SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPMA.1.1

Determine Maintenance of Active License Status

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, Adapted from watts Bar A.1-1 2009 NRC exam	Y	1/18/2010	All	M. Hankins

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 **Determine License Status Active/Inactive** **JA/TA task #**
Knowledge of Conduct of Operations requirements

K/A Ratings:
2.1.1 3.8/4.2

Task Standard:

Evaluation Method : Simulator ________ In-Plant ________ Classroom X

==

Performer: ______________________________
NAME

Start time ________

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

Evaluator: ____________________/______________
SIGNATURE DATE

==

COMMENTS

____

____

____

____

____

____

____

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. A **Critical step** is identified bold type in the SAT/UNSAT column.
2. Any UNSAT requires comments.
3. This JPM will be performed in a classroom

.

Validation Time: CR ______ Local ___________

Tools/Equipment/Procedures Needed:
OPDP-10

REFERENCES:

	Reference	Title	Rev No.
	OPDP-10	License Status Maintenance, reactivation and Proficiency for Non-Licensed Positions	1

Task Number	Task Title	Cont TRN
	Maintain Active NRC License	

===

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. I will provide initiating cues. 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:

Four Senior Reactor Operators have the following history:

1. All four SRO's have off-shift assignments at the plant, are current in License Operator Requalification Training, and have had a medical examination in the last year.
2. None of the 4 SRO's have worked any shift since 12/01/09.
3. Active/Inactive status and time on shift since October 1, 2009 are listed on the following page for each of the Senior Reactor Operators.

INITIATING CUES:

1. You are to determine if each of the Senior Reactor Operators License Status is Active to work the Unit 1 SRO position on the 0700 - 1900 shift on January 31, 2010. Include reasons for determining active or inactive status.

Operator A	**License was active on October 1, 2009.**	
	10/02/09	Worked 0700-1900 shift as Unit 1 SRO.
	10/03/09	Worked 0700-1900 shift as Unit 1 SRO.
	10/04/09	Worked 0700-1900 shift in the Tagging Office.
	10/05/09	Worked 0700-1900 shift as Unit 2 SRO.
	10/06/09	Worked 0700-1900 shift as Unit 2 SRO. SRO performed an observation at the Training Center for ILT in the simulator for 3 hours.
	11/14/09	Worked 1900-0700 shift as Unit 1 SRO.
Operator B	**License was active on October 1, 2009.**	
	10/07/09	Worked 0700-1900 shift as Unit 1 SRO.
	10/08/09	Worked 0700-1900 shift as Unit 1 SRO. Absent from the Control Room for 1 hour while conducting a plant tour with another Senior Reactor Operator who is reactivating their license.
	10/09/09	Worked 0700-1900 shift as Unit 1 SRO.
	10/10/09	Worked 0700-1900 shift as Unit 2 SRO.
	10/11/09	Worked 0700-1900 shift as Unit 2 SRO.
Operator C	**License was active on October 1, 2009.**	
	10/01/09	Worked 0700-1900 shift as Unit 1 SRO.
	10/02/09	Worked 0700-1900 shift in the Tagging Office.
	10/03/09	Worked 0700-1900 shift as Unit 1 CRO.
	10/05/09	Worked 0700-1900 shift as Unit 2 SRO.
	10/14/09	Worked 1900-0700 shift as Unit 2 SRO.
	11/02/09	Worked 0700-1900 shift in the WCC.
Operator D	**License was inactive on October 1, 2009.**	
	10/5/09 thru 10/09/09 worked 40 hours under the direction of the Unit 1 SRO and completed all requirements for license reactivation.	
	11/12/09	Worked 0700-1900 shift as Unit 1 SRO.
	11/13/09	Worked 0700-1900 shift as Unit 1 SRO.
	11/15/09	Worked 0700-1900 shift as Unit 2 SRO.
	11/21/09	Worked 1900-0700 shift as Unit 1 SRO.

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 1.:	Determine the Active / Inactive status of Operator A license.	___ SAT ___ UNSAT
STANDARD:	Applicant determines the licensee is Inactive because the operator did not work the required qualified 5 twelve hour shifts in a license position during the previous quarter. The shift on 10/06/09 DOES NOT count due to the 3 hour absence. OPDP-10, Section 3.2.4.B states "Absences from the Control Room for extended periods (i.e., Fitness-for-Duty testing) will not count towards shift functions."	**CRITICAL STEP** Start Time __________
STEP 2.:	Determine the Active / Inactive status of Operator B license	___ SAT ___ UNSAT
STANDARD:	Applicant determines the licensee is Active because the operator worked 5 twelve hour shifts in a license position during the previous quarter. The 1 hour time during which the plant tour was conducted does count as "actively performing the functions of an operator."	**CRITICAL STEP** __________
STEP 3.:	Determine the Active / Inactive status of Operator C license.	___ SAT ___ UNSAT
STANDARD:	Applicant determines the license is Inactive because the operator did not work the required 5 twelve hour shifts in a license position during the previous quarter. The shifts worked in the tagging office and the WCC are not qualified positions.	**CRITICAL STEP**

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 4.:	Determine the Active / Inactive status of Operator D license.	___ SAT ___ UNSAT
STANDARD:	Applicant determines the license is Active because the license was reactivated in the previous quarter, including working 40 hours under the direction of the Unit 1 SRO.	**CRITICAL STEP** ________ Stop Time

End Of JPM

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. I will provide initiating cues. 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:

Four Senior Reactor Operators have the following history:

1. All four SRO's have off-shift assignments at the plant, are current in License Operator Requalification Training, and have had a medical examination in the last year.
2. None of the 4 SRO's have worked any shift since 12/01/09.
3. Active/Inactive status and time on shift since October 1, 2009 are listed on the following page for each of the Senior Reactor Operators.

INITIATING CUES:

1. You are to determine if each of the Senior Reactor Operators License Status is Active to work the Unit 1 SRO position on the 0700 - 1900 shift on January 31, 2010. Include reasons for determining active or inactive status.

Operator A	**License was active on October 1, 2009.**	
	10/02/09	Worked 0700-1900 shift as Unit 1 SRO.
	10/03/09	Worked 0700-1900 shift as Unit 1 SRO.
	10/04/09	Worked 0700-1900 shift in the Tagging Office.
	10/05/09	Worked 0700-1900 shift as Unit 2 SRO.
	10/06/09	Worked 0700-1900 shift as Unit 2 SRO. SRO performed an observation at the Training Center for ILT in the simulator for 3 hours.
	11/14/09	Worked 1900-0700 shift as Unit 1 SRO.
Operator B	**License was active on October 1, 2009.**	
	10/07/09	Worked 0700-1900 shift as Unit 1 SRO.
	10/08/09	Worked 0700-1900 shift as Unit 1 SRO. Absent from the Control Room for 1 hour while conducting a plant tour with another Senior Reactor Operator who is reactivating their license.
	10/09/09	Worked 0700-1900 shift as Unit 1 SRO.
	10/10/09	Worked 0700-1900 shift as Unit 2 SRO.
	10/11/09	Worked 0700-1900 shift as Unit 2 SRO.
Operator C	**License was active on October 1, 2009.**	
	10/01/09	Worked 0700-1900 shift as Unit 1 SRO.
	10/02/09	Worked 0700-1900 shift in the Tagging Office.
	10/03/09	Worked 0700-1900 shift as Unit 1 CRO.
	10/05/09	Worked 0700-1900 shift as Unit 2 SRO.
	10/14/09	Worked 1900-0700 shift as Unit 2 SRO.
	11/02/09	Worked 0700-1900 shift in the WCC.
Operator D	**License was inactive on October 1, 2009.**	
	10/5/09 thru 10/09/09 worked 40 hours under the direction of the Unit 1 SRO and completed all requirements for license reactivation.	
	11/12/09	Worked 0700-1900 shift as Unit 1 SRO.
	11/13/09	Worked 0700-1900 shift as Unit 1 SRO.
	11/15/09	Worked 0700-1900 shift as Unit 2 SRO.
	11/21/09	Worked 1900-0700 shift as Unit 1 SRO.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM123

CONTAINMENT FORMALDEHYDE STAY TIME CALCULATION

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	Y	12/5/08	All	T. Wooley
1	Revised due inaccuracies regarding respiratory requirement not applicable.	N	12/9/08	2, 6	M. Chambers
2	Updated KA Task, revised initial conditions	Y	1/06/10	All	M Hankins

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:

Calculation Containment Formaldehyde stay time and Determine respiratory protection requirements.

JA/TA task:

K/A Ratings:

2.1.26 (3.4 / 3.6) Knowledge of Industrial Safety Procedures

Task Standard:

Calculate containment formaldehyde stay time and determine respiratory protection requirements in accordance with 0-TI-OPS-000-001.0.

Evaluation Method : Simulator ________ In-Plant ________ Classroom __X____

==

Performer: ____________________________________
NAME

Start Time ________

Performance Rating : SAT _____ UNSAT _____ Performance Time _____

Finish Time _______

Evaluator: ____________________________/________
SIGNATURE DATE

==

COMMENTS

____

____

____

____

____

____

____

____

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Critical steps identified by an asterisk (*).
2. Sequenced steps identified by an "s".
3. Any UNSAT requires comments.
4. 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.________ Local ____________

Tools/Equipment/Procedures Needed:

0-TI-OPS-000-001.0, Containment Formaldehyde Stay Time Calculation
Calculator

References:

	Reference	Title	Rev No.
1.	0-TI-OPS-000-001.0	Containment Formaldehyde Stay Time Calculation	5

==

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. This JPM will be performed in the classroom. I will provide initiating cues. 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 in Mode 1 at 100% power.
- A Level Switch inside lower containment needs repair.
- 0-SI-OPS-000.011.0, Containment Access Control during Modes 1 – 4, has been initiated in preparation for a containment entry to investigate the alarm condition.
- The containment entry requires at least 120 minutes.
- A Chemistry sample taken today at 0900 hours yielded a lower containment formaldehyde concentration of 1.32 ppm.
- Section 4.0, Prerequisite Actions, of 0-TI-OPS-000-001.0 is complete.

INITIATING CUES:

You have been directed by the US to:
a) Calculate the allowable containment stay time for the given formaldehyde concentration in accordance with 0-TI-OPS-000-001.0
AND
b) Identify all required actions to complete the level switch repair in accordance with 0-TI-OPS-000-001.0, Containment Formaldehyde Stay Time Calculation.

<table>
<tr>
<td>

STEP *1.: Unit 1 Lower Containment Entry

CALCULATE Unit 1 Lower containment stay time **USING** the following equation:

$$\frac{0.3 \text{ ppm} \quad X \quad 480 \text{ minutes}}{\text{sample recorded in Step 5.1[1]} \ \mathbf{(1.32)}} = \_\_\_\_\_\_ \text{ minutes}$$

$$\frac{.3 \text{ X } 480}{\mathbf{1.32}} = \frac{\mathbf{144}}{\mathbf{1.32}} = \mathbf{109.1}$$

STANDARD: Operator calculates a containment stay time of 109.1 (± 1) minutes using equation found in applicable section (5.1) of 0-TI-OPS-000-001.0.

</td>
<td>

___ SAT

___ UNSAT

Start Time____

Critical Step

</td>
</tr>
<tr>
<td>

STEP 2.: Identify all required actions to complete level switch repair n accordance with step 7 of TI:

Operator determines Job duration exceeds Stay time

[7] **IF** any required task CANNOT be performed within allowed stay time, **THEN PERFORM** the following …

[7.1]Contact Industrial Safety for additional guidance

[7.2] Evaluate or notify supervisor to evaluate the need for lower Containment Purge in accordance with 0-SO-30-3.

[7.3] DO NOT CONTINUE task UNTIL one of the following conditions are met:

Job Safety Analysis has been performed
OR
Stay Time is Acceptable

EXAMINER NOTE: If applicant states that the level switch repairs cannot be performed unless a respirator is worn, this is not correct.

STANDARD: Operator determines Job duration exceeds Calculated Stay Time.

Operator determines that the level switch repair cannot be performed until the following criteria are completed:
1- A Job Safety Analysis has been performed
2- Industrial Safety is contacted
3- An evaluation of the need for Lower Containment Purge

COMMENTS:

</td>
<td>

___ SAT

___ UNSAT

Critical Step

Stop Time ____

</td>
</tr>
</table>

End of JPM

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. This JPM will be performed in the classroom. I will provide initiating cues. 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 in Mode 1 at 100% power.
- A Level Switch inside lower containment needs repair.
- 0-SI-OPS-000.011.0, Containment Access Control during Modes 1 – 4, has been initiated in preparation for a containment entry to investigate the alarm condition.
- The containment entry requires at least 120 minutes.
- A Chemistry sample taken today at 0900 hours yielded a lower containment formaldehyde concentration of 1.32 ppm.
- Section 4.0, Prerequisite Actions, of 0-TI-OPS-000-001.0 is complete.

INITIATING CUES:

You have been directed by the US to:

a) Calculate the allowable containment stay time for the given formaldehyde concentration in accordance with 0-TI-OPS-000-001.0,
AND
b) Identify all required actions to complete the level switch repair in accordance with 0-TI-OPS-000-001.0, Containment Formaldehyde Stay Time Calculation.

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. This JPM will be performed in the classroom. I will provide initiating cues. 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 in Mode 1 at 100% power.
- A Level Switch inside lower containment needs repair.
- 0-SI-OPS-000.011.0, Containment Access Control during Modes 1 – 4, has been initiated in preparation for a containment entry to investigate the alarm condition.
- The containment entry requires at least 120 minutes.
- A Chemistry sample taken today at 0900 hours yielded a lower containment formaldehyde concentration of 1.32 ppm.
- Section 4.0, Prerequisite Actions, of 0-TI-OPS-000-001.0 is complete.

INITIATING CUES:

You have been directed by the US to:

a) Calculate the allowable containment stay time for the given formaldehyde concentration in accordance with 0-TI-OPS-000-001.0, section 5.1 step 3.
AND
b) Identify all required actions to complete the level switch repair in accordance with 0-TI-OPS-000-001.0, Containment Formaldehyde Stay Time Calculation, Section 5.1, Step 7.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM 410-1
SRO A2

Review Surveillance for Approval

PREPARED/ REVISED BY:		Date/
VALIDATED BY:	*	Date/
APPROVED BY:	(Operations Training Manager)	Date/
CONCURRED:	** (Operations Representative)	Date/

* 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- adapted from SRO JPM A2 on 3-07 AUDIT Exam, revised initial cues and data recorded in SI to improve JPM flow and evaluation criteria	Y	1/08/10	All	M Hankins

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:
Review a surveillance for approval

JA/TA task # : 004 099 0201 Adjust seal injection supply controlled leakage

K/A Ratings: 2.2.12 (3.0)

Task Standard:

Determine that seal injection flow is not within the acceptable area for the listed RCS pressure and determine that needle valves require adjustment

Evaluation Method : Simulator ___X___ In-Plant ________ Classroom ____X__

==

Performer: ______________________________________
NAME
Start Time ________

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

Evaluator: ______________________________/__________
SIGNATURE DATE

==

COMMENTS

____

____

____

____

____

____

____

____

____

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. This JPM will be performed in a classroom setting.
2. Any unsat requires comments.

Validation Time: CR. 20 minutes **Local** ___________

Tools/Equipment/Procedures Needed:

Ruler
Calculator

References:

	Reference	Title	Rev No.
1.	0-SI-SXX-068-137.3	Measurement of Reactor Coolant Pump Seal Injection Flow for Units 1 and 2	6
2	SPP-3.5	Regulatory Requirements	21
3.	TS	Technical Specifications	Latest
4.	TR	Technical Requirements	Latest

==

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:

- You are the Unit 1 Unit Supervisor.
- 1A-A CCP is I/S, discharge pressure 2400 psig (PI-62-92A)
- RCS Pressure 2240 psig (PI-68-334)
- 0-SI-SXX-068-137.3, Measurement of Reactor Coolant Pump Seal Injection Flow for Units 1 and 2, has just been completed.

INITIATING CUES:

1. Perform the Unit Supervisor review of the completed surveillance.
2. Identify any actions required.
3. Identify all required notifications that the Shift Manager must make.

STEP 1.: Reviews sections 4.0, 4.1, 4.2, 4.3 and 4.4 of surveillance STANDARD: Determines all required initials and signatures are present, steps performed have required place keeping. COMMENTS:	___ SAT ___ UNSAT Start Time_______
The following steps are from Section 6.0.	
STEP 2.: [6.1.1] ENSURE RCS pressure reading is 2235 +/- 20 psig STANDARD: SRO reviews step and ensure RCS pressure is within 2235 psig +/- 20 psig. COMMENTS:	___ SAT ___ UNSAT
STEP 3.: [6.1.2] ENSURE CCP A-A is operating..... STANDARD: SRO reviews step and ensures CCP AA is in service COMMENTS:	___ SAT ___ UNSAT
STEP 4.: [6.1.3] RECORD pressure reading in MCR..... [6.1.3.a] PI-68-334 ______ psig STANDARD: SRO reviews step and ensures RCS pressure recorded is within 2235 +/- 20 psig. Initial conditions RCS pressure 2240 psig on PI-68-334. COMMENTS:	___ SAT ___ UNSAT
STEP 5.: [6.1.3] RECORD pressure reading in MCR....(Continued) [6.1.3.b] PI-62-92A ________ psig STANDARD: SRO reviews step and ensures CCP discharge pressure recorded is 2400. Initial conditions 1A-A CCP discharge pressure is 2400 psig	___ SAT ___ UNSAT

STEP 6.: [6.1.4] PERFORM calculation to determine differential pressure...... STANDARD: SRO reviews calculation for differential pressure and determines that • Operator recorded RCS pressure as 2230 psig rather than 2240 psig. • Differential pressure is actually 160 psid rather than 170 psid as recorded. SRO initiates a SR (PER) on the Human Performance Error. Initiation of SR is Not a Critical Step) COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 7.:: [6.1.5] IF pressure drop is less than 100 psig...... STANDARD: SRO determines step 6.1[5] is N/A since pressure drop is greater than 100 psig. COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 8.: [6.1.6] RECORD the seal injection flow rate to each of the four RCP's....... STANDARD: SRO determines flow rates are recorded for each RCP loop and that the total Injection flow rate was calculated correctly. **9.4 + 9.6 + 9.3 + 9.7 = 38 gpm** COMMENTS:	___ SAT ___ UNSAT **Critical Step**

STEP 9.: [6.1.7] FIND the point on the figure in Appendix A corresponding to DP........ STANDARD: Determines that with the correct DP, Acceptance Criteria is ***not*** met for the current seal injection flows. The following actions or notifications may be performed in this step or in JPM step 9. SRO determines the following actions must be performed: • Perform SI Section 6.3, Throttle Adjustment of Seal Injection Needle Valves • Enter LCO 3.5.6, 4 hours to adjust valves or be in Hot Standby in the next 6 hours • Make notifications, in accordance with SPP-3.5 to Duty Plant Manager, Plant Manager, Site VP and Corporate Duty officer (Unplanned entry into a LCO with time duration 72 hours or less. • SRO is initiate a SR (PER) on the Human Performance Error. (Not a critical step) COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 10.: [6.1.8] IF the plotted point for differential pressure versus seal injection flow falls outside the "acceptable region"........ STANDARD: SRO determines that the plotted point is not in the acceptable region and therefore the following actions/notifications are required: • Perform SI Section 6.3, Throttle Adjustment of Seal Injection Needle Valves • • Enter LCO 3.5.6, 4 hours to adjust valves or be in Hot Standby in the next 6 hours • Make notifications, in accordance with SPP-3.5, Appendix D – Site Event Notification Matrix, due to an Unplanned entry into a LCO with time duration 72 hours or less: o Duty Plant Manager o Plant Manager o Site VP o Corporate Duty Officer o (*NOTE: These notifications may be accomplished by the SM notifying Operations Management and the Duty Plant manager. The Duty Plant Manager is responsible for the remaining internal management notifications as noted in the matrix. See note above the matrix in Appendix D)* • Initiate a SR (PER) (initiation of SR is not a critical step) COMMENTS:	___ SAT ___ UNSAT **Critical Step** Stop Time_____

End of JPM

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:

- You are the Unit 1 Unit Supervisor.
- 1A-A CCP is I/S, discharge pressure 2400 psig (PI-62-92A)
- RCS Pressure 2240 psig (PI-68-334)
- 0-SI-SXX-068-137.3, Measurement of Reactor Coolant Pump Seal Injection Flow for
  Units 1 and 2, has just been completed.

INITIATING CUES:

1. Perform the Unit Supervisor review of the completed surveillance.
2. Identify any actions required.
3. Identify all required notifications that the Shift Manager must make.

Surveillance Task Sheet (STS)

ırk Order: SI Key: Procedure: 0-SI-SXX-068-137.3 Train/Loop: Unique Data:

Title: Measurement of RCP Seal Injection Flow for Unit 1 & 2

Perf Sect: OPS Test Reason Quarterly Unit: 0

Data Sheet: One Complete copy

Issued: Extension:

Frequency: NONE FO: N TS: Y ASME XI: N

Applicable Modes: 1,2,3,4,5,6 Perfor Modes: 1,2,3,4,5,6

Clearance Required: Sched. Rec.#:

SRO U-1 — Authorization to Begin: SRO — TODAY Date — T-0 Time

Today Start Date — T-1 Time — TODAY Completion Date — T-2 Time

Mode: SX

Dry Cask Storage:

Subsequent Reviews: Initial Date

Cognizant Engr
Cem Admin Reviewer

Was this a Complete or Partial Performance?
(Explain Particial in "Remarks" below)
Complete [✓] Partial [

Were all Tech Spec/Tech Req/ISFSI CoC/ODCM/Fire Prot Req/AMSAC acceptance criteria satisified?
Yes [✓] No [ ] N/A [

Were all other acceptance criteria satisfied?
Yes [✓] No [ ] N/A [

If all Tech Spec Tech Req/ISFSI CoC/ODCM/Fire Prot Req/AMSAC were not satisfied, was an LCO/TR/ODCM Action required ((Explain in "Remarks")
Yes [ ] No [ ] N/A [✓

Print Name	Test Performer's Signature	Initial	Section
Reactor Operator X	Reactor Operator X	ROX	OPS
Reactor Operator Y	Reactor Operator Y	ROY	OPS
Senior Reactor Oper	Senior Reactor Operator	SRO-1	OPS

Reactor Operator X — Test Director; Reactor Operator X — Lead Performer; TODAY — Date

Acceptance Criteria Review:SRO Date Time
(ASME XI SIs require review within 96 hours)

Independent Reviewer

PERMANENT COMMENTS:

REMARKS:

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

SURVEILLANCE INSTRUCTION

0-SI-SXX-068-137.3

MEASUREMENT OF REACTOR COOLANT PUMP SEAL INJECTION FLOW FOR UNITS 1 AND 2

Revision 6

QUALITY RELATED

PREPARED BY: MS Leenerts

RESPONSIBLE ORGANIZATION: SE/NSSS

APPROVED BY: MR Cooper

EFFECTIVE DATE: 03/21/2001

LEVEL OF USE: **CONTINUOUS USE**

REVISION DESCRIPTION	Revised to clarify seal injection flow calculation. Revised to incorporate the impacts of TS change 00-05 (TS 4.1.2.1.c and TS 4.1.2.2.c changed to TRM 4.1.2.1.c and TRM 4.1.2.2.c). Non Intent change

TABLE OF CONTENTS
PAGE 1 OF 1

UNIT i

1.0 INTRODUCTION

1.1 Purpose

This Surveillance Instruction (SI) provides detailed steps to measure total injection flow to the reactor coolant pump seals for Units 1 and 2. The purpose of this SI is to ensure adequate resistance exists in the seal injection lines so that in the event of Loss of Coolant Accident (LOCA) the safety injection flow will not be less than assumed in the accident analysis. If desired, this SI can be used to improve system balance and used to verify final valve positions meet the Acceptance Criteria.

1.2 Scope

1.2.1 Test to be Performed

Measurements of seal injection flow shall be performed while in Mode 1, 2 or 3 with the RCS pressure at 2235 $\pm$ 20 psig.

A. This SI will verify during this test that the total injection flow to the RCP seals meets the requirements of Technical Specifications for seal injection flow limits.

   1. If Acceptance Criteria are not met, the seal injection line needle valves will be adjusted to provide required system resistance.
   2. Needle valves will be sealed in position after adjustment.

B. This Instruction shall verify that these valves are sealed in position after the adjustment. (Reference TRM 4.1.2.1.c & 4.1.2.2.c.)

1.2.2 Requirements Fulfilled

Performance of this Instruction meets the requirements of TS 4.5.6 and partially fulfills the requirements of TRM 4.1.2.1.c and 4.1.2.2.c.

1.2.3 Modes

Plant operating modes for which the requirements covered by this Instruction shall be satisfied (applicable modes) and during which the test can be performed (performing modes) are:

A. Applicable Modes 1, 2, and 3.

B. Performance Mode 1, 2, or 3.

1.3 Test Frequency/Conditions

This Instruction shall be performed at least once per 31 days and after any seal work on RCPs. This Instruction is not required to be performed until RCS pressure has stabilized at 2215 to 2255 psig. When the 31 day limit has been exceeded or seal work has been performed, this instruction must be performed within 4 hours after stabilization within these limits.

2.0 REFERENCES

2.1 Performance References

A. SPP-3.1, Corrective Action Program.

B. SPP-8.1, Conduct of Testing.

C. 1-SO-62-1, 2-SO-62-1, Chemical & Volume Control System.

2.2 Developmental References

A. Writer's Guide.

B. Technical Specifications Surveillance Requirement 4.5.6 and Technical Requirements Manual 4.1.2.1.c and 4.1.2.2.c.

C. Technical Specification Figure 3.5.6-1, Seal Injection Flow Limits.

D. Westinghouse letter TVA-86-671 from L. L. Williams to John A. Raulston, dated June 27, 1986 (RIMS No. B45 860707 607).

E. Westinghouse letter TVA-84-057 from R. S. Howard to John A. Raulston, dated March 16, 1984 (RIMS No. LOO 840322161).

F. LER SQRO-50-327/86044, Inadequate Verification of ECCS Flow Due to Procedural Inadequacy.

G. Design Criteria, SQN-DC-V-27.3, Safety Injection System

H. Technical Specification Change 98-10.

I. Technical Specification Change 00-05.

3.0 PRECAUTIONS AND LIMITATIONS

A. RCS pressure must be maintained at 2235 $\pm$ 20 psig throughout performance of this surveillance.

B. Failure to meet Acceptance Criteria may result in entering Limiting Condition for Operation (LCO) 3.5.6, which may result in adjusting manual seal injection needle valves to give a flow within limits in 4 hours.

Unit 1

Date TODAY

4.0 PREREQUISITE ACTIONS

NOTE 1 Throughout this Instruction, during an IF-THEN statement, the step should be marked N/A when stated IF condition does not occur.

NOTE 2 The Surveillance Task Sheet may be completed as information becomes available.

4.1 Preliminary Actions

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

RECORD applicable Pretest Data on Surveillance Task Sheet.

Roy Initials

[2] **ENSURE** NO clearances or system off normal configurations exist which would prevent completion of testing.

Roy Initials

[3] **IF** configurations or clearances prevent performance of this Instruction, **THEN**

NOTIFY Unit SRO and responsible Supervisor.

Roy Initials

4.2 Measuring and Test Equipment, Parts, and Supplies

None.

Unit 1 Date TODAY

4.3 Field Preparations

NOTE Steps within Section 4.3 (Field Preparations) may be performed in any order.

[1] **VERIFY** the following personnel are available to support the test as required:

A. Assistant Unit Operator (AUO). ☑

B. Radiological Control (RADCON). ☑

Roy
Initials

[2] **VERIFY** Radiation Work Permits are available for test performance, **OR**

OBTAIN RWPs as required.

Roy
Initials

[3] **VERIFY** plant is in Mode 1, 2, or 3.

Rox
Initials

4.4 Approvals and Notifications

[1] **OBTAIN** unit SRO's permission to perform this Instruction.

SRO U-1 / TODAY / NOW
Unit SRO Date Time

Unit 1 Date TODAY

5.0 ACCEPTANCE CRITERIA

A. Total flow rate to the RCP seals must be within the "acceptable region" shown in the figure in Appendix A with RCS pressure at 2235 ± 20 psig.

6.0 PERFORMANCE

NOTE 1 Component's prefix is omitted throughout procedure; it shall be 1 or 2 as per unit tested.

NOTE 2 This instruction is written such that either section 6.1 or section 6.2 can be performed to take advantage of the pump in operation.

NOTE 3 Section 6.3 may be performed to balance seal injection flows when desired.

6.1 Centrifugal Charging Pump A-A

NOTE 1 All steps in this section may be marked N/A if CCP B-B is in service.

NOTE 2 N/A the Indicator/Computer Point not used in Steps [3] and [6]

NOTE 3 If instrument reading does not meet Acceptance Criteria of 2235 ± 20 psig, then acceptable pressure will have to be established or wait for required pressure and then repeat Step 6.1 [1].

[1] **ENSURE** reactor coolant pressure reading is 2235 ± 20 psig at one of the following: (Check one used.)

A. at **[PI-68-334]** Main Control Room (MCR) or ☑

B. P0481A (corresponding Computer Point), ☐ N/A

OR

C. at **[PI-68-323]** MCR or ☐

D. P0482A (corresponding Computer Point) ☐

Unit 1 Date TODAY

6.1 Centrifugal Charging Pump A-A (Continued)

[2] **ENSURE** Centrifugal Charging pump (CCP) A-A is operating and supplying normal charging and seal flow in accordance with 1,2-SO-62-1.

Roy
Initials

[3] **RECORD** pressure readings in MCR for the following:

A. **[PI-68-334]** 2240 psig or
[P0481A] N/A psig, **OR**
[PI-68-323] ______ psig or
[P0482A] ______ psig. ☑

B. **[PI-62-92A]** 2400 psig or
[P0142A] N/A psig. ☑

Roy
Initials

[4] **PERFORM** calculation to determine differential pressure (between PT-62-92 and pressurizer):

Step 6.1 [3] B 2400 psig - (minus) Step 6.1 [3] A 2230 psig = 170 psid

Roy
Initials

Roy
Checker

Unit 1 Date TODAY

6.1 Centrifugal Charging Pump A-A (Continued)

[5] **IF** pressure drop is less than 100 psig, **THEN**

ADJUST [FCV-62-89] CLOSED to increase header pressure, and

REPEAT Steps 6.1 [3] and 6.1 [4].

N/A
Initials

NOTE Failure to meet Acceptance Criteria results in entering Limiting Condition for Operation (LCO) 3.5.6 for seal injection flow. The flow rate must be reduced to meet Acceptance Criteria within 4 hours by adjustment of seal injection needle valves.

[6] **RECORD** the seal injection flow rate to each of the four reactor coolant pumps (RCPs), and

CALCULATE total flow rates below by adding seal injection flow rates in each RCP loop.

A. RCP Loop 1 [FI-62-1A] 9.4 gpm or

F0704A N/A gpm

Rox
Initials

B. RCP Loop 2 [FI-62-14A] 9.6 gpm or

F0703A N/A gpm

Rox
Initials

Unit 1 Date TODAY

6.1 Centrifugal Charging Pump A-A (Continued)

C. RCP Loop 3 **[FI-62-27A]** 9.3 gpm or

F0702A N/A gpm

Roy
Initials

D. RCP Loop 4 **[FI-62-40A]** 9.7 gpm or

F0701A N/A gpm

Roy
Initials

E. Total Seal Injection Flow Rate = A + B + C + D.

= 38 gpm

Roy
Initials

Roy
Checker

[7] **FIND** the point on the figure in Appendix A corresponding to the DP from Step 6.1[4] and Seal Injection Flow from Step 6.1[6]E.

Roy
Initials

Roy
Checker

Acceptance Criteria Plotted point for differential pressure versus seal injection flow falls within the "acceptable region" of the figure in Appendix A.

[8] **IF** the plotted point for differential pressure versus seal injection flow falls outside the "acceptable region" of the figure in Appendix A,
THEN

NOTIFY Unit SRO that LCO 3.5.6 should be entered AND

PERFORM Section 6.3.

N/A
Initials

Unit 1 Date TODAY

6.2 Centrifugal Charging Pump B-B (Continued)

[5] **IF** pressure drop is less than 100 psig, **THEN**

ADJUST **[FCV-62-89]** CLOSED to increase header pressure, and

REPEAT Steps 6.2 [3] and 6.2 [4].

N/A ______ Initials

NOTE Failure to meet Acceptance Criteria results in entering Limiting Condition for Operation (LCO) 3.5.6. The leakage rate must be reduced to meet Acceptance Criteria within 4 hours by adjustment of seal injection needle valves.

[6] **RECORD** the seal injection flow rate to each of the four reactor coolant pumps (RCPs), and

CALCULATE total flow rates below by adding seal injection flow rates in each RCP loop.

A. RCP Loop 1 **[FI-62-1A]** __________ gpm or

F0704A __________ gpm

N/A ______ Initials

B. RCP Loop 2 **[FI-62-14A]** __________ gpm or

F0703A __________ gpm

______ Initials

C. RCP Loop 3 **[FI-62-27A]** __________ gpm or

F0702A __________ gpm

______ Initials

D. RCP Loop 4 **[FI-62-40A]** __________ gpm or

F0701A __________ gpm

______ Initials

E. Total Seal Injection Flow Rate = A + B + C + D.

= __________ gpm

______ Initials

______ Checker

Unit 1 Date TODAY

6.2 Centrifugal Charging Pump B-B (Continued)

[7] FIND the point on the figure in Appendix A corresponding to the DP from Step 6.2[4] and Seal Injection Flow from Step 6.2[6]E.

N/A
Initials

Checker

Acceptance Criteria Plotted point for differential pressure versus seal injection flow falls within the "acceptable region" of the figure in Appendix A.

[8] IF the plotted point for differential pressure versus seal injection flow falls outside the "acceptable region" of the figure in Appendix A,
THEN

NOTIFY Unit SRO that LCO 3.5.6 should be entered and

PERFORM Section 6.3.

N/A
Initials

Unit ___1___ Date TODAY

6.3 THROTTLE ADJUSTMENT OF SEAL INJECTION NEEDLE VALVES

NOTE 1 Section 6.3 can be done with [FCV-62-93] in automatic or manual.

NOTE 2 The goal is to have equal seal flow to each RCP and positioning of [FCV-62-89] and [FCV-62-93] to provide optimized control for normal plant operation and transients. An example is [FCV-62-89] throttled approximately 60-70 percent Open, [FCV-62-93] throttled approximately 30-40 percent Open, and Charging to RCS pressure between 130 to 160 psig. Other conditions may also provide acceptable results.

NOTE 3 Opening throttle valves, 62-556 through 559, will result in opening of [FCV-62-89] to maintain seal flow with a decrease in charging header pressure. Closing throttle valves, 62-556 through 559, will result in closing [FCV-62-89] to maintain seal flow with an increase in charging header pressure.

CAUTION **Do not allow seal injection flow to drop below 6 gpm during the following step to prevent seal damage. Maintain pressurizer level within normal operating band.**

NOTE 4 Steps [1] and [2] can be done together.

[1] **ADJUST** RCP seal injection needle valves to achieve approximately the same flow rate at 8 gpm (6 to 10 gpm tolerance) on each RCP loop.

N/A
Initials

Unit 1 Date TODAY

6.3 THROTTLE ADJUSTMENT OF SEAL INJECTION NEEDLE VALVES (Continued)

[2] **MAINTAIN** Pressurizer level and seal injection flow rates at normal operating conditions by adjusting **[FCV-62-93]** and **[FCV-62-89]** as necessary.

NA
Initials

[3] **RECORD** adjustments to the seal injection needle valves.

RCP-SEAL (LOOP NO)	VALVE	ADJUSTMENT (Example - 1/4 , 2, turns etc.)
1	62-556	____ turns OPEN ☐ CLOSED ☐ NA ☐ ✓
2	62-557	____ turns OPEN ☐ CLOSED ☐ NA ☐ ✓
3	62-559	____ turns OPEN ☐ CLOSED ☐ NA ☐ ✓
4	62-558	____ turns OPEN ☐ CLOSED ☐ NA ☐ ✓

N/A
Initials

[4] **PERFORM** section 6.1 or section 6.2 to verify Acceptance Criteria after seal injection needle valve adjustments have been made.

N/A
Initials

Unit 1 Date TODAY

7.0 POST SURVEILLANCE ACTIVITIES

NOTE If difficulty is encountered in automatic pressurizer level control after adequate seal flow is obtained System Engineering should be notified to evaluate cause.

7.1 Restoration

[1] **IF** valves were adjusted, **THEN**
ENSURE that lead seals are installed on the seal injection line needle valves listed below:

	RCP-SEAL (LOOP NO)	VALVE	1ST/IV
A.	1	62-556	N/A /
B.	2	62-557	/
C.	3	62-559	/
D.	4	62-558	V /

[2] **ENSURE** [HIC-62-93A] MCR is in AUTO. Ray Initials Ray IV

7.2 Results

[1] **ENSURE** any LCOs are exited and testing is recorded on Surveillance Task Sheet. Ray Initials

[2] **ENSURE** SRO and UO are aware of completion of testing and test results. Ray Initials

Unit 1 Date TODAY

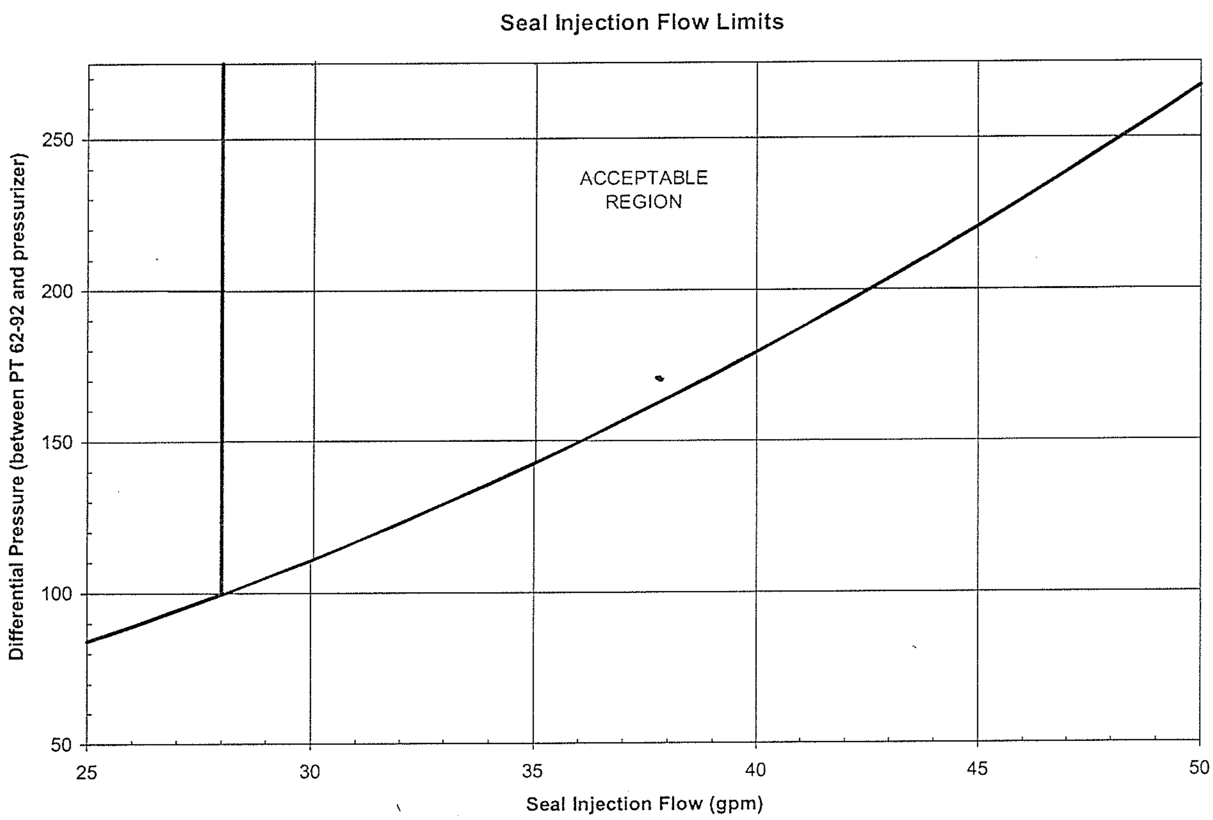
8.0 RECORDS

NOTE Signature and spaces are provided on Surveillance Task Sheet for review/approval of test results. Additional sheets may be added as necessary.

[1] **COMPLETE** applicable sections of Surveillance Task Sheet.

Roy
Initials

APPENDIX A
Page 1 of 1



SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

ADMIN
SRO A.3
JPM

Approval of a
Waste Gas Tank Release

**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		All	
1	Revised to change the initiating cues, and steps for procedure review in the JPM	Y	1/11/10	All	M Hankins

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:

Approval of a Waste Gas Tank Release

JA/TA task:

5030010102 (SRO)
0690150102 (SRO)

K/A Ratings:

2.3.6 (2.0/3.8)
2.3.11 Ability to Approve Release Permits. (CFR: 41.13 / 45.4 / 45.10) 2.0 / 3.8

Task Standard:

Candidate identifies ...
(1) Determine the required actions for RM-90-118 being inoperable.
(2) Review Release package, 0-SI-CEM-077-410.4 for approval.

Valuation 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. Any UNSAT requires comments
2. This task can be performed in a classroom setting.

Validation Time: CR. 20 min **Local** ____________

Tools/Equipment/Procedures Needed:

OPDP-1, Conduct of Operations

References:

	Reference	Title	Rev No.
1.	SQN ODCM	Offsite Dose Calculation Manual	55
2.	0-SI-CEM-077-410.4	Waste Gas Decay Tank Release	15

==

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. This JPM will be performed in a classroom. I will provide the initiating cues. 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:

- The operating crew is preparing to release the Waste Gas Decay Tank 'C' at 1900 today.
- Release can not be rescheduled.
- 0-RM-90-118A, Waste Gas Radiation Monitor, is inoperable.
- Release path is Unit 2 Shield Building Vent
- The monthly projected offsite dose limits have not been exceeded.
- 0-SI-CEM-077-410.4 has been complete through Section 6.2 –Pre-Release Instructions- Chemistry, for release of Waste Gas Decay Tank C.

INITIATING CUES:

You are the Unit 1 US and are to:

1. Determine any required actions (TS, TRM, and/or ODCM) for 0-RM-90-118 being inoperable during a Waste Gas Decay Tank Release.

2. Review release package, 0-SI-CEM-077-410.4, *and* complete all applicable steps in Section 6.3 for approval of WGDT C release.

STEP/STANDARD	SAT/UNSAT
STEP 1.: Operator reviews TS, TRM and ODCM for requirements for making a Waste Gas Tank Release with 0-RM-90-118 inoperable. STANDARD: SRO addresses requirements for release of WGDT with RM-90-118 inoperable. ODCM 1.1.2 Action 40 *Release with the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, the contents of the tank(s) may be released to the environment provided that prior to initiating the release:* a. ***At least two independent samples of the tank's contents obtained by two technically qualified members of the facility staff are analyzed,*** ***and*** *b.* ***At least two technically qualified members of the Facility Staff independently verify the release rate calculations*** ***and;*** ***c. At least two technically qualified members of the Facility Staff independently verify the discharge valve lineup.*** ***Otherwise, suspend release of radioactive effluents via this pathway.***	Start Time____ ___ SAT ___ UNSAT **Critical Step**
STEP 2.: US/SRO reviews release package for approval: STANDARD: US reviews release package for WGDT C and identifies two conditions that prevent the package from being approved: 1- US Identifies that chemistry did not complete the Section 6.2, Step [2] to meet the ODCM requirements for chemistry to obtain two independent samples and independently analyze these samples. 2. US identified that data recorded in Section 6.2, step [11] for Total Body Dose Rate (mrem/yr) did not meet the acceptance criteria.	___ SAT ___ UNSAT **Critical Step** ________ **Stop Time**

END OF JPM

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. This JPM will be performed in a classroom. I will provide the initiating cues. 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:

- The operating crew is preparing to release the Waste Gas Decay Tank 'C' at 1900 today.
- Release can not be rescheduled.
- 0-RM-90-118A, Waste Gas Radiation Monitor, is inoperable.
- Release path is Unit 2 Shield Building Vent
- The monthly projected offsite dose limits have not been exceeded.
- 0-SI-CEM-077-410.4 has been complete through Section 6.2 –Pre-Release Instructions- Chemistry, for release of Waste Gas Decay Tank C.

INITIATING CUES:

You are the Unit 1 US and are to:

1. Determine any required actions (TS, TRM, and/or ODCM) for 0-RM-90-118 being inoperable during a Waste Gas Decay Tank Release.

2. Review release package, 0-SI-CEM-077-410.4, *and* complete all applicable steps in Section 6.3 for approval of WGDT C release.

Attachment 2
(Page 1 of 1)

SPP-8.1-2 - Chronological Test Log (CTL)

CHRONOLOGICAL TEST LOG (CTL)

Data Package Page 1 of ____

Procedure No. 0-SI-CEM-030-410.1 Rev. 15

Date[3]/Time[1]	Narrative	Initials
TODAY No.!	Begin performance of	
	0-SI-CEM-077-410.4 to release	
	WGDT C	Cly

Log entries have been reviewed and items are appropriately addressed.

____________________ Test Director[2] ____________ Date

[1]Use 24 hour clock for each entry.
[2]Test Director signature only required on last sheet of CTL. The other review blanks can be marked N/A.
[3] The Date column needs to be filled in for the first entry on the CTL and for the first entry after each date change.

TVA

Sequoyah Nuclear Plant

Unit 0

Surveillance Instruction

0-SI-CEM-077-410.4

Waste Gas Decay Tank Release

Revision 0015

Quality Related

Level of Use: Reference Use

Effective Date: 09-03-2009

Responsible Organization: CEM, Chemistry

Prepared By: W. Kenneth Kimsey

Approved By: Diedre B. Nida

Revision Log

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
0014	12/19/2007	pages 14, 19, 42	Added tracking mechanism for tracking setpoint changes. PER 134683.
0015	09/03/2009	pages 6 and 10.	Updated sampling reference.

Table of Contents

Table of Contents (continued)

1.0 INTRODUCTION

1.1 Purpose

This Instruction provides detailed steps to document the radiochemical analyses required by the Sequoyah Offsite Dose Calculation Manual (ODCM) for release of Waste Gas Decay Tanks (WGDTs) contents. WGDTs are common equipment.

1.2 Scope

1.2.1 Tests to be Performed

The following activities are performed in connection with the release of Waste Gas Decay Tank contents.

A. Verification of the noble gas dose rate from the Shield Building exhaust due to WGDT releases.

B. Determination of the radiation monitor response prior to each release.

C. Verification that the effluent flow rate measuring device is operable during the release of waste gas.

D. Verification of radioactive gaseous effluent monitoring.

1.2.2 Requirements Fulfilled

Performance of this Instruction partially fulfills Offsite Dose Calculation Manual (ODCM) Surveillance Requirements (SR's).

Surveillance Requirements	Applicable Modes	Performance Modes
ODCM p. 2.2.2.1.1, Table 2.2-2, Item A	All	All
ODCM p. 2.1.2.1.a, Table 1.1-2, Item 1.a	All	All
ODCM p. 2.1.2.1.b, Table 1.1-2, Item 1.b	All	All
ODCM p. 2.2.2.2.	All	All
ODCM p. 2.2.2.4.	All	All
ODCM p. Control 1.1.2, Table 1.1-2, Action 40	All	All

1.3 Frequency and Conditions

This Instruction is performed in any mode when a release is required from the WGDT. Verification of the flow rate monitor (0-FE-77-230) is required once per four (4) hours when waste gas is being released.

2.0 REFERENCES

2.1 Performance References

A. 0-SO-77-15, Waste Gas Decay Tank Release

B. SPP-8.1, Conduct of Testing.

C. 0-TI-CEM-260-011.21, Chemical Analytical Methods - Gas Analysis

D. 0-TI-CEM-000-016.40, Primary Sampling - Waste Gas

E. 0-TI-CEM-030-030.0, Manual Calculation of Plant Gas, Iodine and Particulate Release Rates for Offsite Dose Calculation Manual (ODCM) Compliance

2.2 Developmental References

A. TI-18, Radiation Monitoring

B. Sequoyah Nuclear Plant Offsite Dose Calculation Manual (ODCM)

C. PT-476 (2-18-80), Preoperational Test of FE-77-230

D. TVA Drawing 47W560-16

E. PER SQP890667 and 930807

3.0 PRECAUTIONS AND LIMITATIONS

A. If the monthly projected offsite dose limits have been exceeded, the release cannot be made unless the waste gas decay tank has been held a minimum of 60 days for radioactive decay. The Cognizant Chemist should be contacted for any monthly projected offsite dose limits.

B. The setpoint for the shield building radiation monitors (RM-90-400) can **NOT** be changed without a change to the ODCM.

4.0 PREREQUISITE ACTIONS

NOTE

During the performance of this Instruction, any IF-THEN statement may be marked N/A when the corresponding stated condition does NOT occur.

4.1 Preliminary Actions

NOTE

Sampling of the Waste Gas Decay Tanks can be performed prior to Radiation Monitor checks as long as a second independent sample is collected and analyzed if 0-RM-90-118 is inoperable.

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

[2] **RECORD** the start date and time on the Surveillance Task Sheet. ☑

[3] **COMPLETE** the Test Performers block on the Surveillance Task Sheet. ☑

[4] **INITIATE** SPP-8.1 Chronological Test Log. ☑

[5] **TRANSMIT** the release package to the main control room for radiation monitor checks. ☑

4.2 Approvals and Notifications

None

5.0 ACCEPTANCE CRITERIA

Acceptance criteria are based on administrative limits related to the site release limit and the design flow rate of each release pathway. Regulatory limits will **NOT** be exceeded until a site evaluation is complete. Acceptance criteria are noted where comparison with test data is made.

6.0 PERFORMANCE

NOTE

US/SRO is defined as a Unit Supervisor who is also Senior Reactor Operator qualified.

6.1 Pre-Release Instructions - Operations

[1] **RECORD** Waste Gas Decay Tank (WGDT) being released.

C
WGDT

[2] **OBTAIN** approval of the US/SRO for radiation monitor checks.

Srof / TODAY / NOW
US/SRO / Date / Time

6.1 Pre-Release Instructions - Operations (continued)

[3] IF [0-RM-90-118] is operable, THEN

PERFORM source check response, and

COMPLETE the following table.

Background Response (cpm)	Source Check Response (cpm)	Monitor Setpoint (cpm)	Operable? Yes/No	Initials
N/A	N/A	N/A	NO	Roy

Acceptance Criteria: Source Check Response > Background.

NOTE
For the purposes of this Instruction, if the flow instrumentation for the shield building is INOPERABLE, then the monitor is considered NOT OPERABLE, and a background of "0" is used for permitting the release.

[4] **IF** [RE-90-400] is operable for unit that will receive flow, **THEN**

COMPLETE the following table:

Unit	Background (µCi/sec)	Monitor Setpoint (µCi/sec)	Initials
2	8.1 E-2	23,400	Roy

[5] **TRANSMIT** release permit to Chemistry Laboratory. Roy

6.2 Pre-Release Instructions - Chemistry

[1] **ENSURE** that radwaste operator has aligned the applicable WGDT to the waste gas analyzer. ☐

NOTES

1) Second sample signoff in the following step should be marked N/A if 0-RM-90-118 is OPERABLE. If 0-RM-90-118 is NOT OPERABLE, a second sample must be independently collected and analyzed.

2) All noble gas samples must be analyzed within one hour of sample collection. Otherwise, another sample must be collected.

[2] **SAMPLE** applicable WGDT in accordance with 0-TI-CEM-000-016.40 and

COMPLETE the following table.

Sample	Sample Time	Analysis Time	Analyst
First	TODAY 1215	TODAY 1230	CLY
Second	N/A		

6.2 Pre-Release Instructions - Chemistry (continued)

[3] **IF** Waste Gas Analyzer is OPERABLE, **THEN**

RECORD oxygen and hydrogen concentrations from Waste Gas Analyzer in the table below Step 6.2[4] and **N/A** grab sample analyses data blanks.

[4] **IF** Waste Gas Analyzer is NOT OPERABLE, **THEN**

RECORD Grab Sample analysis data in table below, and N/A

N/A Waste Gas Analyzer data blanks.

Item	Waste Gas Analyzer Data (%)	Grab Sample Analyses Data (%)	Initials
Oxygen Concentration	0.53	N/A	Cly
Hydrogen Concentration	0.01	↓	Cly

[5] **RECORD** tank pressure of WGDT to be released in the following table, and

N/A all remaining blanks.

WGDT Number	Indicator Number	Pressure (psig)
A	0-PIS-77-115	N/A
B	0-PIS-77-114	↓
C	0-PIS-77-113	64
D	0-PIS-77-100	N/A
E	0-PIS-77-101	↓

WGDT Number	Indicator Number	Pressure (psig)
F	0-PIS-77-102	N/A
G	0-PIS-77-145	↓
H	0-PIS-77-146	↓
J	0-PIS-77-147	↓

6.2 Pre-Release Instructions - Chemistry (continued)

[6] **IF** hydrogen concentration is greater than 40 percent, **OR**

IF oxygen concentration is greater than 5 percent, **THEN**

PERFORM either Step 6.2[6.1] or 6.2[6.2] as appropriate.

[6.1] **REQUEST** Operations to dilute tank prior to release, and

WHEN notified of completion of tank dilution, **THEN**

GO TO Step 6.2[1], **OR**

[6.2] **OBTAIN** support for release rate calculations from System Engineering and/or Cognizant Chemist, and

RECORD the support provided in the "Remarks" section of Surveillance Task Sheet. ☐ N/A

[7] **INFORM** Operations of completion of sampling so they can realign the appropriate WGDT. ☐ ✓

NOTES
1) If two samples were required, the analysis results associated with the higher noble gas concentration should be used for further release permit processing.
2) The EMS release rate setpoint calculations for 1,2-RM-90-400 are labeled as µCi/s rather than cpm.

