-303]. _____ 1st _____ IV

[8] **CLOSE [1-68-573]** PRT vent to atmosphere. _____

[9] **OPEN [1-FCV-68-305]** nitrogen inlet isolation valve. _____

[10] **VERIFY** RCDT pumps aligned for service in accordance with Valve Checklist 1-77-1.02. _____

NOTE An AUO at panel 0-L-2 in communication with a MCR UO is needed to perform this Instruction.

[11] **STATION** an AUO at panel 0-L-2. _____

[12] **ENSURE [1-FCV-77-9]** and **[1-FCV-77-10]** RCDT pump outlet isolation valves are **OPEN**. _____

Date_____

[13] **IF** filling and venting of RCDT suction line or pumps **IS NOT** required, **THEN**

GO TO step **[20]** and N/A steps **[14]** through **[19]**. _____

[14] **PLACE** control switches in the **PULL-TO-LOCK** position:,

A. **[1-HS-77-4A]** RCDT pump 1A. _____

B. **[1-HS-77-6A]** RCDT pump 1B. _____

NOTE Steps **[15]** through **[19]** fill and vent the RCDT pump suction header. Step **[20]** starts the O_2 concentration reduction.

[15] **PLACE [1-HS-68-310A]** in the **OPEN** position, **AND**

VERIFY [1-FCV-68-310] opens. _____

NOTE Opening 1-FCV-77-3 allows suction header to be vented to Cntmt Floor & Equip. Drain Sump.

[16] **OPEN [1-FCV-77-3]** RCDT to RBF&EDS isolation. _____

[17] **WHEN** a drop in PRT level is observed, **THEN**

CLOSE [1-FCV-77-3]. _____

[18] **IF** RCDT or suction line from RCDT has been drained and is ready to be filled, **THEN**

[a] **OPEN [1-LCV-77-415]** while **MONITORING** RCDT and PRT levels. _____

[b] **WHEN** a drop in PRT level is observed and/or RCDT level increases or is at desired level, **THEN**

CLOSE [1-LCV-77-415]. _____

Date_____

[19] **CLOSE** **[1-FCV-68-310]**. _____

CAUTION 1 **Pump damage could occur if suction is lost while pumping water > 175°F.**

CAUTION 2 **RCDT pump 1A will NOT automatically stop on low level in PRT OR closure of FCV-68-310.**

NOTE RCDT Pump A operates automatically with 1-FCV-77-415 from the RCDT only.

[20] **ENSURE** **[1-HS-77-6]** RCDT Pump B in **PULL-TO-LOCK**. _____

[21] **PLACE** **[1-HS-68-310A]** in the **OPEN** position, **AND**

VERIFY **[1-FCV-68-310]** opens. _____

[22] **START** RCDT PUMP 'A' by placing **[1-HS-77-4A]** in the **START** position. _____

[23] **IF** PRT pressure drops < 1.5 psig, **THEN**

COMPLETE the following:

[a] **STOP** 'A' RCDT Pump at 0-L-2. _____

[b] **WHEN** PRT pressure returns to normal, **THEN**

START RCDT PUMP 'A' by placing **[1-HS-77-4A]** in the **START** position. _____

[24] **WHEN** PRT reaches desired level, **THEN**

STOP RCDT Pump A. _____

[25] **CLOSE** **[1-FCV-68-310]** _____ _____
1st IV

Date_____

[26] **DIRECT** Chem Lab to obtain sample of the PRT atmosphere for oxygen concentration. _____

[27] **ENSURE** control switches are in the **P-AUTO** position:

A. **[1-HS-77-4A]** RCDT pump 1A. _____ 1st _____ IV

B. **[1-HS-77-6A]** RCDT pump 1B. _____ 1st _____ IV

[28] **IF** PRT O_2 concentration is > 2% by volume, **THEN**

RETURN to step **[1]** of this Appendix. _____

[29] **IF** PRT O_2 concentration is < 2% by volume, **THEN**

RETURN to step **[4]** Section 8.8 of this Instruction. _____

END OF TEXT

Date_____

REDUCING LEVEL IN RCDT

[1] **ENSURE** [1-LCV-77-415] RCDT pump suction **OPEN**. _____

[2] **START** RCDT pump A or B by placing [1-HS-77-4A] or [1-HS-77-6A] in **START**. _____

[3] **WHEN** RCDT level is approximately 20%, **THEN**

STOP the running RCDT pump. _____

[4] **ENSURE** [1-LCV-77-415] RCDT pump suction **CLOSED**. _____

END OF TEXT

SOURCE NOTES

Page 1 of 1

REQUIREMENTS STATEMENT	SOURCE DOCUMENT	IMPLEMENTING STATEMENT
Procedures that do not contain appropriate verification requirements will be revised. (This item is not annotated within the procedure since the entire procedure must meet the verification program requirements.	NCO 970071001	C.1

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

B.1.f JPM 115-2AP

Respond To ERCW Pump Trip per AOP-M.01

PREPARED/ REVISED BY: _____ Date/ _____

VALIDATED BY: * _____ Date/ _____

APPROVED BY: _____ Date/ _____
(Operations Training Manager)

CONCURRED: ** _____ Date/ _____
(Operations Representative)

* Validation not required for minor enhancements, procedure Rev changes that do not affect the JPM, or individual step changes that do not affect the flow of the JPM.
** Operations Concurrence required for new JPMs and changes that affect the flow of the JPM (if not driven by a procedure revision).

NUCLEAR TRAINING

REVISION/USAGE LOG

REVISION NUMBER	DESCRIPTION OF REVISION	V	DATE	PAGES AFFECTED	PREPARED/ REVISED BY:
0	New JPM for NRC Exam. Update for procedure rev. And reorder JPM step 8 and console operator action.	V	12/4/01	all	L. Pauley
1	Updated to current revision and IC. Rewrote to include returning to section 2.1 after header break isolated. Extensive rewrite. Needs full validation run including time.	Y	8/16/04	All	MG Croteau
2	Updated to current procedure revision. Minor Format changes	N	2/5/07	All	RH Evans

V - Specify if the JPM change will require another validation (Y or N).
See cover sheet for criteria.

SEQUOYAH NUCLEAR PLANT
RO/SRO
JOB PERFORMANCE MEASURE

Task:

Respond to ERCW Pump Trip

Note: This JPM satisfies Simulator Manipulation "L".

JA/TA task # : 0000620501 (**RO**)

K/A Ratings:

076A2.01	(3.5/3.7)	076K4.06	(2.8/3.2)
076A4.01	(2.9/2.9)	076A2.02	(2.7/3.1)
076K6.04	(2.1/2.2)		

Task Standard:

STANDBY A TRAIN ERCW Pump has been started and the auto start selection switch is selected away from Q-A ERCW Pump position. ERCW Header leak has been isolated.

Evaluation Method : Simulator ___X_____ In-Plant _____

==========

Performer: _____
NAME

Start Time _____

Performance Rating : SAT _____ UNSAT _____ Performance Time _____ Finish Time _____

Evaluator: _____/_____
SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

_____

_____

_____

_____

_____

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Critical steps are identified within the step
2. Sequenced steps identified by an "s"
3. Any UNSAT requires comments
4. Initialize the simulator in IC #**16**. Ensure Q-A ERCW pump is in service and the selector switch is selected for Q-A. Ensure 1B-B CCP is running and 1A-A is in standby.
5. Activate MF #RW01G (Trips Q-A ERCW Pump)
6. Freeze the simulator until the operator has been briefed and is ready to perform task.
7. **Console operator must insert malfunction RW13B at 90% prior to JPM step 8.**
8. **See specific JPM steps for required remote function manipulations.**
9. Ensure operator performs the following required actions for **SELF-CHECKING;**
   a. Identifies the correct unit, train, component, etc.
   b. Reviews the intended action and expected response.
   c. Compares the actual response to the expected response.

Validation Time: CR. 15 mins **Local** _____

Tools/Equipment/Procedures Needed:
AOP-M.01, Section 2 and 2.1, 2.10

References:

	Reference	Title	Rev No.
A.	AOP-M.01	Loss of ERCW	**15**

==========

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. 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.

INITIAL CONDITIONS:

Unit is in mode 1 at 100% power

INITIATING CUES:

You are the CRO and are to monitor the board and respond, as a reader/doer, to any event that may occur.

