12/27/99

NOTE TO: NRC DOCUMENT CONTROL DESK
MAIL STOP 0-5-D-24

FROM: Virgil Curley, LICENSING ASSISTANT
~~OPERATING LICENSING~~ BRANCH _ REGION I

SUBJECT: OPERATOR LICENSING EXAMINATION ADMINISTERED ON
Feb 26, Mar, 1-5, 1999, AT Salem Units 1 & 2
DOCKET NO. 272 & 311

ON Feb 26 & MAR-1-5 99 OPERATOR LICENSING EXAMINATIONS WERE ADMINISTERED AT THE REFERENCED FACILITY. ATTACHED YOU WILL FIND THE FOLLOWING INFORMATION FOR PROCESSING THROUGH NUDOCS AND DISTRIBUTION TO THE NRC STAFF, INCLUDING THE NRC PDR.

Item #1 a) FACILITY SUBMITTED OUTLINE AND INITIAL EXAM SUBMITTAL DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE A070.

written (Oct. Format)

b) AS GIVEN OPERATING EXAMINATION, DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE A070. + Outlines

Item #2 EXAMINATION REPORT WITH THE AS GIVEN WRITTEN EXAMINATION ATTACHED, DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE IE42.

A070

DAY 1

Facility: Salem Examination Level: RO		Date of Examination: 02/22/98 Operating Test Number:
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	QPTR JPM	2.1.7 3.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. Perform a Quadrant Power Tilt Ratio Calculation
	Temporary Modification of Procedures JPM	2.1.1 3.7 - Knowledge of conduct of operations requirements Prepare a Temporary Modification to a procedure
A.2	Action Requests JPM	2.2.19 *2.1 - Knowledge of maintenance work order requirements Prepare an action request (AR) for corrective maintenance *At Salem, Reactor Operators are required to be able to prepare AR's.
A.3	Radiation Protection	2.3.4 2.5 - Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized Given an emergency situation, determine the allowable stay time
		2.3.10 2.9 - Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. Special requirements for containment entry during Mode 1
A.4	Emergency Plan JPM	2.4.39 3.3 - Knowledge of RO's responsibilities in Emergency Plan implementation. Activate the ERDS as Secondary Communicator

Modified from original outline due to a procedure change and effect on the original task.

JCLloyd
2/27/99

Approved by P. Bissett on 2/23/99

A040

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: SALEM

SYSTEM: Administrative

TASK: Calculate a Quadrant Power Tilt Ratio

TASK NUMBER: 114 503 03 01

JPM NUMBER: WD-ROA1.1

APPLICABILITY:

EO ☐ RO ☒ SRO ☐

K/A NUMBER: 2.1.7

IMPORTANCE FACTOR: 3.7 / 4.4

RO SRO

EVALUATION SETTING/METHOD: CLASSROOM

REFERENCES: S2.OP-ST.NIS-0002

TOOLS AND EQUIPMENT: Calculator

VALIDATED JPM COMPLETION TIME: 15 minutes

TIME PERIOD FOR TIME CRITICAL STEPS: N/A

APPROVED: [signature] for — **PRINCIPAL TRAINING SUPERVISOR**

[signature] for — **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission from the OS or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions);**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL TIME TO COMPLETE JPM:

JPM PERFORMED BY: **GRADE:** ☐ **SAT** ☐ **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: **DATE:**

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Administrative

TASK: Calculate A Quadrant Power Tilt Ratio

TASK NUMBER: 114 503 03 01

INITIAL CONDITIONS: Reactor Power has been maintained at 100% for the last 180 days

INITIATING CUE: The following detector voltages have been recorded from the Power Range NI Detectors:

	N41	N42	N43	N44
UPPER	254	263	252	245
LOWER	270	291	253	243

You have been directed to calculate the existing Quadrant Power Tilt Ratio.

Successful Completion Criteria:

1. All critical steps completed
2. All sequential steps completed in order
3. All time-critical steps completed within allotted time
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

Name: ____________________

Date: ____________________

System: ADMINISTRATIVE

Task: CALCULATE A QUADRANT POWER TILT RATIO

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
NOTE: Refer to the completed Attachments 1 & 2 for the standard.					
		Obtains procedure S2.OP-ST.NIS-0002(Q)	Evaluator provides or candidate obtains correct procedure. ***NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to preceding to the next step***		
	5.1.1	If one Power Range Channel is inoperable and reactor thermal power is >75% - - -	*CUE:* All 4 Power Range Channels operable.		
	5.1.2	Record the following data on Attachment 2: A. Date B. Time C. Reactor Power D. Reason for performing QPTR Calculation	Records data on Attachment.		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

Name: ____________________

Date: ____________________

System: ADMINISTRATIVE

Task: CALCULATE A QUADRANT POWER TILT RATIO

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.1.3	RECORD the following: NI Channels N-41, N-42, N-43 and N-44 Upper Detector current readings, (Power Range B, Detector A, 0-500 milli-amperes scale) NI Channels N-41, N-42, N-43 and N-44 Lower Detector current readings, (Power Range B, Detector B, 0-500 milli-amperes scale) The respective 100% NI Current Values for Channels N-41, N-42, N-43 and N-44 Detectors from S2.RE-RA.ZZ-0011, (RE Manual), Table 2	Transfers Upper Detector currents to Attachment 1 Transfers Lower Detector currents to Attachment 1 Locates and records 100% currents from S2.RE-RA.ZZ-0011, (RE Manual), Table 2 *NOTE:* Evaluator may provide Table 2.		
	5.1.4	Complete calculations	Completes calculations within accuracy of ±0.01. Rounding at the third significant digit is acceptable. Rounding may have minor impact on the calculations shown in the key.		

Name: ____________________
Date: ____________________

System: ADMINISTRATIVE

Task: CALCULATE A QUADRANT POWER TILT RATIO

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.1.5	Record the following on Attachment 2: Power Tilt for each Detector Maximum Power Tilt and applicable detector identification information Test results by initializing the SAT or UNSAT column IAW the stated Acceptance Criteria	Transfers Power Tilt data to Attachment 2 Correctly identifies maximum upper and maximum power tilts and records data. Determines N43 upper has a tilt of 1.0235 (>1.02<1.03)* and initials UNSAT*		
	5.1.6	DIRECT a second Operator to perform Independent Verification of calculations in Attachment 1.	Candidate requests second operator to perform Independent Verification of calculations in Attachment 1. **CUE:** The calculations of Attachment 1 have been verified.		
*	5.1.7	***SRO ONLY*** **IF** the Maximum Power Tilt for <u>any</u> detector exceeds 1.02, **THEN** REFER to Technical Specifications 3.2.4 for corrective actions	SRO determines TSAS 3.2.4.a Item 1 applies in the near-term: • Calculate QPTR once per hour until within its limit, or reduce thermal power to <50%		

Terminating Cue: RO-determines test to be SAT/UNSAT; **SRO**-determines TS applicability.

KEY

QPTR CALCULATION DATA

1.0 UPPER DETECTORS

Detector Current	100% NI Value	= Detector Ratio	Average Upper Detector Ratio	= Power Tilt (1)
N41T= 254	256.3	0.991	1.0005	0.991
N42T= 263	264.8	0.993		0.993
N43T= 252	246.2	1.024		1.0235
N44T= 245	246.6	0.994		0.994
Sum of Detector Ratios		= 4.002		
# of Operable Detectors		4		
Average Upper Detector Ratio		= 1.0005		
Independent Verification of calculation performed by:				

2.0 LOWER DETECTORS

Detector Current	100% NI Value	= Detector Ratio	Average Lower Detector Ratio	= Power Tilt (1)
N41B= 270	271.7	0.994	1.00085	0.993
N42B= 291	291.6	0.998		0.997
N43B= 253	249.4	1.0144		1.014
N44B= 243	243.8	0.997		0.996
Sum of Detector Ratios		= 4.0034		
# of Operable Detectors		4		
Average Lower Detector Ratio		=1.00085		
Independent Verification of calculation performed by:				

(1) Record Power Tilt to three (3) significant digits to the right of the decimal.

KEY

KEY

ATTACHMENT 2
(Page 1 of 1)

QPTR TEST DATA

Date:	Time:	Reactor Power: %

REASON FOR PERFORMING QPTR: (Check as applicable)

__X_ Unit in Mode 1 operating at > 50% thermal power.

___ Unit in Mode 1 operating at # 50% thermal power and verification that QPTR is within limits prior to exceeding 50% thermal power.

___ OHA E-38 or E-46 annunciated or is inoperable and thermal power is > 50%.

___ IAW LCO 3.3.1.1 Action 2c, One Power Range Channel is inoperable **AND** Trip setpoints are > 85% or thermal power is > 75%.

Upper Detector	Power Tilt (1)	Lower Detector	Power Tilt (1)
N41T	.991	N41B	.993
N42T	.993	N42B	.997
N43T	1.0235	N43B	1.014
N44T	.994	N44B	.996

Maximum Power Tilt (1)	Detector	Acceptance Criteria	Test Results	
			SAT	UNSAT
1.0235	N43 Upper	# 1.02 and (2)		X
1.014	N43 Lower		X	

(1) Carry forward the Power Tilt value on Attachment 1 with three significant digits to the right of the decimal.

(2) IAW Tech. Spec. 3.3.1.1, Action 2c and d, when applicable, the 3 channel QPTR is verified consistent with Reactor Engineering Flux Map to satisfy surveillance requirement 4.2.4.2.

KEY

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE
(To be provided to the candidate)

INITIAL CONDITIONS:

Reactor Power has been maintained at 100% for the last 180 days

INITIATING CUE:

The following detector voltages have been recorded from the Power Range NI Detectors:

	N41	N42	N43	N44
UPPER	254	263	252	245
LOWER	270	291	253	243

You have been directed to calculate the existing Quadrant Power Tilt Ratio.

ATTACHMENT 1
(Page 1 of 1)

TABLE 2
100% N.I. CURRENTS 0% AXIAL, RADIAL TILT

NOTE

1. The expiration date and time is the date and time by which the circuitry must be recalibrated with the new values. The expiration date is at most 14 days after the measurement date.

2. The previous values will remain in effect until the expiration date and time is reached OR I&C recalibrates the circuitry, whichever occurs first.

3. The new values will take effect as soon as I&C recalibrates the first NIS channel; the alarm must be declared inoperable. Refer to TS 4.2.4 for surveillance requirements. Ensure that all new values are used to perform the surveillance.

4. If the expiration date and time is reached prior to the circuitry recalibration , the alarm must be declared inoperable. Refer to TS 4.2.4 for surveillance requirements. Ensure that the newest values are used to perform the surveillance.

5. All values are in microamps.

Meas.	N41		N42		N43		N44		Expiration	
Date	Top	Bot	Top	Bot	Top	Bot	Top	Bot	Date	Time
BOC	202	206	210	227	202	197	193	192	9/19/97	0700
9/4/97	215.4	225.0	230.6	253.0	225.8	220.4	215.2	214.0	10/8/97	1753
9/24/97	206.1	238.6	220.1	269.2	212.0	231.8	202.7	223.0	N/A	N/A
9/24/97	213.8	230.1	228.4	259.6	219.9	223.5	210.3	215.1	12/31/97	1053
12/17/97	217.6	234.3	231.1	259.5	222.7	226.7	213.5	215.7	4/16/98	1604
4/2/98	222.9	239.8	237.2	263.9	226.9	234.0	221.2	220.2	5/13/98	1159
4/29/98	227.4	243.6	240.4	267.2	229.5	231.0	223.8	223.1	8/5/98	1338
7/22/98	237.9	253.5	249.9	275.7	236.9	237.4	233.3	230.2	10/26/98	1040
10/12/98	246.9	261.1	257.3	283.6	240.5	244.6	238.5	235.6	1/27/99	1250
1/13/99	256.3	271.7	264.8	291.6	246.2	249.4	246.6	243.8		

POWER DISTRIBUTION - QUADRANT POWER TILT RATIO

CONTROL COPY #
27

USE CATEGORY : I

REVISION SUMMARY

Biennial Review performed Yes ____ No _✓_

- Added new section 5.2 and Attachment 3 to allow use of the Plant Computer when performing QPTR calculations. The program is to be validated by Reactor Engineering. The calculation uses the 1 minute average vice the 5 second average because a buffer card was installed on the 1 minute program which eliminates momentary spikes from the calculation. Previously reviewed and approved in S1.OP-ST.NIS-0002(Q). **(R21411)**
- Step 5.1.3, changed detector readings from "milliamperes" to "microamperes." Previously reviewed and approved in S1.OP-ST.NIS-0002(Q) **(R18923)**
- The following changes incorporate operator comments and lessons learned. **(981014257)(R22062)**
    - Step 1.2 revised, and steps in Attachment 3 deleted, to address Technical Specification 3.3.1.1 applicability.
    - Step 3.4 added, to provide additional direction on section usage.
    - Step 5.2.1 added, and Note prior to Step 5.2.3.G deleted, to clearly specify when the section can not be performed.
    - Added "using Manual Calculation" as noted as an editorial enhancement.
- The following changes to this procedure contain only editorial enhancements as described in NC.NA-AP.ZZ-0001(Q):
    - Step 2.1 added to identify sections of this procedure that are <u>NOT</u> to be performed with "N/A".
    - Note prior to Step 5.1.3, changed "to the 0-0.5 milliamperes range" to "to the 0.5 milliamperes position."
    - References updated and single spaced.

IMPLEMENTATION REQUIREMENTS

Effective Date: Nov 9 1998

- DCP 2EC-3337, P-250 Plant Computer Replacement, 981014257 BPCA# 3 completion.

APPROVED: Preston Johnson
For Operations Manager

10/29/98
Date

POWER DISTRIBUTION - QUADRANT POWER TILT RATIO

TABLE OF CONTENTS

1.0 PURPOSE

1.1 To provide the instructions necessary to verify that the Quadrant Power Tilt Ratio (QPTR) is within the limit in order to satisfy the following Technical Specifications: **[C0265]**

1.1.1 4.2.4.1.a, by performance of a QPTR Calculation once per 7 days when the alarm is OPERABLE.

1.1.2 4.2.4.1.b, by performance of a QPTR Calculation at least once per 12 hours during steady state operation when the alarm is inoperable.

1.1.3 4.2.4.2, by using the movable incore detectors to determine QTPR at least once per 12 hours when one Power Range Channel is inoperable and Thermal Power >75% of Rated Thermal Power.

These requirements are applicable in Mode 1 above 50% of Rated Thermal Power.

1.2 To provide instruction to fulfill the requirements of Technical Specification 3.3.1.1, Table 3.3-1, Actions 2.c and d. These requirements are applicable in Mode 1 and are invoked when one Power Range Channel is inoperable and Thermal Power >75% of Rated Thermal Power or trip setpoint is >85% of Rated Thermal Power.

2.0 PREREQUISITES

___ 2.1 **IDENTIFY** sections of this procedure that are NOT to be performed with "N/A".

3.0 PRECAUTIONS AND LIMITATIONS

___ 3.1 Procedure Use and adherence policy as found in NC.NA-AP.ZZ-0001(Q), Nuclear Procedure System, is applicable to this procedure.

___ 3.2 Steps identified with a dollar sign ($) are those items required to meet Technical Specification acceptance criteria. Such steps, if not satisfactorily completed, may have reportability requirements and are to be brought to immediate attention of the OS/CRS.

___ 3.3 In a situation where one Power Range Channel is inoperable and thermal power is >75%, Reactor Engineering shall perform a flux map to confirm the QPTR once every 12 hours, IAW Technical Specification 4.2.4.2 in addition to the 3 channel QPTR required by 3.3.1.1, Table 3.3-1, Actions 2.c and d.

___ 3.4 Either Step 5.1 or Step 5.2 can be used to satisfy this surveillance. However, Section 5.2, QPTR Calculation using the Plant Computer, can not be used if the 1-MIN QPTR quality is not "Good", during the installation of new currents into the Power Range Channels, or if a Power Range Channel is inoperable.

4.0 EQUIPMENT/MATERIAL REQUIRED

4.1 Additional Tools and Equipment:

- Calculator

5.0 **PROCEDURE**

5.1 QPTR Calculation using Manual Calculation

___ 5.1.1 IF one Power Range Channel is inoperable
AND reactor thermal power is >75%,
THEN **NOTIFY** Reactor Engineering to perform a flux map to calculate QPTR in addition to the requirements of this procedure.

___ 5.1.2 **RECORD** the following data on Attachment 2:

- Date
- Time
- Reactor Power
- Reason for performing QPTR Calculation

NOTE

The Upper and Lower detectors selector switch should be positioned to the 0.5 milliamperes position when obtaining readings.

___ 5.1.3 **RECORD** the following on Attachment 1:

- ___ NI Channels N-41, N-42, N-43 and N-44 Upper Detector current readings, (Power Range B, Detector A, 0-500 microamperes scale).
- ___ NI Channels N-41, N-42, N-43 and N-44 Lower Detector current readings, (Power Range B, Detector B, 0-500 microamperes scale).
- ___ Respective 100% NI Current Values for Channels N-41, N-42, N-43 and N-44 Detectors, from S2.RE-RA.ZZ-0011(Q), (Reactor Engineering Manual), Table 2.

___ 5.1.4 **COMPLETE** Attachment 1 calculations.

___ 5.1.5 **RECORD** the following on Attachment 2:

___ A. "Power Tilt" for each detector.

___ B. "Maximum Power Tilt" and applicable detector identification information.

___ $ C. Test Results by initialing SAT or UNSAT column IAW stated Acceptance Criteria.

___ 5.1.6 **DIRECT** a second Operator to perform Independent Verification of calculations in Attachment 1. **[C0284]**

___ 5.1.7 IF the Maximum Power Tilt for any detector exceeds 1.02,
THEN **REFER** to Technical Specifications 3.2.4 for corrective actions.

5.2 QPTR Calculation using the Plant Computer

___ 5.2.1 IF any of the below conditions are true, THEN Section 5.2 shall NOT be used to determine the QPTR and Section 5.1 must be performed.

- A 1-MIN QPTR has a quality other than "Good". (Examples of invalid qualities are "Good EC", "Bad", "Fair", and "Poor")
- New currents are being installed into the Power Range Channels.
- A Power Range Channel is INOPERABLE.

___ 5.2.2 **RECORD** the following data on Attachment 3:

- Date
- Time
- Reactor Power
- Reason for performing QPTR Calculation

___ 5.2.3 **ACCESS** the 1 min QPTR data from the Plant Computer as follows:

___ A. From the Process Diagram icon in the Application Program, **SELECT** RADIAL FLUX TILTS, by placing the cursor on the "M" at the end of the appropriate bar and depressing the left hand mouse button.

___ B. **SELECT** FT0302 - NIS CHANNEL FLUX AND QPTR by placing the cursor on the applicable bar and depressing the left hand mouse button.

___ C. **UPDATE** the screen by placing the cursor on the UPDATE block in the upper right hand corner and depressing the left hand mouse button.

NOTE

If the RFT PROGRAM RUNNING INDICATOR does NOT show "Running", then the Plant Computer QPTR calculation is invalid, and a manual calculation must be performed.

___ D. **VERIFY** that RFT PROGRAM RUNNING INDICATOR shows "Running".

(step continued on next page)

5.2.3 (continued)

___ E. **GENERATE** a screen copy of the results.

___ F. **RECORD** 1-MIN QPTR values on Attachment 3.

___ G. Using the right hand mouse button for "information", **VERIFY** that all 1-MIN QPTR points have "Good" quality.

___ 5.2.4 **RECORD** the following on Attachment 3:

___ A. "Maximum Power Tilt" and applicable detector identification information.

___ $ B. Test Results by initialing SAT or UNSAT column IAW stated Acceptance Criteria.

___ 5.2.5 **ATTACH** the screen copy of the results to this procedure.

___ 5.2.6 IF the Maximum Power Tilt for any detector exceeds 1.02, THEN **REFER** to Technical Specifications 3.2.4 for corrective actions.

5.3 Acceptance Criteria

___ $ 5.3.1 This surveillance is satisfactory when Attachment 2 or 3 is completed with the Test Data meeting the Acceptance Criteria stated.

OR

___ 5.3.2 This surveillance is unsatisfactory.

___ A. **INITIATE** Action Request(s) to correct the unsatisfactory condition(s).

___ B. **RECORD** the Action Request number(s) AND the reason for unsatisfactory completion on Attachment 4 in the Comments Section.

___ C. **NOTIFY** Reactor Engineering.

5.4 Review and Completion

___ 5.4.1 **COMPLETE** Attachment 4, Sections 1.0 and 2.0, AND **FORWARD** this procedure to OS/CRS for review and approval.

5.4.2 CRS **PERFORM** the following:

___ A. **REVIEW** this procedure with Attachments 1 through 4 for completeness and accuracy.

___ B. **COMPLETE** Attachment 4, Section 3.0.

___ C. **FORWARD** this procedure to the Shift Technical Advisor (STA) for review.

5.4.3 STA **PERFORM** the following:

___ A. **REVIEW** this procedure with Attachments 1 through 4 for completeness and accuracy.

___ B. **COMPLETE** Attachment 4, Section 3.0.

___ C. **FORWARD** this procedure to OS/CRS for review and approval.

5.4.4 OS/CRS **PERFORM** the following:

___ A. **REVIEW** this procedure with Attachments 1 through 4 for completeness and accuracy.

___ B. **COMPLETE** Attachment 4, Section 3.0.

___ C. **FORWARD** completed procedure to Operations Staff.

END OF PROCEDURE SECTION

6.0 RECORDS

6.1 Retain following IAW NC.NA-AP.ZZ-0011(Q), Records Management Program:

Attachments 1-4

7.0 REFERENCES

7.1 Updated Final Safety Analysis Report:

7.1.1 4.3.1, Design Bases
7.1.2 7.7.3.6, Incore Instrumentation
7.1.3 Section 15.1.2.3, Power Distribution

7.2 Cross-References:

7.2.1 Technical Specifications Unit 2:

A. 3.2.4, Quadrant Power Tilt Ratio
B. 4.2.4.1.a, Power Distribution Surveillance Requirement
C. 4.2.4.1.b, Power Distribution Surveillance Requirement
D. 4.2.4.2, Power Distribution Surveillance Requirement
E. 3.3.1.1, Reactor Trip System Instrumentation

7.2.2 Procedures:

A. NC.NA-AP.ZZ-0001(Q), Nuclear Procedure System
B. NC.NA-AP.ZZ-0011(Q), Records Management Program
C. S2.RE-RA.ZZ-0011(Q), Reactor Engineering Manual, Table 2

7.3 Commitments:

7.3.1 C0265, NSO LER 311/89-015-00
7.3.2 C0283, NRC VIOL 311/87-018-01
7.3.3 C0284, NSO LER 272/90-014-00

7.4 Other:

7.4.1 DCP 2EC-3337, P-250 Plant Computer Replacement
7.4.2 BP981014257, Salem Plant Computer QPTR Usage During Calibrations

ATTACHMENT 1
(Page 1 of 1)

QPTR CALCULATION DATA USING MANUAL CALCULATION

1.0 UPPER DETECTORS

Detector Current (microamperes)	÷ 100% NI Value	= Detector Ratio	÷ Average Upper Detector Ratio	= Power Tilt (1)
N41T=				
N42T=				
N43T=			______	
N44T=				
Sum of Detector Ratios		= ______		
# of Operable Detectors		÷ ______		
Average Upper Detector Ratio		= ______		
Independent Verification of calculation performed by:				

.0 LOWER DETECTORS

Detector Current (microamperes)	÷ 100% NI Value	= Detector Ratio	÷ Average Lower Detector Ratio	= Power Tilt (1)
N41B=				
N42B=				
N43B=			______	
N44B=				
Sum of Detector Ratios		= ______		
# of Operable Detectors		÷ ______		
Average Lower Detector Ratio		= ______		
Independent Verification of calculation performed by:				

(1) Record Power Tilt to three significant digits to the right of the decimal.

ATTACHMENT 2
(Page 1 of 1)

QPTR TEST DATA USING MANUAL CALCULATION

Date:	Time:	Reactor Power: %

REASON FOR PERFORMING QPTR: (Check as applicable)

___ Unit in Mode 1 operating at >50% thermal power.

___ Unit in Mode 1 operating at ≤50% thermal power and verification that QPTR is within limits prior to exceeding 50% thermal power.

___ OHA E-38 or E-46 annunciated or is inoperable and thermal power is >50%.

___ IAW LCO 3.3.1.1 Action 2c, One Power Range Channel is inoperable AND Trip setpoints are >85% or thermal power is >75%.

Upper Detector	Power Tilt (1)	Lower Detector	Power Tilt (1)
N41T		N41B	
N42T		N42B	
N43T		N43B	
N44T		N44B	

Maximum Power Tilt (1)	Detector	Acceptance Criteria	Test Results	
			SAT	UNSAT
	________ Upper	≤1.02 and (2)		
	________ Lower			

(1) Carry forward the Power Tilt value on Attachment 1 with three significant digits to the right of the decimal.

(2) IAW Tech. Spec. 3.3.1.1, Actions 2c and d, when applicable, the 3 channel QPTR is verified consistent with Reactor Engineering Flux Map to satisfy surveillance requirement 4.2.4.2.

ATTACHMENT 3
(Page 1 of 1)

QPTR TEST DATA USING THE PLANT COMPUTER

Date:	Time:	Reactor Power: %

REASON FOR PERFORMING QPTR: (Check as applicable)

___ Unit in Mode 1 operating at >50% thermal power.

___ Unit in Mode 1 operating at ≤50% thermal power and verification that QPTR is within limits prior to exceeding 50% thermal power.

___ OHA E-38 or E-46 annunciated or is inoperable and thermal power is >50%.

Detector	Plant Computer Points	1-MIN QPTR (1)
CHAN 41 UPPER	YFT0114N	
CHAN 41 LOWER	YFT0124N	
CHAN 42 UPPER	YFT0112N	
CHAN 42 LOWER	YFT0122N	
CHAN 43 UPPER	YFT0111N	
CHAN 43 LOWER	YFT0121N	
CHAN 44 UPPER	YFT0113N	
CHAN 44 LOWER	YFT0123N	

Maximum Power Tilt (1)	Detector	Acceptance Criteria	Test Results	
			SAT	UNSAT
	________ Upper	≤1.02		
	________ Lower			

(1) **RECORD** 1-MIN QPTR with three significant digits to the right of the decimal.

ATTACHMENT 4
(Page 1 of 2)

COMPLETION SIGN-OFF SHEET

1.0 COMMENTS:

(Include test deficiencies and corrective actions.)

ATTACHMENT 4
(Page 2 of 2)

COMPLETION SIGN-OFF SHEET

2.0 SIGNATURES:

Print	Initials	Signature	Date

INDEPENDENT VERIFICATION:

3.0 STA REVIEW AND OS/CRS FINAL REVIEW AND APPROVAL:

This procedure with Attachments 1-4 is reviewed for completeness and accuracy.
All deficiencies, including corrective actions, are clearly recorded in COMMENTS Section above.
[C0283]

Signature:______________________________ Date:______________
CRS

Signature:______________________________ Date:______________
STA

Signature:______________________________ Date:______________
OS/CRS

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: SALEM

SYSTEM: Administrative

TASK: Prepare a Temporary Modification to a Procedure

TASK NUMBER:

JPM NUMBER: WD-ROA1.2

APPLICABILITY:

EO [ ] **RO** [X] **SRO** [X]

K/A NUMBER: 2.1.1

IMPORTANCE FACTOR: 3.7 / 3.8
RO **SRO**

EVALUATION SETTING/METHOD: CLASSROOM

REFERENCES: NC.NA-AP.ZZ0001(Q)

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 15 minutes

TIME PERIOD FOR TIME CRITICAL STEPS: N/A

APPROVED: J C Lloyd for / Edward Galley

PRINCIPAL TRAINING SUPERVISOR — for **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission from the OS or Unit CRSS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions);**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL TIME TO COMPLETE JPM:

JPM PERFORMED BY: **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: **DATE:**

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Administrative

TASK: Prepare a Temporary Modification to a Procedure

TASK NUMBER:

INITIAL CONDITIONS: During the performance of S2.OP-ST.CS-0001, In-service Testing-21 Containment Spray Pump, 21CS11 was determined to be stuck in the full open position. Management has made the decision to make an OTSC to the procedure to allow the test to be completed.

INITIATING CUE:

The CRS directs you to initiate an OTSC to change S2.OP-ST.CS-0001:

- Step 5.1.21 to "Verify 22CS11 is CLOSED".
- Attachment 4, verification of 21CS11 to 22CS11

Following the performance of the test, a Tagout will be hung to affect repairs to 21CS11.