[8] **ANALYZE** the sample(s) collected above, within one hour, in accordance with Appendix C for principal gamma emitters (noble gas). ☐ ✓

[9] **PROCESS** release permit in accordance with Appendix E, and

ENSURE the expected release rate (RM-90-400 from Page 1 of the special report) is less than 23,400 µCi/s. ☐ ✓

6.2 Pre-Release Instructions - Chemistry (continued)

[10] **IF** the total body dose rate determined in the last step is greater than 47.8 mrem/yr or the noble gas release rate is >23,400 µCi/s, **THEN**

REPROCESS release at a lower release rate by Step 6.2[9] above (applicable section of Appendix E release processing). N/A

[11] **COMPLETE** the following tables using results from analysis performed above.

Dose Rates	Data	Acceptance Criteria	Initials
Total body dose rate (mrem/yr):	19.4 E+1	≤ 4.78E+01	Cly
Skin dose rate (mrem/yr):	4.59 E-4	≤ 2.87E+02	Cly

Parameter	Data	Acceptance Criteria	Initials
0-RM-90-118 setpoint (cpm)	NA	≤ 1.88E+03(3)	Cly / Cly
1,2 RE-90-400 Expected Response (µCi/sec)	0.17617	≤ 2.34E+04(2)	Cly / Cly
Maximum allowable release rate from Appendix D analysis (CFM)	50	≤ 57(1)	Cly / Cly

(1) Maximum release flow rate that flow instrumentation can measure.

(2) This value is based on ODCM Rev. 45 which is 9.55% of the release rate limit for Xe-133 at 500 mRem/y and can NOT be changed without a change to the ODCM (this value is equivalent to ~1.73E-03 µCi/cc).

(3) This is a default setpoint defined in the ODCM. Temporary changes can be made up to ≤ 32,526 CPM (the ODCM Limit).

6.2 Pre-Release Instructions - Chemistry (continued)

[12] **IF** the setpoint for 0-RM-90-118 in step 6.2[11] is greater than step 6.1[3], **THEN** **UPDATE** the CDAS CHEM5 setpoint screen in accordance with Appendix H. ☐ N/A

NOTE

Appendix A is based on the setpoint of PCV-77-117 (2.0 psig) and a temperature of 80°F.

[13] **DETERMINE** the expected pressure drop across flow orifice **[0-FE-77-230]** using Appendix A, the maximum allowable release rate from Step 6.2[11] above and hydrogen concentration from Steps 6.2[3] or 6.2[4].

720 / Cly

inches of H_2O / Performer

[14] **RECORD** release number and the allowable pressure drop across flow orifice **[0-FE-77-230]** as the smaller of Step 6.2[13] or the administrative limit of ≤14 inches of water on Appendix B. ☑

[15] **IF** **[0-RE-90-118]** is **INOPERABLE**, **THEN**

OBTAIN independent verification of Steps 6.2[13] and 6.2[14] above.

≤14 / Cly / TODAY / NOW

inches of H_2O / Ind. Verifier / Date / Time

6.2 Pre-Release Instructions - Chemistry (continued)

[16] **SIGNOFF** for item A and either item B or item C and

CIRCLE B or C to indicate which one was satisfied. ☐✓

A. Approval of pre-release data generated by this Instruction.

Cly / TODAY / NOW
Performer / Date / Time

B. Verification that monthly projected offsite dose limits (ODCM SR 2.2.2.4) have **NOT** been exceeded, based on most recent performance of SI-422.1, **OR**

C. Verification, with Operations support, that selected WGDT has been held a minimum of 60 days and all applicable requirements have been met.

Cly / TODAY / NOW
Performer / Date / Time

[17] **TRANSMIT** release package to Operations with authorization to release. ☐✓

6.3 Release Instructions - Operations

[1] **REVIEW** Steps 6.1[3] and 6.1[4] and Steps 6.2[11] monitor data. ______

[2] **IF** radiation monitor 0-RM-90-118 setpoint change is required, (when setpoint in Step 6.2[11] is greater than the setpoint in Steps 6.1[3]), **THEN**

REQUEST a setpoint change. ______

6.3 Release Instructions - Operations (continued)

[3] **IF** a release is to be made outside of normal release hours (0900 - 1600), **THEN**

OBTAIN US/SRO justification and initials in remarks section of Surveillance Task Sheet. _________

[4] **OBTAIN** US/SRO approval of pre-release data generated by this Instruction and approval for this release.

_________ / _________ / _________
US/SRO Date Time

[5] **INITIATE** release of selected WGDT contents in accordance with 0-SO-77-15 at or below the flow rate (i.e., pressure drop) recorded on Appendix B, and

RECORD release start time and information requested in the table in Appendix B for release initiation and at one-half hour intervals. _________

NOTE
OPERABLE status of 0-FE-77-230 can be determined by noting deflection of indicator.

[6] **IF** **[0-FE-77-230]** is INOPERABLE at initiation of release, **THEN**

GO TO Step 6.3[8]. _________

[7] **IF** **[0-FE-77-230]** becomes INOPERABLE during release, **THEN**

PERFORM the following substeps:

[7.1] **STOP** release. _________

[7.2] **NOTIFY** US/SRO. _________

6.3 Release Instructions - Operations (continued)

[8] **IF** release is to continue with [0-FE-77-230] INOPERABLE, **THEN**

PERFORM the following substeps.

[8.1] **ENSURE** that a test gauge (0 - 20 inches of H_2O suggested) is installed across [0-FE-77-230]. _______

[8.2] **ENSURE** serial number, range and calibration due date of test gauge along with installing Instrument Mechanic's initials are recorded in remarks section of Appendix B. _______

[8.3] **ENSURE** pressure readings from test gauge are recorded in place of [0-FE-77-230] readings on Appendix B. _______

[9] **IF** [0-RM-90-118] or [RM-90-400] alarms, **THEN**

NOTIFY On-shift Chemistry Personnel who will contact the Cognizant Chemist/System Engg. for further guidance in processing tank contents. _______

[10] **WHEN** release is complete or stopped, **THEN**

RECORD the following on Appendix B. _______

[10.1] Release stop time ☐

[10.2] WGDT psig ☐

[10.3] Initials ☐

[11] **IF** radiation monitor setpoint changes were made (Step 6.3[2]), **THEN**

RETURN the radiation monitors to their initial setpoints. _______

[12] **NOTIFY** the US/SRO and On-shift Chemistry Personnel that this release is complete.

[13] **REVIEW** 0-SO-77-15. _______

[14] **ATTACH** 0-SO-77-15 to this release package. _______

[15] **TRANSMIT** the release package to the Chemistry Laboratory for post release evaluation. _______

7.0 POST PERFORMANCE ACTIVITY-CHEMISTRY

[1] **CLOSE** the permit, and

DETERMINE the release total body and skin dose rates during the WGDT release according to Appendix F. ☐

[2] **COMPLETE** the following table. ☐

Dose Rate (mrem/yr)	Data	Acceptance Criteria	Initials
Total Body Dose Rate		< 4.78 E+01	
Skin Dose Rate		< 2.87 E+02	

[3] **IF** any Acceptance Criteria were NOT met, **THEN**

PERFORM the following actions. ☐

[3.1] **REVERIFY** and **REANALYZE** sample. ☐

[3.2] **RESAMPLE** and **REANALYZE**. ☐

[3.3] **REVIEW** of Operations logs, System Operating Instructions, etc. ☐

[3.4] **EVALUATE** all release pathways to determine if a violation of offsite dose criteria has occurred. ☐

[4] **IF** the investigation above does NOT resolve the failure to meet the Acceptance Criteria, **THEN**

INITIATE an evaluation in accordance with 0-TI-CEM-030-030.0, and

NOTIFY the SM immediately of the results of the above evaluation. ☐

[5] **COMPLETE** the SPP-8.1 Chronological Test Log. ☐

[6] **ENSURE** all records, evaluations, analyses, calculations, and the SPP-8.1 Chronological Test Logs are attached to this data package. ☐

7.0 POST PERFORMANCE ACTIVITY-CHEMISTRY (continued)

[7] **RECORD** the completion date and time on the Surveillance Task Sheet. ☐

[8] **COMPLETE** the Test Performers block on the Surveillance Task Sheet, if not already done. ☐

[9] **IF** the CDAS CHEM5 screen was changed in Step 6.2[12],
THEN
RETURN it to initial setpoint in accordance with Appendix H. ☐

8.0 RECORDS

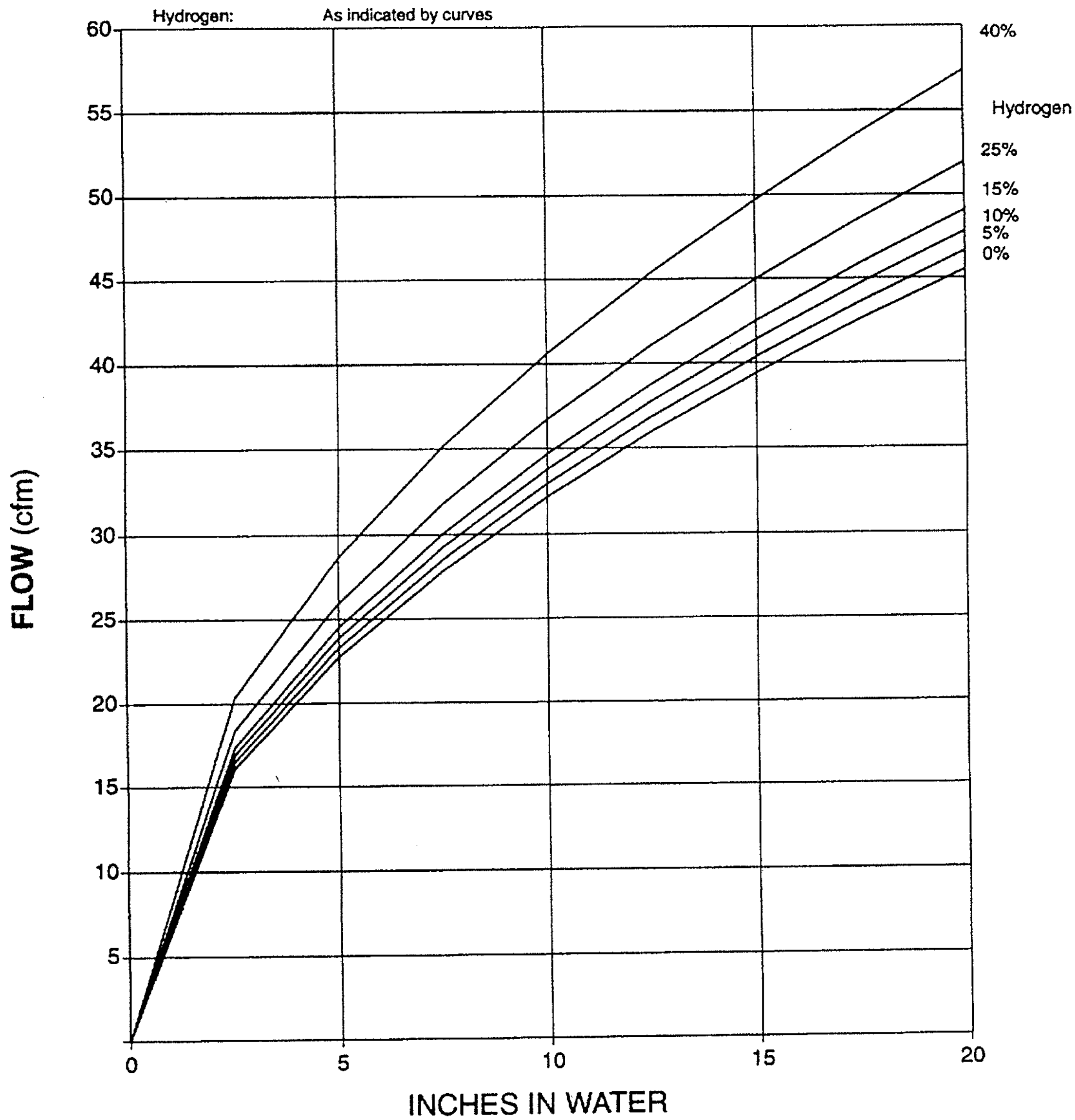
The completed SI package is a QA document controlled in accordance with SPP-2.4.

Appendix A
(Page 1 of 1)

Correction Curve

Expected Pressure Drop Across 0–FE–77–230[1]

Hydrogen: As indicated by curves
Oxygen: 0–5% (By Volume)
Balance: Nitrogen



Based on 2.0 psig and 80°F.

Appendix B
(Page 1 of 1)

Release Data

Release Number:	2010012.037.001.G	Unit:	2	Date:	TODAY

Release Start Time:		Release Stop Time:		Tank ID:	

Pressure drop limit across 0-FE-77-230 ≤14 inches of H2O	Admin. pressure drop limit. ≤ 14.0 inches of H_2O				
Parameter	**Data**				
Time:					
Countrate for 0-RM-90-118, (cpm):					
RM-90-400 response, (µCi/sec or µCi/cc)(2)					
Shield Building exhaust flow rate, (cfm)(1)					
Pressure drop across 0-FE-77-230 or IM's test gauge, (inches of H_20)					
Waste Gas Decay Tank pressure, (psig)					
Operator in charge of release, (initials)					

Remarks:

(1) Actual flow rate for applicable Shield Building vent (Computer point 1, 2Y2210A for applicable Unit). If flow measuring instrumentation is NOT OPERABLE, total design flow rate of fans in operation is used (for example, ABGTS design flow rate is 9000 cfm).

(2) If flow indicator is NOT OPERABLE, record µCi/cc vs µCi/sec.

Appendix C
(Page 1 of 1)

Sample Requirements

1.0 SAMPLE REQUIREMENTS

NOTE

Noble gas samples must be counted within 60 minutes from sample collection for 2000 seconds in order to meet ODCM LLDs. If > 60 minutes has elapsed from collection time, collect another sample.

1.1 COUNTING ANALYSIS

[1] **COUNT** the sample by following the CAS SAMPLE PROCESSING MENU. ☐

NOTE

REFER TO Appendix D of this instruction for Gaseous Release Permit Processing.

[2] **PERFORM** Appendix E. ☐

Appendix D
(Page 1 of 5)

Gaseous Release Permit Processing

1.0 DEFINITIONS

1.1 Effluent Management System (EMS) - Introduction to Gaseous Permits

The gaseous effluent permit definition form is used to input defining data for a new permit and to edit data for a permit already in the database. To move around in the screen, use the following keys:

TAB key:	Moves the cursor forward through the screen. No data is changed when using TAB.
CTRL P:	The CRTL key is held down and the "P" key is pressed to move the cursor backward through the screen. No data is changed.
RETURN key:	Terminates an input. This key will blank, or zero, a data field.
PF1 key:	Moves the cursor to the command line at the bottom of the screen. Repeated pressing of this key at the command line will expose any other commands, if available. This key is also used to call data onto the screen from some menus.
PF3 key:	Used to return to the previous screen, or to a previous sub-section. Also known as the END key.
PF4 key:	Exits from the EMS software. Also known as the QUIT key.

In addition to the above keys, all function keys listed on the command line at the bottom of the screen have a code in parentheses that corresponds to the key with that label. To perform the stated command, press the key enclosed in parentheses. The function can also be performed by typing the command name with the cursor located on the command line. Commands associated with the gaseous effluent permit definition screen include:

HELP:	Provides assistance or additional information.
PERMITS:	Provides a list of existing permit entry numbers.
SAMPLES	Displays a list of samples in the database.
FILL:	Allows the computer to calculate blank data fields.
SAVE:	Inscribes data in the database. Use after entering or altering data on the Permit Definition Form and before using the PROCESS command.
PROCESS:	Sends data entered on the Permit Definition Form to the system for calculation of setpoints and doses.

Appendix D
(Page 2 of 5)

Gaseous Release Permit Processing

1.1 Effluent Management System (EMS) - Introduction to Gaseous Permits (continued)

The concentrations table is used to review nuclides and concentrations in a given sample, or to edit the nuclides and concentrations in a given sample. Commands associated with the concentration table include:

HELP:	Provides assistance or additional information.
COMPOSITES:	Reads in current monthly/quarterly composite nuclide data for a specific release point.
VMS-GSP:	Reads in gamma nuclide data from a specific release sample.
SAVE:	Used after editing nuclide and concentration data.
DELETE:	Used to delete sample nuclide data.

The results form displays the values resulting from the system's calculations of dose rates and doses, and indicates whether these values have exceeded the applicable limits. This form also displays the set-points for radiation monitors. Commands associated with the results form include:

HELP:	Provides assistance or additional information.
OPEN:	Places the permit in an "open" status so pre-release reports can be generated.
CLOSE:	Ends the permit processing after the release is complete and the permit is updated with real release data.
DELETE:	Deletes dose and activity data for a release permit from the database.
REPORT:	Provides printouts of pre-release and post-release data.

Appendix D
(Page 3 of 5)

Gaseous Release Permit Processing

1.2 Gaseous Release Permit Numbers

Gaseous release permit numbers are assigned for each release and are formatted as follows:

YYYYSSS.RRR.sss.T

where:	YYYY	=	the current year
	SSS	=	the sequential number of releases from the plant
	RRR	=	the release point number
	sss	=	the sequential number of releases from release point number
	T	=	A character, either "L" or "G", indicating that the release is either a gas or liquid release

EXAMPLE
2000001.027.001.G

In the example above, the release is the first liquid release of 2000 both from the plant and from Release Point Number 27.

Release Permit Numbers are assigned automatically by the Effluent Management System (EMS) when a permit is defined.

Appendix D
(Page 4 of 5)

Gaseous Release Permit Processing

1.2 Gaseous Release Permit Numbers (continued)

NOTE

The short form of the SI number appears in EMS.

FOLLOWING IS A LISTING OF GASEOUS RELEASE POINT NUMBERS:

23	MISCELLANEOUS UNDEFINED GAS
24	U1 CVE 119(99) NG (0-SI-CEM-030-415.0)
25	U2 CVE 119(99) NG (0-SI-CEM-030-415.0)
26	U1 INCORE INST RM PG 0-SI-CEM-030-410.3
27	U1 CONTAINMENT VENT 0-SI-CEM-030-410.1
28	U1 CONTAINMENT PURGE 0-SI-CEM-030-410.2
29	U2 CONTAINMENT PURGE 0-SI-CEM-030-410.2
30	U2 INCORE INST RM PG 0-SI-CEM-030-410.3
31	U2 CONTAINMENT VENT 0-SI-CEM-030-410.1
32	U1 WGDT A (0-SI-CEM-077-410.4)
33	U2 WGDT A (0-SI-CEM-077-410.4)
34	U1 WGDT B (0-SI-CEM-077-410.4)
35	U2 WGDT B (0-SI-CEM-077-410.4)
36	U1 WGDT C (0-SI-CEM-077-410.4)
37	U2 WGDT C (0-SI-CEM-077-410.4)
38	U1 WGDT D (0-SI-CEM-077-410.4)
39	U2 WGDT D (0-SI-CEM-077-410.4)
40	U1 WGDT E (0-SI-CEM-077-410.4)
41	U2 WGDT E (0-SI-CEM-077-410.4)
42	U1 WGDT F (0-SI-CEM-077-410.4)
43	U2 WGDT F (0-SI-CEM-077-410.4)
44	U1 WGDT G (0-SI-CEM-077-410.4)
45	U2 WGDT G (0-SI-CEM-077-410.4)
46	U1 WGDT H (0-SI-CEM-077-410.4)
47	U2 WGDT H (0-SI-CEM-077-410.4)
48	U1 WGDT J (0-SI-CEM-077-410.4)
49	U2 WGDT J (0-SI-CEM-077-410.4)
50	ABGTS U1 DISCHARGE (0-SI-CEM-030-415.0)
51	U1 EGTS (0-SI-CEM-030-415.0)
52	U2 EGTS (0-SI-CEM-030-415.0)
53	AUX. BLDG. EXH. NG (0-SI-CEM-030-415.0)
54	SERVICE BLDG EXHAUST NG (0-SI-CEM-030-415.0)

Appendix D
(Page 5 of 5)

Gaseous Release Permit Processing

1.2 Gaseous Release Permit Numbers (continued)

55	ABGTS U2 DISCHARGE (0-SI-CEM-030-415-0.)
56	U1 CVE 119(99) P/I (0-SI-CEM-030-407.2)
57	U2 CVE 119(99) P/I (0-SI-CEM-030-407.2)
58	U1 SHIELD BLDG VENT NG (0-SI-CEM-030-415.0)
59	U2 SHIELD BLDG VENT NG (0-SI-CEM-030-415.0)
62	AUX BLDG EXHAUST P/I (0-SI-CEM-030-407.2)
63	U1 SHLD BLDG EXH P/I (0-SI-CEM-030-407.2)
64	U2 SHLD BLDG EXH P/I (0-SI-CEM-030-407.2)
65	SERVICE BLDG EXHAUST P/I (0-SI-CEM-030-407.2)
66	U1 CVE 119(99) H-3 (0-SI-CEM-030-415.0)
67	U2 CVE 119(99) H-3 (0-SI-CEM-030-415.0)
68	AUX BLDG EXHAUST H-3 (0-SI-CEM-030-415.0)
69	U1 SHLD BLDG EXH H-3 (0-SI-CEM-030-415.0)
70	U2 SHLD BLDG EXH H-3 (0-SI-CEM-030-415.0)
71	SERVICE BLDG EXH H-3 (0-SI-CEM-030-415.0)

Appendix E
(Page 1 of 7)

Opening Permits

1.0 PROCESSING WASTE GAS DECAY TANK FOR RELEASE

[1] **REVIEW** the gamma isotopic analysis results for correctness. ☐

[2] **CORRECT** any errors prior to processing. ☐

[3] **WHEN** all of the data has been verified, **THEN**

LOG ON a CAS computer terminal (if **NOT** already logged on). ☐

[4] **SELECT** the item on the Main Menu associated with "Effluent Management", and

PRESS "Return". ☐

[5] **SELECT** "Process Gaseous Permit" option from the Effluent Management Menu, and

PRESS "Return". ☐

NOTE
In the following step, if a "?" is entered at the "Enter Release Point Number:" prompt, a list of gaseous release point numbers will appear.

[6] **ENTER** the appropriate release point number at the prompt "Enter Release Point Number:", and

PRESS "Return". ☐

NOTE
The terminal will indicate that three samples may be required; however only one is required for a WGDT release.

[7] **PRESS** the Return key three times. ☐

Appendix E
(Page 2 of 7)

Opening Permits

1.0 PROCESSING WASTE GAS DECAY TANK FOR RELEASE (continued)

[8] **ENTER** the noble gas sample number, and

PRESS "Return". ☐ ✓

[9] **SELECT** the "Define and Open a New Gaseous Permit" option from the menu. ☐ ✓

Appendix E
(Page 3 of 7)

Opening Permits

1.0 PROCESSING WASTE GAS DECAY TANK FOR RELEASE (continued)

NOTE

Information on the last permit for this release point will be displayed, and the system will ask if you want to define and open a permit.

[10] **TYPE** "Y" for Yes, and

PRESS "Return". ☐

NOTE

In the following step, the estimated start time can be obtained from Operations, past experience, etc. Examples: 23-May-99 13:00, 5/23/99 13:00.

[11] **ENTER** the estimated start time at the "Release Start" field, and

PRESS "Return". ☐

[12] **TAB** through the "Release End" field. ☐

[13] **ENTER** the estimated release flow rate (routinely 50 CFM), and

PRESS "Return". ☐

[14] **PRESS** "Return" at the "Release Volume" field to zero the field. ☐

Appendix E
(Page 4 of 7)

Opening Permits

1.0 PROCESSING WASTE GAS DECAY TANK FOR RELEASE (continued)

> **NOTE**
>
> The following pressure may change prior to release; however, it is only being used to estimate pre-release offsite dose.

[15] **OBTAIN** the initial pressure information from Operations, and **ENTER** the value in the "Initial Pressure" field. ☐

[16] **PRESS** "Return". ☐

> **NOTE**
>
> Based on the design of the Waste Gas Analysis System the following final pressure value should never be zero; however, this value is being used to estimate the maximum activity released and maximum offsite dose.

[17] **PRESS** "Return" to zero the "Final Pressure" field. ☐

[18] **ENTER** the appropriate initials in the "Collected By" field, and **PRESS** "Return". ☐

[19] **PRESS** the "Fill" command to update the screen. ☐

[20] **VERIFY** all data is correct. ☐

[21] **MAKE** any required changes. ☐

[22] **PRESS** the "Save" command key. ☐

[23] **PRESS** the "Process (Do)" command. ☐

Appendix E
(Page 5 of 7)

Opening Permits

1.0 PROCESSING WASTE GAS DECAY TANK FOR RELEASE (continued)

NOTE

The "Sample Entry/Concentrations" screen will appear. After the following step, a message will appear that says the particulate and iodine sample configurations could NOT be opened. This message can be ignored.

[24] **PRESS** the "VMS-GSP" command to read the spectral data information from the sample counted for this release. ☐

[25] **VERIFY** all nuclides and concentration values against the printed gamma spec summary report(s). ☐

NOTE

If the radiation monitor is NOT OPERABLE and the permit is being opened using the sample with the highest Noble Gas Concentration, the file may still need to be edited. The pre-release file should reflect all identified isotopes, excluding natural products, and the highest concentration between the two samples.

[26] **IF** the radiation monitor **[0-RM-90-118]** is NOT OPERABLE, **THEN**

COMPARE all non-natural nuclides and concentration values against the printed gamma spec summary report and/or corrected results for both samples and

EDIT in accordance with Appendix G. ☐

[27] **IF** natural occurring nuclides are present, **THEN**

EDIT in accordance with Appendix G. ☐

Appendix E
(Page 6 of 7)

Opening Permits

1.0 PROCESSING WASTE GAS DECAY TANK FOR RELEASE (continued)

[28] **IF** the concentration for a nuclide or a nuclide is to be added, removed or edited, **THEN**

EDIT in accordance with Appendix G. ☐

[29] **SELECT** the "Process (Do)". ☐

[30] **ENTER** the **[0-RM-90-118]** monitor's background as determined by Operations, and

PRESS "Return". ☐

[31] **PRESS** the "Process (Do)" key. ☐

[32] **ENTER** the background for **[RM-90-400]** as determined by Operations, and

PRESS "Return". ☐

[33] **PRESS** the "Process (Do)" key. ☐

[34] **REVIEW** all data on the results screen, and

ENSURE no limits are exceeded. ☐

[35] **IF** no limits are exceeded, **THEN**

PRESS the "Process (Do)" key to open the permit. ☐

NOTE
If limits are exceeded, the release will have to be reprocessed utilizing a lower flow rate.

[36] **IF** limits are exceeded and all input data is correct, **THEN**

CONTACT the Cognizant Chemist or Designee before proceeding. N☐/A

Appendix E
(Page 7 of 7)

Opening Permits

1.0 PROCESSING WASTE GAS DECAY TANK FOR RELEASE (continued)

[37] **AFFIRM** that a permit is to be opened. ☐

[38] **PRESS** the "Report" command. ☐

[39] **PRESS** "Return" to obtain a default number of copies, **OR**

IF needed, **THEN**

INPUT more copies, and

PRESS "Return". ☐

[40] **WAIT** for reports to print out, **THEN**

PRESS the PF4 key to exit EMS. ☐

[41] **REVIEW** the pre-release report. ☐

[42] **IF** the data is correct, **THEN**

SIGN, **ATTACH** , and **LOG** applicable data in the SI package. ☐

Appendix F
(Page 1 of 4)

Closing Permits

1.0 POST- ANALYSIS

[1] **VERIFY** the information in 0-SI-CEM-077-410.4 is complete on the returned release package. ☐

[2] **LOG ON** the CAS computer (if **NOT** already logged on). ☐

[3] **SELECT** the item associated with "Effluent Management", and

PRESS "Return". ☐

[4] **SELECT** "Process Gaseous Permit", and

PRESS "Return". ☐

[5] **ENTER** the Release Point Number, and

PRESS "Return". ☐

[6] **PRESS** "Return" four times to move out of the sample number section. ☐

[7] **SELECT** "Close A Gaseous Permit". ☐

[8] **TAB** to move to the "Permit Number" field. ☐

[9] **IF** the Permit Number is correct, **THEN**

PRESS "Process (Do)" key. ☐

[10] **ENTER** the actual start time at the "Release Start" time field, and

PRESS "Return". ☐

NOTE
The Stop Time may have to be adjusted if there were any interruptions during the release.

Appendix F
(Page 2 of 4)

Closing Permits

1.0 POST- ANALYSIS (continued)

[11] **ENTER** the actual stop time in the "Release End" time field, and

PRESS "Return". ☐

[12] **PRESS** "Return" at the "Release Flow Rate" field to zero the field. ☐

[13] **PRESS** "Return" at the "Release Volume" field to zero the field. ☐

[14] **ENTER** the correct initial pressure value in the "Initial Pressure" field, and

PRESS "Return". ☐

[15] **ENTER** the correct final pressure value in the "Final Pressure" field, and

PRESS "Return". ☐

[16] **PRESS** the "Fill" key to update the screen. ☐

[17] **REVIEW** the screen and

VERIFY all data is correct. ☐

[18] **IF** correct, **THEN**

PRESS the "Save" key. ☐

[19] **PRESS** the "Process (Do)" key. ☐

NOTE
The "Sample Entry/Concentrations" screen will appear.

[20] **VERIFY** all nuclides and concentration values are correct. ☐

Appendix F
(Page 3 of 4)

Closing Permits

1.0 POST- ANALYSIS (continued)

NOTES

1) Editing data in the following step requires a password which is available from Chemistry Supervision.

2) In the following step, the SAVE command is only required if the data has been edited.

[21] **IF** the concentration for a nuclide or a nuclide is to be added, removed, or edited, **THEN**

EDIT in accordance with Appendix G. ☐

[22] **SELECT** the "Process (Do)". ☐

[23] **IF** all information is correct and no limits are exceeded **THEN**

PRESS the "Process (Do)" key to close the permit. ☐

[24] **ENTER** "Y", and

PRESS "Return". ☐

[25] **PRESS** the "Report" command. ☐

[26] **PRESS** "Return" to obtain a default number of copies, **OR**

IF needed, **THEN**

INPUT more copies. ☐

[27] **REVIEW** the printout, and

VERIFY the data is correct.

[28] **PRESS** the PF4 key to exit. ☐

Appendix F
(Page 4 of 4)

Closing Permits

1.0 POST- ANALYSIS (continued)

[29] **SIGN** and **ATTACH** the printout to the SI, and

LOG applicable data in the SI. ☐

Appendix G
(Page 1 of 3)

Editing Sample Entry/Concentrations Screen

NOTES

1) The system will read in the gamma spectral data from the sample counted for this release. Editing of the concentration table may be required. Movement within the table is accomplished by using the arrow keys and the "Tab" key.
2) If the radiation monitor is NOT operable and the permit is opened with the highest ECL concentration editing may still be required. The pre-release file should have all identified isotopes included as well as the highest activity of each isotope identified included.
3) Editing data requires a "Return" before saving.
4) When editing data, use applicable password EMS or SEMS.

1.0 ADDITION OF A NUCLIDE AND CONCENTRATION

[1] **IF** a Nuclide and concentration is to be added, **THEN**

PERFORM the following:

[1.1] **PLACE** the cursor below the last nuclide, and

ADD the nuclide to the list. ☐

[1.2] **PRESS** TAB, and

ENTER the concentration, and

PRESS "Return". ☐

[2] **IF** other nuclides need to be added, **THEN**

REPEAT sub-steps 1.0[1.1] and 1.0[1.2]. ☐

[3] **PRESS** "Save" command key (F10). ☐

[4] **ENTER** "Y" at the prompt "Has this been authorized? (Y/N)". ☐

Appendix G
(Page 2 of 3)

Editing Sample Entry/Concentrations Screen

1.0 ADDITION OF A NUCLIDE AND CONCENTRATION (continued)

[5] **ENTER** the appropriate password when prompted, and

PRESS "Return". ☐

2.0 EDITING A NUCLIDE AND CONCENTRATION

[1] **IF** a concentration for a nuclide is to be edited, **THEN**

PERFORM the following:

[1.1] **PLACE** the cursor on the nuclide to be edited. ☐

[1.2] **PRESS** TAB, and

ENTER the concentration, and

PRESS "Return". ☐

[2] **IF** other nuclides need to be edited, **THEN**

REPEAT sub-steps 2.0[1.1] and 2.0[1.2]. ☐

[3] **PRESS** "Save" command key (F10). ☐

[4] **ENTER** "Y" at the prompt "Has this been authorized? (Y/N)". ☐

[5] **ENTER** the appropriate password when prompted, and

PRESS "Return". ☐

3.0 REMOVAL OF A NUCLIDE AND CONCENTRATION

[1] **IF** a nuclide and concentration is to be removed, **THEN**

PERFORM the following:

[1.1] **PLACE** the cursor on the nuclide to be removed. ☐

[1.2] **PRESS** the Remove Key or Delete Key on the keyboard. ☐

Appendix G
(Page 3 of 3)

Editing Sample Entry/Concentrations Screen

3.0 REMOVAL OF A NUCLIDE AND CONCENTRATION (continued)

[1.3] **ENTER** "Y" at the prompt "Has this been authorized? (Y/N)". ☐

[1.4] **PRESS** "Return". ☐

[1.5] **ENTER** "SEMS" when prompted for the password, and

PRESS "Return". ☐

[1.6] **TYPE** "R" and **PRESS** "Return" When prompted by sample or row. ☐

[2] **IF** other nuclides need to be removed, **THEN**

REPEAT Step 3.0[1]. ☐

Appendix H
(Page 1 of 1)

Updating the CDAS Setpoint Screen

1.0 UPDATING THE CDAS SETPOINT SCREEN

NOTE
The common rad monitors are on U1 screen.

[1] **SELECT** the Rad Mon button from U1/U2 CDAS CHEMISTRY MAIN VIEW. ☐

[2] **CHANGE** Security Level to level 7, and

USE CHEMSET as the User name and password. ☐

[3] **SELECT** GASEOUS RAD MON SETPOINTS (CHEM 5) button. ☐

[4] **SELECT** the rad monitor button of the monitor to be changed. ☐

[5] **SELECT** the F2 key to zero the field. ☐

[6] **SET** the cursor to the left of the decimal, and

TYPE in the new setpoint. ☐

NOTE
Under the Date Modified Field the message NOT SAVED will momentarily be displayed then the date will appear.

[7] **SELECT** the F3 key to save the new setpoint. ☐

[8] **SELECT** the F1 Key. ☐

[9] **VERIFY** the as left setpoint. ☐

[10] **SELECT** the Chemistry Rad Mon Menu button. ☐

[11] **SELECT** the Chemistry Main View button (Chem_D1) button. ☐

NESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT
TI-12 APP. B.9 BATCH GASEOUS EFFLUENT PERMIT

2010012.037.001.G
Unit # 1
Allocation 100.%

I. REQUEST:

X NORMAL
UNPLANNED

RELEASE POINT
U2 WGDT C (SI-410.4)

ESTIMATED START:
Today 19:00:00

RELEASE VOLUME (EST.)
2.6122E+03 CF

DISCHARGE POINT
U2 SHIELD BUILDING EXHAUST

ESTIMATED STOP:
Today 19:52:15

II. SAMPLE IDENTIFICATION:

NUMBER
9888

COLLECTION DATE/TIME
Today 00:03:00

ANALYSIS DATE/TIME
Today 00:18:46

Noble Gas File Name : CAS_SAM:S090211001.cnf
Particulate File Name: N/A
Radioiodine File Name: N/A

III. RADIOANALYSIS - GASEOUS:

CUMULATIVE DOSES

PROJ. BETA DOSE(31-DAY)	PROJ. GAMMA DOSE(31-DAY)	PROJ. ORGAN DOSE(31-DAY)
1.57E-04 mrad < 0.40	3.62E-04 mrad < 0.20	3.27E-04 mrem < 0.30
AIR DOSE-BETA(Q)	AIR DOSE-GAMMA(Q)	ORGAN DOSE(Q)
1.06E-04 mrad < 10.00	2.45E-04 mrad < 5.00	2.22E-04 mrem < 7.50
AIR DOSE-BETA(A)	AIR DOSE-GAMMA(A)	ORGAN DOSE(A)
1.06E-04 mrad < 20.00	2.45E-04 mrad < 10.00	2.22E-04 mrem < 15.00

YEARLY DOSE RATES

ALLOC T-BODY DOSE RATE
9.71E-04 mrem/yr < 500.

ALLOC SKIN DOSE RATE
2.29E-03 mrem/yr < 3000.
ALLOC ORGAN DOSE RATE
0.00E+00 mrem/yr < 1500.

Setpoint Option: Dose Rates

IV. RADIATION MONITOR(S):

NUMBER		SETPOINT		EXPECTED RESPONSE	
0-RM-90-118	(NG)	1880.0	CPM	35.132	CPM
2-RM-90-400	(NG)	0.19997	uCi/s	0.17617	uCi/s

V. AUTHORIZATION:

MAX. VOLUME
2.6122E+03 CF

MAX. EFFLUENT FLOW RATE
5.0000E+01 CFM

The above-named source has been sampled and analyzed and is in compliance with the Offsite Dose Calculation Manual. Release is authorized for the volume and flow rates specified.

NESSEE VALLEY AUTHORITY
UOYAH NUCLEAR PLANT
TI-12 APP. B.9
Gaseous Radioactive Waste Release Permit 2009012.037.001.G
Pre-Release Supplementary Data

PART I: PRE-RELEASE DATA

RELEASE POINT (37): U2 WGDT C (SI-410.4)
DISCHARGE POINT (8): U2 SHIELD BUILDING EXHAUST

Permit Issued: 21-jan-2009 10:42:08 Release Type: Batch

Rad Monitor: (C.4) 0-RM-90-118
Rad Monitor Bckgrnd: 3.5000E+01 CPM
Estim. Waste Flow: 5.0000E+01 CFM
Estim. Waste Volume: 2.6122E+03 CF
Estim. Release Start: 21-jan-2009 12:00:00
Estim. Release End: 21-jan-2009 12:52:15 Initial Pressure : 6.4000E+01
Estim. Duration: 52.2449 MIN Final Pressure : 0.0000E+00

PART II: PRE-RELEASE CALCULATIONS

Sample Entry # : 9888
ble Gas File Name : CAS_SAM:S090211001.cnf
rticulate File Name: N/A
adioiodine File Name: N/A
Gas sample time: 21-jan-2009 00:03:00 Sampled by: WDT

Gas Monitor Response: 3.51E+01 CPM
Setpoint Option: Dose Rates

Allocated Total Body Dose Rate:	9.71E-04	mrem/yr	% Limit =	0.0%
Allocated Skin Dose Rate:	2.29E-03	mrem/yr	% Limit =	0.0%
Allocated Max Organ Dose Rate:	0.00E+00	mrem/yr	% Limit =	0.0%

Max Monitor Setpoints:	0-RM-90-118		2-RM-90-400	
Noble Gas :	1.88E+03	CPM	2.00E-01	uCi/s
Particulate :	0.00E+00	^^^^^^	0.00E+00	^^^^^^
Radioiodine :	0.00E+00	^^^^^^	0.00E+00	^^^^^^

Flag:
Flags: A-Release Curies > Local Limit N-Noble Gas Dose Rate > Limit
S-Release Curies > Site Limit O-Organ Dose Rate > Limit

	Analysis Date	Measured Concen.	Est. Curies
Noble Gases	21-jan-2009 00:18:46	4.03E-06 uCi/cc	2.98E-04
Particulates	21-jan-2009 00:18:46	0.00E+00 uCi/cc	0.00E+00
Radioiodines	21-jan-2009 00:18:46	0.00E+00 uCi/cc	0.00E+00

proved By: [signature] Date 1/21/2009

'NESSEE VALLEY AUTHORITY
,UOYAH NUCLEAR PLANT
TI-12 APP. B.9
Gaseous Radioactive Waste Release Permit
Pre-Release Supplementary Data

2009012.037.001.G

ISOTOPIC IDENTIFICATION - Unit 1

Isotope	Pre-Disp. Measured uCi/cc	Post-Disp. uCi/cc	Release Rate uCi/sec	Estimated Curies Released
XE-133 N	4.03E-06	6.61E-13	9.52E-02	2.98E-04
Totals	4.03E-06	6.61E-13	9.52E-02	2.98E-04

NNESSEE VALLEY AUTHORITY
UOYAH NUCLEAR PLANT
1-12 APP. B.9
Gaseous Radioactive Waste Release Permit
Pre-Release Supplementary Data

2009012.037.001.G

Calculated Gamma & Beta Air Doses @ Site Boundary: Calculated Doses at Site Boundary. Gamma and Beta Air Doses, Tot-body and Skin Doses and Dose Rates.

Type of Activity : Noble Gases
Controlling Sector : N
Unit number : 1

	Site Boundary Dist (km)	Tot-body Dose mrem	Skin Dose mrem	Gamma Air mrad	Beta Air mrad	Unalloc. Tot-body Dose Rate mrem/year	Unalloc. Skin Dose Rate mrem/year
N	9.50E-01	1.93E-08	4.56E-08	2.32E-08	6.89E-08	1.94E-04	4.59E-04

'NESSEE VALLEY AUTHORITY
.UOYAH NUCLEAR PLANT
TI-12 APP. B.9
Gaseous Radioactive Waste Release Permit
Pre-Release Supplementary Data

2009012.037.001.G

Report Category	: Calculated Dose Rate to Man (mrem/year) from this : Release at Site Boundary.
Type of Activity	: Radioiodines and Particulates
Age Group & Pathway(s)	:
Controlling Sector	:
Unit number	: 1

	:Bone	:Liver	:Tot-body	:Thyroid	:Kidney	:Lung	:GI-LLI
N	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
N	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
N	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
N	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

NESSEE VALLEY AUTHORITY
JOYAH NUCLEAR PLANT
TI-12 APP. B.9
Gaseous Radioactive Waste Release Permit
Pre-Release Supplementary Data

2009012.037.001.G

Report Category : Cumulative Dose at Site Boundary
Type of Activity : Noble Gases
Location : N at 0.950 km.
Unit number : 1

	Tot-body mrem	Skin mrem	Gamma Air mrad	Beta Air mrad
This Release	1.93E-08	4.56E-08	2.32E-08	6.89E-08
31D Prior: To Rel	2.32E-04	3.46E-04	2.45E-04	1.06E-04
31D After: Release	2.32E-04	3.46E-04	2.45E-04	1.06E-04
31 Day Limit	0.00E+00	0.00E+00	2.00E-01	4.00E-01
31 Day ..it	0.00%	0.00%	0.12%	0.03%
Qtr Prior: To Rel	2.32E-04	3.46E-04	2.45E-04	1.06E-04
Qtr After: Release	2.32E-04	3.46E-04	2.45E-04	1.06E-04
Quarterly: Limit	0.00E+00	0.00E+00	5.00E+00	1.00E+01
% Quarter: Limit	0.00%	0.00%	0.00%	0.00%
Ann Prior: To Rel	2.32E-04	3.46E-04	2.45E-04	1.06E-04
Ann After: Release	2.32E-04	3.46E-04	2.45E-04	1.06E-04
Annual Limit	0.00E+00	0.00E+00	1.00E+01	2.00E+01
% Annual Limit	0.00%	0.00%	0.00%	0.00%

NESSEE VALLEY AUTHORITY
JOYAH NUCLEAR PLANT
TI-12 APP. B.9
Gaseous Radioactive Waste Release Permit
Pre-Release Supplementary Data

2009012.037.001.G

Report Category : Projected Dose at Site Boundary
Type of Activity : Noble Gases
Location : N at 0.950 km.
Unit number : 1

	Tot-body mrem	Skin mrem	Gamma Air mrad	Beta Air mrad
This Release	1.93E-08	4.56E-08	2.32E-08	6.89E-08
31D Prior: To Rel	3.43E-04	5.11E-04	3.62E-04	1.57E-04
31D After: Release	3.43E-04	5.11E-04	3.62E-04	1.57E-04
31 Day Limit	0.00E+00	0.00E+00	2.00E-01	4.00E-01
31 Day nit	0.00%	0.00%	0.18%	0.04%
Qtr Prior: To Rel	1.02E-03	1.52E-03	1.07E-03	4.65E-04
Qtr After: Release	1.02E-03	1.52E-03	1.07E-03	4.65E-04
Quarterly: Limit	0.00E+00	0.00E+00	5.00E+00	1.00E+01
% Quarter: Limit	0.00%	0.00%	0.02%	0.00%
Ann Prior: To Rel	4.04E-03	6.01E-03	4.26E-03	1.84E-03
Ann After: Release	4.04E-03	6.01E-03	4.26E-03	1.84E-03
Annual Limit	0.00E+00	0.00E+00	1.00E+01	2.00E+01
% Annual Limit	0.00%	0.00%	0.04%	0.01%

NESSEE VALLEY AUTHORITY
QUOYAH NUCLEAR PLANT
TI-12 APP. B.9
Gaseous Radioactive Waste Release Permit
Pre-Release Supplementary Data

2009012.037.001.G

Report Category : Cumulative Maximum Individual Dose (mrem) for
: Controlling Age Group at Controlling Location
Type of Activity : Radioiodines and Particulates
Age Group & Pathway(s) :
Location : at 0.000 km.
Unit number : 1

	Bone	Liver	Tot-body	Thyroid	Kidney	Lung	GI-LLI
This Release	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
31D Prior: To Rel	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04
31D After: Release	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04
31 Day Limit	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01
31 Day Limit	0.07%	0.07%	0.07%	0.07%	0.07%	0.07%	0.07%
Qtr Prior: To Rel	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04
Qtr After: Release	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04
Quarterly: Limit	7.50E+00	7.50E+00	7.50E+00	7.50E+00	7.50E+00	7.50E+00	7.50E+00
% Quarter: Limit	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Ann Prior: To Rel	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04
Ann After: Release	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04
Annual Limit	1.50E+01	1.50E+01	1.50E+01	1.50E+01	1.50E+01	1.50E+01	1.50E+01
% Annual Limit	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

NESSEE VALLEY AUTHORITY
..QUOYAH NUCLEAR PLANT
TI-12 APP. B.9
Gaseous Radioactive Waste Release Permit
Pre-Release Supplementary Data

2009012.037.001.G

Report Category : Projected Maximum Individual Dose (mrem) for
: Controlling Age Group at Controlling Location
Type of Activity : Radioiodines and Particulates
Age Group & Pathway(s) :
Location : at 0.000 km.
Unit number : 1

	Bone	Liver	Tot-body	Thyroid	Kidney	Lung	GI-LLI
This Release	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
31D Prior: To Rel	3.27E-04	3.27E-04	3.27E-04	3.27E-04	3.27E-04	3.27E-04	3.27E-04
31D After: Release	3.27E-04	3.27E-04	3.27E-04	3.27E-04	3.27E-04	3.27E-04	3.27E-04
31 Day Limit	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01
31 Day Limit	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%
Qtr Prior: To Rel	9.71E-04	9.71E-04	9.71E-04	9.71E-04	9.71E-04	9.71E-04	9.71E-04
Qtr After: Release	9.71E-04	9.71E-04	9.71E-04	9.71E-04	9.71E-04	9.71E-04	9.71E-04
Quarterly: Limit	7.50E+00	7.50E+00	7.50E+00	7.50E+00	7.50E+00	7.50E+00	7.50E+00
% Quarter: Limit	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Ann Prior: To Rel	3.85E-03	3.85E-03	3.85E-03	3.85E-03	3.85E-03	3.85E-03	3.85E-03
Ann After: Release	3.85E-03	3.85E-03	3.85E-03	3.85E-03	3.85E-03	3.85E-03	3.85E-03
Annual Limit	1.50E+01	1.50E+01	1.50E+01	1.50E+01	1.50E+01	1.50E+01	1.50E+01
% Annual Limit	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%

_NESSEE VALLEY AUTHORITY
__QUOYAH NUCLEAR PLANT
TI-12 APP. B.9
Gaseous Radioactive Waste Release Permit
Pre-Release Supplementary Data

2009012.037.001.G

Report Category : Fuel Cycle Dose
Type of Activity : Noble Gases
Location : N at 0.950 km.
Unit number : 1

	Tot-body mrem	Skin mrem
This Release	1.35E-08	3.19E-08
Projected: Prior Rel	2.83E-03	4.21E-03
Projected: After Rel	2.83E-03	4.21E-03
Annual Limit	2.50E+01	2.50E+01
Annual .mit	0.00%	0.00%
Cumulativ: Prior Rel	1.63E-04	2.42E-04
Cumulativ: After Rel	1.63E-04	2.42E-04
Annual Limit	2.50E+01	2.50E+01
% Annual Limit	0.00%	0.00%

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM19AP3

Classify the Event per the REP
(LOCA with Significant Fuel Failure)

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, adapted from JPM 19AP2	Y	1/11/10	All	M Hankins

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

SEQUOYAH NUCLEAR PLANT
SRO
JOB PERFORMANCE MEASURE

Task:
Classify the Event per the REP (LOCA with Significant Fuel Failure)

JA/TA task # : 3440030302 (**SRO**)
3440190302 (**SRO**)

K/A Ratings:

2.4.29 (2.6/4.0)	2.4.38 (2.2/4.0)	2.4.44 (2.1/4.0)
2.4.30 (2.2/3.6)	2.4.40 (2.3/4.0)	
2.4.37 (2.0/3.5)	2.4.41 (2.3/4.1)	

Evaluation Method : Simulator ________ In-Plant ________ Classroom ____X_____

==

Performer: ______________________________________ NAME

Start Time ________

Performance Rating : SAT _____ UNSAT _____ Performance Time _____

Finish Time _______

Evaluator: ________________________________/________
SIGNATURE DATE

==

COMMENTS

____

____

____

____

____

____

____

____

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Any UNSAT requires comments.
2. 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.
3. Clock must be available in classroom and visible to examiner and examinees.

Caution: **DO NOT LET THE EXAMINEE FAX THE NOTIFICATION FORM OFFSITE!**

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

Tools/Equipment/Procedures Needed:

EPIP-1 thru 5, for each student in classroom
FR Procedures
Steam Tables, for each student in classroom
Clock must be available in classroom that all examinees and evaluator can see.

References:

	Reference	Title	Rev No.
1.	EPIP-1	Emergency Plan Initiating Conditions Matrix	42
2.	EPIP-4	Site Area Emergency	30

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps of this JPM shall be performed in a classroom or in the simulator (simulator will not be set up to match the scenario).
The evaluator will provide initiating cues. Time begins when directed by evaluator.
When the declaration has been made, raise your hand, the evaluator will record the time, and then continue the procedure.
Raise your hand again when you have completed the TVA Initial Notification Form, to the point of notifying the ODS.

INITIAL CONDITIONS:

1. Unit 2 is at 100% RTP and stable.
2. Unit 1 experienced an AUTO SI from a small RCS leak which quickly escalated to a LOCA and a high containment pressure.
3. RCS pressure has stabilized at 600 psig.
4. Subcooling is 10°F.
5. Crew is entering FR-C.2 Core Cooling, Orange Path.
6. RVLIS lower range is indicating 40%.
7. The ONLY ECCS pump available and in service is the 1B-B RHR pump.
8. Containment Spray pumps are running.
9. Maximum containment pressure was 5 psig.
10. Containment radiation level are as follows:
    ~1.8E+02 Rem/hr on RM-90-273A and RM-90-274.
    ~1.7E+02 Rem/hr on RM-90-271A and RM-90-272.
11. EPS *is not* available in MCR.
12. All radiological releases are within Tech Spec limits.
13. There are no indications of an Onsite Security Event.

INITIATING CUES:

You are the Unit 1 US and have assumed the SED position, until the TSC is staffed.
You are to perform each of the following:

1. Classify this event per EPIP 1,
   and
2. Fill out TVA Initial Notification Form and make Protective Action Recommendations, if any.

THIS IS A TIME CRITICAL JPM
Time begins when directed by evaluator.

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 1.:	Refers to EPIP-1 to determine level of event.	___ SAT
STANDARD:	Operator refers to EPIP-1, Section 1, Fission Product Barrier Matrix. Operator determines that they have met the conditions of: 1.1.5 Loss, "Containment High Radiation" **AND** 1.2.2 Loss "RCS leak results in subcooling <40°F" **and / or** 1.2.4 Loss RVLIS <42% with no RCP's running *(1.1.1 Potential, "Core Cooling Orange" may also be selected but not required) Declaration of event must be made in **15 minutes** from the time the task was accepted. **Record Time of Declaration:____________** **Time from Task Acceptance to Declaration:____________** Utilizing "Emergency Class Criteria", operator determines the need to declare a **SITE AREA EMERGENCY** based on Loss of two barriers. Time of Declaration is recorded when the operator raises his hand.	___ UNSAT **Critical Step** **Task Start Time** __________
	The following steps implement EPIP-4:	
STEP 2.:	Implements EPIP-4 SITE AREA EMERGENCY, Section 3.1 [1] If TSC is operational...	___ SAT
STANDARD:	Operator N/A's this step, per initiating cues the TSC is not staffed.	___ UNSAT
STEP 3.	[3] ACTIVATE Emergency Paging System (EPS) as follows:	___ SAT
STANDARD:	Operator recalls from initial conditions, that EPS has is not available from the control room and continues goes to Step [4].	___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 4. [4] Complete Appendix B (TVA INITIAL NOTIFICATION FOR SITE AREA EMERGENCY). STANDARD: Operator fills out Appendix B through step 7, prior to Notifying the ODS. 1. This is a DRILL 2. This is **[Their name, Shift Manager at SQN Plant]** Sequoyah has declared a SITE AREA EMERGENCY affecting **[Unit 1]** 3. EAL Designator(s): **1.2.2 LOSS; and/or 1.2.4 LOSS;** **AND** **1.1.5 LOSS** (1.1.1 POTENTIAL may also be listed but not required) 4.. Brief description of incident: **[Core Cooling Orange Path AND Containment High Radiation AND RCS leak results in subcooling <40°F]** 5.. Radiological Conditions **[Minor releases within federally approved limits.]** 6. Event Declared: **[Time and Date]** 7. Protective Action Recommendation: **[None].** 8. Please repeat back the information you have received to ensure accuracy. 9. When completed, FAX this information to the ODS.	___ SAT ___ UNSAT **Critical Step**
STEP 5. [5] **NOTIFY** ODS. __________ Initial __________ Time **NOTE:** **Evaluator Enter time call is made to the ODS_______________** **Time from Declaration (step 1) to ODS Notification:___________** STANDARD: Operator raises hand as signal that they have completed TVA Initial Notification form and are ready to Notify the ODS. ODS should be notified within 10 minutes after declaration of the event.	___ SAT ___ UNSAT **Critical Step** Stop Time: __________

End of JPM

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps of this JPM shall be performed in a classroom or in the simulator (simulator will not be set up to match the scenario).
The evaluator will provide initiating cues. Time begins when directed by evaluator.
When the declaration has been made, raise your hand, the evaluator will record the time, and then continue the procedure.
Raise your hand again when you have completed the TVA Initial Notification Form, to the point of notifying the ODS.