Inform SM when any required action(s) associated with the failure have been completed.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
Examiner NOTE: Candidate may perform the ARP actions. They are identical to procedure steps. STEP 1.: Obtain a copy of the appropriate procedure. ***Cue:*** ***The SM will evaluate Tech Specs, TRM, and the REP*** STANDARD: A copy of the AOP-M.01 has been obtained and goes to section 2.1. COMMENTS:	___ SAT ___ UNSAT Start Time____
STEP 2.: **[1]** **IDENTIFY** and **LOCK OUT** failed ERCW pump STANDARD: ERCW pump Q-A HAND SWITCH has been placed in the PULL TO LOCK position. COMMENTS:	___ SAT ___ UNSAT
STEP 3.: **[2]** **START** additional ERCW pumps as required to maintain header pressure between 78 psig and 124 psig. STANDARD: Operator starts another A (J-A) Train ERCW pump. **This step is critical to return header pressure to normal.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 4.: **[3]** **CHECK** two A Train ERCW Pumps AVAILABLE. STANDARD: Operator verifies at least 2 A train ERCW pumps available COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 5.: [4] **CHECK** 1A and 2A ERCW supply header pressures and flows **NORMAL**: a. Supply Header pressures [between 78 psig and 124 psig]: • 1-PI-67-493A • 2-PI-67-493A STANDARD: Operator checks header pressures are between 78 and 124 psig on both A Train indicators. COMMENTS:	___ SAT ___ UNSAT
STEP 6.: b. Supply Header flows [expected value]. • 1-FI-67-61 • 2-FI-67-61 STANDARD: Operator checks there is flow on the A train supply header as indicated on both indicators. COMMENTS:	___ SAT ___ UNSAT
Console operator insert malfunction RW13B at 90% prior to checking header flows.	
STEP 7.: [5] **CHECK** 1B and 2B ERCW supply header pressures and flows NORMAL: a. Supply Header pressures [between 78 psig and 124 psig]: • 1-PI-67-488A • 2-PI-67-488A b. Supply header flows [expected value]: • 1-FI-67-62 • 2-FI-67-62 STANDARD: Operator checks header pressures are between 78 and 124 psig on both B Train indicators. Flows are abnormal, transitions to section 2.10. COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
EVALUATOR NOTE: The following steps are from section 2.10:	
STEP 8.: [1] Stop and **LOCK OUT** All Train B ERCW Pumps STANDARD: Operator places all running B train ERCW pumps in pull-to-lock position. **This step is critical to prevent pumping water out the break.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 9.: [2] **DISPATCH** operators with radios to perform the following: • PERFORM Appendix F, ERCW Rx MOV Board ERCW Valves. • PERFORM Appendix G, ERCW MCC Valves. • ENSURE all pumping station watertight doors are CLOSED. ***Cue:*** ***Play role of AUO and acknowledge the request.*** STANDARD: Operator dispatches operators to perform the required appendices and actions. **This step is critical to supply power to valves needed to isolate the leak.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 10.: [3] **ENSURE** 1A and 2A CCPs RUNNING. ***Cue:*** ***Play role of U2 CRO and start 2A CCP*** STANDARD: Operator starts 1A-A charging pump. **This step is critical to supply RCP seals and normal charging from A train equipment.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 11.: **[4] STOP** and **LOCK OUT** effected equipment: a. **PLACE** the following pumps in PULL TO LOCK: ▪ 1B CCP ▪ 2B CCP ▪ 1B SI Pump ▪ 2B SI Pump ***Cue:*** ***Play role of U2 CRO and Stop/Lockout associated pumps*** STANDARD: Operator secures the running pumps in the control room and dispatches an AUO to lockout the B Aux Control Air Compressor. **This step is critical to prevent start of ECCS equipment without cooling water available to the room coolers.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 12.: b. **DISPATCH** operator to place Train B Aux Air Compressor in SAFE STOP. ***Cue:*** ***Play role of AUO and acknowledge the request.*** STANDARD: Operator secures the running pumps in the control room and dispatches an AUO to lockout the B Aux Control Air Compressor COMMENTS:	
STEP 13.: **[5] OPEN** alternate ERCW supply to B train DGs: • 1-FCV-67-65 (1B DG) • 2-FCV-67-65 (2B DG) ***Cue:*** ***Play role of CRO/AUO and acknowledge the request.*** STANDARD: Operator opens 1-FCV-67-65 and directs opening of 2-FCV-67-65. COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
EVALUATOR NOTE: RCP Temperature alarms may come in depending on pace.	
STEP 14.: **[6] ISOLATE** B Train ERCW Header rupture: a. **CLOSE** 1-FCV-67-489, Header 1B Isol Before Strainer [ERCW MCC 1BB Compt. 3C]. b. **CLOSE** 2-FCV-67-489, Header 2B Isol Before Strainer [ERCW MCC 2BB Compt. 3C]. ***Cue:*** ***Play role of AUO and acknowledge the request.*** STANDARD: Operator notifies an AUO to close the valves to isolate the B ERCW header. **This step is critical to isolate the ERCW leak.** COMMENTS: **Console Operator perform the following to isolate the leak:** MRF RWRV489 0% MRF RWR2V489 0%	___ SAT ___ UNSAT **Critical Step**
STEP 15.: **[7] OPERATE** available A Train ERCW Pumps to maintain pressure between 78 psig and 124 psig. STANDARD: Operator will start an additional A train pump. **This step is critical to return ERCW supply header pressure to normal.** COMMENTS: Pressure is less than 78 psig, but procedure also allows reducing flow to non-essential equipment to raise pressure.	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 16.: [8] **EVALUATE** aligning Train A ERCW to supply Train B: a. **IF** aligning 1A to 2B header is desired, **THEN PERFORM** the following: 1) **DISPATCH** personnel to CLOSE 0-67-1501 CCS Htx 0B2 Inlet valve. 2) **WHEN** 0-67-1501 CLOSED, **THEN OPEN** 1-FCV-67-147, Hdr 1A to Hdr 2B Isol Valve [Rx MOV Bd 1A2-A c/9A] AND RECORD the time 3) **WHEN** 1-FCV-67-147 has been OPEN for approximately 10 minutes, **THEN OPEN** 0-67-1501 CCS Htx 0B2 Inlet valve ***Cue:*** ***Direct operator to align 1A and 2A ERCW Supplies to Train B*** ***Cue:*** ***Play role of AUO and acknowledge the request. When 1-FCV-67-147 has been directed opened, cue that 10 minutes have elapsed.*** STANDARD: Operator dispatches an AUO to close 0-67-1501, open 1-FCV-67-147 and reopens 0-67-1501 after 1-FCV-67-147 has been open for ~ 10 minutes. **This step is critical to supply cooling water to A train equipment.** COMMENTS: **Console Operator perform the following to open 1-FCV-67-147 (ignore cycling 0-67-1501):** MRF RWRV489 100%	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 17.: b. **IF** aligning 2A to 1B header is desired, **THEN PERFORM** the following: ▪ **OPEN** 1-FCV-67-424, Hdr 1B to Hdr 2A CCS HX Isol Valve [Rx MOV Bd 1A2-A Compt. 9B] AND RECORD the Time ▪ **ENSURE** 1-FCV-67-223, Hdr 1B to Hdr 2A Isol Valve is OPEN. [Rx MOV Bd 1A2-A Compt. 8B]. ▪ **ENSURE** 2-FCV-67-223, Hdr 2A to Hdr 1B Isol Valve is OPEN. [Rx MOV Bd 2A2-A Compt. 8B]. ***Cue:*** ***Play role of AUO and acknowledge the request.*** STANDARD: Operator dispatches an AUO to open 1-FCV-67-424, and ensures that 1-FCV-67-223 and 2-FCV-67-223 are open. **This step is critical to supply cooling water to A train equipment.** COMMENTS: **Console Operator perform the following to open 1-FCV-67-424 (1/2-FCV-67-223 are already open):** MRF RWRV424 100%	___ SAT ___ UNSAT **Critical Step**
STEP 18.: **[9]** **START** additional Lower Compartment Cooling Fans and CRDM Fans as required to maintain containment temperature. STANDARD: Operator checks containment temperature and starts fans if needed. COMMENTS:	___ SAT ___ UNSAT
STEP 19.: **[10]** **MONITOR** Containment Pressure and Temperature. STANDARD: Operator monitors containment temperature and pressure. COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 20.: **[11]** **CHECK** 1A and 2A ERCW header pressures and flows adequate for current alignment: • 1-FI-67-61 and 2-FI-67-61, at expected value • 1-PI-67-493 and 2-PI-67-493 STANDARD: Operator checks above indicators and observes parameters are normal. If not starts additional A train ERCW pumps (see JPM step 15). COMMENTS:	___ SAT ___ UNSAT
STEP 21.: **[12]** RESTORE equipment: a. **CHECK** Train B ERCW header supplied from Train A crosstie. b. **RESTORE** ther following handswitches as applicable: • 1B-B CCP to A-AUTO • 1B-B SI Pump to A-AUTO • 2B-B CCP to A-AUTO • 1B-B SI Pump to A-AUTO ***Cue:*** ***Play role of AUO and acknowledge the request.*** STANDARD: Operator restores B Train components to service. **This step is critical to restore A train ECCS equipment.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 22.: **[13]** **EVALUATE** isolation of non-essential A Train CCS heat loads **USING** Appendix E, CCS Heat Load Reduction. ***Cue:*** ***SM will perform the evaluation*** STANDARD: Operator ensures Appendix E evaluated. COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 23.: **[14] ENSURE** all ACBs opened **USING** the following appendixes: • Appendix F, ERCW Rx MOV Board Appendix R Valves • Appendix G, ERCW MCC Appendix R Valves ***Cue:*** ***Play role of AUO and acknowledge the request.*** STANDARD: Operator dispatches an AUO to perform the appendices. COMMENTS:	___ SAT ___ UNSAT
STEP 24.: **[15] REFER** to the following: • Appendix B, Affected Equipment List (Header 1B) • Appendix D, Affected Equipment List (Header 2B) • Appendix P, Potential Tech Spec Impacts ***Cue:*** ***SM will refer to the Appendices.*** STANDARD: Operator ensures Appendix B referred to. COMMENTS:	___ SAT ___ UNSAT
STEP 25.: **[16] REFER** TO AOP-M.03, Loss of Component Cooling Water. ***Cue:*** ***SM will refer to AOP-M.03.*** STANDARD: Operator ensures AOP-M.03 referred to. COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 26.: [17] **GO TO** appropriate plant procedure. ***Cue:*** ***Direct operator to complete performance of AOP-M.01 section 2.1.*** STANDARD: SM is informed of completion of AOP-M.01 section 2.10. COMMENTS:	___ SAT ___ UNSAT Stop Time____
EVALUATOR NOTE The following steps are from section 2.1	
STEP 27.: [5] **b.** **CHECK** 1B and 2B ERCW supply Header flows [expected value]. • 1-FI-67-62 • 2-FI-67-62 STANDARD: Operator checks there is flow on the B train supply header as indicated on both indicators. COMMENTS:	___ SAT ___ UNSAT
STEP 28.: [6] DISPATCH personnel to INSPECT failed pump(s) and determine cause for failure. ***Cue:*** ***The floor US reports that the 51 relay has a flag picked up. The AUO reports no apparent reason for the trip locally.*** STANDARD: The Floor US or AUO has been notified to inspect the breaker and an AUO has been dispatched to the pump. COMMENTS:	___ SAT ___ UNSAT
STEP 29.: [7] **NOTIFY** STA to evaluate Tech Spec LCO 3.7.4, ERCW System. ***Cue:*** ***Play role of STA and acknowledge the request.*** STANDARD: STA has been notifed. COMMENTS:	