Successful Completion Criteria:

1. All critical steps completed
2. All sequential steps completed in order
3. All time-critical steps completed within allotted time
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).

Name: ______________
Date: ______________

System: ADMINISTRATIVE

Task: PREPARE A TEMPORARY MODIFICATION TO A PROCEDURE

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		Obtain NC.NA-AP.ZZ-0001(Q) *Note: NAP-1, Form 4 Attached to JPM*	Procedure and/or applicable sections may be provided by the Evaluator		
	A	Discuss the proposed OTSC with the Job Supervisor. If there is a change of intent involved, an OTSC shall not be used.	*CUE:* As Job Supervisor, inform candidate that no intent change is involved and no TSAS will apply to the change.		
	B	Obtain the latest revision of the procedure to serve as the "OTSC-Original" including copies of any outstanding OTSCs impacting the proposed change.	*CUE:* Provide candidate with a copy of the procedure being revised. There are no other OTSC's impacting the proposed change.		
*	C	Assign a OTSC #. • Use current revision number followed by a sequential letter. • If a temporary OTSC, complete the OTSC# with T and identify the expected duration. List procedure pages changed on Page 1 of Form-4 • Complete Page 1 up to and including Initiator signature. • Attach the entire Form-4 to the "OTSC- Original"	*CUE:* Inform candidate that the change is temporary and will only be applicable this test. • The candidate assigns the number OTSC# 10A-T. • The candidate lists procedure pages 6&22 as changed pages. • The candidate completes and signs Form 4.		

Name: ____________
Date: ____________

System: ADMINISTRATIVE

Task: PREPARE A TEMPORARY MODIFICATION TO A PROCEDURE

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	D	Mark-up the "OTSC-Original" with the required changes. Identify changes by placing revision bars and OTSC change number in the right margin. Ensure previously approved OTSCs for the current revision are not adversely affected.	The candidate changes Step 5.1.21 to read: • "VERIFY CLOSED 22CS11, 22 CS Pump Flow Test Stop Valve. • Places a rev bar and the OTSC # in the right hand margin, adjacent to Step 5.1.21. The candidate changes the Attachment 4 verification of 21CS11 to read: • "22CS11, 22 CS Pump Flow Test Stop Valve, X". • Places a rev bar and the OTSC # in the right hand margin, adjacent to the 22CS11 verification line.		
	E	Submit the OTSC and Form 4 to the CRS.	The candidate submits the OTSC and Form 4 to the Evaluator.		

Terminating Cue: The CRS acknowledges receipt of the OTSC.

FORM-4
(Page 1 of 2)

ON-THE-SPOT-CHANGE FORM

PROCEDURE NO: ______________________ OTSC # ____________

PROCEDURE TITLE: ______________________ USE CATEGORY: ________

TEMPORARY OTSC: YES ☐ NO ☐ Est. Duration: ____________

DESCRIPTION OF CHANGE:

REASON FOR CHANGE:

LIST PROCEDURE PAGES CHANGED:

Determine if the OTSC changes the intent of the procedure, refer to NAP-1 Attachment 6, Change of Intent Guidelines. Are any of the statements in Attachment 6 true or does the OTSC in any way change the intent of the procedure? YES ☐ NO ☐

If the above answer is "Yes", STOP! An OTSC shall not be processed.

INITIATOR: ______________________ DATE: __________

APPROVED: ______________________ DATE: __________
Job Supervisor/Department Management

APPROVED: ______________________ DATE: __________
OS/CRS

FORM-4
(Page 2 of 2)

ON-THE-SPOT-CHANGE FORM

PROCEDURE NO: ______________________________ OTSC # __________

INITIATOR:

1. Give a copy of the OTSC Package to the TDR by end of shift.
2. Initiate a BP type AR, Action Request Code OTSC, to the Sponsor Organization by the next working day to evaluate the OTSC. Action Request No: ______________
3. Give the OTSC Package to the Sponsor Organization by the next working day. **[CD-427B]**
4. Include a copy of completed procedure with WO package, if the procedure was part of a WO.

COMPLETED BY: ______________________ __________ __________

Initiator Extension Date

OTSC POST EVALUATION

5. Did the use of the OTSC result in a plant system, structure or component being in a condition which:

		YES	NO
A.	Deviates from acceptance criteria extracted or calculated from approved design or licensing documents?	☐	☐
B.	Deviates from operating conditions or methods required by approved design or licensing documents?	☐	☐
C.	Is prohibited by the Technical Specifications?	☐	☐

6. If there is a **"Yes"** to 5.A, B or C, notify the OS/CRS and initiate an Action Request in accordance with NAP-0. Action Request No: ______________
7. Ensure a 10CFR50.59 Applicability Review or Safety Evaluation is performed and attached.
8. SQR Review Completed: ______________________ __________

SQR Date

SQR Qualification Expires: __________

Date

9. Approval: ______________________ __________

Department Management Date

TEAR OFF SHEET FOR CANDIDATE

INITIAL CONDITIONS: During the performance of S2.OP-ST.CS-0001, In-service Testing-21 Containment Spray Pump, 21CS11 was determined to be stuck in the full open position. Management has made the decision to make an OTSC to the procedure to allow the test to be completed.

INITIATING CUE: The CRS directs you to initiate an OTSC to change S2.OP-ST.CS-0001:

- Step 5.1.21 to "Verify 22CS11 is CLOSED".
- Attachment 4, verification of 21CS11 to 22CS11

Following the performance of the test, a Tagout will be hung to affect repairs to 21CS11.

INSERVICE TESTING - 21 CONTAINMENT SPRAY PUMP

CONTROL COPY #
26

USE CATEGORY : I

REVISION SUMMARY Biennial Review Yes ___ No ✓

- Revised Steps 5.4.3.B.2 and 5.4.3.C.2 to indicate changing test frequency IAW "NC.NA-AP.ZZ-0012(Q), Technical Specifications Surveillance Program **AND** NC.NA-AP.ZZ-0070(Q), Inservice Testing Program" versus "SC.OP-ST.ZZ-0002(Q), In Service Testing Pumps and Valves Test Frequency Change". This editorial change was incorporated due to changes in NAP-70 concerning the method of performing test frequency changes, which will result in the deletion of SC.OP-ST.ZZ-0002(Q). **[R21619]**

- Revised Reference Section 7.0 to reflect appropriate required references. This editorial change was incorporated to ensure applicable references are indicated.

- Revised procedure to indicate "IST Implementation Engineer" versus "IST Program Manager". This editorial change was incorporated to reflect title changes in NC.NA-AP.ZZ-0070(Q), Inservice Testing Program". **[R21619]**

IMPLEMENTATION REQUIREMENTS Effective Date 7/29/98

None

APPROVED: [signature] for Operations Manager July 28, 1998 Date

INSERVICE TESTING - 21 CONTAINMENT SPRAY PUMP

TABLE OF CONTENTS

ATTACHMENTS

1.0 **PURPOSE**

1.1 Provides instructions necessary to perform Inservice Inspection and Testing of the 21 Containment Spray Pump and Eductor Check Valve 21CS21 IAW Technical Specification 4.0.5. This requirement is applicable in Modes 1-4. **[C0265]**

1.2 This test also satisfies the requirements of Technical Specification 4.6.2.1.b by verifying, that on recirculation flow, 21 Containment Spray Pump develops a differential pressure of greater than or equal to 204 psig when tested pursuant to Technical Specification 4.0.5. This requirement is applicable in Modes 1-4. **[C0265]**

1.3 Performance of this procedure is required at least once per 92 days in Modes 1-4, prior to entry into Mode 4 if NOT previously performed in the last 92 days, or as otherwise specified in post-maintenance operational retest requirements.

2.0 **PREREQUISITES**

___ 2.1 **REVIEW** Components "Off Normal and Off-Normal Tagged" list(s) for the system and support system(s) associated with the evolution to be performed in this procedure.

___ 2.2 Applicable Work Order number(s) and Reason for Test are recorded on Attachment 1, Section 1.0.

___ 2.3 IF this surveillance is being performed to verify post-maintenance operability OR to establish new baseline data, THEN the IST Implementation Engineer is notified. **[C0583]**

___ 2.4 IF this surveillance is being performed as a regular scheduled surveillance OR to verify post-maintenance operability, THEN a copy of S2.RA-ST.CS-0001(Q), Inservice Testing - 21 Containment Spray Pump Acceptance Criteria is attached.

___ 2.5 Calibration data for the instruments and test equipment listed in Attachment 1, Section 2.0 is obtained. **[C0289]**

___ 2.6 The temporary test equipment as specified in Attachment 1, Section 3.0 is installed, labeled and aligned for service by Maintenance Controls.

___ 2.7 Flushing of the CS Eductor Piping IAW Attachment 5 is completed.

3.0 PRECAUTIONS AND LIMITATIONS

___ 3.1 Procedure Use and adherence policy as found in NC.NA-AP.ZZ-0001(Q), Nuclear Procedure System, is applicable to this procedure.

___ 3.2 Steps identified with a dollar sign ($) are those items required to meet Technical Specification acceptance criteria. Such steps, if not satisfactorily completed, may have reportability requirements and should be brought to the immediate attention of the OS/CRS.

___ 3.3 IF a valid Containment Spray Actuation occurs during performance of this procedure, THEN all valves should be IMMEDIATELY aligned to support the actuation.

___ 3.4 The 21 CS Pump requires a minimum RWST level indication of >0 ft to ensure adequate NPSH.

___ 3.5 IF this test is performed when the RWST is emptied to support Refueling Activities, THEN the respective data should NOT be used to establish new baseline data.

___ IST 3.6 IF substitution of Measuring and Test Equipment (M&TE) is required, THEN the IST Implementation Engineer has specified range, accuracy and documented substitution in the Comments Section of Attachment 6.

___ 3.7 When the Reactor is in Mode 1-4, Section 5.1 of this procedure is to be performed (Section 5.2 should be indicated as N/A).

___ 3.8 When the Reactor is in Mode 5, 6 or Defueled, Section 5.2 of this procedure is to be performed (Section 5.1 should be indicated as N/A).

___ 3.9 During operational testing of the 21 Containment Spray Pump, portions of the system subjected to pump pressure SHALL be inspected for leakage. This inspection includes, but is not limited to, pump seals, valve packing, flanged joints, and piping (Reference UFSAR Section 6.2.2.1.4 and PR #960716112).

___ 3.10 An RWST level of ≥40.5 ft and ≤41.9 ft is required to satisfy the OPEN and CLOSED Inservice Testing requirements of Eductor Check Valve 21CS21.

___ 3.11 The 21 Containment Spray Pump is to be stopped should motor winding temperature exceed 266°F.

4.0 EQUIPMENT/MATERIAL REQUIRED

4.1 M&TE:

- CSI 2110 Machine Analyzer
- CSI 2110 Pickup Probe
- Pressure Gauge, Heise CM or equivalent, 0-60 psig, Accuracy ±2.0% of full scale or better
- Pressure Gauge, Heise CM or equivalent, 0-300 psig or 0-500 psig, Accuracy ±2.0% of full scale or better

4.2 Additional Tools and Equipment:

- JA Master Key

4.3 Procedure(s):

- Copy of S2.RA-ST.CS-0001(Q), Inservice Testing - 21 Containment Spray Pump Acceptance Criteria, if applicable

5.0 **PROCEDURE**

5.1 IST of 21 CS Pump and Eductor Check Valve 21CS21 (Modes 1-4)

___ 5.1.1 **ENSURE** 21 CS Pump oil level ≥1/4 full.

___ 5.1.2 **ENSURE** the following valves are CLOSED:

- ___ ♦ 21CS2, PUMP DISCH
- ___ ♦ 2CS16, TANK DISCHARGE
- ___ ♦ 2CS17, TANK DISCHARGE

___ 5.1.3 **ENTER** Technical Specification Action Statements 3.6.2.1 and 3.6.2.2.

___ 5.1.4 **PLACE** 2CS14, TANK DISCHARGE, in the VALVE OPERABLE position at 2RP4 Panel.

___ 5.1.5 **CLOSE** 2CS14, TANK DISCHARGE.

___ 5.1.6 **OPEN** 21CS11, 21 CS PUMP FLOW TEST STOP VALVE.

___ 5.1.7 **OPEN** 2CS35, CS PUMP FLOW TEST STOP VALVE.

___ 5.1.8 **PERFORM** CLOSED check valve testing of 21CS21, as follows:

___ A. **UNLOCK** and **CLOSE** 22CS20, 22 CS EDUCTOR SUP VALVE.

___ B. **OPEN** 2CS61, CS SPRAY ADD TK DISCH HDR SAMP.

___ $ C. **RECORD** 21CS21 CLOSED "Check Valve Data" and "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 3.

___ D. **CLOSE** 2CS61, CS SPRAY ADD TK DISCH HDR SAMP.

___ E. **OPEN** and **LOCK** 22CS20, 22 CS EDUCTOR SUP VALVE.

___ 5.1.9 **UNLOCK** and **CLOSE** 21CS20, 21 CS EDUCTOR SUP VALVE.

___ 5.1.10 **RECORD** the "Suct. Press. Pump STOPPED" in Attachment 2, Section 4.0.

___ 5.1.11 **CLOSE** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

___ 5.1.12 **START** 21 CS Pump.

___ 5.1.13 **THROTTLE** 2CS35 UNTIL flow rate is set at 300 (295-305) gpm on 2FI929.

___ 5.1.14 Slowly **OPEN** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

NOTE

After pump conditions are as stable as the system permits, 21 Containment Spray Pump is required to be operated for at least 2 minutes prior to acquiring "Vibration Readings" and "Pump Performance Data".

___ 5.1.15 When 21 CS Pump has operated for >2 minutes at stable conditions, **RECORD** the "Vibration Readings" and "Pump Performance Data" on Attachment 2, Sections 2.0, 3.0, and 4.0.

___ 5.1.16 **PERFORM** a visual leakage inspection of the 21 Containment Spray Pump, and portions of the system subjected to pump pressure.

___ 5.1.17 **RECORD** 21 CS Pump Leakage "Inspection Results" by initialing the NO LEAKAGE or LEAKAGE column using the Leakage Criteria specified in Attachment 2, Section 5.0.

___ 5.1.18 **OPEN** and **LOCK** 21CS20, 21 CS EDUCTOR SUP VALVE.

___ 5.1.19 **PERFORM** OPEN check valve testing of 21CS21, as follows:

___ A. **UNLOCK** and **OPEN** 2CS31, RWST TO EDUCTORS STOP VALVE.

___ $ B. **RECORD** 21CS21 OPEN "Check Valve Data" and "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 3.

___ C. **CLOSE** and **LOCK** 2CS31, RWST TO EDUCTORS STOP VALVE.

___ 5.1.20 **STOP** 21 CS Pump.

___ 5.1.21 **CLOSE** 21CS11, 21 CS PUMP FLOW TEST STOP VALVE.

___ 5.1.22 **CLOSE** 2CS35, CS PUMP FLOW TEST STOP VALVE.

___ 5.1.23 **CLOSE** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

___ 5.1.24 **OPEN** 2CS14, TANK DISCHARGE.

___ 5.1.25 **PLACE** 2CS14, TANK DISCHARGE in the LOCKED OUT position at 2RP4 Panel.

NOTE

Cycling 21CS2 ensures that the valve is NOT hydraulically locked following pump operation. (NRC GL 95-07) [C0620]

___ 5.1.26 **PERFORM** the following to cycle 21CS2: **[C0620]**

___ A. **OPEN** 21CS2, PUMP DISCH.

___ B. **CLOSE** 21CS2, PUMP DISCH.

___ 5.1.27 Direct a second Operator to **PERFORM** Independent Verification of the following:

___ ♦ Calculations performed in Attachment 2. **[C0284]**

___ ♦ Valve positions in Attachment 4. **[C0290]**

___ $ 5.1.28 IF this surveillance is being performed as a regular scheduled surveillance OR to verify post-maintenance operability, THEN **RECORD** the "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 2, Sections 3.0 and 4.0.

___ 5.1.29 IF this surveillance is being performed to establish new baseline data, THEN IST Implementation Engineer **PERFORM** the following:

___ IST A. **EVALUATE** the data AND **DETERMINE** if the specified components meet minimum design requirements.

___ $ IST B. **RECORD** "Test Results" by initialing SAT or UNSAT column using the Acceptance Criteria in Attachment 2, Sections 3.0 and 4.0.

___ 5.1.30 **EVALUATE** Technical Specification Action Statements 3.6.2.1 and 3.6.2.2, for continued applicability.

5.2 IST of 21 CS Pump and Eductor Check Valve 21CS21 (Modes 5, 6 or Defueled)

___ 5.2.1 **ENSURE** 21 CS Pump oil level ≥1/4 full.

___ 5.2.2 **ENSURE** the following valves are CLOSED:

- ___ ♦ 21CS2, PUMP DISCH
- ___ ♦ 2CS14, TANK DISCHARGE
- ___ ♦ 2CS16, TANK DISCHARGE
- ___ ♦ 2CS17, TANK DISCHARGE

___ 5.2.3 **OPEN** 21CS11, 21 CS PUMP FLOW TEST STOP VALVE.

___ 5.2.4 **OPEN** 2CS35, CS PUMP FLOW TEST STOP VALVE.

___ 5.2.5 **PERFORM** CLOSED check valve testing of 21CS21, as follows:

___ A. **ENSURE** 22CS20, 22 CS EDUCTOR SUP VALVE closed.

___ B. **UNLOCK** and **OPEN** 21CS20, 21 CS EDUCTOR SUP VALVE.

___ C. **OPEN** 2CS61, CS SPRAY ADD TK DISCH HDR SAMP.

___ $ D. **RECORD** 21CS21 CLOSED "Check Valve Data" and "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 3.

___ E. **CLOSE** 2CS61, CS SPRAY ADD TK DISCH HDR SAMP.

___ F. **CLOSE** 21CS20, 21 CS EDUCTOR SUP VALVE.

___ 5.2.6 **RECORD** the "Suct. Press. Pump STOPPED" in Attachment 2, Section 4.0.

___ 5.2.7 **CLOSE** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

___ 5.2.8 **START** 21 CS Pump.

___ 5.2.9 **THROTTLE** 2CS35 UNTIL flow rate is set at 300 (295-305) gpm on 2FI929.

___ 5.2.10 Slowly **OPEN** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

NOTE

After pump conditions are as stable as the system permits, 21 Containment Spray Pump is required to be operated for at least 2 minutes prior to acquiring "Vibration Readings" and "Pump Performance Data".

___ 5.2.11 When 21 CS Pump has operated for >2 minutes at stable conditions, **RECORD** the "Vibration Readings" and "Pump Performance Data" on Attachment 2, Sections 2.0, 3.0, and 4.0.

___ 5.2.12 **PERFORM** OPEN check valve testing of 21CS21, as follows:

___ A. **OPEN** 21CS20, 21 CS EDUCTOR SUP VALVE.

___ B. **UNLOCK** and OPEN 2CS31, RWST TO EDUCTORS STOP VALVE.

___ C. **RECORD** 21CS21 OPEN "Check Valve Data" and "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 3.

$

___ D. **CLOSE** and **LOCK** 2CS31, RWST TO EDUCTORS STOP VALVE.

___ E. **CLOSE** and **LOCK** 21CS20, 21 CS EDUCTOR SUP VALVE.

___ 5.2.13 **PERFORM** a visual leakage inspection of the 21 Containment Spray Pump, and portions of the system subjected to pump pressure.

___ 5.2.14 **RECORD** 21 CS Pump Leakage "Inspection Results" by initialing the NO LEAKAGE or LEAKAGE column using the Leakage Criteria specified in Attachment 2, Section 5.0.

___ 5.2.15 **STOP** 21 CS Pump.

___ 5.2.16 **CLOSE** 21CS11, 21 CS PUMP FLOW TEST STOP VALVE.

___ 5.2.17 **CLOSE** 2CS35, CS PUMP FLOW TEST STOP VALVE.

___ 5.2.18 **CLOSE** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

___ 5.2.19 C/T 21 CS Pump.

NOTE

Cycling 21CS2 ensures that the valve is NOT hydraulically locked following pump operation. (NRC GL 95-07) [C0620]

___ 5.2.20 **PERFORM** the following to cycle 21CS2: **[C0620]**

___ A. **OPEN** 21CS2, PUMP DISCH.

___ B. **CLOSE** 21CS2, PUMP DISCH.

___ 5.2.21 Direct a second Operator to **PERFORM** Independent Verification of the following:

___ ♦ Calculations performed in Attachment 2. **[C0284]**

___ ♦ Valve positions in Attachment 4. **[C0290]**

___ $ 5.2.22 IF this surveillance is being performed as a regular scheduled surveillance OR to verify post-maintenance operability, THEN **RECORD** the "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 2, Sections 3.0 and 4.0.

___ 5.2.23 IF this surveillance is being performed to establish new baseline data, THEN IST Implementation Engineer **PERFORM** the following:

___ IST A. **EVALUATE** the data AND **DETERMINE** if the specified components meet minimum design requirements.

___ $ IST B. **RECORD** "Test Results" by initialing SAT or UNSAT column using the Acceptance Criteria in Attachment 2, Sections 3.0 and 4.0.

5.3 Acceptance Criteria

___ $ 5.3.1 This surveillance is satisfactory when Attachments 2 and 3 are completed with equipment listed meeting the Acceptance Criteria stated in the attachment.

OR

___ 5.3.2 This surveillance is unsatisfactory.

___ A. **INITIATE** Action Request(s) to correct unsatisfactory conditions(s).

___ B. **RECORD** Action Request number(s), and reason for unsatisfactory completion on Attachment 6 in the Comments Section.

5.4 Completion and Review

___ 5.4.1 IF testing is complete,
THEN Direct Maintenance Controls to **REMOVE** temporary test equipment AND **INITIAL and DATE** the "Removal" in Attachment 1, Section 3.0.

___ 5.4.2 **COMPLETE** Attachment 6, Sections 1.0 and 2.0, AND **FORWARD** this procedure to the CRS for review.

___ 5.4.3 CRS **PERFORM** the following:

___ A. **REVIEW** this procedure with Attachments 1-6 for completeness and accuracy.

___ B. IF ALL pump Acceptance Criteria parameters are within the ACCEPTABLE RANGE,
THEN:

___ 1. **DECLARE** 21 CS Pump OPERABLE.

___ 2. IF this pump was previously in the ALERT RANGE,
THEN **EVALUATE** conditions required to "Return Pump to Normal Surveillance Test Frequency" IAW NC.NA-AP.ZZ-0012(Q), Technical Specifications Surveillance Program **AND** NC.NA-AP.ZZ-0070(Q), Inservice Testing Program.

(step continued on next page)

5.4.3 (continued)

___ C. IF ANY pump Acceptance Criteria parameter is in the ALERT RANGE, AND NO pump Acceptance Criteria parameter is in the REQUIRED ACTION RANGE, THEN:

___ 1. **DECLARE** 21 CS Pump OPERABLE.

___ 2. IF pump surveillance has NOT been increased, THEN **PERFORM** "Increase Pump Surveillance Testing Frequency Change" IAW NC.NA-AP.ZZ-0012(Q), Technical Specifications Surveillance Program **AND** NC.NA-AP.ZZ-0070(Q), Inservice Testing Program.

___ D. IF ANY pump Acceptance Criteria parameter is in the REQUIRED ACTION RANGE, THEN:

___ 1. **DECLARE** 21 CS Pump inoperable.

___ 2. **EVALUATE** Technical Specification requirements for system operability.

___ E. IF 21CS21 Check Valve Surveillance is **UNSAT**, THEN:

___ 1. **DECLARE** Check Valve inoperable.

___ 2. **EVALUATE** Technical Specification requirements for system operability.

___ F. **COMPLETE** Attachment 6, Section 3.0.

___ G. **FORWARD** this procedure to the STA for review.

___ 5.4.4 STA **PERFORM** the following:

___ A. **REVIEW** this procedure with Attachments 1-6 for completeness and accuracy.

___ B. **COMPLETE** Attachment 6, Section 3.0.

___ C. **FORWARD** this procedure to OS/CRS for review and approval.

___ 5.4.5 OS/CRS **PERFORM** the following:

___ A. **REVIEW** this procedure with Attachments 1-6 for completeness and accuracy.

___ B. **COMPLETE** Attachment 6, Section 3.0.

___ C. **PLACE** this procedure in the IST IMPLEMENTATION ENGINEER REVIEW REQUIRED mail slot.

END OF PROCEDURE SECTION

6.0 RECORDS

6.1 Retain the following IAW NC.NA-AP.ZZ-0003(Q), Document Management Program:

- Attachments 1-6
- Copy of S2.RA-ST.CS-0001(Q), Inservice Testing - 21 Containment Spray Pump Acceptance Criteria, if applicable

7.0 REFERENCES

7.1 Updated Final Safety Analysis Report:

7.1.1 Section 6.2.2.1, Containment Spray

7.2 Drawings:

7.2.1 205335, Unit 2 Containment Spray

7.3 Procedures:

7.3.1 NC.NA-AP.ZZ-0022(Q), Measuring & Test Equipment, Lifting & Rigging and Tool Control

7.3.2 NC.NA-AP.ZZ-0050(Q), Station Testing Program

7.4 Others:

7.4.1 Section XI of ASME Boiler and Pressure Vessel Code, Subsection IWP (1983 Edition with Addenda through Summer 1983)

7.4.2 OMa-10, Inservice Testing of Valves in Light-Water Reactor Power Plants (1987 Edition with 1988 Addenda)

7.4.3 Salem Generating Station IST Manual

7.4.4 NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants

7.4.5 PR #960716112, CSS Piping Inspection Requirement Not in Surveillance Procedure

7.4.6 PR #970205322, Potential to Violate Technical Specification 4.0.5 for 21(22)CS21

7.5 Cross-References:

7.5.1 Technical Specifications - Unit 2:

A. 3.6.2.1, Containment Spray System

B. 3.6.2.2, Spray Additive System

C. 4.0.5, Inservice Inspection and Testing

7.5.2 Procedures:

A. NC.NA-AP.ZZ-0001(Q), Nuclear Procedure System

B. NC.NA-AP.ZZ-0003(Q), Document Management Program

C. NC.NA-AP.ZZ-0012(Q), Technical Specifications Surveillance Program

D. NC.NA-AP.ZZ-0070(Q), Inservice Testing Program

E. S2.RA-ST.CS-0001(Q), Inservice Testing - 21 Containment Spray Pump Acceptance Criteria

7.6 Commitments:

7.6.1 C0265 - NSO LER 311/89-015-00

7.6.2 C0275 - NRC INSP 90-03

7.6.3 C0283 - NRC VIOL 311/87-18-01

7.6.4 C0284 - NSO LER 272/90-014-00

7.6.5 C0289 - INSTRUMENT CALIBRATION REQUIREMENTS

7.6.6 C0290 - NRC INFO 84-51

7.6.7 C0583 - NRC VIOL 50-272/94-21

7.6.8 C0620 - NRC GL 95-07, Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves

ATTACHMENT 1
(Page 1 of 2)

INSTRUMENT AND TEST EQUIPMENT DATA

1.0 WORK ORDER DATA

Work Order Number(s): ______	Reason for Test
______	___ Scheduled Surveillance
______	___ Post-Maintenance Operability
	___ Establish New Baseline Data
	___ Other (Explain in Comments)

2.0 INSTRUMENT/TEST EQUIPMENT:

Instrument/Test Equipment	Description	Calibration Overdue Date	Initials
2FI929	Containment Spray System Recirc Flow Indicator		
2FT930	Control Room Spray Additive Flow Indicator		
2LI960	RWST Level Channel I		
2LI961	RWST Level Channel II		
2LI962	RWST Level Channel III		
2LI963	RWST Level Channel IV		
	CSI 2110 Machine Analyzer		
	CSI 2110 Pickup Probe		

ATTACHMENT 1
(Page 2 of 2)

INSTRUMENT AND TEST EQUIPMENT DATA

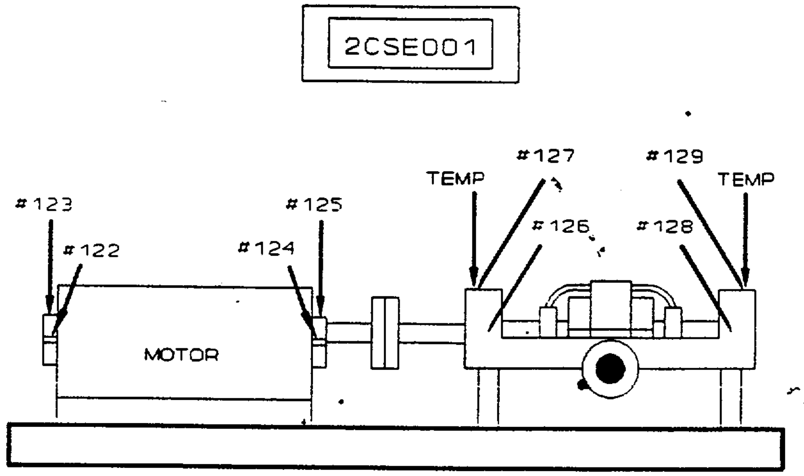
3.0 TEMPORARY TEST EQUIPMENT:

Temporary Test Equipment	ID Number & Cal. Due Date	Installation Point	Installation		Removal	
			Initials	Date	Initials	Date
Heise CM or equivalent 0-60 psig	#	Instr. Vent for 2PI953A				
	Date:					
Heise CM or equivalent 0-300 psig **OR** 0-500 psig	#	Instr. Vent for 2PI953C				
	Date:					

ATTACHMENT 2
(Page 1 of 3)

21 CS PUMP SURVEILLANCE DATA

1.0 VIBRATION POINT LOCATIONS:



2.0 MOTOR VIBRATION READINGS:

* Pnt. #122: Mils	* Pnt. #123: Mils	* Pnt. #124: Mils	* Pnt. #125: Mils

* For trending purposes only. NOT required for Acceptance Criteria.