INITIAL CONDITIONS:

1. Unit 2 is at 100% RTP and stable.
2. Unit 1 experienced an AUTO SI from a small RCS leak which quickly escalated to a LOCA and a high containment pressure.
3. RCS pressure has stabilized at 600 psig.
4. Subcooling is 10°F.
5. Crew is entering FR-C.2 Core Cooling, Orange Path.
6. RVLIS lower range is indicating 40%.
7. The ONLY ECCS pump available and in service is the 1B-B RHR pump.
8. Containment Spray pumps are running.
9. Maximum containment pressure was 5 psig.
10. Containment radiation levels are as follows:
    ~1.8E+02 Rem/hr on RM-90-273A and RM-90-274.
    ~1.7E+02 Rem/hr on RM-90-271A and RM-90-272.
11. EPS *is not* available in MCR.
12. All radiological releases are within Tech Spec limits.
13. There are no indications of an Onsite Security Event.

INITIATING CUES:

You are the Unit 1 US and have assumed the SED position, until the TSC is staffed.
You are to perform each of the following:

1. Classify this event per EPIP 1,
   and
2. Fill out TVA Initial Notification Form and make Protective Action Recommendations, if any.

THIS IS A TIME CRITICAL JPM
Time begins when directed by evaluator.

Evaluator Key

APPENDIX B
TVA INITIAL NOTIFICATION FOR SITE AREA EMERGENCY

TVA INITIAL NOTIFICATION FOR SITE AREA EMERGENCY

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

2. This is SED "Name", **Sequoyah** has declared a **SITE AREA EMERGENCY** affecting: ☑ Unit 1 ☐ Unit 2 ☐ Both Unit 1 and Unit 2

3. **EAL Designator(s):** 1.1.5L and 1.2.2L +/or 1.2.4L

4. **Brief Description of the Event:** Core Cooling Orange Path Containment High Rad, RCS Leak, Subcooling <40°F

(Note: 1.1.1P, 1.1.4P, 1.2.2P can be listed but are not critical)

5. **Radiological Conditions:** (Check one box under each Airborne AND Liquid column.)

Airborne Releases Offsite	**Liquid** Releases Offsite
☑ Minor releases within federally approved limits[1]	☑ Minor releases within federally approved limits[1]
☐ Releases above federally approved limits[1]	☐ Releases above federally approved limits[1]
☐ Release information not known	☐ Release information not known
([1]Tech Specs)	([1]Tech Specs)

6. **Event Declared:** Time: (time declared) Date: Today

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

8. Please repeat back the information you have received to ensure accuracy. ☐

9. **When completed, FAX this information to the ODS.** ☐

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps of this JPM shall be performed in a classroom or in the simulator (simulator will not be set up to match the scenario).
The evaluator will provide initiating cues. Time begins when directed by evaluator.
When the declaration has been made, raise your hand, the evaluator will record the time, and then continue the procedure.
Raise your hand again when you have completed the TVA Initial Notification Form, to the point of notifying the ODS.

INITIAL CONDITIONS:

1. Unit 2 is at 100% RTP and stable.
2. Unit 1 experienced an AUTO SI from a small RCS leak which quickly escalated to a LOCA and a high containment pressure.
3. RCS pressure has stabilized at 600 psig.
4. Subcooling is 10°F.
5. Crew is entering FR-C.2 Core Cooling, Orange Path.
6. RVLIS lower range is indicating 40%.
7. The ONLY ECCS pump available and in service is the 1B-B RHR pump.
8. Containment Spray pumps are running.
9. Maximum containment pressure was 5 psig.
10. Containment radiation levels are as follows:
    ~1.8E+02 Rem/hr on RM-90-273A and RM-90-274.
    ~1.7E+02 Rem/hr on RM-90-271A and RM-90-272.
11. EPS *is not* available in MCR.
12. All radiological releases are within Tech Spec limits.
13. There are no indications of an Onsite Security Event.

INITIATING CUES:

You are the Unit 1 US and have assumed the SED position, until the TSC is staffed.
You are to perform each of the following:

1. Classify this event per EPIP 1,
   and
2. Fill out TVA Initial Notification Form and make Protective Action Recommendations, if any.

THIS IS A TIME CRITICAL JPM
Time begins when directed by evaluator.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM 190

Reactivity Balance Calculation

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	3/17/04	ALL	G.S. Poteet
Pen/ink	Made corrections resulting from validation	N	5/12/04	2, 4-7	G.S. Poteet
1	Developed for 6/7-14/04 NRC Exam. Transferred to JPM Bank.	N	6/15/04	All	J. Kearney
2	Revised to update to the latest procedure revision, enhanced initial conditions.	Y	1/11/10	All	M Hankins

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

SEQUOYAH NUCLEAR PLANT
AUO/RO/SRO
JOB PERFORMANCE MEASURE

Task: Perform a Reactivity Balance Calculation per 0-SO-62-7, Appendix E

JA/TA TASK #: 0040070101 (RO)

K/A Ratings:

2.1.25 (3.9/4.2)
004 A4.04 (3.2/3.6)
004 K5.20 (3.6/3.7)

Task Standard:

Operator performs 0-SO-62-7 Appendix E, Reactivity Balance Calculation

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 identified.
2. Any UNSAT requires comments
3. 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. 35 min **Local** ______

Tools/Equipment/Procedures Needed

1. Cycle Nuclear Design Report (NDR)
2. 0-SO-62-7 Boron Concentration Control
3. Highlighter and ruler

References:

	Reference	Title	Rev No.
A.	0-SO-62-7	Boron Concentration Control	56
B.	TI-44	Boron Tables	12

==

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps shall be performed for this JPM. I will provide initiating cues and indicate any steps to be discussed. 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 1 is currently stable at 20 %.
2. Control rod Bank D is at 160 steps.
3. RCS boron concentration is 1400 ppm.
4. 1U0981Core burnup is 600 MWD/MTU.
5. Reactor Engineering has provided following Xenon data:
   XE_1 = -2430 pcm
   XE_2 = -2250 pcm

INITIATING CUES:

Perform 0-SO-62-7, Appendix E, Reactivity Balance calculation, in preparation for a change in reactor power from 20% with Control Rods at 160 steps on D Bank,
to 70% with Control Bank D at 228 steps, using a 3%/hour power increase rate.

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 1.:	Obtain a copy of the procedure.	___ SAT ___ UNSAT Start Time____
STANDARD:	Operator obtains a copy of 0-SO-62-7 Boron Concentration Control, Appendix E Reactivity Balance Calculation.	
STEP 2.:	**[1] ENTER** the following Data: Current RCS Boron	___ SAT ___ UNSAT
NOTE	***Per initial conditions RCS boron concentration is 1400 ppm***	
STANDARD	Operator enters 1400 ppm from INITIAL CONDITIONS	
STEP 3.:	Core Burnup	___ SAT ___ UNSAT
NOTE	***Per initial conditions computer point 1U0981 indicates 600 MWD/MTU***	
STANDARD	Operator uses 1U0981 data from initial conditions, and enters 600 MWD/MTU on Appendix E.	
STEP 4.:	Current Reactor Power	___ SAT ___ UNSAT
NOTE	***Per initial conditions, current reactor power is 20%.***	
STANDARD:	Operator enters 20% per Initial Conditions	
STEP 5.:	Final Reactor Power	___ SAT ___ UNSAT
NOTE	***Per initial conditions, final reactor power is 70%.***	
STANDARD:	Operator enters 70% per Initial Conditions	
STEP 6.:	Total Reactor Power Change	___ SAT ___ UNSAT
STANDARD:	Operator determines power change to be 50%.	**Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 7.: Rate of Reactor Power change STANDARD: Operator enters 3%/hr per initial conditions.	___ SAT ___ UNSAT
STEP *8.: Number of hours to change power STANDARD: Operator calculates number of hours to change power; 50% / 3%/hour and enters results: 16 2/3 hours (or 16.67 hours, or 16 hours and 40 minutes).	___ SAT ___ UNSAT
STEP *9.: Current Rod Position STANDARD: Operator enters 160 steps on Bank D per Initial Conditions	___ SAT ___ UNSAT
STEP *10.: Final Rod Position STANDARD: Operator enters 228 steps per Initial Conditions	___ SAT ___ UNSAT
STEP *11.: **[2] CALCULATE** change in boron concentration by performing the following: [a] $\Delta\rho_{\text{POWER DEFECT}}$ $\Delta\rho_{\text{POWER DEFECT}}$ = _______ pcm PD_1 - _______ pcm PD_2= _____pcm NOTE: Use "eye-ball" interpolation between closest parameter lines. Band accuracy ½ increment presented on figure. STANDARD: Operator uses proper curve, Figure 1, U1C17 Power Defect BOL, 1400 ppm line (long dash line) to enter data. For 20% operator should enter 350 pcm. For 70%, operator should enter 1100 pcm. $\Delta\rho_{\text{POWER DEFECT}}$ = 350 pcm PD_1 - 1100 pcm = -750 pcm	___ SAT ___ UNSAT **Critical Step**
STEP *12.: [b] $\Delta\rho_{\text{XENON}}$ $\Delta\rho_{\text{XENON}}$ = -2250 pcm XE_2 - (-2430 pcm) XE_1 = 180 pcm STANDARD: Operator enters Xenon values (provided in the initial conditions) and calculates the change in reactivity due to Xenon.	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP *13.: [c] $\Delta\rho_{RODS}$ $\Delta\rho_{RODS}$ = _______ pcm $Rods_2$ - _______ pcm $Rods_1$ = ____pcm NOTE: Use "eye-ball" interpolation between closest parameter lines. Band accuracy ½ increment presented on figure. STANDARD: Operator uses proper curve Figure 4, 25% line for 160 steps operator should enter -480 (-450 to -525 pcm). For 228 steps, operator should enter 0. $\Delta\rho_{RODS}$ = (0) pcm $Rods_2$ - -480 (Acceptable Range -450 to -525) pcm $Rods_1$ = 480 (Acceptable Range 450 to 525 pcm)	___ SAT ___ UNSAT **Critical Step**
STEP 14.: [d] Change in reactivity due to Power Defect, Xenon and Rods [a] + [b]+[c] = ______ pcm STANDARD: Operator calculates Change in reactivity due to power defect, Xenon and rods: -750 pcm + 180 pcm + 480 (450 to 525) pcm = -90 pcm (Acceptable Range -120 pcm to -45 pcm)	___ SAT ___ UNSAT **Critical Step**
STEP 15.: [e] Change in Boron Reactivity Substep [d] X (-1) = 90 pcm (Acceptable Range 120 pcm to 45 pcm) STANDARD: Operator calculates the change in Boron Reactivity, by multiplying substep [d] by -1.	___ SAT ___ UNSAT **Critical Step**
STEP 16.: [f] Change in Boron Concentration Substep [e] / Boron Worth STANDARD: Operator Records change in boron reactivity and determines the Boron Worth pcm/ppm from Figure 7. Substep [e] / -6.25 pcm/ppm Boron worth = 14.4 (Acceptable Range 19.2 – 7.2 pcm)	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 17.: [3] Ensure independently verified by SRO in accordance with Appendix J. STANDARD: Operator notifies the US an independent verification is required in accordance with Appendix J.	___ SAT ___ UNSAT **End Time** ______

End of JPM

KEY JPM190
P1/5

REACTIVITY BALANCE CALCULATION

NOTE 1 One calculation is required for each major change. Calculation is an approximation of required Boron change. Eyeball interpolation of graphs is expected.

NOTE 2 Dilution or Boration value for power change from P_1 % to P_2 % power in time period T with rods moving from step position R_1 to R_2. (Subscript convention: 1 = current point, 2 = target point)

[1] **ENTER** the following data:

DATA REQUIRED	DATA	Where To Get
Current RCS Boron	1400 ppm	Chem Lab or Estimate using Appendix O
Core Burnup	600 MWD/MTU	ICS U0981
Current Reactor power	20 %	NIS or ICS
Final Reactor power	70 %	As required for plant conditions
Total Reactor Power change	50 Δ%	Δ Current and final Reactor power
Rate of Reactor power change	3 %/hr	As required for plant conditions
Number of hours to change power	16 2/3 hr(s) 16 h 40 m 16.67	As required for plant conditions
Current Rod Position	160 steps	ICS or MCR Board
Final Rod Position	228 steps	Estimate number of rod steps required to control ΔI and rod withdrawal requirements for power change.

Key JPM 190
p 2/5

APPENDIX E
Page 2 of 18

CAUTION **Follow sign conventions explicitly. (See Example Power Increase and Power decrease.)**

[2] **CALCULATE** change in boron concentration by performing the following:

Parameter	Where To Get	Calculation	Value
[a] Δρ POWER DEFECT	Attached Power Defect Curves: Unit 1: Figure 1, 2, or 3 Unit 2: Figure 8, 9, or 10.	350 pcm PD_1 (current) - 1100 pcm PD_2 =	-750 pcm Δρ POWER DEFECT (negative for power increase)
[b] Δρ XENON	$Xenon_1$: From ICS* or REACTF (either current conditions or projection to initial condition). $Xenon_2$: From ICS* or REACTF (projection over time period T). *(ICS Xenon values must add negative sign).	NOTE: Xenon reactivity must be negative -2250 pcm XE_2 - -2430 pcm XE_1 (current) =	180 pcm Δρ XENON (negative for rise in Xenon conc)
[c] Δρ RODS	Attached Rod Worth Curves: Unit 1: Figure 4, 5, or 6 Unit 2: Figure 11, 12, or 13.	0 pcm $Rods_2$ - -480 pcm $Rods_1$ (current) = (Range 450 to 525 pcm)	480 pcm Δρ RODS (450 to 525) (negative for rod insertion)
[d] Δρ POWER DEFECT + XENON + RODS (CHANGE IN REACTIVY DUE TO POWER DEFECT, XENON, AND RODS) [a] pcm Δρ POWER DEFECT + [b] pcm Δρ XENON + [c] pcm Δρ RODS =			-90 pcm Acceptable Range -120 pcm to -45 pcm
[e] Δρ BORON (CHANGE IN BORON REACTIVITY) ([d] pcm Δρ POWER DEFECT + XENON + RODS) X (−1) =			90 pcm Δρ BORON (120 to 45)
[f] Δppm BORON (CHANGE IN BORON CONCENTRATION) ([e] pcm Δρ BORON) ÷ (-6.25 pcm/ppm Boron Worth from Fig. 7 (U-1) or Fig. 14 (U-2)) =			-14.4 ppm (-19.2 to -7.2 ppm) (negative for dilution, positive for boration)

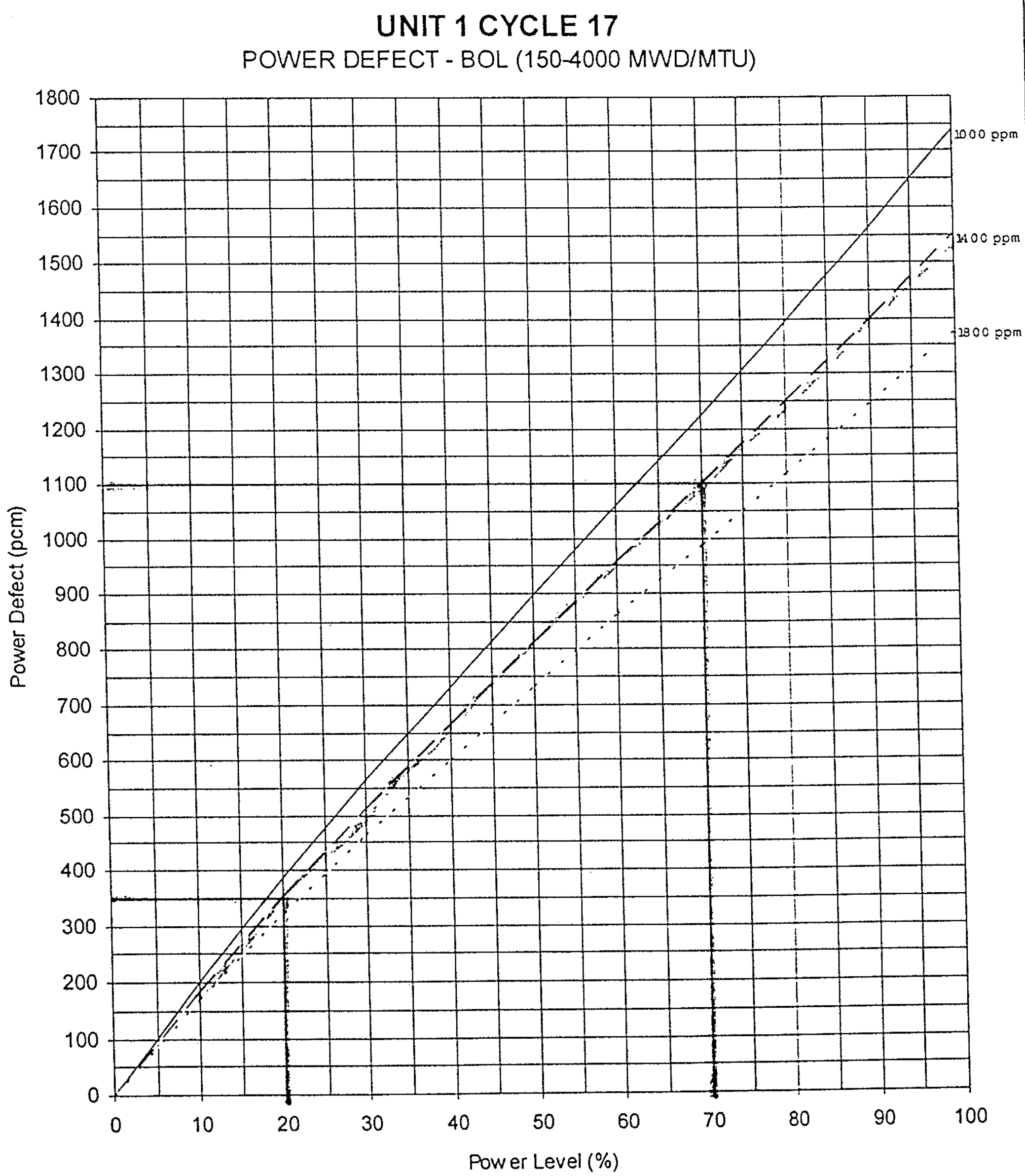
[3] **ENSURE** independently verified by SRO in accordance with Appendix J.
(N/A if performed by an SRO to verify data provided by Rx. Eng) ______

Key JPM 190
p 3/5

APPENDIX E
Page 5 of 18

Figure 1 U1C17 Power Defect BOL

NOTE Use "eye-ball" interpolation between closest parameter lines.

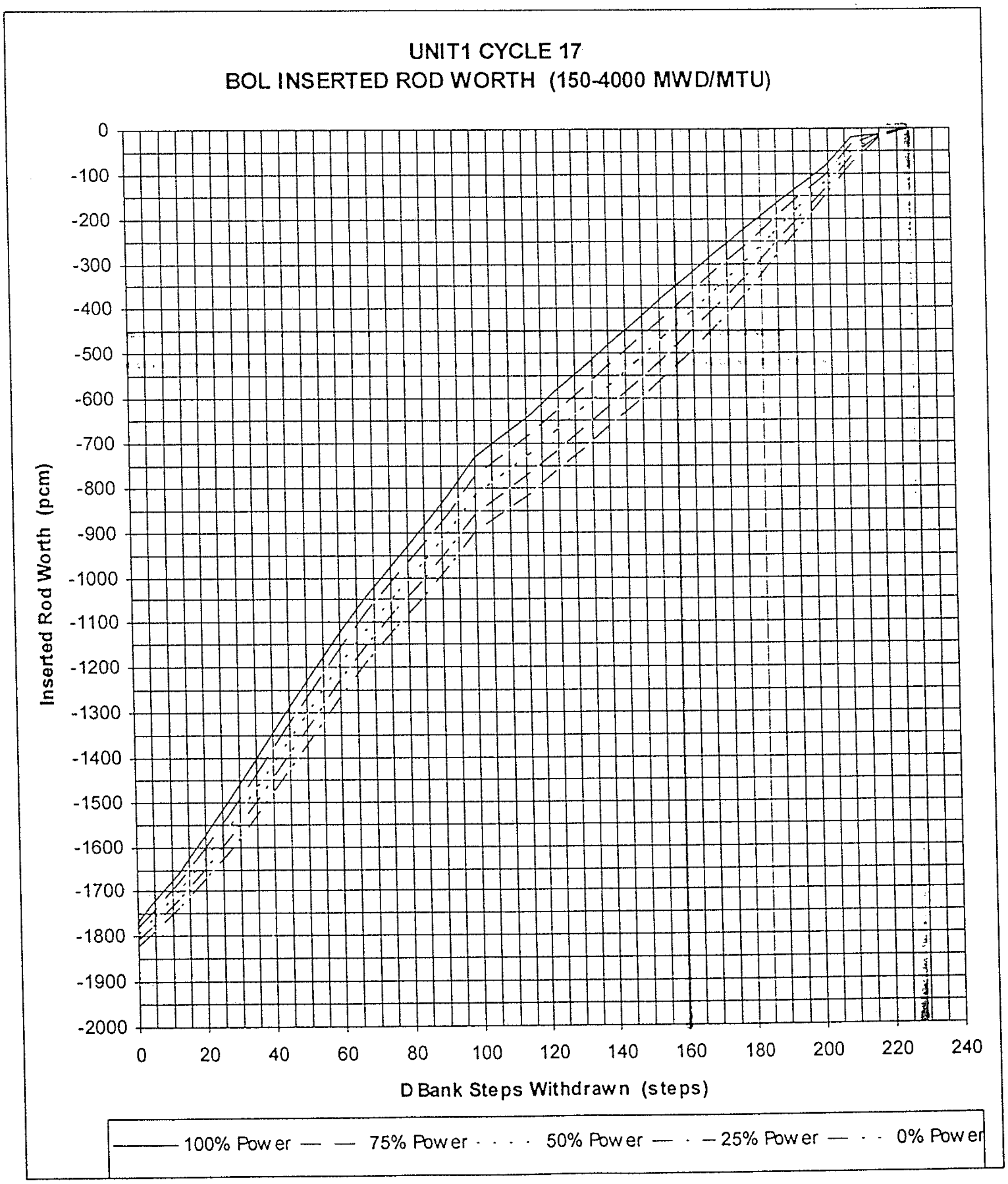


Reference: NDR Table 6-23 to 6-27

Key JPM 190
P4/5

Figure 4 U1C17 Inserted Rod Worth BOL

NOTE Use "eye-ball" interpolation between closest parameter lines.



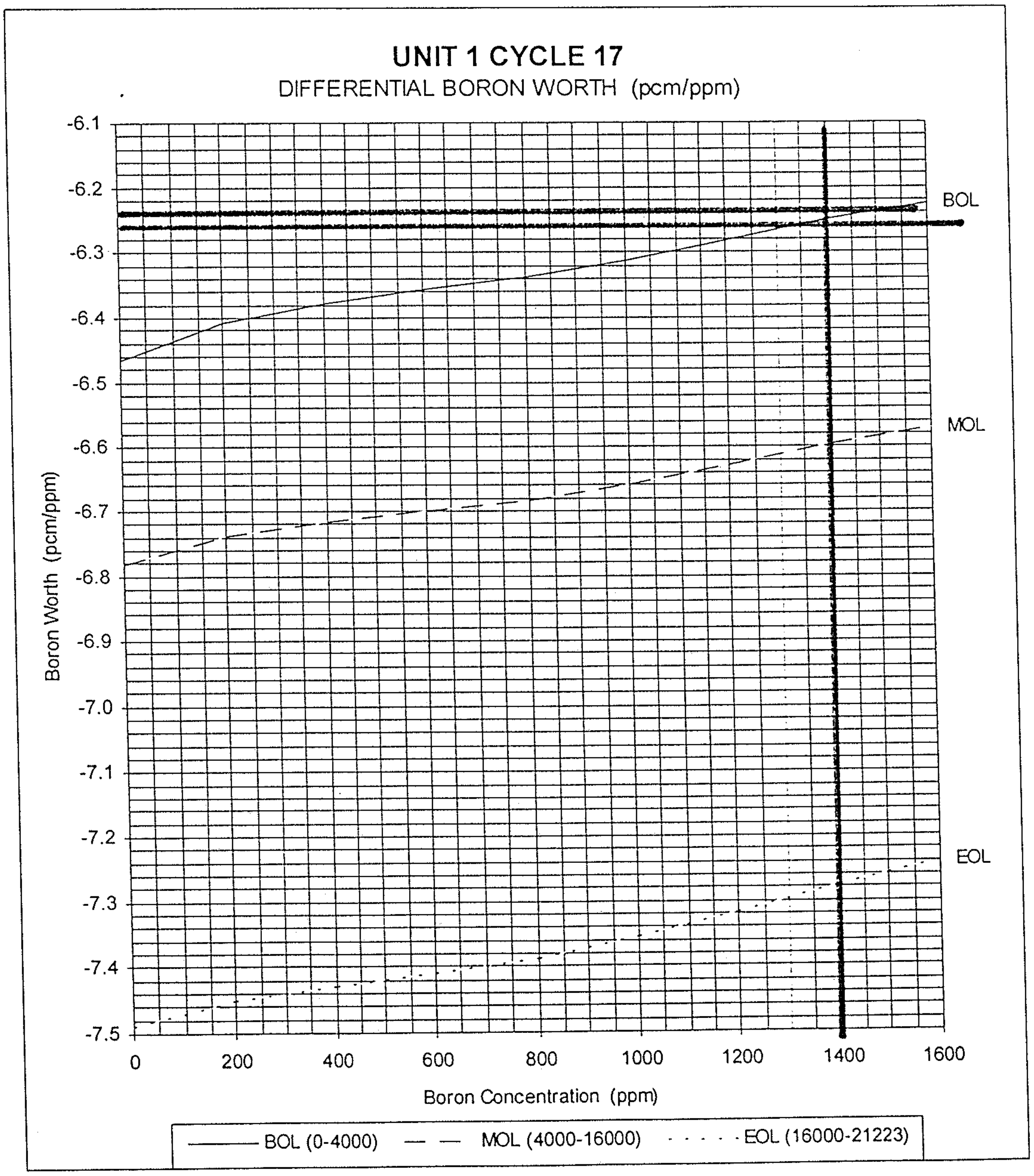
Reference : NDR Table 6-34.

Key JPM 19a
p 5/5

APPENDIX E
Page 11 of 18

Figure 7 U1C17 Differential Boron Worth

NOTE Use "eye-ball" interpolation between closest parameter lines.



Reference: NDR Table 6-7

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps shall be performed for this JPM. I will provide initiating cues and indicate any steps to be discussed. 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 1 is currently stable at 20 %.
2. Control rod Bank D is at 160 steps.
3. RCS boron concentration is 1400 ppm.
4. 1U0981Core burnup is 600 MWD/MTU.
5. Reactor Engineering has provided following Xenon data:
   XE_1 = -2430 pcm
   XE_2 = -2250 pcm

INITIATING CUES:

Perform 0-SO-62-7, Appendix E, Reactivity Balance calculation, in preparation for a change in reactor power from 20% with Control Rods at 160 steps on D Bank,
to 70% with Control Bank D at 228 steps, using a 3%/hour power increase rate.

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

SYSTEM OPERATING INSTRUCTIONS

0-SO-62-7

BORON CONCENTRATION CONTROL

Revision 56

QUALITY RELATED

PREPARED BY: Olivia Taylor

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: J. K. WILKES

EFFECTIVE DATE: 07/06/09

LEVEL OF USE: **CONTINUOUS USE**

REVISION
DESCRIPTION: Minor editorial change made to correct UNID issue in Section 8.15 (09001012)

PERFORMANCE OF THIS PROCEDURE MAY IMPACT REACTIVITY

TABLE OF CONTENTS
Page 1 of 3

TABLE OF CONTENTS

Page 2 of 3

TABLE OF CONTENTS

Page 3 of 3

1.0 INTRODUCTION

1.1 Purpose

To provide instructions for operation of the Boron Control System.

1.2 Scope

This instruction provides detailed steps for the following modes of operation:

Automatic Makeup

At Power Routine Dilution

Dilute and Alternate Dilute

Borate

Manual Makeup Control (preferred method for VCT makeup in Modes 1 and 2)

Blending to Spent Fuel Pit Using Boric Acid Blender via SFP Cooling Pump Suction Pressure Indicators

Blending to Spent Fuel Pit Using Boric Acid Blender via Bull Hose Directly to Spent Fuel Pit

Blending to RWST Using Boric Acid Blender

Makeup to the Reactor Coolant System from the RWST in modes 1-4 when the Automatic/Manual Makeup is unavailable.

Manual Makeup to the Reactor Coolant System from the RWST in modes 5 or 6

Blending to Transfer Canal Using Boric Acid Blender

Blending to the Holdup Tank using Boric Acid Blender

Flushing Unit 1 Blender/Piping Using Primary Water (Maintenance Activities)

Flushing Unit 2 Blender/Piping Using Primary Water (Maintenance Activities)

UNIT 2 Alternate divert path using RCL sampling system

2.0 REFERENCES

2.1 Performance References

A. Procedures

1. 0-SO-62-10, Boric Acid Batch, Transfer, and Storage System
2. 0-SO-78-1, Spent Fuel Pit Cooling System

B. Technical Instructions - TI-44, Boron Tables

2.2 Developmental References

A. Procedures

1. SOI-62.2, Boron Concentration Control
2. 0-PI-OPS-000-633.0, Aux. Cont. Rm. Switch Alignment Verification
3. Westinghouse Vendor Manual SQN-VM 4990

B. Technical Specifications

1. 3.1.1.1
2. 3.1.1.2
3. 3.9.1
4. 3.10.1
5. Bases 3/4.1.3

C. Technical Requirements Manual

1. 3.1.2.1
2. 3.1.2.2
3. 3.1.2.3
4. 3.1.2.4
5. 3.1.2.5
6. 3.1.2.6
7. Bases 3/4.1.2

D. FSAR

1. 9.3.4.2.5
2. 9.3.4.2.2
3. 9.3.4.2.6
4. 15.2.4
5. 15.2.14.1
6. 15.4.6.1

E. TVA Drawings

1. 47W809-1
2. 47W809-2
3. 47W809-5

3.0 PRECAUTIONS AND LIMITATIONS

A. The mode selector switch should be returned to the **AUTO** makeup mode after any dilution or boration operation. The control switch must be turned to **START** in order for the auto makeup to function.

B. At least one Reactor Coolant Pump or one RHR Pump must be in operation during dilution operations. **[C.6]**

C. Maintain Pressurizer boron concentration within 50 ppm of reactor coolant loop boron concentration. This can be accomplished by turning pressurizer heaters on and allowing sprays to maintain RCS pressure within program. If Normal Spray is NOT available, then Auxiliary Spray should be used (1, 2-SO-62-1) in conjunction with pressurizer backup heaters.

D. Axial flux difference should be maintained within limits by using the control bank of rods while changing boron concentration.

E. Prior to making a positive reactivity change, Tech Specs and TRM should be referenced to ensure the unit is not in a LCO action that prohibits a positive reactivity change. **[C.1]**

F. A boron sample should be obtained whenever reactor makeup water is added to the VCT, unless the unit is at power and results of the makeup are as expected.

G. When making an RCS dilution of ≥ 3000 gallons, it should be done in batches with an RCS boron concentration verification at the halfway point (e.g., 1500 gallons). Allow at least 15 minutes between batches. **[C.5]** **[C.7]**

H. Simultaneous makeup to the RWST and the RCS should be avoided to prevent the possibility of injecting unborated (or under borated) water into the core. **[C.4]** **[C.6]** **[C.7]**

I. Reactivity balance calculations are required for any power changes more than 1%, except when immediate boration is required to maintain rods above the insertion limit or as required during an Rapid Shutdown or Load Reduction (AOP-C.03) or dropped/misaligned rod recovery (AOP-C.01). Although stated in the procedure that only one calculation is required for a major change in Reactor Power, calculations should be current and take into account the time dependency of parameters used in the calculation. [e.g. one calculation to decrease RX power to 70% power to remove a MFP is acceptable]. In the event of a large power manipulation (GO startup or shutdown) several calculations will be required. A calculation should be performed for the increase to 30% Reactor power, another for an increase to 50%, and so on. These calculations may be correlated to GO plateaus.

3.0 PRECAUTIONS AND LIMITATIONS (CONTINUED)

J. Boric Acid Controller adjustment is required for B-10 depletion for automatic and manual makeup to improve the accuracy of the blend. The B-10 depletion value for each unit can be obtained from the Rx Eng Information file located on the site intranet. Reactor Eng Information ICON can be found on the control room PC's.

K. An unanticipated power change greater than 5 MWT, rod motion greater than 1 step (in or out), or T_{AVG} greater than 0.5°F, require a PER and should be evaluated as a potential reactivity management event per SPP-10.4, Reactivity Management Program.

L. Boron concentration measurement inaccuracies and integrator calibration tolerance may result in a small difference between RCS boron concentration and blend boron concentration. This may result in a small change in Tavg (~1/4°F) and thermal power (by a few megawatts) after makeup.

M. Manual Makeup (Section 6.5) of approximately 200 gallons or less is preferred over allowing the system to automatically make up in Modes 1 and 2. Performing manual makeup and limiting the volume of makeup is preferred to reduce the impact on reactivity, RCP seal performance (due to reduced pressure/temperature transients) and RCS chemistry (due to reduced VCT pressure changes). During transient conditions, emergencies, or during plant cooldown, automatic makeup may be used as necessary.

N. The potential exists that the blender piping contains primary water. This will result in a dilution and a small reactivity addition.

O. Completely emptying the BAT's for all valve work is not required to establish a safe work boundary. The valves on the lower portions the tanks require an empty tank to establish safe conditions. The tank drain, level instrument isolation and pump suction line are all at or near the bottom of the tank. These are listed in the table below:

BAT A	BAT C	BAT B
1-VLV-62-1049	0-VLV-62-1049	2-VLV-62-1049
1-VLV-62-1058	0-VLV-62-1058	2-VLV-62-1058
1-VLV-62-1088	0-VLV-62-1088	2-VLV-62-1088

The other valves associated with the Boric Acid Transfer Pumps can be worked with some level remaining in the tanks. As a margin of safety, a maximum of 85% should be used to establish safe working conditions.

Unit 1 Date TODAY

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** the instruction to be used is a copy of the effective version. Roy

[2] **ENSURE** Precautions and Limitations, Section 3.0, has been reviewed. Roy

[3] **REVIEW** the following Status Files for any off-normal alignments that may impact performance:

Status File	✓
Unit 1	☑
Unit 2	☑
Radwaste	☑

Roy

[4] **ENSURE** Chemical and Volume Control System is in operation. Roy

[5] **IF** in modes 1, 2, or 3, **THEN**

ENSURE requirements of TRM L.C.O. 3.1.2.6 are met,
OR
COMPLY with applicable actions. Roy

[6] **IF** in modes 4, 5, or 6, **THEN**

ENSURE requirements of TRM L.C.O. 3.1.2.5 are met,
OR
COMPLY with applicable actions. N/A

[7] **IF** Primary Water required for the evolution to be performed, **THEN**

ENSURE Primary Makeup Water system in service. N/A

Unit 1 Date TODAY

4.0 PREREQUISITE ACTIONS (Continued)

NOTE The following step is performed at the discretion of the RO and/or SRO.

[8] **WHEN** performing a dilution or boration, **THEN**

[a] **IF** Normal pressurizer spray is available, **THEN** **ENERGIZE** pressurizer heaters so sprays can equalize the boron concentration between the pressurizer and the RCS N/A

[b] **IF** Normal pressurizer spray is NOT available, **THEN** **PLACE** Auxiliary Spray in service (1, 2-SO-62-1) in conjunction with pressurizer backup heaters. (N/A if not applicable) N/A

[9] **ENSURE** appropriate Valve Checklist has been completed (**N/A** if not applicable).

VALVE CHECKLIST	INITIALS
1-62-7.03	Roy
2-62-7.04	N/A

[10] **ENSURE** appropriate Power Checklist had been completed (**N/A** if not applicable).

POWER CHECKLIST	INITIALS
1-62-7.01	Roy
2-62-7.02	N/A

[11] **IF** Boric Acid Tank is the borated water source, **THEN**

ENSURE Boric acid pump aligned properly in accordance with 0-SO-62-10. N/A

[12] **IF** using the RWST for the borated water source, **THEN**

ENSURE LCV-62-135 and/or LCV-62-136 **OPERABLE**. N/A

NOTE Step **[13]** may be marked N/A if boration must be immediately initiated to maintain shutdown margin OR if performing a rapid boration using FCV-62-138 in preparation for RCS cooldown.

[13] **IF** reactor is subcritical **AND** an RCS boration or dilution is required, **THEN** **PERFORM** Appendix D. N/A

Unit________________ Date______________

4.0 PREREQUISITE ACTIONS (Continued)

NOTE 1 Step **[14]** may be marked N/A for any of the following conditions:

- Minor power changes (Reference Section 3.0)
- If boration must be immediately initiated to maintain control rods above the insertion limit
- During an emergency shutdown (AOP-C.03)
- Recovery of a dropped or misaligned rod (AOP-C.01).
- If initiating a rapid boration using FCV-62-138 immediately prior to reactor shutdown in preparation for RCS cooldown.
- During low power physics testing per 0-RT-NUC-000-003.0 if boration/dilution values have been provided and verified by Reactor Engineering.

NOTE 2 Appendix D and E may be used to verify data provided by Reactor Engineering. IV is not required if Appendices are performed by an SRO to verify Rx. Engineering data.

[14] **IF** reactor is critical **AND** RCS boration or dilution will be performed, **THEN**

PERFORM the following:

[a] Appendix E Reactivity balance calculation. RH

[b] Appendix D Calculation for amount of boric acid or primary water (TI-44). N/A

[15] **IF** performing a Spent Fuel Pit boration, **THEN**

ENSURE RCL has provided supporting data. N/A

Unit 1 Date TODAY

4.0 PREREQUISITE ACTIONS (Continued)

[16] **REVIEW** Unit and Radwaste Status Files for any off normal alignments that may impact performance. Rox

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

Print Name	Initials
Reactor Operator X	Rox

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

☐ 5.0 STARTUP/STANDBY READINESS

☐ 6.0 NORMAL OPERATION

☐ 7.0 SHUTDOWN

☐ 8.0 INFREQUENT OPERATION

REASON: Appendix E Reactivity Balance Calculation

End of Section 4.0

APPENDIX E
Page 1 of 18

REACTIVITY BALANCE CALCULATION

NOTE 1 One calculation is required for each major change. Calculation is an approximation of required Boron change. Eyeball interpolation of graphs is expected.

NOTE 2 Dilution or Boration value for power change from P_1 % to P_2 % power in time period T with rods moving from step position R_1 to R_2. (Subscript convention: 1 = current point, 2 = target point)

[1] ENTER the following data:

DATA REQUIRED	DATA	Where To Get
Current RCS Boron	_________ ppm	Chem Lab or Estimate using Appendix O
Core Burnup	_________ MWD/MTU	ICS U0981
Current Reactor power	_________ %	NIS or ICS
Final Reactor power	_________ %	As required for plant conditions
Total Reactor Power change	_________ Δ%	Δ Current and final Reactor power
Rate of Reactor power change	_________ %/hr	As required for plant conditions
Number of hours to change power	_________ hr(s)	As required for plant conditions
Current Rod Position	_________ steps	ICS or MCR Board
Final Rod Position	_________ steps	Estimate number of rod steps required to control ΔI and rod withdrawal requirements for power change.

APPENDIX E
Page 2 of 18

CAUTION **Follow sign conventions explicitly. (See Example Power Increase and Power decrease.)**

[2] CALCULATE change in boron concentration by performing the following:

Parameter	Where To Get	Calculation	Value
[a] $\Delta\rho$ POWER DEFECT	Attached Power Defect Curves: Unit 1: Figure 1, 2, or 3 Unit 2: Figure 8, 9, or 10.	________pcm PD_1 - ________pcm PD_2 = (current)	________pcm $\Delta\rho$ POWER DEFECT (negative for power increase)
[b] $\Delta\rho$ XENON	$Xenon_1$: From ICS* **or** REACTF (either current conditions **or** projection to initial condition). $Xenon_2$: From ICS* **or** REACTF (projection over time period T). *(ICS Xenon values must add negative sign).	**NOTE:** Xenon reactivity must be negative ________pcm XE_2 - ________pcm XE_1 = (current)	________pcm $\Delta\rho$ XENON (negative for rise in Xenon conc)
[c] $\Delta\rho$ RODS	Attached Rod Worth Curves: Unit 1: Figure 4, 5, or 6 Unit 2: Figure 11, 12, or 13.	________pcm $Rods_2$ - ________pcm $Rods_1$ = (current)	________pcm $\Delta\rho$ RODS (negative for rod insertion)
[d] $\Delta\rho$ POWER DEFECT + XENON + RODS (CHANGE IN REACTIVY DUE TO POWER DEFECT, XENON, AND RODS) ____[a]____pcm $\Delta\rho$ POWER DEFECT **+** ____[b]____pcm $\Delta\rho$ XENON **+** ____[c]____pcm $\Delta\rho$ RODS **=**			________pcm
[e] $\Delta\rho$ BORON (CHANGE IN BORON REACTIVITY) (____[d]____pcm $\Delta\rho$ POWER DEFECT + XENON + RODS) **X** (−1) **=**			________pcm $\Delta\rho$ BORON
[f] Δppm BORON (CHANGE IN BORON CONCENTRATION) (____[e]____pcm $\Delta\rho$ BORON) ÷ (____________pcm/ppm Boron Worth) = from Fig. 7 (U-1) or Fig. 14 (U-2)			________ ppm (negative for dilution, positive for boration)

[3] ENSURE independently verified by SRO in accordance with Appendix J.
(N/A if performed by an SRO to verify data provided by Rx. Eng) ________

APPENDIX E

Page 3 of 18

Example Power Increase

NOTE Typical values displayed in this example are not Unit and Cycle specific, however, the following example indicates proper sign convention.

Current RCS boron	1000 ppm
Core burnup	3000 MWD/MTU
Current reactor power	70%
Final reactor power	100%
Total reactor power change	30%
Rate of reactor power change	5%/hr
Number of hours to change power	6 hours
Current rod position	180 steps
Final Rod Position	220 steps

Reactivity Balance:

[a] $\Delta\rho_{\text{Power Defect}}$ = 1210 pcm PD1 – 1720 pcm PD2 = –510 pcm

[b] $\Delta\rho_{\text{Xenon}}$ = –2262 pcm XE2 –(–2436) pcm XE1 = +174 pcm

[c] $\Delta\rho_{\text{Rods}}$ = –10 pcm Rods2 – (–275) pcm Rods1 = +265 pcm

[d] $\Delta\rho_{\text{POWER DEFECT + XENON + RODS}}$ = –510 pcm + 174 pcm + 265 pcm = –71 pcm

[e] $\Delta\rho_{\text{BORON}}$ = –71 pcm x (–1) = + 71 pcm

Change in Boron PPM:

[f] (+71) pcm Boron ÷ (–6.35) pcm/ppm Boron worth = –11 ppm (dilution)

APPENDIX E
Page 4 of 18

Example Power Decrease

NOTE Typical values displayed in this example are not Unit and Cycle specific, however, the following example indicates proper sign convention.

Current RCS boron	500 ppm
Core burnup	18000 MWD/MTU
Current reactor power	100%
Final reactor power	80%
Total reactor power change	-20%
Rate of reactor power change	-5%/hr
Number of hours to change power	4 hours
Current rod position	220 steps
Final Rod Position	200 steps

Reactivity Balance:

[a] $\Delta\rho_{\text{Power Defect}}$ = 2630 pcm PD1 – 2100 pcm PD2 = +530 pcm

[b] $\Delta\rho_{\text{Xenon}}$ = –3030 pcm XE2 –(–2884) pcm XE1 = –146 pcm

[c] $\Delta\rho_{\text{Rods}}$ = –220 pcm Rods2 – (–20) pcm Rods1 = –200 pcm

[d] $\Delta\rho_{\text{POWER DEFECT + XENON + RODS}}$ = +530 pcm + (–146 pcm) + (–200 pcm) = +184 pcm

[e] $\Delta\rho_{\text{BORON}}$ = +184 pcm x (–1) = –184 pcm

Change in Boron PPM:

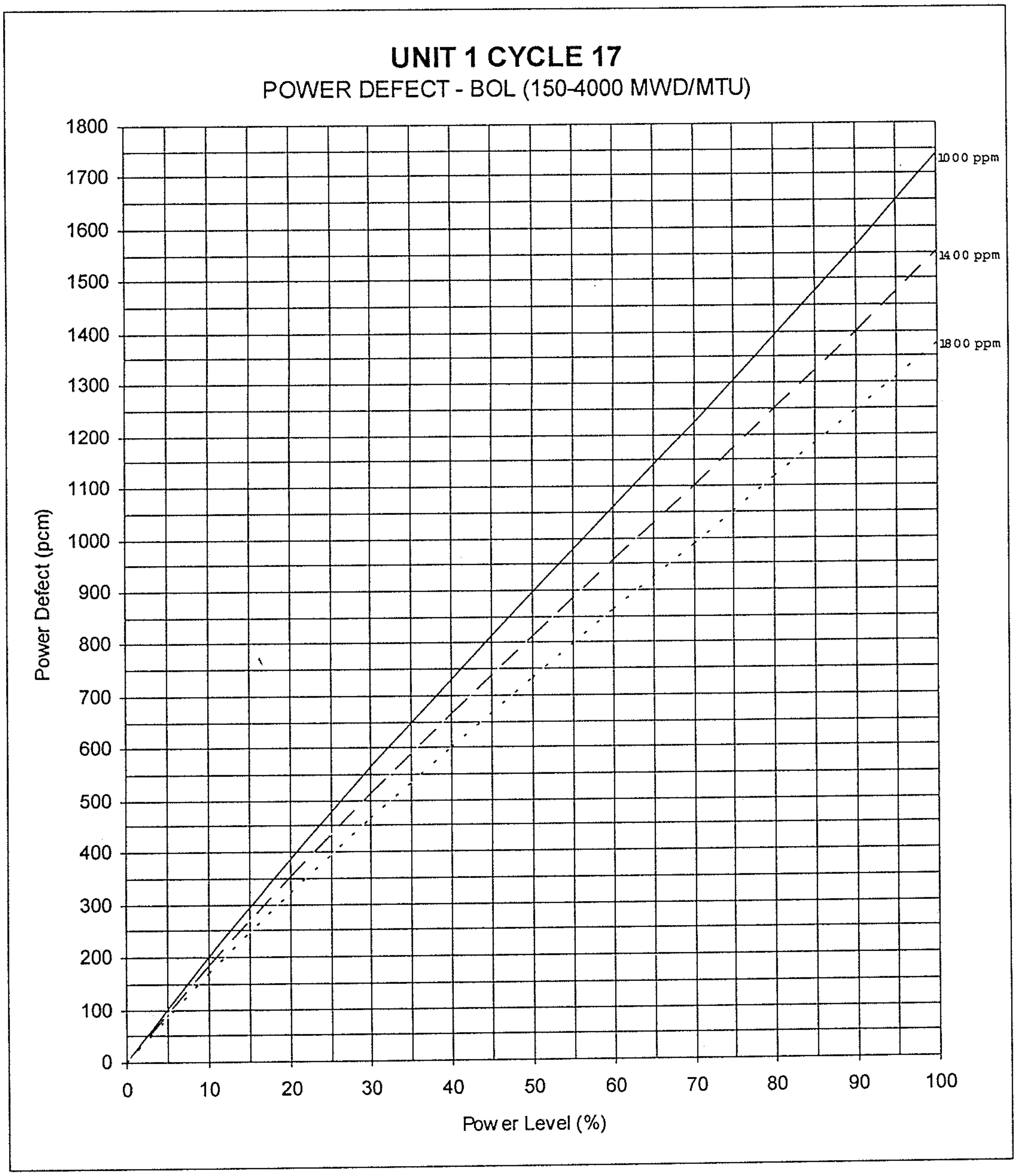
[f] (–184) pcm Boron ÷ (–7.47) pcm/ppm Boron worth = +25 ppm (boration)

APPENDIX E

Page 5 of 18

Figure 1 U1C17 Power Defect BOL

NOTE Use "eye-ball" interpolation between closest parameter lines.

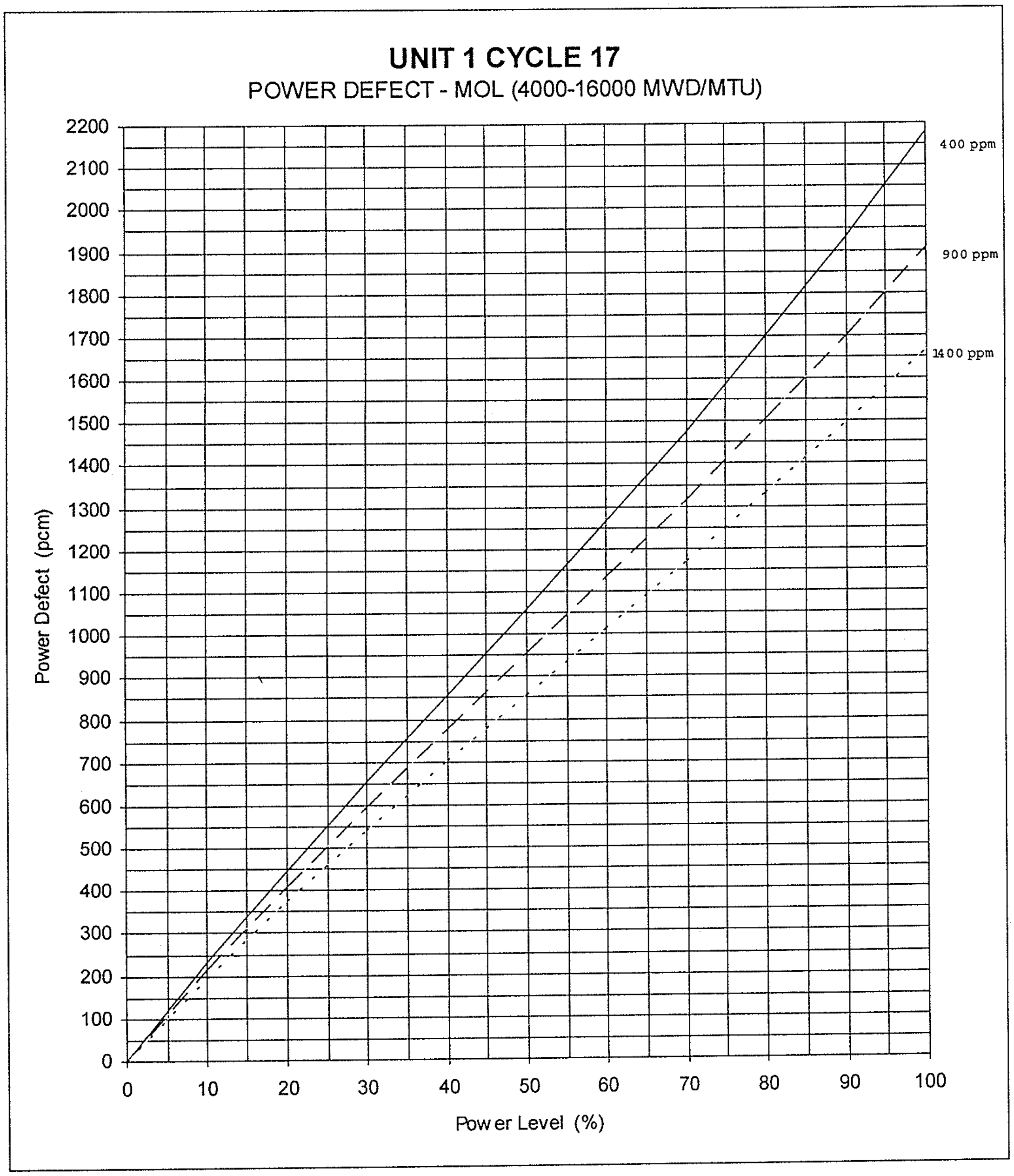


Reference: NDR Table 6-23 to 6-27

APPENDIX E
Page 6 of 18

Figure 2 U1C17 Power Defect MOL

NOTE Use “eye-ball” interpolation between closest parameter lines.