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 30.: [8] **CHECK** ERCW pump loading amps NORMAL. STANDARD: Pump amp meter for pump that was started verified to be in normal operating range. COMMENTS:	___ SAT ___ UNSAT
STEP 31.: [9] **TRANSFER** emergency power selector switch away from failed pump. STANDARD: The Emergency Power Selector Switch is positioned away from Q-A ERCW pump. COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 32.: [10] **EVALUATE** need to close and place clearance on manual discharge valve for failed pump. ***Cue:*** ***If AUO is contacted, Play role of AUO and acknowledge the request.*** STANDARD: Operator may notify an AUO to close the manual discharge valve of Q-A ERCW pump. COMMENTS:	___ SAT ___ UNSAT
STEP 33.: Inform SM of failure of ERCW pump and header and performance of AOP-M.01 STANDARD: SM is informed of pump and header failure and that AOP-M.01 has been performed. COMMENTS:	___ SAT ___ UNSAT Stop Time____

End of JPM

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

DIRECTION TO TRAINEE:

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

INITIAL CONDITIONS:

Unit is in mode 1 at 100% power

INITIATING CUES:

You are the CRO and are to monitor the board and respond, as a reader/doer, to any event that may occur.

Inform SM when any required action(s) associated with the failure have been completed

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

AOI PROGRAM MANUAL

ABNORMAL OPERATING PROCEDURES

AOP-M.01

LOSS OF ESSENTIAL RAW COOLING WATER

Revision 15

QUALITY RELATED

PREPARED/PROOFREAD BY: D. A. PORTER

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: W. T. LEARY

EFFECTIVE DATE: 07/21/06

REVISION DESCRIPTION: Incorporated various enhancements to Sect. 2.11 based upon feedback from REP drill (PER 97828, NB-060173, NB-060178). Relocated caution, notes, and administrative actions from Section 2.0. Incorporated other enhancements and minor corrections.

INTENT CHANGES TO SECTION 2.11 OF THIS PROCEDURE MUST BE APPROVED BY PORC.

1.0 PURPOSE

This procedure provides the actions necessary to mitigate the effects of an ERCW pump or piping failure.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.0 OPERATOR ACTIONS

CAUTION: **ERCW header rupture in Auxiliary Building could fill the passive sump in 15 minutes. Prompt action is needed.**

1. **DIAGNOSE** the failure:

IF...	GO TO SECTION		PAGE
ERCW Pump(s) tripped or failed	2.1	ERCW pump failure	5
High flow ERCW Supply Header 1A	2.2	Supply Hdr 1A Failure to Aux Bldg	8
High flow ERCW Supply Header 1B	2.3	Supply Hdr 1B Failure to Aux Bldg	12
High flow ERCW Supply Header 2A	2.4	Supply Hdr 2A Failure to Aux Bldg	16
High flow ERCW Supply Header 2B	2.5	Supply Hdr 2B Failure to Aux Bldg	22
Indications of an ERCW Return Header rupture (must be diagnosed locally since M-27 indications are not affected)	2.6	Return Hdr rupture in Aux Bldg	27
Low flow ERCW Supply Header 1A and 2A, **AND** STRAINER DIFF PRESS HIGH alarm LIT [M-27A, C-3 and/or D-2]	2.7	Supply Header 1A/2A Failure in Yard Area	38
Low flow ERCW Supply Header 1B and 2B, **AND** STRAINER DIFF PRESS HIGH alarm LIT [M-27A, C-6 and/or D-5]	2.8	Supply Header 1B/2B Failure in Yard Area	52

(step continued on next page)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.0 OPERATOR ACTIONS (Continued)

3. (Continued)

IF...	GO TO SECTION	PAGE
Low flow ERCW supply headers 1A and 2A, **AND** STRAINER DIFF PRESS alarms DARK [M-27A, C-3 and D-2], **AND** at least one of the following alarms LIT: • ERCW DECK SUMP LEVEL HI alarm LIT [1-M-15B, A-3] **OR** • ERCW DECK SUMP PMP RUNNING [1-M-15B, D-2 or D-4] **OR** • MECH EQUIP SUMP LVL HI alarm LIT [1-M-15A, B-6]	2.9 Supply Header A Failure Upstream of Strainer Inlet Valves	63
Low flow ERCW supply headers 1B and 2B, **AND** STRAINER DIFF PRESS alarms DARK [M-27A, C-6 and D-5], **AND** at least one of the following alarms LIT: • ERCW DECK SUMP LEVEL HI alarm LIT [1-M-15B, A-3] **OR** • ERCW DECK SUMP PMP RUNNING [1-M-15B, D-2 or D-4] **OR** • MECH EQUIP SUMP LVL HI alarm LIT [1-M-15A, B-6]	2.10 Supply Header B Failure Upstream of Strainer Inlet Valves	71
Loss of flow on ALL ERCW supply headers in modes 1-4.	2.11 Loss of all ERCW flow	77

END OF SECTION

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	2.1 ERCW Pump Failure	
1.	**IDENTIFY** and **LOCK OUT** failed ERCW pump.	
2.	**START** additional ERCW pumps as required to maintain supply header pressure between 78 psig and 124 psig.	
3.	**CHECK** two Train A ERCW Pumps AVAILABLE.	**IF** less than two Train A ERCW Pumps available, **THEN** **EVALUATE** isolation of non-essential Train A CCS heat loads **USING** Appendix E, CCS Heat Load Reduction **[C.1]**
4.	**CHECK** 1A and 2A ERCW supply header pressures and flows NORMAL: a. Supply header pressures [between 78 psig and 124 psig]: • 1-PI-67-493A • 2-PI-67-493A b. Supply header flows [expected value]: • 1-FI-67-61 • 2-FI-67-61	**IF** BOTH 1A **AND** 2A ERCW Headers FAILED, **THEN** **GO TO** Section 2.9, ERCW Supply Header A Failure Prior to ERCW Strainer Inlet Valves. **IF** 1A **OR** 2A ERCW Header FAILED, **THEN** **RETURN TO** Section 2.0 for diagnosis.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	2.1 ERCW Pump Failure (cont'd)	
5.	**CHECK** 1B and 2B ERCW supply header pressures and flows NORMAL:	**IF** BOTH 1B **AND** 2B ERCW Headers FAILED, **THEN** **GO TO** Section 2.10, ERCW Supply Header B Failure Prior to ERCW Strainer Inlet Valves.
	a. Supply header pressures [between 78 psig and 124 psig]: • 1-PI-67-488A • 2-PI-67-488A	
	b. Supply header flows [expected value]: • 1-FI-67-62 • 2-FI-67-62	**IF** 1B **OR** 2B ERCW Header FAILED, **THEN** **RETURN TO** Section 2.0 for diagnosis.
6.	**DISPATCH** personnel to INSPECT failed pump(s) and determine cause for failure.	
7.	**NOTIFY** STA to evaluate Tech Spec LCO 3.7.4, ERCW System.	
8.	**CHECK** ERCW pump loading amps NORMAL.	**INVESTIGATE** abnormal amp readings: • **CHECK** header flows and pressures. **IF** amps are high due to only one pump available, **THEN** **EVALUATE** isolation of non-essential ERCW loads.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.1 ERCW Pump Failure (cont'd)

9. **TRANSFER** emergency power selector switch away from failed pump.

10. **EVALUATE** need to close and place clearance on manual discharge valve for failed pump.

11. **GO TO** appropriate plant procedure.

END OF SECTION

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.10 ERCW Supply Header B Failure Upstream of ERCW Strainer Inlet Valves

CAUTION: During operation, CCP and SI Pumps may experience bearing failure 10 minutes after loss of ERCW cooling.

1. **STOP** and **LOCK OUT** all Train B ERCW Pumps.

2. **DISPATCH** operators with radios to perform the following:

   - **PERFORM** Appendix F, Rx MOV Board ERCW Valves [Aux Bldg el. 749', Rx MOV Boards].
   - **PERFORM** Appendix G, ERCW MCC Valves. [ERCW Pumping Stations]
   - **ENSURE** all pumping station watertight doors are CLOSED. [ERCW Pumping Station].

3. **ENSURE** 1A-A and 2A-A CCPs RUNNING.

4. **STOP** and **LOCK OUT** affected equipment:

   a. **PLACE** the following pumps in PULL TO LOCK:

      - 1B-B CCP
      - 1B-B SI Pump
      - 2B-B CCP
      - 2B-B SI Pump

   b. **DISPATCH** operator to place Train B Aux Air Compressor in SAFE STOP. [Aux Bldg, 734' elev, Refuel Floor]

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.10 ERCW Supply Header B Failure Upstream of ERCW Strainer Inlet Valves (cont'd)

5. **OPEN** alternate ERCW supply to Train B DGs

   - 1-FCV-67-65 (1B DG)
   - 2-FCV-67-65 (2B DG)

NOTE Flooding at the ERCW station may prevent FCVs from closing. Manual valves are located south of the CCW station and are normally locked open.