3.0 PUMP VIBRATION READINGS:

21 CS PUMP Vibration Readings	Test Results		
	Acceptable Range SAT	Alert Range SAT	Required Action UNSAT
Pnt. #126 Mils			
Pnt. #127 Mils			
Pnt. #128 Mils			
Pnt. #129 Mils			
Acceptance Criteria: Measured values are within bands specified in S2.RA-ST.CS-0001(Q), Inservice Testing - 21 Containment Spray Pump Acceptance Criteria OR data represents new baseline data as determined by the IST Implementation Engineer.			

Note - Quick Lock adapters that are worn or missing should be recorded in the Comments Section of Attachment 6. [C0275]

ATTACHMENT 2
(Page 2 of 3)

21 CS PUMP SURVEILLANCE DATA

4.0 PUMP PERFORMANCE DATA:

Pump Performance Parameter	Parameter Value	Test Results		
		Acceptable Range SAT	Alert Range SAT	Required Action UNSAT
Motor Amps	amps	N/A	N/A	N/A
Pump Discharge Flow Rate (2FI929)	gpm		N/A	
Suct. Press. Pump **STOPPED** (Test Gauge)	psig	N/A	N/A	N/A
Suct. Press. Pump **RUNNING** (Test Gauge) (A)	psig	N/A	N/A	N/A
Pump Discharge Pressure (Test Gauge) (B)	psig	N/A	N/A	N/A
Differential Pressure (B) - (A) = psid	psid			

Acceptance Criteria:

1) Measured values are within bands specified in S2.RA-ST.CS-0001(Q), Inservice Testing - 21 Containment Spray Pump Acceptance Criteria OR data represents new baseline data as determined by the IST Implementation Engineer.

2) Pump Differential Pressure is ≥204 psid IAW Technical Specification 4.6.2.1.b.

Independent Verification of Calculation Performed By:

ATTACHMENT 2
(Page 3 of 3)

21 CS PUMP SURVEILLANCE DATA

5.0 21 CS PUMP LEAKAGE INSPECTION

Component	**Inspection Results (1)**		
	No Leakage Initial	**Leakage (2)**	
		Initial	**AR No.**
21 CS Pump and portions of the CS System subjected to pump pressure.			

Notes: (1) Component leakage is NOT an operability concern as long as:

- System or component operation is NOT jeopardized.
- Personnel safety is NOT compromised.

(2) ANY leakage from ANY component requires an AR to be written against that component, and an entry made in the Comments Section of Attachment 6 indicating the component leaking and amount of leakage. If any leakage exceeds the following Leakage Criteria, the System Engineer should be contacted for further evaluation and prioritization. Notification of the System Engineer should also be noted in the Comments Section of Attachment 6. The Leakage Criteria is as follows:

Component	Leakage Criteria
♦ CS Pump Seal	>10 drops per minute
♦ Valves, Packing leak	>1 drop per 3 minutes
Body to Bonnet >2"	>10 drops per minute
≤2"	>1 drop per minute
Seat Leakage	>3 drops per minute
♦ Other Flanges	>10 drops per minute
♦ Pressure Boundary	ANY

ATTACHMENT 3
(Page 1 of 1)

CHECK VALVE DATA

Check Valve Tested	Stroke	Acceptance Criteria	Test Results		Date
			SAT	UNSAT	
21CS21	CLOSED	With RWST level ≥40.5 and ≤41.9 ft, Absence of continuous pressurized flow from 2CS61. ______ ft 2LI960 (RWST Ch I Lvl) ______ ft 2LI961 (RWST Ch II Lvl) ______ ft 2LI962 (RWST Ch III Lvl) ______ ft 2LI963 (RWST Ch IV Lvl)			
	OPEN	With RWST level ≥40.5 and ≤41.9 ft, Forward Flow is verified by 2FI930 ≥51.3 gpm. ______ ft 2LI960 (RWST Ch I Lvl) ______ ft 2LI961 (RWST Ch II Lvl) ______ ft 2LI962 (RWST Ch III Lvl) ______ ft 2LI963 (RWST Ch IV Lvl) ______ gpm 2FI930			

ATTACHMENT 4
(Page 1 of 1)

INDEPENDENT VERIFICATION

Component	Description	Normal Position	IV
21CS2	PUMP DISCH	X	
2CS14	TANK DISCHARGE	(1)	
2CS14 Power L/O	2CS14, CS ADD TANK DISCH VALVE ECCS Power L/O Switch (2RP4)	(2)	
21CS11	21 CS PUMP FLOW TEST STOP VALVE	X	
21CS20	21 CS EDUCTOR SUP VALVE	(3)	
22CS20	22 CS EDUCTOR SUP VALVE	(3)	
2CS31	RWST TO EDUCTORS STOP VALVE	LX	
2CS35	CS PUMP FLOW TEST STOP VALVE	X	
2CS40	SPRAY ADD TK DISCH LINE DRN	X	
2CS61	CS SPRAY ADD TK DISCH HDR SAMP	X	
N/A	INSTR. VENT FOR 2PI953A	X	
N/A	INSTR. VENT FOR 2PI953C	X	

(1) OPEN in Modes 1-4, CLOSED in Modes 5, 6 and Defueled.

(2) LOCKED OUT in Modes 1-4, OPERABLE in Modes 5, 6 and Defueled.

(3) LOCKED OPEN in Modes 1-4, LOCKED CLOSED in Modes 5, 6 and Defueled.

ATTACHMENT 5
(Page 1 of 2)

CS EDUCTOR LINE FLUSHING

CAUTION

IF a valid Containment Spray Actuation occurs during performance of this procedure, THEN all valves should be IMMEDIATELY aligned to support the actuation.

___ 1.0 **ENSURE** the following valves are CLOSED:

___ A. 2CS16, TANK DISCHARGE

___ B. 2CS17, TANK DISCHARGE

___ 2.0 IF in Modes 1-4,
THEN:

___ A. **ENTER** Technical Specification 3.6.2.2 Action Statement.

___ B. **UNLOCK** and **CLOSE** 21CS20, 21 CS EDUCTOR SUP VALVE.

___ C. **UNLOCK** and **CLOSE** 22CS20, 22 CS EDUCTOR SUP VALVE.

___ 3.0 **UNLOCK** and **OPEN** 2CS31, RWST SUPPLY TO EDUCTORS STOP VALVE.

___ 4.0 **OPEN** 2CS40, SPRAY ADD TK DISCH LINE DRN.

___ 5.0 After 3 minutes of flushing to drain header, **CLOSE** 2CS40.

___ 6.0 **THROTTLE OPEN** 2CS61, CS SPRAY ADD TK DISCH HDR SAMP, directing sample flow to a floor drain.

___ 7.0 Direct Chemistry to **PERFORM** sodium sample analysis of the water at the 2CS61 local sample point.

___ 8.0 After sample has been obtained, **CLOSE** 2CS61, CS SPRAY ADD TK DISCH HDR SAMP.

___ 9.0 IF additional sampling is required,
THEN **THROTTLE OPEN** 2CS61 as required by the Chemistry Department.

ATTACHMENT 5
(Page 2 of 2)

CS EDUCTOR LINE FLUSHING

___ 10.0 When Chemistry analysis verifies <10 ppm sodium, **PERFORM** the following:

___ A. **ENSURE** 2CS61 is CLOSED.

___ B. **CLOSE** and **LOCK** 2CS31.

___ 11.0 IF in Modes 1-4, THEN:

___ A. **OPEN** and **LOCK** 21CS20, 21 CS EDUCTOR SUP VALVE.

___ B. **OPEN** and **LOCK** 22CS20, 22 CS EDUCTOR SUP VALVE.

___ C. **EXIT** Technical Specification 3.6.2.2 Action Statement.

___ 12.0 **NOTIFY** Control Room Containment Spray Eductor Line flushing is complete.

ATTACHMENT 6
(Page 1 of 2)

COMPLETION SIGN-OFF SHEET

1.0 COMMENTS:

(Include test deficiencies and corrective actions)

ATTACHMENT 6
(Page 2 of 2)

COMPLETION SIGN-OFF SHEET

2.0 SIGNATURES:

Print	Initials	Signature	Date
______	______	______	______
______	______	______	______
______	______	______	______
______	______	______	______
______	______	______	______
______	______	______	______

INDEPENDENT VERIFICATION:

______	______	______	______
______	______	______	______
______	______	______	______
______	______	______	______

3.0 STA REVIEW AND OS/CRS FINAL REVIEW AND APPROVAL:

This procedure with Attachments 1-6 is reviewed for completeness and accuracy. All deficiencies, including corrective actions, are clearly recorded in the COMMENTS Section of this attachment. Technical Specification compliance, procedure compliance, and Acceptance Criteria are evaluated. [C0283]

Signature:______________________________ Date:____________
CRS

Signature:______________________________ Date:____________
STA

Signature:______________________________ Date:____________
OS/CRS

4.0 IST IMPLEMENTATION ENGINEER REVIEW:

Test Results are reviewed for acceptability. If required, revision of Acceptance Criteria and test frequency change is initiated. Forward completed procedure to Operations Staff.

Signature:______________________________ Date:____________
IST Implementation Engineer

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Administrative

TASK: Initiate a manual Action Request (Form1)

TASK NUMBER: 1145340104

JPM NUMBER: Admin 2 RO

K/A NUMBER: ~~2.1.14~~ 2.2.19 JMW 2/22/99

APPLICABILITY: EO [ ] RO [X] SRO [X]

IMPORTANCE FACTOR:

RO	SRO
~~2.5~~ 2.1*	~~3.3~~ 3.1

* At Salem, RO's are required to be able to generate a Corrective Maintenance Request.

EVALUATION SETTING/METHOD: **Control Room/Simulator; Simulate**

REFERENCES: NC.NA-AP.ZZ-0000(Q) Action Request Process

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 15 MINUTES

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: [signature] for
PRINCIPAL TRAINING SUPERVISOR

[signature] for **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the SNSS Or Unit NSS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________________ **DATE:** ____________

NAME: ____________________

DATE: ______________________

SYSTEM: Administrative

TASK: Initiate a maual Action Request

TASK NUMBER:

INITIAL CONDITIONS:

1. Both Units are operating at 100% power.
2. You are an Extra Operator assigned to perform Administartive Tasks for the Shift.
3. The Unit 2 Reactor Operator had been adjusting the Master Flow Controller to restore Pressurizer Level to program following the transfer to 21 Charging Pump. The Operator reports that the Flow Demand Indication, FI-459B, has stopped responding at 38%.
4. It has been determined that only the controller demand indication is affected. Local observation of 2CV55 confirms it is operating properly and pressurizer level is being maintained at the target value.

INITIATING CUE:

The CRS has directed you to initiate an Action Request for the flow demand indication. The computer is UNavailable.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

NAME: ____________

DATE: ____________

SYSTEM: Administrative

TASK: Initiate a manual Action Request

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Obtain FORM 1 ***Evaluator is provided with a copy of NAP-0 and an extra Form 1 is attached to this JPM.***	Locates or is provided a copy of procedure NC.NA-AP.ZZ-0000(Q) (NAP-0) and Form 1 For a MANUAL AR, perform NAP-0 steps 5.3.4, 5.3.8, 5.3.11, 5.3.12, 5.3.16		
	5.3.4	Only one component should be described in a CM type AR - - - -	Step is actually a note indicating SRO approval is required to list more than one component on a corrective maintenance AR.		
*	5.3.8	Describe the condition in sufficient detail and clarity such that additional explanation beyond the text of the AR is not required for review or approval	Describes condition on FORM 1 and completes all fields red-circled on the KEY: • Unit, component identification number, noun name and system – Unit 2, Master Flow Controller • List symptoms and the effect the condition has on plant operations - Failure of the controller flow demand indication to respond (Appears stuck at 38%) • Initiating alarm/indication (control room and local) and any indications that were unusual or abnormal for the plant conditions - Operator noted Charging System Flow changing but controller flow demand indication was not. 2CV55 was verified to be responding locally.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________

DATE: ____________

SYSTEM: Administrative

TASK: Initiate a manual Action Request

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	5.3.11	Retention of non-conforming equipment for analysis - - - -	N/A		
	5.3.12	An Equipment Malfunction EMIS Tag may be used to indicate - - - -	EMIS Tag N/A for control console Candidate may discuss red-striping instrument on control console.		
	5.3.16	Present the AR to your immediate supervisor - - - -	Presents Form 1 to the Evaluator		

Terminating CUE: Presents Form 1 to the Evaluator

JOB PERFORMANCE MEASURE

ACTION REQUEST FORM

Part A. To be completed by the Initiator	
(1) Department identifying concern: Salem Operations	(2) Unit Designator: HC ☐ S2 ☒ SC ☐ S1 ☐ S3 ☐ CA ☐

(3) Describe the actual condition or event (add additional pages as needed):

The Flow Demand indication for the Master Flow Controller FI-459B does not respond to demand changes greater than 38%. The controller output and the charging system components have been verified as responding Properly.

- Operator noted charging flow changing but controller flow demand indication was not.
- Local observation verifies that 2CV55 is responding properly and pressurizer level is being maintained at the program value.

KEY

(4) EMIS Tag Hung? Yes ☐ No ☒	**(5) Component Description.** Master Flow Controller Demand indication FI-459B
If Yes, what is the location of the EMIS tag? ______ EMIS Tag No. ______	**(6) Component Location:** CC2

(7) Initiator: NAME	**(8) Date:** X	**(9) Time:** X

Part B. To be completed by the Reviewer	
(1) Action Request Type: CM ☒ *Corrective Maintenance* CR ☐ *Condition Resolution* BP ☐ *Business Process (Sig. Lvl. "X" only)* N/A for this exam	(2) Significance Level: 1 ☐ 2 ☐ 3 ☒ X ☐ N/A for this exam **NOTE:** Immediately present Significance Level 1 or 2 conditions to the SRO Approver.

(3) AR Code:	(4) System ID:	(5) Comp. ID:	(6) Action Request No:

(7) Reviewer: ______	**(8) Date:** ______	**(9) Time:** ______

PROVIDE THIS SHEET TO THE CANDIDATE

INITIAL CONDITIONS:

- Both Units are operating at 100% power.
- You are an Extra Operator assigned to perform Administartive Tasks for the Shift.
- The Unit 2 Reactor Operator had been adjusting the Master Flow Controller to restore Pressurizer Level to program following the transfer to 21 Charging Pump. The Operator reports that the Flow Demand Indication, FI-459B, has stopped responding at 38%.
- It has been determined that only the controller demand indication is affected. System flow and 2CV55 position have been verified to be responding properly.

INITIATING CUE

The CRS has directed you to initiate an Action Request for the flow demand indication. The computer is UNavailable.

FORM –1
Page 1 of 2
ACTION REQUEST [NOTIFICATION] FORM

Part A. To be completed by the Initiator

(1) **Department identifying concern:**

(2) **Unit Designator:**
HC ☐ S2 ☐ SC ☐
S1 ☐ S3 ☐ CA ☐

(3) **Describe the actual condition or event** (add additional pages as needed):

(4) **EMIS Tag Hung?** Yes ☐ No ☐

If Yes, what is the location of the EMIS tag?
____

EMIS Tag No. ______________________

(5) **Component Desc.:**

(6) **Component Location:**

(7) **Initiator:** ______________________ (8) **Date:** __________ (9) **Time:** __________

Part B. To be completed by the Reviewer

(1) **Action Request [Notification] Type:**
CM ☐ *Corrective Maintenance*
CR ☐ *Condition Resolution*
BP ☐ *Business Process (Sig. Lvl. "X" only)*

(2) **Significance Level:**
1 ☐ 2 ☐ 3 ☐ X ☐
NOTE: Immediately present SL-1 or 2 ARs, or SL-3 ARs affecting operability to the SRO Approver.

(3) **AR Code:** __________
(4) **System ID:** __________
(5) **Comp. ID:** __________
(6) **Action Request [Notification] No:** __________

(7) **Reviewer:** ______________________ (8) **Date:** __________ (9) **Time:** __________

ACTION REQUEST [NOTIFICATION] FORM

INITIATOR INSTRUCTIONS
Part A. To be completed by the Initiator
Department Identifying concern: This is the department that you were working for when you observed the actual condition or event. You may either use the full department name (e.g., Salem Maintenance Department) or the abbreviated name (e.g. SMD). Be sure to include the sub-group as well (e.g., mechanical group, electrical group, staff).
Unit Designator: This is the Plant or Unit that the condition affects. Check one of the following: HC = Hope Creek Station; S2 = Salem Station, Unit #2; SC = Salem Station, Common to both units S1 = Salem Station, Unit #1; S3 = Salem Station, Unit #3 (the "Jet"); CA = Common to all NOTE: The CA designator can only be used for Significance Level "X" ARs. NOTE: If the condition impacts Hope Creek and Salem Generating Stations, two separate ARs shall be generated.
Describe the actual condition or event: Describe the condition. Use additional pages as required. Be sure to address the following areas: What is the actual condition? How does this issue impact plant or personnel safety? What caused the condition? Did you take immediate actions to correct the condition? If so, what? What should be done to fix the condition? Is there anyone who should be responsible for correcting the issue (Use title/position, not name)? Is there anything else you want to tell us about the condition?
EMIS Tag Hung: Is an EMIS tag hung, Y or N. If so, on what part of the equipment is it hanging? Tag #?
Component Description: Common name of the component identified, use plain language.
Component Location: Identify the component's location?
Initiator: Print your name here, please print legibly.
Date: Input the date the condition was identified.
Time: Input the time of day the condition was identified.
REVIEWER INSTRUCTIONS
Part B. To be completed by the Reviewer
Action Request [Notification] Type.
Significance Level: (refer to NAP-0, Attachment 1, Significance Level Determination, for description)
AR Code: (refer to MMIS for listing of available AR codes)
System ID: Designator for Plant System (e.g., RHR)
Component ID: Component identification number as found on P&ID or component label plate or ID tag.
AR No: Document Action Request [Notification] number after Form-1 has been inputted into MMIS.
Reviewer: Sign your name here, please write legibly.
Date: The date the Action Request [Notification] was reviewed.
Time: The time the Action Request [Notification] was reviewed.
Some additional things to consider: Verify the issue. Is the issue valid? Ensure description is complete IAW NAP-0, Step 5.3.8. The SRO Approver shall be notified of SL-1 & 2 ARs, and ARs that affect operability immediately after review.

CANDIDATE: ____________________ DOCKET: __________________ DATE: __________

QUESTION: A leak has developed in the VCT Room and must be isolated. You have been assigned to perform the valve manipulations. Your annual dose is currently 122 mr. The general area dose rate where the valves are located is 1.3 R/hr. What is the longest time you can take manipulating the valves without exceeding the Salem administrative dose limit? (Do NOT consider access and egress time.)

ANSWER: The Administrative Annual dose limit is 2000 mr. Allowable Dose = 2000-122 = 1878 mr.
Max Time = (1878/1300 mr/hr) x 60 min/hr = <u>1 hr. and 27 min</u> (1hr. and 22 mins. to 1 hr. and 27 minutes is acceptable band)

RESPONSE:

SAT ______ **UNSAT** ______ **K/A NUMBER:** 2.3.4 – 2.5/3.1

REFERENCES: NC.NA-AP.ZZ-0024, Radiation Protection Program, Rev. 8

QUESTION: A task must be performed that requires entry into a Locked Very High Radiation Area.

What specific requirements must be met prior to entry into this area?

ANSWER:
1. A Special RWP is required.
2. Rad. Protection coverage is required.
3. Must be an Operational or Safety reason for entry.
4. Radiation Protection Manager and OS must be notified prior to entry.
5. A brief on the radiological conditions in the area and the procedures to be followed in case area evacuation is required.

NOTE: Candidate may discuss dosimetry and other general requirements.

RESPONSE:

SAT ______ **UNSAT** ______ **K/A NUMBER:** 2.3.10 – 2.9/3.3

REFERENCES: LP Radcon-00, Section X. Control of Access.
NC.NA-AP.ZZ-0024, Radiation Protection Program, Rev.8, Sections 5.7-5.9

CANDIDATE COPY

SALEM ADMIN QUESTIONS

QUESTION: A leak has developed in the VCT Room and must be isolated. You have been assigned to perform the valve manipulations. Your annual dose is currently 122 mr. The general area dose rate where the valves are located is 1.3 R/hr.

What is the longest time you can take manipulating the valves without exceeding the Salem administrative dose limit? (Do NOT consider access and egress time.)

CANDIDATE COPY

SALEM ADMIN QUESTIONS

QUESTION: A task must be performed that requires entry into a Locked Very High Radiation Area.

What specific requirements must be met prior to entry into this area?

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Administrative

TASK: Activate ERDS as Secondary Communicator

TASK NUMBER: 1240100501

JPM NUMBER: Admin 4.1 RO

K/A NUMBER: 2.4.27

APPLICABILITY: EO [ ] RO [X] SRO [ ]

IMPORTANCE FACTOR: 3.0 (RO) 3.5 (SRO)

EVALUATION SETTING/METHOD: Simulator

REFERENCES: ECG Attachment 8 Secondary Communicator Log

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 5 mins (ERDS); 10 mins. (MEES)

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A 2/22/99

APPROVED: [signature] for PRINCIPAL TRAINING SUPERVISOR [signature] for OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________________ **GRADE:** [ ] SAT [ ] UNSAT

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________________ **DATE:** ____________

NAME: ______________________

DATE: ______________________

SYSTEM: Administrative

TASK: Activate ERDS as Secondary Communicator

TASK NUMBER: 1240100501

INITIAL CONDITIONS: This will be done as part of the I/P Operational Examination and can be done on either unit.

1. Unit 2 is in Mode 5.
2. Core cooling was being provided by the RHR System
3. An unplanned loss of all systems providing decay heat removal functions has occurred.
4. RCS temperature has exceeded 200°F.
5. The Emergency Plan has been implemented and an Alert declared.
6. You are assigned to assist the Secondary Communicator while the Primary and Secondary Communicators are making notifications.

INITIATING CUE:

The Operations Superintendent directs you to assist the Secondary Communicator by activating the Emergency Response Data System (ERDS) and completing the Major Equipment and Electrical Status (MEES) Form in accordance with Attachment 8 of the Emergency Classification Guide.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

NAME: ____________________

DATE: ____________________

SYSTEM: Administrative

TASK: Activate ERDS as Secondary Communicator

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
NOTE: Obtain an up-to-date copy of ECG Attachment 8 prior to the start of the JPM.					
	1	Locate Unit 2 ECG and obtain a copy of Attachment 8	The operator locates the Unit 2 ECG and obtains a copy of Attachment 8.		
CUE: When Attachment 8 of the ECG is located, provide the candidate with a copy.					
*	2	At a Unit 2 SPDS Terminal: PRESS "UNIT MASTER MENU" Key	The Operator presses the "UNIT MASTER MENU" key		
*	3	PRESS "ERDS" key	The Operator presses the "ERDS" key		
	4	***Steps 4, 5, &6 are prompted on the SPDS screen and will only be completed if the task is done on the Simulator:*** PRESS "SHIFT" and "1" keys	The Operator presses the "SHIFT" and "1" keys		
	5	PRESS "Y" key to confirm	The Operator presses the "Y" key to confirm the selection		

NAME: ______________________

DATE: ______________________

SYSTEM: Administrative

TASK: Activate ERDS as Secondary Communicator

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	6	PRESS "RETURN" key to execute	The Operator presses the "RETURN" key to execute and observes the following message displayed on the SPDS terminal: "ERDS Activation Accepted"		
	7	Obtain a copy of the Major Equipment and Electrical Status Form	The Operator locates a copy of the Major Equipment and Electrical Status Form from ECG Attachment 8.		
*	8	Determine and record the status of each component on the Major Equipment and Electrical Status Form	***CUE:* For the purposes of this examination, log the equipment status as it is today** The Operator determines and records (without error) the status of each component on the Major Equipment and Electrical Status Form.		

Terminating Cue: Major Equipment and Electrical Status Form completed and submitted for licensed operator review.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE
(To be provided to the candidate)

INITIAL CONDITIONS:

1. Unit 2 is in Mode 5.
2. Core cooling was being provided by the RHR System.
3. An unplanned loss of all systems providing decay heat removal functions has occurred .
4. RCS temperature has exceeded 200°F.
5. The Emergency Plan has been implemented and an Alert declared.
6. You are assigned to assist the Secondary Communicator while the Primary and Secondary Communicators are making notifications.

INITIATING CUE:

The Operations Superintendent directs you to assist the Secondary Communicator by activating the Emergency Response Data System (ERDS) and completing the Major Equipment and Electrical Status (MEES) Form in accordance with Attachment 8 of the Emergency Classification Guide.

ATTACHMENT 8

SECONDARY COMMUNICATOR LOG

Table of Contents

PSE&G CONTROL COPY # 35

Pages

Emergency Classification: (circle) UE ALERT SAE GE

Name: ______________________ (Print) Position: CM2 /TSC2/ EOF2 (circle)

A. NOTIFICATIONS

NOTE

A new Attachment 8 is required to be implemented if the classification changes.

Initials

_______ CM2/TSC2 /EOF2 1. If **GE** classification, assist Primary Communicator with 15 minute notifications.

_______ CM2 2. DIRECT the Shift Rad Pro Tech (SRPT) (x2644) to implement **EPIP 301S**, RPT Onshift Response.

Name: ______________________ Time: _______

_______ CM2 3. For an ALERT or higher emergency;

( ) a. DIRECT Security (x2223) to implement both **EPIP 901,** Onsite Security Response, and **EPIP 903**, Opening Emergency Operations Facility and Emergency News Center.

Name: ______________________ Time: _______

( ) b. ACTIVATE **ERDS** within 60 minutes from the Affected Unit's SPDS terminal;

1) PRESS <**UNIT MASTER MENU**> key.
2) PRESS <**ERDS**> key.
3) FOLLOW screen prompts.

Initials

A. NOTIFICATIONS (cont'd)

_______ 4. COMPLETE a **Station Status Checklist (SSCL)** Form;

CM2/TSC2 /EOF2

( ) a. OBTAIN OS (TSS/SSM) assistance, as needed for Pg.1.
( ) b. OBTAIN SRPT (RAC/RSM) assistance, as needed for Pg.2.
( ) c. FAX to Group B.
( ) d. IF fax transmission of the SSCL is incomplete,
THEN CONTACT the State A gencies listed below, READ the data, AND DOCUMENT on SSCL, Pg. 2.

DEMA	Delaware Emergency Management Agency	302-834-4531
BNE	NJ Bureau of Nuclear Engineering	984-7700

_______ 5. OBTAIN completed **NRC Data Sheet** and FAX form to Group B.

CM2/TSC2 /EOF2

_______ 6. REPEAT Step 4 approximately every half hour OR IMMEDIATELY for significant changes in Station status, until either Turnover or relief.

CM2/TSC2 /EOF2

_______ 7. TURNOVER responsibility for offsite notifications and offsite data updates (SSCLs) to the oncoming facility (TSC or EOF);

CM2/TSC2

( ) a. GIVE names and phone numbers of contacts already made with any Offsite Agencies.
( ) b. GIVE time for next SSCL.

_______ 8. IF available for other duties AND TSC turnover is complete,
THEN obtain headset, MAN the Ops Data line and CONTACT the TSC ops advisor and establish an open line of communication from the control room to the TSC.

CM-2

B. DATA COLLECTION/TRANSMISSION

_______ 1. WHEN in an ALERT or higher emergency OR AFTER significant changes in plant status;
THEN COMPLETE the **Major Equipment and Electrical Status (MEES)** Form.