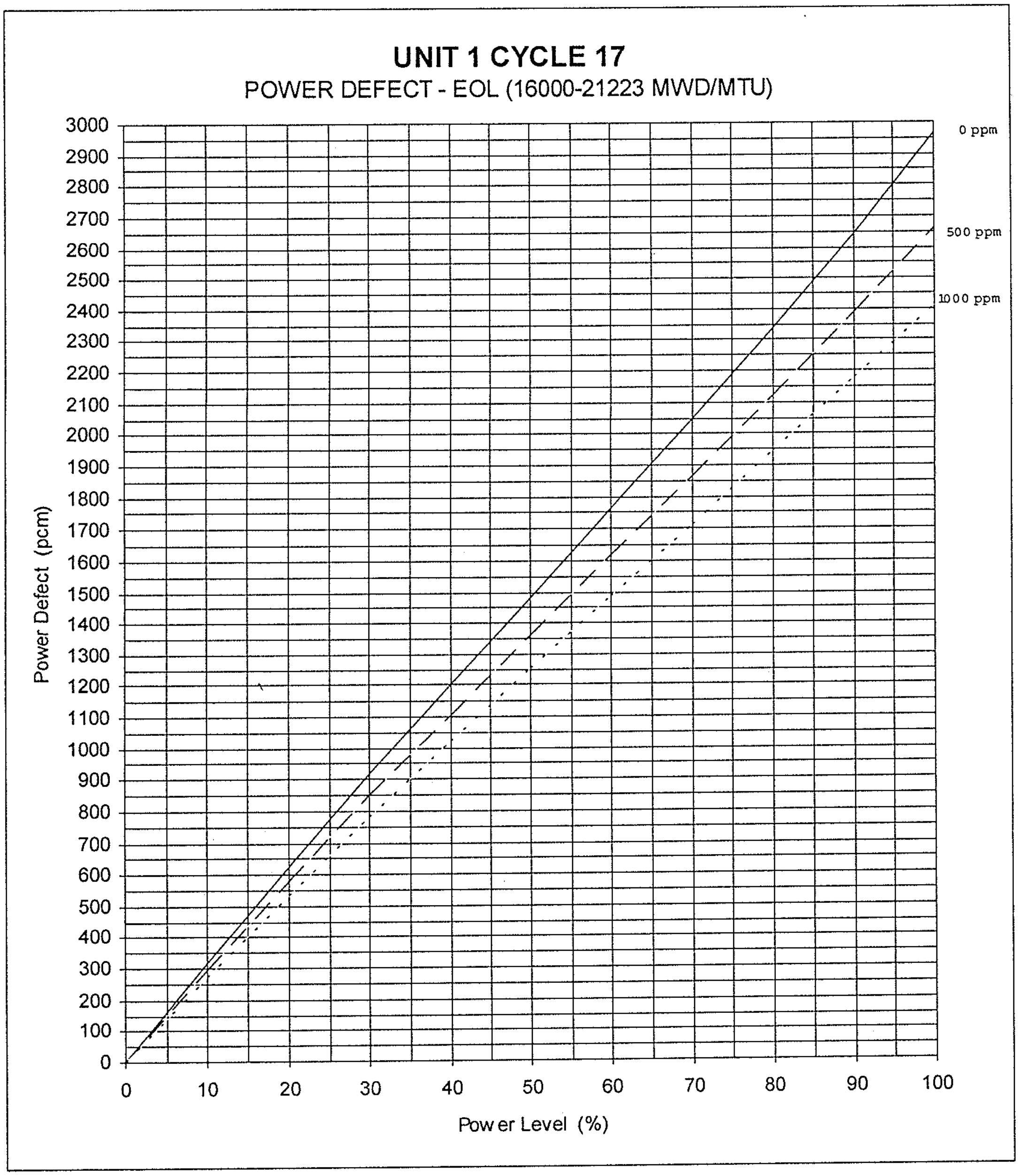


Reference: NDR Table 6-23 to 6-27.

APPENDIX E
Page 7 of 18

Figure 3 U1C17 Power Defect EOL

NOTE Use “eye-ball” interpolation between closest parameter lines.

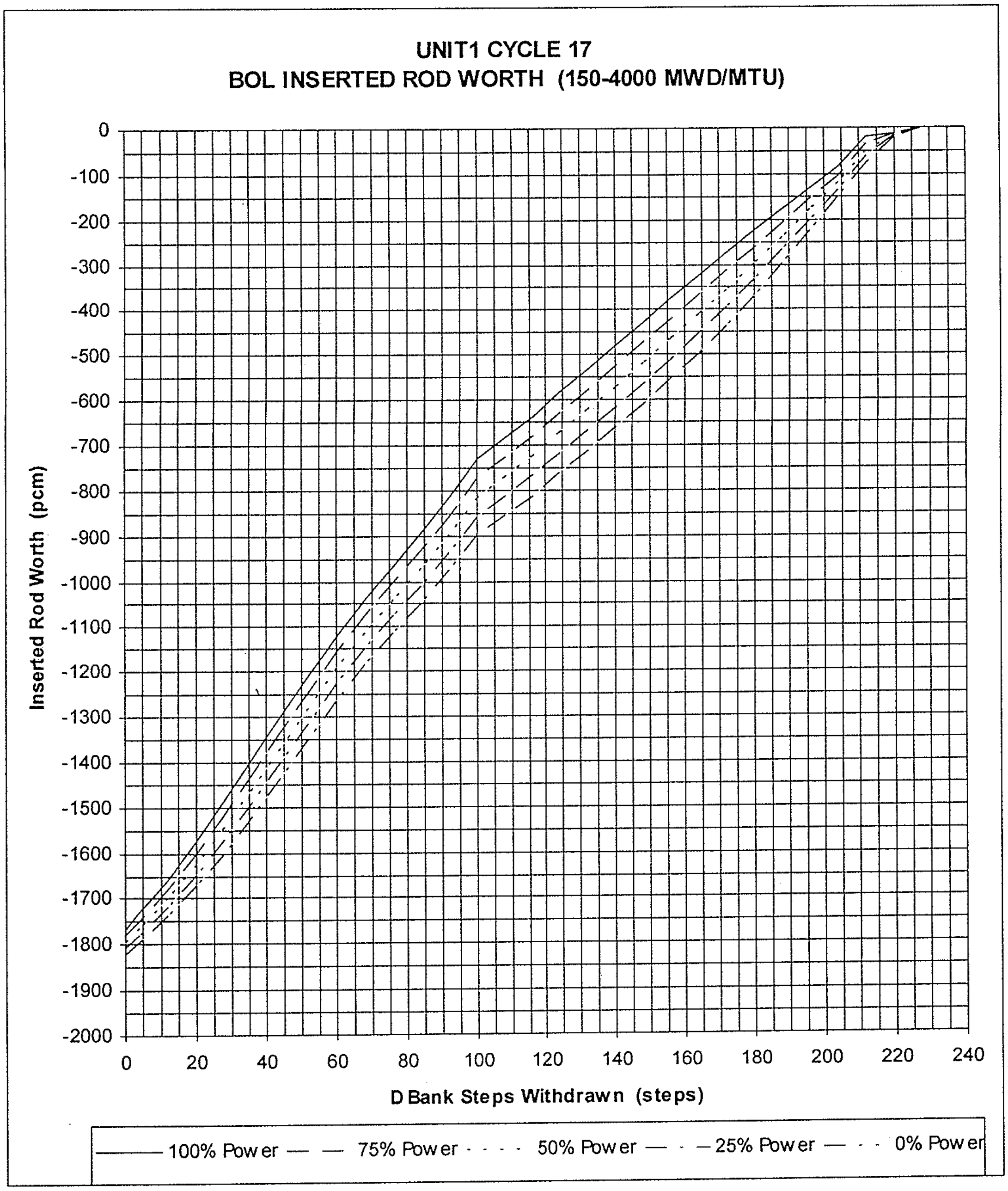


Reference: NDR Table 6-23 to 6-27

APPENDIX E
Page 8 of 18

Figure 4 U1C17 Inserted Rod Worth BOL

NOTE Use "eye-ball" interpolation between closest parameter lines.

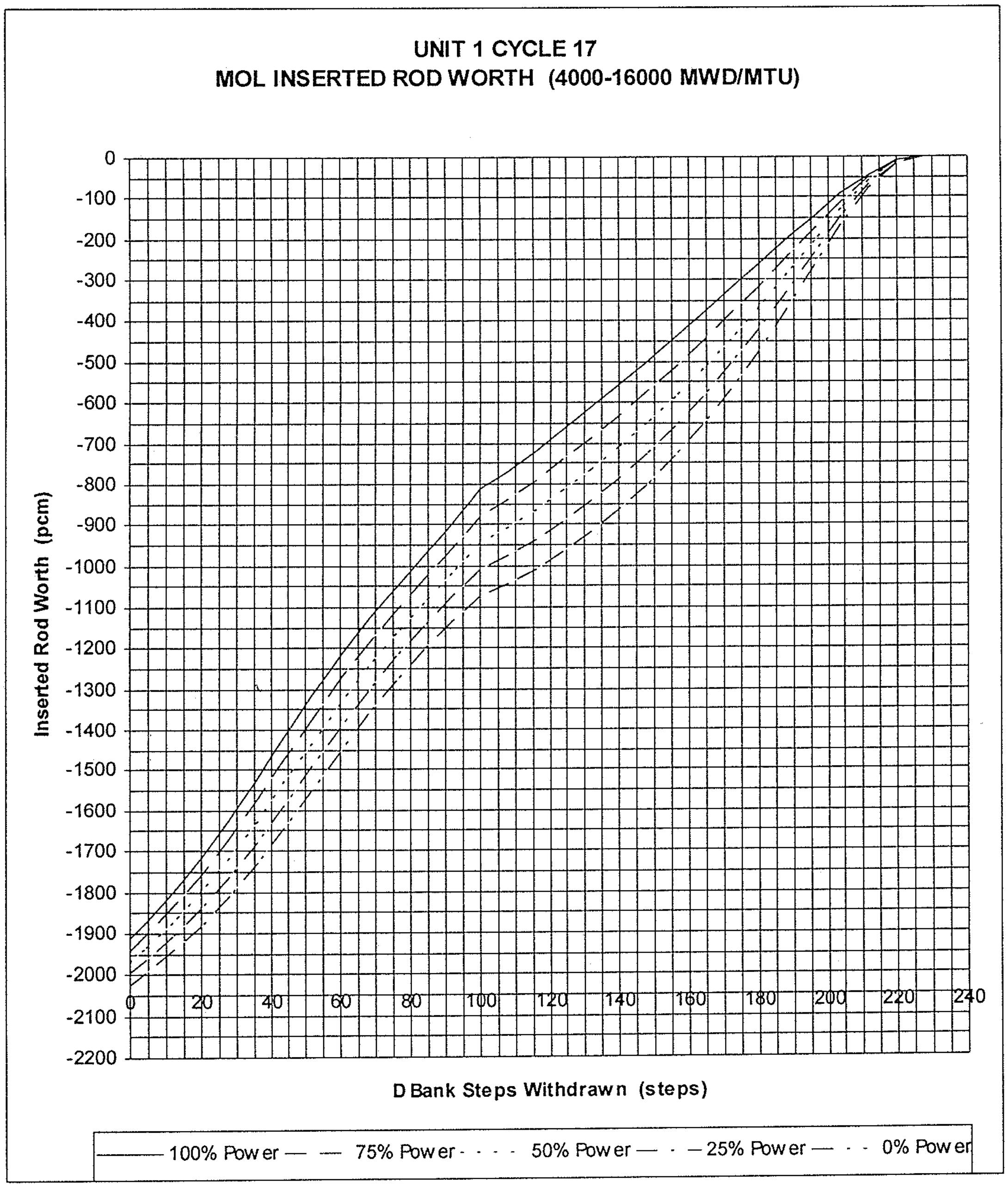


Reference : NDR Table 6-34.

APPENDIX E
Page 9 of 18

Figure 5 U1C17 Inserted Rod Worth MOL

NOTE Use "eye-ball" interpolation between closest parameter lines.



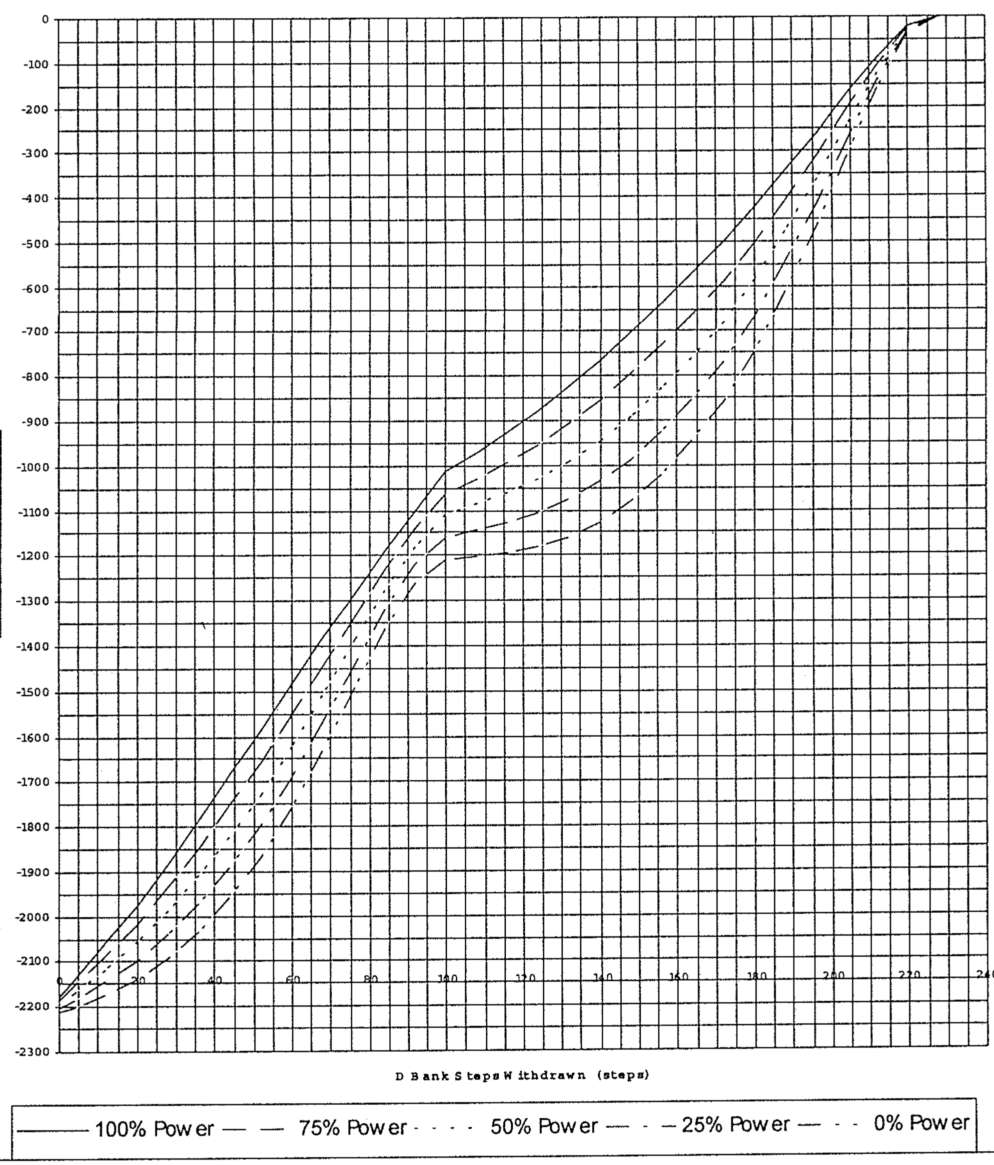
Reference : NDR Table 6-34.

APPENDIX E
Page 10 of 18

Figure 6 U1C17 Inserted Rod Worth EOL

NOTE Use “eye-ball” interpolation between closest parameter lines.

UNIT 1 CYCLE 17
EOL INSERTED ROD WORTH (16000-21223 MWD/MTU)

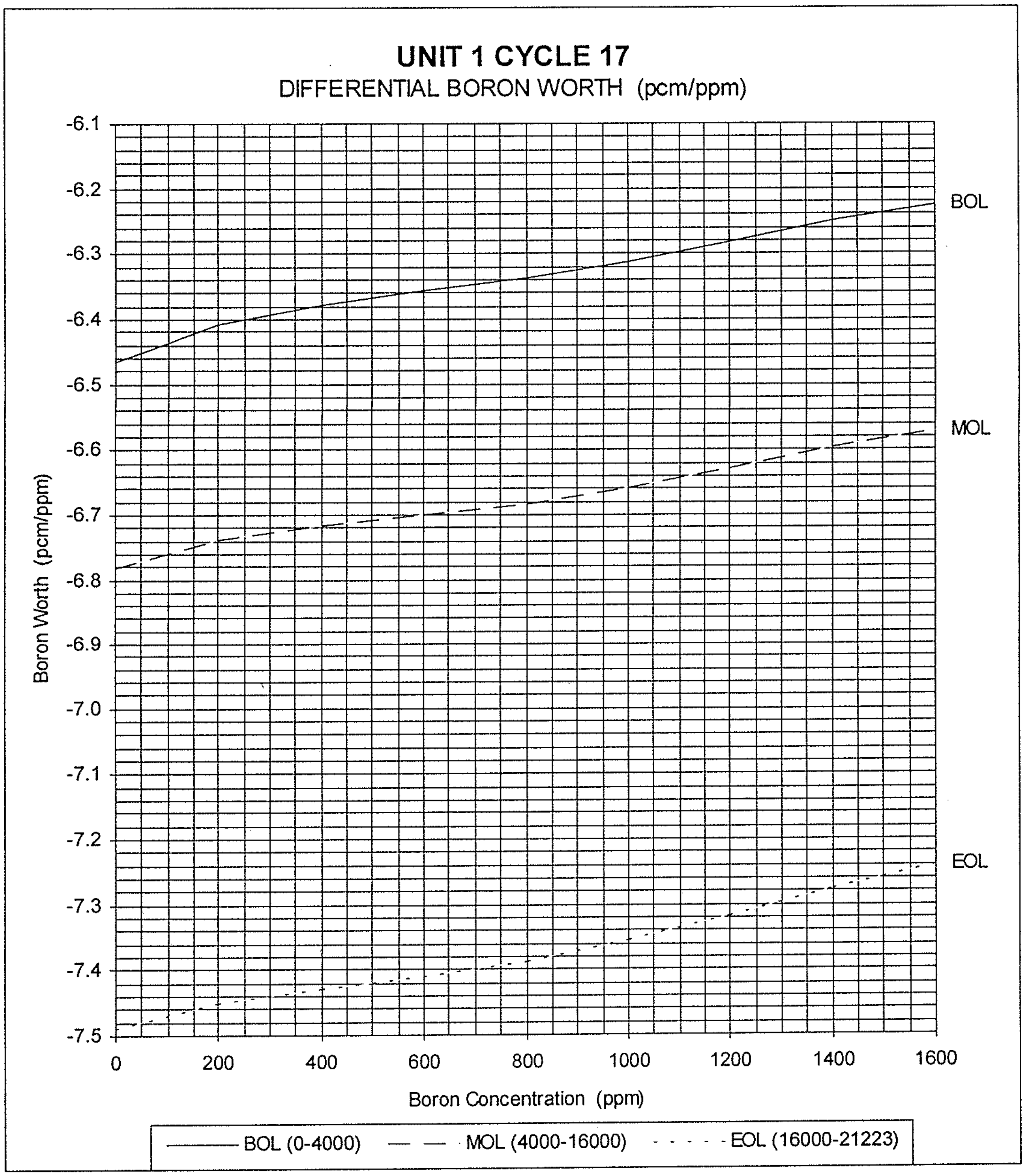


Reference : NDR Table 6-34.

APPENDIX E

Figure 7 U1C17 Differential Boron Worth

NOTE Use "eye-ball" interpolation between closest parameter lines.

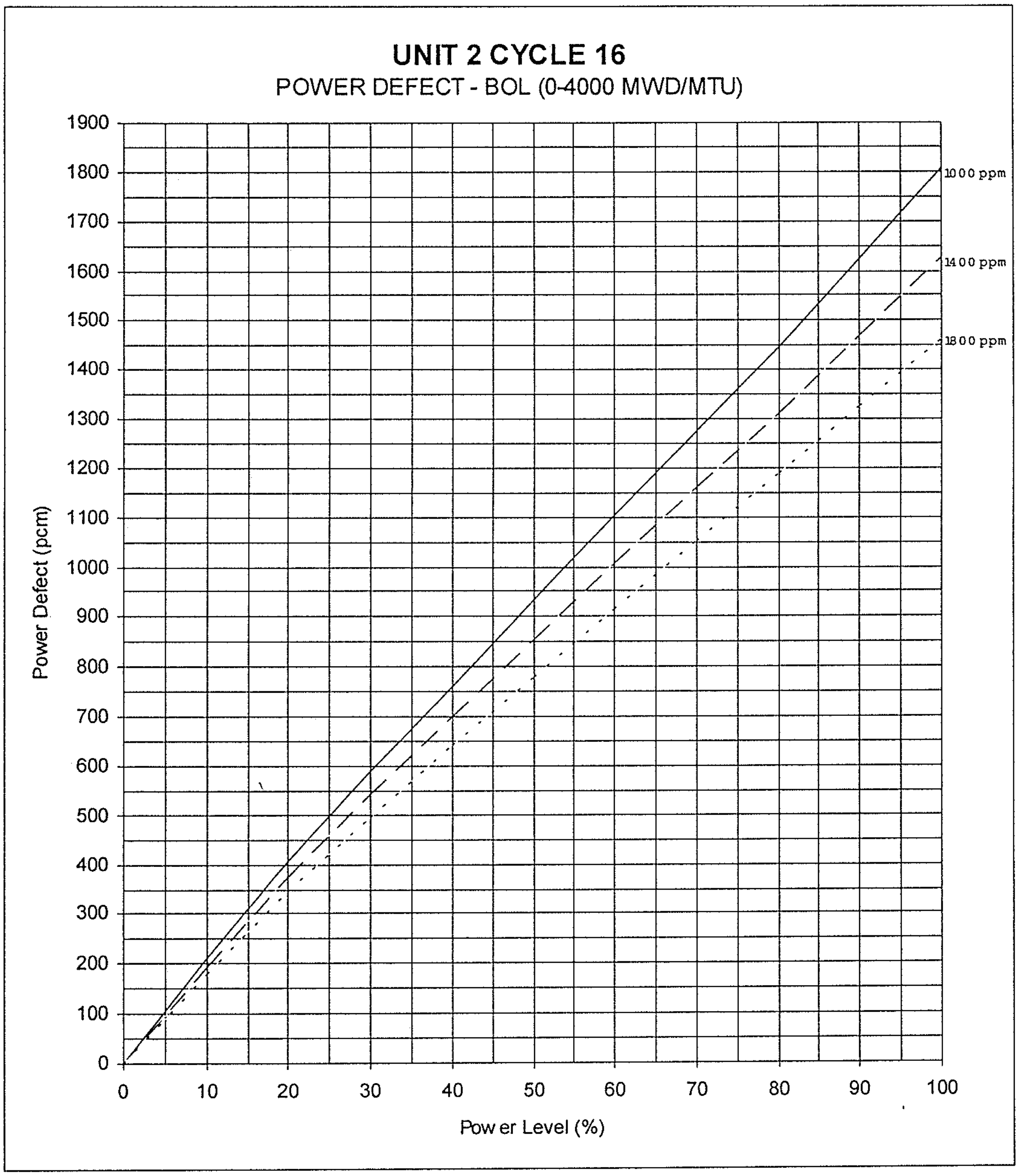


Reference: NDR Table 6-7

APPENDIX E
Page 12 of 18

Figure 8 U2C16 Power Defect BOL

NOTE Use "eye-ball" interpolation between closest parameter lines.

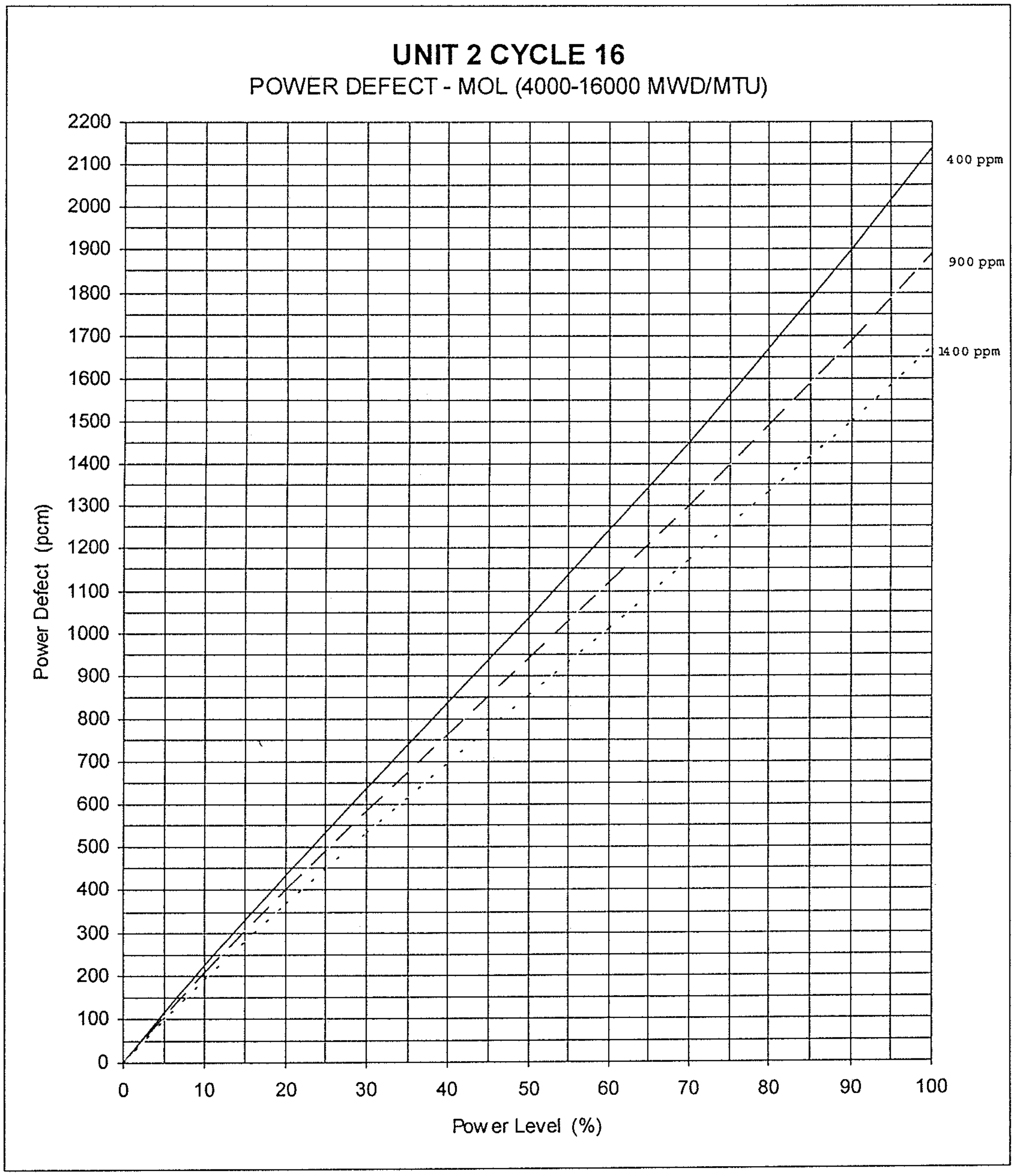


Reference: NDR Table 6-23 to 6-27, Total Power Defect

APPENDIX E
Page 13 of 18

Figure 9 U2C16 Power Defect MOL

NOTE Use "eye-ball" interpolation between closest parameter lines.

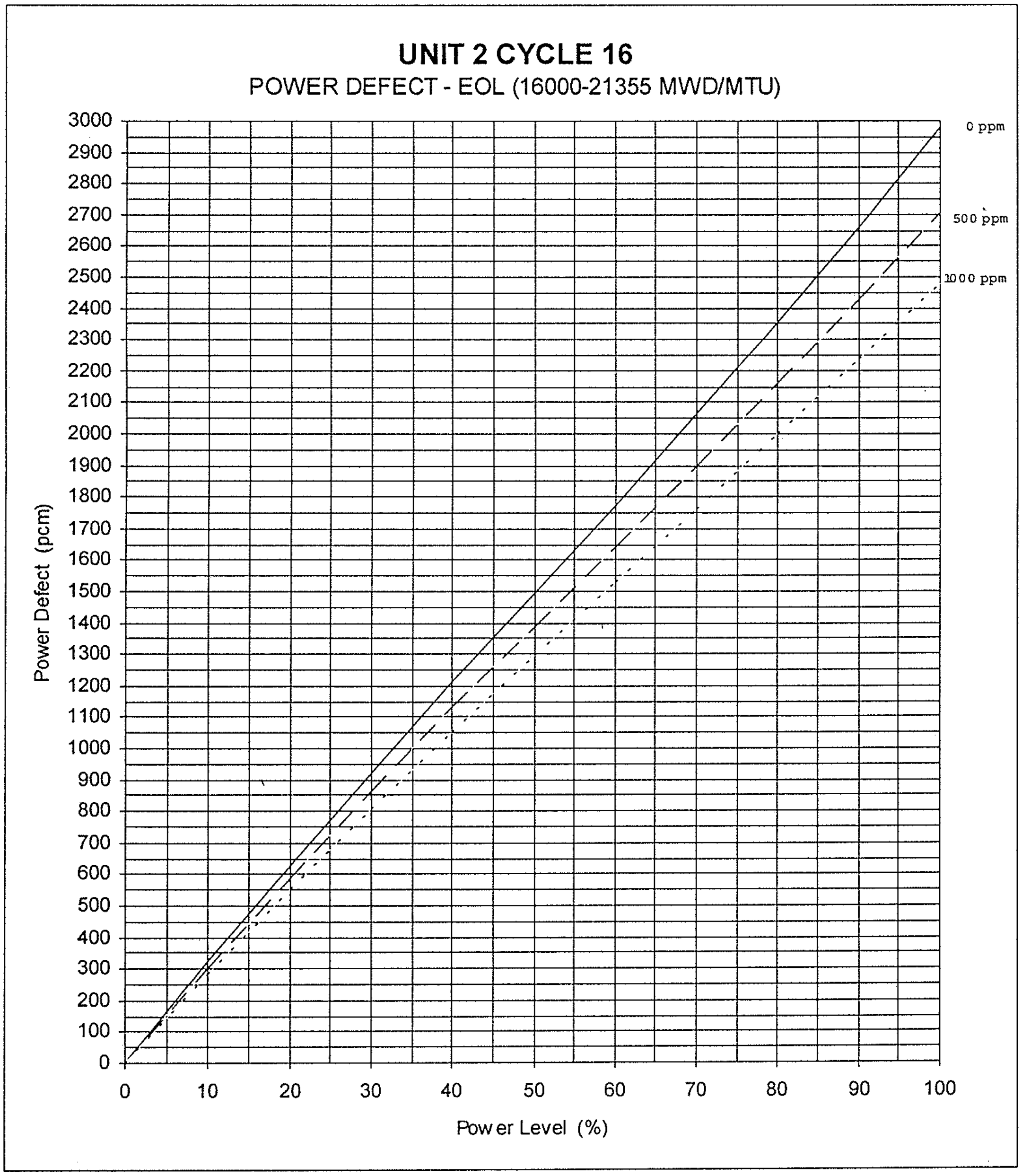


Reference: NDR Table 6-23 to 6-27, Total Power Defect

APPENDIX E
Page 14 of 18

Figure 10 U2C16 Power Defect EOL

NOTE Use "eye-ball" interpolation between closest parameter lines.

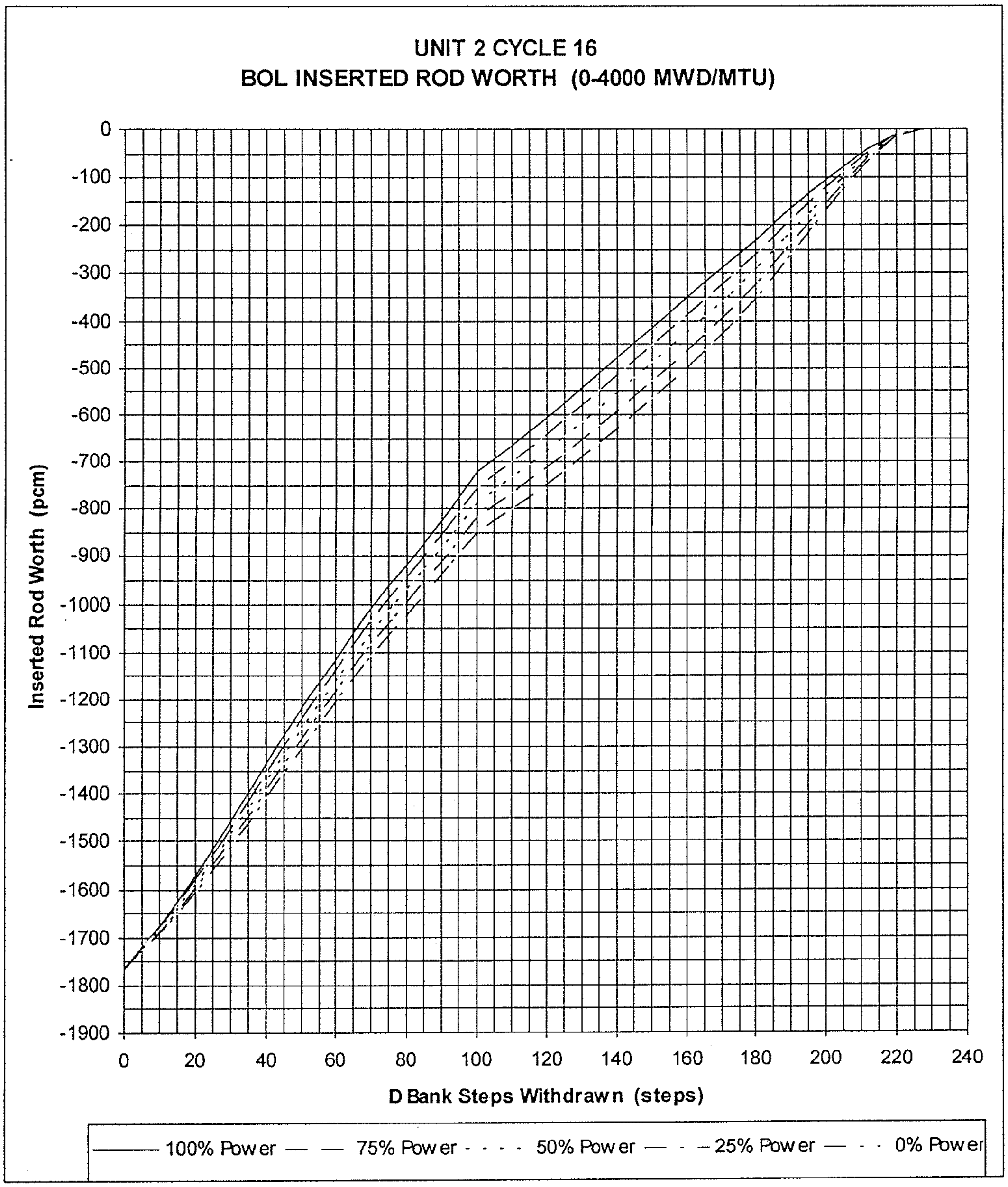


Reference: NDR Table 6-23 to 6-27, Total Power Defect

APPENDIX E
Page 15 of 18

Figure 11 U2C16 Inserted Rod Worth BOL

NOTE Use "eye-ball" interpolation between closest parameter lines.

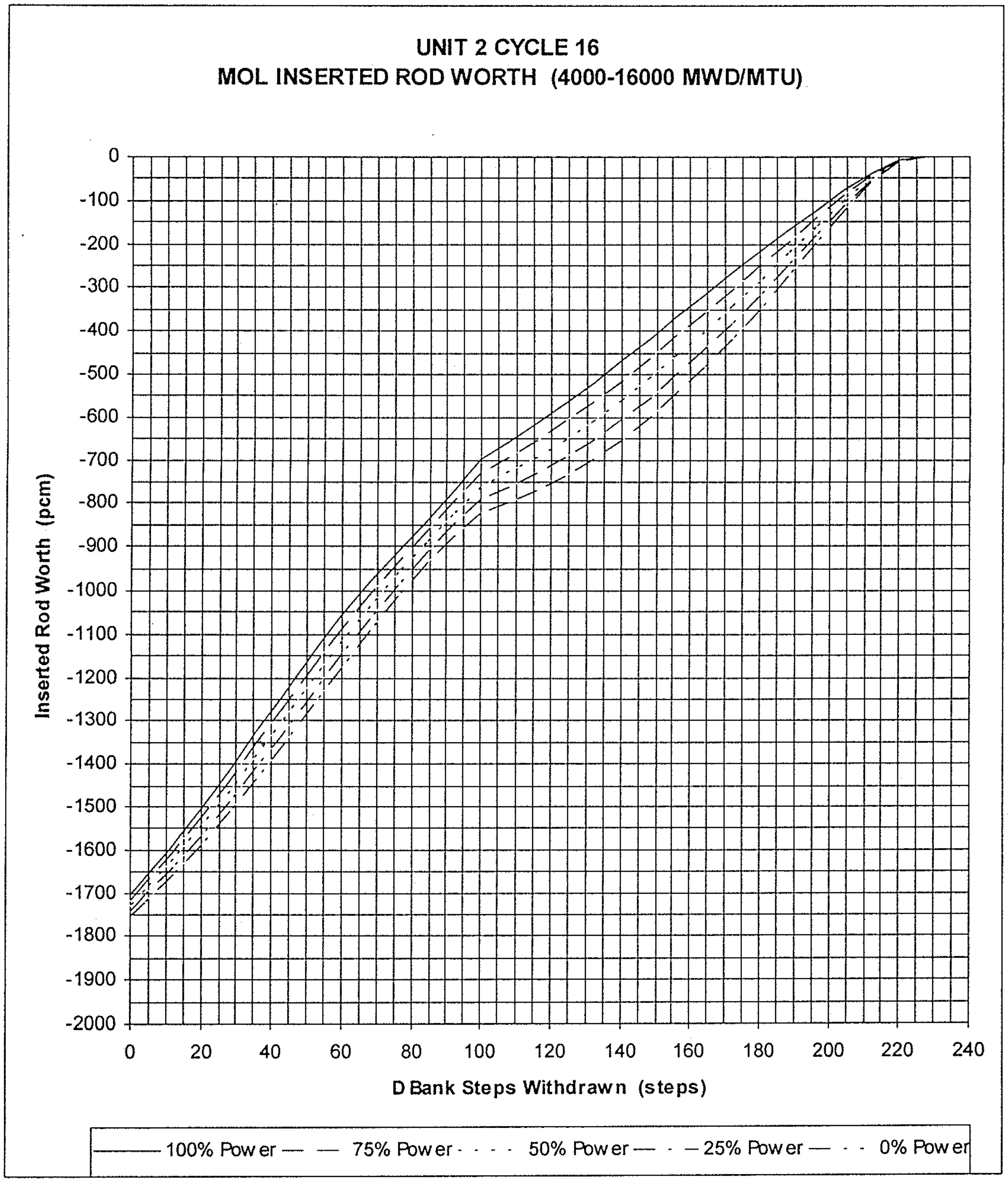


Reference: NDR Table 6-34, HFP Integral Rod Worth as a function of Steps withdrawn and burnup for Banks CD, CC, CB in overlap.

APPENDIX E
Page 16 of 18

Figure 12 U2C16 Inserted Rod Worth MOL

NOTE Use "eye-ball" interpolation between closest parameter lines.



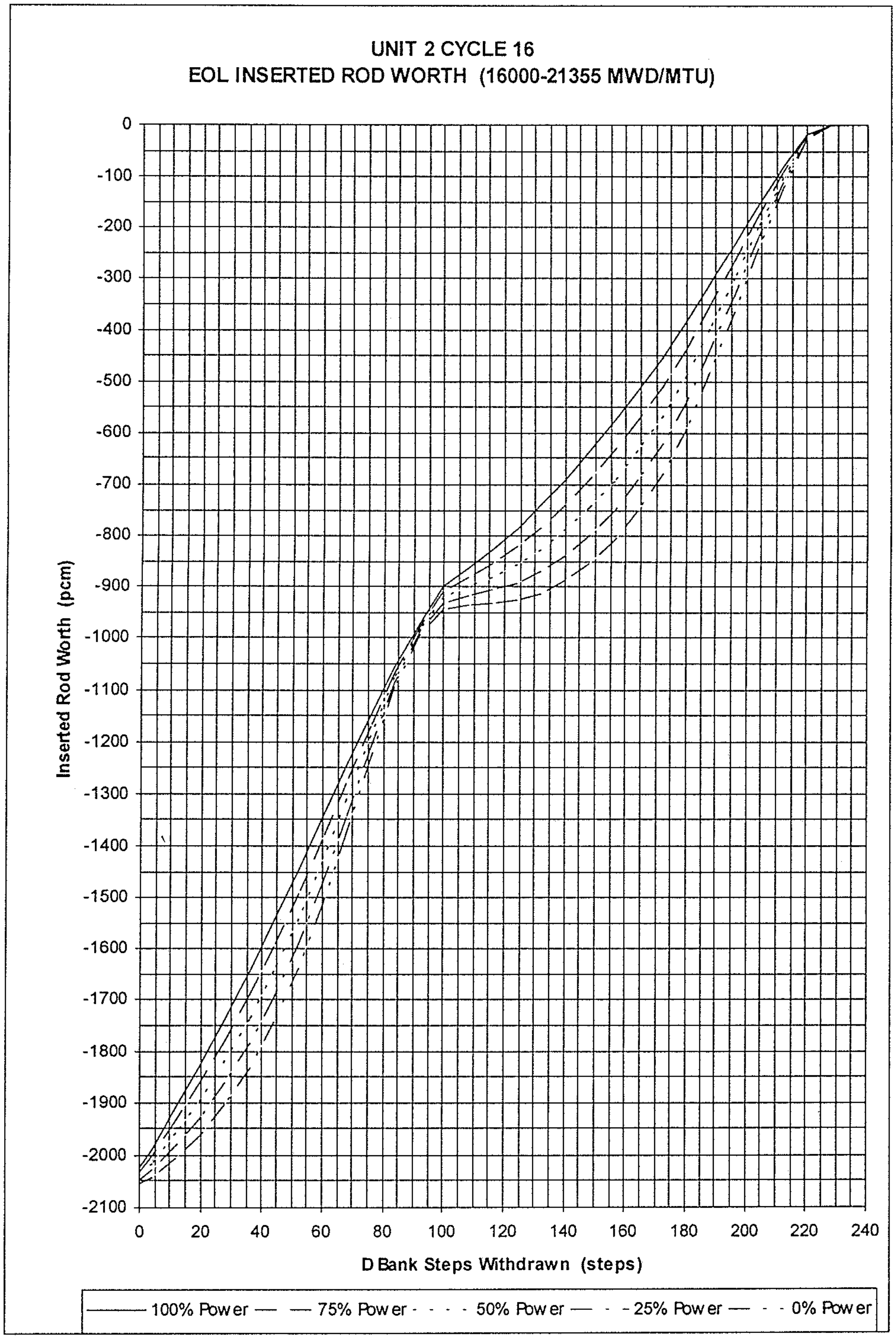
Reference: NDR Table 6-34, HFP Integral Rod Worth as a function of Steps withdrawn and burnup for Banks CD, CC, CB in overlap.

APPENDIX E

Page 17 of 18

Figure 13 U2C16 Inserted Rod Worth EOL

NOTE Use "eye-ball" interpolation between closest parameter lines.



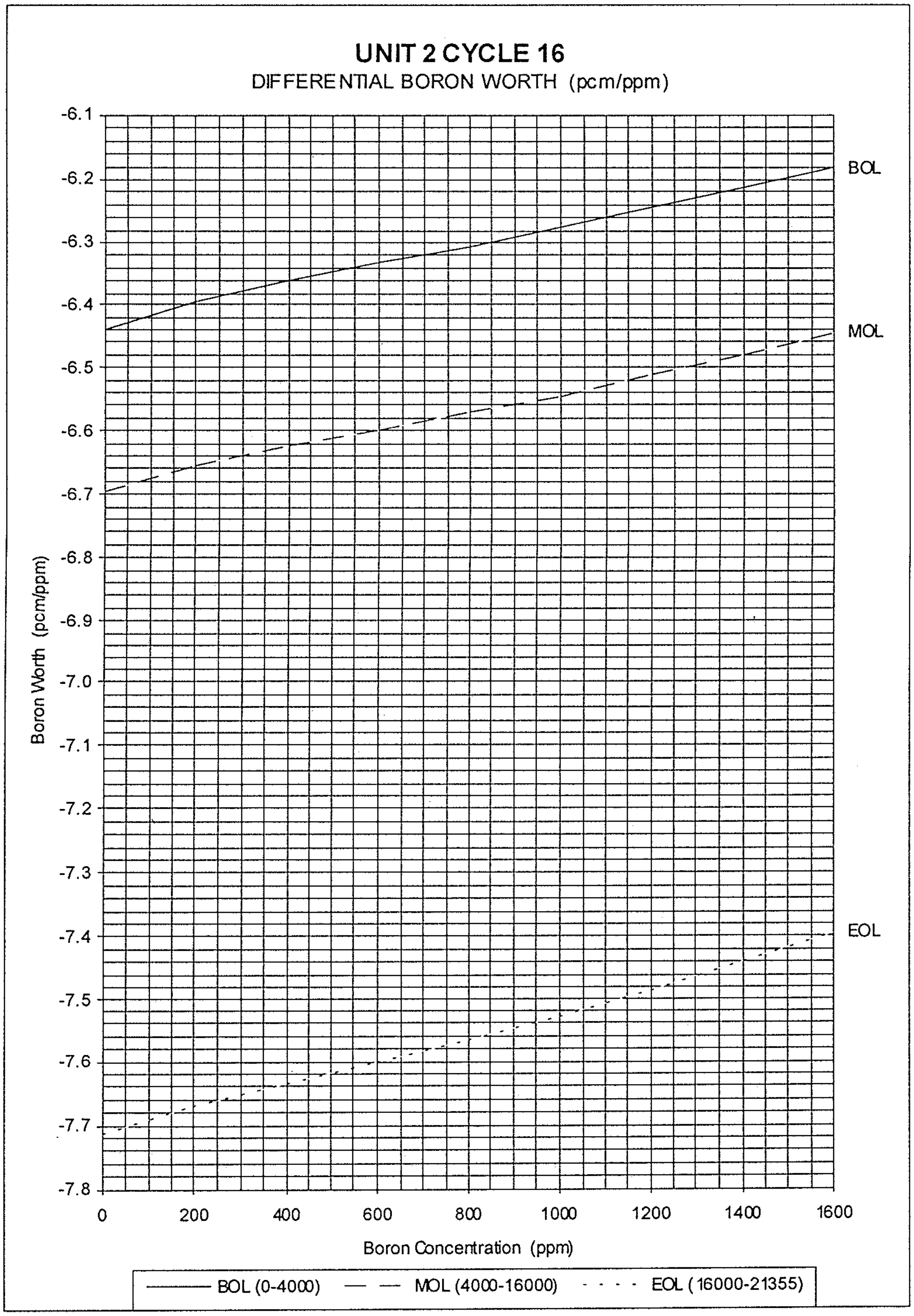
Reference: NDR Table 6-34, . HFP Integral Rod Worth as a function of Steps withdrawn and burnup for Banks CD, CC, CB in overlap.

APPENDIX E

Page 18 of 18

Figure 14 U2C16 Differential Boron Worth

NOTE Use “eye-ball” interpolation between closest parameter lines.



Reference: NDR Table 6-7, HFP Differential Boron Worth

Surveillance Task Sheet (STS)

'k Order: SI Key: Procedure: 0-SI-OPS-068-137.0 Train/Loop: Unique Data:

Title: Reactor Coolant system Water Inventory

Perf Sect: OPS Test Reason Daily Unit: 0

SRO LL-1
Authorization to Begin: SRO — Date: TODAY — Time: NOW

Data Sheet: One Complete copy

Start Date: TODAY — Time: NOW — Completion Date: — Time:

Issued: Extension:

Frequency: NONE FO: N TS: Y ASME XI: N

Mode: SX

Applicable Modes: 1,2,3,4,5,6 Perfor Modes: 1,2,3,4,5,6

Clearance Required: Sched. Rec.#:

Dry Cask Storage:

Subsequent Reviews:	Initial	Date
Cognizant Engr		
Cem Admin Reviewer		

Was this a Complete or Partial Performance?
(Explain Particial in "Remarks" below)
Complete [ ] Partial [

Were all Tech Spec/Tech Req/ISFSI CoC/ODCM/Fire Prot Req/AMSAC acceptance criteria satisified?
Yes [ ] No [ ] N/A [

Were all other acceptance criteria satisfied?
Yes [ ] No [ ] N/A [

If all Tech Spec Tech Req/ISFSI CoC/ODCM/Fire Prot Req/AMSAC were not satisfied, was an LCO/TR/ODCM Action required ((Explain in "Remarks")
Yes [ ] No [ ] N/A [

Print Name	Test Performer's Signature	Initial	Section
Reactor Operator X	Reactor Operator X	ROX	OPS
Reactor Operator Y	Reactor Operator Y	ROY	OPS

Test Director: Reactor Operator X — Lead Performer: Reactor Operator X — Date: TODAY

Acceptance Criteria Review:SRO — Date — Time
(ASME XI SIs require review within 96 hours)

Independent Reviewer

PERMANENT COMMENTS:

REMARKS:

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM 43-2 Manual
RO A2

PERFORM REACTOR COOLANT SYSTEM WATER INVENTORY (137.0)

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 to perform manual calculation of RCS water inventory, and to be performed in a classroom.	Y	1/29/10	All	M. Hankins

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: Perform RCS Leakage Calculation (0-SI-OPS-068-137.0)

JA/TA task # : **0020010201** (**RO**)

K/A Ratings:	2.2.12	(3.7/4.1)
	002A4.01	(3.5/3.8)
	002K405	(3.8/4.2)
	002K504	(3.1/3.4)

Task Standard:
Upon completion of this task, the operator will have correctly determined RCS leakage per 0-SI-OPS-068-137.0 and notify the SRO of Tech Spec and EPIP requirements.

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. Any UNSAT requires comments.
2. Ensure calculator is available for operators use.
3. A copy of 0-SI-OPS-068-137.0 and previously performed procedural steps must be provided to the operator for task performance.

Validation Time: CR. 20 mins **Local** ____________

Tools/Equipment/Procedures Needed:
0-SI-OPS-068-137.0

References:

	Reference	Title	Rev No.
1.	0-SI-OPS-068-137.0	Reactor Coolant System Water Inventory	22
2	TS	Technical Specifications	Latest

==

READ TO OPERATOR

DIRECTIONS TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. I will provide initiating cues. 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-1 is in MODE 1.
2. The RCS leakage surveillance required by T.S. 4.4.6.2.1 is due this shift and the ICS computer is not available
3. The off going crew initiated performance of 0-SI-OPS-068-137.0, Section 6.1 and Appendix C are complete. Appendix D is complete through section 1.4
4. SG leakages

SG # 1	SG # 2	SG # 3	SG # 4
3.2 gpd	2.2 gpd	2.3 gpd	4.8 gpd

5. SI-50 and SI-137.5 were completed last nigth at 2300.
6. Chemistry supervisor reported no additions or samples taken from the RCS during the selected performance period.
7. CLA Levels initial and final are as follows:

CLA	LI	INITIAL	FINAL
1	63-129	7692	7692
2	63-109	7677	7677
3	63-89	7672	7672
4	63-89	7680	7680

8. CCPIT/HUT leakage and "other" leakage is 0 gpm
9. Do all calculations to three decimal places, or to 1/1000.
10. Data collected for performance of this leak rate is documented in Appendix C and was collected over 124 minutes

INITIATING CUES:

You are the Unit-1 CRO and have been directed to complete the performance of 0-SI-OPS-068-137.0 Appendix "D" and Section 6.1.1 through step 8.