6. **ISOLATE** Train B ERCW Header rupture:

   a. **CLOSE** 1-FCV-67-489, Header 1B Isol Before Strainer [ERCW MCC 1B-B Compt. 3C].

   b. **CLOSE** 2-FCV-67-489, Header 2B Isol Before Strainer [ERCW MCC 2B-B Compt. 3C].

   a. **CLOSE** 1-VLV-67-518B, ERCW Supply Isolation Valve

   b. **CLOSE** 2-VLV-67-518B, ERCW Supply Isolation Valve

7. **OPERATE** available Train A ERCW Pumps to maintain pressure between 78 psig and 124 psig.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.10 ERCW Supply Header B Failure Upstream of ERCW Strainer Inlet Valves (cont'd)

CAUTION 1 **Crosstying A and B train ERCW supply headers should only be performed if cooling is urgently required for Train B CCS related equipment. LCO 3.0.3 may be applicable.**

CAUTION 2 **Opening of crosstie valve 1-FCV-67-147 may result in severe fouling or flow blockage of 0B1/0B2 CCS Heat Exchanger, therefore the CCS Hx 0B2 should be isolated prior to opening. After approximately 10 minutes 0B2 CCS Hx will be returned to service.**

NOTE
- The following step allows 1A ERCW header to supply 2B ERCW header (including 0B1 and 0B2 CCS HX).
- With the ERCW header crosstie valves at the CCW (IPS) station open, 1A header will supply 2B and 1B ERCW Aux Bldg supply headers.

8. **EVALUATE** aligning Train A ERCW to supply Train B:

   a. **IF** aligning 1A to 2B header is desired,
   THEN
   PERFORM the following:

      1) **DISPATCH** personnel to CLOSE 0-67-1501 CCS Hx OB2 Inlet valve.

      2) **WHEN** 0-67-1501 CLOSED,
      THEN
      OPEN 1-FCV-67-147, Hdr 1A to Hdr 2B Isol Valve [Rx MOV Bd 1A2-A Compt. 9A] and
      RECORD time_____

      3) **WHEN** 1-FCV-67-147 has been OPEN for approximately 10 minutes,
      THEN
      OPEN 0-67-1501 CCS Hx OB2 Inlet valve

(step continued on next page)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.10 ERCW Supply Header B Failure Upstream of ERCW Strainer Inlet Valves (cont'd)

8. b. **IF** aligning 2A to 1B header is desired,
THEN
PERFORM the following:

- **OPEN** 1-FCV-67-424, Hdr 1B to Hdr 2A CCS HX Isol Valve [Rx MOV Bd 1A2-A Compt. 9B] and

  RECORD the Time_____

- **ENSURE** 1-FCV-67-223, Hdr 1B to Hdr 2A Isol Valve is OPEN. [Rx MOV Bd 1A2-A Compt. 8B].

- **ENSURE** 2-FCV-67-223, Hdr 2A to Hdr 1B Isol Valve is OPEN. [Rx MOV Bd 2A2-A Compt. 8B].

9. **START** additional Lower Compartment Cooling Fans and CRDM Fans as required to maintain containment temperature.

10. **MONITOR** Containment Pressure and Temperature.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.10 ERCW Supply Header B Failure Upstream of ERCW Strainer Inlet Valves (cont'd)

11.	**CHECK** 1A and 2A ERCW header pressures and flows adequate for current alignment: • 1-FI-67-61 and 2-FI-67-61, at expected value • 1-PI-67-493A and 2-PI-67-493A	**START** additional "A" Train ERCW pumps as necessary. **ISOLATE** non-essential ERCW loads as necessary. **DO NOT CONTINUE** UNTIL header pressure and flow are adequate for current alignment.
12.	**RESTORE** equipment:	
	a. **CHECK** Train B ERCW header supplied from Train A crosstie.	a. **GO TO** step 14.
	b. **RESTORE** the following handswitches as applicable: • 1B-B CCP to A-AUTO • 1B-B SI Pump to A-AUTO • 2B-B CCP to A-AUTO • 2B-B SI Pump to A-AUTO • Train B Aux Air Compressor to AUTO [Aux Bldg, 734' elev, Refuel Floor]	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.10 ERCW Supply Header B Failure Upstream of ERCW Strainer Inlet Valves (cont'd)

13. **EVALUATE** isolation of non-essential Train A CCS heat loads **USING** Appendix E, CCS Heat Load Reduction.

14. **ENSURE** all breakers opened **USING** the following appendixes
    - Appendix F, Rx MOV Board ERCW Valves
    - Appendix G, ERCW MCC Valves

15. **REFER TO** the following:
    - Appendix B, Affected Equipment List (Header 1B)
    - Appendix D, Affected Equipment List (Header 2B)
    - Appendix P, Potential Tech Spec Impacts.

16. **REFER TO** AOP-M.03, Loss of Component Cooling Water.

17. **GO TO** appropriate plant procedure.

END OF SECTION

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

B.1.g

Respond to Spray Valve Failure

Original Signatures on File

PREPARED/ REVISED BY: _____ Date/ _____

VALIDATED BY: * _____ Date/ _____

APPROVED BY: _____ Date/ _____
(Operations Training Manager)

CONCURRED: ** _____ Date/ _____
(Operations Representative)

* Validation not required for minor enhancements, procedure Rev changes that do not affect the JPM, or individual step changes that do not affect the flow of the JPM.
** Operations Concurrence required for new JPMs and changes that affect the flow of the JPM (if not driven by a procedure revision).

NUCLEAR TRAINING

REVISION/USAGE LOG

REVISION NUMBER	DESCRIPTION OF REVISION	V	DATE	PAGES AFFECTED	PREPARED/ REVISED BY:
0	Initial Issue	Y	2/13/07	All	RH Evans

V - Specify if the JPM change will require another validation (Y or N).
See cover sheet for criteria.

SEQUOYAH NUCLEAR PLANT
RO/SRO
JOB PERFORMANCE MEASURE

Task:

Respond to Spray Valve failure

Note: This JPM satisfies Simulator Manipulation XXXXXX.

JA/TA task # : 3210140401 **(RO)** 0150050101 **(RO)** 0150040101 **(RO)**
0000910501 **(RO)**

K/A Ratings:

Task Standard:

RCPs supplying failed spray valve are tripped. Pressurizer heaters are energized.

Evaluation Method : Simulator ___X_____ In-Plant _____

==========

Performer: _____
NAME

Start Time _____

Performance Rating : SAT _____ UNSAT _____ Performance Time _____ Finish Time _____

Evaluator: _____/_____
SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

_____

_____

_____

_____

_____

SPECIAL INSTRUCTIONS TO EVALUATOR:

a. **Set up the simulator post trip with one spray valve cracked and stuck open. RCS pressure should be dropping but not less than approximately 2100-2150 psig when the applicant reaches the step to check pressure control. If possible, fail pressurizer backup heaters to automatically energize so that they must be energized manually**

Validation Time: CR. 11 mins **Local** _____

Tools/Equipment/Procedures Needed:
ES-0.1

References:

	Reference	Title	Rev No.
A.	ES-0.1	Reactor Trip Response	**30**

==========

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. 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.

INITIAL CONDITIONS:

1. Unit has tripped.
2. Transition to ES-0.1 has been performed.

INITIATING CUES:

You have been directed to stabilize the unit in accordance with ES-0.1, beginning at step 1. Notify the SRO when the unit is stable