CM2

( ) a. OBTAIN Licensed Operator review.
( ) b. GIVE a copy to the OSC Coordinator.
( ) c. FAX to Group C.

Initials

B. DATA COLLECTION/TRANSMISSION (cont'd)

_______ CM2 2. IF requested by the TSC,
THEN COMPLETE the **Operational Status Board (OSB)** Form every 15 minutes; (TSS may modify the frequency or data list as appropriate)

( ) a. OBTAIN Licensed Operator review.
( ) b. FAX to Group C.

_______ TSC2/EOF2 3. ENSURE the Facility OSB and MEES Status Boards are updated as follows;

( ) a. OBTAIN OSB Data from **SPDS** "Unit Master Menu."
( ) b. IF SPDS is Out of Service,
THEN REQUEST CM2 to perform step B.2, above. (data set and frequency of updates may be revised by the TSS based on event circumstances)
( ) c. WHEN significant changes in plant status occur,
THEN REQUEST CM2 to perform step B.1, above.

_______ CM2/TSC2/EOF2 4. WHEN the emergency is terminated,
THEN FORWARD this document and all completed Forms to the OS (TSS/SSM).

C. INCOMING CALLS

STATE OFFICIALS

_______ CM2/TSC2 1. IF Notifications authority has transferred,
THEN DIRECT the caller to contact the TSC (or EOF if activated).

_______ CM2/TSC2/EOF2 2. WHEN contacted by any State Agency Officials (listed here),

DEMA - Delaware Emergency Management Agency
AAAG - Delaware Accident Assessment Advisory Group
BNE - NJ Bureau of Nuclear Engineering
DEP - NJ Department of Environmental Protection
OEM - NJ Office of Emergency Management

PERFORM the following;

( ) a. OBTAIN and RECORD;

Agency	Caller's Name	Phone #
________	____________________	________
________	____________________	________

( ) b. READ the latest EC approved SSCL.

Initials

C. INCOMING CALLS (cont'd)

STATE OFFICIALS

( ) c. IF caller is **NJ-BNE**, **DEMA**, or **AAAG**,
THEN also READ the approved NRC Data Sheet Event Description.

NEWS MEDIA

> **CAUTION**
>
> **Communicators are NOT authorized to release any information to the News Media.**

_______ CM2/TSC2 /EOF2

3. WHEN contacted by any News Media representative,
READ the appropriate message below;

( ) a. IF the ENC is not activated (Unusual Event), say;

"You are requested to contact the Nuclear Communications Office at any of the following numbers; 609-339-1001, -1006, or -1002."

( ) b. IF the ENC is activated (ALERT or higher), say;

"You are requested to contact the Media Information Operator at any of the following numbers; 609-273-0188, -0282, -0386, -0479, or -0586."

NRC OPERATIONS CENTER

_______ CM2

4. WHEN directed by the NRC to TERMINATE ERDS transmission,
THEN GO TO any SPDS terminal of the affected Unit AND PROCEED as follows;

a. PRESS <**UNIT MASTER MENU**> key.
b. PRESS <**ERDS**> key.
c. FOLLOW screen prompts.
d. WHEN completed, NOTIFY the OS.

SALEM UNIT ____

MAJOR EQUIPMENT AND ELECTRICAL STATUS

Y = IN SERVICE
N = OUT OF SERVICE
CIRCLE UNAVAILABLE EQUIP.

DATE: ________
UPDATE TIME: ________

COOLING SYSTEMS		ELECTRICAL FEED	Y/N
AUX FD PUMPS	1	A1D	
	2	B1D	
	3	STM.	
SERVICE WATER PUMPS	1	3D	
	2	8D	
	3	B3D	
	4	B8D	
	5	3D	
	6	8D	
COMP. COOLING PUMPS	1	A10D	
	2	B10D	
	3	C10D	
REACTOR COOLANT PUMPS	1	H4D	
	2	E4D	
	3	F4D	
	4	G4D	
COND. PUMPS	1	H1D	
	2	E1D	
	3	F1D	
		(U1) / (U2)	
CIRC WATER PUMPS	1A	2AD/H7D	
	1B	7BD/F7D	
	2A	3AD/E7D	
	2B	6BD/G7D	
	3A	4AD/E3D	
	3B	5BD/G3D	

ECCS SYSTEMS		ELECTRICAL FEED	Y/N
CHARGING PUMPS	1	B9D	
	2	C9D	
	3	A7X	
SAFETY INJ PUMPS	1	A8D	
	2	C8D	
RHR PUMPS	1	A7D	
	2	B7D	

ELECTRICAL STATUS		Y/N
IS OFFSITE AC POWER AVAILABLE?		

EMER. DIESEL		RUN	LOAD
EDG	A		
	B		
	C		
*3 GAS TURBINE			

ELEC DISTRIBUTION AVAILABLE?		Y/N	
VITAL BUS	A		
	B		
	C		
GROUP BUS	E		
	F		
	G		
	H		

CONT. CONTROL SYSTEMS		ELECTRICAL FEED	Y/N
CONT. SPRAY PUMPS	1	A2D	
	2	C2D	

CFCU	HI	LOW
1	A3X A4X	A2X
2	B3X B4X	B2X
3	C3X C4X	C2X
4	B7X B8X	B6X
5	C7X C8X	C6X

			Y/N
IODINE REMOVAL	1	G7X	
	2	E7X	
H^2 RECOM	1	A15X	
	2	B15X	

MISC. EQUIPMENT		Y/N
FIRE PUMPS (DIESEL)	1	
	2	

STATION AIR COMP.			Y/N
	1	1H6D	
	2	2G1D	
	3	1G1D	

EMERGENCY AIR COMP.			Y/N
	1	1C14X	
	2	2C14X	

COMMENTS:

LICENSED OPERATOR REVIEW: ________
INITIALS

OPERATIONAL STATUS BOARD - SALEM

SGS

UPDATE: ____ ____
TIME DATE

UNIT #: ____

I. EMERGENCY CORE COOLING SYSTEM

CENT. CHRG. PUMP FLOW		GPM
SI PUMP FLOW # _1		GPM
SI PUMP FLOW # _2		GPM
RHR PUMP FLOW # _1		GPM
RHR PUMP FLOW # _2		GPM
RWST LEVEL		FT

II. CONTAINMENT

CONT. PRESSURE		PSIG
CONT. TEMP (AVG)		F
CONT. H_2 CONCEN.		%
CONT. SUMP LEVEL		%
CONT. RAD (HI RANGE)		
_R44A		R/hr
_R44B		R/hr

III. REACTOR COOLANT SYSTEM

# OF RCP'S RUNNING		
RVLIS (FULL RANGE)		%
THERMOCOUPLE (HOTTEST)		F
# THERMOCOUPLES >1200 F		
Tc LOOP _1		F
Tc LOOP _2		F
Tc LOOP _3		F
Tc LOOP _4		F
* Tave (AUCTIONEERED)		F
PZR/RCS PRESSURE		PSIG
PZR LEVEL (HOT)		%
Th LOOP _1		F
Th LOOP _2		F
Th LOOP _3		F
Th LOOP _4		F
RX PWR/NEUTRON FLUX		%/A/CPS
SUBCOOLING MARGIN		F

IV. C.V.C.S.

LETDOWN FLOW		GPM
CHARGING FLOW		GPM

V. SECONDARY COOLANT SYSTEM

NO. _1 SG LEVEL		% (NR or WR)
NO. _2 SG LEVEL		% (NR or WR)
NO. _3 SG LEVEL		% (NR or WR)
NO. _4 SG LEVEL		% (NR or WR)
NO. _1 SG PRESS.		PSIG
NO. _2 SG PRESS.		PSIG
NO. _3 SG PRESS.		PSIG
NO. _4 SG PRESS.		PSIG
NO. _1 SG FEED FLOW		% or LBS/HR
NO. _2 SG FEED FLOW		% or LBS/HR
NO. _3 SG FEED FLOW		% or LBS/HR
NO. _4 SG FEED FLOW		% or LBS/HR
AFST LEVEL		%

VI. MISC. TANKS LEVEL

WASTE HOLD-UP TANK # _1		%
WASTE HOLD-UP TANK # _2		%
WASTE MONITOR HUT		%

VII. SSCL INFORMATION

	YES or NO
OFFSITE POWER AVAILABLE?	
TWO OR MORE DIESELS AVAILABLE?	
DID ECCS ACTUATE?	
IS THE CONTAINMENT ISOLATED?	
IS IT CAPABLE OF BEING ISOLATED?	

VIII. SIGNIFICANT PLANT EVENTS

* WHEN NO RCP'S ARE RUNNING, Tave ON THE CONTROL CONSOLE IS INVALID

LICENSED OPERATOR REVIEW ____
INITIALS

Rev. 01

SSCL

STATION STATUS CHECKLIST
(Pg. 1 of 2)

Operational Information
SALEM GENERATING STATION Unit No.____ Message Date_______ Time______

Transmitted By: Name______________________ Position: ______________
(CR/TSC/EOF)

1. Date and Time Event Declared: Date ______ Time ______ (24 hr clock)
2. Event Classification: ☐ Unusual Event ☐ Site Area Emergency ☐ Alert ☐ General Emergency
3. Cause of Event: Primary Initiating Condition used for declaration

   EAL #(s) ______________________________
   Description of the event ______________________________
   ____
   ____
   ____

4. Status of Reactor: ☐ Tripped/Time ________ ☐ At Power ☐ Startup ☐ Hot Standby ☐ Hot Shutdown ☐ Cold Shutdown ☐ Refuel
5. PZR/RCS Pressure ________ psig Core Exit TC ________ °F
   Hottest
6. Is offsite power available? ☐ YES ☐ NO
7. Are two or more diesel generators operable? ☐ YES ☐ NO
8. Did any Emergency Core Cooling Systems actuate? ☐ YES ☐ NO
9. Containment:
   A. Has the Containment been isolated? ☐ YES ☐ NO
   B. Is it capable of being isolated? ☐ YES ☐ NO
10. Other pertinent information ______________________________
    ____
    ____
    ____
    ____

Approved: ______________________
EC or TSS or SSM

STATION STATUS CHECKLIST
(PAGE 2 OF 2)
RADIOLOGICAL INFORMATION

SALEM GENERATING STATION UNIT NUMBER:_____ CALCULATION TIME:________ DATE:________

1. GASEOUS RELEASE>TECH SPEC (T/S) LIMITS:
(T/S LIMITS: 2.42E+05 µCi/sec NG or 2.10E+01 µCi/sec IODINE)

YES: [ ]   RELEASE START TIME:___________ DATE:___________
NO: [ ]

A. RELEASE TERMINATED: YES [ ] NO [ ] N/A [ ]
B. ANTICIPATED OR KNOWN DURATION OF RELEASE:__________ HOURS
C. TYPE OF RELEASE: GROUND [ ] ELEVATED [ ] N/A [ ]
D. ADJUSTED WIND SPEED:______(mph) ______(m/sec) WIND DIR (deg from)_______
E. STABILITY CLASS:__________ (A-G) DELTA T:_______(deg C)
F. VENT PATH OF RELEASE: R41 [ ] R45B/C [ ] R44 [ ] R46 [ ]
G. NG RELEASE RATE: R41_________ R45B/C___________ R44__________
R46_________ (µCi/sec)
H. I-131 RELEASE RATE: R41_________ R45B/C___________ R44__________
R46__________ DEFAULT (µCi/sec) (circle if default)
I. TOTAL RELEASE RATE NOBLE GAS:______________(µCi/sec)
J. TOTAL RELEASE RATE IODINE-131:______________(µCi/sec)

2. PROJECTED OFFSITE DOSE RATE CALCULATIONS:

DISTANCE FROM VENT (IN MILES)	XU/Q (1/M2)	TEDE RATE (MREM/HR)	TEDE DOSE (4 DAY) (MREM)	THYROID-CDE RATE (MREM/HR)	THYROID-CDE DOSE (MREM)
MEA 0.79	________	________	________	________	________
2.00	________	________	________	________	________
LPZ 5.00	________	________	________	________	________
EPZ 10.00	________	________	________	________	________

3. OTHER PERTINENT INFORMATION: ____

____

____

____

4. UPDATE TO STATES (IF VERBALLY TRANSMITTED):

	NAME	TIME	INITIALS
STATE OF NEW JERSEY:	____________________	________	________
STATE OF DELAWARE :	____________________	________	________
AGENCY:	____________________	________	________

APPROVED: ______________________
EC or RAC or RSM

Day 2

Facility: Salem Examination Level: SRO		Date of Examination: 2/22/98 Operating Test Number:
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Valve Lineup JPM	2.1.29 3.3 - Knowledge of how to conduct and verify valve lineups. Perform a valve alignment verification surveillance
	Perform a QPTR Surveillance JPM	2.1.7 4.4 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. Perform a QPTR surveillance and evaluate TS applicability
A.2	Surveillance Test Review JPM (FAULTED)	2.2.12 3.4 - Knowledge of surveillance procedures. Review a completed surveillance test on a Containment Spray Pump
A.3	Radiation Protection	2.3.4 3.1 – Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized. Determine Emergency Exposure Limits during a plant emergency
		2.3.10 3.3 - Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. Special requirements necessary for personnel to enter a locked High Radiation Area
A.4	Emergency Plan JPM	2.4.44 4.0 – Knowledge of Emergency Plan Protective Action Recommendations Determine PARs during a General Emergency

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: SALEM

SYSTEM: Administrative

TASK: Perform a Valve Alignment Check of AFW Valves

TASK NUMBER: 0610100201

JPM NUMBER: WD-SROA.1.1

APPLICABILITY:

EO [ ] **RO** [ ] **SRO** [X]

K/A NUMBER: 2.1.29

IMPORTANCE FACTOR: 3.4 / 3.3

RO **SRO**

EVALUATION SETTING/METHOD: PLANT

REFERENCES: S2.OP-ST.AF-0008(Q)

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 10 mins

TIME PERIOD FOR TIME CRITICAL STEPS: N/A

APPROVED:

PRINCIPAL TRAINING SUPERVISOR

for **OPERATIONS MANAGER**

CAUTION: N llowing:

1.
2
3.

SRO. see RO Pkg. for QPTR

ACTUAL TIME TO C

JPM PERFORMED E

REASON, IF UNSATI

EVALUATOR'S SIGN

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM:	Administrative
TASK:	Perform a Valve Alignment Check of AFW Valves
TASK NUMBER:	
INITIAL CONDITIONS:	S2.OP-ST.AF-0008, Auxiliary Feedwater Valve Verification Modes 1-3, is in progress.
INITIATING CUE:	You are to perform 2LCK SURV 002 for the Inner Penetration Area, Elevation 100, IAW S2.OP-ST.AF-0008, Auxiliary Feedwater Valve Verification Modes 1-3. Another operator is performing AF SURV 001.

Successful Completion Criteria:

1. All critical steps completed
2. All sequential steps completed in order
3. All time-critical steps completed within allotted time
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

Name: ______________________
Date: ______________________

System: **ADMINISTRATIVE**

Task: **Perform a Valve Alignment Check of AFW Valves**

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	1	Obtain Auxiliary Feedwater Valve Verification Modes 1-3 procedure, S2.OP-ST.AF-0008.	*CUE:* Provide the candidate with a copy of S2.OP-ST.AF-0008, Auxiliary Feedwater Valve Verification Modes 1-3 and a copy of 2LCK SURV 002 for the Inner Penetration Area, Elevation 100'.		
*	2	Read the Lineup Sheet and locate the Unit, System and Components to be verified. ***NOTE: The candidate must locate each valve. 23AF23 and 23MS45 are clearly marked but require a ladder to get close. Have the candidate point out 23AF23 and 23MS45 but not get a ladder to perform the other functions.*** • Locate 21AF23, 21MS45, 23AF23, 23MS45	The operator reads the lineup sheet and locates the Unit, System and Components to be verified. • Locates each valve		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

Name: ______________________
Date: ______________________

System: ADMINISTRATIVE

Task: Perform a Valve Alignment Check of AFW Valves

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
			CUE: Demonstrate on 21AF23 and 21MS45 all actions that you would also perform on 23AF23 and 23MS45 when a ladder is used for access.		
	3	Perform the following:	The operator performs the following for each valve:		
*		• Verify the valve ID for 21AF23 and 21MS45	• Verifies the valve ID by comparing the ID Tag with the Lineup Sheet		
*		• Verify 21AF23 and 21MS45 are properly locked	• Verifies the valve is locked properly by observing the locking device is intact and positioned such that the valve operator cannot be positioned to move the valve stem.		
*		• Verify 21AF23 and 21MS45 are in the correct position.	• Verifies the valve is in the correct position by observing the local position indicator and/or valve stem position.		
		Record the As-Found position	Records the As-Found position		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

Name: ______________________
Date: ______________________

System: ADMINISTRATIVE

Task: Perform a Valve Alignment Check of AFW Valves

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	4	When all valves have been verified, sign on Section 2.0 of ST.AF-0008.	Prints name, initials, signs name and dates		
	5	Inform the Control Room Supervisor when the lineup is complete.	The candidate informs the Control Room Supervisor of task completion.		

Terminating Cue: CRS notified

<u>THIS SHEET SHOULD BE PROVIDED TO THE CANDIDATE</u>

INITIAL CONDITIONS: S2.OP-ST.AF-0008, Auxiliary Feedwater Valve Verification Modes 1-3, is in progress.

INITIATING CUE: You are to perform 2LCK SURV 002 for the Inner Penetration Area, Elevation 100, IAW S2.OP-ST.AF-0008, Auxiliary Feedwater Valve Verification Modes 1-3. Another operator is performing AF SURV 001.

T2M3121

SALEM 2 Unit: S2 Opmode: 1 Printer: TSR1 01/20/99 13:44

Blocking Point Lineup Completion

Command ===> BROWS

Unit: S2 + System : 2LCK + Type: SURV + ID: 002 +

Area: 13 Elevation: 100 Opmode: 1 Verification Nbr: 1

Blocking Pt#	Norm Pos	Tris Pos	Remarks	Current Status
21AF23	LO	LO		NORMAL
21MS45	LO	LO		NORMAL
23AF23	LO	LO		NORMAL
23MS45	LO	LO		NORMAL

F3 Cancel F4 Commit F6 Edit F7 Back F8 Forward F9 Help F11 Prompt

AUXILIARY FEEDWATER
VALVE VERIFICATION
MODES 1-3

CONTROL COPY # 28

USE CATEGORY : II

REVISION SUMMARY

- Added requirements for the STA to review the completed procedure. **(R15425)**
- Added requirements to perform 2LCK SURV002, 31 DAY LOCKED VALVE SURV AUX FEED. **(R16076)**
- Minor editorial changes to bring the procedure in line with higher tier procedures and S1.OP-ST.AF-0008(Q).
- Completion Signoff Sheet changed to reflect the current requirements.

IMPLEMENTATION REQUIREMENTS

- Effective Date May 27, 1997

APPROVED: for Manager - Salem Operations — May 23, 1997 Date

AUXILIARY FEEDWATER VALVE VERIFICATION MODES 1-3

TABLE OF CONTENTS

1.0 PURPOSE

1.1 Performance of this procedure is used to satisfy the following Technical Specifications:

1.1.1 4.7.1.2.a.1 by verifying that each non-automatic valve in flow path that is not locked, sealed or otherwise secured in position, is in its correct position. [C0265]

1.1.2 4.7.1.2.a.2 by verifying that manual maintenance valves in flow path to each steam generator are locked open. [C0265]

1.2 This requirement is applicable:

1.2.1 At least once per 31 days in Modes 1-3.

1.2.2 In Mode 4 prior to entering Mode 3.

2.0 PREREQUISITES

____ 2.1 A printout of AF SURV 001 and 2LCK SURV 002 for required plant Mode is generated to perform this surveillance.

3.0 PRECAUTIONS AND LIMITATIONS

____ 3.1 Procedure Use and adherence policy as found in NC.NA-AP.ZZ-0001(Q), Nuclear Procedure System, is applicable to this procedure.

____ 3.2 Any components found misaligned during performance of this procedure must not be repositioned without first determining the reason for misalignment and obtaining approval from the SNSS/NSS.

____ 3.3 Steps identified with a dollar sign ($) are those items required to meet Technical Specification acceptance criteria. Such steps, if not satisfactorily completed, may have reportability requirements and are to be brought to the immediate attention of the SNSS/NSS.

____ 3.4 Both steam supplies to 23 AFW Pump must be OPERABLE to consider 23 AFW Pump OPERABLE IAW Technical Specification 3.7.1.2.

4.0 EQUIPMENT/MATERIAL REQUIRED

None

5.0 PROCEDURE

5.1 Verification of Auxiliary Feedwater Valves

____ **COMPLETE** AF SURV 001 and 2LCK SURV 002 for required plant Mode.

5.2 Acceptance Criteria

____ $ 5.2.1 This surveillance is satisfactory when all valves listed on AF SURV 001 and 2LCK SURV 002 are verified to be in their required position.

OR

____ 5.2.2 This surveillance is unsatisfactory.

____ A. **INITIATE** Action Request(s) to correct the unsatisfactory conditions.

____ B. **RECORD** Action Request number(s) AND reason for unsatisfactory completion on Attachment 1 in the Comments Section.

5.3 Completion and Review

____ 5.3.1 **COMPLETE** Attachment 1, Sections 1.0 and 2.0, AND **FORWARD** this procedure with AF SURV 001 and 2LCK SURV 002 to the NSS for review.

____ 5.3.2 NSS **PERFORM** following:

____ A. **REVIEW** this procedure with Attachment 1, AF SURV 001 and 2LCK SURV 002 for completeness and accuracy.

____ B. **COMPLETE** Attachment 1, Sections 3.0 and 4.0.

____ C. IF ANY Evaluation Result is identified as UNSAT for applicable Mode, THEN **ENTER** applicable Technical Specification Action Statement(s).

____ D. **FORWARD** package to Shift Technical Advisor (STA) for review.

____ 5.3.3 STA **PERFORM** following:

____ A. **REVIEW** this procedure with Attachment 1, AF SURV 001 and 2LCK SURV 002 for completeness and accuracy.

____ B. **COMPLETE** Attachment 1, Section 4.0.

____ C. **FORWARD** package to SNSS/NSS for review and approval.

___ 5.3.4 SNSS/NSS **PERFORM** the following:

___ A. **REVIEW** this procedure with Attachment 1, AF SURV 001 and 2LCK SURV 002 for completeness and accuracy.

___ B. **COMPLETE** Attachment 1, Section 4.0.

___ C. **FORWARD** completed package to Operations Staff.

END OF PROCEDURE SECTION

6.0 RECORDS

Retain following IAW NC.NA-AP.ZZ-0003(Q), Document Management Program:

AF SURV 001
2LCK SURV 002
Attachment 1

7.0 REFERENCES

7.1 Updated Final Safety Analysis Report:

7.1.1 Section 10.4.7.2, Auxiliary Feed Water System

7.2 Technical Specifications - Unit 2:

7.2.1 3.7.1.2, Plant Systems, Auxiliary Feed Water System

7.2.2 4.7.1.2.a.1, Auxiliary Feed Water Surveillance Requirements

7.2.3 4.7.1.2.a.2, Auxiliary Feed Water Surveillance Requirements

7.3 Procedures:

7.3.1 NC.NA-AP.ZZ-0012(Q), Technical Specification Surveillance Program

7.4 Drawings:

7.4.1 205336, Unit 2, Auxiliary Feed Water

7.5 Cross-References:

7.5.1 Technical Specifications - Unit 2:

A. 3.7.1.2, Plant Systems - Auxiliary Feed Water System

B. 4.7.1.2.a.1, Auxiliary Feed Water Surveillance Requirements

C. 4.7.1.2.a.2, Auxiliary Feed Water Surveillance Requirements

7.5.2 Procedures:

A. NC.NA-AP.ZZ-0001(Q), Nuclear Procedure System

B. NC.NA-AP.ZZ-0003(Q), Document Management Program

7.5 Cross-References: (Continued)

7.5.3 Others:

A. AF SURV 001

B. 2LCK SURV 002

7.6 Commitments:

7.6.1 C0265 - NSO LER 311/89-015-00

7.6.2 C0283 - NRC VIOL 311/87-18-01

ATTACHMENT 1
(Page 1 of 2)

COMPLETION SIGN-OFF SHEET

1.0 COMMENTS:

(Include procedure/test deficiencies and corrective actions.)

ATTACHMENT 1
(Page 2 of 2)

COMPLETION SIGN-OFF SHEET

2.0 SIGNATURES:

Print	Initials	Signature	Date
______	______	______	______
______	______	______	______
______	______	______	______
______	______	______	______
______	______	______	______
______	______	______	______

3.0 SNSS/NSS EVALUATION RESULTS:

3.1 All valves listed in AF SURV 001 are verified to be in their required position. _____SAT _____UNSAT

3.2 All valves listed in 2LCK SURV 002 are verified to be in their required position. _____SAT _____UNSAT

4.0 SNSS/NSS FINAL REVIEW AND APPROVAL:

This procedure with Attachment 1, AF SURV 001 and 2LCK SURV 002 has been reviewed for completeness and accuracy. All deficiencies, including corrective actions, have been clearly recorded in COMMENTS Section above. Technical Specification compliance, procedure compliance, and Acceptance Criteria have been evaluated.

Signature:______________________________ Date:__________
Nuclear Shift Supervisor

Signature:______________________________ Date:__________
Shift Technical Advisor

Signature:______________________________ Date:__________
(Senior) Nuclear Shift Supervisor

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: SALEM

SYSTEM: Administrative

TASK: Review a completed surveillance test

TASK NUMBER: 1230300302

JPM NUMBER: WD-SROA.2

APPLICABILITY:

EO [ ] **RO** [X] **SRO** [X]

K/A NUMBER: 2.2.12

IMPORTANCE FACTOR: 3.0 / 3.4
RO **SRO**

EVALUATION SETTING/METHOD: CLASSROOM

REFERENCES: S1.OP-ST.CS-0001(Q) ; S1.RA-ST.CS-0001(Q)

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 20 min

TIME PERIOD FOR TIME CRITICAL STEPS: N/A

APPROVED: J C Chloroz for ______ G W Galley ______

PRINCIPAL TRAINING SUPERVISOR for **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission from the OS or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions);**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL TIME TO COMPLETE JPM: ______

JPM PERFORMED BY: ______ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: **DATE:**

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM:	Administrative
TASK:	Review a completed surveillance test
TASK NUMBER:	1230300302
INITIAL CONDITIONS:	The unit is in Mode 1. A regularly scheduled surveillance test is in progress on the 11 Containment Spray Pump. The procedure has been completed through step 5.1.27.
INITIATING CUE:	Beginning at Step 5.1.28, complete the procedure; including the actions of the CRS.

Successful Completion Criteria:

1. All critical steps completed
2. All sequential steps completed in order
3. All time-critical steps completed within allotted time
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).

NAME:____________________

DATE:____________________

System: ADMINISTRATIVE

Task: REVIEW A COMPLETED SURVEILLANCE TEST

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		Provide the candidate with the marked up S1.OP-ST.CS-0001(Q), Inservice Testing-11 Containment Spray Pump and S1.RA-ST.CS-0001, In-service Testing-11 Containment Spray Pump Acceptance Criteria.	Candidate reviews procedures		
*	5.1.28	Record the Test Results by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 2. Section 3.0 and 4.0	The candidate reviews the data of sections 3.0 & 4.0 of Attachment 2 and compares it against the acceptance criteria in S1.RA-ST.CS-0001 Determines the vibration data point status and initials the appropriate column as follows: ▪ Pt. 126 – Alert Range, SAT ▪ Pt. 127 – Alert Range, SAT ▪ Pt. 128 – Required Action, UNSAT ▪ Pt. 129 – Alert Range, SAT Determines Pump flow rate to be SAT and initials the SAT column. Determines Pump Differential Pressure to be UNSAT and initials the UNSAT column.		

NAME:________________________

DATE:________________________

System: ADMINISTRATIVE

Task: REVIEW A COMPLETED SURVEILLANCE TEST

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.1.29	IF this surveillance is being performed to establish new baseline data THEN IST Program Manager PERFORM the following:	CUE: Initial Conditions stated that the surveillance was regularly scheduled. Candidate marks this step N/A.		
	5.1.30	Evaluate TSAS 3.6.2.1 and 3.6.2.2 for continued applicability	Remain in 3.6.2.1. Can exit 3.6.2.2		
	5.3.1	If surveillance is satisfactory…	Candidate marks this step N/A		
*	5.3.2	If surveillance is unsatisfactory -- - - -	The candidate indicates an AR should be prepared to correct the situation. CUE: After the candidate states that an AR should be prepared, inform him that the AR # 99-XXX has been completed. The Candidate records the AR # for the UNSAT (Low DP) in Attachment 6.		