STEP 1.:	Operator begins with Appendix D, Step 1.5 **Total RCS Leakage**:	___ SAT
		___ UNSAT
STANDARD:	Operator continues at step 1.5 of Appendix D and totals leakage from steps 1.1 (VCT) , 1.3[3] (PZR)and 1.4 RCS Temp Corr (1.46 + 0.031 + -0.066 = 1.425 GPM)	**Critical Step** ___________ **Start Time**
STEP 2.:	2.1 Pressurizer Relief Tank PRT Leakage = $\frac{\text{Final Volume} - \text{Initial Volume}}{\text{Delta Time}}$	___ SAT ___ UNSAT
STANDARD:	Operator obtains volumes that were calculated in Appendix "C" Section 6.0 and determines the PRT leakage to be 0.242 GPM = (8622 - 8592) / 124.	**Critical Step**
STEP 3.:	2.2 Reactor Coolant Drain Tank RCDT Leakage = $\frac{\text{Final Volume} - \text{Initial Volume}}{\text{delta time}}$	___ SAT ___ UNSAT
STANDARD:	Operator obtains volumes that were calculated in Appendix "C" Section 7.0 and determines the RCDT leakage to be 0.033 = (85.4 - 81.3) / 124.)	**Critical Step**
STEP 4.:	2.3 Steam Generator	___ SAT
STANDARD:	Operator utilizes information provided in the initial conditions or contacts Chemistry	___ UNSAT
NOTE 1:	**S/G leakages from initial conditions are as follows:** **[a] SG 1=3.2 GPD** **[b] SG 2=2.2 GPD** **[c] SG 3=2.3 GPD** **[d] SG 4=4.8 GPD**	**Critical Step**
NOTE 2:	**Per initial conditions, SI-50 and SI 137.5 were completed yesterday at 2300.**	
STANDARD:	Operator obtains SG leakages from initial conditions: Performs calculation and determines Total SG leakage = .3.2 + 2.2 + 2.3 + 4.8 = $\frac{\text{12.5 GPD}}{\text{1440 min/day}}$ = 0.009 Records performance times for SI-50 and SI-137.5, from initial conditions	

STEP 5.: 2.4 Cold Leg Accumulators **NOTE:** **Operator should use note and determine CLA leakage can be marked N/A. If calculation is performed, result should be 0 GPM since the start and end levels of all accumulators remained constant.** STANDARD: Operator determines CLA leakage is either not applicable and N/A's the step or records zero.	___ SAT ___ UNSAT
STEP 6.: 2.5 Other identified leakage **NOTE:** **Operator should use note and determine other leakage can be marked N/A or utilize initial condition that states no other leakage.** STANDARD: Operator determines "other" leakage is either not applicable and N/A's the step or records zero.	___ SAT ___ UNSAT
STEP 7.: 2.6 Total Identified Leakage **NOTE:** **Operator should use initial conditions to determine that the CCPIT/HUT leakage is zero.** Total Identified Leakage = PRT + RCDT + SG + CLA + CCPIT/HUT + OTHER TIL = 0.242 + 0.033 + 0.009+ 0 + 0 + 0 = 0.284 STANDARD: Operator totals the individual contributions to total leakage and determines identified leakage to be 0.284 GPM.	___ SAT ___ UNSAT **Critical Step**
STEP 8.: 3.0 Unidentified leakage Unidentified leakage = Total Leakage – Identified leakage UL = 1.425 – 0.284 = 1.141 gpm STANDARD: Operator should subtract identified leakage from step 2.6 from total leakage determined in step 1.5 and find unidentified leakage to be ≈ 1.141 GPM.	___ SAT ___ UNSAT **Critical Step**

Operator continues with section 6.1.1	
STEP 9.: 6.1.1 [1]CALCULATE total RCS leakage, identified leakage… Total RCS Leakage = 1.425 gpm Identified Leakage = 0.242 gpm Unidentified Leakage = 1.141 gpm STANDARD: Operator records leakage values determined from Appendix D.	___ SAT ___ UNSAT
STEP 10.: 6.1.1 [2] If identified leakage is less than zero… STANDARD: The operator should mark this step N/A since the leakage is greater than zero.	___ SAT ___ UNSAT
STEP 11.: 6.1.1 [3] If identified leakage is more negative… STANDARD: The operator should mark this step N/A since the leakage is greater than zero.	___ SAT ___ UNSAT
STEP 12.: 6.1.1 [4] If an identified leakage more positive… STANDARD: The operator should mark this step N/A since the leakage is greater than zero.	___ SAT ___ UNSAT
STEP 13.: 6.1.1 [5] Record maximum leak rate from an individual steam generator… STANDARD: The operator should reference Appendix "D" or the initiating cue to determine the maximum steam generator leakage is 4.8 GPD from S/G # 4 and the total leakage is 0.009 GPM .	___ SAT ___ UNSAT

STEP 14.:	6.1.1 [6] Check appropriate box to indicate whether acceptance criteria were met…… Technical Specifications: Max individual SG leakage — check Yes Total Identified — check Yes Total unidentified — check **NO** Administrative Acceptance SG leakage ≤ 75 GPD — check Yes	___ SAT ___ UNSAT **Critical Step**
STANDARD:	The operator should check "Yes" for acceptance criteria met for S/G leakage and total identified leakage BUT "No" for unidentified leakage less than 1.0.	
STEP 15.:	6.1.1 [7] If any Technical Specification acceptance criteria NOT satisfied…… Notify SM Refer to REP Refer to AOP- R.01 *or* AOP-R.05	___ SAT ___ UNSAT
NOTE to Evaluator:	Follow up question to determine procedure transition may be required.	
STANDARD:	The operator should address each sub-step. The SM is notified that TS acceptance criteria were not met based on **unidentified** leakage greater than **1 gpm**. ▪ SM/US is notified ▪ Refer to EPIP 1 for the REP implementation ▪ Refer AOP-R.05, RCS Leak and Leak Source identification* (SI also references AOP-R.01, Steam Generator Tube Leak in this step, but RO should recognize that AOP-R.01 is not applicable)	***Critical Step**
STEP 16.:	6.1.1 [8] If leakage is within Tech Spec limits but exceeds…	___ SAT
STANDARD:	The operator should mark this step N/A since S/G leakage is within all acceptance criteria.	___ UNSAT _________ Stop Time

END OF JPM

READ TO OPERATOR

DIRECTIONS TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. I will provide initiating cues. 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-1 is in MODE 1.
2. The RCS leakage surveillance required by T.S. 4.4.6.2.1 is due this shift and the ICS computer is not available
3. The off going crew initiated performance of 0-SI-OPS-068-137.0, Section 6.1 and Appendix C are complete. Appendix D is complete through section 1.4
4. SG leakages

SG # 1	SG # 2	SG # 3	SG # 4
3.2 gpd	2.2 gpd	2.3 gpd	4.8 gpd

5. SI-50 and SI-137.5 were completed last nigth at 2300.
6. Chemistry supervisor reported no additions or samples taken from the RCS during the selected performance period.
7. CLA Levels initial and final are as follows:

CLA	LI	INITIAL	FINAL
1	63-129	7692	7692
2	63-109	7677	7677
3	63-89	7672	7672
4	63-89	7680	7680

8. CCPIT/HUT leakage and “other” leakage is 0 gpm
9. Do all calculations to three decimal places, or to 1/1000.
10. Data collected for performance of this leak rate is documented in Appendix C and was collected over 124 minutes

INITIATING CUES:

You are the Unit-1 CRO and have been directed to complete the performance of 0-SI-OPS-068-137.0 Appendix “D” and Section 6.1.1 through step 8.

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

SURVEILLANCE INSTRUCTION

0–SI–OPS–068–137.0

REACTOR COOLANT SYSTEM WATER INVENTORY

Revision 22

QUALITY RELATED

PREPARED/PROOFREAD BY: OLIVIA HEAD

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: J. K. WILKES

EFFECTIVE DATE: 04/24/08

LEVEL OF USE: **CONTINUOUS USE**

REVISION DESCRIPTION: Revised to change the manual calculation formulas for temperature correction and PZR leakage rates per engineering guidelines. A normalized equation will be used with the specific gravity of water at 70 degrees (07001541). Made conservative administrative changes to Post Performance Activity section based on management directive.

TABLE OF CONTENTS

Page 1 of 2

TABLE OF CONTENTS

Page 2 of 2

1.0 INTRODUCTION

1.1 Purpose

This Instruction provides detailed steps for performing a water inventory balance on the Reactor Coolant System (RCS).

1.2 Scope

1.2.1 Surveillance Test to be Performed

This SI performs a detailed water inventory balance on the RCS to determine the total identified and unidentified RCS leakage. These values are then compared to applicable sections of Technical Specification (TS) Limiting Condition for Operation (LCO) 3.4.6.2 and to the administrative limits on S/G leakage and unidentified leakage.

1.2.2 Requirements Fulfilled

A. Performance of this instruction completely fulfills TS 3.4.6.2 surveillance requirement (SR) 4.4.6.2.1 & 4.4.6.2.2.

B. Performance of this instruction may be utilized to fulfill TS LCO 3.4.6.1 action a. or 3.4.6.1 action b. on a 24 hour frequency, however is not required until 12 hours after establishment of steady state operation.

1.2.3 Modes

Plant operating modes for which the surveillance requirements covered by this Instruction must be satisfied (applicable modes) and during which the test can be performed (performance modes) are:

A. Applicable Modes: 1, 2, 3, and 4

B. Performance Modes: 1 through 5

1.3 Frequency and Conditions

A. This SI must be performed at least once every 72 hours, however is not required to be performed until 12 hours after establishment of steady state plant conditions.

B. This SI may be performed at least once every 24 hours to satisfy LCO 3.4.6.1 action a.

C. This SI may be performed at least once every 24 hours to satisfy LCO 3.4.6.1 action b. in lieu of performance of SI-183, *Lower Containment Gaseous and Particulate Radioactivity Monitoring During Periods of Radiation Monitor Inoperability*.

2.0 REFERENCES

2.1 Performance References

A. 0–SI–CEM–000–050.0, *72–Hour Chemistry Requirements.*

B. 1, 2–SI–CEM–068–137.5, *Primary–To–Secondary Leakage Via Steam Generators*

2.2 Developmental References

A. SQN Unit 1 & 2 Technical Specifications.

B. SI–137.1, *Reactor Coolant System Unidentified Leakage Measurement.*

C. SQN Final Safety Analysis Report (FSAR), Chapter 5.2.7 and Table 5.1–1.

D. Westinghouse Calculation No. PDC–76–23, *Pressurizer Level Channel Cross Reference,* G. Richard, November 15, 1976. (Information Sheet from Westinghouse, S. O. No. TVA 320).

E. Westinghouse Letter TVA–88–533, *Steam Generator Secondary Water Volume,* T. A. Lordi to J. B. Hosmer, February 11, 1988.

F. TVA Drawings 47W801–2; 47W809–1,2; 47W813–1; and 47W830–1.

G. Westinghouse Drawing 1099J91.

H. TI–41.68, *Scaling and Setpoint Document Reactor Coolant System.*

I. ONP–STD–4.4.7, Attachment 1, *Writer's Guide for Technical Documents.*

J. Safety Evaluation, Reg Guide 1.121 Eval of SQN 1 S/G Circumferential Defect.

K. STA Log.

L. SPP–8.1, *Conduct of Testing.*

M. Westinghouse Safety Evaluation, SECL–91–431, *Circumferential Oriented Primary Water Stress Corrosion Cracking – WEXTEX Region.*

N. Integrated Computer System, NSSS Critical Design Review, Chapter 9, RCS Leakage Rate.

O. TSC 05-09.

P. WCAP-16423-NP, *Pressurized Water Owners Group Standard Process and Methods for Calculating RCS Leak Rate for Pressurized Water Reactors.*

3.0 PRECAUTIONS AND LIMITATIONS

A. Stability of the RCS during performance of this test is of utmost importance. It is essential that the end points for RCS temperature and pressure be as close as possible to the RCS temperature and pressure values used at the beginning of the test.

B. Two hours is the minimum test duration. Use of a longer test duration (3, 4 or 6 hours) is preferred, but not required.

C. The administrative limit for primary–to–secondary leakage to an individual SG is 75 GPD. This reduced limit is due to the circumferential cracking of SG tubes at the tube sheet caused by primary water stress corrosion cracking. The limit is obtained from EPRI PWR Primary-To-Secondary Leak Guidelines.

D. All attempts to identify RCS leakage in accordance with Appendix A must be completed before proceeding past section 6.1. This is <u>not</u> meant to delay the completion of this test; rather, to identify as many sources of RCS leakage as possible while performing section 6.1.

E. The Reactor Coolant Drain Tank (RCDT) level data may be marked N/A if conditions do not permit obtaining RCDT level. The leakage into the RCDT in this case will be accounted for as unidentified leakage.

F. During the performance of this Instruction, it is expected that the unidentified leakage will occasionally be determined to be less than zero (i.e., negative leakage). If negative leakage is calculated to be more negative than –0.10 gpm, then the following sequence of actions are taken: **[C.2]**

1. A minimum of one hour of additional data is collected and all calculations are re–performed (at the discretion of the Test Director, any two–hour block or longer of data may be used provided all PRECAUTIONS AND LIMITATIONS are satisfied). **[C.2]**

2. If the unidentified leakage calculated using the additional data is equal to or more positive than –0.10 GPM, this value may be recorded as an acceptable result. **[C.2]**

3.0 PRECAUTIONS AND LIMITATIONS (Continued)

3. If the re–calculated unidentified leakage calculated using the additional data is more negative than –0.10 GPM, the test must be continued until: **[C.2]**

   a. The calculated value of unidentified leakage is equal to or more positive than –0.10 GPM, or

   b. The total RCS leakage is less than or equal to 1.0 gpm, or

   c. A condition occurs which causes the test to be aborted (e.g., makeup to the VCT).

4. If an unidentified leakage equal to or more positive than –0.10 GPM can not be obtained but the total RCS leakage is less than or equal to 1.0 GPM, the calculated value of unidentified leakage may be recorded as an acceptable result provided an investigation is initiated by Systems Engineering and Operations to determine the source of the negative calculation. If the total RCS leakage is greater than 1.0 GPM (coincident with an unidentified leakage more negative than –0.1 GPM), then non–RCS inleakage may be masking the true RCS leakage and the validity of the test is questionable. Under these conditions, the test must be continued until the above described criteria are satisfied or a condition occurs which causes the test to be aborted. **[C.2]**

5. If four consecutive tests result in negative values for unidentified leakage, an investigation into the source of the in–leakage must be initiated regardless of whether or not the above described criteria are satisfied. **[C.2]**

3.0 PRECAUTIONS AND LIMITATIONS (Continued)

3.1 Manual Calculations

A. The final RCS temperature must be within ± 1°F of the initial RCS temperature or the final data is VOID and must be retaken.

B. The final core power level must be within ± 2.0 % of the initial core power level or the final data is VOID and must be retaken.

C. All pumps, coolers, valve alignments, etc. which could affect RCS leakage results must remain constant for 30 minutes before starting and throughout the performance, unless specified by this Instruction or otherwise directed by the Unit Senior Reactor Operator (SRO).

D. The same instrumentation shall be used when recording initial and final values of RCS parameters. Differences between two instruments monitoring the same parameter could be misinterpreted as RCS leakage.

E. No samples shall be taken from, nor chemical additions made to, the RCS during the performance of this instruction. An exception is RCS Zinc Injection, which is not detectable within the instrumentation and testing parameters.

F. If any of the following events occur during the performance, the data is VOID and the test must be restarted or the system returned to normal.

1. Emergency boration.
2. Diversion of letdown to the holdup tanks.
3. Makeup from any source.
4. Change in purification demineralizers or filter lineup.
5. Failure of any instrument channel used to obtain initial readings.
6. Failure to use data for at least a two (2) hour time period.
7. VCT level falls below 10% or low VCT level alarm annunciates.
8. Restarting the primary water pumps if they were stopped before the initial data was collected.

3.0 PRECAUTIONS AND LIMITATIONS (Continued)

3.2 Plant Computer N/A

A. All pumps, coolers, valve alignments, etc. which could affect RCS leakage results remained constant during data collection, except where makeup was accounted for by the plant computer.

B. Preferably no samples shall be taken from, nor chemical additions made to the RCS. However, the Plant Computer program has provisions for accounting for RCS leakage changes. Any samples or additions should be noted in the Remarks section Data Package Cover Sheet. An exception is RCS Zinc Injection, which is not detectable within the instrumentation and testing parameters.

C. CVCS and RCS should remain nearly constant (i.e., no diversion of letdown to holdup tanks, no changes in CVCS demineralizer lineup, no changes to filter lineups, and no RCS make–up from any source.

D. If any of the following events occur, the data is VOID and the test must be restarted or the system returned to normal.

1. Plant Computer becomes inoperable.
2. Emergency boration.
3. Diversion of letdown to the holdup tanks.
4. Makeup from any source that is not accounted for by the Plant Computer program.
5. RCS Dilution
6 Change in purification demineralizers or filter lineup.
7. Failure to use data for at least a two (2) hour time period.

E. The Plant Computer leakage report shall be attached to the completed SI package to provide documentation in lieu of manually entered data.

3.2 Plant Computer (Continued) N/A

F. The ICS will periodically store data to history for each computer point flagged as an archive point. Depending on the amount of data that is being stored or archived at one time, the computer may take a short period of time to archive the data creating what appears to be a gap in the data. If a selected start or stop time coincides with one of these "archive gaps", one of the following alarm messages may appear during the calculation:

"START TIME IN ARCHIVE GAP. CALCULATION CANCELLED"
"END TIME IN ARCHIVE GAP. CALCULATION CANCELLED".

If either of these messages is received, move the start and/or stop time a few minutes and repeat the calculation.

G. Performance of any of the following while performing the leakage calculation may result in RCS leak rate uncertainty:

1. RCS Makeup or Dilution (Data will be considered Void.)
2. Changing level in the PRT and / or the RCDT.
3. Removal from service of any of the instruments listed in Section 4.1 Step **[2]**.
4. Procedures or activities that result in Control Rod motion.

Unit 1 Date Today

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.

4.1 Preliminary Actions

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

[2] **IF** ICS Points are to be used for leakage determination, **THEN** **IDENTIFY** ICS Points that are inservice prior to performing leakage calculation:

Computer Points Needed to Perform RCS Water Inventory at 100% Power			
Parameter	Instrument	Computer Point	I/S
Inputs to Total Leakage			
RCS Temperature Correction			
RCL AVG Tavg(1)		U0484	☒ N/A
Loop 1 Tavg	T-68-2	T0400A	☐
Loop 2 Tavg	T-68-25	T0420A	☐
Loop 3 Tavg	T-68-44	T0440A	☐
Loop 4 Tavg	T-68-67	T0460A	☐
Pzr. Pressure 1/2/3/4 Avg(2)		U0482	☐
Pzr. Pressure Ch. I	P-68-340	P0480A	☐
Pzr. Pressure Ch. II	P-68-334	P0481A	☐
Pzr. Pressure Ch.III	P-68-323	P0482A	☐
Pzr. Pressure Ch.IV	P-68-322	P0483A	☐
Pressurizer			
Pzr. Level(3)		U0483	☐
Pzr. Level Ch. I	L-68-339	L0480A	☐
Pzr. Level Ch. II	L-68-335	L0481A	☐
Pzr. Level Ch. III	L-68-320	L0482A	☐
Volume Control Tank			
VCT Level	L-62-130	L0112A	☐
Inputs to Identified RCS Leakage			
RCDT Level	L-77-1	L2400A	☐
PRT Level	L-68-300	L0485A	☐

(1) RCL AVG Tavg is the average of the four narrow range loop temperatures.
(2) Pzr. Pressure 1/2/3/4 Avg is the average of the four narrow range Pressurizer Pressure Channels.
(3) Pzr. Level is the average of the three Pressurizer Level Channels

Roy

4.2 Measuring and Test Equipment, Parts, and Supplies

NOTE The tables in this section may be completed during the performance of section 6.1, as necessary.

[1] **IF** any RCS leak sources will be quantified using a stopwatch and container, **THEN**

RECORD the following information for all stopwatches and containers to be used.

TVA ID Number		Calibration Due Date
Stopwatch	Container	
N/A		

Unit 1 Date Today

4.2 Measuring and Test Equipment, Parts, and Supplies (Continued)

[2] **IF** any other special test equipment will be used during the performance of this Instruction, **THEN**

RECORD the following information for each additional piece of test equipment to be used.

Test Equipment	Model	Accuracy	TVA ID	Calibration Due Date
N/A				

N/A

4.3 Field Preparations

[1] **ENSURE** reactor power and RCS average temperature (T–avg) are stable and have varied less than ± 2% and ± 1°F, respectively, during the calculation test interval. Roy

4.4 Approvals and Notifications

NOTE During data collection using the Manual Calculation Method (Sect. 6.1), RCS chemical additions and / or sampling invalidate the data and will require a re-initiation of SI performance. During data collection using the Plant Computer (Sect. 6.2), it is preferred that RCS chemical additions and / or sampling not take place. If chemical additions or samples are required, then volume MUST be accounted for, in gallons per minute. RCS dilution is not allowed during either method of data collection.

[1] **CONTACT** Chemistry Lab to verify that performance of this SI and limitations imposed on sampling will NOT interfere with any sampling required by Technical Specifications or Technical Requirements Manual. Roy

Unit 1 Date TODAY

5.0 ACCEPTANCE CRITERIA

A. The Technical Specification acceptance criteria is as follows:

1. The primary–to–secondary leakage must be less than or equal to 150 GPD through any one steam generator.
2. The total identified RCS leakage must be less than or equal to 10 GPM.
3. The total unidentified leakage must be less than or equal to 1 GPM.

B. If any of the Technical Specification criteria are **NOT** satisfied, the SM must be notified and action requirement (b) of LCO 3.4.6.2 satisfied.

C. The administrative acceptance criteria for total primary–to–secondary leakage is less than or equal to 75 GPD through any one steam generator. AOP-R.01, *Steam Generator Tube Leak*, contains required actions and criteria for plant shutdown.

Unit 1 Date TODAY

6.0 PERFORMANCE

NOTE 1 Manipulation of any of the following valves during this test could effect the results of this test.

VALVE	DESCRIPTION
FCV–63–24	CLA fill line isolation valve
FCV–63–71	Check valve test line isolation valve
FCV–63–84	Check valve test line isolation valve
VLV–68–601	Test header isolation valve to HUT

NOTE 2 Maintaining the pressurizer pressure control and pressurizer level control systems in the automatic mode during data collection will improve RCS stability.

[1] **IF** using the Plant Computer, **THEN**

GO TO Section **6.2**. ☐ N/A

[2] **IF** using MANUAL calculations, **THEN**

GO TO Section **6.1**. ☐ ✓

Unit 1 Date TODAY

6.1 Data Collection for MANUAL calculation method

[1] **ENSURE** VCT level is such that makeup is <u>not</u> anticipated for the duration of this test. Roy

NOTE 1 The applicable section of 1, 2–SO–77–1 is dependent upon where the RCDT is to be pumped.

NOTE 2 The following step may be marked N/A if conditions do not permit obtaining RCDT level.

[2] **IF** reactor coolant drain tank (RCDT) level is greater than 30% as indicated by 1, 2–LI–77–1, **THEN**

GO TO 1, 2–SO–77–1.

PERFORM the applicable section, **AND**

RETURN to step **[3]** of this section. N/A

NOTE The following step may be marked N/A if conditions do not permit obtaining RCDT level.

[3] **PLACE** both RCDT pumps hand switches in the **PULL–TO–LOCK** position:

PUMP	HANDSWITCH	REQUIRED POSITION	INITIALS
A	HS–77–4A	PULL–TO–LOCK	Roy
B	HS–77–6A	PULL–TO–LOCK	Roy

NOTE Steam generator primary to secondary leak rates required by section 2.3 of Appendix D may be obtained from the Chemistry Lab at the time the following notification is performed.

[4] **NOTIFY** Chemistry Lab of the following:

[a] **ENSURE** <u>no</u> chemical additions to, nor take samples from, the RCS until further notice. An exception is RCS Zinc Injection, which is not detectable within the instrumentation and testing parameters. Roy

[b] **ENSURE** 0–SI–CEM–000–050.0 has been performed within the last 72 hours. Roy

Unit 1 Date TODAY

6.1 **Data Collection for MANUAL calculation method** (Continued)

[5] **ENSURE** the following system lineup **ESTABLISHED**:

VALVE	DESCRIPTION	POSITION	INITIALS
FCV–62–118	VCT Isolation Valve	To VCT	Roy
FCV–62–128	Blender Output to VCT	CLOSED	Roy
FCV–62–144	Blender Output to CCPs	CLOSED	Roy
FCV–62–138	Emerg Boration to CCPs	CLOSED	Roy
PCV–68–301	PRT Vent to RCDT	CLOSED	Roy
FCV–68–310	PRT Drain to RCDT	CLOSED	Roy

NOTE Primary water pumps should be shut off only if primary water inleakage is suspected, the last performance of this SI resulted in a negative value for unidentified leakage, or if directed by the Unit SRO.

[6] **IF** primary water pumps will be shut off during data collection, **THEN**

[a] **PLACE** both primary water pumps hand switches in the **PULL–TO–LOCK** position:

PUMP	HANDSWITCH	POSITION	INITIALS
A	HS–81–3A	PULL–TO–LOCK	N/A
B	HS–81–7A	PULL–TO–LOCK	↓

[b] **ENSURE** [0–81–519], Primary Water Unit Crosstie Valve is **LOCKED CLOSED**. N/A

[7] **IF** RCS conditions are <u>NOT</u> stable and it is desired to do a calculation from the current time, **THEN**

WAIT approximately 30 minutes to allow RCS parameters to stabilize, **AND**

RECORD any remarks regarding RCS stability in the chronological test log. N/A

Unit______________ Date TODAY

6.1 **Data Collection for MANUAL calculation method** (Continued)

NOTE The following step may be marked N/A if conditions do not permit obtaining RCDT level.

[8] **IF** pump down of the RCDT is required during the 30–minute waiting period, **THEN**

[a] **GO TO** 1, 2–SO–77–1. N/A

[b] **PERFORM** the applicable section, **AND**

RETURN to step **[8][c]** of this section.

[c] **RETURN** both RCDT pumps handswitches to the **PULL–TO–LOCK** position:

PUMP	HANDSWITCH	POSITION	INITIALS
A	HS–77–4A	PULL–TO–LOCK	N/A
B	HS–77–6A	PULL–TO–LOCK	

[9] **IF** additional methods will be used to quantify RCS leakage, **THEN**

INITIATE performance of Appendix A. N/A

NOTE 1 When bench board instruments are used, the first instrument read will initiate the timed duration of this test (minimum of 2 hours).

NOTE 2 RCS T–avg should be maintained within a ± 1.0°F band for at least 5 minutes before data collection is initiated.

[10] **RECORD** initial RCS data required by Appendix C. ☑

[11] **ENSURE** all readings are taken at approximately the same time. **[C.1]** Rof

[12] **IF** pump down(s) of the RCDT (level > 45%) is required before final RCS data is recorded, **THEN**

COMPLETE RCDT pump down in accordance with Appendix B before proceeding to step **[13]**. N/A

Unit 1 Date TODAY

6.1 Data Collection for MANUAL calculation method (Continued)

NOTE 1 Two hours is the minimum test duration. If desired, the final data may be voided and retaken to lengthen the test. Increasing the length of the test will reduce the adverse impact of variations in RCS temperature and reactor power.

NOTE 2 When using bench board instruments, the last instrument read will determine the finish time of the data collection.

NOTE 3 RCS T–avg should be maintained within a ± 1.0°F band for at least 5 minutes before data collection is initiated.

[13] **WHEN** a minimum of two hours has elapsed since initial data collection, **THEN** **[C.1]**

[a] **RECORD** final RCS data required by Appendix C. ☑

[b] **ENSURE** all readings are taken at approximately the same time. **[C.1]** ☑

[14] **IF** Appendix A is being used to quantify additional RCS leakage sources, **THEN**

ENSURE Appendix A has been completed. N/A

[15] **WHEN** final data collection has been completed, **THEN**

CHECK appropriate boxes to indicate whether initial and final data are acceptable.

(A) Were final reactor power and RCS temperature within ± 2% and ± 1°F, respectively, of their initial readings? ☑ YES ☐ NO

(B) Have all pumps, coolers, valve alignments, etc. which could affect RCS leakage results remained constant during data collection (except as specified otherwise by this Instruction or the Unit SRO). ☑ YES ☐ NO

Unit______________ Date__________

6.1 Data Collection for MANUAL calculation method (Continued)

C. Have the CVCS and RCS remained nearly constant (i.e., no VCT makeup, no diversion of letdown to holdup tanks, no changes in CVCS demineralizer lineup, no changes to filter lineups, and either no RCS make–up from any source)? ☑ YES ☐ NO

D. Were sampling and chemical additions to the RCS (with the exception of RCS Zinc Injection) stopped during data collection? ☑ YES ☐ NO

E. Were the same instruments/points used for recording initial and final data? ☑ YES ☐ NO

F. Were initial and final RCDT data taken at the same time as the other data? ☐ N/A ☑ YES ☐ NO

G. Was data collection performed over a minimum of two hours? ☑ YES ☐ NO

Roy

[16] **IF** any box in step **[15]** is checked "NO", **THEN**

[a] **TERMINATE** this test. N/A

[b] **NOTIFY** the Unit SRO that the test was invalid. ______

[c] **NOTE** in Remarks section of chronological test log why test has been aborted. ______

[d] **OBTAIN** a working copy of this procedure to restart test **AND**

MAINTAIN the working copy in this SI package. ______

Unit 1 Date TODAY

6.1.1 Calculation of RCS Leakage using the MANUAL method

[1] **CALCULATE** total RCS leakage, identified leakage and unidentified leakage in accordance with Appendix D, **AND**

RECORD below:

A. Total RCS leakage = __________ GPM

B. Identified leakage = __________ GPM

C. Unidentified leakage = __________ GPM __________

NOTE Copies of Appendices C, or D may be used to perform steps **[2]** through **[9]** provided all copies are included in the data package.

[2] **IF** unidentified leakage is less than zero by more than –0.1 gpm (i.e., negative leakage), **THEN** **[C.2]**

[a] **COLLECT** a minimum of one hour of additional data. ☐

[b] **RECALCULATE** all RCS leakage terms in accordance with Appendix D. ☐

[c] **RECORD** below:

A. Total RCS leakage = __________ GPM

B. Identified leakage = __________ GPM

C. Unidentified leakage = __________ GPM __________

Unit______________ Date__________

6.1.1 Calculation of RCS Leakage using the MANUAL method (Continued)

NOTE An unidentified leakage more negative than –0.10 GPM may be recorded as an acceptable result provided the total RCS leakage is equal to or less than 1.0 GPM and there is an on–going investigation to determine the source of the inleakage. **[C.2]**

[3] **IF** unidentified leakage is more negative than –0.10 GPM,
THEN

CONTINUE data collection and calculation of RCS leakage terms in accordance with Appendices C, or D by changing the time interval or performing a new calculation until an unidentified leakage term more positive than –0.10 GPM is obtained or total RCS leakage is equal to or less than 1.0 GPM (or until test must be aborted), **AND** **[C.2]**

RECORD results below (N/A any blanks not used).

A. Calculations completed:

–Time ___________

–Total RCS leakage = ___________ GPM

–Identified leakage = ___________ GPM

–Unidentified leakage = ___________ GPM ___________

B. Calculations completed:

–Time ___________

–Total RCS leakage = ___________ GPM

–Identified leakage = ___________ GPM

–Unidentified leakage = ___________ GPM ___________

Unit______________ Date__________

6.1.1 Calculation of RCS Leakage using the MANUAL method (Continued)

C. Calculations completed:

–Time ___________

–Total RCS leakage = ___________ GPM

–Identified leakage = ___________ GPM

–Unidentified leakage = ___________ GPM __________

[4] **IF** an unidentified leakage more positive than –0.10 GPM could not be obtained, **OR**

IF four consecutive performances of this Instruction have resulted in a negative value of unidentified leakage, **THEN**

NOTIFY Unit SRO and/or cognizant Systems Engineer that an investigation to determine the source of inleakage to the RCS must be initiated. **[C.2]** __________

NOTE 'Maximum' may be the same as 'Total' if activity/leakage is too low to identify an individual steam generator.

[5] **RECORD** maximum leak rate from an individual steam generator and total leak rate from all four steam generators from section 2.3 of Appendix D.

A. Max. individual SG leakage = ___________ GPD

B. Total SG leakage = ___________ GPM __________

Unit______________ Date__________

6.1.1 Calculation of RCS Leakage using the MANUAL method (Continued)

[6] **CHECK** appropriate box to indicate whether the following acceptance criteria were satisfied.

TECHNICAL SPECIFICATION ACCEPTANCE CRITERIA:

Maximum individual SG leakage is less than or equal to 150 GPD. ☐ Yes ☐ No

The total identified leakage is less than or equal to 10.0 GPM. ☐ Yes ☐ No

The total unidentified leakage is less than or equal to 1.0 GPM. ☐ Yes ☐ No

ADMINISTRATIVE ACCEPTANCE CRITERIA:

The maximum individual SG leakage is less than or equal to 75 GPD. ☐ Yes ☐ No

[7] **IF** any of the Technical Specification acceptance criteria stated in step **[6]** is NOT satisfied, **THEN**

[a] **NOTIFY** SM that RCS leakage exceeds limit and LCO 3.4.6.2 action (b) must be satisfied. ☐

[b] **REFER** to EPIP–1 for REP implementation. ☐

[c] **REFER TO** AOP-R.01, *Steam Generator Tube Leak*, or AOP-R.05, *RCS Leak and Leak Source Identification,* as applicable. ☐

Unit______________ Date__________

6.1.1 Calculation of RCS Leakage using the MANUAL method (Continued)

[8] **IF** leakage is within Tech Spec limits but exceeds administrative acceptance criteria for S/G leakage, **THEN**

[a] **NOTIFY** SM that primary–to–secondary leakage exceeds administrative limit. ☐

[b] **REFER TO** AOP-R.01, *Steam Generator Tube Leak*. ☐

[9] **WHEN** all data collection has been completed, **THEN**

NOTIFY Chemistry Lab that RCS sampling/chemical additions may be resumed, as necessary. __________

Unit______________ Date__________

6.1.2 Restoration using the MANUAL method

[1] **IF** the following RCDT handswitch(es) can be returned to their normal alignment, **THEN**

PLACE the applicable handswitch(es) in the required position:

PUMP	HANDSWITCH	POSITION	INITIALS
A	HS–77–4A	P–AUTO	____ 1st ____ IV
B	HS–77–6A	P–AUTO	____ 1st ____ IV

[2] **IF** the RCDT pump handswitch(es) <u>cannot</u> be returned to the required position, **THEN**

NOTIFY the US and **VERIFY** the position is documented and controlled by an approved configuration control process. ________

[3] **IF** the Primary Water Pump(s) were stopped for data collection, **AND**

[a] **IF** handswitch(es) are to be returned to the required position, **THEN**

PLACE the pump handswitch(es) to the required position in accordance with the applicable SO:

PUMP	HANDSWITCH	POSITION	INITIALS
A	HS–81–3A	START/MAN ❑ P–AUTO ❑	____ 1st ____ IV
B	HS–81–7A	START/MAN ❑ P–AUTO ❑	____ 1st ____ IV

Unit______________ Date__________

6.1.2 **Restoration using the MANUAL method** (Continued)

[b] **IF** handswitch(es) <u>cannot</u> be returned to the required position, **THEN**

NOTIFY the US and **VERIFY** the position is documented and controlled by an approved configuration control process. __________

[4] **ENSURE** the following valves are in their required position:

VALVE	REQUIRED POSITION	FIRST PERSON	INDEPENDENT VERIFICATION
FCV–77–9	A AUTO/OPEN	__________	__________
FCV–77–10	A–P AUTO/OPEN	__________	__________
FCV–62–128	P–AUTO	__________	__________
FCV–62–144	P–AUTO	__________	__________
FCV–62–118	P–AUTO	__________	__________
FCV–62–138	CLOSED	__________	__________
PCV–68–301	CLOSED	__________	__________
FCV–68–310	CLOSED	__________	__________

Unit____________ Date__________

6.2 RCS LEAKAGE USING THE PLANT COMPUTER

NOTE VCT level should be in a range between Auto make-up and Auto divert to the HUT before starting the test. Desired range 25 to 60%. Dilution of the RCS will void data collected.

[1] **CHECK** VCT level in desired range:

[a] **IF** VCT level approaching Auto make-up,

THEN
ADJUST VCT level using 0-SO-62-7 (manual make-up). ________

[b] **IF** VCT level approaching divert to HUT,

THEN
DIVERT letdown flow to the HUT by turning [HS-62-118A] to the **DIVERT** position.

N/A ______
1st IV

[2] **WHEN** VCT level in desired range,

THEN
PLACE [HS-62-118A] in **VCT** position

______/______
1st IV

NOTE 1 Plant computer uses historical data for calculations. The minimum test duration is two hours. Use of a longer test duration (3, 4 or 6 hours) is preferred, but not required.

NOTE 2 Stable conditions result in reactor power and RCS average temperature (T–avg) having not varied more than ± 2% and ± 1°F, respectively, and pressurizer, PRT, VCT, and RCDT levels not changing excessively over the calculation period.

[3] **MAINTAIN** plant conditions as stable as possible (minimum of 2 hours).

N/A

Unit______________ Date__________

6.2 RCS LEAKAGE USING THE PLANT COMPUTER

NOTE 1 SG leak rates are obtained by 1, 2–SI–CEM–068–137.5. 0–SI–CEM–000–050.0 is performed every 72 hours and at activity levels which will determine if those leak rates from the last performance of 1, 2–SI–CEM–068–137.5 have increased.

NOTE 2 Individual steam generator leakage may be **N/A'd** if activity is too low to be separately identified.

[4] **REQUEST** from Chemistry Lab the following:

[a] SG 1 Leakage = __________ GPD

[b] SG 2 Leakage = __________ GPD

[c] SG 3 Leakage = __________ GPD

[d] SG 4 Leakage = __________ GPD

Total SG leakage = $\frac{\text{\_\_\_\_\_\_\_\_\_\_ GPD}}{\text{1440 min/day}}$ = N/A GPM

Date/Time 0–SI–CEM–000–050.0 performed: N/A
Date Time

Date/Time 1, 2–SI–CEM–068–137.5 performed: ___ / ___
Date Time

NOTE Selected performance period (time interval) is that period chosen by the operator to perform this instruction. Water additions or samples taken from RCS must be converted to gallons per minute.

[e] **DETERMINE** the amount of any chemical additions made to or samples taken from the RCS during the selected performance period, with the exception of RCS Zinc Injection, which is not detectable within the instrumentation and testing parameters. (to be recorded in computer as "Other Sources" in gpm): ☐

Unit______________ Date__________

6.2 RCS LEAKAGE USING THE PLANT COMPUTER (Continued)

[5] **IF** volume from any source (chemical addition, sampling, or make–up) cannot be determined from the selected performance period, **THEN**

PERFORM one of the following (N/A other):

[a] **CHANGE** the selected performance period (time interval) so known volume changes can be used **AND REPEAT** the instruction. ☐ N/A

OR

[b] **PERFORM** Section **6.1**, step **[1]** through **[14]**, **THEN**

GO TO to step **[6]**. ☐

[6] **IF** pump down of the RCDT is a frequent occurrence, **THEN**

PERFORM one of the following (N/A other):

[a] **WAIT** for computer to build a file history (greater than 2 hours) after the RCDT is initially pumped down **AND REPEAT** the instruction. ☐

OR

[b] **COMPLETE** RCDT pump down in accordance with Appendix B. ______

[7] **IF** in–leakage to the CLA, **THEN**

[a] **RECORD** initial CLA levels in Appendix C and wait at least 2 hours. ☐

[b] **WHEN** greater than 2 hours has elapsed, **THEN**

RECORD final CLA levels in Appendix C. ☐

Unit______________ Date__________

6.2 **RCS LEAKAGE USING THE PLANT COMPUTER** (Continued)

NOTE 1 Plant Computer cannot look ahead and determine leakage rates. All leakage rates must be determined from past points.

NOTE 2 The ICS will periodically store data to history for each computer point flagged as an archive point. Depending on the amount of data that is being stored or archived at one time, the computer may take a short period of time to archive the data creating what appears to be a gap in the data. If a selected start or stop time coincides with one of these "archive gaps", one of the following alarm messages may appear during the calculation:
"START TIME IN ARCHIVE GAP. CALCULATION CANCELLED"
"END TIME IN ARCHIVE GAP. CALCULATION CANCELLED".

If either of these messages is received, move the start and/or stop time a few minutes and repeat the calculation.

[8] **INITIATE** RCS Leakage Program using the Plant Computer by performing the following:

[a] **SELECT** NSSS & BOP menu on monitor. ☐ N/A

[b] **SELECT** SI–137.0, RCS leakage screen on monitor. ☐

[c] **ENSURE** correct START date and time entered in Plant Computer. ☐

[d] **ENSURE** correct STOP date and time entered in Plant Computer. ☐

Unit______________ Date__________

6.2 RCS LEAKAGE USING THE PLANT COMPUTER (Continued)

NOTE If data is to be manually inserted into the computer, then the start/stop times to be entered into the computer must encompass the time interval the data was taken.

[9] **MANUALLY** enter the following:

[a] SG leakages from Chemistry. ☐ N/A

NOTE CLA leakage calculations may be marked **N/A** if the RCS pressure is greater than 683 psig and quantification of the CLA leakage is <u>not</u> required.

[b] CLA initial and final volumes from Appendix C (if required). ☐

[c] CCPIT/HUT leakage (N/A if not required). ☐

[d] Other sources, such as Appendix B or Chemistry sampling (N/A if not required). ☐

[10] **INITIATE** execute for calculation results. ☐

Unit______________ Date__________

6.2 RCS LEAKAGE USING THE PLANT COMPUTER (Continued)

[11] **WHEN** data collection has been completed, **THEN**

CHECK the following to indicate whether data is acceptable:

A. **VERIFY** dates and times entered for the leak rate performance period are correct and data collection performed over a minimum of two hours. N/A ________

B. **VERIFY** all sampling and chemical additions to the RCS were stopped during data collection or have been accounted for. (with the exception of RCS Zinc Injection). ________

C. **VERIFY** all pumps, coolers, valve alignments, etc. which could affect RCS leakage results remained constant during data collection, except where makeup was accounted for by the plant computer. ________

D. **VERIFY** the CVCS and RCS remained nearly constant (i.e., no diversion of letdown to holdup tanks, no changes in CVCS demineralizer lineup, no changes to filter lineups, and no RCS make–up from any source, except where makeup was accounted for by the plant computer. ________

E. **VERIFY NO** RCS dilution occurred during data taking period. ________

STEP CONTINUED ON NEXT PAGE

Unit______________ Date__________

6.2 RCS LEAKAGE USING THE PLANT COMPUTER (Continued)

E. **RECORD** the ICS Points that were available during performance of leakage calculation:

Computer Points Needed to Perform RCS Water Inventory at 100% Power			
Parameter	Instrument	Computer Point	√
Inputs to Total Leakage			
RCS Temperature Correction			
RCL AVG Tavg(1)		U0484	N/A
Loop 1 Tavg	T-68-2	T0400A	
Loop 2 Tavg	T-68-25	T0420A	
Loop 3 Tavg	T-68-44	T0440A	
Loop 4 Tavg	T-68-67	T0460A	
Pzr. Pressure 1/2/3/4 Avg(2)		U0482	
Pzr. Pressure Ch. I	P-68-340	P0480A	
Pzr. Pressure Ch. II	P-68-334	P0481A	
Pzr. Pressure Ch.III	P-68-323	P0482A	
Pzr. Pressure Ch.IV	P-68-322	P0483A	
Pressurizer			
Pzr. Level(3)		U0483	
Pzr. Level Ch. I	L-68-339	L0480A	
Pzr. Level Ch. II	L-68-335	L0481A	
Pzr. Level Ch. III	L-68-320	L0482A	
Volume Control Tank			
VCT Level	L-62-130	L0112A	
Inputs to Identified RCS Leakage			
RCDT Level	L-77-1	L2400A	
PRT Level	L-68-300	L0485A	

(1) RCL AVG Tavg is the average of the four narrow range loop temperatures.
(2) Pzr. Pressure 1/2/3/4 Avg is the average of the four narrow range Pressurizer Pressure Channels.
(3) Pzr. Level is the average of the three Pressurizer Level Channels

N/A ________

F. **IF** ICS Points recorded in Section 4.1 **[2]** do NOT match those recorded in Section 6.2 Step **[11] E, THEN**
ENSURE evaluation of the validity of the data is performed by engineering. N/A ________

Unit____________ Date_________

6.2 RCS LEAKAGE USING THE PLANT COMPUTER (Continued)

[12] **IF** any substep in step **[11]** cannot be completed, **THEN**

[a] **TERMINATE** this test. N/A

[b] **NOTIFY** the Unit SRO that the test was invalid. ______

[c] **NOTE** in chronological test log why test has been aborted. ______

[d] **OBTAIN** a working copy of this procedure to restart test **AND**

MAINTAIN the working copy in this SI package. ______

[e] **ENSURE** [HS-62-118A] in P-AUTO. ______

1st IV

[13] **IF** calculation inputs are invalid, **THEN**

[a] **INITIATE** MANUAL function to correct inputs. ☐

[b] **INITIATE** execute function for calculated results. ☐

[14] **PRINT** a hard copy of the results. ☐

[15] **ATTACH** hard copy program output (printout) to surveillance procedure package. ☐

[16] **WHEN** all data collection has been completed, **THEN**

NOTIFY Chemistry Lab that RCS sampling/chemical additions may be resumed, as necessary. ☐

[17] **IF** Sect. 6.2 Step **[5][b]** was performed for manual data collection, **THEN**

PERFORM section 6.1.2 for restoration of equipment. ______

Unit______________ Date____

6.2 RCS LEAKAGE USING THE PLANT COMPUTER (Continued)

NOTE 1 Due to the calculation methodology of rounding off numbers, Unidentified Leakage and Identified Leakage may not add up to computer generated total RCS leakage when leakage is small.

NOTE 2 An unidentified leakage more negative than –0.10 GPM may be recorded as an acceptable result provided the total RCS leakage is equal to or less than 1.0 GPM and there is an on–going investigation to determine the source of the inleakage. **[C.2]**

[18] **IF** unidentified leakage is more negative than –0.10 GPM,
THEN

REPEAT data collection by changing and/or lengthening the time interval until an unidentified leakage term more positive than
–0.10 GPM is obtained or total RCS leakage is equal to or less than 1.0 GPM (or until test must be aborted), **AND** **[C.2]**

RECORD results below (N/A any blanks not used).

A. Calculations completed:

N/A

–Time Interval ____________

–Total RCS leakage = ________ GPM

–Identified leakage = ________ GPM

–Unidentified leakage = ________ GPM

B. Calculations completed:

–Time Interval ____________

–Total RCS leakage = ________ GPM

–Identified leakage = ________ GPM

–Unidentified leakage = ________ GPM

Unit______________ Date__________

6.2 RCS LEAKAGE USING THE PLANT COMPUTER (Continued)

[19] **IF** an unidentified leakage more positive than –0.10 GPM could not be obtained, **OR**

IF four consecutive performances of this Instruction have resulted in a negative value of unidentified leakage, **THEN**

NOTIFY Unit SRO and/or cognizant Systems Engineer that an investigation to determine the source of inleakage to the RCS must be initiated. **[C.2]** N/A

[20] **CHECK** appropriate box to indicate whether the following acceptance criteria were satisfied.

TECHNICAL SPECIFICATION ACCEPTANCE CRITERIA:

The maximum individual SG leakage is less than or equal to 150 GPD. ☐ Yes ☐ No

The total identified leakage is less than or equal to 10.0 GPM. ☐ Yes ☐ No

The total unidentified leakage is less than or equal to 1.0 GPM. ☐ Yes ☐ No

ADMINISTRATIVE ACCEPTANCE CRITERIA:

The maximum individual SG leakage is less than or equal to 75 GPD. ☑ Yes ☐ No

Unit______________ Date__________

6.2 RCS LEAKAGE USING THE PLANT COMPUTER (Continued)

[21] **IF** any of the Technical Specification acceptance criteria stated in step **[20]** is NOT satisfied,
THEN

[a] **NOTIFY** SM that RCS leakage exceeds limit and LCO 3.4.6.2 action b must be satisfied. ☐ N/A

[b] **REFER** to EPIP–1 for REP implementation. ☐

[c] **REFER TO** AOP-R.01, *Steam Generator Tube Leak*, or AOP-R.05, *RCS Leak and Leak Source Identification,* as applicable. ☐

[22] **IF** leakage is within Tech Spec limits but exceeds administrative acceptance criteria for S/G leakage,
THEN

[a] **NOTIFY** SM that primary–to–secondary leakage exceeds administrative limit. ☐

[b] **REFER TO** AOP-R.01, *Steam Generator Tube Leak*. ☐

[23] **WHEN** leakage test is complete, **THEN**

ENSURE [HS-62-118A] in P-AUTO. ______________
1st IV

END OF TEXT

Unit 1 Date TODAY

7.0 POST PERFORMANCE ACTIVITY

[1] **NOTIFY** Unit SRO that test has been completed. ________

NOTE Graphs of RCS leakage trends are available on S:\Engineering\Systems\Systems Notebook\068 - Reactor Coolant System\Trending\SI-137\Current data.

[2] **EVALUATE** unidentified leakage results:

[a] **COMPARE** unidentified leakage result to value from previous (last) performance on this unit. ☐

[b] **COMPARE** unidentified leakage result to leakage trend graph maintained by Engineering. ☐

[3] **IF** any of the following conditions are met:

- RCS unidentified leakage exceeds 0.10 gpm

  OR

- RCS unidentified leakage has risen by more than 0.03 gpm from last performance

  OR

- RCS unidentified leakage shows a sustained rising trend above previous baseline (typical) value

THEN

PERFORM the following:

[a] **PERFORM** an additional official leak rate calculation to validate results (using different time interval). ________

(step continued on next page)

Unit 1 Date TODAY

7.0 POST PERFORMANCE ACTIVITY

[b] **IF** rise in leak rate is confirmed by additional calculation(s),
THEN
PERFORM the following:

1. **EVALUATE** recent activities to determine possible causes of rise in leak rate. ☐

2. **INITIATE** RCS leak search:
   - **REFER TO** AOP-R.05, *RCS Leak and Leak Source Identification.* ☐
   - **REQUEST** assistance from Systems Engineering as required. ☐

3. **INITIATE** performance of this SI at least shiftly to monitor leakage trend UNTIL SM determines leak rate is stable (NOT rising). ☐

4. **ENSURE** PER initiated. ☐

[c] **IF** rise in leak rate is NOT confirmed by additional calculation(s),
THEN
LOG results in narrative log. ☐

[d] **INITIATE** performance of OPDP-9 Emergent Issues. ________

END OF TEXT

APPENDIX A
Page 1 of 1

Unit_____________ Date__________

IDENTIFICATION OF RCS LEAKAGE

NOTE 1 Any attempts to isolate RCS leakage before completing the appropriate section of this Instruction will make the initial and final data VOID.

NOTE 2 An acceptable method for calculating leakage is to collect leakage in a container of known volume and time the fill with a stopwatch. Leakage calculated in the following step must be a positive number or zero.

NOTE 3 All test equipment used in the following step must be listed in section 4.2.

[1] **MEASURE** and **RECORD** any other RCS leakage, source of the leakage, and method used to calculate leakage below (**N/A** any blanks not used).

LEAKAGE SOURCE	METHOD USED	APPLICABLE DATA	LEAK RATE (GPM)
N/A			

____

[2] **SUM** all leak rates identified in step **[1]**, **AND**

RECORD below:

Total leak rate = _______ GPM

N/A

APPENDIX B
Page 1 of 3

Unit 1 Date TODAY

REACTOR COOLANT DRAIN TANK LEAKAGE

NOTE The following steps provide instructions for pumping down the RCDT after the initial RCDT pump down has been completed. These instructions may be performed as many times as necessary or marked **N/A** if they are not required.

[1] **ENSURE** initial time and RCDT level/volume from Appendix C have been recorded on Data Sheet B–1. N/A

[2] **WHEN** RCDT approaches 50% level, **THEN**

RECORD final time and RCDT level on Data Sheet B–1. ______

NOTE The applicable section of 1,2–SO–77–1 is dependent upon where the RCDT is to be pumped.

[3] **GO TO** 1,2–SO–77–1

PERFORM the applicable section, **AND**

RETURN to step **[4]** of this appendix. ______

[4] **RETURN** both RCDT pumps handswitches to the **PULL–TO–LOCK** position:

PUMP	HANDSWITCH	POSITION	INITIALS
A	HS–77–4A	PULL–TO–LOCK	
B	HS–77–6A	PULL–TO–LOCK	

[5] **RECORD** new initial time and RCDT level on Data Sheet B–1. ______

APPENDIX B
Page 2 of 3

Unit 1 Date TODAY

[6] **CONVERT** initial and final RCDT levels to gallons using Table E–2 of Appendix E, **AND**

RECORD on Data Sheet B–1. N/A

[7] **CALCULATE** RCDT leakage using the following equation, **AND**

$$\text{RCDT Leak Rate} = \frac{(\underline{\qquad\quad \text{Gal}}) - (\underline{\qquad\quad \text{Gal}})}{\underset{\Delta\ \text{Time}}{(\underline{\qquad\quad \text{min.}})}}$$

Initial Volume — Final Volume

RECORD on Data Sheet B–1. ☐

[8] **WHEN** final RCS leakage data has been collected, **THEN**

CALCULATE total of all calculated RCDT leakages, **AND**

RECORD on Data Sheet B–1. ☐

[9] **CALCULATE** average RCDT leakage using the following equation, **AND**

$$\text{Avg. RCDT Leak Rate} = \frac{\underset{\text{Total of All Calculated Leakage}}{(\underline{\qquad\quad}\text{GPM})}}{\underset{\text{Number of Data Points Taken}}{(\underline{\qquad\qquad})}}$$

RECORD on Data Sheet B–1. ☐

APPENDIX B
Page 3 of 3

Unit ___1___ Date TODAY

DATA SHEET B–1

Data Points Taken	Initial Time	Initial Level (%)	Initial Volume (Gal)	Final Time	Final Level (%)	Final Volume (Gal)	Calculated Leak Rate (GPM)
1	N/A						
2							
3							
4							
5							
6							
7							
8							
9							
10							
TOTAL OF ALL CALCULATED RCDT LEAK RATES							

Average RCDT leak rate = __________ GPM

Data Recorded By ______/______
Date

Date Reviewed By ______/______
Date

APPENDIX C
Page 1 of 5

Unit 1

Date TODAY

INITIAL/FINAL DATA

NOTE 1 N/A steps in this Appendix, except for **8.0** (if applicable) if the Plant Computer RCS Leakage program is being used.

NOTE 2 Copies of this Appendix may be used if more than one data set is required provided all copies are included in the data package.

Initials Data Start Time: 0438 / TODAY
Date

1.0 VOLUME CONTROL TANK (VCT) LEVEL

Instrument Used: (Check One) L0112MA ☐ LI–62–129 ☑

48.1 % Initial Level

38.7 % Final Level

2.0 PRESSURIZER (PZR) LEVEL

Instrument Used: (Check One) U0483MA ☐ LI–68–320 ☑ LI–68–335A ☐ LI–68–339A ☐

60.3 % Initial Level

60.2 % Final Level

3.0 PRESSURIZER PRESSURE

Instrument Used: (Check One)

P >1700 psig U0482MA ☐ PR–68–340 ☑ PI–68–334 ☐ PI–68–342A ☐

P < 1700 psig P0499MA ☐ PI–68–342A ☐ PI–68–66 ☐

2237 psig Initial Press

2234 psig Final Press

Initial Data Recorded By: Roy / TODAY
Date

Final Data Recorded By: Roy / TODAY
Date

APPENDIX C
Page 2 of 5

Unit 1   Date TODAY

4.0 RCS TEMPERATURE (T–AVG)

Instrument Used: (Check One)	T > 530 °F	U0484MA ☐	TI–68–2E ☑
	T < 530 °F	U0486MA ☐ U0489MA ☐	TR–68–1 ☐

576.9 °F Initial Level   577.1 °F Final Temp

5.0 REACTOR POWER

Instrument Used: (Check One)

U1127 Percent Rated Core Thermal Power	☐
XI–92–5005C Power Range NIS	☑
XI–92–5006C Power Range NIS	☐
U0485 Average Delta T (use when reactor power less than 15% OR less than 40% with LEFM unavailable)	☐

100.1 % Initial Pwr   99.9% Final Pwr

Initial Data Recorded By: Roy / TODAY Date

Final Data Recorded By: Ray / TODAY Date

Unit 1

Date TODAY

6.0 PRESSURIZER RELIEF TANK (PRT) LEVEL

NOTE Five PRT level readings should be taken approximately one minute apart. Table E–1 of App. E is used to convert PRT level (%) to gallons.