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
Note: Applicant may take action related to critical steps prior to reaching required steps by use of the ES-0.1 Handout.	
STEP 1.: Obtain the appropriate procedure. STANDARD: Operator obtains a copy of ES-0.1.	___ SAT ___ UNSAT Start Time____
STEP 2.: **[1]** MONITOR SI NOT actuated: • SI ACTUATED permissive DARK [M-4A, D4] STANDARD: Determines SI is NOT actuated by observing annunciator M-4A-D4 permissive is dark	___ SAT ___ UNSAT
STEP 3.: **[2]** VERIFY generator breakers OPEN. STANDARD: Verifies generator breakers open by observing green lights on 1-M-1 benchboard.	___ SAT ___ UNSAT
STEP 4.: **[3]** MONITOR RCS temperatures: • RCPs Running: CHECK T-avg stable at or trending to between 547°F and 552°F. STANDARD: Determines T-avg is stable at or trending to between 547°F and 552°F.	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 5. [4] MONITOR feedwater status: • T-avg less than 550°F. • MFW regulating valves CLOSED. • MFW regulating bypass valve controller outputs ZERO. • MFW isolation valves CLOSED. • MFW pumps TRIPPED. • MFW flow ZERO. • Total feed flow to SIGs greater than 440 gpm. STANDARD: Determines Tavg is NOT less than 550°F and goes to step 5.	___ SAT ___ UNSAT
STEP 6.: [5] CHECK if emergency boration is required: [a] VERIFY all control rods fully inserted: • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps. STANDARD: Determines All rod Bottom lights are illuminated.	___ SAT ___ UNSAT
STEP 7.: [b] MONITOR RCS temperature: • T-avg greater than 540°F if any RCP running STANDARD: Determines T-avg is approximately 551°F	___ SAT ___ UNSAT
STEP 8.: [6] ANNOUNCE reactor trip USING PA system. STANDARD: Announces reactor trip over PA system	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 9.: [7] MONITOR pressurizer level control: • CHECK pressurizer level greater than 17%. • VERIFY charging IN SERVICE. • VERIFY letdown IN SERVICE. • CHECK pressurizer level trending to 25% (normal range 20% to 30%). STANDARD: Determines Charging and Letdown are in service and PZR level is >17% and trending to 25%.	___ SAT ___ UNSAT
STEP 10.: [8] MONITOR pressurizer pressure control: • Pressurizer pressure greater than 1870 psig. • Pressurizer pressure stable at or trending to 2235 psig (normal range 2210 psig to 2260 psig). STANDARD: Determines PZR pressure >1870 but NOT trending toward 2210-2260 psig.	___ SAT ___ UNSAT
EVALUATOR NOTE: JPM steps 11,12 and 13 are from procedure step 8 RNO	
STEP 11.: IF pressure less than 2235 psig and dropping, THEN PERFORM the following: • ENSURE pressurizer PORVs CLOSED. • ENSURE spray valves CLOSED. • **IF spray valve(s) CANNOT be closed, THEN STOP RCPs #I and 2.** • IF pressurizer pressure continues to drop, THEN STOP additional RCPs as necessary. • **ENSURE all pressurizer heaters ON.** STANDARD: Stops Number 1 RCP by rotating handswitch counter-clockwise.	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 12.: IF pressure less than 2235 psig and dropping, THEN PERFORM the following: • ENSURE pressurizer PORVs CLOSED. • ENSURE spray valves CLOSED. • **IF spray valve(s) CANNOT be closed, THEN STOP RCPs #I and 2.** • IF pressurizer pressure continues to drop, THEN STOP additional RCPs as necessary. • **ENSURE all pressurizer heaters ON.** STANDARD: Stops Number 2 RCP by rotating handswitch counter-clockwise, if candidate determines that RCS pressure continues to drop, additional RCPs may be stopped.	___ SAT ___ UNSAT **Critical Step**
STEP 13.: IF pressure less than 2235 psig and dropping, THEN PERFORM the following: • ENSURE pressurizer PORVs CLOSED. • ENSURE spray valves CLOSED. • **IF spray valve(s) CANNOT be closed, THEN STOP RCPs #I and 2.** • IF pressurizer pressure continues to drop, THEN STOP additional RCPs as necessary. • **ENSURE all pressurizer heaters ON.** STANDARD: Manually energized PZR heater Bank D by rotating handswitch clockwise.	___ SAT ___ UNSAT **Critical Step**

End of JPM

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

DIRECTION TO TRAINEE:

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

INITIAL CONDITIONS:

Unit has tripped.

Transition to ES-0.1 has been performed.

INITIATING CUES:

You have been directed to stabilize the unit in accordance with ES-0.1, beginning at step 1.

Notify the SRO when the unit is stable

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

EOI PROGRAM MANUAL

EMERGENCY SUBPROCEDURE

ES-0.1

REACTOR TRIP RESPONSE

Revision **30**

QUALITY RELATED

PREPARED/PROOFREAD BY: D. A. PORTER

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: W. T. LEARY

EFFECTIVE DATE: 08/01/2005

REVISION DESCRIPTION: Added new step which checks generator PCBs open. This step is being relocated from E-0 Step 3 in conjunction with incorporation of E-0A. Revised step 11.b to provide details on placing steam dumps in pressure mode.

This procedure has a handout page (2 copies) and foldout page.

FOLDOUT PAGE

SI ACTUATION CRITERIA

IF either of the following conditions occurs:

- RCS subcooling based on core exit T/Cs less than 40°F

  OR

- Pressurizer level CANNOT be maintained greater than 5%,

THEN
ACTUATE SI and **GO TO** E-0, Reactor Trip or Safety Injection.

EVENT DIAGNOSTICS

IF both trains of shutdown boards deenergized,
THEN
GO TO ECA-0.0, Loss of All AC Power.

TANK SWITCHOVER SETPOINTS

IF CST level less than 5%,
THEN
ALIGN AFW suction to ERCW.

HANDOUT

STEP	ACTION
FOP	**IF** RCS subcooling based on core exit T/Cs less than 40°F **OR** Pressurizer level CANNOT be maintained greater than 5%, **THEN ACTUATE** SI and **GO TO** E-0, Reactor Trip or Safety Injection.
FOP	**IF** CST level less than 5%, **THEN ALIGN** AFW suction to ERCW.
1.	**MONITOR** SI NOT actuated:
3.	**MONITOR** RCS temperatures stable at or trending to between 547°F and 552°F.
3.c. RNO	(if RCS temperature continues to drop) • **CONTROL** total feed flow to minimize RCS cooldown. • **MAINTAIN** total feed flow greater than 440 gpm UNTIL narrow range level greater than 10% in at least one S/G.
4.	**MONITOR** feedwater status: (verify FWI when T-avg less than 550°F)
5.b.	**MONITOR** RCS temperatures greater than 540°F.
7.	**MONITOR** pressurizer level control: (pressurizer level greater than 17%)
7.a. RNO	(if pzr level less than 17%) 3) **CONTROL** charging to restore pressurizer level greater than 17%. 4) **WHEN** pressurizer level greater than 17%, **THEN OPERATE** pressurizer heaters as necessary.
7.c. RNO	(if letdown not in service) **WHEN** charging established **AND** pressurizer level greater than 17%, **THEN ESTABLISH** letdown.
7.d. RNO	(if pzr level is NOT trending to 25%) **CONTROL** charging and letdown to maintain pressurizer level at 25% (normal range 20% to 30%).
8.	**MONITOR** pressurizer pressure control: (pzr pressure greater than 1870 psig and stable at or trending to 2235 psig)
8.b.2) RNO	(if pzr pressure greater than 2235 psig and rising) **CONTROL** pressure.
9.	**MAINTAIN** S/G narrow range levels: (between 10% and 50%)
9.a. RNO	(if S/G levels less than 10%) **MAINTAIN** total feed flow greater than 440 gpm UNTIL level greater than 10%.

HANDOUT

Page 2 of 2

STEP	ACTION
12.b. 2). RNO	(if NO RCP can be started) **MONITOR** natural circulation.
13.	**MONITOR** if source range channels should be reinstated: (IRM flux less than 10^{-4} % power)
15.	**MAINTAIN** stable plant conditions: a. Pressurizer pressure at 2235 psig (normal range 2210 psig to 2260 psig) b. Pressurizer level at 25% (normal range 20% to 30%) c. S/G narrow range levels between 10% and 50% d. RCS temperature at 547°F (between 540°F and 550°F)

HANDOUT

STEP	ACTION
FOP	**IF** RCS subcooling based on core exit T/Cs less than 40°F **OR** Pressurizer level CANNOT be maintained greater than 5%, **THEN ACTUATE** SI and **GO TO** E-0, Reactor Trip or Safety Injection.
FOP	**IF** CST level less than 5%, **THEN ALIGN** AFW suction to ERCW.
1.	**MONITOR** SI NOT actuated:
3.	**MONITOR** RCS temperatures stable at or trending to between 547°F and 552°F.
3.c. RNO	(if RCS temperature continues to drop) • **CONTROL** total feed flow to minimize RCS cooldown. • **MAINTAIN** total feed flow greater than 440 gpm UNTIL narrow range level greater than 10% in at least one S/G.
4.	**MONITOR** feedwater status: (verify FWI when T-avg less than 550°F)
5.b.	**MONITOR** RCS temperatures greater than 540°F.
7.	**MONITOR** pressurizer level control: (pressurizer level greater than 17%)
7.a. RNO	(if pzr level less than 17%) 3) **CONTROL** charging to restore pressurizer level greater than 17%. 4) **WHEN** pressurizer level greater than 17%, **THEN OPERATE** pressurizer heaters as necessary.
7.c. RNO	(if letdown not in service) **WHEN** charging established **AND** pressurizer level greater than 17%, **THEN ESTABLISH** letdown.
7.d. RNO	(if pzr level is NOT trending to 25%) **CONTROL** charging and letdown to maintain pressurizer level at 25% (normal range 20% to 30%).
8.	**MONITOR** pressurizer pressure control: (pzr pressure greater than 1870 psig and stable at or trending to 2235 psig)
8.b.2) RNO	(if pzr pressure greater than 2235 psig and rising) **CONTROL** pressure.
9.	**MAINTAIN** S/G narrow range levels: (between 10% and 50%)
9.a. RNO	(if S/G levels less than 10%) **MAINTAIN** total feed flow greater than 440 gpm UNTIL level greater than 10%.

HANDOUT

Page 2 of 2

STEP	ACTION
12.b. 2). RNO	(if NO RCP can be started) **MONITOR** natural circulation.
13.	**MONITOR** if source range channels should be reinstated: (IRM flux less than 10^{-4} % power)
15.	**MAINTAIN** stable plant conditions: a. Pressurizer pressure at 2235 psig (normal range 2210 psig to 2260 psig) b. Pressurizer level at 25% (normal range 20% to 30%) c. S/G narrow range levels between 10% and 50% d. RCS temperature at 547°F (between 540°F and 550°F)

1.0 PURPOSE

This procedure provides the necessary instructions to stabilize and control the plant following a reactor trip WITHOUT a safety injection.