OPERATOR TRAINING PROGRAM NAME:____________________

JOB PERFORMANCE MEASURE DATE:____________________

System: ADMINISTRATIVE

Task: REVIEW A COMPLETED SURVEILLANCE TEST

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
NOTE: If the Candidate indicates the Test could be re-run to verify data, then: **CUE: The surveillance will not be re-run prior to repairs to the pump.**					
	5.4.1	IF testing is complete, THEN Direct Maintenance Controls to REMOVE temporary test equipment and INITIAL and DATE the Removal in Attachment 1,Section 3.0	The Candidate informs I&C to remove the temporary test equipment and INITIAL and DATE the removal in Attachment 1, Section 3.0 and initials the step. **CUE: I&C acknowledges.**		
	5.4.2	COMPLETE Attachment 6, Sections 1.0 and 2.0, AND FORWARD this procedure to the CRS for review.			
*	5.4.3	CRS reviews the procedure.	Candidate reviews the procedure and initials Step A. Candidate recognizes that the test is unsatisfactory IAW Part D and marks Steps B & C N/A. *Candidate declares the pump Inoperable and initials Step D.		

NAME:____________________________
DATE:____________________________

System: ADMINISTRATIVE

Task: REVIEW A COMPLETED SURVEILLANCE TEST

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*		Evaluate Technical Specifications	Candidate refers to Technical Specifications and remains in 3.6.2.1		

Terminating Cue: TS evaluation complete.

PROVIDE THIS SHEET TO THE CANDIDATE

INITIAL CONDITIONS: The unit is in Mode 1. A regularly scheduled surveillance test is in progress on the 11 Containment Spray Pump. The procedure has been completed through step 5.2.21.

INITIATING CUE: Beginning at Step 5.1.28, complete the procedure; including the actions of the CRS.

FORM-4
(Page 1 of 2)

ON-THE-SPOT-CHANGE FORM

PROCEDURE NO: SI.OP-ST.CS-0001(Q) OTSC # 8A

PROCEDURE TITLE: INSERVICE TESTING - 11 CONTAINMENT SPRAY PUMP USE CATEGORY I

TEMPORARY OTSC: YES ☐ NO ☒ Est. Duration: ______

DESCRIPTION OF CHANGE: Added specific requirements in step to install Panametrics Flow meter 206936 as directed ~~in ARR 980707087~~ 7/30/98 by IST Program Manager. (Dave Lyons)

REASON FOR CHANGE: Ensures Panametrics flow meter properly setup to ensure proper response for operability concerns.

LIST PROCEDURE PAGES CHANGED: Page 17 of 26

Determine if the OTSC changes the intent of the procedure, refer to NAP-1 Attachment 6, Change of Intent Guidelines. Are any of the statements in Attachment 6 true or does the OTSC in any way change the intent of the procedure? YES ☐ NO ☒

If the above answer is "Yes", STOP! An OTSC shall not be processed.

INITIATOR ______ DATE 7/30/98

APPROVED ______ DATE 7-30-98
Job Supervisor/Department Management

APPROVED ______ DATE 7/30/98
OS/CRS

FORM-4
(Page 2 of 2)

ON-THE-SPOT-CHANGE FORM

PROCEDURE NO 51.OP-ST.CS-0001(Q) OTSC # 8A

INITIATOR:

1. Give a copy of the OTSC Package to the TDR by end of shift
2. Initiate a BP type AR, Action Request Code OTSC, to the Sponsor Organization by the next working day to evaluate the OTSC. Action Request No 980730134
3. Give the OTSC Package to the Sponsor Organization by the next working day. **[CD-427B]**
4. Include a copy of completed procedure with WO package, if the procedure was part of a WO

COMPLETED BY: ____________ Initiator 5157 Extension 7/30/98 Date

OTSC POST EVALUATION

5. Did the use of the OTSC result in a plant system, structure or component being in a condition which:

		YES	NO
A.	Deviates from acceptance criteria extracted or calculated from approved design or licensing documents?	☐	☐
B	Deviates from operating conditions or methods required by approved design or licensing documents?	☐	☐
C	Is prohibited by the Technical Specifications?	☐	☐

6. If there is a **"Yes"** to 5.A, B or C, notify the OS/CRS and initiate an Action Request in accordance with NAP-0. Action Request No. ____________
7. Ensure a 10CFR50.59 Applicability Review or Safety Evaluation is performed and attached.
8. SQR Review Completed. ____________ SQR ____________ Date

   SQR Qualification Expires ____________ Date
9. Approval ____________ Department Management ____________ Date

INSERVICE TESTING - 11 CONTAINMENT SPRAY PUMP

USE CATEGORY : I

REVISION SUMMARY Biennial Review Yes ___ No ✓

- Revised procedure to reflect utilizing "Panametrics Ultrasonic Flow Meter #206936" for indication of 11 CS Pump recirculation flow versus flow indicator "1FI929". This change was incorporated as 1FI929 is inoperable, and use of the Panametrics Ultrasonic Flow Meter is consistent with changes identified PR #980107096, 11/12 CS Pumps Could Not Attain Desired Flow. Use of the Panametrics Ultrasonic Flow Meter for performance of Inservice Testing will continue until replacement of flow indicator 1FI929. **[R21638]**

- Revised "11CS11, 11 CS PUMP FLOW TEST STOP VALVE" to indicate "11CS11, CS PUMP FLOW TEST STOP VALVE" throughout procedure. This change was incorporated to reflect field verified valve nomenclature. **[Operator Comment]**

- Revised "11CS20, 11 CS EDUCTOR SUP VALVE" to indicate "11CS20, CS EDUCTOR SUP VALVE" throughout procedure. This change was incorporated to reflect field verified valve nomenclature. **[Operator Comment]**

- Revised "1CS61, CS SPRAY ADD TK DISCH HDR SAMP" to indicate "1CS61, CS SPRAY ADD TK DISCH SAMP VALVE" throughout procedure. This change was incorporated to reflect field verified valve nomenclature. **[Operator Comment]**

- Revised Steps 5.4.3.B.2 and 5.4.3.C.2 to indicate changing test frequency IAW "NC.NA-AP.ZZ-0012(Q), Technical Specifications Surveillance Program AND NC.NA-AP.ZZ-0070(Q), Inservice Testing Program" versus "SC.OP-ST.ZZ-0002(Q), In Service Testing Pumps and Valves Test Frequency Change". This editorial change was incorporated due to changes in NAP-70 concerning the method of performing test frequency changes, which will result in the deletion of SC.OP-ST.ZZ-0002(Q). **[R21619]**

- Revised Reference Section 7.0 to reflect appropriate required references. This editorial change was incorporated to ensure applicable references are indicated.

- Revised procedure to indicate "IST Implementation Engineer" versus "IST Program Manager". This editorial change was incorporated to reflect title changes in NC.NA-AP.ZZ-0070(Q), Inservice Testing Program". **[R21619]**

IMPLEMENTATION REQUIREMENTS Effective Date 7/29/98

None

APPROVED: [signature] for **Operations Manager** July 29, 1998 **Date**

INSERVICE TESTING - 11 CONTAINMENT SPRAY PUMP

TABLE OF CONTENTS

1.0 PURPOSE

1.1 Provides instructions necessary to perform Inservice Inspection and Testing of the 11 Containment Spray Pump and Eductor Check Valve 11CS21 IAW Technical Specification 4.0.5. This requirement is applicable in Modes 1-4. **[C0265]**

1.2 This test also satisfies the requirements of Technical Specification 4.6.2.1.b by verifying, that on recirculation flow, 11 Containment Spray Pump develops a differential pressure of greater than or equal to 204 psig when tested pursuant to Technical Specification 4.0.5. This requirement is applicable in Modes 1-4. **[C0265]**

1.3 Performance of this procedure is required at least once per 92 days in Modes 1-4, prior to entry into Mode 4 if NOT previously performed in the last 92 days, or as otherwise specified in post-maintenance operational retest requirements.

2.0 PREREQUISITES

2.1 **REVIEW** Components "Off Normal and Off-Normal Tagged" list(s) for the system and support system(s) associated with the evolution to be performed in this procedure.

2.2 Applicable Work Order number(s) and Reason for Test are recorded on Attachment 1, Section 1.0.

2.3 IF this surveillance is being performed to verify post-maintenance operability OR to establish new baseline data, THEN the IST Implementation Engineer is notified. **[C0583]**

2.4 IF this surveillance is being performed as a regular scheduled surveillance OR to verify post-maintenance operability, THEN a copy of S1.RA-ST.CS-0001(Q), Inservice Testing - 11 Containment Spray Pump Acceptance Criteria is attached.

2.5 Calibration data for the instruments and test equipment listed in Attachment 1, Section 2.0 is obtained. **[C0289]**

2.6 The temporary test equipment as specified in Attachment 1, Section 3.0 is installed, labeled and aligned for service by Maintenance Controls.

2.7 Flushing of the CS Eductor Piping IAW Attachment 5 is completed.

3.0 **PRECAUTIONS AND LIMITATIONS**

3.1 Procedure Use and adherence policy as found in NC.NA-AP.ZZ-0001(Q), Nuclear Procedure System, is applicable to this procedure.

3.2 Steps identified with a dollar sign ($) are those items required to meet Technical Specification acceptance criteria. Such steps, if not satisfactorily completed, may have reportability requirements and should be brought to the immediate attention of the OS/CRS.

3.3 IF a valid Containment Spray Actuation occurs during performance of this procedure, THEN all valves should be IMMEDIATELY aligned to support the actuation.

3.4 The 11 CS Pump requires a minimum RWST level indication of >0 ft to ensure adequate NPSH.

3.5 IF this test is performed when the RWST is emptied to support Refueling Activities, THEN the respective data should NOT be used to establish new baseline data.

NA IST 3.6 IF substitution of Measuring and Test Equipment (M&TE) is required, THEN the IST Implementation Engineer has specified range, accuracy and documented substitution in the Comments Section of Attachment 6.

3.7 When the Reactor is in Mode 1-4, Section 5.1 of this procedure is to be performed (Section 5.2 should be indicated as N/A).

3.8 When the Reactor is in Mode 5, 6 or Defueled, Section 5.2 of this procedure is to be performed (Section 5.1 should be indicated as N/A).

3.9 During operational testing of the 11 Containment Spray Pump, portions of the system subjected to pump pressure SHALL be inspected for leakage. This inspection includes, but is not limited to, pump seals, valve packing, flanged joints, and piping (Reference UFSAR Section 6.2.2.1.4 and PR #960716112).

3.10 An RWST level of ≥40.5 ft and ≤41.9 ft is required to satisfy the OPEN and CLOSED Inservice Testing requirements of Eductor Check Valve 11CS21.

3.11 The 11 Containment Spray Pump is to be stopped should motor winding temperature exceed 266°F.

4.0 EQUIPMENT/MATERIAL REQUIRED

4.1 M&TE:

- CSI 2110 Machine Analyzer
- CSI 2110 Pickup Probe
- Pressure Gauge, Heise CM or equivalent, 0-60 psig,
  Accuracy ±2.0% of full scale or better
- Pressure Gauge, Heise CM or equivalent, 0-300 psig or 0-500 psig,
  Accuracy ±2.0% of full scale or better
- Panametrics Ultrasonic Flow Meter #206936

4.2 Additional Tools and Equipment:

- JA Master Key

4.3 Procedure(s):

- Copy of S1.RA-ST.CS-0001(Q), Inservice Testing - 11 Containment Spray Pump Acceptance Criteria, if applicable

5.0 PROCEDURE

5.1 IST of 11 CS Pump and Eductor Check Valve 11CS21 (Modes 1-4)

5.1.1 **ENSURE** 11 CS Pump oil level ≥1/4 full.

5.1.2 **ENSURE** the following valves are CLOSED:

- 11CS2, PUMP DISCH
- 1CS16, TANK DISCHARGE
- 1CS17, TANK DISCHARGE

5.1.3 **ENTER** Technical Specification Action Statements 3.6.2.1 and 3.6.2.2.

5.1.4 **PLACE** 1CS14, TANK DISCHARGE, in the VALVE OPERABLE position at 1RP4 Panel.

5.1.5 **CLOSE** 1CS14, TANK DISCHARGE.

5.1.6 **OPEN** 11CS11, CS PUMP FLOW TEST STOP VALVE.

5.1.7 **OPEN** 1CS35, CS PUMP FLOW TEST STOP VALVE.

5.1.8 **PERFORM** CLOSED check valve testing of 11CS21, as follows:

A. **UNLOCK** and **CLOSE** 12CS20, 12 CS EDUCTOR SUP VALVE.

B. **OPEN** 1CS61, CS SPRAY ADD TK DISCH SAMP VALVE.

C. **RECORD** 11CS21 CLOSED "Check Valve Data" and "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 3.

$

D. **CLOSE** 1CS61, CS SPRAY ADD TK DISCH SAMP VALVE.

E. **OPEN** and **LOCK** 12CS20, 12 CS EDUCTOR SUP VALVE.

5.1.9 **UNLOCK** and **CLOSE** 11CS20, CS EDUCTOR SUP VALVE.

5.1.10 **RECORD** the "Suct. Press. Pump STOPPED" in Attachment 2, Section 4.0.

5.1.11 **CLOSE** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

5.1.12 **START** 11 CS Pump.

5.1.13 **THROTTLE** 1CS35 UNTIL flow rate is set at 300 (295-305) gpm as indicated on the Panametrics Ultrasonic Flow Meter.

5.1.14 Slowly **OPEN** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

NOTE

After pump conditions are as stable as the system permits, 11 Containment Spray Pump is required to be operated for at least 2 minutes prior to acquiring "Vibration Readings" and "Pump Performance Data".

5.1.15 When 11 CS Pump has operated for >2 minutes at stable conditions, **RECORD** the "Vibration Readings" and "Pump Performance Data" on Attachment 2, Sections 2.0, 3.0, and 4.0.

5.1.16 **PERFORM** a visual leakage inspection of the 11 Containment Spray Pump, and portions of the system subjected to pump pressure.

5.1.17 **RECORD** 11 CS Pump Leakage "Inspection Results" by initialing the NO LEAKAGE or LEAKAGE column using the Leakage Criteria specified in Attachment 2, Section 5.0.

5.1.18 **OPEN** and **LOCK** 11CS20, CS EDUCTOR SUP VALVE.

5.1.19 **PERFORM** OPEN check valve testing of 11CS21, as follows:

A. **UNLOCK** and **OPEN** 1CS31, RWST TO EDUCTORS STOP VALVE.

B. **RECORD** 11CS21 OPEN "Check Valve Data" and "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 3.

C. **CLOSE** and **LOCK** 1CS31, RWST TO EDUCTORS STOP VALVE.

5.1.20 **STOP** 11 CS Pump.

5.1.21 **CLOSE** 11CS11, CS PUMP FLOW TEST STOP VALVE.

5.1.22 **CLOSE** 1CS35, CS PUMP FLOW TEST STOP VALVE.

5.1.23 **CLOSE** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

5.1.24 **OPEN** 1CS14, TANK DISCHARGE.

5.1.25 **PLACE** 1CS14, TANK DISCHARGE in the LOCKED OUT position at 1RP4 Panel.

> **NOTE**
>
> Cycling 11CS2 ensures that the valve is NOT hydraulically locked following pump operation. (NRC GL 95-07) [C0620]

5.1.26 **PERFORM** the following to cycle 11CS2: [C0620]

A. **OPEN** 11CS2, PUMP DISCH.

B. **CLOSE** 11CS2, PUMP DISCH.

5.1.27 Direct a second Operator to **PERFORM** Independent Verification of the following:

- Calculations performed in Attachment 2. [C0284]
- Valve positions in Attachment 4. [C0290]

___ $ 5.1.28 IF this surveillance is being performed as a regular scheduled surveillance OR to verify post-maintenance operability, THEN **RECORD** the "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 2, Sections 3.0 and 4.0.

___ 5.1.29 IF this surveillance is being performed to establish new baseline data, THEN IST Implementation Engineer **PERFORM** the following:

___ IST A. **EVALUATE** the data AND **DETERMINE** if the specified components meet minimum design requirements.

___ $ IST B. **RECORD** "Test Results" by initialing SAT or UNSAT column using the Acceptance Criteria in Attachment 2, Sections 3.0 and 4.0.

___ 5.1.30 **EVALUATE** Technical Specification Action Statements 3.6.2.1 and 3.6.2.2, for continued applicability.

5.2 IST of 11 CS Pump and Eductor Check Valve 11CS21 (Modes 5, 6 or Defueled)

NA 5.2.1 **ENSURE** 11 CS Pump oil level ≥1/4 full.

___ 5.2.2 **ENSURE** the following valves are CLOSED:

___ ◆ 11CS2, PUMP DISCH

___ ◆ 1CS14, TANK DISCHARGE

___ ◆ 1CS16, TANK DISCHARGE

___ ◆ 1CS17, TANK DISCHARGE

___ 5.2.3 **OPEN** 11CS11, CS PUMP FLOW TEST STOP VALVE.

___ 5.2.4 **OPEN** 1CS35, CS PUMP FLOW TEST STOP VALVE.

___ 5.2.5 **PERFORM** CLOSED check valve testing of 11CS21, as follows:

___ A. **ENSURE** 12CS20, 12 CS EDUCTOR SUP VALVE closed.

___ B. **UNLOCK** and **OPEN** 11CS20, CS EDUCTOR SUP VALVE.

___ C. **OPEN** 1CS61, CS SPRAY ADD TK DISCH SAMP VALVE.

___ $ D. **RECORD** 11CS21 CLOSED "Check Valve Data" and "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 3.

___ E. **CLOSE** 1CS61, CS SPRAY ADD TK DISCH SAMP VALVE.

___ F. **CLOSE** 11CS20, CS EDUCTOR SUP VALVE.

___ 5.2.6 **RECORD** the "Suct. Press. Pump STOPPED" in Attachment 2, Section 4.0.

___ 5.2.7 **CLOSE** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

___ 5.2.8 **START** 11 CS Pump.

___ 5.2.9 **THROTTLE** 1CS35 UNTIL flow rate is set at 300 (295-305) gpm as indicated on the Panametrics Ultrasonic Flow Meter.

___ 5.2.10 Slowly **OPEN** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

NOTE

After pump conditions are as stable as the system permits, 11 Containment Spray Pump is required to be operated for at least 2 minutes prior to acquiring "Vibration Readings" and "Pump Performance Data".

___ 5.2.11 When 11 CS Pump has operated for >2 minutes at stable conditions, **RECORD** the "Vibration Readings" and "Pump Performance Data" on Attachment 2, Sections 2.0, 3.0, and 4.0.

___ 5.2.12 **PERFORM** OPEN check valve testing of 11CS21, as follows:

___ A. **OPEN** 11CS20, CS EDUCTOR SUP VALVE.

___ B. **UNLOCK** and **OPEN** 1CS31, RWST TO EDUCTORS STOP VALVE.

___ $ C. **RECORD** 11CS21 OPEN "Check Valve Data" and "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 3.

___ D. **CLOSE** and **LOCK** 1CS31, RWST TO EDUCTORS STOP VALVE.

___ E. **CLOSE** and **LOCK** 11CS20, CS EDUCTOR SUP VALVE.

___ 5.2.13 **PERFORM** a visual leakage inspection of the 11 Containment Spray Pump, and portions of the system subjected to pump pressure.

___ 5.2.14 **RECORD** 11 CS Pump Leakage "Inspection Results" by initialing the NO LEAKAGE or LEAKAGE column using the Leakage Criteria specified in Attachment 2, Section 5.0.

___ 5.2.15 **STOP** 11 CS Pump.

___ 5.2.16 **CLOSE** 11CS11, CS PUMP FLOW TEST STOP VALVE.

___ 5.2.17 **CLOSE** 1CS35, CS PUMP FLOW TEST STOP VALVE.

___ 5.2.18 **CLOSE** Instrument Isolation Valves for Temporary Test Equipment specified in Attachment 1, Section 3.0.

___ 5.2.19 C/T 11 CS Pump.

NOTE

Cycling 11CS2 ensures that the valve is NOT hydraulically locked following pump operation. (NRC GL 95-07) [C0620]

5.2.20 **PERFORM** the following to cycle 11CS2: **[C0620]**

___ A. **OPEN** 11CS2, PUMP DISCH.

___ B. **CLOSE** 11CS2, PUMP DISCH.

___ 5.2.21 Direct a second Operator to **PERFORM** Independent Verification of the following:

___ ♦ Calculations performed in Attachment 2. **[C0284]**

___ ♦ Valve positions in Attachment 4. **[C0290]**

___ $ 5.2.22 IF this surveillance is being performed as a regular scheduled surveillance OR to verify post-maintenance operability, THEN **RECORD** the "Test Results" by initialing the SAT or UNSAT column using the Acceptance Criteria in Attachment 2, Sections 3.0 and 4.0.

___ 5.2.23 IF this surveillance is being performed to establish new baseline data, THEN IST Implementation Engineer **PERFORM** the following:

___ IST A. **EVALUATE** the data AND **DETERMINE** if the specified components meet minimum design requirements.

___ $ IST B. **RECORD** "Test Results" by initialing SAT or UNSAT column using the Acceptance Criteria in Attachment 2, Sections 3.0 and 4.0.

5.3 Acceptance Criteria

___ $ 5.3.1 This surveillance is satisfactory when Attachments 2 and 3 are completed with equipment listed meeting the Acceptance Criteria stated in the attachment.

OR

___ 5.3.2 This surveillance is unsatisfactory.

___ A. **INITIATE** Action Request(s) to correct unsatisfactory conditions(s).

___ B. **RECORD** Action Request number(s), and reason for unsatisfactory completion on Attachment 6 in the Comments Section.

5.4 Completion and Review

___ 5.4.1 IF testing is complete,
THEN Direct Maintenance Controls to **REMOVE** temporary test equipment AND **INITIAL and DATE** the "Removal" in Attachment 1, Section 3.0.

___ 5.4.2 **COMPLETE** Attachment 6, Sections 1.0 and 2.0, AND **FORWARD** this procedure to the CRS for review.

___ 5.4.3 CRS **PERFORM** the following:

___ A. **REVIEW** this procedure with Attachments 1-6 for completeness and accuracy.

___ B. IF ALL pump Acceptance Criteria parameters are within the ACCEPTABLE RANGE,
THEN:

___ 1. **DECLARE** 11 CS Pump OPERABLE.

___ 2. IF this pump was previously in the ALERT RANGE,
THEN **EVALUATE** conditions required to "Return Pump to Normal Surveillance Test Frequency" IAW NC.NA-AP.ZZ-0012(Q), Technical Specifications Surveillance Program **AND** NC.NA-AP.ZZ-0070(Q), Inservice Testing Program.

(step continued on next page)

5.4.3 (continued)

___ C. <u>IF</u> ANY pump Acceptance Criteria parameter is in the ALERT RANGE, <u>AND</u> NO pump Acceptance Criteria parameter is in the REQUIRED ACTION RANGE, <u>THEN</u>:

___ 1. **DECLARE** 11 CS Pump OPERABLE.

___ 2. <u>IF</u> pump surveillance has NOT been increased, <u>THEN</u> **PERFORM** "Increase Pump Surveillance Testing Frequency Change" IAW NC.NA-AP.ZZ-0012(Q), Technical Specifications Surveillance Program **AND** NC.NA-AP.ZZ-0070(Q), Inservice Testing Program.

___ D. <u>IF</u> ANY pump Acceptance Criteria parameter is in the REQUIRED ACTION RANGE, <u>THEN</u>:

___ 1. **DECLARE** 11 CS Pump inoperable.

___ 2. **EVALUATE** Technical Specification requirements for system operability.

___ E. <u>IF</u> 11CS21 Check Valve Surveillance is **UNSAT**, <u>THEN</u>:

___ 1. **DECLARE** Check Valve inoperable.

___ 2. **EVALUATE** Technical Specification requirements for system operability.

___ F. **COMPLETE** Attachment 6, Section 3.0.

___ G. **FORWARD** this procedure to the STA for review.

___ 5.4.4 STA **PERFORM** the following:

___ A. **REVIEW** this procedure with Attachments 1-6 for completeness and accuracy.

___ B. **COMPLETE** Attachment 6, Section 3.0.

___ C. **FORWARD** this procedure to OS/CRS for review and approval.

___ 5.4.5 OS/CRS **PERFORM** the following:

___ A. **REVIEW** this procedure with Attachments 1-6 for completeness and accuracy.

___ B. **COMPLETE** Attachment 6, Section 3.0.

___ C. **PLACE** this procedure in the IST IMPLEMENTATION ENGINEER REVIEW REQUIRED mail slot.

END OF PROCEDURE SECTION

6.0 RECORDS

6.1 Retain the following IAW NC.NA-AP.ZZ-0003(Q), Document Management Program:

- Attachments 1-6
- Copy of S1.RA-ST.CS-0001(Q), Inservice Testing - 11 Containment Spray Pump Acceptance Criteria, if applicable

7.0 REFERENCES

7.1 Updated Final Safety Analysis Report:

7.1.1 Section 6.2.2.1, Containment Spray

7.2 Drawings:

7.2.1 205235, Unit 1 Containment Spray

7.3 Procedures:

7.3.1 NC.NA-AP.ZZ-0022(Q), Measuring & Test Equipment, Lifting & Rigging and Tool Control

7.3.2 NC.NA-AP.ZZ-0050(Q), Station Testing Program

7.4 Others:

7.4.1 Section XI of ASME Boiler and Pressure Vessel Code, Subsection IWP (1983 Edition with Addenda through Summer 1983)

7.4.2 OMa-10, Inservice Testing of Valves in Light-Water Reactor Power Plants (1987 Edition with 1988 Addenda)

7.4.3 Salem Generating Station IST Manual

7.4.4 NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants

7.4.5 PR #960716112, CSS Piping Inspection Requirement Not in Surveillance Procedure

7.4.6 PR #970205322, Potential to Violate Technical Specification 4.0.5 for 11(12)CS21

7.4.7 PR #980107096, 11/12 CS Pumps Could Not Attain Desired Flow

7.5 Cross-References:

7.5.1 Technical Specifications - Unit 1:

A. 3.6.2.1, Containment Spray System

B. 3.6.2.2, Spray Additive System

C. 4.0.5, Inservice Inspection and Testing

7.5.2 Procedures:

A. NC.NA-AP.ZZ-0001(Q), Nuclear Procedure System

B. NC.NA-AP.ZZ-0003(Q), Document Management Program

C. NC.NA-AP.ZZ-0012(Q), Technical Specifications Surveillance Program

D. NC.NA-AP.ZZ-0070(Q), Inservice Testing Program

E. S1.RA-ST.CS-0001(Q), Inservice Testing - 11 Containment Spray Pump Acceptance Criteria

7.6 Commitments:

7.6.1 C0265 - NSO LER 311/89-015-00

7.6.2 C0275 - NRC INSP 90-03

7.6.3 C0283 - NRC VIOL 311/87-18-01

7.6.4 C0284 - NSO LER 272/90-014-00

7.6.5 C0289 - INSTRUMENT CALIBRATION REQUIREMENTS

7.6.6 C0290 - NRC INFO 84-51

7.6.7 C0583 - NRC VIOL 50-272/94-21

7.6.8 C0620 - NRC GL 95-07, Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves

ATTACHMENT 1
(Page 1 of 2)

INSTRUMENT AND TEST EQUIPMENT DATA

1.0 WORK ORDER DATA

Work Order Number(s):	Reason for Test
990210215	✓ Scheduled Surveillance __ Post-Maintenance Operability __ Establish New Baseline Data __ Other (Explain in Comments)

2.0 INSTRUMENT/TEST EQUIPMENT:

Instrument/Test Equipment	Description	Calibration Overdue Date	Initials
1FT930	Control Room Spray Additive Flow Indicator	4-20-00	JC
1LI920	RWST Level Channel II	4-20-00	JC
1LI921	RWST Level Channel I	4-2-00	JC
N624	CSI 2110 Machine Analyzer	10-26-99	JC
N624-A	CSI 2110 Pickup Probe	10-26-99	JC

ATTACHMENT 1
(Page 2 of 2)

INSTRUMENT AND TEST EQUIPMENT DATA

3.0 TEMPORARY TEST EQUIPMENT:

Temporary Test Equipment	ID Number & Cal. Due Date	Installation Point	Installation Initials	Installation Date	Removal Initials	Removal Date
Heise CM or equivalent 0-60 psig	# 36724 Date: 7-11-99	Instr. Vent for 1PI953A	PM	2-10-99		
Heise CM or equivalent 0-300 psig **OR** 0-500 psig	# 36716 Date: 6-29-99	Instr. Vent for 1PI953C	PM	2-10-99		
Panametrics Ultrasonic Flow Meter	# 206936 (1) (2) Date: 5-11-99	11 CS Pump Recirculation Piping	PM	2-10-99		

GTS 8A

(1) Panametrics Ultrasonic Flow Meter #206936 was specifically calibrated to indicate CS Pump recirculation flow IAW the requirements of PR #980107096, 11/12 CS Pumps Could Not Attain Desired Flow.