Instrument Used: (Check One) L0485MA ☐ LI–68–300 ☑

Initial Level: (1) 62 %(2) 62 % (3) 63 % (4) 62 %(5) 62 %

62.2 % Avg Level   8592 gal Avg Volume

Final Level: (1) 62 %(2) 63 % (3) 62 % (4) 63 %(5) 62 %

62.4 % Avg Level   8622 gal Avg Volume

7.0 REACTOR COOLANT DRAIN TANK (RCDT) LEVEL

NOTE 1 RCDT Level (7.0) may be marked N/A if conditions do not permit obtaining RCDT level.

NOTE 2 Final RCDT data may be marked N/A if App. C will be used to calculate average RCDT leakage; however, initial data must be recorded. Table E–2 of Appendix E is used to convert RCDT level (%) to gallons.

Instrument Used: L2400MA ☐ LI–77–1 ☑

23.5 % Initial Level   24.7 % Final Level

81.3 gal Initial Volume   85.4 gal Final Volume

Initial Data Recorded By: Roy / TODAY Date

Final Data Recorded By: Roy / TODAY Date

Unit 1 Date TODAY

8.0 COLD LEG ACCUMULATOR (CLA) LEVEL

NOTE CLA data may be marked N/A if RCS pressure is greater than 683 psig and quantification of CLA leakage is not required.

8.1 CLA 1

Instrument Used: (Check One) N/A LI–63–129 ☐ LI–63–119 ☐

______gal Initial Volume ______gal Final Volume

8.2 CLA 2

Instrument Used: (Check One) LI–63–109 ☐ LI–63–99 ☐

______gal Initial Volume ______gal Final Volume

8.3 CLA 3

Instrument Used: (Check One) LI–63–89 ☐ LI–63–81 ☐

______gal Initial Volume ______gal Final Volume

Initial Data Recorded By:____________/________ Date

Final Data Recorded By:____________/________ Date

APPENDIX C
Page 5 of 5

Unit 1 Date TODAY

8.0 COLD LEG ACCUMULATOR (CLA) LEVEL (Continued)

8.4 CLA 4

Instrument Used: LI–63–82 ☐ LI–63–60 ☐
(Check One)

N/A gal ____ gal
Initial Volume Final Volume

Initial Data Recorded By: ____ / ____
Date

Final Data Recorded By: ____ / ____
Date

Final Data End Time : 0642 / TODAY
Date

Initial Data Start Time: 0438 – Final Data End Time: 0642 = 124 min.
Δ Time

Data Reviewed By: Roy / TODAY
Date

APPENDIX D
Page 1 of 9

Unit 1 Date TODAY

RCS LEAKAGE CALCULATIONS

NOTE 1 All calculations must be performed manually. Verification may be performed using the computer.

NOTE 2 All calculations should be carried out to two places after the decimal. Signs must be carried through all calculations.

NOTE 3 Calculations in this Appendix may need to be performed more than once. If multiple calculations are required, copies of this Appendix may be used.

1.0 TOTAL RCS LEAKAGE

1.1 Volume Control Tank (VCT)

$$\text{VCT Leakage} = \frac{[(\underset{\text{Initial Level}}{48.1\ \%}) - (\underset{\text{Final Level}}{38.7\ \%})] \times 19.27\ \text{gal/\%}}{\underset{\Delta\text{ Time}}{124\ \text{min.}})}$$

VCT Leakage = 1.461 GPM

1.2 Pressurizer (Pzr)– UNIT 2 only N/A

[1] **CALCULATE** initial PZR volume by using the following equation:

NOTE 1 V_f (specific volume of a fluid) and V_g (specific volume of a gas)values for current plant conditions can be found using a copy of the steam tables.

NOTE 2 In the following equation the multiplier is the Pressurizer Volumetric Constant determined by engineering.

$$\text{Initial PZR Vol} = \left(\frac{\text{PZRLevel}}{V_f} + \frac{100\% - \text{PZRLevel}}{V_g}\right) * 2.02\ \text{gal} * \text{ft}^3 / \text{lb}_m * \%\text{level}$$

APPENDIX D
Page 2 of 9

Unit 1 Date TODAY

$$\text{Initial PZR Vol} = \left(\frac{\text{N/A} \quad \%}{ft^3/lb_m} + \frac{100 - \quad \%}{ft^3/lb_m} \right) * 2.02\, gal * ft^3/lb_m * \%level$$

Initial PZR Vol = ______ gal

______ Performed By

______ Reviewed By

[2] **CALCULATE** Final PZR volume by using the following equation:

NOTE 1 V_f (specific volume of a fluid) and V_g (specific volume of a gas) values for current plant conditions can be found using a copy of the steam tables.

NOTE 2 In the following equation the multiplier is the Pressurizer Volumetric Constant determined by engineering.

$$\text{Final PZR Vol} = \left(\frac{PZRLevel}{Vf} + \frac{100\% - PZRLevel}{Vg} \right) * 2.02\, gal * ft^3/lb_m * \%level$$

$$\text{Final PZR Vol} = \left(\frac{\quad \%}{ft^3/lb_m} + \frac{100 - \quad \%}{ft^3/lb_m} \right) * 2.02\, gal * ft^3/lb_m * \%level$$

Final PZR Vol = ______ gal

______ Performed By

______ Reviewed By

APPENDIX D
Page 3 of 9

Unit 1 Date TODAY

[3] **CALCULATE** PZR leakage rate by using the following equation:

$$\text{PZR Leakage} = \frac{\text{Initial PZR Volume} - \text{Final PZR Volume}}{\Delta\text{time}}$$

$$\text{PZR Leakage} = \frac{\text{N/A} \_\_\_ \text{gal} - \_\_\_ \text{gal}}{\_\_\_ \text{min}}$$

$$\text{PZR Leakage} = \_\_\_\_ \text{gpm}$$

_______ Performed By

_______ Reviewed By

1.3 Pressurizer (Pzr)– UNIT 1 only

[1] **CALCULATE** initial PZR volume using the following equation:

NOTE 1 V_f (specific volume of a fluid) and V_g (specific volume of a gas)values for current plant conditions can be found using a copy of the steam tables.

NOTE 2 In the following equation the multiplier is the Pressurizer Volumetric Constant determined by engineering.

$$\text{Initial PZR Vol} = \left(\frac{\text{PZRLevel}}{V_f} + \frac{100\% - \text{PZRLevel}}{V_g}\right) * 2.01 \,{}^{\text{gal} * \text{ft}^3}\!/_{\text{lb}_\text{m}} * \%\text{level}$$

$$\text{Initial PZR Vol} = \left(\frac{60.3\ \%}{0.02697\ {}^{\text{ft}^3}\!/_{\text{lb}_\text{m}}} + \frac{100 - 60.3\%}{0.1566\ {}^{\text{ft}^3}\!/_{\text{lb}_\text{m}}}\right) * 2.01 \,{}^{\text{gal} * \text{ft}^3}\!/_{\text{lb}_\text{m}} * \%\text{level}$$

$$\text{Initial PZR Vol} = 5002.9\ \text{gal}$$

Roy Performed By

Roy Reviewed By

APPENDIX D
Page 4 of 9

Unit 1 Date TODAY

[2] **CALCULATE** Final PZR volume using the following equation:

NOTE 1 V_f (specific volume of a fluid) and V_g (specific volume of a gas)values for current plant conditions can be found using a copy of the steam tables.

NOTE 2 In the following equation the multiplier is the Pressurizer Volumetric Constant determined by engineering.

$$\text{Final PZR Vol} = \left(\frac{\text{PZRLevel}}{V_f} + \frac{100\% - \text{PZRLevel}}{V_g}\right) * 2.01 \, \text{gal} * \text{ft}^3 / \text{lb}_m * \%\text{level}$$

$$\text{Final PZR Vol} = \left(\frac{60.2 \; \%}{.02695 \; \text{ft}^3/\text{lb}_m} + \frac{100 - 60.2 \; \%}{.1571 \; \text{ft}^3/\text{lb}_m}\right) * 2.01 \, \text{gal} * \text{ft}^3 / \text{lb}_m * \%\text{level}$$

Final PZR Vol = 4999.1 gal

Roy
Performed By
Roy
Reviewed By

[3] **CALCULATE** PZR leakage rate using the following equation:

$$\text{PZR Leakage} = \frac{\text{Initial PZR Volume} - \text{Final PZR Volume}}{\Delta\text{time}}$$

$$\text{PZR Leakage} = \frac{5002.9 \text{ gal} - 4999.1 \text{ gal}}{124 \text{ min}}$$

PZR Leakage = 0.0306 gpm

Roy
Performed By
Roy
Reviewed By

APPENDIX D
Page 5 of 9

Unit 1 Date TODAY

1.4 RCS Temperature Correction[C.1]

NOTE The multiplier used in the following equation is the RCS Temperature Correction Volumetric constant as determined by engineering.

A. Initial Conditions:

RCS pressure = 2237 psig + 14.7 = 2251.7 psia

RCS temperature = 576.9 °F

Specific volume (v_i) = 0.3090 ft^3/lbm

Density = $1/v_i$ = 3.2362 lbm/ft^3

B. Final Conditions:

RCS pressure = 2234 psig + 14.7 = 2248.7 psia

RCS temperature = 577.1 °F

Specific volume (v_i) = 0.3084 ft^3/lbm

Density = $1/v_i$ = 3.2425 lbm/ft^3

C. Temperature Correction:

$$\text{Temp Corr.} = \frac{[\,(\underset{\text{Initial Density}}{3.2362\ lbm/ft^3}) - (\underset{\text{Final Density}}{3.2425\ lbm/ft^3})\,] * 1298.19\ gal*ft^3 / lb_m}{\text{time}}$$

Temperature Correction = −0.0660 GPM

Unit 1 Date TODAY

1.5 Total RCS Leakage

Total RCS Leakage = (__________) + (__________) + (__________)
VCT PZR Temp Corr

Total RCS Leakage = ______________ GPM

____
Performed By

____
Reviewed By

2.0 IDENTIFIED LEAKAGE

NOTE Leakage into the PRT or CLA tanks will always be a positive value (or zero) when RCS pressure is greater than the specific tank's pressure. If negative leakage is calculated under these conditions, that tank's leakage must be set equal to zero.

2.1 Pressurizer Relief Tank (PRT)

$$\text{PRT Leakage} = \frac{\left[\left(\underline{\qquad\qquad \text{gal}} \right) - \left(\underline{\qquad\qquad \text{gal}} \right) \right]}{\left(\underline{\qquad\quad \text{min}} \right)}$$

Numerator terms: Final Volume, Initial Volume; denominator: Δ Time

PRT Leakage = ______________ GPM

NOTE RCDT Level (2.2) may be marked N/A if conditions do not permit obtaining RCDT level.

2.2 Reactor Coolant Drain Tank (RCDT)

$$\text{RCDT Leakage} = \frac{\left[\left(\underline{\qquad\qquad \text{gal}} \right) - \left(\underline{\qquad\qquad \text{gal}} \right) \right]}{\left(\underline{\qquad\quad \text{min}} \right)}$$

Numerator terms: Final Volume, Initial Volume; denominator: Δ Time

RCDT Leakage = ______________ GPM

____
Performed By

____
Reviewed By

Unit______________ Date__________

2.3 Steam Generator (SG)

NOTE 1 SG leak rates are obtained by 1, 2–SI–CEM–068–137.5. 0–SI–CEM–000–050.0 is performed every 72 hours and looks at activity levels which will determine if those leak rates from the last performance of 1, 2–SI–CEM–068–137.5 have increased.

NOTE 2 Individual steam generator leakage may be **N/A'd** if activity is too low to be separately identified.

A. SG1 Leakage = __________ GPD
B. SG2 Leakage = __________ GPD
C. SG3 Leakage = __________ GPD
D. SG4 Leakage = __________ GPD

$$\text{Total SG leakage} = \frac{\_\_\_\_\_\_\_\_\_\_\ \text{GPD}}{1440\ \text{min/day}} = \_\_\_\_\_\_\_\_\_\_\ \text{GPM}$$

Date/Time 0–SI–CEM–000–050.0 performed: ____________/__________
Date Time

Date/Time 1, 2–SI–CEM–068–137.5 performed: __________/__________
Date Time

____
Recorded by

Unit______________ Date__________

2.4 Cold Leg Accumulators (CLA)

NOTE CLA leakage calculations may be marked **N/A** if RCS pressure is greater than 683 psi**g** and quantification of CLA leakage is <u>not</u> required.

A. CLA 1 Leakage $= \dfrac{\left[\left(\underline{\hspace{3cm}}\text{ gal}_{\text{Final Volume}}\right) - \left(\underline{\hspace{3cm}}\text{ gal}_{\text{Initial Volume}}\right)\right]}{\left(\underline{\hspace{2.5cm}}\text{ min}_{\Delta\text{ Time}}\right)}$

CLA 1 Leakage = ______________________GPM

B. CLA 2 Leakage $= \dfrac{\left[\left(\underline{\hspace{3cm}}\text{ gal}_{\text{Final Volume}}\right) - \left(\underline{\hspace{3cm}}\text{ gal}_{\text{Initial Volume}}\right)\right]}{\left(\underline{\hspace{2.5cm}}\text{ min}_{\Delta\text{ Time}}\right)}$

CLA 2 Leakage = ______________________GPM

C. CLA 3 Leakage $= \dfrac{\left[\left(\underline{\hspace{3cm}}\text{ gal}_{\text{Final Volume}}\right) - \left(\underline{\hspace{3cm}}\text{ gal}_{\text{Initial Volume}}\right)\right]}{\left(\underline{\hspace{2.5cm}}\text{ min}_{\Delta\text{ Time}}\right)}$

CLA 3 Leakage = ______________________GPM

D. CLA 4 Leakage $= \dfrac{\left[\left(\underline{\hspace{3cm}}\text{ gal}_{\text{Final Volume}}\right) - \left(\underline{\hspace{3cm}}\text{ gal}_{\text{Initial Volume}}\right)\right]}{\left(\underline{\hspace{2.5cm}}\text{ min}_{\Delta\text{ Time}}\right)}$

CLA 4 Leakage = ______________________GPM

Total CLA leakage = ___________ GPM

____
Performed By

____
Reviewed By

Unit______________ Date__________

2.5 Other Identified Leakage

NOTE The following value may be marked **N/A** if no additional identified leakage sources (i.e., Appendix A) are to be included.

Other identified leakage (Appendix A) = __________ GPM

2.6 Total Identified Leakage

Total identified leakage = __________ (PRT) + __________ (RCDT) + __________ (SG)

+ __________ (Total CLA) + __________ (CCPIT/HUT) + __________ (Other)

Total identified leakage = ______________ GPM

3.0 UNIDENTIFIED LEAKAGE

Unidentified leakage = ______________ (Total leakage) – ______________ (Identified leakage)

Unidentified leakage = ______________ GPM

____
Performed By

____
Reviewed By

APPENDIX E
Page 1 of 2

TABLE E–1

PRESSURIZER RELIEF TANK (PRT) LEVEL VS. VOLUME

Level (%)	Volume (Gal)	Level (%)	Volume (Gal)	Level (%)	Volume (Gal)	Level (%)	Volume (Gal)
0.0	317.0	25.0	3033.7	50.0	6732.9	75.0	10432.0
1.0	387.7	26.0	3170.6	51.0	6886.6	76.0	10567.5
2.0	462.9	27.0	3308.8	52.0	7040.2	77.0	10701.3
3.0	542.4	28.0	3448.4	53.0	7193.8	78.0	10833.6
4.0	626.0	29.0	3589.3	54.0	7347.2	79.0	10964.1
5.0	713.3	30.0	3731.4	55.0	7500.4	80.0	11093.0
6.0	804.1	31.0	3874.6	56.0	7653.3	81.0	11219.9
7.0	898.4	32.0	4018.8	57.0	7805.9	82.0	11345.0
8.0	996.0	33.0	4164.1	58.0	7958.1	83.0	11468.0
9.0	1096.6	34.0	4310.4	59.0	8109.9	84.0	11589.0
10.0	1200.1	35.0	4457.5	60.0	8261.2	85.0	11707.8
11.0	1306.5	36.0	4605.5	61.0	8411.9	86.0	11824.3
12.0	1415.6	37.0	4754.2	62.0	8562.0	87.0	11938.5
13.0	1527.3	38.0	4903.7	63.0	8711.5	88.0	12050.1
14.0	1641.4	39.0	5053.8	64.0	8860.2	89.0	12159.2
15.0	1757.9	40.0	5204.6	65.0	9008.2	90.0	12265.6
16.0	1876.7	41.0	5355.9	66.0	9155.4	91.0	12369.2
17.0	1997.7	42.0	5507.6	67.0	9301.6	92.0	12469.8
18.0	2120.7	43.0	5659.8	68.0	9446.9	93.0	12567.3
19.0	2245.8	44.0	5812.4	69.0	9591.2	94.0	12661.6
20.0	2372.8	45.0	5965.3	70.0	9734.4	95.0	12752.5
21.0	2501.6	46.0	6118.5	71.0	9876.4	96.0	12839.8
22.0	2632.2	47.0	6271.9	72.0	10017.3	97.0	12923.3
23.0	2764.4	48.0	6425.3	73.0	10156.9	98.0	13002.8
24.0	2898.3	49.0	6579.2	74.0	10295.2	99.0	13078.0
						100.0	13148.7

APPENDIX E
Page 2 of 2

TABLE E–2

REACTOR COOLANT DRAIN TANK (RCDT) LEVEL VS. VOLUME

Level (%)	Volume (Gal)	Level (%)	Volume (Gal)	Level (%)	Volume (Gal)	Level (%)	Volume (Gal)
0.0	17.4	25.0	86.4	50.0	179.1	75.0	271.8
1.0	19.4	26.0	89.8	51.0	182.9	76.0	275.2
2.0	21.6	27.0	93.3	52.0	186.8	77.0	278.5
3.0	23.8	28.0	96.8	53.0	190.6	78.0	281.7
4.0	26.1	29.0	100.4	54.0	194.5	79.0	285.0
5.0	28.4	30.0	103.9	55.0	198.3	80.0	288.2
6.0	30.8	31.0	107.5	56.0	202.2	81.0	291.3
7.0	33.3	32.0	111.2	57.0	206.0	82.0	294.4
8.0	35.8	33.0	114.8	58.0	209.9	83.0	297.5
9.0	38.4	34.0	118.5	59.0	213.7	84.0	300.5
10.0	41.1	35.0	122.2	60.0	217.4	85.0	303.4
11.0	43.7	36.0	125.3	61.0	221.2	86.0	306.2
12.0	46.4	37.0	129.5	62.0	224.9	87.0	309.1
13.0	49.2	38.0	133.3	63.0	228.7	88.0	311.8
14.0	52.0	39.0	137.1	64.0	232.4	89.0	314.5
15.0	54.9	40.0	140.9	65.0	236.1	90.0	317.2
16.0	57.7	41.0	144.6	66.0	239.8	91.0	319.9
17.0	60.8	42.0	148.4	67.0	243.5	92.0	322.4
18.0	63.8	43.0	152.2	68.0	247.2	93.0	324.9
19.0	66.8	44.0	156.0	69.0	250.8	94.0	327.4
20.0	69.9	45.0	159.8	70.0	254.4	95.0	329.8
21.0	73.2	46.0	163.7	71.0	257.9	96.0	332.1
22.0	76.4	47.0	167.5	72.0	261.5	97.0	334.4
23.0	79.6	48.0	171.4	73.0	265.0	98.0	336.7
24.0	83.0	49.0	175.2	74.0	268.4	99.0	338.7
						100.0	340.8

SOURCE NOTES

REQUIREMENTS STATEMENT	SOURCE DOCUMENT	IMPLEMENTING STATEMENT
Take RCDT data over same interval as other data. The test should last at least two hours. All T–avg changes shall be considered.	NRC Exit with C. Chung (1–30–88)	**C.1**
Steps to take when negative unidentified leakage is calculated.	NRC Inspection Report 50–327,328/89–16. Revised corrective action for NOV 50–327, 328/89–16–02 L44 891226 801	**C.2**
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	TROI NCO 970071001	**C.3**

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM # Admin 2.4 0210

Calculating Maximum Reactor Vessel Vent Time

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	01/05/10	All	M. Hankins

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
Calculating Maximum Reactor Vessel Vent Time
Respond to Voids in the Reactor Vessel per FR-I.3

JA/TA task #

3110130601

K/A Ratings:
2.4.13 4.0/4.6

Task Standard:

Evaluation Method : Simulator ________ In-Plant ________ Classroom __X____

==

Performer: ______________________________________
NAME

Start time ________

Performance Rating : SAT _____ UNSAT _____ Performance Time _____

Finish time ________

Evaluator: ________________________/______________
SIGNATURE DATE

==

COMMENTS

____

____

____

____

____

____

____

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. **Critical step** are identified.
2. Any UNSAT requires comments
3. This JPM will be performed in a classroom setting.
4. 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 min **Local** ____________

Tools/Equipment/Procedures Needed:

REFERENCES:

	Reference	Title	Rev No.
	EA-0-7	Calculating Maximum Reactor Vessel Vent Time	2

Task Number	Task Title	Cont TRN
3110130601	Respond to Voids in the Reactor Vessel per FR-I.3	Y

===

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. I will provide initiating cues. All steps shall be performed for this task. 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:

Pzr Level is ~95%
RCS Pressure is 1000 psig (PI-68-62)
NO RCP's Running
RVLIS Upper Plenum Range ~95%
Unit 1 is performing FR-I.3, Voids in Reactor Vessel, Step 20
1U0983 indicates 223°F
1U0928 is inoperable
Containment Hydrogen Concentration per Chemistry Supervisor is 1.3% (15 minutes ago)
TSC is not available at this time

INITIATING CUES:

The US has directed you to perform EA-0-7 to calculate the maximum reactor vessel vent time.
Return completed performance of EA-07 to the US.
PERFORM all calculations to the nearest tenth.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 1.: [1] **OBTAIN** and **RECORD** the following data: RCS Pressure ***NOTE:*** ***Per initial conditions, PI-68-62, RCS pressure, is indicating~1000 psig*** STANDARD: Operator records RCS pressure as provided in the initial conditions or from the cue.	___ SAT ___ UNSAT
STEP 2.: Containment lower compartment average air temperature (Tctmt) ***NOTE:*** ***Per initial conditions, computer point U0983 indicates 223°F*** STANDARD: Operator records 223°F for the lower compartment temperature.	___ SAT ___ UNSAT
STEP 3.: Containment lower compartment volume at standard temperature and pressure (A) ***NOTE:*** ***Per initial conditions, Computer point U0928 is inoperable.*** STANDARD: Operator records that the computer point is not available.	___ SAT ___ UNSAT
STEP 4.: Containment Hydrogen Concentration (H) ***NOTE:*** ***Per initial conditions, Chemistry Supervisor reported Containment Hydrogen concentration 1.3 % ~ fifteen minutes ago.*** STANDARD: Operator records hydrogen concentration provided in cue.	___ SAT ___ UNSAT
STEP 5.: [2.a] **DETERMINE** containment lower compartment volume at standard temperature and pressure (A) a. If computer point U0928 available...... **NOTE:** ***Per initial conditions,*** **U0928 is not available operator continues with the next substep.** STANDARD: Operator N/A this substep.	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 6.: [2.b] **IF** computer point U0928 NOT available, **THEN** **CALCULATE** A as follows: $\frac{383{,}000 \text{ cu ft}}{} \times \frac{492R^\circ}{(460 + \mathbf{223^\circ F})} = \frac{492}{\mathbf{683^\circ}}$ = ***383,000 X .7 = 268,100 cu ft*** STANDARD: Operator performs substep b, and determines A= 268,100 cu ft	___ SAT ___ UNSAT **Critical Step**
STEP 7.: [3] **DETERMINE** maximum hydrogen volume that can be vented (B) WHILE maintaining containment hydrogen concentration less than 3%. $B= \frac{(3\%\text{-}H\%) \times A \text{ CU FT}}{100\%} = \frac{\mathbf{1.7} \times \mathbf{268{,}100}}{100} = \underline{\mathbf{4557.7}}$ STANDARD: Operator utilizes data from step 4.2.1 for Containment Hydrogen concentration ***(3%-1.3%= 1.7%)*** and step 4.2.2 (b) for the lower compartment volume, and performs calculation to determine the max hydrogen volume that can be vented while maintaining the containment hydrogen concentration less than 3%.	___ SAT ___ UNSAT **Critical Step**
STEP 8.: [4.a] **DETERMINE** hydrogen flow rate as a function of RCS pressure (C): a. **RECORD** RCS pressure ___***1000***___ psig 4..2.1 STANDARD: Operator records RCS pressure as given in the initial conditions.	___ SAT ___ UNSAT
STEP 9.: [4.b] **DETERMINE** hydrogen flow rate (C) Using Curve 8, Hydrogen Flow vs RCS Pressure: C= ___***3250 (range 3150-3350)***___ SCFM (Curve 8) STANDARD: Operator uses the RCS pressure from 4.2.1 to determine hydrogen flow rate using Curve 8. Range 3250 +/- 100 SCFM.	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 10.: [5] **CALCULATE** maximum venting time (T): $T = \dfrac{\text{B CU FT}}{\text{C Standard CU FT/Minute}}$ $T = \dfrac{\mathit{4557.7}}{\mathit{3250\ (3150\ to\ 3350)}}$ = ***1.4* +/- 0.1 minutes** ***Cue:*** STANDARD: Operator calculates the maximum venting time.	___ SAT ___ UNSAT **Critical Step**
STEP 11.: Operator returns complete performance of EA-0-7 to the Unit Supervisor. STANDARD: Operator returns complete performance of EA-0-7 to the Unit Supervisor.	___ SAT ___ UNSAT

End Of JPM

CALCULATION SUMMARY SHEET FOR EXAMINER

Determine Lower Compartment Volume (A)

$$A = 383{,}000 \text{ cu ft} \times \frac{492°R}{(460 + T_{ctmt}\ °F)}$$

A= 383,000 cu ft X $\frac{492R°}{(460 + \mathbf{\textit{223°F}})}$ = $\frac{492}{\mathbf{\textit{683°}}}$ = ***383,000 X 0.7 = 268,100 cu ft***

Determine Max Hydrogen Volume That Can Be Vented (B)

$$B = \frac{(3\% - H\%) \times A \text{ cu ft}}{100\%}$$

B= $\frac{(3\%\text{-}H\%) \text{ X A CU FT}}{100\%}$ = $\frac{\mathbf{\textit{1.7}} \text{ X } \mathbf{\textit{268,100}}}{100}$ = ***<u>4557.7</u>***

Determine Hydrogen Flow rate (C)

C = ____________ SCFM.
(Curve 8)

C= *3250 (range 3150-3350)* SCFM

Calculate Max Vent Time (T)

$$T = \frac{B \text{ cu ft}}{C \text{ standard cu ft/minute}}$$

T= $\frac{\textit{4557.7}}{\mathbf{\textit{3220 (3200 to 3250)}}}$ = ***1.4*** minutes +/- 0.1 minutes

End of Sheet

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. I will provide initiating cues. All steps shall be performed for this task in a classroom. 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:

Pzr Level is ~95%
RCS Pressure is 1000 psig (PI-68-62)
NO RCP's Running
RVLIS Upper Plenum Range ~95%
Unit 1 is performing FR-I.3, Voids in Reactor Vessel, Step 20
1U0983 indicates 223°F
1U0928 is inoperable
Containment Hydrogen Concentration per Chemistry Supervisor is 1.3% (15 minutes ago)
TSC is not available at this time

INITIATING CUES:

The US has directed you to perform EA-0-7 to calculate the maximum reactor vessel vent time.
Return completed performance of EA-07 to the US.

PERFORM all calculations to the nearest tenth.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM21-1A

Respond to a Failure of PRM N-41

**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	1/26/10	All	M Hankins

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 a Failure of PRM N-41

Note: This JPM satisfies Simulator Manipulation "AA".

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

K/A Ratings:

015A4.03 (3.8/3.9)	015A4.02 (3.9/3.6)
015A2.01 (3.5/3.9)	015A3.03 (3.9/3.9)
015A4.01 (3.6/3.6)	015A2.02 (3.1/3.5)

Task Standard:

Recognize failure of Power Range Monitor, N-41, defeat its control functions, and prepare for its removal from service.

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. Any UNSAT requires comments.
2. Acknowledge any associated alarms.
3. Initialize simulator in IC #13.
4. **Booth operator:**
   a. Select N-41 on NR45.
   b. Verify Rx power <75% on PRNIs, NR-45 and ΔT recorder, *TR-68-2A*
1. Approximately 1 minute after operator assumes shift, Activate **IMF NI07A f:120**.
2. 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. 9 mins **Local** ____________

Tools/Equipment/Procedures Needed:

AOP-I.01, Section 2.0 & 2.3, AR-M6-A, AR-M4-B

References:

	Reference	Title	Rev No.
1.	AOP-I.01	Nuclear Instrument Malfunction	9
2.	1-AR-M6-A	Reactor Protection and Safeguards	15
3.	1-AR-M4-B	NIS/ROD CONTROL	28

==

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 operating at ~46% reactor power, all controls are in AUTOMATIC.

INITIATING CUES:

1. You are the OATC and are to monitor the control board and respond per licensed duties to operating conditions.
2. You will be required to respond, as a *single performer*, to any abnormality that occurs.
3. When any required actions/procedures have been completed notify the SM.

STEP/STANDARD	SAT/UNSAT
<u>STEP 1.</u>: Operator places rods in Manual. **<u>STANDARD</u>:** Operator places rods in manual after verifying rod motion is not warranted due to no power change or Tave/Tref mismatch. Rods are placed in manual without referencing a procedure, prior to exceeding insertion of >25 steps. <u>COMMENTS:</u>	___ SAT ___ UNSAT __________ Start Time **Critical Step**
<u>STEP 2.</u>: Operator evaluates malfunction to determine Power Range Monitor (N-41)failed high. ***<u>Cue</u>:*** ***After operator locates AOP-I.01 procedure, provide operator a copy.*** <u>STANDARD</u>: Operator recognizes Power Range Monitor (N-41) failed high, determines AOP-I.01, Section 2.3 is the appropriate procedure. AOP-I.01 may be entered directly or by transitions from any one of the procedures below: • AOP-C.01 section 2.1 step [3] • 1-AR-M6-A windows [B-1] or [D-1] • 1-AR-M4-B windows [D-3] and [E-3] <u>COMMENTS:</u>	___ SAT ___ UNSAT **Critical Step**
AOP-I.01, Nuclear Instrument Malfunction	
<u>STEP 3.</u>: 2.3 [1] **PLACE** rod control in Man. <u>STANDARD</u>: Operator verifies HS-85-5110 is in manual, or states Rods have already been placed in manual. <u>COMMENTS:</u>	___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 4.: 2.3 [2] **STABILIZE** reactor power at current level. STANDARD: Operator checks other power range instruments and determines that reactor is stable. COMMENTS:	___ SAT ___ UNSAT
STEP 5.: 2.3 [3] **EVALUATE** the following Tech Specs for applicability: ***Cue:*** ***SM will evaluate Tech Specs.*** STANDARD: Operator requests SM to evaluate Tech Specs COMMENTS:	___ SAT ___ UNSAT
STEP 6.: 2.3 [4] **PLACE** the following switches located on the Detector Current Comparator drawer [M-13, N50] in position corresponding to failed power Range Channel: • UPPER SECTION STANDARD: Detector Current comparator "Upper Section" switch in the PRN-41 position. Channel defeat light on. COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 7.: 2.3 [4] **PLACE** the following switches located on the Detector Current Comparator drawer [M-13, N50] in position corresponding to failed power Range Channel: • LOWER SECTION STANDARD: Detector Current comparator "Lower Section" switch in the PRN-41 position. Channel defeat light on. COMMENTS:	___ SAT ___ UNSAT **Critical Step**

STEP/STANDARD	SAT/UNSAT
<u>STEP 8.</u>: 2.3 [4] **PLACE** the following switches located on the Detector Current Comparator drawer [M-13, N50] in position corresponding to failed power Range Channel: Appropriate ROD STOP BYPASS <u>STANDARD</u>: Rod Stop Bypass switch in "BYPASS PRN-41" position. <u>COMMENTS:</u>	___ SAT ___ UNSAT **Critical Step**
<u>STEP 9.</u>: 2.3 [4] **PLACE** the following switches located on the Detector Current Comparator drawer [M-13, N50] in position corresponding to failed power Range Channel: • Appropriate Power Mismatch Bypass switch (XX-92-5037) <u>STANDARD</u>: Power Mismatch Bypass switch in the "Bypass PRN-41" position. <u>COMMENTS:</u>	___ SAT ___ UNSAT **Critical Step**
<u>STEP 10.</u>: 2.3 [5] **DEFEAT** failed Power Range channel Using Comparator Channel defeat switch: • Comparator and Rate Drawer [M-13, N37] <u>STANDARD</u>: Comparator Channel Defeat switch is placed in the N-41 position. Comparator defeat light on. <u>COMMENTS:</u>	___ SAT ___ UNSAT **Critical Step**
<u>STEP 11.</u>: 2.3 [6] **RESTORE** T-avg to within 1.5°F of T-ref USING one of the following: ***<u>Cue:</u>*** ***CRO is evaluating Tavg and Tref deviation and restoration.*** <u>STANDARD</u>: Operator acknowledges CRO will perform this step and continues with procedure. . <u>COMMENTS:</u>	___ SAT ___ UNSAT

STEP/STANDARD		SAT/UNSAT
STEP 12.:	2.3 [7] **ENSURE** OPERABLE Power Range channel selected to the following: • Nuclear Power Recorder [M4, NR-45] • Nuclear Power Recorder [M4, NR-45] (ΔI)	___ SAT ___ UNSAT
STANDARD:	Operator Uses Touch Screen to ensure the recorder is not selected for PR Channel I or ΔI Channel 1. Operator should select the highest operable power range channel and an operable ΔI Channel. (Operator could select view for all points on NR-45)	
COMMENTS:		
STEP 13.:	2.3 [7 continued] **ENSURE** RCS Temp ΔT recorder (green pen) [M-5, XS-68-2B]	___ SAT ___ UNSAT
STANDARD:	Operator checks position of XS-68-2B. Ensures it is NOT selected for LOOP ONE.	
COMMENTS:		
STEP 14.:	2.3 [8] **RETURN** rod control to AUTO if desired.	___ SAT ___ UNSAT
Cue:	***CRO will perform this step.***	
STANDARD:	Operator acknowledges this step is being addressed by the CRO and continues with procedure.	
COMMENTS:		
STEP 15.:	2.3 [9] **CHECK** reactor power greater than 75%.	___ SAT ___ UNSAT
STANDARD:	Operator verifies power less than 75% (current power is ~ 46%), goes to RNO "GO TO Step 11."	
COMMENTS:		

STEP/STANDARD		SAT/UNSAT
STEP 16.:	2.3[11] **NOTIFY** IM to remove failed power range channel from service USING appropriate Appendix:	___ SAT ___ UNSAT
Cue:	***Role play as MSS or IM, inform operator that a crew will be in the MCR within the hour to perform Appendix "A" of AOP-I.01.***	
STANDARD:	Operator communicates with IMs or MSS to request performance of Appendix "A" of AOP-I.01 for removal of N-41 from service.	
COMMENTS:		
STEP 17.:	**NOTIFY** SM that N-41 failed, its control functions have been defeated, IMs have been notified to remove it from service.	___ SAT ___ UNSAT
STANDARD:	Operator informs SM.	
COMMENTS:		____________ Stop Time

End of JPM

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 operating at ~46% reactor power, all controls are in AUTOMATIC.

INITIATING CUES:

1. You are the OATC and are to monitor the control board and respond per licensed duties to operating conditions.
2. You will be required to respond, as a *single performer*, to any abnormality that occurs.
3. When any required actions/procedures have been completed notify the SM.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM 1-AP

Emergency Boration (Stuck Rods)

PREPARED/ REVISED BY:		Date/
VALIDATED BY:	*	Date/
APPROVED BY:	(Operations Training Manager)	Date/
CONCURRED:	** (Operations Representative)	Date/

* 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:
8	Transfer from WP. Minor enhancements.	N	8/12/94	All	HJ Birch
9	Boron Conc. changes	N	9/16/94	All	HJ Birch
10	Chg due to Rev B procedure.	Y	9/9/95	All	HJ Birch
11	Incorp previous pen/inks: which corrected step 10 to continue with procedure instead of transition (JPM performance comment. Moved Tave cue from step 14 to 17 added step to determine fully inserted, 12 steps. Latest EA-68-4 & ES-0.1 Rev Chgd 'rods full out' to 'rods >12 steps', added step to use the computer to verify Rods position	N	1/19/96	6	HJ Birch
12	Major flow change for the start of EA-68-4	Y	2/2/98	All	HJ Birch
13	Revision to ES-0.1 had no impact. Made step 28 a critical step. Revised K/A ratings. Reformatted critical steps.	N	9/23/98	All	JP Kearney
pen/ink	ES-0.1 procedure revision had no impact	N	8/22/00	4	S. R. Taylor
pen/ink	Minor clarification	N	11/27/01	4, 6, 7, 9	L. Pauley
14	Incorporated change to EA-68-4. Change was editorial in nature	N	8/12/02	All	J P Kearney
15	Incorporated REV. 1C changes to ES-0.1 and EA-68-4	Y	9/8/03	All	G S Poteet
16	Incorporated comments	N	3/30/04	All	G.S. Poteet
17	Made minor editorial changes throughout. Updated to current revisions of EA-68-4 and ES-0.1.	N	7/27/04	All	MG Croteau
18	Updated to current revisions of EA-68-4 and ES-0.1. Made minor editorial changes throughout.	Y	9/20/2005	All	JJ Tricoglou
19	Revised format and updated IC. Added candidate cue sheet and minor revisions to match procedure references.	N	11/21/07	All	R Putnam
20	Added H3 auto generate of Handout. Remove handout page. Minor step chgs base on previous procedure changes.	N	7/15/08	5, 7, 9	H J Birch
21	Updated procedure revisions, deleted steps to realign Emergency Boration, validation time change to 15 minutes.	Y	1/31/10	All	M Hankins

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:

Emergency Boration (Stuck Rods)

Note: This JPM satisfies Simulator Manipulation "T".

JA/TA task # : 0000980501 (**RO**)

K/A Ratings:

005AA2.03 (3.5/4.4)	
024AA1.17 (3.9/3.9)	005AK3.01 (4.0/4.3)
024AA1.18 (3.7/3.6)	005AK3.06 (3.9/4.2)
024AA1.15 (3.1/2.9)	005AA2.03 (3.5/4.4)

Task Standard:

$\geq$ 5040 (or amount determined per 0-SI-NUC-000-038.0 and TI-44) gallons of boric acid injected into the reactor coolant system using the normal boration path.

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. Initialize the simulator in IC-**118**.
4. **Insert the following:**
   a. **IMF RD13A f:1**
   b. **IMF RD13E f:1**
   c. Override **IOR ZDIHS62138A f:0**
   d. **IMF RD07C5 (F-8)**
   e. **IMF RD07D8 (H-14)**
   f. **IMF AN_OV_325** CPU alarm for Control Rods Dev & Seq- Nuisance alarm
5. **INITIATE** a reactor trip.
6. Close TDAFW valves and freeze the simulator after you have acknowledged the control board alarms.
7. The Console operator can be used to acknowledge alarms not associated with the JPM.
8. 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:

1. EA-68-4,
2. ES-0.1
3. Calculator for examiner and examinee

REFERENCES:

	Reference	Title	Rev No.
A.	EA-68-4	Emergency Boration	10
B.	ES-0.1	Reactor Trip Response	32

==

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. The reactor has tripped with no safety injection and the Immediate Actions of E-0, Reactor Trip or Safety Injection, were completed.
2. The transition was made to ES-0.1 "Reactor Trip Response".
3. BAT A is aligned to Unit 1 via 1A BATP

INITIATING CUES:

1. You are directed to PERFORM step 6 of ES-0.1.
2. NOTIFY the US/SRO when you have completed all actions required by Step 6 of ES-0.1.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 1.: **OBTAIN** the appropriate procedure(s). STANDARD: Operator obtains a copy of ES-0.1 (and EA-68-4 at step 3 of JPM)	___ SAT ___ UNSAT Start Time____
NOTE: The next three steps of the JPM are from ES-0.1. STEP 2. 6. **CHECK** if emergency boration required: a. **VERIFY** all control rods fully inserted STANDARD: Determinre that two rods F8 and H14 are indicating full out by checking rod bottom lights and rod position indicators for control rod position. Enter Step 6.a RNO.	___ SAT ___ UNSAT **Critical Step**
STEP 3. **IF** all rod bottom lights are de-energized, **THEN** **RESTORE** power to RPIs by switching Instrument Rack B Transfer Switch to ALTERNATE. [M-7, lower switch] STANDARD: Operator determines this step N/A since power is available.	___ SAT ___ UNSAT
STEP 4. **IF** any of the following conditions exists: • two or more RPI's indicate greater than 12 steps **OR** • two or more control rod positions CANNOT be determined, **THEN** **EMERGENCY BORATE USING** EA-68-4, EMERGENCY BORATION • STANDARD: Operator transitions to EA-68-4, Emergency Boration	___ SAT ___ UNSAT
EA-68-4, Emergency Boration	
STEP 5. [4.1.1] **IF** entering this instruction from any of the following: STANDARD: Operator determines this step is N/A, since procedure entry was from ES-0.1, Reactor Trip Response.	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 6. [4.1.2] **IF** entering this instruction from ES-0.1 AND any of the following conditions are met: • RCS temperature less than 540°F AND core burnup is greater than 12,000 MWD/MTU **OR** • RCS temperature less than 530°F ***Cue:*** ***If checked, cue that RCS temperature reads 547 degrees on all loops.*** STANDARD: Operator recognizes that emergency boration is not required based on temperature.	___ SAT ___ UNSAT
STEP 7. [4.1.3] **IF** rod positions CANNOT be verified due to RPI's de-energized, STANDARD: Operator determines this step is N/A, since procedure entry was from ES-0.1, Reactor Trip Response due to two stuck rods, continue with next step.	___ SAT ___ UNSAT
STEP 8. [4.1.4] **IF** entering this instruction from ES-0.1 **AND** any of the following conditions are met: • Two or more control rods indicating greater than 12 steps **OR** • Two or more rod positions CANNOT be determined due to RPIs unavailable **THEN** **PERFORM** the following: **a.** **IF** using BAT as a boration source **GO TO** Section 4.2, Emergency Boration from BAT **b.** **IF** using RWST as a boration source **GO TO** Section 4.3, Emergency Boration from RWST **NOTE:** **Since Section 4.3 is an acceptable path, if the operator chooses this path give the following cue:** ***Cue:*** ***If the operator chooses to go to section 4.3, role play as US and state that the preferred boration method is via the BAT.*** STANDARD: Operator selects Section 4.2.	___ SAT ___ UNSAT
NOTE: **The following steps are from Section 4.2.** STEP 9.: [4.2.1] **PLACE** boric acid transfer pumps to fast speed. **NOTE:** **Standard 1 and 2 can be done in any order.** STANDARD: 1) Pump(s) stopped. **Green** light on HS 2) Speed selector switch placed on "FAST" position 3) Pump(s) restarted, **Red** light on right comes on for fast speed. 4) **(Starting only 1A pump is acceptable)**	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 10.: [4.2.2] **ADJUST** emergency borate valve **[FCV-62-138]** to maintain flow between 35 and 150 gpm on **[FI-62-137A]**. **NOTE:** **FCV-62-138 will not operate.** STANDARD: Operator recognizes that FCV-62-138 will not operate. Operator continues with procedure.	___ SAT ___ UNSAT
STEP 11.: [4.2.3] **MONITOR** emergency boration flow: a. **CHECK** emergency boration flow established on **[FI-62-137A]**. **NOTE:** **Since FCV-62-138 will not operate, this step will have no affect on flow. Operator may continue with the next step.** STANDARD: Operator determines FCV-62-138 will not open and no flow is available. Continues with next step. This is a MONITOR step which requires checking a process repeatedly at an unspecified interval.	___ SAT ___ UNSAT
STEP 12.: [4.2.3.b] **IF** boric acid flow less than 35 gpm, **THEN CLOSE** recirculation valve for the BAT aligned to the blender: **[1-FCV-62-237]** for BAT A. **NOTE:** There is no boric acid flow indicated on FI-62-137A at this time. This is a monitor step and if or when flow is established on this FI the operator should verify flow greater than 35 gpm, or throttle recirculation valve as necessary to establish 35 gpm. **Placing the recirculation valve in closed, without a flow path will dead head the boric acid transfer pump.** See Attachment 1 Boric Acid Flowpath and Valves. STANDARD: Operator should continue with the next step.	___ SAT ___ UNSAT
STEP 13.: [4.2.4] **IF** emergency boration flow NOT established, **THEN ALIGN** normal boration path: [4.2.4a] **VERIFY** VCT outlet valves **[LCV-62-132]** and **[LCV-62-133]** OPEN STANDARD: Operator verifies valve positions using indicator lights for LCV-62-132 and 133 on control panel, red lights illuminated.	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 14.: [4.2.4.b] **ALIGN** normal boration to VCT outlet: • **OPEN [FCV-62-140].** • **OPEN [FCV-62-144].** STANDARD: Operator verifies FCV-62-140 is already OPEN (red light illuminated, green light dark) and opens FCV-62-144 by placing HS-62-144 to the OPEN position (right) and verifies red light illuminated and green light dark.	___ SAT ___ UNSAT **Critical Step**
STEP 15.: [4.2.4.c] **CHECK** boration flow greater than 35 gpm on **[FI-62-139]**. ***CUE:*** ***If operator notifies the SRO that emergency boration has been established acknowledge flow has been established.*** STANDARD: Operator ensures flow rate is greater than 35 gpm. May notify SRO that emergency boration flow has been established.	___ SAT ___ UNSAT
STEP 16.: [4.2.5] **IF** boration flow NOT established, **THEN** PERFORM one of the following… STANDARD: Operator N/A's this step.	___ SAT ___ UNSAT
STEP 17.: [4.2.6] **VERIFY** charging flow established. STANDARD: Operator verifies charging flow established on FI-62-93.	___ SAT ___ UNSAT
STEP 18.: [4.2.7] **MAINTAIN** boric acid flow between 35 and 150 gpm. STANDARD: Operator monitors flow on FI-62-139 between 35 and 50 gpm.	___ SAT ___ UNSAT
STEP 19.: [4.2.8] **Monitor** BAT level. STANDARD: Operator monitors BAT level on LI-62-238.	___ SAT ___ UNSAT
STEP 20.: [4.2.9] **IF** FR-S.1 ATWS or FR-S.2 Loss of core Shutdown condition exists, **THEN**.... STANDARD: Operator N/A's this step.	___ SAT ___ UNSAT
STEP 21.: [4.2.10] **IF** emergency boration required for RCS cooldown, **THEN DETERMINE** required boric acid volume based on RCS Temperature STANDARD: Operator N/As this step.	___ SAT ___ UNSAT

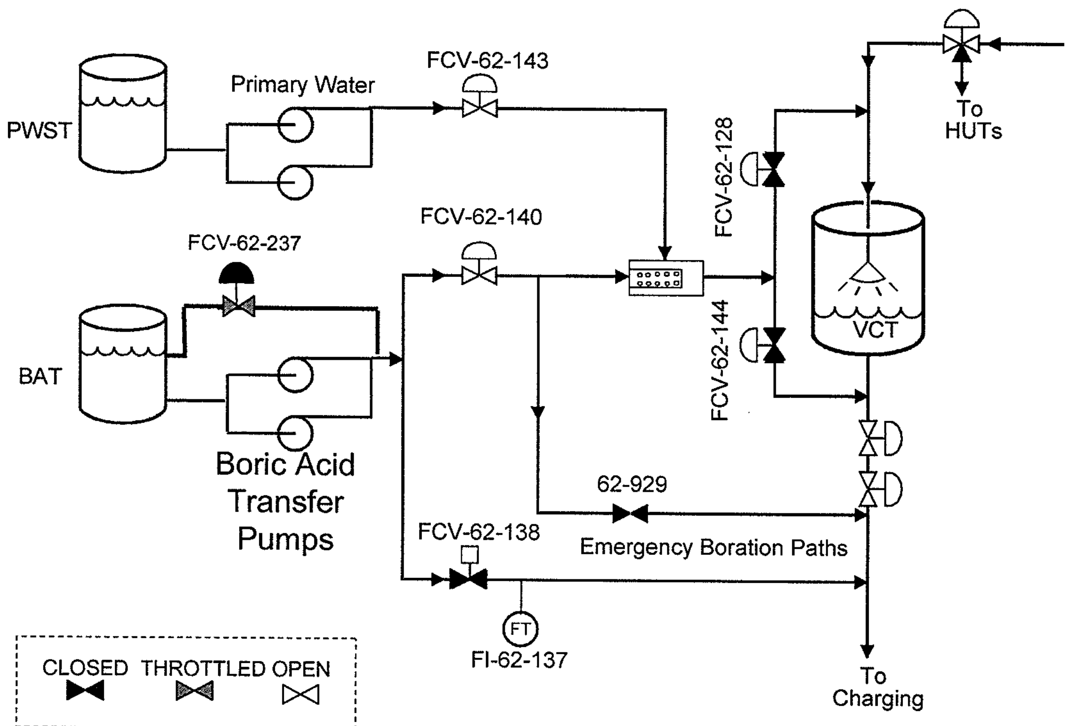
Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 22.:	[4.2.11] **IF** any of the following conditions are met: • 2 or more control rods greater than 12 steps OR • 2 or more control rods positions CANNOT be determined **THEN PERFORM** one of the following: • Determine Boric Acid Volume from Table **OR** • **CALCULATE** required boric acid volume **USING** 0-SI-NUC-000-038.0 and TI-44.	___ SAT ___ UNSAT **Critical Step**
CUE:	***If operator decides to use SI-38, tell them the preferred method to determine Boric Acid volume is from the table in EA-68-4.***	
STANDARD:	Operator Determines boric acid volume using table and determines that *5040 gallons* of boric acid are required.	
STEP 23.:	**CALCULATE** time to inject boric acid volume determined in EA-68-4 step 11 at established flow rate:	___ SAT ___ UNSAT **Critical Step**
NOTE:	**5040 / (flow indicated by FI-62-139) = _______ minutes**	
STANDARD:	Operator determines the time required to inject 5040 gallons of boric acid based on the flow rate they establish. 5040 gal/ flow rate on FI-62-139 = _____ minutes +/- 1 minute	
STEP 24.:	**WHEN** either of the following conditions exists: • FR-0 Subcriticality Status Tree is GREEN **AND** • Required Boric Acid Volume has been injected to RCS **OR** Adequate SDM verified **OR** Conditions which require Emergency Boration no longer exist, **THEN GO TO** Section 4.4 for Termination of Boron.	___ SAT ___ UNSAT
Cue:	***When the operator determines the time, cue them that the JPM is complete.***	
STANDARD:	Operator notifies the US that boration has been established to RCS.	

End of JPM

Attachment 1

Emergency Boration Flowpath/Valves



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. The reactor has tripped with no safety injection and the Immediate Actions of E-0, Reactor Trip or Safety Injection, were completed.
2. The transition was made to ES-0.1 "Reactor Trip Response".
3. BAT A is aligned to Unit 1 via 1A BATP

INITIATING CUES:

1. You are directed to PERFORM step 6 of ES-0.1.
2. NOTIFY the US/SRO when you have completed all actions required by Step 6 of ES-0.1.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM2 RO/SRO

Remove Excess Letdown from Service

**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	1/18/2010	All	M. Hankins

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
Place excess letdown in service to the VCT /RCDT

JA/TA task #
0040160101

K/A Ratings:
004 A4.06 (3.6/3.1) 004 A4.05 (3.6/3.1)
A4.06 (3.6/3.1)

Task Standard: Remove Excess letdown from service in accordance with 1-SO-62-6, Excess Letdown, section 7.0

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. A **Critical step** is identified bold type in the SAT/UNSAT column.
2. Any UNSAT requires comments
3. Task should begin at the IC198, B CCP I/S, Excess LD I/S, LD I/S at ~73 gpm.
5. 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.
6. **Place a Pink Tag on 1-HIC-62-93, which is in manual.**

Validation Time: CR 7 min **Local** ____________

Tools/Equipment/Procedures Needed:

REFERENCES:

	Procedure	Title	Rev No.
	1-SO-62-6	Excess Letdown	17
	1-AR-M5-B	Annunciator Response	36

Task Number	Task Title	Cont TRN
0040160101	**Place excess letdown in service to the VCT /RCDT**	

==

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. All steps shall be performed for this task 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:

The Unit is operating at 100% power.
A Leaking valve required Normal Letdown to be removed from service.,
Excess letdown was placed in service while the repairs were made.
Excess letdown temperature is ~207°F and 45 psig on 1-PI-62-57.
The leaking valve has now been repaired.
Normal Letdown has been restored to service in accordance with 1-SO-62-1.
1-HIC-62-93 is in manual, per section 5.0 of 1-SO-62-6, Excess Letdown.
1-SO-62-6, Section 4.0, 5.0 and 7.0 step 1are complete.

INITIATING CUES:

You are the U-1 OATC. You have been directed to remove excess letdown from service using 1-SO-62-6, Section 7.0.