2.0 SYMPTOMS AND ENTRY CONDITIONS

2.1 ENTRY CONDITIONS

E-0 Reactor Trip or Safety Injection

- SI NOT actuated and NOT required

3.0 OPERATOR ACTIONS

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE This procedure has a foldout page.	
1.	**MONITOR** SI NOT actuated: • SI ACTUATED permissive DARK [M-4A, D4]	**IF** SI actuated, **THEN** **GO TO** E-0, Reactor Trip or Safety Injection.
2.	**VERIFY** generator breakers OPEN.	**OPEN** generator breakers.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	**MONITOR** RCS temperatures: • **IF** any RCP running, **THEN** **CHECK** T-avg stable at or trending to between 547°F and 552°F. OR • **IF** RCPs stopped, **THEN** **CHECK** T-cold stable at or trending to between 547°F and 552°F.	**IF** temperature less than 547°F and dropping, **THEN** **PERFORM** the following: a. **ENSURE** steam dumps and atmospheric reliefs CLOSED. b. **ENSURE** S/G blowdown isolation valves CLOSED. c. **IF** cooldown continues, **THEN** **PERFORM** the following: 1) **CONTROL** total feed flow **USING** EA-3-8, Manual Control of AFW Flow. 2) **MAINTAIN** total feed flow greater than 440 gpm UNTIL narrow range level greater than 10% in at least one S/G. 3) **DEPRESS** RESET on MSR control panel. 4) **IF** any MSR temp control valve fails to close, **THEN** **ISOLATE** HP steam to MSRs. d. **IF** cooldown still continues, **THEN** **CLOSE** MSIVs and bypass valves. **IF** temperature greater than 552°F and rising, **THEN** • **DUMP** steam to condenser. OR • **DUMP** steam **USING** atmospheric reliefs.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	**MONITOR** feedwater status:	
	a. T-avg less than 550°F.	a. **GO TO** Step 5.
	b. MFW regulating valves CLOSED.	b. **CLOSE** valves.
	c. MFW regulating bypass valve controller outputs ZERO.	c. **CLOSE** valves.
	d. MFW isolation valves CLOSED.	d. **CLOSE** valves.
	e. MFW pumps TRIPPED.	e. **TRIP** MFW pumps.
	f. MFW flow ZERO.	f. **CLOSE** feedwater heater isolation MOVs as necessary. OR **DISPATCH** personnel to isolate MFW regulating and regulating bypass valves **USING** EA-3-12, Local Isolation of Main Feedwater.
	g. Total feed flow to S/Gs greater than 440 gpm.	g. **ESTABLISH** AFW flow as necessary. **IF** AFW flow CANNOT be established, **THEN** **ESTABLISH** main feedwater flow **USING** EA-2-2, Establishing Secondary Heat Sink Using Main Feedwater or Condensate System.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5.	**CHECK** if emergency boration is required:	
	a. **VERIFY** all control rods fully inserted: • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps.	a. **IF** any of the following conditions exists: • two or more RPIs indicate greater than 12 steps **OR** • two or more control rod positions CANNOT be determined, **THEN** **EMERGENCY BORATE** **USING** EA-68-4, Emergency Boration.
	b. **MONITOR** RCS temperature: • T-avg greater than 540°F if any RCP running OR • T-cold greater than 540°F if all RCPs stopped.	b. **EMERGENCY BORATE** as necessary to maintain shutdown margin **USING** EA-68-4, Emergency Boration.
6.	**ANNOUNCE** reactor trip **USING** PA system.	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	**MONITOR** pressurizer level control:	
	a. **CHECK** pressurizer level greater than 17%.	a. **PERFORM** the following: 1) **ENSURE** normal and excess letdown ISOLATED. 2) **ENSURE** pressurizer heaters OFF. 3) **CONTROL** charging to restore pressurizer level greater than 17%. 4) **WHEN** pressurizer level greater than 17%, **THEN** **OPERATE** pressurizer heaters as necessary.
	b. **VERIFY** charging IN SERVICE.	b. **ESTABLISH** charging **USING** EA-62-5, Establishing Normal Charging and Letdown.
	c. **VERIFY** letdown IN SERVICE.	c. **WHEN** charging established **AND** pzr level greater than 17%, **THEN** **ESTABLISH** letdown **USING** EA-62-5, Establishing Normal Charging and Letdown.
	d. **CHECK** pressurizer level trending to 25% (normal range 20% to 30%).	d. **CONTROL** charging and letdown to maintain pressurizer level at 25% (normal range 20% to 30%).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	**MONITOR** pressurizer pressure control:	
	a. Pressurizer pressure greater than 1870 psig.	a. **ENSURE** SI ACTUATED. **GO TO** E-0, Reactor Trip or Safety Injection.
	b. Pressurizer pressure stable at or trending to 2235 psig (normal range 2210 psig to 2260 psig).	b. **IF** pressure less than 2235 psig and dropping, **THEN** **PERFORM** the following: 1) **ENSURE** pressurizer PORVs CLOSED. **IF** pressurizer PORV CANNOT be closed, **THEN** **CLOSE** its block valve. 2) **ENSURE** spray valves CLOSED. **IF** spray valve(s) CANNOT be closed, **THEN** **STOP** RCPs #1 and 2. **IF** pressurizer pressure continues to drop, **THEN** **STOP** additional RCP as necessary. 3) **ENSURE** all pressurizer heaters ON.

(step continued on next page)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	b. (continued)	**IF** pressure greater than 2235 psig and rising, **THEN** **PERFORM** the following: 1) **ENSURE** all pressurizer heaters OFF. 2) **CONTROL** pressure **USING** normal spray. **IF** normal spray NOT available **AND** letdown in service, **THEN** **CONTROL** pressure **USING** EA-62-4, Establishing Auxiliary Spray. **IF** normal spray NOT available **AND** letdown NOT in service, **THEN** **ENSURE** pressure controlled with pressurizer PORV(s).
9.	**MAINTAIN** S/G narrow range levels:	
	a. Greater than 10%.	a. **MAINTAIN** total feed flow greater than 440 gpm UNTIL level greater than 10% in at least one S/G.
	b. Between 10% and 50%.	b. **IF** level in any S/G continues to rise, **THEN** **ENSURE** feed flow STOPPED to that S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10.	**VERIFY** AC busses ENERGIZED from start busses.	**PERFORM** the following: a. **ENSURE** diesel generators supplying shutdown board loads as necessary: • CCPs • ERCW pumps. • AFW pumps. • Thermal barrier booster pumps. • CCS pumps. • Pressurizer heaters A-A and B-B. b. **ATTEMPT** to restore offsite power **USING** EA-202-1, Restoring Off-Site Power to 6900V Shutdown Boards. c. **ENSURE** control air compressors A and B started **USING** EA-32-2, Establishing Control and Service Air.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION **Arming steam dumps in pressure mode with demand signal present could result in rapid RCS cooldown.**

11. **DETERMINE** if steam dump to condenser available:

    a. **CHECK** condenser AVAILABLE:

    - C-9 CONDENSER INTERLOCK permissive LIT [M-4A, E6]
    - At least one Intact S/G MSIV OPEN.

    a. **USE** atmospheric reliefs in AUTO and set for 84% (1005 psig).

    IF atmospheric reliefs NOT functioning in AUTO,
    THEN
    USE manual control of atmospheric reliefs.

    IF local control of atmospheric reliefs is necessary,
    THEN
    DISPATCH personnel to dump steam **USING** EA-1-2, Local Control of S/G PORVs.

    GO TO Note prior to Step 12.

    b. **PLACE** steam dumps in STEAM PRESS mode:

    1) **PLACE** steam dumps in OFF.

    2) **ENSURE** steam dumps in steam pressure mode.

    3) **ENSURE** zero output (demand).

    4) **PLACE** steam dumps in ON.

    5) **ADJUST** steam dump controller setpoint to 84% (1005 psig) in AUTO.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Loop 2 RCP and associated spray valve will provide adequate spray flow for RCS pressure control. If Loop 2 is not available, all three remaining RCPs may be required to ensure adequate spray flow.

12. **CHECK** RCP #2 RUNNING.

PERFORM the following:

a. **IF** NO RCPs running,
THEN
ENSURE all RCS dilution STOPPED.

b. **ATTEMPT** to start RCP(s) to provide normal pzr spray:

1) **ESTABLISH** conditions for starting RCP(s) **USING** EA-68-2, Establishing RCP Start Conditions.

2) **IF** RCP start conditions established,
THEN
START RCP #2 (if available) OR RCPs #1, 3, and 4.

IF NO RCP can be started,
THEN
MONITOR natural circulation **USING** EA-68-6, Monitoring Natural Circulation Conditions.

IF natural circulation CANNOT be verified,
THEN
RAISE steam dump rate.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13.	**MONITOR** if source range channels should be reinstated:	
	a. **CHECK** intermediate range flux less than 10^{-4} % power on operable channels.	a. **GO TO** Step 14.
	b. **CHECK** source range channels REINSTATED.	b. **REINSTATE** source range channels by simultaneously placing both SRM TRIP RESET-BLOCK switches to RESET position. [M-4]
	c. **SELECT** one SRM and one IRM on NR-45 recorder.	
	d. **ENSURE** audio count rate operation.	
	e. **RESET** shutdown monitor alarm setpoints. [M-13]	
	f. **WHEN** shutdown monitor ALARM LEDs dark **AND** HIGH FLUX AT SHUTDOWN bistable lights dark, **THEN** **PLACE** HIGH FLUX AT SHUTDOWN alarm block switches in NORMAL. [M-13]	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. **SHUT DOWN** unnecessary plant equipment:

    - **REFER TO** 0-GO-12, Realignment Of Secondary Equipment Following Reactor/Turbine Trip.