(2) ENSURE THE 1.02 CALIBRATION FACTOR HAS BEEN ENTERED IN PANAMETRIC # 206936.

ENSURE THE ACTUAL PIPE THICKNESS AS MEASURED HAS BEEN RECORDED IN THE COMMENTS SECTION WITH THE IDENTIFICATION # OF THE THICKNESS GAGE AND.

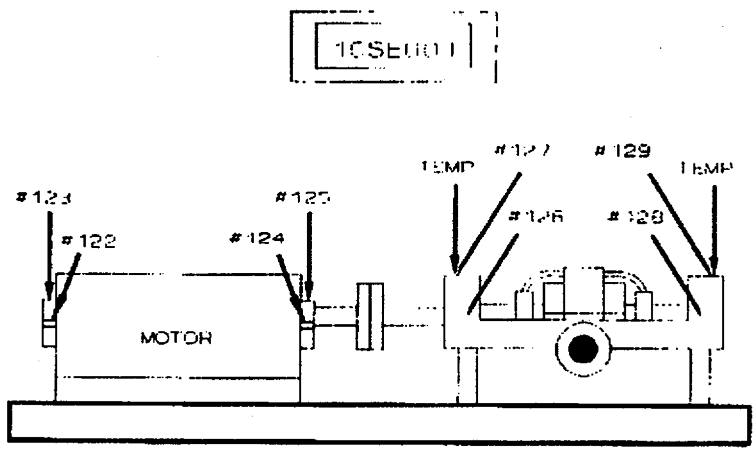
THE ACTUAL PIPE THICKNESS HAS BEEN INPUTED INTO PANAMETRIC #206936

GTS 8A

ATTACHMENT 2
(Page 1 of 3)

11 CS PUMP SURVEILLANCE DATA

1.0 VIBRATION POINT LOCATIONS:



2.0 MOTOR VIBRATION READINGS:

* Pnt. #122: .92 Mils	* Pnt. #123: .67 Mils	* Pnt. #124: 1.1 Mils	* Pnt. #125: .96 Mils

* For trending purposes only. NOT required for Acceptance Criteria.

3.0 PUMP VIBRATION READINGS:

11 CS PUMP Vibration Readings	Test Results		
	Acceptable Range SAT	Alert Range SAT	Required Action UNSAT
Pnt. #126 2.9 Mils			
Pnt. #127 1.1 Mils			
Pnt. #128 3.2 Mils			
Pnt. #129 1.8 Mils			
Acceptance Criteria: Measured values are within bands specified in S1.RA-ST.CS-0001(Q), Inservice Testing - 11 Containment Spray Pump Acceptance Criteria OR data represents new baseline data as determined by the IST Implementation Engineer.			

Note - Quick Lock adapters that are worn or missing should be recorded in the Comments Section of Attachment 6. **[C0275]**

ATTACHMENT 2
(Page 2 of 3)

11 CS PUMP SURVEILLANCE DATA

4.0 PUMP PERFORMANCE DATA:

Pump Performance Parameter	Parameter Value	Test Results		
		Acceptable Range SAT	Alert Range SAT	Required Action UNSAT
Motor Amps	24 amps	N/A	N/A	N/A
Pump Discharge Flow Rate (Panametrics)	302 gpm		N/A	
Suct. Press. Pump **STOPPED** (Test Gauge)	26.5 psig	N/A	N/A	N/A
Suct. Press. Pump **RUNNING** (Test Gauge) (A)	25.7 psig	N/A	N/A	N/A
Pump Discharge Pressure (Test Gauge) (B)	228 psig	N/A	N/A	N/A
Differential Pressure (B) - (A) = psid	202.3 psid			

Acceptance Criteria:

1) Measured values are within bands specified in S1.RA-ST.CS-0001(Q), Inservice Testing - 11 Containment Spray Pump Acceptance Criteria OR data represents new baseline data as determined by the IST Implementation Engineer.

2) Pump Differential Pressure is ≥204 psid IAW Technical Specification 4.6.2.1.b.

Independent Verification of Calculation Performed By: Glen Otto

ATTACHMENT 2
(Page 3 of 3)

11 CS PUMP SURVEILLANCE DATA

5.0 11 CS PUMP LEAKAGE INSPECTION

Component	**Inspection Results (1)**		
	No Leakage Initial	**Leakage (2)**	
		Initial	**AR No.**
11 CS Pump and portions of the CS System subjected to pump pressure.			

Notes: (1) Component leakage is NOT an operability concern as long as:

- ♦ System or component operation is NOT jeopardized.
- ♦ Personnel safety is NOT compromised.

(2) ANY leakage from ANY component requires an AR to be written against that component, and an entry made in the Comments Section of Attachment 6 indicating the component leaking and amount of leakage. If any leakage exceeds the following Leakage Criteria, the System Engineer should be contacted for further evaluation and prioritization. Notification of the System Engineer should also be noted in the Comments Section of Attachment 6. The Leakage Criteria is as follows:

Component	Leakage Criteria
♦ CS Pump Seal	>10 drops per minute
♦ Valves, Packing leak	>1 drop per 3 minutes
Body to Bonnet >2"	>10 drops per minute
≤2"	>1 drop per minute
Seat Leakage	>3 drops per minute
♦ Other Flanges	>10 drops per minute
♦ Pressure Boundary	ANY

ATTACHMENT 3
(Page 1 of 1)

CHECK VALVE DATA

<table>
<tr><th rowspan="2">Check Valve Tested</th><th rowspan="2">Stroke</th><th rowspan="2">Acceptance Criteria</th><th colspan="2">Test Results</th><th rowspan="2">Date</th></tr>
<tr><th>SAT</th><th>UNSAT</th></tr>
<tr><td rowspan="2">11CS21</td><td>CLOSED</td><td>With RWST level
≥40.5 and ≤41.9 ft,
Absence of continuous pressurized flow from 1CS61.
41.5 ft 1LI920 (RWST Ch II Lvl)
41.5 ft 1LI921 (RWST Ch I Lvl)</td><td></td><td></td><td>2-10-99</td></tr>
<tr><td>OPEN</td><td>With RWST level
≥40.5 and ≤41.9 ft,
Forward Flow is verified by 1FI930 ≥51.3 gpm.
41.5 ft 1LI920 (RWST Ch II Lvl)
41.5 ft 1LI921 (RWST Ch I Lvl)
53 gpm 1FI930</td><td></td><td></td><td>2-10-99</td></tr>
</table>

ATTACHMENT 4
(Page 1 of 1)

INDEPENDENT VERIFICATION

Component	Description	Normal Position	IV
11CS2	PUMP DISCH	X	
1CS14	TANK DISCHARGE	(1)	
1CS14 Power L/O	1CS14, CS ADD TANK DISCH VALVE ECCS Power L/O Switch (1RP4)	(2)	
11CS11	CS PUMP FLOW TEST STOP VALVE	X	
11CS20	CS EDUCTOR SUP VALVE	(3)	
12CS20	12 CS EDUCTOR SUP VALVE	(3)	
1CS31	RWST TO EDUCTORS STOP VALVE	LX	
1CS35	CS PUMP FLOW TEST STOP VALVE	X	
1CS40	SPRAY ADD TK DISCH LINE DRN	X	
1CS61	CS SPRAY ADD TK DISCH SAMP VALVE	X	
N/A	INSTR. VENT FOR 1PI953A	X	
N/A	INSTR. VENT FOR 1PI953C	X	

(1) OPEN in Modes 1-4, CLOSED in Modes 5, 6 and Defueled.

(2) LOCKED OUT in Modes 1-4, OPERABLE in Modes 5, 6 and Defueled.

(3) LOCKED OPEN in Modes 1-4, LOCKED CLOSED in Modes 5, 6 and Defueled.

ATTACHMENT 5
(Page 1 of 2)

CS EDUCTOR LINE FLUSHING

> **CAUTION**
>
> **IF a valid Containment Spray Actuation occurs during performance of this procedure, THEN all valves should be IMMEDIATELY aligned to support the actuation.**

1.0 **ENSURE** the following valves are CLOSED:

- A. 1CS16, TANK DISCHARGE
- B. 1CS17, TANK DISCHARGE

2.0 IF in Modes 1-4,
THEN:

- A. **ENTER** Technical Specification 3.6.2.2 Action Statement.
- B. **UNLOCK** and **CLOSE** 11CS20, CS EDUCTOR SUP VALVE.
- C. **UNLOCK** and **CLOSE** 12CS20, 12 CS EDUCTOR SUP VALVE.

3.0 **UNLOCK** and **OPEN** 1CS31, RWST SUPPLY TO EDUCTORS STOP VALVE.

4.0 **OPEN** 1CS40, SPRAY ADD TK DISCH LINE DRN.

5.0 After 3 minutes of flushing to drain header, **CLOSE** 1CS40.

6.0 **THROTTLE OPEN** 1CS61, CS SPRAY ADD TK DISCH SAMP VALVE, directing sample flow to a floor drain.

7.0 Direct Chemistry to **PERFORM** sodium sample analysis of the water at the 1CS61 local sample point.

8.0 After sample has been obtained, **CLOSE** 1CS61, CS SPRAY ADD TK DISCH SAMP VALVE.

NA 9.0 IF additional sampling is required,
THEN **THROTTLE OPEN** 1CS61 as required by the Chemistry Department.

ATTACHMENT 5
(Page 2 of 2)

CS EDUCTOR LINE FLUSHING

10.0 When Chemistry analysis verifies < 10 ppm sodium, **PERFORM** the following:

A. **ENSURE** 1CS61 is CLOSED.

B. **CLOSE** and **LOCK** 1CS31.

11.0 IF in Modes 1-4,
THEN:

A. **OPEN** and **LOCK** 11CS20, CS EDUCTOR SUP VALVE.

B. **OPEN** and **LOCK** 12CS20, 12 CS EDUCTOR SUP VALVE.

C. **EXIT** Technical Specification 3.6.2.2 Action Statement.

12.0 **NOTIFY** Control Room Containment Spray Eductor Line flushing is complete.

ATTACHMENT 6
(Page 1 of 2)

COMPLETION SIGN-OFF SHEET

1.0 COMMENTS:

(Include test deficiencies and corrective actions)

ATTACHMENT 6
(Page 2 of 2)

COMPLETION SIGN-OFF SHEET

2.0 SIGNATURES:

Print	Initials	Signature	Date
Joe Crew	JC	Joe Crew	2-10-99
Peter Mecke	PM	Peter Mecke	2-10-99

INDEPENDENT VERIFICATION:

Steve Oster	SO	Steve Oster	2-10-99

3.0 STA REVIEW AND OS/CRS FINAL REVIEW AND APPROVAL:

This procedure with Attachments 1-6 is reviewed for completeness and accuracy. All deficiencies, including corrective actions, are clearly recorded in the COMMENTS Section of this attachment. Technical Specification compliance, procedure compliance, and Acceptance Criteria are evaluated. [C0283]

Signature:______________________ Date:__________
OS

Signature:______________________ Date:__________
STA

Signature:______________________ Date:__________
OS/CRS

4.0 IST IMPLEMENTATION ENGINEER REVIEW:

Test Results are reviewed for acceptability. If required, revision of Acceptance Criteria and test frequency change is initiated. Forward completed procedure to Operations Staff.

Signature:______________________ Date:__________
IST Implementation Engineer

IST GROUP
S1.RA-ST.CS-0001(Q) - REV. 1

INSERVICE TESTING
11 CONTAINMENT SPRAY PUMP
ACCEPTANCE CRITERIA

USE CATEGORY : **II**

REVISION SUMMARY

- Incorporated the following Revision Requests:
  - R16231, Added SC.RA-TI.ZZ-0028(Q) to cross reference section
  - R17437 (PIR 970213240), revised notes referencing pump discharge pressure and developed head.
- This revision meets the biennial review requirements as specified in NC.NA-AP.ZZ-0001(Q).
- Revision bars have been utilized to indicate changes.

IMPLEMENTATION REQUIREMENTS

- Effective Date 2/12/98

APPROVED: for

Director - System Engineering

2/12/98
Date

INSERVICE TESTING
11 CONTAINMENT SPRAY PUMP
ACCEPTANCE CRITERIA

TABLE OF CONTENTS

1.0 PURPOSE

1.1 To provide the acceptance criteria necessary to evaluate the Inservice Testing data IAW Technical Specification 4.0.5, relative to performance of S1.OP-ST.CS-0001(Q), Inservice Testing - 11 Containment Spray Pump. [C0265]

2.0 PREREQUISITES

None

3.0 PRECAUTIONS AND LIMITATIONS

None

4.0 EQUIPMENT/MATERIAL REQUIRED

None

5.0 PROCEDURE

None

END OF PROCEDURE SECTION

6.0 **RECORDS**

None

7.0 **REFERENCES**

7.1 Updated Final Safety Analysis Report:

7.1.1 Section 6.2.2.1, Containment Spray

7.2 Technical Specifications - Unit 1:

A. 3.6.2.1, Containment Spray System

B. 3.6.2.2, Spray Additive System

7.3 Drawings:

7.3.1 205235, Unit 1 Containment Spray

7.4 Others:

7.4.1 Section XI of ASME Boiler and Pressure Vessel Code (1983 Edition with Addenda through Summer 1983)

7.4.2 NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants

7.4.3 Salem Generating Station IST Manual

7.4.4 Westinghouse Letter PSE-91-045

7.5 Procedures:

7.5.1 NC.NA-AP.ZZ-0012(Q), Technical Specifications Surveillance Program

7.5.2 NC.NA-AP.ZZ-0050(Q), Station Testing Program

7.5.3 NC.NA-AP.ZZ-0070(Q), Inservice Testing Program

7.6 Cross-References:

7.6.1 Technical Specifications - Unit 1:

A. 4.0.5, Inservice Inspection and Testing

7.6.2 Procedures:

A. SC.RA-TI.ZZ-0028(Q), Pump and Valve Reference and Acceptance Criteria Values

B. S1.OP-ST.CS-0001(Q), Inservice Testing - 11 Containment Spray Pump

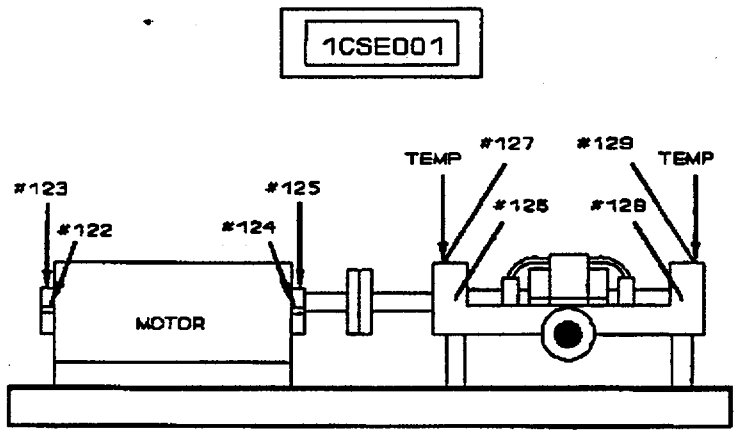
7.7 Commitments:

7.7.1 C0265 - NSO/LER/89-015-00

ATTACHMENT 1
(Page 1 of 2)

11 CS PUMP SURVEILLANCE DATA ACCEPTANCE CRITERIA

1.0 VIBRATION POINT LOCATIONS:



2.0 PUMP VIBRATION READINGS:

11 CS Pump Vib. Pt.	Reference Value (mils)	Date	Acceptance Range SAT	Alert Range SAT	Required Action Range UNSAT
Pnt. #126	1.3	06/02/93	0.0 - 2.6	> 2.6 - 3.9	> 3.9
Pnt. #127	0.2		0.0 - 1.0	> 1.0 - 1.5	> 1.5
Pnt. #128	1.0		0.0 - 2.0	> 2.0 - 3.0	> 3.0
Pnt. #129	0.7		0.0 - 1.4	> 1.4 - 2.1	> 2.1

Note: Reference values collected under W.O. 930630018. New baseline following evaluation of historical pump performance.

ATTACHMENT 1
(Page 2 of 2)

11 CS PUMP SURVEILLANCE DATA ACCEPTANCE CRITERIA

3.0 PUMP PERFORMANCE DATA:

Pump Performance Parameter	Reference Value	Date	Test Results				
			Acceptable Range SAT	Alert Range SAT		Required Action UNSAT	
				Low	High	Low	High
Pump Discharge Flow Rate (1FI929)	300 gpm	06/02/93 (1)	295 - 305 (3)	N/A		<295 or >305	
Suct. Press. Pump Running (A)	25.8 psig		N/A	N/A		N/A	
11 Pump Disch. Pressure (B)	247 psig						
Pump Discharge ΔP (B)-(A) = psid	221.2 psid		206.0 - 225.6 (2)	204.0 - <206.0 (2)	>225.6 - 227.8	< 204.0 (2)	> 227.8

(1) Reference values collected under W.O. 930630018. New baseline following evaluation of historical pump performance.

(2) Acceptable pump differential pressure is ≥ 204 psid IAW Technical Specification 4.6.2.1.b (LCR S96-20) and Westinghouse Letter PSE-91-045. An administrative alert limit of 206 psid is selected to provide a margin for action.

(3) Values outside of this range do not necessarily mean the pump is inoperable, but do invalidate the performance of this test.

CANDIDATE: ____________________ DOCKET: ____________________ DATE: __________

QUESTION: During a rector shutdown, a leak occurred in the CVCS charging line outside containment. 2CV68 &2CV69 cannot be closed remotely. An ALERT has been declared. Radio contact was lost with an Equipment Operator who was in the process of closing the valves manually. A RadPro Tech. reports that the NEO can be seen lying unconscious across some pipes in the area of the valves and is bleeding. Radiation Protection has determined radiation levels in the vicinity of 2CV68 & 2CV69 to be 6.3 R/hr.

Given the following information, determine the allowable dose two individuals may receive while rescuing the Equipment Operator:

- Neither person is declared pregnant
- Accumulated dose for the individuals this year is 1.6 rem and 1.87 rem.

ANSWER: The limit to save a life is 75 rem. This dose is in addition to current annual accumulated dose. Therefore, the total dose either individual may receive for this task is 75 rem.

RESPONSE:

SAT _____ **UNSAT** _____ **K/A NUMBER:** 2.3.4 – 2.5/3.1

SALEM ADMIN QUESTIONS

REFERENCES: NC.NA-AP.ZZ-0024, Radiation Protection Program, Rev. 8

CANDIDATE: ____________________ DOCKET: ____________________ DATE: __________

QUESTION: A task must be performed that requires entry into a Locked Very High Radiation Area.

What specific entry requirements must be met prior to entry into this area?

ANSWER:
1. A Special RWP is required.
2. Rad. Protection coverage is required.
3. Must be an Operational or Safety reason for entry.
4. Radiation Protection Manager and OS must be notified prior to entry.
5. A brief on the radiological conditions in the area and the procedures to be followed in case area evacuation is required.

NOTE: Candidate may discuss dosimetry and other general requirements.

RESPONSE:

SAT _____ **UNSAT** _____ **K/A NUMBER:** 2.3.10 – 2.9/3.3

REFERENCES: LP Radcon-00, Section X. Control of Access.
NC.NA-AP.ZZ-0024, Radiation Protection Program, Rev.8, Sections 5.7-5.9

CANDIDATE COPY

SALEM ADMIN QUESTIONS

QUESTION:

A task must be performed that requires entry into a Locked Very High Radiation Area.

What specific entry requirements must be met prior to entry into this area?

CANDIDATE COPY

SALEM ADMIN QUESTIONS

QUESTION: During a rector shutdown, a leak occurred in the CVCS charging line outside containment. 2CV68 &2CV69 cannot be closed remotely. An ALERT has been declared. Radio contact was lost with an Equipment Operator who was in the process of closing the valves manually. A RadPro Tech. reports that the NEO can be seen lying unconscious across some pipes in the area of the valves and is bleeding. Radiation Protection has determined radiation levels in the vicinity of 2CV68 & 2CV69 to be 6.3 R/hr.

Given the following information, determine the allowable dose two individuals may receive while rescuing the Equipment Operator:

- Neither person is declared pregnant
- Accumulated dose for the individuals this year is 1.6 rem and 1.87 rem.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: SALEM

SYSTEM: Administrative

TASK: Determine PARs during a General Emergency

TASK NUMBER:

JPM NUMBER: WD-SROA.4

APPLICABILITY:

EO ☐ **RO** ☐ **SRO** ☒ X

K/A NUMBER: 2.4.44

IMPORTANCE FACTOR: 2.1 / 4.0
RO **SRO**

EVALUATION SETTING/METHOD: CLASSROOM

REFERENCES: EPIP 104S; ECG ATT. 4

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 20 min

TIME PERIOD FOR TIME CRITICAL STEPS: N/A

APPROVED: J C Lloyd / D Gallagher for

PRINCIPAL TRAINING SUPERVISOR **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission from the SNSS or Unit NSS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions);**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL TIME TO COMPLETE JPM: ____________

JPM PERFORMED BY: ____________ **GRADE:** ☐ **SAT** ☐ **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: **DATE:**

JOB PERFORMANCE MEASURE

NAME: ____________________
DATE: ____________________

SYSTEM: Administrative

TASK: Determine PARs for a General Emergency

TASK NUMBER:

INITIAL CONDITIONS: A major tube rupture occurred in 21 S/G while recovering from a Loss of Secondary Heat Sink. One safety valve on 21 S/G has been verified stuck open. RCS pressure has stabilized at 1240 psig following SI actuation. The following conditions exist:

- No feed is available to the S/Gs
- 22,23 & 24 S/G WR Level is 23%,19%, & 25% respectively
- 21 S/G WR Level is 18% and rising
- 21 S/G pressure is 248 psig
- RVLIS Full Range indicates 83%
- The highest Core Exit TC indicates 585° F
- Containment Pressure is 1.5 psia
- Chemistry reports 325 Uci/gm DEI in RCS
- Wind direction is from 327 degrees
- Wind speed is 25 mph
- A General Emergency has been declared.

INITIATING CUE:

You are the Emergency Coordinator. Prepare the ICMF.

Successful Completion Criteria:

1. All critical steps completed
2. All sequential steps completed in order
3. All time-critical steps completed within allotted time
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE
ADMINISTRATIVE

NAME:____________________
DATE:____________________

System:

Task: DETERMNE PARs FOR A PLANT EMERGENCY

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		Obtain the proper Attachment to the EPIPs	**CUE:** When Attachment 4 to the ECG is located, provide the candidate with a copy.		
		Complete ECG Attachment 4			
	1	CALL communicators to the control room	**CUE:** Communicators are on the way to the control room		
	2	MAKE a PAR by the following steps:			
*	2a	Refer to Pre-determined PAR Flow chart on Pg. 5 and CHOOSE the appropriate PAR.	Refers to flowchart, using CFSTs and Table 3. – Determines that 10 points are made up on the barrier table [3.1.2.b(4 pts.), 3.2.3.b(4 pts.), 3.3.4.b(2 pts.)] – Answers YES and evacuates all sectors 0-5 miles – Evacuate all sectors 0-5 miles – Evacuate downwind ± 1 sector 5-10 miles – Shelter all remaining sectors 5-10 miles		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE
ADMINISTRATIVE

NAME:______________________
DATE:______________________

System:

Task: **DETERMNE PARs FOR A PLANT EMERGENCY**

# *	STEP NO.	STEP (* Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	2b.	REFER to Recommended Protective Actions Worksheet on Pg. 6 to DETERMINE the compass designations for the downwind sectors affected.	Refers to Pg. 6 worksheet. Determines that the compass directions for the affected sectors are S, SSE & SE. Since the wind direction is within ± 3° of the sector dividing line, Sector ESE should also be included.		
	2c	IF a Radiologically based PAR is IMMEDIATELY available, THEN compare the two PARs and choose the most appropriate for inclusion on the ICMF.	**CUE:** A radiologically based PAR is NOT available at this time.		
*	3	COMPLETE the ICMF	Completes the ICMF; including the PAR information determined in JPM steps 2a and 2b.		
	4	Provide ICMF to the Communicator	Communicator acknowledges receipt of the ICMF		

Terminating Cue: Communicator acknowledges receipt of the ICMF

<u>THIS SHEET SHOULD BE PROVIDED TO THE CANDIDATE</u>

INITIAL CONDITIONS: A major tube rupture occurred in 21 S/G while recovering from a Loss of Secondary Heat Sink. One safety valve on 21 S/G has been verified stuck open. RCS pressure has stabilized at 1240 psig following SI actuation. The following conditions exist:

- No feed is available to the S/Gs
- 22,23 & 24 S/G WR Level is 23%,19%, & 25% respectively
- 21 S/G WR Level is 18% and rising
- 21 S/G pressure is 248 psig
- RVLIS Full Range indicates 83%
- The highest Core Exit TC indicates 585° F
- Containment Pressure is 1.5 psia
- Chemistry reports 325 Uci/gm DEI in RCS
- Wind direction is from 327 degrees
- Wind speed is 25 mph
- A GENERAL EMERGENCY has been declared.

INITIATING CUE: You are the Emergency Coordinator. Prepare the ICMF.

ATTACHMENT 4

GENERAL EMERGENCY

I. EMERGENCY COORDINATOR (EC) LOG SHEET

Initials

____ EC A. **DECLARE A GENERAL EMERGENCY AT SALEM UNIT ____**

EAL #(s) __________, __________, __________

Declared at __________ hrs on __________
time date

B. **NOTIFICATIONS**

( ) 1. CALL communicators to the Control Room.

CAUTION

A Protective Action Recommendation (PAR) SHALL be made on the Initial Contact Message Form (ICMF).

____ EC 2. MAKE A PAR by the following steps;

( ) a. REFER to Predetermined PAR Flowchart on Pg. 5 and CHOOSE the appropriate PAR.

( ) b. REFER to Recommended Protective Actions Worksheet on Pg. 6 to DETERMINE the compass designations for the downwind sectors affected.

( ) c. IF a Radiologically Based PAR is IMMEDIATELY available, THEN COMPARE the two PARs and choose the most appropriate for inclusion on the ICMF.

( ) 3. COMPLETE the INITIAL CONTACT MESSAGE FORM (ICMF) (last page of this attachment).

( ) 4. PROVIDE the ICMF to the Communicator (CM1) and DIRECT the CM1 to implement **Attachment 7.**

( ) 5. DIRECT the Secondary Communicator (CM2) to implement **Attachment 8** for a GENERAL EMERGENCY.

Initials

____ OS — 6. IF NOT done previously,
NOTIFY the ITOC Operator on NETS x5027 (973-430-8153, 7190, 7191) with the following message:

"This is (your name) , Operations Superintendent at Salem. Please IMPLEMENT EPIP 204S, Salem Emergency Response Callout, immediately. This procedure is being implemented for an Actual Emergency."

______________________ notified at ________
ITOC Operator name time

(EP96-003)

____ EC — 7. Direct the OS (NETS 5122; DID 5200) to make the General Emergency Page Announcement per ECG Attachment 4, Appendix 2.

____ EC — 8. NOTIFY the Hope Creek OS. (NETS 5224; DID 3027)
a. PROVIDE a briefing on the GE conditions.
b. DIRECT implementation of EPIP 101H, Section 3.2.

____ EC — 9. IF Security Related,
THEN DIRECT the PSE&G Security Supervisor (x2222) to implement the Security Contingency Plan.

C. EMERGENCY COORDINATOR DUTIES

____ EC — 1. IF NOT done previously,
THEN DIRECT the OSC Coordinator to ACTIVATE the OSC IAW EPIP 202S, OSC Activation and Operations.

____ EC — 2. COMPLETE and APPROVE the NRC Data Sheet (Attachment 5) for transmittal by the CM1 within 60 minutes.

____ OS/EDO — 3. IF the Emergency Coordinator is the EDO or OS,
THEN REFER TO EPIP 104S, General Emergency, AND
IMPLEMENT emergency actions assigned to the EDO until relieved while continuing at Step C.5.