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 1.:	**IF** letdown is to be placed in service, **THEN RETURN** to service per 1-SO-62-1.	___ SAT ___ UNSAT
STANDARD:	Operator verifies letdown is in service. Initial conditions stated	________ Start Time
STEP 2.:	**CLOSE [1-FCV-62-56]** Excess Letdown Heat Exchanger outlet valve.	___ SAT ___ UNSAT
STANDARD:	Operator turns the potentiometer in the clockwise direction until the pointer (needle) is in the CLOSE or ZERO position. Operator may verify a decrease in temperature on TI-62-58 and pressure decrease on PI-62-57.	**CRITICAL STEP**
STEP 3.:	**VERIFY [1-FCV-62-59]** Excess Letdown 3-way valve in **NORMAL**.	___ SAT ___ UNSAT
STANDARD:	Operator verifies the HS for FCV-62-59 is in NORMAL.	
STEP 4.:	**CLOSE [1-FCV-62-55]** Excess Letdown containment isolation valve.	___ SAT ___ UNSAT
STANDARD:	Operator places HS in closed and verifies green light illuminated and red light dark	
STEP 5.:	**CLOSE [1-FCV-62-54]** COLD LEG Loop #3 Excess Letdown valve.	___ SAT ___ UNSAT
STANDARD:	Operator places HS to close and verifies green light illuminated and red light dark	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 6.:	**IF** charging is in service, **THEN** **ADJUST** seal injection flow to 6-11 gpm using **[1-FCV-62-89]**	___ SAT ___ UNSAT
STANDARD:	Operator turns potentiometer CCW to close (demand moves to the right toward 100% or CLOSE) to reduce seal injection flow to between 6 and 11 gpm.	
STEP 7.:	**IF** auto operation is desired and system conditions will allow it, THEN **PLACE [1-FCV-62-93]** in **AUTO**.	___ SAT ___ UNSAT
STANDARD:	Prior to placing charging in automatic, the Operator should adjust Pressurizer level, by taking the lever to the right to decrease charging flow (or to the left to increase charging flow) as needed to match Pzr Level and Program Level. When program level and actual level are matched, the Auto/Manual Toggle should be placed in the Auto (Down) position.	
STEP 8.:	**NOTIFY** RADCON that Excess Letdown is REMOVED from SERVICE.	___ SAT ___ UNSAT
CUE:	***Acknowledge as RADCON that Excess Letdown has been removed from service.***	
STANDARD:	Operator should call RADCON and notify them Excess Letdown has been removed from service on Unit 1.	
STEP 9.:	**ENSURE [1-FCV-70-85]** Excess Letdown HX CCS FCV is **CLOSED**.	___ SAT ___ UNSAT **CRITICAL STEP**
NOTE	Operator should address the need to have a CV (Concurrent Verifier) present prior to operating the valve.	
STANDARD:	Operator takes the HS for 1-FCV-70-85 to CLOSE position (to the left) and verfies green light illuminated and red light dark.	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 10.:	**ENSURE [1-HS-70-85A]** is in the A-Auto position.	___ SAT
NOTE	Operator should address the need to have a CV (Concurrent Verifier) present prior to operating the valve.	___ UNSAT
STANDARD:	Operator places the HS in the A-Auto position (mid position).	**CRITICAL STEP**
STEP 11.:	**INDEPENDENTLY VERIFY**....	___ SAT
NOTE	The next four steps are independent verification of manipulations previously made by the operator	___ UNSAT
CUE:	***Tell the operator the independent verifications were performed by another operator.***	
STANDARD:	Operator requests an independent verification for previous manipulations.	
STEP 12.:	**IF** operation at greater than 200°F has occurred, **THEN CONTACT** Systems Engineering to evaluate Grinnell Valve maintenance requirements.	___ SAT ___ UNSAT
STANDARD:	Operator notifies the US that excess letdown temperature exceeded 200°F, therefore System Engineering must be notified to evaluate Grinell Valve maintenance requirements.	________ STOP TIME

End of JPM

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. All steps shall be performed for this task 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:

The Unit is operating at 100% power.
A Leaking valve required Normal Letdown to be removed from service.,
Excess letdown was placed in service while the repairs were made.
Excess letdown temperature is ~207°F and 45 psig on 1-PI-62-57.
The leaking valve has now been repaired.
Normal Letdown has been restored to service in accordance with 1-SO-62-1.
1-HIC-62-93 is in manual, per section 5.0 of 1-SO-62-6, Excess Letdown.
1-SO-62-6, Section 4.0, 5.0 and 7.0 step 1are complete.

INITIATING CUES:

You are the U-1 OATC. You have been directed to remove excess letdown from service using 1-SO-62-6, Section 7.0.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM # 152-1

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

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 based on JPM 152, changed to swap from Train B to Train A RHR pump.	Y	12/03/09	All	M Hankins

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 (Train B to Train A) 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)
005A4.01 (3.6/3.4)		

Task Standard:
'A' Train RHR is placed in service injecting to Loops 2 & 3.

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. Initialize IC-197. Ensure Train B RHR is in service with flow aligned through FCV-63-94 to Loops 1 & 4.
2. An extra operator will be required to acknowledge alarms and monitor S/G levels, RCS temp, RCS press.
3. Any UNSAT requires comments
4. 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.
5. Ensure 74-530 valve is closed.
6. **Override alarm SR Hi Flux at SD**

Validation Time: CR. 15 minutes **Local** ___________

Tools/Equipment/Procedures Needed:
0-SO-74-1, Section 8.3.1

REFERENCES:

	Reference	Title	Rev No.
1.	0-SO-74-1	Residual Heat Removal System	69

===

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 1 had been in Mode 5 for 72 hours to repair a leak on the #1 Steam Line.
2. RHR pump B is in-service and supplying letdown
2. RCS boron is 1400 ppm and the previous shift determined that Train A RHR boron concentration is 1450 ppm.
3. Shutdown margin required boron concentration is 1200 ppm.
4. Train B RHR pump needs to be shutdown to allow Maintenance to add oil to the motor.
5. Train A RHR has been checked out locally by the Auxiliary Bldg AUO and is ready for service.
6. Two AUO's are briefed and standing by in the Auxiliary Building to assist in swapping the pumps.
7. 0-SO-74-1 Prerequisite Actions are complete.

INITIATING CUES:

You are the Unit 1 OATC and the SRO has directed you to place Train A RHR in service and remove Train B RHR from service, using 0-SO-74-1 Section 8.3.1, step [1].
Align Train A injection flowpath to loops 2 & 3.
Notify the SRO when you have Train A RHR in service.

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 1.:	Obtain copy of 0-SO-74-1 and determine appropriate section	___ SAT ___ UNSAT Start Time____
STANDARD:	Operator obtains a copy of 0-SO-74-1 and determines Section 8.3.1 is the section for Placing Train A RHR I/S.	
STEP 2.:	**IF** adjustment is required on CCS flow through RHR Hxs, **THEN ENSURE** [FCV-70-156] RHR Hx A CCS outlet is **THROTTLED**.	___ SAT ___ UNSAT
NOTE:	**Operator may decide to keep FCV-70-156 at current position.**	
STANDARD:	Operator ensures HS-70-156 has a RED & GREEN light LIT with flow indicated on 0-M-27A.	
STEP 3.:	**ENSURE** [FCV-74-16] RHR Hx A Outlet is CLOSED.	___ SAT ___ UNSAT
STANDARD:	Operator ensures FCV-74-16 RHR Hx A Outlet CLOSED, HIC-74-16 @ 100%.	
STEP 4.:	**START** RHR Pump A-A with [HS-74-10A].	___ SAT ___ UNSAT **Critical Step**
STANDARD:	Operator may address making a plant announcement prior to starting 1A-A RHR Pump (not critical). Starts pump and verifies RED light LIT on HS, verifies amps.	
STEP 5.:	**VERIFY** [FCV-74-12] RHR Pump A-A miniflow OPENS or greater than 500 gpm in indicated on FI-74-12.	___ SAT ___ UNSAT
Cue:	IF dispatched: ***FI-74-12 indicates >500 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.	
STEP 6.:	**IF** aligning Train A RHR cooling to loops 2 and 3, **THEN PERFORM** the following: [a] **ENSURE** [FCV-63-93] OPEN.	___ SAT ___ UNSAT **Critical Step**
STANDARD:	Operator opens FCV-63-93, verifies red light illuminated, green light dark.	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 7.:	[b] **ADJUST [FCV-74-16]** to establish flow from train A RHR.	___ SAT ___ UNSAT **Critical Step**
STANDARD:	Operator adjusts FCV-74-16 RHR Hx A Outlet OPEN, using HIC-74-16, to the approximate valve of HIC-74-28, to obtain ~2000 gpm flow (~68-70% demand on HIC).	
STEP 8.:	[c] **ADJUST [FCV-74-28] AND [FCV-74-32]** to reduce Train B RHR flow.	___ SAT ___ UNSAT **Critical Step**
STANDARD:	Operator closes FCV-74-28 RHR Hx B Outlet, place HIC-74-28 to 0%.	
STEP 9.:	[d] **VERIFY [FCV-74-24]** RHR Pump B-B miniflow OPENS *OR* greater than 500 gpm in indicated on FI-74-24.	___ SAT ___ UNSAT
Cue:	**IF dispatched: *FI-74-24 indicates >500 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.	
STEP 10.:	[e] **CLOSE [FCV-74-35]** RHR Hx B Outlet.	___ SAT ___ UNSAT **Critical Step**
STANDARD:	Operator closes FCV-74-35, green light illuminated, red light dark.	
STEP 11.:	[f] **ENSURE [FCV-74-33]** RHR Hx A Outlet OPEN.	___ SAT ___ UNSAT
STANDARD:	Operator ensures FCV-74-33 RHR Hx A Outlet OPEN, red light illuminated, green light dark.	
STEP 12.:	[g] **OPEN [VLV-74-530]** RHR Hx A to Letdown Hx.	___ SAT ___ UNSAT **Critical Step**
NOTE:	***Console operator needs to modify remote function RHR03 to 100.***	
Cue:	***AUO reports that VLV-74-530 has been opened locally, operator should discuss the need for CV.***	
STANDARD:	Operator directs an AUO to OPEN VLV-74-530 RHR Hx A to Letdown Hx.	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 13.:	[h] **STOP** RHR Pump B-B with **[HS-74-20A].**	___ SAT
STANDARD:	Operator stops RHR pump 1B-B, verifies GREEN light on handswitch.	___ UNSAT **Critical Step**
STEP 14.:	[i] **OPEN [HCV-74-36]** RHR Hx A Bypass.	___ SAT
NOTE:	***Console operator needs to modify remote function RHR06 to 100.***	___ UNSAT
Cue:	***AUO reports HCV-74-36 is opened (including CV).***	
STANDARD:	Operator directs an AUO to OPEN HCV-74-36 RHR Hx A Bypass.	**Critical Step**
STEP 15.:	[j] **CLOSE [HCV-74-37]** RHR Hx B Bypass.	___ SAT
NOTE:	***Console operator needs to modify remote function RHR07 to 0.***	___ UNSAT
Cue:	***AUO reports HCV-74-37 has been closed locally (including CV).***	
STANDARD:	Operator directs an AUO to CLOSE HCV-74-37 RHR Hx B Bypass.	**Critical Step**
STEP 16.:	[k] **CLOSE [VLV-74-531]** RHR Hx B-B to Letdown Hx.	___ SAT
NOTE:	***Console operator needs to modify remote function RHR04 to 0.***	___ UNSAT
Cue:	***AUO report s VLV-74-531 has been closed an AUO locally (including CV).***	
STANDARD:	Operator directs an AUO to close HCV-74-531.	
STEP 17.:	[l] **ENSURE [FCV-63-94]** CLOSED.	___ SAT
STANDARD:	Operator closes FCV-63-94, green light illuminated, red light dark	___ UNSAT **Critical Step**
STEP 18.:	**IF** aligning RHR cooling to loops 1 and 4, **THEN ENSURE** the following valves are in the required position.	___ SAT
NOTE:	**Step is NA'd, initiating Cues direct alignment to loops 2 & 3.**	___ UNSAT
STANDARD:	Operator NA's the step.	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
NOTE:	**Initial flow values ~ 2500-2800 gpm.**	___ SAT ___ UNSAT **Critical Step**
STEP 19.:	**THROTTLE** one or both of the following to maintain desired cooling rate: FCV-74-16, RHR Hx A Outlet, AND/OR FCV-74-32, RHR Hx Bypass.	
STANDARD:	Operator may throttle FCV-74-16 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.	
STEP 20.:	**WHEN** injection flow is > 1250 gpm, **THEN VERIFY [FCV-74-12]** RHR Pump A-A miniflow is CLOSED.	___ SAT ___ UNSAT
STANDARD:	Operator verifies FCV-74-12 closed, GREEN light LIT on handswitch.	
STEP 21.:	**IF** cooling water is to be removed from Train B Hx, **THEN CLOSE [FCV-70-153].**	___ SAT ___ UNSAT
Cue:	***Leave cooling water aligned to Train B at its current flowrate.***	
STANDARD:	Operator NA's step.	
STEP 22.:	NOTIFY U1 US that Train A of RHR is in service to loops 2 & 3 and Train B of RHR has been removed from service.	___ SAT ___ UNSAT Stop Time____
STANDARD:	None.	

End of JPM

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 1 had been in Mode 5 for 72 hours to repair a leak on the #1 Steam Line.
2. RHR pump B is in-service and supplying letdown
2. RCS boron is 1400 ppm and the previous shift determined that Train A RHR boron concentration is 1450 ppm.
3. Shutdown margin required boron concentration is 1200 ppm.
4. Train B RHR pump needs to be shutdown to allow Maintenance to add oil to the motor.
5. Train A RHR has been checked out locally by the Auxiliary Bldg AUO and is ready for service.
6. Two AUO's are briefed and standing by in the Auxiliary Building to assist in swapping the pumps.
7. 0-SO-74-1 Prerequisite Actions are complete.

INITIATING CUES:

You are the Unit 1 OATC and the SRO has directed you to place Train A RHR in service and remove Train B RHR from service, using 0-SO-74-1, Section 8.3.1, step [1]. Align Train A injection flowpath to loops 2 & 3.
Notify the SRO when you have Train A RHR in service.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM # 65-1

Re-establishment of Containment Pressure Control Following High Pressure Conditions

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 adapted from JPM 65 for NRC exam 0210.	Y	1/14/10	ALL	M Hankins

V - Specify if the JPM change will require another validation.
See cover sheet for criteria.

SEQUOYAH NUCLEAR PLANT

RO/SRO
JOB PERFORMANCE MEASURE

Task:

Re-establishment of CNTMT Pressure Control Following High Pressure Condition

JA/TA task # : 00601801 (**RO**)

K/A Ratings:

103A1.01 (3.7/4.1) 103A4.01 (3.2/3.3) 2.1.31 (4.2/3.9)
103A4.09 (3.1/3.7) 2.1.20 (4.3/4.2)

Task Standard:

Vent the containment pressure down to normal range (within -0.1 to +0.3 psig) and then place the containment automatic Pressure Control System in service.

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. Any UNSAT requires comments.
2. Acknowledge any associated alarms.
3. Initialize Simulator in IC: #116, verify containment pressure 0.6 psig.
4. 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 min **Local** ____________

Tools/Equipment/Procedures Needed:
0-SO-30-8 Sections 3.0, 4.0, and 5.2

References:

	Reference	Title	Rev No.
A.	0-SO-30-8	Containment Pressure Control	29
B.	0-SI-CEM-030-410.1	Containment Vent to Aux Building Exhaust	31

==

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 in Mode 1 recovering from an Air Line break in containment. The air leak was discovered on a section of the header that allowed isolation without affecting any equipment.
- During isolation efforts, containment pressure increased to approximately 0.6 psig.
- EAM's are in the Adverse Containment condition.
- Purge is ***not*** in progress
- 0-SI-CEM -030-410.1, Containment Vent to Aux Building Exhaust, is in progress and approved by SRO and Radiochemical Laboratory Supervisor.
- RM-90-101, 106 and 112 and 130 are in service and indicating Normal.
- RM-90-106B is indicating 2.84 E+02; previous sample (yesterday) was 2.83E+02.
- Prerequisite Actions (Section 4.0) are complete for 0-SO-30-8.
- Power checklist 1-30-8.02 is complete with no deviations.

INITIATING CUES:

1. The US directs you, to vent containment using 0-SO-30-8, section 5.2.1.
2. Inform the US when Containment pressure is decreasing.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
The following steps are from Section 5.2.1 of 0-SO-30-8: STEP 1.: **ENSURE** 1-30-8.02 power checklist complete. STANDARD: Power checklist 1-30-8.02 is complete with no deviations per initial conditions.	___ SAT ___ UNSAT Start Time____
STEP 2.: **ENSURE** the check valve portion of the containment vacuum relief assembly is capable of closing by observing monitor lights on panel (panel M-9). STANDARD: Operator checks monitor lights on panel (panel M-9) to ensure valves are closed, green lights are ON.	___ SAT ___ UNSAT
STEP 3.: **IF** the unit is in MODES 1, ,2 or 3, **THEN** **NOTIFY** the US/SRO that the EAM will be placed in the Adverse Containment condition for venting containment. STANDARD: Per initial conditions, EAM's are in the Adverse Cntmt condition for venting containment.	___ SAT ___ UNSAT
STEP 4.: **EVALUATE** entry into LCO 3.6.6. Vacuum Relief Lines. ***Cue:*** ***Play role of SRO and state you will evaluate the LCO.*** STANDARD: Operator informs the US/SRO LCO 3.6.6, Vacuum Relief Lines needs to be evaluated.	___ SAT ___ UNSAT
STEP 5.: **IF** the Unit is in Modes 1, 2, 3, **THEN** **PERFORM** the following: [5.1] **IF** the EAM is **NOT** in the Adverse Cntmt condition.... STANDARD: Operator recognizes the EAMs are in the Adverse Cntmt condition. Operator should N/A step [5.1] and complete [5.2] and [5.3].	___ SAT ___ UNSAT
STEP 6.: [5.2] **ENSURE** blue purge/vent operation permissive lights illuminated for each steam generator. STANDARD: Operator verifies blue purge/vent permissive lights are illuminated for each S/G (M-4 above SG NR levels indicators).	___ SAT ___ UNSAT
STEP 7.: [5.3] **VERIFY** window 30 "S/G Level Adverse Setpoint" illuminated on XA-55-3C. STANDARD: Operator verifies XA-55-3C window 30 illuminated.	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 8.:	[6] **IF** the Unit is in Modes 1-4, **THEN** [6.1] **VERIFY** Radiochemical Laboratory has a current weekly performance of 0-SI-CEM-030-410.1 in progress.	___ SAT ___ UNSAT
STANDARD:	Per initial conditions, 0-SI-CEM-030-410.1 is in progress and approved by SRO and Radiochemical Laboratory Supervisor.	
STEP 9.:	[6.2] **IF** the noble gas count rate for lower containment	___ SAT ___ UNSAT
STANDARD:	Operator determines from initial conditions that noble gas has not increased by 50% since last sample and N/A's the step.	
STEP 10.:	[6.3] **IF** the lower containment noble gas radiation monitor is inoperable.....	___ SAT ___ UNSAT
STANDARD:	Operator determines RM-90-106 is operable by looking at RM or per initial conditions and N/A's the step.	
STEP 11.:	[7] **ENSURE** that the Shield Building Annulus Vacuum Control System is in service and maintaining a negative 5.0 inches of H_2O as indicated on M-9, [PDI-30-126] or [PDI-30-127] **OR** EGTS in service OR EGTS testing in progress.	___ SAT ___ UNSAT
STANDARD:	Operator obtains reading from PDI-30-126 or 127 on panel M-9, AB-Annulus Vacuum reading ~ 5"of water.	
STEP 12.:	[8] **VERIFY** **NO** abnormal or unexplainable radiation levels exist inside containment.	___ SAT ___ UNSAT
STANDARD:	Operator checks RM-90-106 and 112 for abnormal radiation levels in containment, determine radiation levels are normal and signs of step.	
STEP 13.:	[9] **VERIFY** that **NO** containment vent isolation signal exists.	___ SAT ___ UNSAT
STANDARD :	Operator checks XA-55-6C windows C5 & C6 dark to verify that a containment vent isolation signal is not present.	
STEP 14.:	[10] **ENSURE** at least ONE of the following radiation monitors in service: U-1 Containment 1-RM-90-130 Purge Exhaust Monitors 1-RM-90-131	___ SAT ___ UNSAT
STANDARD:	Operator verifies the RM-90-130 per initial conditions is in service (No Alarms and Not Blocked).	

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 15.: [11] **VERIFY** that all personnel have been evacuated from the annulus and that all doors are closed. **Cue:** ***when asked, Role play Rad Con and state all personnel are out of the annulus and the doors are closed.*** STANDARD: Operator calls Rad Con and verifies that all personnel have been evacuated from the annulus and that all doors are closed.	___ SAT ___ UNSAT
STEP 16.: [12] **ENSURE** at least one of the following radiation monitors in service for the appropriate unit: AB Vent: 0-RM-90-101B Upper Compartment: 1-RM-90-112 A, B Lower compartment: 1-RM-90-106 A, B STANDARD: Operator verifies the absence of applicable instrument malfunction alarms on 0-M-12, the RM's above are in service and Normal per initial conditions.	___ SAT ___ UNSAT
STEP 17.: [13] **ENSURE** PROTECTED EQUIPMENT DO NOT INOP tags placed on the following radiation monitors block switches as appropriate: (N/A tags not placed). **BLOCK SWITCH** — **MONITOR** 0-HS-90-136A1 — 1-RM-90-130 0-HS-90-136A2 — 1-RM-90-131 0-HS-90-136A3 — 0-RM-90-101B **Cue:** ***An Extra Operator will place Protected Equipment tags.*** STANDARD: Operator addresses placing PROTECTED EQUIPMENT Tags on Rad monitor Block Switches.	___ SAT ___ UNSAT
STEP 18.: [14] **IF** aligning the lower compartment purge isolation valves using the NORMAL flow path, **THEN PERFORM** steps [a] thru [f]. **NOTE: This step will be satisfied in steps 19 thru 22.** STANDARD: Operator selects the normal flow path as stated in initial conditions.	___ SAT ___ UNSAT

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 19.:	[14.1] **ENSURE** [FCV-30-37] is CLOSED.	___ SAT ___ UNSAT
STANDARD:	Operator verifies green light ON for FCV-30-37	
STEP 20.:	[14.2] **ENSURE** [FCV-30-40] is CLOSED.	___ SAT ___ UNSAT
STANDARD:	Operator verifies green light ON for FCV-30-40	
STEP 21.:	[14.3] **OPEN** [FCV-30-14 & 56] with [HS-30-14].	___ SAT ___ UNSAT
STANDARD:	Operator places HS-30-14 in the OPEN position and places HS-30-14 in the A-AUTO position.	**Critical Step**
STEP 22.:	[14.4] **VERIFY** [FCV-30-14 & 56] OPEN.	___ SAT ___ UNSAT
STANDARD:	Operator verifies red lights illuminated ON [FCV-30-14 & 56].	
STEP 23.:	[14.5] **OPEN** [FCV-30-15 & 57] with HS-30-15.	___ SAT ___ UNSAT
STANDARD:	Operator places HS-30-15 in the OPEN position and places HS-30-15 in the A-AUTO position.	**Critical Step**
STEP 24.:	[14.6] **VERIFY** FCV-30-15 & 57 **OPEN**.	___ SAT ___ UNSAT
STANDARD:	Operator verifies red lights illuminated for FCV-30-15 & 57 and places HS-30-15 in the A-AUTO position.	
STEP 25.:	[15] **IF** aligning the lower compartment purge isolation valves using the Alternate flow path **THEN PERFORM** steps [15.1] thru [15.8].	___ SAT ___ UNSAT
STANDARD:	Operator should NA this step since the NORMAL flow path is being used.	
STEP 26.:	[16] **OPEN** Annulus exhaust isolation valve FCV-30-54 with HS-30-54.	___ SAT ___ UNSAT
STANDARD:	Operator opens FCV-30-54 with HS-30-54. Verifies valve open by observing red light ON.	**Critical Step**

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 27.:	[17] **RECORD** time purge isolation valves are OPENED. TIME ___________	___ SAT ___ UNSAT
STANDARD:	Operator records the time purge valves were opened.	
STEP 28.:	[18] **IF** the Annulus Vacuum Control System is in service and the standby Annulus Vacuum Control Fan is available, **THEN PERFORM** the following **START** the standby Annulus Vacuum Control Fan.	___ SAT ___ UNSAT
STANDARD:	Operator starts the standby Annulus Vacuum Control Fan.	
STEP 29.	IF a high radiation alarm occurs on any of the following RM's	___ SAT ___ UNSAT
STANDARD:	Operator checks RM's, and verifies all alarms are clear.	
STEP 30.	Operator notifies US that containment vent is in progress.	___ SAT ___ UNSAT
CUE:	***Another operator will complete the vent.***	___________ STOP TIME

END OF JPM

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 in Mode 1 recovering from an Air Line break in containment. The air leak was discovered on a section of the header that allowed isolation without affecting any equipment.
- During isolation efforts, containment pressure increased to approximately 0.6 psig.
- EAM's are in the Adverse Containment condition.
- Purge is ***not*** in progress
- 0-SI-CEM -030-410.1, Containment Vent to Aux Building Exhaust, is in progress and approved by SRO and Radiochemical Laboratory Supervisor.
- RM-90-101, 106 and 112 and 130 are in service and indicating Normal.
- RM-90-106B is indicating 2.84 E+02; previous sample (yesterday) was 2.83E+02.
- Prerequisite Actions (Section 4.0) are complete for 0-SO-30-8.
- Power checklist 1-30-8.02 is complete with no deviations.

INITIATING CUES:

3. The US directs you, to vent containment using 0-SO-30-8, section 5.2.1.
4. Inform the US when Containment pressure is decreasing.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM # 34-1

Establishing Secondary Heat Sink Using Main Feedwater or Condensate

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	1/31/10	All	M Hankins

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: Establishing Secondary Heat sink using Main Feedwater or Condensate System

JA/TA task # : 3110060601 (**RO**)
0100040101 (**RO**)

K/A Ratings:
WE05 EA2.1 (3.4/4.4)

Task Standard:
Loss of Secondary Heat Sink, Establish Secondary Heat Sink Using Main Feedwater or Condensate System

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.
2. Any UNSAT requires comments
3. Acknowledge any associated alarms.
4. Initialize simulator in ***IC: 119*** Steam Dump Pressure Mode Setpoint-968 psig
   All AFW pumps are shutdown, MDAFW A-A tagged, TDAFW pump and MDAFW B-B trip on Reactor Trip. RX trip due Rod control problems (multiple rod drops), adjust steam dumps in pressure mode to control Tavg 544-546°F.
5. Allow S/G narrow range levels are <~20%. (allow SD to steam off to reduce S/G level if necessary)
6. Console operator will role play as CRO and acknowledge/clear alarms as needed.
7. 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. ___*30* mins___ **Local** ____________

Tools/Equipment/Procedures Needed:
EA-2-2

References:

	Reference	Title	Rev No.
1.	EA-2-2	Establishing Secondary Heat sink using Main Feedwater or Condensate	8

==

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 1 has experienced a Reactor Trip due multiple dropped rods.
2. MDAFW pump A-A is tagged out for maintenance,
   MDAFW pump B-B tripped on electrical fault and the
   TDAFW pump tripped on mechanical overspeed just after RX trip.
3. Unit has transitioned to ES-0.1 and is ready to perform the RNO for STEP 5.
4. All four S/G levels have been decreasing.
5. AFW Flow to the S/Gs can NOT be established.

INITIATING CUES:

1. You are the CRO and the US directed you to establish Main Feedwater flow
   USING EA-2-2, Establishing Secondary Heat Sink Using Main Feedwater or Condensate System.
2. Inform the US when Main Feedwater or Condensate flow has been established to **one** S/G.

STEP 1.: Obtain copy of the appropriate procedure. STANDARD: Operator may obtain a copy of ES-0.1 and review step 5 RNO, for transition step to EA-2-2.	___ SAT ___ UNSAT Start Time____
EA-2-2 Establishing Secondary Heat Sink Using MFW or Condensate System Section 4.1	
STEP 2.: [1] **IF** directed by ES-0.1, Reactor Trip Response, to establish Main Feedwater flow, **THEN PERFORM** Section 4.2. STANDARD: Operator recognizes Section 4.2 is the correct section for performance and transitions to section 4.2.	___ SAT ___ UNSAT **Critical Step**
EA-2-2 Establishing Secondary Heat Sink Using MFW or Condensate System Section 4.2	
STEP 3. [1] **REFER TO** the following EAPs to attempt to restore AFW flow in parallel with this procedure: • EA-3-10 Establishing MDAFW flow • EA-3-9, establishing TDAFW flow ***CUE:*** ***Maintenance and Ops personnel have been dispatched to restore MDAFW pumps A and B and the TDAFWP, EA-3-10 and EA-3-9 are in progress.*** STANDARD: Operator contacts the US and or the MSS to have personnel dispatched to establish AFW flow.	___ SAT ___ UNSAT
STEP 4.: [2] **CLOSE** MFW Regulating valves. STANDARD: Operator ensures the MFW Reg valves output signal is zero, on 1-FIC 3-35, 48, 90 and 103 and check lights for MFW Reg valves on 1-XX-3-35.	___ SAT ___ UNSAT
STEP 5.: [3] **ENSURE** MFW Regulating Bypass valves CLOSED. STANDARD: Operator ensures MFW Bypass valves CLOSED using 1-LIC-3-35, 48, 90, 103	___ SAT ___ UNSAT
STEP 6.: [4] **CYCLE** Reactor Trip breakers. STANDARD: Operator places 1-HS-99-7 in the CLOSE position, and places 1-RT-1 in the trip position. Rx trip breaker lights turn red and then green.	___ SAT ___ UNSAT **Critical Step**

STEP 7.:	[5] **RESET** FW Isolation signal. [M-3]	___ SAT ___ UNSAT **Critical Step**
STANDARD:	Operator depresses pushbuttons 1-HS-3-99A and 99B, and Annunciator Window 1-XA-55-6B, LOW Tavg Reactor Trip MFW Valves Actuated alarm clears.	
STEP 8.:	[6] **OPEN** FW isolation valves for S/G's to be fed.	___ SAT ___ UNSAT **Critical Step**
STANDARD:	Operator opens at least one FWI valve(s) for S/G to be fed, using 1-HS-3-33A, 47A, 87A or 100A, red light on green light off.	
STEP 9.:	[7] **PERFORM** Section 4.4 to establish Main Feedwater flow to S/G's.	___ SAT ___ UNSAT
STANDARD:	Operator transitions to Section 4.4.	
	Section 4.4	
STEP 10.:	[1] **DISPATCH** operator to **PERFROM** Appendix A, Part I to remove fuses to disable intermediate heater string Isolation.	___ SAT ___ UNSAT
Cue	***Respond as an AUO and tell operator you will perform Appendix A to remove fuses to disable intermediate heater string isolation.***	
STANDARD:		
STEP 11.:	[2] **ENSURE** Condensate Inlet and Outlet valves for at least one LP Heater String OPEN.	___ SAT ___ UNSAT
STANDARD:	Operator verifies LP Heater Inlet/Outlet valves OPEN for at least one LP heater string, red light illuminated and green lights dark for (A) 1-HS 2-45A and 55A, OR (B) 1-HS-2-56A and 65A, OR (C) 1-HS-2-66A and 75A.	
STEP 12.:	[3] **ENSURE** the following condensate pumps RUNNING: • 2 Hotwell pumps • 1 CBP (with suction valve open) • 1 Injection water pump	___ SAT ___ UNSAT
STANDARD:	Operator ensures 2 HW pumps, 1 CBP with suction valve open and 1 injection water pump running.	

STEP 13.:	[4] **ENSURE** MFPT Recirc Valves in MANUAL and CLOSED: • MFPT A 1-FIC-3-70 • MFPT B 1-FIC-3-84	___ SAT ___ UNSAT
STANDARD:	Operator ensures recirc valves for the MFP's, 1-FIC-3-70 and 3-84, are in manual (amber light illuminated) and closed (indicator to the right). .	
STEP 14.:	[5] **ENSURE** MFW Reg controllers in MANUAL and Output Zero.	___ SAT ___ UNSAT
STANDARD:	Operator ensures Main FRV are in manual (toggle switch to manual) and closed (output demand 0) using 1-FIC-3-35, 48, 90, 103, and checks green status lights illuminated on 1-XX-3-35 (red dark).	
STEP 15.:	[6] **ENSURE** MFW Bypass Reg valves controllers in MANUAL and output ZERO.	___ SAT ___ UNSAT
STANDARD:	Operator ensures all MFW Reg Bypass valves are in Manual (amber light illuminated) and output ZERO using 1-LIC-3-35, 48, 90, and 103.	
STEP 16.:	[7] **IF** a flowpath is not available through at least one Intermediate Heater string……	___ SAT ___ UNSAT
STANDARD:	Operator N/A's this step, flow path is available.	
STEP 17.:	[8] **ENSURE** Inlet and Outlet valves for at least one string of Intermediate and High Pressure Heaters OPEN: • High Pressure FW Heaters (panel M-3) (A) 1-HS-3-3A and 10A OR (B) 1-HS-3-13A and 20A OR (C) 1-HS-3-23A and 30A • Intermediate Pressure FW Heaters (Panel M-2) (A) 1-HS-2-110A and 128A OR (B) 1-HS-2- 130A and 147A OR (C) 1-HS-2- 149A and 167A	___ SAT ___ UNSAT
STANDARD:	Operator verifies at least one string of IP (M-2) and HP (M-3) heater string isolation valves are OPEN.	

STEP 18.:	[9] **IF** starting MFW pump A, **THEN PERFORM** the following: [9.a] **ENSURE** MFP a drain hand-switch **[HS-46-14]** in OPEN position STANDARD: OPERATOR ensures the MFPT drain hand-switch **[HS-46-14] is** in OPEN position (HS to the right on M-3)	___ SAT ___ UNSAT
STEP 19.:	[9.b] **ENSURE** the following valves are OPEN: VALVE / DESCRIPTION / OPEN ✓ FCV-2-205 / MFPT Condenser A Inlet Isol [M2] / ☐ FCV-2-210 / MFPT Condenser A Outlet Isol [M2] / ☐ FCV-2-221 / MFWP A Inlet Valve [M2] / ☐ FCV-3-67 / MFWP A Outlet Valve [M3] / ☐ STANDARD: OPERATOR ensures the MFPT condenser Inlet and Outlet Isolation valves are OPEN, FCV-2-205 and 210, and the MFP Inlet and Outlet isol Valves are open, FCV-2-221 and 3-67.	___ SAT ___ UNSAT
CUE: STEP 20.:	***IF asked, state 0-GO-12, Appendix A was not performed.*** [9.c] **IF [VLV-1-611]** MFP pump A HP steam Isolation .... ***CUE:*** ***IF operator dispatches personnel to open valve Inform them that VLV-1-611 is already open.*** STANDARD: Operator dispatches an operator to check valve open locally, or acknowledges that 0-GO-12, Appendix A was not performed.	___ SAT ___ UNSAT
STEP 21.:	[9.d] **RESET** MFPT A USING **[HS-46-9A]**. STANDARD: Operator places HS in the reset position and verifies the red light illuminates green light is dark, alarm clears for MFP trip.	___ SAT ___ UNSAT **Critical Step**

STEP 22.: [9.e] **PLACE** MFPT A **[SIC-46-20A]** in MANUAL and with ZERO output. STANDARD: Operator places MFPT A SIC-46-20 to manual and sets output signal to 0.	___ SAT ___ UNSAT **Critical Step**
STEP 23.: [9.f] **ENSURE** MFPT A and B master speed controller **[PC-46-20]** in MANUAL and with output at 0. STANDARD: Operator places MFPT A and B master speed controller [PC-46-20] in MANUAL and sets output at 0.	___ SAT ___ UNSAT **Critical Step**
STEP 24.: [9.g] **DO NOT CONTINUE** until suction flow path established to MFP. STANDARD: Operator has previously verified suction flow path is available to MFP, and continues with procedure.	___ SAT ___ UNSAT
STEP 25.: [9.h] **ENSURE [FIC-3-70]** MFPTA recirc valve in MANUAL and OPEN. STANDARD: Operator verifies the MFP A recirc valve is in manual, amber light illuminated and opens valve (toggle switch to the left).	___ SAT ___ UNSAT **Critical Step**
STEP 26.: [9.i] **PLACE** MFPT A speed controller **[SIC-46-20A]** in AUTO. STANDARD: Operator places MFPT A speed controller in AUTO.	___ SAT ___ UNSAT **Critical Step**
STEP 27.: [9.k] **VERIFY** the governor valve positioner is indicating CLOSED. STANDARD: Operator verifies 1-HS-46-13A green light illuminated and/or checks 1-ZI-46-13B (M-3) indicating 0.	___ SAT ___ UNSAT

STEP 28.: [9.k] **IF** MFPT governor valve **NOT** indicating CLOSED, **THEN** .... STANDARD: Operator N/A's this step, valve is closed.	___ SAT ___ UNSAT
STEP 29.: [9.l] **OPEN** MFPT A stop valves by placing HP stop valve switch **[HS-46-15A]** to raise. **NOTE:** HP and LP stop valve will open when the HS is placed in raise. Either HS placed in raise will open the valves. If HS-46-16A is used to open stop valves then make a comment. Critical task is SAT if HS-46-16A is used. STANDARD: OPERATOR holds the HS-46-15A in raise position until the red light is illuminated and green light is dark.	___ SAT ___ UNSAT **Critical Step**
STEP 30.: [9.m] **RAISE** MFPT A speed by **PERFORMING** one of the following: 1) **IF** MCR operation of governor valve positioner is available, **PLACE [HS-47-13A]** to RAISE to open the steam chest valves. STANDARD: OPERATOR places HS-47-13A in RAISE to open GV while monitoring MFP loading. MFP speed should stabilize at ~3300 rpm as seen on 1-SI-46-20A.	___ SAT ___ UNSAT **Critical Step**
STEP 31.: [9.m] (continued) 2) **IF** MCR operation of governor valve positioner unavailable, THEN... STANDARD: Operator N/A's this step since governor valve positioner was available.	___ SAT ___ UNSAT
STEP 32.: [9.n] **WHEN** MFPT speed controller controlling MFPT speed, **THEN ENSURE** governor valve positioner is fully raised. **NOTE:** MFPT speed controller takes over speed control when MFPT accelerates to ~ 3300 rpm on 1-SI-46-20A. STANDARD: Operator ensures Governor Valves Positioner is fully raised, red light illuminated and green light dark.	___ SAT ___ UNSAT

STEP 33.:	[9.o] **ADJUST** MFPT speed **USING** Master Controller **[PC-46-20]** UNTIL feedwater header pressure is ~ 80 psid greater than steam header pressure.	___ SAT ___ UNSAT **Critical Step**
STANDARD:	Operator adjusts [PC-46-20] in manual to increase FW header pressure to 80 psid greater than steam header pressure while monitoring PI-3-1, # 1 HTR Inlet Pressure (on M-3 panel), and PI-1-33, Main Steam Header Pressure (on M-4 panel). Operator may also monitor FW/SG delta P on: ICS/Secondary Mimics/Feedwater screen.	
STEP 34.:	[10] IF starting MFP pump B......	___ SAT ___ UNSAT
STANDARD:	OPERATOR N/A's this step.	
STEP 35.:	[11] **IF** RCS temperature is less than 550°F, **THEN GO TO** Step 13.	___ SAT ___ UNSAT
STANDARD:	OPERATOR verifies temperature is <550°F and continues with step 13.	

STEP 36.: [13] **ADJUST** MFW regulating Bypass valve controller to establish required feed flow. **CAUTION** **IF automatic SI signals are NOT blocked, feed flow should be carefully controlled to prevent rapid cooldown which could result in low steam flow line pressure SI actuation (and subsequent feedwater isolation).** **NOTE** 0.2 X10^6 lbm/hr feed is equivalent to ~440 gpm. Due to inaccuracy of flow indication at low end of scale, feed flow should be determined based on a rise in indicated flow. **NOTE TO EVALUATOR: If operator notifies the US that FW flow is established to one SG in this step, then N/A step 37 and record stop time in step 38.** STANDARD: Operator adjusts MFW Reg Bypass valve in manual by adjusting the lever to the right to establish feed water flow to at least one steam generator. Monitors for an indication of flow on FW Flow Indicators or level increase in the selected steam generator(s). Operator may notify the US that FW flow has been established to at least one S/G, this ends the JPM as FW flow is established to one SG.	___ SAT ___ UNSAT **Critical Step**
STEP 37.: [14] **MONITOR** Hotwell level and **CONTROL** as necessary. **NOTE:** **If operator notified US that FW was established in previous step then this step is not required.** STANDARD: Operator may state that they are monitoring HW level on 1-LR-2-12 (M-3), and using 1-LIC-2-3 and 1-LIC-2-9 for auto makeup and dumpback.	___ SAT ___ UNSAT
STEP 38.: Inform the US/SRO when feedwater flow has been established. STANDARD: Operator informs the US/SRO FW flow has been established.	___ SAT ___ UNSAT ______________ Stop Time

End of JPM

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 1 has experienced a Reactor Trip due multiple dropped rods.
2. MDAFW pump A-A is tagged out for maintenance,
   MDAFW pump B-B tripped on electrical fault and the
   TDAFW pump tripped on mechanical overspeed just after RX trip.
3. Unit has transitioned to ES-0.1 and is ready to perform the RNO for STEP 5.
4. All four S/G levels have been decreasing.
5. AFW Flow to the S/Gs can NOT be established.

INITIATING CUES:

1. You are the CRO and the US directed you to establish main feedwater flow USING EA-2-2, Establishing Secondary Heat sink Using Main Feedwater or Condensate System.
2. Inform the US when Main Feedwater or Condensate flow has been established to **one** S/G.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM # 77-1AP

Perform D/G Load Test on 1B-B D/G
(with high crankcase press)

**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:
8	Revised to reflect revision changes in SI-7B, changed critical steps for consistency with JPM 77-5AP reviewed/approved 4/20/99, corrected typos and incorporated comments from 1999 cycle 5 requal performances of JPM 77-2AP. Flow of the JPM is not affected.	N	10/13/99	All	SR Taylor
pen/ink	0-AR-M26-B Rev chg only	N	8/9/00	4	SR Taylor
pen/ink	Minor change to step 6, SO-83 Rev update.	N	8/17/00	4	SR Taylor
pen/ink	0-AR-M26-B Rev chg only	N	8/28/00	4	SR Taylor
pen/ink	1-SI-OPS-082-007.B Rev chg only	N	6/21/01	4	WR Ramsey
pen/ink	1-SI-OPS-082-007.B rev 25 Update minor changes related to stopwatch usage	N	09/07/01	ALL	WR Ramsey
pen/ink	minor enhancement changes and 1-SI-OPS-082-007.B Revision update	N	03/21/02	ALL	WR Ramsey
9	Incorporated pen/ink changes; updated to latest revisions of referenced documents; no impact on JPM flow	N	8/20/02	All	J P Kearney
10	Updated references Revised remote functions/annunciator overrides to conform to new simulator configurations.	N N	12/10/03	4 8, 9	JJ Tricoglou
11	Updated to current revisions and IC.	N	8/11/04	All	MG Croteau
12	Updated to current revision of procedure	Y	12/03/09	ALL	M Hankins

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:

Perform D/G Load Test on 1B-B D/G

JA/TA task # :

0640020101 0640040101 0640060101 (**RO**)

K/A Ratings:

064A4.01 (4.0/4.3)	064A1.04 (2.8/2.9)
064A4.02 (3.3/3.4)	064A4.03 (3.2/3.3)
064A2.09 (3.1/3.3)	064A3.06 (3.9/3.9)

Task Standard:

Perform D/G Operability Test per 1-SI-OPS-082-007.B, specifically manually start the D/G. Emergency stop D/G on high crankcase pressure annunciation.

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. Any UNSAT requires comments
2. Acknowledge any associated alarms.
3. Initialize Simulator in IC: #16.
4. A console operator will be needed to insert override and play role of AUO on Radio.
5. Operator will need assistance during D/G start (at step 5). An extra simulator operator or the console operator needs to be present to perform this timing.
6. Place Protected equipment tag on the A DG.
7. **AT JPM step 13, Console operator should insert IRF EGR08 f:1 to reset 86LOR and then notify operator - 86 LOR is reset.**
7. **When operator starts JPM step #25, prior to D/G breaker closure, insert IMF AN_OV_958 f:2.**
8. 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 30 minutes **Local** ____________

Tools/Equipment/Procedures Needed:

1. 1-SI-OPS-082-007.B, Through Section 6.1 and Appendix "C".
2. "Signed off" copy of entire section 4.
3. 0-AR-M26-B window D-2.

References:

	Reference	Title	Rev No.
1.	1-SI-OPS-082-007.B	Electrical Power System Diesel Generator 1B-B	50
2.	0-AR-M26-B	Annunciator 0-XA-55-26B	27

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. Both units are at 100% RTP.
2. All systems are OPERABLE, except for the 1B-B D/G.
3. 0-GO-16 has been completed on all the A train equipment.
4. Maintenance has been completed on the 1B-B D/G and the clearance has been removed.
5. The D/G has been rolled and is in standby alignment using 0-SO-82-2.
6. The AUO at the D/G building has completed Appendix A of 1-SI-OPS-082-007.B and all parameters are within limits. Two AUO's are standing by for DG start.
7. The U1 Control Room AUO has verified breaker 1934 is in the Disconnect position.
8. D/G-DAQ has been installed.
9. Room fire protection is in service.
10. The U1 US/SRO has reviewed the completed work package for the 1B-B D/G, all that remains is to perform 1-SI-OPS-082-007.B for the PMT.
11. Section 4.0 and Appendix A of 1-SI-OPS-082-007.B are complete.
12. Section 6.1 is complete thru step 6.

INITIATING CUES:

1. Perform 1-SI-OPS-082-007.B, beginning with Section 6.1, step 7.c.

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 1.:	Operator obtains a copy of the appropriate procedure.	___ SAT ___ UNSAT Start Time____
NOTE:	**Initial conditions cover steps in procedure up to the transition to Appendix "C".**	
STANDARD:	Operator obtains a copy of 1-SI-OPS-082-007.B. Begins in section 6.1, Step 7.c, and transitions to Appendix C.	
Appendix C		
STEP 2.:	[1] **ENSURE** 0-HS-82-48 1B-B D/G mode selector switch in the UNIT position.	___ SAT ___ UNSAT
STANDARD:	0-HS-82-48 in UNIT position on 0-M-26. Green light ON.	
STEP 3.:	[2] **PLACE** 1-HS-57-74 D/G 1B-B Synchronize Switch in the SYN position.	___ SAT ___ UNSAT
NOTE:	**0-EI-82-35 and 0-XI-82-33 will indicate running voltage & frequency.**	
STANDARD:	1-HS-57-74 in "SYN" position on 0-M-26	**Critical Step**
NOTE	Operator may discuss notes preceding step 3 with the DAQ operator and the stopwatch operator to ensure expectations for starting and stopping the DAQ and Stopwatches are clear.	___ SAT ___ UNSAT
STEP 4.	[3] **PERFORM** the following to initiate D/G start signal: [3.1]**IF** the D/G DAQ is to be used, **THEN** **NOTIFY** D/G-DAQ Operator to **START** the D/G-DAQ.	
NOTE:	**Operator must coordinate the start of the D/G-DAQ just prior to D/G start actuation.**	
CUE:	**Tell D/G operator there is extra operator that will time the DG start with a stopwatch.**	
STANDARD:	Operator notifies the ***D/G-DAQ*** operator to start the ***D/G-DAQ***.	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
NOTE:	**The DG operator will NOT be able to operate the stop watch alone. Another operator simulates the DG start timing. Only one stopwatch is required since the DAC is used.**	___ SAT ___ UNSAT
STEP 5.:	[3.2] **PROCEED** with the countdown: 3,2,1, START.	
STANDARD:	Operator ensures operator is ready with stop watch and announces the countdown to start the D/G. Only one stopwatch is required since the DAQ is being used.	
STEP 6.:	[3.3] **DEPRESS** 0-HS-82-46A, DG 1B-B Emergency Start Switch **AND START** Stopwatch(es).	___ SAT ___ UNSAT **Critical Step**
STANDARD:	0-HS-82-46A momentarily depressed. Green light will go "out" and red light will come "on" above D/G mimic. [Not critical: Stop watch is started. D/G running alarm will ANN to indicate D/G > 40 rpm. Incoming voltage and frequency are verified on 0-EI-82-34 and 0-XI-82-32.]	
STEP 7.:	[3.4] When voltage >6800 volts and Frequency >58.8 HZ, THEN STOP stopwatch.	___ SAT ___ UNSAT
STANDARD:	Stop stopwatch when voltage >6800 volts and Frequency >58.8 HZ.	
STEP 8.:	[4] **ENSURE** 1-FCV-67-67, ERCW cooling water supply valve is OPEN.	___ SAT ___ UNSAT
STANDARD:	ERCW valve 1-FCV-67-67 red light comes "on" and green light goes "out" on 0-M-27A panel.	
STEP 9.:	[5] Record the time from the Stopwatches:	___ SAT ___ UNSAT
CUE:	**STOP WATCH E123, TIME 9.5 SECONDS**	
STANDARD:	Operator records the stop watch ID number and seconds for DG start and checks acceptance criteria met: <10 seconds Generator Voltage ≥ 6800 V Frequency ≥ 58.8 Hz	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 10.:	[6] **RECORD** the steady state values for the following: A. 0-EI-82-34, DG 1B-B incoming Voltage. B. 0-XI-82-32, DG 1B-B incoming Frequency.	___ SAT ___ UNSAT
STANDARD:	Operator records **D/G voltage** (as indicated on INC Voltage Gen 1B-B 0-EI-34) is ≥ 6800 but ≤ 7260 volts and **frequency** (as indicated on INC Freq Gen 1B-B 0-XI-82-32) is ≥ 59.9 Hz and ≤ 60.1 Hz Checks acceptance criteria to verify readings are within limits	
STEP 11.:	[7] **RECORD** Voltage Regulator Control Current.	___ SAT ___ UNSAT
Cue:	***Voltage Regulator Control Current is 1.8 dc amps.***	
STANDARD:	Operator records Voltage Regulator Control Current.	
STEP 12.:	[8] **ENSURE** D/G 1B-B **86 LOR** red light NOT ILLUMINATED, at D/G local relay panel.	___ SAT ___ UNSAT
Cue:	***Role play as D/G operator - 86 LOR local red light is not illuminated.***	
STANDARD	Operator verifies red light on 86 LOR at D/G is not illuminated.	
STEP 13.:	[9] **RESET 86 LOR** lockout relay, on D/G local relay panel.	___ SAT ___ UNSAT
Cue:	**When the D/G AUO is requested to reset 86LOR, the Console operator should insert IRF EGR08 f:1 to reset 86LOR and then notify operator - 86 LOR is reset.**	
STANDARD:	86 LOR is reset locally, operator continues.	
STEP 14.:	**[10] VERIFY** [86LOR] reset by amber light 0-XI-82-49 illuminated on 0-M-26.	___ SAT ___ UNSAT
STANDARD:	Operator verifies Amber light on 0-M-26 is lit.	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 15.:	[11] **IF** the D/G-DAQ was used , **THEN** **RECORD** the time required to achieve ≥ 58.8 HZ and ≥ 6800 Volts from the ***D/G-DAQ*** computer.	___ SAT ___ UNSAT
NOTE:	Evaluator can initial for DG-DAQ Operator if asked	
Cue:	***Time was 9.5 seconds for D/G-DAQ.***	
STANDARD:	Operator checks acceptance criteria met, in < 10 seconds generator voltage ≥ 6800 volts and frequency ≥58.8 Hz.	
STEP 16.:	[12] IF step 1.0[6] is <59.9 or >60.1, THEN INITIATE a PER.	___ SAT ___ UNSAT
STANDARD:	Parameters in Step 1.0 [6] were within limits, no PER required, operator N/A's step.	
STEP 17.:	[13] **RECORD** start as ambient in 0-SI-OPS-082-007.M.	___ SAT ___ UNSAT
CUE:	**Another operator will record D/G start in 0-SI-OPS-082-007.M.**	
STANDARD:	Operator addresses logging the start in 0-SI-OPS-082-007.M.	
STEP 18.:	[14] **RETURN** to Section 6.1, Step 10.	___ SAT ___ UNSAT
STANDARD:	Operator returns to the appropriate section and step of the procedure. (Exits Appendix C)	
	Section 6.1 Step 10	
STEP 19.:	[10] **PERFORM** the following to wipe the Automatic Voltage Control Rheostat: [10.1] **RECORD** voltage from 0-EI-82-34.	___ SAT ___ UNSAT
STANDARD:	OPERATOR records voltage and continues with next step.	
STEP 20.:	[10.2] **ENSURE** 0-HS-82-42, DG 1B-B Voltage Regulator Switch in the Pull-to P-AUTO position	___ SAT ___ UNSAT
STANDARD:	Operator verifies 0-HS-82-42 in the Pull To PAUTO position.	