15. **MAINTAIN** stable plant conditions:

    a. Pressurizer pressure at 2235 psig (normal range 2210 psig to 2260 psig)

    b. Pressurizer level at 25% (normal range 20% to 30%)

    c. S/G narrow range levels between 10% and 50%

    d. RCS temperature at 547°F (between 540°F and 550°F):

    - T-avg if any RCP running

      OR

    - T-cold if all RCPs stopped.

16. **PERFORM** EA-0-9, Post Trip Administrative Requirements and Recovery Actions.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17.	**DETERMINE** if natural circulation cooldown is required:	
	a. **CHECK** at least one RCP RUNNING.	a. **IF** plant cooldown required with NO RCP available, **THEN** **GO TO** ES-0.2, Natural Circulation Cooldown. **DO NOT CONTINUE** this procedure UNTIL at least one RCP restarted.
	b. **CHECK** at least one AFW pump AVAILABLE.	b. **DO NOT CONTINUE** this procedure UNTIL at least one AFW pump AVAILABLE.
	c. **SELECT** appropriate procedure: • 0-GO-6, Power Reduction from 30% Reactor Power to Hot Standby (if maintaining hot standby) OR • 0-GO-7, Unit Shutdown from Hot Standby to Cold Shutdown OR • other appropriate procedure as determined by Shift Manager or TSC (if manned).	
	d. **GO TO** appropriate plant procedure.	

END

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

DIRECTION TO TRAINEE:

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

INITIAL CONDITIONS:

Unit 1 had been in Mode 5 for 72 hours to repair a leak on the #1 Steam Line.

RCS boron is 1400 ppm and the previous shift determined that B Train RHR boron concentration is 1450 ppm.

Shutdown margin required boron concentration is 1200 ppm.

A Train RHR pump needs to be shutdown to allow MEG to add oil to the motor.

B Train RHR has been checked out locally by the Auxiliary Bldg. AUO and is ready for service.

INITIATING CUES:

You are the Unit 1 OATC and the SRO has directed you to place B Train RHR in service and take A Train RHR out of service.

Align B Train injection flowpath to loops 1 & 4.

Notify the SRO when you have B Train RHR in service.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

B.1.h JPM 152

Swap RHR Pumps (A Train to B Train) With Level in the Pressurizer

Original Signatures on File

PREPARED/ REVISED BY: _____ Date/ _____

VALIDATED BY: * _____ Date/ _____

APPROVED BY: _____ Date/ _____
(Operations Training Manager)

CONCURRED: ** _____ Date/ _____
(Operations Representative)

* Validation not required for minor enhancements, procedure Rev changes that do not affect the JPM, or individual step changes that do not affect the flow of the JPM.
** Operations Concurrence required for new JPMs and changes that affect the flow of the JPM (if not driven by a procedure revision).

NUCLEAR TRAINING

REVISION/USAGE LOG

REVISION NUMBER	DESCRIPTION OF REVISION	V	DATE	PAGES AFFECTED	PREPARED/ REVISED BY:
0	New	Y	10/14/98	All	JP Kearney
pen/ink	0-SO-74-1 Rev change only	N	9/21/99	4	SR Taylor
pen/ink	0-SO-74-1 Rev change only	N	8/29/00	4	SR Taylor
pen/ink	Updated references	Y	2/5/01	2, 4	GS Poteet
pen/ink	Updated reference	N	12/10/01	3	Lacy Pauley
1	Updated to current revision and simulator commands. Verify new IC-2 satisfactory.	Y	8/25/04	All	MG Croteau
2	Updated to current revision of procedure.	N	2/5/07	All	RH Evans

V - Specify if the JPM change will require another validation (Y or N).
See cover sheet for criteria.

SEQUOYAH NUCLEAR PLANT
RO/SRO
JOB PERFORMANCE MEASURE

Task: Swap RHR Pumps (A Train to B Train) with Level in the Pressurizer

JA/TA task # : 0050030101 **(RO)**
0050080101 **(RO)**

K/A Ratings:

005K4.03 (2.9/3.2)	005A1.01 (3.5/3.6)	005A4.02 (3.4/3.1)
005K4.10 (3.1/3.1)	005A1.02 (3.3/3.4)	005A4.01 (3.6/3.4)

Task Standard:
'B" Train RHR is placed in service injecting to Loops 1 & 4.

Evaluation Method : Simulator ___X___ In-Plant _____

==========

Performer: _____
NAME

Start time _____

Performance Rating : SAT _____ UNSAT _____ Performance Time _____

Finish time _____

Evaluator: _____/_____
SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Sequenced steps identified by an "s"
2. Initialize IC-2. Ensure A Train RHR is in service with flow aligned through FCV-63-93 to Loops 2 & 3.
3. A Console operator will be required at steps 4, 8, & 10.
4. An extra operator will be required to acknowledge alarms and monitor S/G levels, RCS temp, RCS press..
5. Any UNSAT requires comments
6. Ensure operator performs the following required actions for **SELF-CHECKING;**
   a. Identifies the correct unit, train, component, etc.
   b. Reviews the intended action and expected response.
   c. Compares the actual response to the expected response.

Validation Time: CR. 11 minutes **Local** _____

Tools/Equipment/Procedures Needed:
0-SO-74-1, Section 8.3.2

REFERENCES:

	Reference	Title	Rev No.
1.	0-SO-74-1	Residual Heat Removal System	61

==========

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. 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 to indicate completion of your answer to a knowledge question return the written copy of the question to me.

INITIAL CONDITIONS:

1. Unit 1 had been in Mode 5 for 72 hours to repair a leak on the #1 Steam Line.
2. RCS boron is 1400 ppm and the previous shift determined that B Train RHR boron concentration is 1450 ppm.
3. Shutdown margin required boron concentration is 1200 ppm.
4. A Train RHR pump needs to be shutdown to allow MEG to add oil to the motor.
5. B Train RHR has been checked out locally by the Auxiliary Bldg. AUO and is ready for service.

INITIATING CUES:

You are the Unit 1 OATC and the SRO has directed you to place B Train RHR in service and take A Train RHR out of service. Align B Train injection flowpath to loops 1 & 4.
Notify the SRO when you have B Train RHR in service.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 1.: Obtain copy of 0-SO-74-1 and determine appropriate section STANDARD: Operator obtains a copy of 0-SO-74-1 and goes to Section 8.3.2. COMMENTS:	___ SAT ___ UNSAT Start Time____
STEP 2.: [1] **IF** adjustment is required on CCS flow through RHR Hxs, **THEN ENSURE [FCV-70-153]** RHR Hx B CCS outlet is **THROTTLED**. **NOTE: Operator may decide to keep FCV-70-153 Open** STANDARD: Operator ensures HS-70-153 has a RED & GREEN light LIT with flow indicated on 0-M-27A. COMMENTS:	___ SAT ___ UNSAT
STEP 3.: [2] **ENSURE [FCV-74-28]** RHR Hx B Outlet is **CLOSED**. STANDARD: Operator ensures FCV-74-28 RHR Hx B Outlet CLOSED, FIC-74-28 @ 100%. COMMENTS:	___ SAT ___ UNSAT
STEP 4.: [3] **START** RHR Pump B-B with **[HS-74-20A]**. STANDARD: Operator starts 1B-B RHR Pump, verifies RED light LIT on HS. **This step is critical to place the B train RHR Pump in service.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 5.: **[4]** **VERIFY [FCV-74-24]** RHR Pump B-B miniflow **OPENS** **OR** greater than 500 gpm in indicated on FI-74-24. ***Cue:*** **IF dispatched: *FI-74-24 indicates ~550 gpm.*** STANDARD: Operator verifies FCV-74-24 is open by Red light LIT on handswitch or checks with AUO locally to verify >500 gpm flow indicated on local flow indicator FI-47-24. COMMENTS:	___ SAT ___ UNSAT
STEP 6.: **[5]** **IF** aligning Train B RHR cooling to loops 1 and 4, **THEN PERFORM** the following: [a] **ENSURE [FCV-63-94]** OPEN. [b] **ADJUST [FCV-74-28]** to establish flow from train B RHR. [c] **ADJUST [FCV-74-16]** AND [FCV-74-32] to reduce Train A RHR flow. STANDARD: Operator performs the following: • ENSURE FCV-63-94 OPEN • ADJUST FCV-74-28 RHR Hx B Outlet OPEN, using FIC-74-28 CLOSE FCV-74-16 RHR Hx A Outlet, place FIC-74-16 @ 0%. **This step is critical to align the B train RHR Pump flow path to the RCS.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 7.: [d] **VERIFY** FCV-74-12 RHR Pump A-A miniflow **OPENS** **OR** greater than 500 gpm in indicated on FI-74-12. ***Cue:*** **IF dispatched: *FI-74-12 indicates ~550 gpm.*** STANDARD: Operator verifies FCV-74-12 is open by Red light LIT on handswitch or checks with AUO locally to verify >500 gpm flow indicated on local flow indicator FI-47-12. COMMENTS:	___ SAT ___ UNSAT
STEP 8.: [e] **CLOSE [FCV-74-33]** RHR Hx A Outlet. STANDARD: Operator closes FCV-74-33. **This step is critical to isolate A train RHR from B train RHR.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 9.: [f] **ENSURE [FCV-74-35]** RHR Hx B Outlet OPEN. STANDARD: Operator ensures FCV-74-35 RHR Hx B Outlet OPEN. COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 10.: **[g]** **OPEN [VLV-74-531]** RHR Hx B to Letdown Hx. **NOTE:** ***Console operator needs to modify remote function RHR04 to 100.*** ***Cue:*** ***Open HCV-74-531 as an AUO locally.*** STANDARD: Operator directs an AUO to OPEN HCV-74-531 RHR Hx B to Letdown Hx. **This step is critical to align B train RHR Pump for CVCS letdown.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 11.: **[h]** **STOP** RHR Pump A-A with **[HS-74-10A]**. STANDARD: Operator stops RHR pump 1A-A, verifies GREEN light on handswitch. **This step is critical to remove the A train RHR Pump from service.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 12.: **[i]** **OPEN [HCV-74-37]** RHR Hx B Bypass. **NOTE:** ***Console operator needs to modify remote function RHR07 to 100.*** ***Cue:*** ***Open HCV-74-37 as an AUO locally (including IV).*** STANDARD: Operator directs an AUO to OPEN HCV-74-37 RHR Hx B Bypass. **This step is critical to align the B train RHR HX bypass valve so operator can control HX outlet temperature.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 13.: **[j]** **CLOSE [HCV-74-36]** RHR Hx A Bypass. **NOTE:** ***Console operator needs to modify remote function RHR06 to 0.*** ***Cue:*** ***Close HCV-74-36 as an AUO locally (including IV).*** STANDARD: Operator directs an AUO to CLOSE HCV-74-36 RHR Hx A Bypass. **This step is critical to isolate the A train RHR HX bypass valve.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 14.: **[k]** **CLOSE [HCV-74-530]** RHR Hx A-A to Letdown Hx. **NOTE:** ***Console operator needs to modify remote function RHR03 to 0.*** ***Cue:*** ***Close HCV-74-530 as an AUO locally (including IV).*** STANDARD: Operator directs an AUO to close HCV-74-530. **This step is critical to isolate the A train RHR flow path to CVCS letdown.** COMMENTS:	___ SAT ___ UNSAT
STEP 15.: **[l]** **ENSURE [FCV-63-93]** CLOSED. STANDARD: Operator ensures FCV-63-93 CLOSED. **This step is critical to isolate the A train RHR RCS injection low path.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 16.: [6] **IF** aligning RHR cooling to loops 2 and 3, **THEN PERFORM** the following: **NOTE:** **Step is NA'd, initiating Cues direct alignment to loops 1 &4.** STANDARD: Operator NA's the step. COMMENTS:	___ SAT ___ UNSAT
STEP 17.: [7] **THROTTLE** one or both of the following to maintain desired cooling rate: (**N/A** if not throttled): FCV-74-28, RHR Hx B Outlet, FCV-74-32, RHR Hx Bypass. STANDARD: Operator throttles open FCV-74-28 and/or FCV-74-32 to stabilize RCS temperature and establish RHR flowrates at approximately the same values that were present prior to the flowpath realignment. **This step is critical to control RCS cooldown rate.** COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 18.: [8] **WHEN** injection flow is > 1250 gpm, **THEN VERIFY [FCV-74-24]** RHR Pump B-B miniflow is **CLOSED**. STANDARD: Operator verifies FCV-74-24 closed, GREEN light LIT on handswitch. COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 19.: [9] **IF** cooling water is to be removed from Train A Hx, **THEN** **CLOSE [FCV-70-156].** ***Cue:*** ***Leave cooling water aligned to A Train at its current flowrate.*** STANDARD: Operator NA's step. COMMENTS:	___ SAT ___ UNSAT
STEP 20.: Notify U1 US that B train of RHR is in service to loops 1&4 and A train of RHR has been removed from service. STANDARD: None. COMMENTS:	___ SAT ___ UNSAT Stop Time____