Initials

____ ERM

4. IF the Emergency Coordinator is the ERM,
THEN continue to REFER to EPIP 401, ERM Response.

( ) a. Notify the EDO of General Emergency details;
- Time of declaration
- EAL exceeded (Basis)
- Direct the EDO to implement EPIP 104S, General Emergency

( ) b. Notify EOF Staff of the change in classification.

____ EC

5. WHEN provided by the CM2,
THEN REVIEW and APPROVE the Station Status Checklist (SSCL) for transmittal.

( ) a. REPEAT this step approximately every half hour.

( ) b. PERFORM immediately for any significant change in emergency status. (operational or radiological)

D. TURNOVER

( ) 1. WHEN turning over EC duties,
THEN DIRECT your Communicators to turnover notifications responsibilities to the oncoming facility communicators.

( ) 2. IF relieved as EC prior to termination of the GE,
THEN DOCUMENT the name of your relief below:

________________________ assumed EC duties at __________.
Name time

E. TERMINATION

____ EC

1. TERMINATE the GE IAW EPIP 106S, Emergency Termination/Reduction /Recovery/Reentry.

____ OS

2. ENSURE appropriate reports are made IAW Section II, Reporting, of this attachment.

II. REPORTING

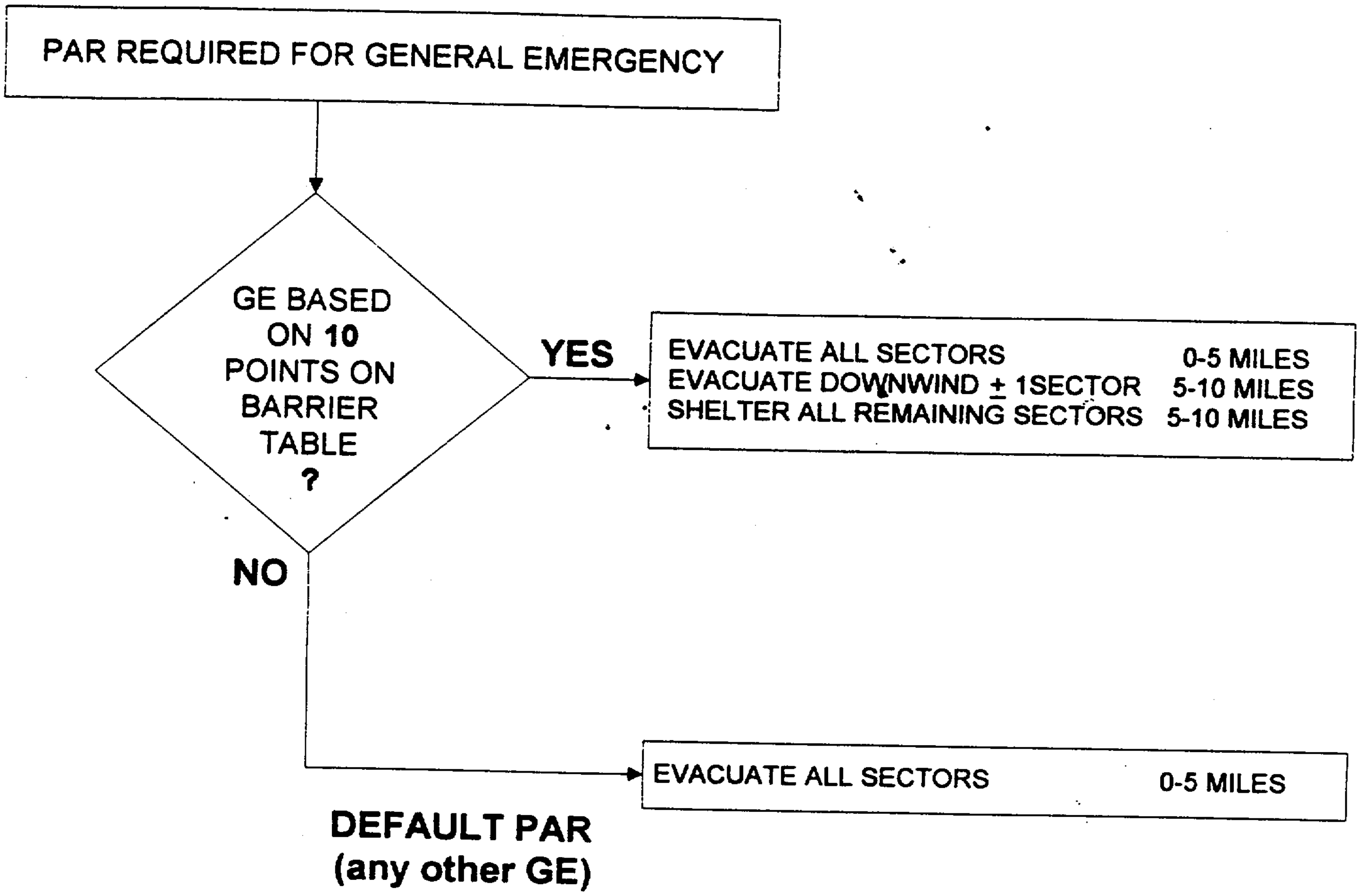
INSTRUCTIONS	
1.	This is a permanent document.
2.	ATTACH appropriate documents to this form and EXPEDITE the package through all steps.

Initials

Initials		
____ OS	1.	PREPARE an Action Request (AR). AR # ________________
____ OS	2.	FORWARD this attachment and supporting documentation, to the Operations Manager (OM).
____ OM	3.	REVIEW this attachment, the (AR) and any other relevant information for correct classification of event and corrective action taken.
____ OM	4.	CONTACT the LER Coordinator (LERC) and request that the required reports be prepared. Provide this attachment and any other supporting documentation to the LERC.
____ LERC	5.	PREPARE required reports. Report or LER Number ________________
____ LERC	6.	FORWARD this attachment to the Central Technical Document Room for microfilming.

APPENDIX 1

PREDETERMINED PROTECTIVE ACTION RECOMMENDATIONS



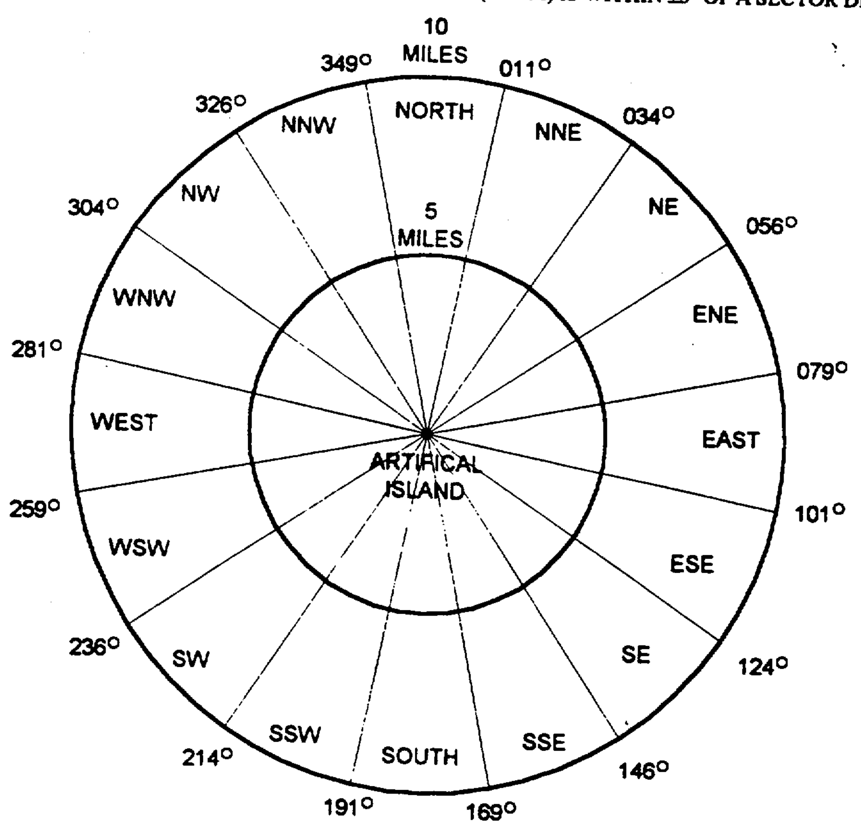
CAUTION:

IF TRAVEL CONDITIONS PRESENT AN EXTREME HAZARD (SEVERE ICE, SNOW, WIND, FLOOD, QUAKE DAMAGE, ETC.), CONSIDER SHELTER INSTEAD OF EVACUATE IN THE ABOVE SELECTED PAR

APPENDIX 1 (continued)
RECOMMENDED PROTECTIVE ACTION WORKSHEET

WIND DIRECTION FROM DEGREES	WIND DIRECTION FROM COMPASS		PAR AFFECTED SECTORS DOWNWIND ±1 SECTORS
349 - 011	N	⇒	SSE - S - SSW
011 - 034	NNE	⇒	S - SSW - SW
034 - 056	NE	⇒	SSW - SW - WSW
056 - 079	ENE	⇒	SW - WSW - W
079 - 101	E	⇒	WSW - W - WNW
101 - 124	ESE	⇒	W - WNW - NW
124 - 146	SE	⇒	WNW - NW - NNW
146 - 169	SSE	⇒	NW - NNW - N
169 - 191	S	⇒	NNW - N - NNE
191 - 214	SSW	⇒	N - NNE - NE
214 - 236	SW	⇒	NNE - NE - ENE
236 - 259	WSW	⇒	NE - ENE - E
259 - 281	W	⇒	ENE - E - ESE
281 - 304	WNW	⇒	E - ESE - SE
304 - 326	NW	⇒	ESE - SE - SSE
326 - 349	NNW	⇒	SE - SSE - S

NOTE: CONSIDER ADDING A SECTOR TO THE PAR IF THE WIND DIRECTION (FROM) IS WITHIN ±3° OF A SECTOR DIVIDING LINE.



APPENDIX 2

GENERAL EMERGENCY PAGE ANNOUNCEMENT

SOUND the Radiation Alert Alarm
ANNOUNCE over the page the following:

> **"Attention all personnel, Attention all personnel"**
> **"Salem is in an General Emergency due to**
>
> ____"
>
> **"All PSE&G personnel assemble at your accountability stations.**
> **All contractors leave the Owner Controlled Area immediately"**

(REPEAT)

INITIAL CONTACT MESSAGE FORM

I. THIS IS ____________________ (NAME), COMMUNICATOR IN THE ☐ CONTROL ROOM ☐ TSC ☐ EOF

AT THE **SALEM** NUCLEAR GENERATING STATION, UNIT NO. ________.

IIa. ☐ THIS IS NOTIFICATION OF A **GENERAL EMERGENCY** WHICH WAS

DECLARED AT ____________________ (TIME - 24 HOUR CLOCK) ON ____________________ (DATE).

EAL #(s) ______________, ______________, ______________

DESCRIPTION OF EVENT: ____________________

____

____

IIb.

☐ THIS IS NOTIFICATION OF A **PROTECTIVE ACTION RECOMMENDATION UPGRADE** WHICH WAS MADE AT ______________ (24 HOUR CLOCK) HRS ON ______________ (DATE).

Reason for PAR Upgrade: ____________________

____

III. ☐ NO RADIOLOGICAL RELEASE IS IN PROGRESS.

☐ THERE IS A RADIOLOGICAL RELEASE IN PROGRESS.

} see NOTE for release definition

33 FT. LEVEL WIND DIRECTION (From): ______________ (DEGREES) WIND SPEED: ______________ (MPH)
(From MET Computer)

IV.

	Sectors	Dist.- Miles
☐ WE RECOMMEND **EVACUATION** AS FOLLOWS	______	______
	______	______
☐ WE RECOMMEND **SHELTERING** AS FOLLOWS	______	______
	______	______

____
EC Initials
(Approval to Transmit ICMF)

NOTE: Radiological Release is defined as: Plant Effluent > Tech Spec Limit of 2.42E+05 μCi/sec Noble Gas or 2.1E+01 μCi/sec I-131.

Facility: Salem 1 & 2
Examination Level:
Inplant 1 – Simulator 1

Date of Examination: 2/22/99
Operating Test Number: 1

System / JPM Title / Type Codes*	Safety Function		Planned Followup Questions: K/A/G – Importance — Description
1. CVCS/RWST Makeup Using Blender (S2.OP-SO.CVC-0006(Q) section 5.7) N S	I	a.	004 K1.23 //3.4/3.7// Flow path for procedure (If power is decreasing, where can the boron be entering CVCS?)
		b.	2.2.22 //3.4/4.1//Technical Specifications for loss of a charging pump. {Repeated on Set 3}
2. ECCS/Fill an accumulator using an SI pump. (JPM 33) ~~M~~D[1] S	II	a.	011 EK3.07 //3.5/3.6// Reason for SI Pump Mini-Flow Isolation during Recirculation Phase
		b.	011 EK3.12 //4.4/4.6// Negative effects if an accumulator is not isolated when required by LOCA-1
3. RHR / Swapping RHR Loops (JPM 28) (Repeated on Set 2) D S L	IV	a.	005 K4.01 //3.0/3.2// Overpressurization protection for shutdown cooling piping on increasing RCS pressure.
		b.	005 A2.04 //2.9/2.9// Effect a loss of air would have on RHR flow with SDC in service {Repeated on Set 2})
4. Containment Spray / Manually initiate Containment Spray[2]~~PRT/Purging the PRT (S2.OP-SO.PZR-0001)~~ D~~N~~ S A	V	a.	026 K4.04 //3.7/4.1// Containment Spray design basis~~2.1.32 //3.4/3.8// Difference between venting to IRU and to the containment atmosphere.~~
		b.	026 A3.01 //4.3/4.5// Effect of resetting SI and SEC on containment spray operation~~007 K4.01 //2.6/2.9// How will a feed and bleed operation on the PRT be affected by an SI signal?~~
5. NI / Respond to failure of a Source Range Instrument (JPM 44) {Repeated on Set 3} D S L	VII	a.	2.2.22 //3.4/4.1// Technical Specifications for Source Range
		b.	015 A2.01 //3.5/3.9// Effect of a control power fuse blowing during startup.
6. Containment / Containment Pressure Relief with R-12A In Service (JPM 48)[3] (Repeated on Set 2)~~Containment / Containment Pressure Relief with R-12A Out of Service (JPM 48)~~ D S	VIII	a.	029 K3.01 //2.9/3.1// What are the negative effects if the pressure relief was not performed when required? {Repeated on Set 2}
		b.	-2.3.11 //2.7/3.2// Limits on times that VC-5 and VC-6 can be open. {Repeated on set 2}
7. Pressure Control / Depressurize in accordance with LOCA-2 using Auxiliary Spray (2-EOP-LOCA-2 Steps 13-15.2) N S A	III	a.	010 A1.08 //3.2/3.3// Factors affecting the delta T on the spray nozzle.
		b.	010 A1.09 //3.4/3.7// Validate temperature indication for a leaking PORV.

[1] Corrected error of designating the JPM as being a modified JPM when it was used directly from the bank.
[2] Replaced JPM because simulator would not support task performance.
[3] Replaced JPM because simulator would not support task performance.

8.	Shutdown Outside the CR / Perform actions to Trip Turbine, Open Exciter Breaker and Trip SGFP[1] ~~Pressurizer / Transfer Pressurizer heaters to Emergency Power Supply (JPM PZHTEP)~~ D P	~~XIIIII~~ VIII	a.	068 AK3.18 //4.2/4.5// Expected equipment status. ~~2.1.30 //3.9/3.4// Local operation of pressurizer heaters during shutdown outside the control room~~
			b.	2.4.35 //3.3/3.5// AFWST level determination. ~~010 K4.02 //3.0/3.4// Automatic control/protective features available during operation outside the control room.~~
9.	Diesel Generator/Perform Attachment 4 for Shutdown Outside the Control room. N P R	VI	a.	064 K4.02//3.9//4.2//Comparison of purpose for similar sounding controls located at the EDG Control Panel and RP-5 Panel[2] ~~064 K1.04 //3.6/3.9// What will prevent the diesel from starting on loss of DC?~~
			b.	063 K2.01 //2.9/3.1// Effect of loss of DC power will have on Diesel Room Ventilation and required actions
10.	Main Steam / Align Main Steam following a Control Room Evacuation (JPM 83 & 108) M P	IV	a.	068 AK3.18 //4.2/4.5// Why removing power to the solenoids is not used when closing and MSIV outside the control room?
			b.	068 AA2.08 //3.9/4.1// When locally operating MS10's why is it important to coordinate with the CRS at HSD?

Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA # Questions or JPM are similar or the same as Questions or JPMs used on a recent NRC exam.

[1] Replaced JPM due to duplication with the audit examination.
[2] Replaced with a more specific question

Facility: Salem 1 & 2
Examination Level:
In-Plant 1 – Simulator 2

Date of Examination: 2/22/99
Operating Test Number: 2

System / JPM Title / Type Codes*	Safety Function		Planned Followup Questions: K/A/G – Importance – Description
1. Rod Cont./Recover a Dropped rod (JPM – DROPROD) D S	I	a.	001 K4.01 //3.5/3.8// Effects of incorrectly setting the P to A converter during realigning a control rod.
		b.	001 A3.02 //3.5/3.6// Rod Insertion Limit determination
2. CVCS/Establish Excess Letdown (JPM 21) D S	II	a.	004 A2.12 //4.1/4.3// Effect of a Phase A Isolation on excess letdown
		b.	004 A1.04 //3.9/4.1// What will be the expected Pzr level trend with excess letdown in service?
3. LOCA / Respond to a Shutdown LOCA ~~– Start Centrifugal Charging Pump and~~[1] Realign flow through the BIT (S2.OP-AB.LOCA-0001) N S A L	III	a.	009 EA2.34 //3.6/4.2// Based on plant conditions determine if a SI pump can be secured.
		b.	009 EK1.01 //4.2/4.7// Based on plant conditions determine if Natural Circulation has been established.
4. RHR / Swapping RHR Loops (JPM 28)[2] {Repeated on Set 1}~~RHR/Place RHR in service with RCS depressurized (JPM -inirhr) {Repeated on Set 2}~~ D S L	IV	a.	2.2.22 //3.4/4.1// RHR Technical Specifications
		b.	005 A2.04 //2.9/2.9// Effect a loss of air would have on RHR flow {Repeated on Set 1}
5. Containment / Containment Pressure Relief with R-12A In Service (JPM 48)[3] (Repeated on Set 1)~~Containment / Perform a containment purge (JPM 69)~~ D S A	VIII	a.	029 K3.01 //2.9/3.1// What are the negative effects if the pressure relief was not performed when required? {Repeated on Set 1}
		b.	2.3.11 //2.7/3.2// Limits on times that VC-5 and VC-6 can be open. {Repeated on Set 1}
6. NI / Respond to a failed Intermediate Range Instrument (JPM 45) [4]~~NI / Respond to failure of a Source Range Instrument (JPM 44)~~ D S L	VII	a.	015 A2.02 //3.1/3.5// Undercompensation effects on Intermediate Range ~~2.1.12 //2.9/4.0// Apply AFD limits~~
		b.	015 A3.03 //3.9/3.9// Indication at NIS rack when at power~~015 K1.02 //3.4/3.6 // Effect on NIS of removing Deans line from service during a Unit 1 startup~~
7. Hydrogen Recombiner/Place the Hydrogen Recombiner in Service (JPM 49) {Repeated on Set 3} D S	V	a.	028 A2.01 //3.4/3.6//~~028 A1.02 //3.4/3.7//~~ Actions for rising Hydrogen[5]~~Effect of recombiner operation on containment pressure.~~ {Repeated on Set 3}
		b.	028 K5.03 //2.9/3.6//~~028 K6.01 //2.6/3/1// Effect of not achieving required temperature.~~ Sources of Hydrogen following a LOCA.[6] ~~{Repeated on Set 3}~~

[1] During validation deleted the portion of the JPM associated with starting the charging pump. Initial JPM conditions established a centrifugal charging pump being in service.
[2] Replaced the Initiate RHR because consisted of unrealistic initial conditions.
[3] Replaced JPM because simulator would not support task performance.
[4] Exchanged JPMs between set 3 and set 2. The JPM for Increasing RHR boration was not modeled in the simulator and had to be replaced. This resulted in no Low Power JPMs on set three. Exchanged JPMs to maintain a Low Power JPM on Simulator set 3.
[5] Replaced question during validation.
[6] Replaced question during validation.

File Name: OutlinesShowingChangesFootnotes.doc~~OutlinesShowingChangesFootnotes.docOutlines.doc~~

Date and Time Printed: 01/23/99~~01/18/9901/05/99~~ 12:29 PM~~1:50 PM1:20 PM~~

8.	Shutdown Outside the CR / Perform actions to Trip Turbine, Open Exciter Breaker and Trip SGFP[1] ~~Pressurizer / Transfer Pressurizer heaters to Emergency Power Supply (JPM PZHTEP)~~ D P	~~III~~XIII VIII	a.	068 AK3.18 //4.2/4.5// Expected equipment status. ~~2.1.30 //3.9/3.4// Local operation of pressurizer heaters during shutdown outside the control room~~
			b.	2.4.35 //3.3/3.5// AFWST level determination. ~~010 K4.02 //3.0/3.4// Automatic control/protective features available during operation outside the control room.~~
9.	Diesel Generator/Perform Attachment 4 for Shutdown Outside the Control room. N P R	VI	a.	064 K4.02//3.9//4.2//Comparison of purpose for similar sounding controls located at the EDG Control Panel and RP-5 Panel [2]~~064 K1.04 //3.6/3.9// What will prevent the diesel from starting on loss of DC?~~
			b.	063 K2.01 //2.9/3.1// Effect of loss of DC power will have on Diesel Room Ventilation and required actions
10.	Main Steam / Align Main Steam following a Control Room Evacuation (JPM 83 & 108) M P	IV	a.	068 AK3.18 //4.2/4.5// Why removing power to the solenoids is not used when closing and MSIV outside the control room?
			b.	068 AA2.08 //3.9/4.1// When locally operating MS10's why is it important to coordinate with the CRS at HSD?

Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA # Questions or JPM are similar or the same as Questions or JPMs used on a recent NRC exam.

[1] Replaced JPM due to duplication with the audit examination.
[2] Replaced with a more specific question

Facility: Salem 1 & 2 Examination Level: n-Plant 1 – Simulator 3		Date of Examination: 2/22/99 Operating Test Number: 3

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance – Description
1. CVCS/ Place the CVCS make-up control in the MANUAL mode. [1]~~Increasing RHR Loop Boron Concentration (S2.OP-SO.CVC-0006 Att. 1)~~ ~~D~~N S ~~L~~	I	a. ~~004 K1.24 //3.4/3.9// Using the P&IDs trace how the Boron Concentration is changed.~~ 024 AA2.05 //3.3/3.5// Required action for three stuck rods and the emergency borate valve does not open. b. ~~004 A2.06 //4.2/4.3// Why is boron a concern when placing SDC in service and the temperature change not a concern?~~ 2.2.22 //3.4/4.1//Technical Specifications for loss of a charging pump. {Repeated on Set 1}
2. ECCS&ESFAS / Terminate SI (JPM – Terminate SI) D S	II	a. 013 K4.01 //3.9/4.3// Failure of P-4 on SI reset b. 013 K4.06 //4.0/4.3// Status of SI signal input to Semi Automatic Switchover system following SI reset.
3. Pressure Control/ Respond to a failed open spray valve (JPM ABPZRPS3) D S A	III	a. 010 K1.03 //3.6/3.7// Why are the actions different if PS-1 sticks open instead of PS-3? b. 027 AK3.03 //3.7/4.1// Explain how selecting "IMP OUT" prevents an RCS cooldown when stopping an RCP for a stuck open spray valve?
4. Feedwater/Establish feed with SGFP (S2.OP-SO.CN-0007,~~2~~ section 5.4) N S	IV	a. 059 A2.01 //3.4/3.6// AFW pump response to a SGFP trip. b. 059 K4.05 //2.5/2.8// Function of the "Bias" control on 22 SGFP.
5. Hydrogen Recombiner / Place the Hydrogen Recombiner in Service (JPM 49) {Repeated on Set 2} D S	V	a. 028 A1.01 // 3.4/3.8// When are the hydrogen recombiners required to be placed in service? b. [2]028 A2.01 //3.4/3.6//Actions for rising Hydrogen ~~028 K6.01 //2.6/3/1// Effect of not achieving required temperature.~~{Repeated on Set 2}
6. NI / Respond to failure of a Source Range Instrument (JPM 44) [3]~~NI / Respond to a failed Intermediate Range Instrument (JPM 45)~~ {Repeated on Set 1} D~~D~~ S~~S~~ L	VII	a. 2.1.12 //2.9/4.0// Apply AFD limits~~015 A2.02 //3.1/3.5// Undercompensation Effects on Intermediate Range~~ b. 015 K1.02 //3.4/3.6 // Effect on NIS of high voltage switching operations duriing a Unit 1 startup~~015 A3.03 //3.9/3.9// Indication at NIS rack when at power~~
7. CCW / Start a CCW Pump IAW APX-1 D S A	VIII	a. 2.2.3 // 3.1/3.3 // CCW response during a LOCA (Unit Differences) (#) b. 2.2.22 //3.4/4.1// Required TS actions for one CCW pump being inoperable.
8. Shutdown Outside the CR / Perform actions to Trip Turbine, Open Exciter Breaker and Trip SGFP[4] ~~Pressurizer / Transfer Pressurizer heaters to Emergency Power Supply (JPM PZHTEP)~~ D P	~~XIIIII~~ VIII	a. 068 AK3.18 //4.2/4.5// Expected equipment status. ~~2.1.30 //3.9/3.4// Local operation of pressurizer heaters during shutdown outside the control room~~ b. 2.4.35 //3.3/3.5// AFWST level determination. ~~010 K4.02 //3.0/3.4// Automatic control/protective features available during operation outside the control room.~~

[1] Replaced the JPM because the simulator is not modeled for this JPM.
[2] Replaced question during validation.
[3] Exchanged SR and IR range JPMs between sets 2 and 3 to ensure a low power JPM is included on each set..
[4] Replaced JPM due to duplication with the audit examination.

9. Diesel Generator/Perform Attachment 4 for Shutdown Outside the Control room. N P R	VI	a.	064 K4.02//3.9//4.2//Comparison of purpose for similar sounding controls located at the EDG Control Panel and RP-5 Panel [1]~~064 K1.04 //3.6/3.9// What will prevent the diesel from starting on loss of DC?~~
		b.	063 K2.01 //2.9/3.1// Effect of loss of DC power will have on Diesel Room Ventilation and required actions
10. Main Steam / Align Main Steam following a Control Room Evacuation (JPM 83 & 108) M P	IV	a.	068 AK3.18 //4.2/4.5// Why removing power to the solenoids is not used when closing and MSIV outside the control room?
		b.	068 AA2.08 //3.9/4.1// When locally operating MS10's why is it important to coordinate with the CRS at HSD?
Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA # Questions or JPM are similar or the same as Questions or JPMs used on a recent NRC exam.			