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 21.: [10.3] **DECREASE** voltage to 6700 volts on 0-EI-82-34 using 0-HS-82-42. STANDARD: Operator decreases voltage to 6700 volts on EI-82-34.	___ SAT ___ UNSAT
STEP 22.: [10.4] **INCREASE** voltage to 7300 volts on 0-EI-82-34 using 0-HS-82-42. STANDARD: Operator increases voltage to 7300 volts on EI-82-34.	___ SAT ___ UNSAT
STEP 23.: [10.5] **RETURN** voltage to value recorded in 6.1 [10.1] STANDARD: Operator returns voltage to reading recorded in step 6.1[10.1], ~ 7000 Volts (+/- 200 volts)	___ SAT ___ UNSAT **Critical Step**
STEP 24.: [11] **PLACE** 0-HS-82-48, DG 1B-B Mode Selector Switch, in PARALLEL position. STANDARD: 0-HS-82-48 rotated to the PARALLEL position. Red light "on" & green light "off".	___ SAT ___ UNSAT **Critical Step**
EVALUATOR NOTE: **While operator is adjusting the speed control in the next step have console operator insert IMF AN-OV-958 f:2**	
STEP 25.: [12] **ADJUST** 0-HS-82-43 DG 1B-B Speed Control Switch to obtain a synchroscope indication of slowly rotating in FAST direction. STANDARD: Operator adjusts speed control hand switch 0-HS-82-43 such that synchroscope (XI-82-31) is moving slowly in the fast direction (slowly clockwise).	___ SAT ___ UNSAT **Critical Step**
The steps [27] thru [29] are from 0-AR-M26-B	
STEP 26.: **RESPOND TO** annunciator panel 0-M-26B window D-2. STANDARD: Operator pulls AR 0-M-26B and consults for window D-2, OR depresses the emergency stop button for D/G 1B-B.	___ SAT ___ UNSAT
STEP 27.: [1] **IF** D/G running with no valid accident (blackout or SI) signal present, **THEN ENSURE** D/G shutdown by depressing emergency stop pushbutton 0-HS-82-47A. STANDARD: Operator depresses emergency stop button for Diesel Generator 1B-B.	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 28.:	[2] **IF** D/G running with valid accident (blackout or SI) signal present...	___ SAT
STANDARD:	Operator N/A's this step, D/G is being run for PMT.	___ UNSAT
STEP 29.:	[3] **DISPATCH** personnel to D/G Bldg to verify alarm, **AND CHECK** crankcase trip device actuated [0-PS-82-5026/2] or [0-PS-82-5025/2].	___ SAT ___ UNSAT
Cue:	***AUO informs Unit Operator that crankcase pressure alarm is in on local panel and 0-PS-82-5026/2 is actuated on engine 2.***	
STANDARD:	Operator contacts AUO at the Diesel Generator Building to confirm crankcase pressure alarm.	
STEP 30.:	**NOTIFY** US/SRO of Emergency Stop of Diesel Generator 1B-B.	___ SAT
Cue:	***US/SRO instructs operator to standby for further instructions.***	___ UNSAT
STANDARD:	Operator informs US/SRO of Emergency stop of Diesel Generator 1B-B.	Stop Time____

END of JPM

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. Both units are at 100% RTP.
2. All systems are OPERABLE, except for the 1B-B D/G.
3. 0-GO-16 has been completed on all the A train equipment.
4. Maintenance has been completed on the 1B-B D/G and the clearance has been removed.
5. The D/G has been rolled and is in standby alignment using 0-SO-82-2.
6. The AUO at the D/G building has completed Appendix A of 1-SI-OPS-082-007.B and all parameters are within limits. Two AUO's are standing by for DG start.
7. The U1 Control Room AUO has verified breaker 1934 is in the Disconnect position.
8. D/G-DAQ has been installed.
9. Room fire protection is in service.
10. The U1 US/SRO has reviewed the completed work package for the 1B-B D/G, all that remains is to perform 1-SI-OPS-082-007.B for the PMT.
11. Section 4.0 and Appendix A of 1-SI-OPS-082-007.B are complete.
12. Section 6.1 is complete thru step 6.

INITIATING CUES:

1. Perform 1-SI-OPS-082-007.B, beginning with Section 6.1, step 7.c.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM13AP1-1

Transfer to Hot Leg Recirculation

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 adapted from JPM 13AP1 for NRC exam 02 2010, updated special instructions to the evaluator, added Appendix A with Hot Leg Recirc flowpath and major valve manipulations for examiner. Revised to end JPM after flow established for train A SI pump.	Y	1/18/10	All	M Hankins

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:
Transfer to Hot Leg Recirculation

JA/TA Task # : 0000790501 (**RO**)

K/A Ratings:

194001 A1.02 (4.1/3.9)	194001 A1.13 (4.3/4.1)	000011 EA1.11 (4.2/4.2)
000011 EA1.13 (4.1/4.2)	006020 A4.01 (3.7/3.6)	000011 EA1.05 (4.3/3.9)
006020 A4.02 (3.9/3.8)		

Task Standard:
Realign RHR to cold leg injection and BOTH trains of safety injection to hot leg recirculation flow path. (RHR hot leg injection valve fails to open)

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 identified.
2. Any UNSAT requires comments.
3. Initialize Simulator to IC #120, after automatic containment sump swapover is initiated, perform required alignment of ECCS to Containment Sump per ES-1.3. Insert the following remote functions:
   a. **IRF RHR14 f:1** (FCV-63-1)
   b. **IRF SIR06 f:0**) (FCV-63-22) (Verify power on during setup)
   c. **IOR ZDIHS63172A f:0 (Fails FCV-63-172 closed)**
5. If sump recirc IC is not available, then initialize to IC #16 and complete the following setup:
   a. Insert **IMF TH01A f:10** (10% LOCA on Loop #1 Hot Leg) and trip RCPs.
   b. After automatic containment sump swapover is initiated, perform required alignment of ECCS to containment sump per ES-1.3.
   c. Place operating power on FCV-63-1 (remote function **IRF RHR14 f:1**).
   d. When RWST level decreases to 8% realign containment spray pump suction to containment sump per ES-1.3.
   e. Ensure operating power **ON** FCV-63-22 (Check remote function main menu for **IRF SIR06 f:0,** this task should have been performed in E-1).
   f. Insert override **IOR ZDIHS63172A f:0 (Fails [FCV-63-172] CLOSED**)
   g. Acknowledge and clear ALL alarms.
   h. Freeze simulator after realignment of containment spray suction to containment sump.
6. Insert overrides to silence following nuisance alarms:
   a. **IMF AN_OV_304 f:3** (Saturation Margin Trouble)
   b. **IMF AN_OV_420 f:3** (Lower Compt Moisture High)
   c. **IMF AN_OV_96 f:3** (Turbine Zero Speed)
   d. Change plaque next to FCV-63-22 to indicate power restored to valve.
7. Ensure Operator performs the following required actions for **SELF-CHECKING;**
   a. Reviews the intended action and expected response.
   b. Compares the actual response to the expected response.
8. Appendix A Hot Leg Recirculation Flowpath is available for examiner.

Validation Time: CR. 15 mins **Local** ____________
Tools/Equipment/Procedures Needed:
ES-1.4, Transfer to Hot Leg Recirculation
References:

	Reference	Title	Rev No.
1.	ES-1.4	Transfer to Hot Leg Recirculation	5

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. All ECCS components and Containment Spray pumps are aligned and taking suction from containment sump per ES-1.3, Transfer To RHR Containment Sump.
2. RCS pressure is less than 180 psig. RHR spray is NOT in service.
3. Both RHR pumps are in service.
4. 5 hours have elapsed since the time of the event.

INITIATING CUES:

1. As the OATC, you are directed to transfer to hot leg recirculation in accordance with ES-1.4, Transfer to Hot Leg Recirculation.
2. Notify the US/SRO when you have completed ES-1.4.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 1: Obtain a copy of the appropriate procedure. STANDARD: Operator obtains a copy of ES-1.4. COMMENTS:	___ SAT ___ UNSAT Start Time____
STEP 2: 1. DETERMINE if RHR spray should be isolated: a. CHECK RHR spray IN SERVICE: • Train A RHR spray valve FCV-72-40 OPEN OR • Train B RHR spray valve FCV-72-41 OPEN. STANDARD: Operator determines FCV-72-40 and FCV-72-41 closed, verifies green lights ON and red lights OFF for both valves. Operator goes to RNO step [a] and then proceeds to step 2. COMMENTS:	___ SAT ___ UNSAT
STEP 3: 2. CHECK RHR pump A-A RUNNING. STANDARD: Operator checks RHR pump A-A running, verifies red light ON and green light OFF. Operator may also verify pump amps normal (EI-74-5A). COMMENTS:	___ SAT ___ UNSAT
STEP *4: 3. ALIGN RHR Train A for hot leg recirculation: a. CLOSE RHR Train A cold leg isolation valve FCV-63-93. **NOTE: Alarm on M-6D, window E-6, Group 6 Monitor Lights Component Off Normal will come in when FCV-63-93 is closed.** STANDARD: Operator places FCV-63-93 to Close, verifies green light ON and red light OFF. COMMENTS:	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 5: 3. ALIGN RHR Train A for hot leg recirculation: b. ENSURE RHR Train B discharge crosstie valve FCV-74-35 CLOSED. STANDARD: Operator ensures FCV-74-35 Closed, verifies green light ON and red light OFF. COMMENTS:	___ SAT ___ UNSAT
STEP *6: 3. ALIGN RHR Train A for hot leg recirculation: c. OPEN RHR Train A discharge crosstie valve FCV-74-33. STANDARD: Operator places FCV-74-33 to Open, verifies red light ON and green light OFF. COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP *7: 3. ALIGN RHR Train A for hot leg recirculation: d. OPEN RHR HL injection valve FCV-63-172. NOTE: **FCV-63-172 fails to open. Operator must transition to RNO Column and realign RHR trains to cold legs.** STANDARD: Operator places FCV-63-172 to Open. Operator determines FCV-63-172 will NOT open, verifies green light remains ON. Operator goes to RNO Column. COMMENTS:	___ SAT ___ UNSAT **Critical Step**
NOTE: **Begin alternate path steps, RNO for Step 3:** STEP 8: 1) ENSURE RHR hot leg injection valve FCV-63-172 CLOSED. STANDARD: Operator ensures FCV-63-172 Closed, verifies green light ON and red light OFF. COMMENTS:	___ SAT ___ UNSAT

Job Performance Checklist:

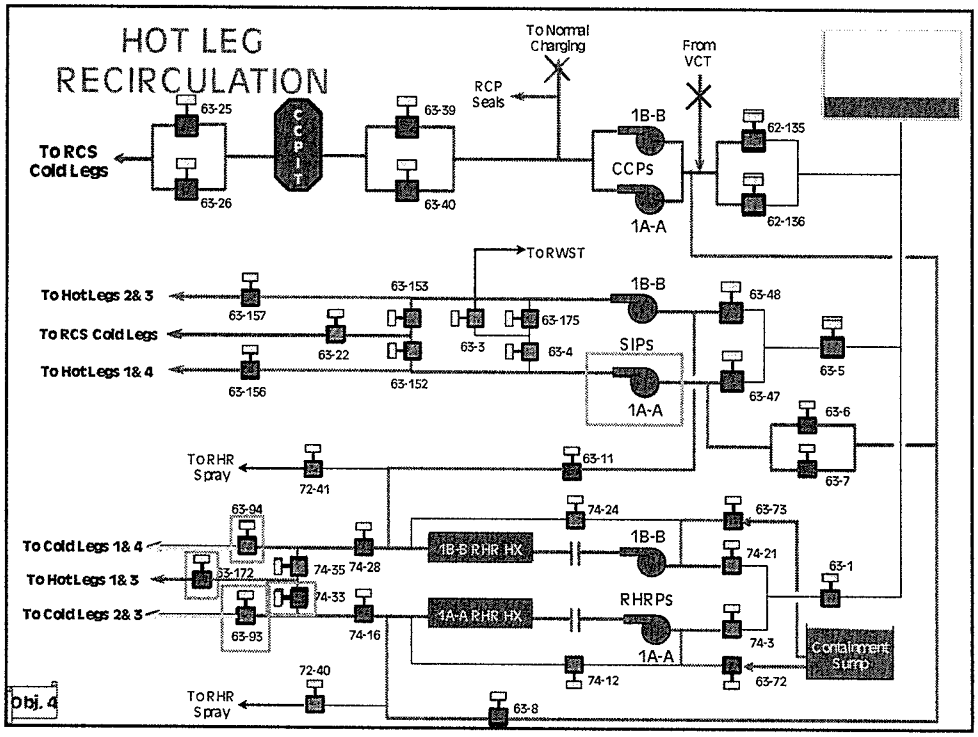
STEP/STANDARD	SAT/UNSAT
STEP *9: 2) ENSURE RHR Train A discharge crosstie valve FCV-74-33 CLOSED. STANDARD: Operator places FCV-74-33 to Close, verifies green light ON and red light OFF. COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP *10: 3) ENSURE RHR Train A cold leg isolation valve FCV-63-93 OPEN. **NOTE: Alarm on M-6D, window E-6, Group 6 Monitor Lights Component Off Normal will clear when FCV-63-93 is open.** STANDARD: Operator places FCV-63-93 to Open, verifies red light ON and green light OFF. COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP 11: 4) IF FCV-63-172 is NOT capable of opening from MCR, THEN GO TO Step 11. STANDARD: Operator determines FCV-63-172 not able to be opened and goes to Step 11. COMMENTS:	___ SAT ___ UNSAT
STEP 12: 11. CHECK SI pump A-A RUNNING. STANDARD: Operator checks SI pump A-A running, verifies red light ON and green light OFF. Operator may also verify pump amps normal on 1-EI-63-12A. COMMENTS:	___ SAT ___ UNSAT
STEP *13: 12. ALIGN SI pump A-A for hot leg recirculation: a. ENSURE SI pump A-A STOPPED. STANDARD: Operator places SI pump A-A to Stop, verifies green light ON and red light OFF (HS-63-10A). COMMENTS:	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP *14: 12. ALIGN SI pump A-A for hot leg recirculation: b. CLOSE SI Train A crosstie valve FCV-63-152. **NOTE** **Alarm on M-6D, window E-6, Group 6 Monitor Lights Component Off Normal will come in when FCV-63-152 is fully closed.** STANDARD: Operator places FCV-63-152 to Close, verifies green light ON and red light OFF. COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP *15: 12. ALIGN SI pump A-A for hot leg recirculation: c. WHEN FCV-63-152 closed, THEN PERFORM the following: 1) OPEN SI Train A hot leg injection FCV-63-156. STANDARD: Operator places FCV-63-156 to Open, verifies red light ON and green light OFF. COMMENTS:	___ SAT ___ UNSAT **Critical Step**
STEP *16: 12. ALIGN SI pump A-A for hot leg recirculation: c. WHEN FCV-63-152 closed, THEN PERFORM the following: 2) START SI pump A-A. STANDARD: Operator places SI pump A-A to Start, verifies red light ON and green light OFF (HS-63-10A). Operator may also verify pump amps normal on 1-EI-63-12A. COMMENTS:	___ SAT ___ UNSAT **Critical Step**
NOTE **JPM will be terminated when operator establishes SI Train A flow on FI-63-151.** STEP 17: 13. VERIFY SI Train A discharge flow on FI-63-151. STANDARD: Operator verifies SI Train A discharge flow indicated on FI-63-151. ***CUE:*** ***Tell operator JPM is terminated at this step.*** COMMENTS:	___ SAT ___ UNSAT _______ Stop Time

END of JPM

Appendix A
Hot Leg Recirculation Flowpath for Examiner



<u>**Hot Leg Recirculation Swapover:**</u>

Swapover is manually done by operators in the Main Control Room.

RHR Sequence:

- **Close A Train cold leg isolation valve FCV-63-93**
- **Ensure RHR Train B discharge crosstie valve FCV-74-35 is closed**
- **Open Train A crosstie valve FCV-74-33**
- **Open RHR hot leg recirculation valve FCV-63-172**
- **Close B Train cold leg isolation valve FCV-63-94**

<u>**SI Sequence: One train is completed at a time.**</u>

<u>**A Train**</u>	<u>**B Train**</u>
Stop SI Pump A-A	**Stop SI Pump B-B**
Close Trn A Crosstie FCV-63-152	**Close Trn B Crosstie FCV-63-153**
Open Trn A H/L valve FCV-63-156	**Open Trn B H/L valve FCV-63-157**
Start SI Pump A-A	**Start SI Pump B-B**

After both SI pumps aligned for Hot Leg Recirculation
Close FCV-63-22 SI pump CL injection

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. All ECCS components and Containment Spray pumps are aligned and taking suction from containment sump per ES-1.3, Transfer To RHR Containment Sump.
2. RCS pressure is less than 180 psig. RHR spray is NOT in service.
3. Both RHR pumps are in service.
4. 5 hours have elapsed since the time of the event.

INITIATING CUES:

1. As the OATC, you are directed to transfer to hot leg recirculation in accordance with ES-1.4, Transfer to Hot Leg Recirculation.
2. Notify the US/SRO when you have completed ES-1.4.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM # 189AP

Radiation Monitor 0-RE-90-122 Flushing After Hi Radiation Signal Isolation of Release (Alternate Path)

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		V	DATE	PAGES AFFECTED	PREPARED/ REVISED BY:
0	Initial Issue	Y	1/19/04	All	S. Poteet
1	Revised to update to latest procedure revision	Y	12/07/09	ALL	M. Hankins

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

SEQUOYAH NUCLEAR PLANT
AUO/RO/SRO
JOB PERFORMANCE MEASURE

Task:
Radiation Monitor 0-RE-90-122 Flushing After Hi Radiation Signal Isolation of Release.

JA/TA TASK #: 0690100104

K/A Ratings:

AA1.01 (3.5/3.5)
2.3.11 (2.7/3.2) 073 K4.02 (3.3/3.9)
068 K6.10 (2.5/2.9)

Task Standard:

The operator completes flushing of 0-RE-90-122 after isolation due to high radiation.

Evaluation Method : Simulator ________ In-Plant ____X_____

==

Performer: ____
NAME
Start Time ________

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

Evaluator: ________________________________/________
SIGNATURE DATE

==

COMMENTS

____

____

____

____

____

____

____

____

____

____

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Critical steps identified.
2. Any UNSAT requires comments
3. 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. ________ **Local** 30 minutes

Tools/Equipment/Procedures Needed

0-SO-77-1 Section 8.2

References:

	Reference	Title	Rev No.
1.	0-SO-77-1	Waste Disposal System	47

==

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps shall be simulated for this JPM. I will provide initiating cues and indicate any steps to be discussed. 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. A release from the CDCT has just been initiated using 0-SO-77-1 Waste Disposal System and 0-SI-CEM-077-400.1 Liquid Waste Effluent Batch Release.
2. The calculated high radiation trip setpoint for 0-RM-90-122 is 8.59 E+04 cpm, per 0-SI-CEM-077-400.1, Liquid Waste Effluent Batch Release.
3. A high radiation signal on 0-RE-90-122 occurred shortly after initiation of the release, causing an isolation of the release.
4. 0-RCV-77-43 has been verified CLOSED.
5. All Prerequisite Actions are complete (Section 4.0)

INITIATING CUES:

You are the RadWaste AUO and have been directed by the Unit 1 SRO to perform Section 8.2 of 0-SO-77-1 to flush 0-RE-90-122 after the High Radiation Isolation. Inform the Unit 1 SRO when Section 8.2 is complete.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 1.: Obtain a copy of the appropriate procedure. STANDARD: The operator obtains a copy of 0-SO-77-1, Section 8.2	___ SAT ___ UNSAT Start Time___
STEP 2.: Section 4.0 Prerequisite Actions ***Cue:*** ***If asked, state all prerequisite actions are complete per initial conditions.*** STANDARD Operator may review Prerequisite Actions, but all steps have already been complete.	
STEP 3.: [1] **ENSURE [0-RCV-77-43]** Radiation Control Valve is CLOSED. ***Cue:*** ***If asked, state 0-RCV-77-43 is closed per the Initial Conditions.*** STANDARD: Operator verifies that valve is closed by reviewing INITIAL CONDITIONS portion of JPM, or can verify valve closed locally (AB el. 669', West Wall of SFP.)	___ SAT ___ UNSAT
STEP 4.: [2] **ENSURE [0-77-689A]** Radiation Monitor Inlet isolation Valve is OPEN. ***Cue:*** ***Inform the operator that the HW for [0-77-689A] is open.*** STANDARD Operator ensures [0-77-689A] Radiation Monitor Inlet isolation Valve is OPEN by turning HW in the CW direction only enough to verify valve movement (indicates the valve is open), and then returns valve to original position.	___ SAT ___ UNSAT
STEP 5.: [3] **OPEN [0-77-689B]** Discharge to FDCT Isolation Valve. ***Cue:*** ***Inform the operator that the HW for [0-77-689B] moves in the counter clockwise direction until snug.*** STANDARD Operator OPENS [0-77-689B] Discharge to FDCT Isolation Valve by turning HW in the CCW direction until HW is snug.	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 6.:	[4] **CLOSE [0-77-689C]** Radiation Monitor Return to Release Header Isolation Valve.	___ SAT ___ UNSAT
Cue:	***Inform the operator that the HW for [0-77-689C] moves in the clockwise direction until snug.***	
STANDARD:	Operator CLOSES [0-77-689C] Radiation Monitor Return to Release Header Isolation Valve by turning HW in the CW direction until HW is snug.	**Critical Step**
STEP 7.:	[5] **VERIFY [0-RE-90-122]** radiation monitor pump is running.	___ SAT ___ UNSAT
Cue:	***0-HS-90-122B RED light ON; GREEN light OFF.***	
STANDARD:	Operator verifies that [0-RE-90-122] radiation monitor pump is running.	
STEP 8.:	[6] **ALLOW [0-RE-90-122]** Radiation Monitor to flush to FDCT for 5 minutes.	___ SAT ___ UNSAT
Cue:	***Inform operator that 5 minutes have elapsed.***	
STANDARD:	Operator allows flush for at least 5 minutes prior to proceding to next step.	
STEP 9.:	[7] **OPEN [0-77-689C]**	___ SAT ___ UNSAT
Cue:	***Inform the operator that the HW for [0-77-689C] moves in the counter clockwise direction until snug.***	
STANDARD:	Operator OPENS [0-77-689C] Radiation Monitor Return to Release Header Isolation Valve by turning HW in the CCW direction until HW is snug.	**Critical Step**
STEP *10.:	[8] **CLOSE [0-77-689B]**	___ SAT ___ UNSAT
Cue:	***Inform the operator that the HW for [0-77-689B] moves in the clockwise direction until snug.***	
STANDARD:	Operator CLOSES [0-77-689B] Discharge to FDCT Isolation Valve by turning HW in the CW direction until HW is snug.	**Critical Step**

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 11.:	**[9] RECORD** 0-RE-90-122 reading: 0-RE-90-122 Reading ________________ cpm	___ SAT ___ UNSAT
NOTE:	**ALTERNATE PATH BEGINS HERE.**	
Cue:	***Inform operator that 0-RE-90-122 is reading 9.00 E+04 cpm***	
STANDARD:	Operator enters 9.00 E+04 cpm for 0-RE-90-122 data.	
STEP * 12.:	[10] **IF** the reading in step [9] is below the trip setpoint. **THEN RETURN** to instruction where exited	___ SAT ___ UNSAT
NOTE:	**RE high radiation trip setpoint, 8.59 E+04 cpm, was provided in the INITIAL CONDITIONS.**	
STANDARD:	Operator determines that the current 0-RE-90-122 reading remained greater than the trip setpoint 8.59 E+04 cpm and continues with step [11].	
STEP 13.:	[11] **IF** the reading obtained in step [9] is still above the trip setpoint, **THEN PERFORM** the following steps to lower the radiation monitoring reading:	___ SAT ___ UNSAT
NOTE:	**Valve is located in CDCT room**	
	[11.a] **CLOSE** applicable tank isolation valve from release header. (N/A tanks not aligned)	

Tank Being Released	Isolation Valve	Initials
CDCT	0-77-679	______
Monitor Tank	0-77-1306	______

Cue:	***Inform the operator that the HW for [0-77-679] moves in the clockwise direction until snug.***	**Critical Step**
STANDARD:	Operator CLOSES [0-77-679] Cask Decon Collector Tank by turning HW in the CW direction until HW is snug. Operator enters an "N/A" for the Monitor Tank.	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
NOTE:	**Valve is located in CDCT room.**	___ SAT
STEP14.:	[11.b] **OPEN <u>[0-VLV-59-735]</u>** Demin Flush To Radwaste Isol.	___ UNSAT
<u>Cue:</u>	***Inform the operator that the handle for <u>[0-VLV-59-735]</u> moves in the counter clockwise direction until handle is in line with pipe.***	**Critical Step**
STANDARD:	Operator OPENS <u>[0-VLV-59-735]</u> Demin Flush To Radwaste Isol by turning handle in the CCW direction until handle is in line with pipe.	
STEP15.:	[11.c] **OPEN <u>[0-77-689B]</u>** Discharge to FDCT Isolation Valve.	___ SAT
<u>Cue:</u>	***Inform the operator that the HW for <u>[0-77-689B]</u> moves in the counter clockwise direction until snug.***	___ UNSAT
STANDARD:	Operator OPENS <u>[0-77-689B]</u> Discharge to FDCT Isolation Valve by turning HW in the CCW direction until HW is snug.	**Critical Step**
STEP 16.:	[11.d] **CLOSE <u>[0-77-689C]</u>** Radiation Monitor Return to Release Header Isolation Valve.	___ SAT
<u>Cue:</u>	***Inform the operator that the HW for <u>[0-77-689C]</u> moves in the clockwise direction until snug.***	___ UNSAT
STANDARD:	Operator CLOSES <u>[0-77-689C]</u> Radiation Monitor Return to Release Header Isolation Valve by turning HW in the CW direction until HW is snug.	**Critical Step**
STEP 17.:	[11.e] **WHEN** count rate on <u>[0-RE-90-122]</u> decreases to its minimum value, **THEN**	___ SAT
<u>Cue:</u>	***0-RE-90-122 reading has lowered to 8.00 E+02 cpm and is stable.***	___ UNSAT
STANDARD:	Operator reads count rate on 0-RE-90-122.	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 18.:	[11.e.1] **OPEN <u>[0-77-689C]</u>** Radiation Monitor Return to Release Header Isolation Valve.	___ SAT ___ UNSAT **Critical Step**
<u>Cue:</u>	***Inform the operator that the HW for <u>[0-77-689C]</u> moves in the counterclockwise direction until snug.***	
STANDARD:	Operator OPENS [0-77-689C] Radiation Monitor Return to Release Header Isolation Valve by turning HW in the CCW direction until HW is snug.	
STEP 19.:	[11.e.2] **CLOSE <u>[0-77-689B]</u>** Discharge to FDCT Isolation Valve.	___ SAT ___ UNSAT **Critical Step**
<u>Cue:</u>	***Inform the operator that the HW for <u>[0-77-689B]</u> moves in the clockwise direction until snug.***	
STANDARD:	Operator CLOSES [0-77-689B] Discharge to FDCT Isolation Valve by turning HW in the CW direction until HW is snug.	
STEP 20.:	[11.f] **CLOSE <u>[0-VLV-59-735]</u>** Demin Flush To Radwaste Isol.	___ SAT ___ UNSAT **Critical Step**
<u>Cue:</u>	***Inform the operator that the handle for <u>[0-VLV-59-735]</u> moves in the clockwise direction until perpendicular with pipe.***	
STANDARD:	Operator CLOSES [0-VLV-59-735] Demin Flush To Radwaste Isol by turning handle until handle is perpendicular with pipe.	
STEP 21.:	[11.g] **OPEN** applicable tank isolation valve previously closed in step [a] (N/A tanks not aligned):	___ SAT ___ UNSAT **Critical Step**

Tank Being Released	Isolation Valve	Initials
CDCT	0-77-679	______
Monitor Tank	0-77-1306	______

<u>Cue:</u>	***Inform the operator that the HW for <u>[0-77-679]</u> moves in the counter clockwise direction until snug.***	
STANDARD:	Operator OPENS <u>[0-77-679]</u> Cask Decon Collector Tank by turning HW in the CCW direction until HW is snug, and N/A's valve for the Monitor Tank.	

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 22.:	[h] **IF** hi radiation alarm will not clear, **THEN NOTIFY** the appropriate US/SRO that alarm will not clear.	___ SAT ___ UNSAT
Cue:	***0-RE-90-122 high radiation alarm is clear*** ***If asked, rad monitor 0-RE-90-122 is still reading 8.00 E+2 cpm.***	
STANDARD:	Operator determines that 0-RE-90-122 alarm has cleared by observing verifying XA-55-L2C Window C-3 DARK in RadWaste AUO shack OR Calling Main Control Room and verifying alarm status.	
STEP 23.:	[12] **RETURN** to instruction where exited.	___ SAT ___ UNSAT
STANDARD:	Operator informs Unit 1 US/SRO that 0-SO-77-1 is complete	End Time____

End of JPM

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps shall be simulated for this JPM. I will provide initiating cues and indicate any steps to be discussed. 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. A release from the CDCT has just been initiated using 0-SO-77-1 Waste Disposal System and 0-SI-CEM-077-400.1 Liquid Waste Effluent Batch Release.
2. The calculated high radiation trip setpoint for 0-RM-90-122 is 8.59 E+04 cpm, per 0-SI-CEM-077-400.1, Liquid Waste Effluent Batch Release.
3. A high radiation signal on 0-RE-90-122 occurred shortly after initiation of the release, causing an isolation of the release.
4. 0-RCV-77-43 has been verified CLOSED.
5. All Prerequisite Actions are complete (Section 4.0)

INITIATING CUES:

You are the RadWaste AUO and have been directed by the Unit 1 SRO to perform Section 8.2 of 0-SO-77-1 to flush 0-RE-90-122 after the High Radiation Isolation. Inform the Unit 1 SRO when Section 8.2 is complete.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM # 44

Venting the A-A RHR Pump due to Cavitation While in Mid-Loop Operation

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:
1	Transfer from WP. Minor enhancements.	N	8/31/95	All	HJ Birch
2	Incorp prev pen/ink which chgd performance time from 20 to 24. AOP-R.03 replaced AOI-14. Minor JPM chgs to match new procedure	N	3/5/96	3,4,5	HJ Birch
pen/ink	AOP-R.03 Rev chg. Procedure step 14d referenced in JPM became 15d.	N	6/8/96	4,5,8	HJ Birch
pen/ink	AOP-R.03 Rev chg added train designation to valves. For JPM to save confusion: added a note that valves in ( ) are B Train.	N	2/6/97	4,5	HJ Birch
	AOP-R.03 Rev chg only	N	8/12/97	4	HJ Birch
pen/ink	requal comment - FCV is normally blocked. Chg cue to block fell off.	N	5/13/98	4	HJ Birch
pen/ink	AOP R.03 revision had no impact. Revised K/A ratings. Reformatted critical steps.	N	8/13/98	All	JP Kearney
pen/ink	AOP-R.03 revision had no impact. Updated procedure revision only	N	9/25/98	2,4	JP Kearney
pen/ink	AOP Rev Change only	N	9/22/99	4	SR Taylor
pen/ink	Corrected proceduredstep number references in initiating cues and in JPM steps 1 & 14 due to AOP Rev Change and updated rev level.	N	8/21/00	4,5,8	SR Taylor
pen/ink	Added item 7 to initial conditions to eliminate confusion during performance.	N	08/02/01	4	WR Ramsey
3	Incorporated pen/ink changes; revised per recent changes to AOP-R.03; No impact on JPM flow	N	8/20/02	4	J P Kearney
4	Updated to current revision.	N	9/15/04	All	MG Croteau
5	Updated to current revision.	N	10/03/05	All	MG Croteau
6	Proc chg eliminated several vlv manipulation steps.	Y	2/9/09	All	H J Birch
7	Update to divide JPM steps to reflect current procedure revision	Y	11/3/2009	All	M Hankins

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

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Any UNSAT requires comments
2. ***This JPM may be performed on either unit or train depending on accessibility. The Evaluator MUST clearly specify which UNIT and TRAIN the task is to be performed on when reading the initial conditions and initiating cues.***
3. 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.
4. If a ladder is needed to operate any equipment the trainee should locate a ladder and state that they would use the ladder to operate the valve, it is not necessary to bring the ladder to the work location.

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

Tools Needed:

AOP-R.03, Section 2.1 step 17. and Appendix J

References:

	Reference	Title	Rev No.
A.	AOP-R.03	RHR System Malfunctions	22

==

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps shall be simulated. I will provide initiating cues and indicate any steps to be discussed. 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 ___ is in Mode 5 following a refueling outage.
2) The RCS is at Mid-loop with the A-A (B-B) RHR pump aligned for Shutdown Cooling.
3) Hoses are not installed at 74-512 and 513
4) The flow block gag device on discharge valve FCV-74-16 (74-28) on the A-A (B-B) RHR Hx fell off and the FCV failed full open, causing vortexing in the RCS loop, resulting in air being drawn into the A-A (B-B) RHR pump suction and pump casing.
5) Rad Con Techs are standing by to support the venting operation.
6) The A-A (B-B) RHR pump is in the Pull-to-Lock position.
7) Repairs have been completed on the flow block gag for FCV-74-16 (74-28) and the valve is now functional.

INITIATING CUES:

1) The operators in the MCR have unsuccessfully attempted to get the A-A (B-B) RHR pump back in service.
2) You are the Unit___ Aux. Bldg. AUO. You have been directed to locally vent the A-A (B-B) RHR pump using AOP-R.03 Using Appendix J.
3) When you have completed the local venting notify the CRO on the unit.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 1.: Obtain a copy of the appropriate procedure STANDARD: Operator obtains a copy of AOP-R.03, Appendix J	___ SAT ___ UNSAT Start Time____
STEP 2. OBTAIN M-5 key and radio. **Cue: After explaining how to obtain M-5 Key and radios, inform operator that they have both.** STANDARD: Operator explains how to obtain M-5 Key and radios, procedure contains note stating keys may be obtained from AOP-C.04 cabinet or could be checked out from the Shift Manger clerks office, radios made be obtained from AUO work station (OFO), MCR, SM office	____ SAT ____ UNSAT
STEP 3. **IDENTIFY** applicable unit: • Unit 1 _____ • Unit 2 _____ STANDARD: Operator identifies proper unit as determined from the initiating cues	____ SAT ____ UNSAT
STEP 4. **IDENTIFY** RHR Pump(s) to be vented (specified by MCR). • Train A ____ • Train B ____ STANDARD: Operator identifies proper RHR pump as determined from the initiating cues	____ SAT ____ UNSAT
STEP 5.: **UNLOCK** and **CLOSE** pump discharge valve on affected train: [RHR pump Room, 653'] • 74-520 (Train A) **OR** • 74-521 (Train B) ***Cue: Lock is removed; HW turned several times in the CW direction and is now snug.*** STANDARD: Operator locates VLV-74-520 (74-521), unlocks and turns the HW in the CW direction until snug.	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 6.: **UNLOCK** and **OPEN** pump discharge vent on affected train: [RHR pump room] • 74-516 (Train A) **OR** • 74-517 (Train B) **Cue:** ***Lock is removed; HW turned several times in the CCW direction and is now snug.*** STANDARD: Operator locates VLV-74-516 (74-517), unlocks and turns the HW in the CCW direction until snug and states that the valve will be open for approximately 10 minutes.	___ SAT ___ UNSAT **Critical Step**
STEP 7.: **VENT** for 10 minutes. **Cue:** ***10 minutes have elapsed.*** STANDARD: Operator states that once the valve is open they will vent for 10 minutes.	___ SAT ___ UNSAT **Critical Step**
STEP 8.: **CLOSE** RHR pump discharge vent valve on affected train: • 74-516 (Train A) **OR** • 74-517 (Train B) **Cue:** ***The HW turned several times in the CW direction and is now snug.*** STANDARD: Operator locates valve 74-516 (74-517) turns the HW in the CW direction until snug.	___ SAT ___ UNSAT **Critical Step**
STEP 9.: **OPEN** RHR pump discharge valve on affected train. • 74-520 (Train A) **OR** • 74-521 (Train B) • **Cue:** ***The HW turned several times in the CCW direction and is now snug.*** STANDARD: Operator locates VLV-74-520 (74-521), turns the HW in the CCW direction until snug.	___ SAT ___ UNSAT **Critical Step**

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 10.:	**FULLY OPEN** pressure transmitter instrument drain valve for 5 minutes on affected train: [Racks outside RHR pump room] • PT-74-13 (Train A) **OR** • PT-47-26 (Train B)	___ SAT ___ UNSAT **Critical Step**
Cue:	***HW turned CCW until snug, 5 minutes have elapsed.***	
STANDARD:	Operator locates drain valve for PT-74-13 (26), turns HW in the CCW direction until snug, leaves open for 5 minutes.	
STEP 11.:	**CLOSE** pressure transmitter instrument drain valve on affected train: • PT-74-13 (Train A) **OR** • PT-47-26 (Train B)	___ SAT ___ UNSAT **Critical Step**
Cue:	***HW turned CW until snug.***	
STANDARD:	Operator turns HW in the CW direction until snug.	
STEP 12.:	**NOTIFY** MCR that RHR pump Venting is complete on the affected train.	___ SAT ___ UNSAT Stop Time____
Cue:	***Acknowledge report and instruct operator to resume normal duties.***	
STANDARD:	Operator communicates with the UO in the MCR and informs him/her that the A-A (B-B) RHR pump has been vented in accordance with Appendix J of AOP-R.03.	

END OF JPM

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps shall be simulated. I will provide initiating cues and indicate any steps to be discussed. 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 ___ is in Mode 5 following a refueling outage.
2) The RCS is at Mid-loop with the A-A (B-B) RHR pump aligned for Shutdown Cooling.
3) Hoses are not installed at 74-512 and 513.
4) The flow block gag device on discharge valve FCV-74-16 (74-28) on the A-A (B-B) RHR Hx fell off and the FCV failed full open, causing vortexing in the RCS loop, resulting in air being drawn into the A-A (B-B) RHR pump suction and pump casing.
5) Rad Con Techs are standing by to support the venting operation.
6) The A-A (B-B) RHR pump is in the Pull-to-Lock position.
7) Repairs have been completed on the flow block gag for FCV-74-16 (74-28) and the valve is now functional.

INITIATING CUES:

1) The operators in the MCR have unsuccessfully attempted to get the A-A (B-B) RHR pump back in service.
2) You are the Unit___ Aux. Bldg. AUO. You have been directed to locally vent the A-A (B-B) RHR pump using AOP-R.03 Using Appendix J.
3) When you have completed the local venting notify the CRO on the unit.

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps shall be simulated. I will provide initiating cues and indicate any steps to be discussed. 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 ___ is in Mode 5 following a refueling outage.
2) The RCS is at Mid-loop with the A-A (B-B) RHR pump aligned for Shutdown Cooling.
3) Hoses are not installed at 74-512 and 513.
4) The flow block gag device on discharge valve FCV-74-16 (74-28) on the A-A (B-B) RHR Hx fell off and the FCV failed full open, causing vortexing in the RCS loop, resulting in air being drawn into the A-A (B-B) RHR pump suction and pump casing.
5) Rad Con Techs are standing by to support the venting operation.
6) The A-A (B-B) RHR pump is in the Pull-to-Lock position.
7) Repairs have been completed on the flow block gag for FCV-74-16 (74-28) and the valve is now functional.

INITIATING CUES:

1) The operators in the MCR have unsuccessfully attempted to get the A-A (B-B) RHR pump back in service.
2) You are the Unit___ Aux. Bldg. AUO. You have been directed to locally vent the A-A (B-B) RHR pump using AOP-R.03 Using Appendix J.
3) When you have completed the local venting notify the CRO on the unit.

SEQUOYAH NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM # 91-1

Transfer Controls to the Auxiliary Mode Per Checklist 3

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, adapted from JPM91AP, revised to require partial performance fo checklist 3, no alternate path. Also updated steps to latest procedure revision, revised steps concerning Time Critical Action Clock starts as addressed AOP-N.01.	Y	1/23/2010	All	M Hankins

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

SEQUOYAH NUCLEAR PLANT
AUO/UO/SRO
JOB PERFORMANCE MEASURE

Task:
Transfer Controls to the Auxiliary Mode per Checklist AOP-C.04 checklist 3.

JA/TA TASK #: 0000680501 (RO) 0620090104 (AUO)

K/A Ratings:
068AK2.01 (3.9/4.0)
068AK3.18 (4.2/4.5)
068AA1.12 (4.4/4.4)
068AK3.09 (3.9/4.4)
068AA1.21 (3.9/4.1)

Task Standard: The required controls located on the 480V and 6.9kV Shutdown Boards and the 6.9kV Logic Panels are transferred to the AUXILIARY mode.

Evaluation Method : Simulator ________ In-Plant ____X_____

==

Performer: ______________________________________
NAME

Start Time ________

Performance Rating : SAT _____ UNSAT _____ Performance Time _____

Finish Time _______

Evaluator: ________________________________/________
SIGNATURE DATE

==

COMMENTS

____

____

____

____

____

____

____

____

____

____

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Any UNSAT requires comments.
2. *The SHUTDOWN BOARD LOGIC CABINETS are not locked, it will NOT be necessary to open the cabinet, having the operator locate the correct cabinet and describing his/her actions will suffice.*
3. *The AOP-C.04 cabinet is sealed. It is not necessary to open the cabinet and retrieve the key. Having the operator locate the cabinet and discuss his/her actions will suffice.*
4. AOP-N.01 directs the operators to go to the AOP-C.04 cabinet in 6.9KV SDBD Rm via el. 690 radcon Portal to avoid entering the fire area. For this JPM students can enter the 6.9 KV SDBD thru the MCR. Access from the AB to the 6.9 KV SDBD is normally prohibited by RADCON, exception in emergencies.
5. Evaluators review Attachment 1 and 2.
6. The clock starts for time critical actions in AOP-C.04 when ANY of the conditions listed in AOP-N.01 Appendix E are met. Timing for Time Critical Actions in this JPM will start one minute prior to the operator being notified to perform the checklist. Operator should be allowed a few minutes to review checklist prior to checklist performance.
7. 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. _______ **Local** 20 minutes

Tools Needed:
AOP-C.04 Checklist 3

References:

	Reference	Title	Rev No.
A.	AOP-C.04	Control Room Inaccessibility	18

==

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps shall be simulated.
WHEN ENTERING A UNIT TRIP HAZARD ZONE ENSURE YOU DO NOT TOUCH ANY SWITCHES WITHIN THAT ZONE.
DO NOT OPEN ANY COMPARTMENTS.
I will provide initiating cues and indicate any steps to be discussed. 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) Both units were operating at 100% power, both units enetered AOP-N.01 due to a fire in the spreader room.
2) Operators have dispatched AUO's to the AOP-C.04 cabinets. AUO's are standing by awaiting instructions.

INITIATING CUES:

1) You are the Control Room AUO and have been directed by the UO to report to the AOP-C.04 Cabinet in the 6.9 KV Shutdown Bd Room A.
2) The CRO has assigned you to report to the AOP-C.04 cabinet and review Checklist 3 for performance.
3) When notified that AOP-C.04 is entered, Perform Checklist 3.
4) NOTIFY the ACR when a CCP has been restored to service.

THIS IS A TIME CRITICAL JPM

Clock Start for Time Critical Actions is one minute prior to the operator being notified to PERFORM the checklist.

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
NOTE 1	**This checklist has Time Critical Actions. Time limits are identified at applicable steps. The clock starts for Time Critical Actions in AOP-C.04 when ANY of the entry conditions listed in AOP-N.01 are met.**	___ SAT ___ UNSAT
NOTE 2	**For JPM performance the clock start for Time Critical Actions is one minute before the operator is notified to perform checklist.**	Start Time____
STEP 1.:	Obtain a copy of the appropriate checklist(s).	
STANDARD:	Operator obtains a copy of AOP-C.04, Checklist 3. (Checklist is obtained by the operator for review prior to entering AOP-C.04)	
STEP 2.:	[1] **OBTAIN** the following from AOP-C.04 Cabinet: • C415A Key • Flashlight	___ SAT ___ UNSAT
NOTE:	The AOP-C.04 cabinet is sealed. It is not necessary to open the cabinet and retrieve the key or a flashlight. Having the operator locate the cabinet and discuss his/her actions will suffice.	
STANDARD:	Operator locates the AOP-C.04 cabinet in the A-A 6.9 KV Shutdown Board Room (north end) and states that they would get a C415A Key and a flashlight.	
STEP 3.:	Operator is notified that AOP-C.04 has been entered by the MCR, Timing for Time Critical Actions started one minute ago.	**Record time AOP-C.04 was entered in MCR** (Present time minus 1 minute)
CUE:	***Tell OPERATOR that AOP-C.04 has been entered in the Main Control Room for Both units. Timing for Time Critical Actions started one minute ago***	______________
STANDARD:	N/A.	**This time starts the clock for Time Critical Actions**

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 4. [2] **ATTEMPT** to STOP both Unit 1 CCP's by.....**(5 minutes)** [2.a] **PLACE** CCP transfer switch in AUX (Lift Lever below switch to break seal and allow transfer switch operation) [2.b] **ATTEMPT to STOP** CCP **USING** HS on Bkr cmpt	____ SAT ____ UNSAT **Critical Step** **Time** ______ **Δ minutes from AOP-C.04 entry** ______ (5 minutes or less to meet critical task)

CCP	Breaker Location	Transfer Switch	AUX √	Control Switch	Stopped √
1A-A	6.9 SDBD 1AA Compt 18	1-XS-62-108	☐	1-HS-62-108C	☐
1B-B	6.9 SDBD 1BB Compt 18	1-XS-62-104	☐	1-HS-62-104C	☐

CUE: ***1st Shutdown Bd –***

- ***Lever is up and Switch Transferred.***
- ***Initially CCP has Red Light ON – Green Light OFF.***
- ***After operator places HS to Stop Bkr has green light ON, Red Light is OFF.***

CUE: ***2nd Shutdown Bd –***

- ***Lever is up and Switch Transferred.***
- ***CCP has Green Light ON – Red Light OFF.***

STANDARD: Operator places **BOTH** Xfr switches in AUX and Ensures **BOTH CCP** are OFF.
Critical time 5 minutes from time enter AOP-C.04.

STEP/STANDARD	SAT/UNSAT
STEP 5. [3] **ENSURE** [0-XS-82-122] GEN 1B-B Transfer switch in AUX CONT RM position. [inside SD Bd 1B-B Logic Cabinet panel 4, bottom row] **NOTE:** **DO NOT ALLOW OPERATOR TO OPEN PANEL DOOR – operator can explain process, or show operator Attachment 1- Logic cabinet** ***Cue:*** ***Switch is in the AUX position*** STANDARD: Operator places DG 1B-B Transfer Switch to AUX CONT RM position	____ SAT ____ UNSAT **Critical Step**
STEP 6. [4] **CHECK** if 6.9KV Shutdown Board 1B-B is Energized – Voltmeter cmpt 12 ***CUE:*** ***Voltage is as indicated (or cue ~7000 V)*** STANDARD: Operator checks SD Bd 1B is energized, using voltmeter on compartment 12, and checks YES box.	____ SAT ____ UNSAT

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
STEP 7. [5] **IF**6.9KV Shutdown Bd 1B-B is NOT energized… STANDARD: Operator will N/A this step.	____ SAT ____ UNSAT
STEP 8. [6] **PLACE** the following transfer switches in AUX position on 6.9KV Shutdown Bd 1B-B: (see table below) ***CUE 1:*** ***Latch lifted, XS rotated clockwise, and indicates in the AUX. position.*** STANDARD: All Nor/Aux switches, addressed, are correctly placed in the Auxiliary position, and placekeeping boxes are checked.	____ SAT ____ UNSAT **Critical Step**
NOTE: **The following step ensures one ERCW pump will sequence on following a blackout. If ERCW pump L-B or N-B is already running (breaker closed), the running pump should be selected.** STEP 9.: [7] **PLACE** breaker control switch for ERCW pump L-B **OR** N-B in START momentarily (1B SD BD cmpt 8 or 9) **[If a pump is running the running pump should be selected]** ***CUE:*** ***L-B Pump Red Light ON*** ***N-B Pump Green Light ON*** STANDARD: Operator ensures the HS for ERCW pump L-B (Compartment 8) on 1B-B 6.9KV shutdown board has been placed to start momentarily. **[If N-B pump is started this should be a comment not an Unsat]**	___ SAT ___ UNSAT **Critical Step**
STEP 10. [8] **CHECK** if 6.9KV Shutdown Board 1B-B is Energized – Voltmeter cmpt 12 ***CUE:*** ***Voltage is as indicated (~7000 Volts)*** STANDARD: Operator checks SD Bd 1BB energized utilizing voltmeter on compartment 12, and checks YES box.	____ SAT ____ UNSAT

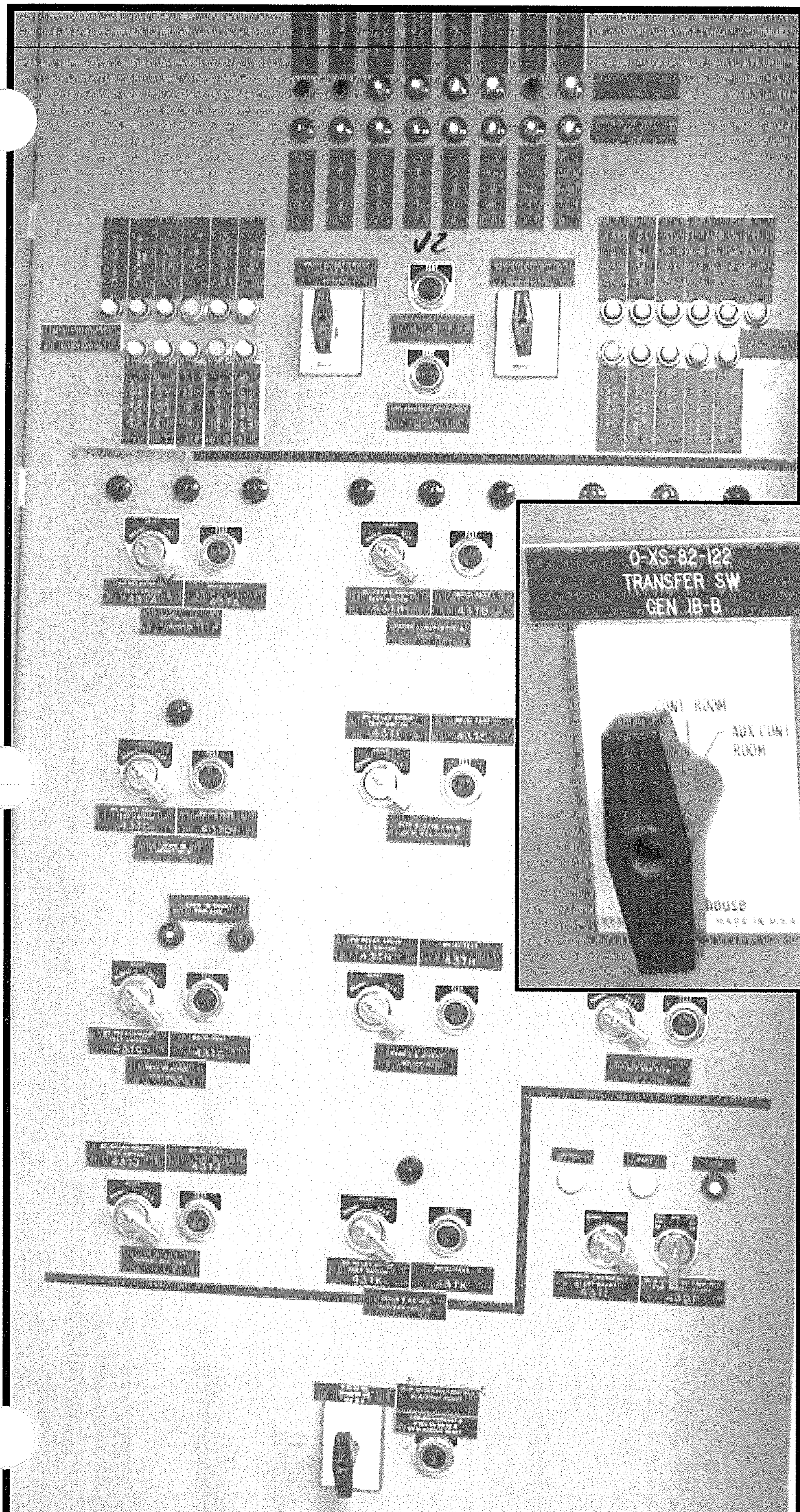
Step 8 table:

Equipment	Compt	Switch	Position
ALT brk 6.9 UB 1D 1728	16	1-XS-57-71	☐ AUX
Nor Supply Brk 6.9 UB 1C 1726	11	1-XS-57-68	☐ AUX
ERCW Pump N-B	9	0-XS-67-452	☐ AUX
ERCW Pump L-B	8	0-XS-67-440	☐ AUX
Emerg Supply Brk 1BB 1914	6	1-XS-57-73	☐ AUX

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
STEP 11.	[9] **IF** 6.9KV Shutdown Bd 1B-B is NOT energized....	____ SAT ____ UNSAT
STANDARD:	Operator N/A's this step.	
NOTE	AUO performing checklist 5 notifies operator performing checklist 3, by face to face communication, that CCP suction is aligned to the RWST.	____ SAT ____ UNSAT
STEP 12.	[10] **WHEN** Unit 1 CCP suction has been aligned to the RWST, **THEN PERFORM** the following **[13 minutes]** • IF CCP 1A-A is NOT running THEN START CCP 1B-B [cmpt 18]	**CRITICAL STEP**
Cue 1:	***AUO with Checklist 5 has opened FCV-62-135***	**Time** ________
NOTE:	**Operator ensured both CCPs were off earlier and may state this, or may verify 1A-A is not running.**	**Δ minutes from AOP-C.04 entry**
Cue 2:	***If checked - 1A-A CCP Green Light only*** ***When Operator goes to "START" with 1B-B HS state Red Light ON– Green Light OFF [~ 32 Amps indicated]***	________
STANDARD:	Operator STARTS 1B-B CCP. **TIME Critical Action 13 minutes from the time AOP-C.04 is entered.**	(13 minutes or less to meet critical task)
NOTE	**Per initiating cues the operator should notify the ACR that a CCP has been started, and state they have completed their assigned task.**	**STOP Time** ________

End of JPM



ATTACHMENT 1

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps shall be simulated. **WHEN ENTERING A UNIT TRIP HAZARD ZONE ENSURE YOU DO NOT TOUCH ANY SWITCHES WITHIN THAT ZONE.**
DO NOT OPEN ANY COMPARTMENTS.
I will provide initiating cues and indicate any steps to be discussed. 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) Both units were operating at 100% power, both units enetered AOP-N.01 due to a fire in the spreader room.
2) Operators have dispatched AUO's to the AOP-C.04 cabinets. AUO's are standing by awaiting instructions.

INITIATING CUES:

1) You are the Control Room AUO and have been directed by the UO to report to the AOP-C.04 Cabinet in the 6.9 KV Shutdown Bd Room A.
2) The CRO has assigned you to report to the AOP-C.04 cabinet and review Checklist 3 for performance.
3) When notified that AOP-C.04 is entered, Perform Checklist 3.
4) NOTIFY the ACR when a CCP has been restored to service.

THIS IS A TIME CRITICAL JPM

Clock Start for Time Critical Actions is one minute prior to the operator being notified to PERFORM the checklist.