End of JPM

Unit _____ Date_____

8.3.2 Placing Train B in Service and Removing Train A from Service.

CAUTION **CCS flow should be adjusted to provide adequate flow through the RHR Hx to prevent RHR Hx CCS outlet temperature from exceeding 145°F. The RHR Hx CCS outlet temperature alarm will come in a 115°F.**

NOTE The following steps may require operators in both heat exchanger rooms and one outside the pump rooms.

[1] **IF** adjustment is required on CCS flow through RHR Hxs,
THEN
ENSURE **[FCV-70-153]** RHR Hx B CCS outlet is **THROTTLED**. _____

[2] **ENSURE** **[FCV-74-28]** RHR Hx B Outlet is **CLOSED**. _____

CAUTION 1 **Failure to maintain shutdown cooling flow rate for an RHR pump at the maximum possible could result in reduced thrust bearing life. [C.3]**

CAUTION 2 **If RHR pressure downstream of pumps exceeds 600 psig, then RHR discharge pressure must be reduced below 600 psig or RHR isolated from the RCS within 1 hour.**

NOTE RHR motor lower bearing oil level will increase after pump is started and may increase above sightglass. The presence of oil can be verified by a golden tint in sightglass.

[3] **START** RHR Pump B-B with **[HS-74-20A]**. _____

[4] **VERIFY** **[FCV-74-24]** RHR Pump B-B miniflow **OPENS**

OR

greater than 500 gpm is indicated on FI-74-24. _____

Unit _____ Date_____

8.3.2 Placing Train B in Service and Removing Train A from Service (Continued)

CAUTION 1 **To reduce vibration across FCV-74-16 and FCV-74-28 (RHR Hx Outlet Valves), RHR must be aligned to only two cold legs with one train in service.**

CAUTION 2 **Operating RHR pumps in parallel (HCV-74-36 and HCV-74-37 OPEN OR 74-530 and 74-531 OPEN) and on miniflow for > 10 minutes may result in pump damage due to one pump dead-heading. [C.2] [C.13]**

NOTE Step **5[b]** and **[c]** may be performed together to ensure continuous flow delivered to RCS.

[5] **IF** aligning Train B RHR cooling to loops 1 and 4, **THEN**

PERFORM the following:

[a] **ENSURE [FCV-63-94]** OPEN. _____

[b] **ADJUST [FCV-74-28]** to establish flow from Train B RHR. _____

[c] **ADJUST [FCV-74-16]** AND **[FCV-74-32]** to reduce Train A RHR flow. _____

[d] **VERIFY [FCV-74-12]** RHR Pump A-A miniflow **OPENS**

OR

greater than 500 gpm is indicated on FI-74-24. _____

Unit _____ Date_____

8.3.2 Placing Train B in Service and Removing Train A from Service (Continued)

[e] **CLOSE [FCV-74-33]** RHR Hx A Outlet. _____

[f] **ENSURE [FCV-74-35]** RHR Hx B Outlet OPEN. _____

[g] **OPEN [VLV-74-531]** RHR Hx B to Letdown Hx. _____ 1st _____ CV

[h] **STOP** RHR Pump A-A with **[HS-74-10A]**. _____

[i] **OPEN [HCV-74-37]** RHR Hx B Bypass. _____ 1st _____ CV

[j] **CLOSE [HCV-74-36]** RHR Hx A Bypass. _____ 1st _____ CV

[k] **CLOSE [VLV-74-530]** RHR Hx A to Letdown Hx. _____ 1st _____ CV

[l] **ENSURE [FCV-63-93]** CLOSED. _____

Unit _____ Date_____

8.3.2 Placing Train B in Service and Removing Train A from Service (Continued)

CAUTION 1 **To reduce vibration across FCV-74-16 and FCV-74-28 (RHR Hx Outlet Valves), RHR must be aligned to only two cold legs with one train in service.**

CAUTION 2 **Operating RHR pumps in parallel (HCV-74-36 and HCV-74-37 OPEN OR 74-530 and 74-531 OPEN) and on miniflow for > 10 minutes may result in pump damage due to one pump dead-heading. [C.2] [C.13]**

NOTE Step **6[d]** and **[e]** may be performed together to ensure continuous flow delivered to RCS.

[6] **IF** aligning Train B RHR cooling to loops 2 and 3, **THEN PERFORM** the following:

[a] **ENSURE [FCV-63-93]** OPEN. _____

[b] **ENSURE [FCV-74-33]** RHR Hx A Outlet OPEN. _____

[c] **ENSURE [FCV-74-35]** RHR Hx B Outlet OPEN. _____

[d] **ADJUST [FCV-74-28]** to establish Train B RHR flow. _____

[e] **ADJUST [FCV-74-16]** and **[FCV-74-32]** to reduce Train A RHR flow. _____

[f] **VERIFY [FCV-74-12]** RHR Pump A-A miniflow **OPENS or** greater than 500 gpm is indicated on FI-74-24. _____

[g] **OPEN [VLV-74-531]** RHR Hx B to Letdown Hx. _____ _____

1st CV

Unit _____ Date_____

8.3.2 Placing Train B in Service and Removing Train A from Service (Continued)

[h] **STOP** RHR Pump A-A with **[HS-74-10A]**. _____

[i] **OPEN [HCV-74-37]** RHR Hx B Bypass. _____ 1st _____ CV

[j] **CLOSE [HCV-74-36]** RHR Hx A Bypass. _____ 1st _____ CV

[k] **CLOSE [VLV-74-530]** RHR Hx A to Letdown Hx. _____ 1st _____ CV

[l] **ENSURE [FCV-63-94]** CLOSED. _____

NOTE One or both of the valves in the next step may be throttled to maintain RCS at desired temperature.

[7] **THROTTLE** one or both of the following to maintain desired cooling rate (**N/A** if not throttled):

VALVE NO.	FUNCTION	INITIALS
FCV-74-28	RHR Hx B Outlet	_____
FCV-74-32	RHR Hx Bypass	_____

[8] **WHEN** injection flow is > 1250 gpm, **THEN**
VERIFY [FCV-74-24] RHR Pump B-B miniflow is **CLOSED**. _____

[9] **IF** cooling water is to be removed from Train A Hx, **THEN**

CLOSE [FCV-70-156]. _____

END OF TEXT