[1] Replaced with a more specific question

Facility: Salem 1 & 2 Examination Level: Inplant 2 – Simulator 1		Date of Examination: 2/22/99 Operating Test Number: 1	
System / JPM Title / Type Codes*	**Safety Function**	**Planned Followup Questions: K/A/G – Importance - Description**	
1. CVCS/RWST Makeup Using Blender (S2.OP-SO.CVC-0006(Q) section 5.7) N S	I	a.	004 K1.23 //3.4/3.7// Flow path for procedure (If power is decreasing, where can the boron be entering CVCS?)
		b.	2.2.22 //3.4/4.1//Technical Specifications for loss of a charging pump. {Repeated on Set 3}
2. ECCS/Fill an accumulator using an SI pump. (JPM 33) DM[1] S	II	a.	011 EK3.07 //3.5/3.6// Reason for SI Pump Mini-Flow Isolation during Recirculation Phase
		b.	011 EK3.12 //4.4/4.6// Negative effects if an accumulator is not isolated when required by LOCA-1
3. RHR / Swapping RHR Loops (JPM 28) (Repeated on Set 2) D S L	IV	a.	005 K4.01 //3.0/3.2// Overpressurization protection for shutdown cooling piping on increasing RCS pressure
		b.	005 A2.04 //2.9/2.9// Effect a loss of air would have on RHR flow with SDC in service {Repeated on Set 2}
4. Containment Spray / Manually initiate Contament Spray[2]~~PRT/Purging the PRT (S2.OP-SO.PZR-0001)~~ DN S A	V	a.	026 K4.04 //3.7/4.1// Containment Spray design basis~~2.1.32 //3.4/3.8// Difference between venting to IRU and to the containment atmosphere.~~
		b.	026 A3.01 //4.3/4.5// Effect of resetting SI and SEC on containment spray operation~~007 K4.01 //2.6/2.9// How will a feed and bleed operation on the PRT be affected by an SI signal?~~
5. NI / Respond to failure of a Source Range Instrument (JPM 44) {Repeated on Set 3} D S L	VII	a.	2.2.22 //3.4/4.1// Technical Specifications for Source Range
		b.	015 A2.01 //3.5/3.9// Effect of a control power fuse blowing during startup.
6. Containment / Containment Pressure Relief with R-12A ~~Out~~In ~~of~~ Service (JPM 48)[3] (Repeated on Set 2) D S	VIII	a.	029 K3.01 //2.9/3.1// What are the negative effects if the pressure relief was not performed when required? {Repeated on Set 2}
		b.	2.3.11 //2.7/3.2// Limits on times that VC-5 and VC-6 can be open. {Repeated on set 2}
7. Pressure Control / Depressurize in accordance with LOCA-2 using Auxiliary Spray (2-EOP-LOCA-2 Steps 13-15.2) N S A	III	a.	010 A1.08 //3.2/3.3// Factors affecting the delta T on the spray nozzle.
		b.	010 A1.09 //3.4/3.7// Validate temperature indication for a leaking PORV.
8. AFW/Reset an AFW turbine trip valve (MS52) (JPM Reset MS52) D P R	V	a.	061 A2.04//3.4/3.8//Actions required to feed four SG's with one MDAFW Pp[4]~~061 A2.07 //3.4/3.5// Operation of AFW valves with PRESS OVRD lights illuminated~~
		b.	061 A2.02 //3.2/3.6// Effect of a loss of control air

[1] Corrected error of designating the JPM as being a modified JPM when it was used directly from the bank.
[2] The simulator model would not allow this task to be performed.
[3] Changed from "R-12A Out Of Service" to "R-12A In Service" due to R41s not being tested in the simulator.
[4] Replaced question that can be evaluated during simulator evaluation

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9. AC Elect/Startup Vital Instrument Inverter – Alternate Source Startup and Return the Inverter to Normal (JPM 112) D P	VI	a.	062 A2.10 //3.0/3.3// Loss of 115VAC affect on RHR temperature control[1] ~~062 K3.01 //3.5/3.9// Effect of a loss 115 VAC on SI~~
		b.	062 K4.10 //3.1/3.5// Status of Inverter if Manual Bypass Switch is in the Isolate (Preferred) Position.
10. ECCS / Align Charging suction to the RWST ~~during CR~~ IAW ~~Evacuation (S1OP-AB.CR-0001 Att. 3 step 19-21)~~ EOP N P R	II LOPA-1	a.	006 K2.04//3.8/4.2//Effect of single bus power loss on RWST/VCT alignment[2] ~~2.2.22 //3.4/4.1// ECCS flow path Technical Specifications~~
		b.	006 K4.09 //3.9/4.2// How is an inadvertent SI is prevented during shudown outside the control room.
Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA # Questions or JPM are similar or the same as Questions or JPMs used on a recent NRC exam.			

[1] Replaced question similar to one on written examination

[2] Replaced question that would require engineering/mgmt. input to render a T.S. decision

Facility: Salem 1 & 2
Examination Level:
n-Plant 2 – Simulator 2

Date of Examination: 2/22/99
Operating Test Number: 2

System / JPM Title / Type Codes*	Safety Function		Planned Followup Questions: K/A/G – Importance – Description
1. Rod Cont./Recover a Dropped rod (JPM – DROPROD) D S	I	a.	001 K4.01 //3.5/3.8// Effects of incorrectly setting the P to A converter during realigning a control rod.
		b.	001 A3.02 //3.5/3.6// Rod Insertion Limit determination
2. CVCS/Establish Excess Letdown (JPM 21) D S	II	a.	004 A2.12 //4.1/4.3// Effect of a Phase A Isolation on excess letdown
		b.	004 A1.04 //3.9/4.1// What will be the expected Pzr level trend with excess letdown in service?
3. LOCA / Respond to a Shutdown LOCA ~~– Start Centrifugal Charging Pump and~~ [1]Realign flow through the BIT (S2.OP-AB.LOCA-0001) N S A L	III	a.	009 EA2.34 //3.6/4.2// Based on plant conditions determine if a SI pump can be secured.
		b.	009 EK1.01 //4.2/4.7// Based on plant conditions determine if Natural Circulation has been established.
4. RHR / Swapping RHR Loops (JPM 28)[2] {Repeated on Set 1}~~RHR/Place RHR in service with RCS depressurized (JPM – inirhr) {Repeated on Set 1}~~ D S L	IV	a.	2.2.22 //3.4/4.1// RHR Technical Specifications
		b.	005 A2.04 //2.9/2.9// Effect a loss of air would have on RHR flow {Repeated on Set 1}
5. Containment / Containment Pressure Relief with R-12A In Service (JPM 48)[3] (Repeated on Set 1)~~Containment / Perform a containment purge (JPM 69)~~ D S ~~A~~	VIII	a.	029 K3.01 //2.9/3.1// What are the negative effects if the pressure relief was not performed when required? {Repeated on Set 1}
		b.	2.3.11 //2.7/3.2// Limits on times that VC-5 and VC-6 can be open. {Repeated on Set 1}
6. NI / Respond to a failed Intermediate Range Instrument (JPM 45) [4]~~NI / Respond to failure of a Source Range Instrument (JPM 44)~~ D S ~~L~~	VII	a.	015 A2.02 //3.1/3.5// Undercompensation effects on Intermediate Range ~~2.1.12 //2.9/4.0// Apply AFD limits~~
		b.	015 A3.03 //3.9/3.9// Indication at NIS rack when at power~~015 K1.02 //3.4/3.6 // Effect on NIS of removing Deans line from service during a Unit 1 startup~~
7. Hydrogen Recombiner/Place the Hydrogen Recombiner in Service (JPM 49) {Repeated on Set 3} D S	V	a.	028 A2.01 //3.4/3.6//Actions for rising Hydrogen[5].~~028 A1.02 //3.4/3.7// Effect of recombiner operation on containment pressure~~
		b.	028 K5.03 //2.9/3.6//Sources of Hydrogen following a LOCA.[6]~~028 K6.01 //2.6/3/1// Effect of not achieving required temperature. {Repeated on Set 3}~~

[1] During validation deleted the portion of the JPM associated with starting the charging pump. Initial JPM conditions established a centrifugal charging pump being in service.
[2] Replaced the Initiate RHR because consisted of unrealistic initial conditions.
[3] Replaced JPM because simulator would not support task performance.
[4] Exchanged SR and IR range JPMs between sets 2 and 3 to ensure a low power JPM is included on each set..
[5] Replaced question during validation.
[6] Replaced question during validation.

8.	AFW/Reset an AFW turbine trip valve (MS52) (JPM Reset MS52) D P R	V	a.	061 A2.04//3.4/3.8//Actions required to feed four SG's with one MDAFW Pp [1] ~~061 A2.07 //3.4/3.5// Operation of AFW valves with PRESS OVRD lights illuminated~~
			b.	061 A2.02 //3.2/3.6// Effect of a loss of control air
9.	AC Elect/Startup Vital Instrument Inverter – Alternate Source Startup and Return the Inverter to Normal (JPM 112) D P	VI	a.	062 A2.10 //3.0/3.3// Loss of 115VAC affect on RHR temperature control [2] ~~062 K3.01 //3.5/3.9// Effect of a loss 115 VAC on SI~~
			b.	062 K4.10 //3.1/3.5// Status of Inverter if Manual Bypass Switch is in the Isolate (Preferred) Position.
10.	ECCS / Align Charging suction to the RWST during CR Evacuation (S1OP-AB.CR-0001 Att. 3 step 19-21) N P R	II	a.	006 K2.04//3.8/4.2//Effect of single bus power loss on RWST/VCT alignment [3] ~~2.2.22 //3.4/4.1// ECCS flow path Technical Specifications~~
			b.	006 K4.09 //3.9/4.2// How is an inadvertent SI is prevented during shudown outside the control room.

Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA # Questions or JPM are similar or the same as Questions or JPMs used on a recent NRC exam.

[1] Replaced question that can be evaluated during simulator evaluation
[2] Replaced question that is similar to one on the written examination
[3] Replaced question that would require engineering/mgmt. input to render a T.S. decision

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Facility: Salem 1 & 2	Date of Examination: 2/22/99
Examination Level:	Operating Test Number: 3
n-Plant 2 – Simulator 3	

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance – Description
1. CVCS/ Place the CVCS make-up control in the MANUAL mode[1]. ~~CVCS/Increasing RHR Loop Boron Concentration (S2.OP-SO.CVC-0006 Att. 1)~~ DN SS ~~L~~	I	a. 024 AA2.05 //3.3/3.5// Required action for three stuck rods and the emergency borate valve does not open. ~~004 K1.24 //3.4/3.9// Using the P&IDs trace how the Boron Concentration is changed.~~
		b. 2.2.22 //3.4/4.1//Technical Specifications for loss of a charging pump. {Repeated on Set 1} ~~004 A2.06 //4.2/4.3// Why is boron a concern when placing SDC in service and the temperature change not a concern?~~
2. ECCS&ESFAS / Terminate SI (JPM – Terminate SI) D S	II	a. 013 K4.01 //3.9/4.3// Failure of P-4 on SI reset
		b. 013 K4.06 //4.0/4.3// Status of SI signal input to Semi Automatic Switchover system following SI reset.
3. Pressure Control/ Respond to a failed open spray valve (JPM ABPZRPS3) D S A	III	a. 010 K1.03 //3.6/3.7// Why are the actions different if PS-1 sticks open instead of PS-3?
		b. 027 AK3.03 //3.7/4.1// Explain how selecting "IMP OUT" prevents an RCS cooldown when stopping an RCP for a stuck open spray valve?
4. Feedwater/Establish feed with SGFP (S2.OP-SO.CN-0007,2 section 5.4) N S	IV	a. 059 A2.01 //3.4/3.6// AFW pump response to a SGFP trip.
		b. 059 K4.05 //2.5/2.8// Function of the "Bias" control on 22 SGFP.
5. Hydrogen Recombiner / Place the Hydrogen Recombiner in Service (JPM 49) {Repeated on Set 2} D S	V	a. 028 A1.01 // 3.4/3.8// When are the hydrogen recombiners required to be placed in service?
		b. 028 A2.01 //3.4/3.6//Actions for rising Hydrogen[2] ~~{028 K6.01 //2.6/3/1// Effect of not achieving required temperature.{Repeated on Set 2}~~
6. NI / Respond to failure of a Source Range Instrument (JPM 44) [3] {Repeated on Set 1} ~~NI / Respond to a failed Intermediate Range Instrument (JPM 45)~~ D S L	VII	a. 2.1.12 //2.9/4.0// Apply AFD limits ~~015 A2.02 //3.1/3.5// Undercompensation Effects on Intermediate Range~~
		b. 015 K1.02 //3.4/3.6// Effect on NIS of high voltage switching operations duriing a Unit 1 startup ~~015 A3.03 //3.9/3.9// Indication at NIS rack when at power~~
7. CCW / Start a CCW Pump IAW APX-1 D S A	VIII	a. 2.2.3 // 3.1/3.3 // CCW response during a LOCA (Unit Differences) (#)
		b. 2.2.22 //3.4/4.1// Required TS actions for one CCW pump being inoperable.
8. AFW/Reset an AFW turbine trip valve (MS52) (JPM Reset MS52) D P R	V	a. 061 A2.04//3.4/3.8//Actions required to feed four SG's with one MDAFW Pp [4] ~~061 A2.07 //3.4/3.5// Operation of AFW valves with PRESS OVRD lights illuminated~~
		b. 061 A2.02 //3.2/3.6// Effect of a loss of control air

[1] Replaced the JPM because the simulator is not modeled for this JPM.
[2] Replaced question during validation.
[3] Exchanged SR and IR range JPMs between sets 2 and 3 to ensure a low power JPM is included on each set..
[4] Replaced question that can be evaluated during simulator evaluation

9. AC Elect/Startup Vital Instrument Inverter – Alternate Source Startup and Return the Inverter to Normal (JPM 112) D P	VI	a.	062 A2.10 //3.0/3.3// Loss of 115VAC affect on RHR temperature control [1]~~062 K3.01 //3.5/3.9// Effect of a loss 115 VAC on SI~~
		b.	062 K4.10 //3.1/3.5// Status of Inverter if Manual Bypass Switch is in the Isolate (Preferred) Position.
10. ECCS / Align Charging suction to the RWST during CR Evacuation (S1OP-AB.CR-0001 Att. 3 step 19-21) N P R	II	a.	006 K2.04//3.8/4.2//Effect of single bus power loss on RWST/VCT alignment [2]~~2.2.22 //3.4/4.1// ECCS flow path Technical Specifications~~
		b.	006 K4.09 //3.9/4.2// How is an inadvertent SI is prevented during shudown outside the control room.
Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA # Questions or JPM are similar or the same as Questions or JPMs used on a recent NRC exam.			

[1] Replaced question that is similar to one on the written examination

[2] Replaced question that would require engineering/mgmt. input to render a T.S. decision

Sim. JPMr

Day 3

(Sample Plan Day 1)

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Containment System

TASK: Perform a Containment Pressure Relief with R-12A in service

TASK NUMBER: 0225130101

JPM NUMBER: 48

K/A NUMBER: 2.1.23

IMPORTANCE FACTOR: 3.9 (RO) 4.0 (SRO)

APPLICABILITY: EO [ ] RO [X] SRO [X]

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES: S2.OP-SO.CBV-0002(Q) Containment Pressure-Vacuum Relief System Operation

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 10 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: [signature] for — **PRINCIPAL TRAINING SUPERVISOR**; [signature] for — **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ______________

ACTUAL TIME CRITICAL COMPLETION TIME: ______________

JPM PERFORMED BY: ______________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ______________________ **DATE:** ______________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

SIMULATOR SETUP INSTRUCTIONS

SYSTEM:	Containment System
TASK:	Perform a Containment Pressure Relief with R-12A in service
TASK NUMBER:	0225130101
SIMULATOR IC:	IC-161 for 2/99 NRC Exam
MALFUNCTIONS REQUIRED:	
OVERRIDES REQUIRED:	
SPECIAL INSTRUCTIONS:	Mark up procedure up to and including Step 5.2.1.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Containment Systems

TASK: Perform a Containment Pressure Relief with R-12A in service

TASK NUMBER: 022 513 01 01

INITIAL CONDITIONS:

1. The plant is at 100% power with all systems aligned normally and control systems in automatic. Containment differential pressure is 0.23 psig.

INITIATING CUE:

You have been directed to perform a containment pressure relief IAW S2.OP-SO.CBV-0002, with R-12A in service. RMS Channels 2R16 and 2R41 are not available. The procedure has been completed up to and including 5.2.1.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Containment Systems

TASK: Perform a Containment Pressure Relief with R-12A in service

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Evaluator should provide a properly marked up copy of the procedure S2.OP-SO.CBV-0002, Containment Pressure-Vacuum Relief System Operation	Correct procedure obtained *NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to proceeding to the next step.*		
	1	RECORD the following on required attachment: • Pressure Relief start • Initial Containment Pressure • Initial reading of monitor 2R12A	Records the required information on Attachment 2 • Time/Date • Cnmt pressure psig • 2R12A reading		
	2	INITIATE Containment Relief as follows:			
	3	Monitor available radiation monitors 2R41D, 2R16 & 2R12A.	Monitors 2R12A indications		
	4	If Containment pressure <0.5 psig , then OPEN:.....	Determines containment pressure <0.5 psig		
*	5	Open 2VC6, ISOL VLV	Opens 2CV6		
*	6	Open 2VC5, ISOL VLV	Opens 2VC5		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Containment Systems

TASK: Perform a Containment Pressure Relief with R-12A in service

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	7	Open PRESSURE RELIEF DAMPER	Opens Pressure Relief Damper		
*	8	RECORD time that 2VC5 and 2VC6 are OPENED in the Control Room Narrative log for the Cyclic Data Monitoring Program IAW required procedure.	Indicates logging time of opening 2VC5 & 2VC6 *CUE:* Opening time is recorded		
*	9	When Containment Pressure decreases to required value, CLOSE • PRESSURE RELIEF DAMPER • 2VC6 • 2VC5	*CUE: Containment differential pressure indicates 0.0 psig* Determines containment pressure at required value and closes Press Relief Damper. Closes Pressure Relief Damper Closes 2VC5 Closes 2VC6		
	10	RECORD the following on applicable attachment: • Final Containment Pressure • Pressure Relief stop • Highest reading on available radiation monitors 2R41D, 2R16, and 2R12A	Records the required information on Attachment 2 • Time/Date *CUE:* • Cnmt Pressure 0.0 psig • Highest 2R12A reading 550 CPM •		

NAME: ____________________

DATE: ____________________

SYSTEM: Containment Systems

TASK: Perform a Containment Pressure Relief with R-12A in service

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	11	RECORD time that 2VC5 and 2VC6 are CLOSED in the Control Room Narrative Log for the Cyclic Data Monitoring Program.	Indicates logging time of closing 2VC5 & 2VC6 *CUE:* Closing time is recorded		

Terminating Cue: Closing time recorded

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: Containment Systems

TASK: Perform a Containment Pressure Relief with R-12A in service

TASK NUMBER: 022 513 01 01

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

What would be the potential negative effects if containment internal pressure was allowed to increase to 1.0 psig and an accident occurred before performing a pressure relief?

OPEN REFERENCE

ANSWER:

The design pressure may be challenged if one of the design basis accidents occurs.

NOTE: The procedure would also require a visual inspection of the duct work following the releases. The operator may also provide this correct information but it is not directly elicited by the question.

KA #: 029 K3.01 //2.9/3.3//

Objective: 0300-000.00S-CONTMT-00, 2.b)
Reference: Technical Specification Basis 3/4.6.1.4, page B 3/4 6-2
S2.OP-SO.CBV-0002, Section 5.1.

Comments: ____
____
____
____
____

JPM QUESTION #2

Why is it necessary to log the time that the Containment Pressure – Vacuum Relief Isolation valves (VC-5 and VC-6) are open?

OPEN REFERENCE

ANSWER:

Salem is committed to maintaining the time the valves are open to less than 1000 hours/year. This is to limit the potential for off-site releases during a LOCA.

KA #: 2.3.11 //2.7/3.2//

Objective: 0300-000.00S-CONTMT-00, LO 12

Reference: SC.OP-AP.ZZ-0004, Attachment 1 and 2.
0300-000.00S-CONTMT-00, Section VIII.H.f.1)

Comments: ____
____
____
____
____

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

What would be the potential negative effects if containment internal pressure was allowed to increase to 1.0 psig and an accident occurred before performing a pressure relief?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Why is it necessary to log the time that the Containment Pressure – Vacuum Relief Isolation valves (VC-5 and VC-6) are open?

OPEN REFERENCE

JOB PERFORMANCE MEASURE

INITIAL CONDITIONS:

1. The plant is at 100% power with all systems aligned normally and control systems in automatic. Containment pressure is 0.23 psig.

INITIATING CUE:

You have been directed to perform a containment pressure relief IAW S2.OP-SO.CBV-0002, with R-12A in service. RMS Channels 2R16 and 2R41 are not available. The procedure has been completed up to and including 5.2.1.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Residual Heat Removal

TASK: Swapping RHR Loops in Shutdown Cooling

TASK NUMBER: 0050050101

JPM NUMBER:

K/A NUMBER:	2.1.23	
IMPORTANCE FACTOR:	3.9	4.0
	RO	**SRO**

APPLICABILITY:
EO ☐ RO ☒ SRO ☒

EVALUATION SETTING/METHOD: Simulator

REFERENCES: S2.OP-SO.RHR-001(Q) Initiating RHR

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 10 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ____________

APPROVED: J C Lloyd for
PRINCIPAL TRAINING SUPERVISOR

for G D Gallagher
OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________ **GRADE:** ☐ **SAT** ☐ **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________ **DATE:** ____________

NAME: ____________

DATE: ______________________

SYSTEM: Residual Heat Removal

TASK: Swapping RHR Loops in Shutdown Cooling

TASK NUMBER: 0050050101

INITIAL CONDITIONS: IC-172 for 2/99 NRC EXAM

1. The unit is in Mode 5 with RHR in service maintaining RCS temperature.

INITIATING CUE:

You have been directed to remove 21 RHR from service and place 22 RHR in service.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Residual Heat Removal

TASK: Swapping RHR Loops in Shutdown Cooling

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Provide operator with properly marked up copy of S2.OP-SO.RHR-0001(Q), Initiating RHR, Swapping RHR Loops In Shutdown Cooling	Obtains S2.OP-SO.RHR-0001(Q), selects correct procedure section. *NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to preceding to the next step.*		
#	1	IF starting 22 RHR Loop and stopping 21RHR Loop, THEN perform the following: Ensure 22RH29 in AUTO.	Verifies 22RH29 in AUTO.		
* #	2.	IF placing 22 RHR Heat Exchanger in service, THEN: 1. Open 22CC16, 22 RHR HX OUTLET. 2. Throttle 22CC15, RHR HX CC FLOW CONT VALVE, as required for Component Cooling flow to control RCS temperature.	Opens 22CC16. Directs Primary NEO to throttle 22CC15 as required to control RCS temperature at current value ± 10°F. CUE: Primary NEO is throttling 22CC15		
* #	3.	Start 22 RHR Pump	Starts 22 RHR pump		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Residual Heat Removal

TASK: Swapping RHR Loops in Shutdown Cooling

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
#	4.	Throttle either or both RH18s to maintain stable RHR flow to the Reactor Coolant System.	Transfers flow from 21 RHR loop to 22 RHR loop using 21&22RH18's such that stable RHR flow is maintained to the RCS		
* #	5.	Stop 21 RHR Pump.	Stops 21 RHR Pump.		
	6.	Monitor 22 RHR Loop until parameters are stabilized.	Monitors 22 RHR loop flow, system temperatures, and pump motor amps.		
	7.	IF removing 21 RHR Heat Exchanger from service, THEN close 21CC16, 22 RHR HX OUTLET.	Closes 21CC16		
	8.	Record actual valve positions in Attachment 2, Section 6.0.	Records current valve positions in appropriate attachment section.		
	9.	Direct a second Operator to Complete Attachment 2, Section 6.0	Requests CRS direct a second operator to complete verification of valve positions in appropriate attachment section.		

Terminating Cue: When CRS is requested to direct second operator complete Attachment 2, Section 6.0.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: Residual Heat Removal

TASK: Swapping RHR Loops in Shutdown Cooling

TASK NUMBER: 0050050101

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

A loss of RHR cooling has occurred causing an increase in RCS pressure to occur.

List all equipment that will operate to prevent overpressurizing RHR piping as RHR system pressure increased to 650 psig.

OPEN REFERENCE

ANSWER:

1. Pressurizer Over pressure Protection (POPs) will open at 375 psig.
2. (Alarm "1(2) RHR1 (or 1(2) RH2) NOT FULL CLS & RX PRESS HIGH" will alarm at $\geq$ 400 psig.) Not required for full credit.
3. RCS to RHR Inlet Relief Valve RH3 will open at 375 psig.
4. RHR to RCS Hot Leg Relief Valve RH25 will lift at 600 psig.

KA #: 005 K4.01 //3.0/3.2//

Objective:	0300-000.00S-PZRPRT-00, LO 6
	0300-000.00S-RHR000-00, LO 4
Reference:	0300-000.00S-PZRPRT-00, IV.B.5.d
	0300-000.00S-RHR000-00, IV.D.1.c, IV.B.6.a
	P&ID 205332

Comments: ____

JPM QUESTION #2

Given the following conditions:

- 21 RHR pump and 21 HX are inservice for Shutdown Cooling Mode.
- 21RH18 RHR Heat Exchanger Discharge valve is throttled.
- 21SJ49 Flow is 3000 GPM.
- 2RH20 RHR Heat Exchanger Bypass valve is fully closed.

What will be the effect on RHR flow if control air to RHR components is lost? Explain the cause for any change in RHR flow.

OPEN REFERENCE

ANSWER:

RHR flow will increase to maximum due to a loss of air causing:

- RHR Heat Exchanger Discharge valves (21,22) RH 18 to fail open.
- RHR Heat Exchanger Bypass valve (RH20) to fail open.

KA #: 005 A2.04 //2.9/2.9//

Objective:	0300-000.00S-ABCA01-00, LO 4
Reference:	0300-000.00S-RHR0001, IV.B.5.
	0300-000.00S-CCW0001, IV.B.1.b)
	P&ID 205331 Sheet 1.
	S2.OP-AB.CA-0001, pg 18.

Comments: ____

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*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

A loss of RHR cooling has occurred causing an increase in RCS pressure to occur.

List all equipment that will operate to prevent overpressurizing RHR piping as RHR system pressure increased to 650 psig.

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Given the following conditions:

- 21 RHR pump and 21 HX are inservice for Shutdown Cooling Mode.
- 21RH18 RHR Heat Exchanger Discharge valve is throttled.
- 21SJ49 Flow is 3000 GPM.
- 2RH20 RHR Heat Exchanger Bypass valve is fully closed.

What will be the effect on RHR flow if control air to RHR components is lost? Explain the cause for any change in RHR flow.

OPEN REFERENCE

INITIAL CONDITIONS:

1. The unit is in Mode 5 with RHR in service maintaining RCS temperature.

INITIATING CUE:

You have been directed to remove 21 RHR loop from service and place 22 RHR loop in service.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem

SYSTEM: Emergency Core Cooling Systems

TASK: Increase Accumulator Level with a Safety Injection Pump

TASK NUMBER: 006 501 01 01

JPM NUMBER:

K/A NUMBER: 006 A4.07

APPLICABILITY:
EO [ ] **RO** [X] **SRO** [X]

IMPORTANCE FACTOR:

	RO	SRO
IMPORTANCE FACTOR	4.4	4.4

EVALUATION SETTING/METHOD: Simulator

REFERENCES: S2.OP-SO.SJ-0002, Accumulator Operations

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 15 minutes

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ____________

APPROVED: J C Lloyd for
PRINCIPAL TRAINING SUPERVISOR

OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**
1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________ **DATE:** ____________

SIMULATOR SETUP INSTRUCTIONS

SYSTEM:	Emergency Core Cooling Systems
TASK:	Increase Accumulator Level with a Safety Injection Pump
TASK NUMBER:	006 501 01 01
SIMULATOR IC:	IC-95 for 2/99 NRC Exam (Any Steady State 100% IC, lower accum. lev. <TS)
MALFUNCTIONS REQUIRED:	None
OVERRIDES REQUIRED:	None
SPECIAL INSTRUCTIONS:	Lower 21 Accumulator level to 56%.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Emergency Core Cooling Systems

TASK: Increase Accumulator Level with a Safety Injection Pump

TASK NUMBER: 006 501 01 01

INITIAL CONDITIONS:

1. The plant is at 100% power with all systems in their normal alignment with control systems in automatic.
2. 21 Accumulator is at 56% level.

INITIATING CUE:

Fill 21 ECCS Accumulator to 60% using 21 SI pump.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Emergency Core Cooling Systems

TASK: Increase Accumulator Level with a Safety Injection Pump

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Obtains the current revision of the S2.OP-SO.SJ-0002(Q), Accumulator Operations, and selects Accumulator Make-up with 21 Safety Injection Pump section.	Obtains correct procedure, selects appropriate section. *NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to proceeding to the next step.*		
	1	IF RCS Pressure is less than 2000 psig, THEN ensure closed 21SJ134, COLD LEG DISCHARGE.	Operator verifies RCS pressure >2000 psig and leaves 21SJ134 OPEN.		
*	2	Start 21 Safety Injection Pump.	Operator depresses START PB, notes change in light status, and observes stabilization of running current.		
*	3.	Open SJ53, 21 SI PUMP DISCHARGE TEST LINE VALVE.	Operator depresses 2J53 OPEN PB and notes change in light status.		
*	4	Open SJ123, TEST LINE TO CVCS HUT.	Operator depresses 21SJ123 OPEN PB and notes change in light status.		

NAME: ______________________

DATE: ______________________

SYSTEM: Emergency Core Cooling Systems

TASK: Increase Accumulator Level with a Safety Injection Pump

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	5	OPEN associated Accumulator fill valve: ♦ 21SJ20, 21 ACCUMULATOR FILL ♦ 22SJ20, 22 ACCUMULATOR FILL ♦ 23SJ20, 23 ACCUMULATOR FILL ♦ 24SJ20, 24 ACCUMULATOR FILL	Operator depresses 21SJ20 OPEN PB; notes change in light status and monitor 21 Accumulator level on LI934 and LI935.		
*	6	When desired level is reached, close the Accumulator fill valve: ♦ 21SJ20, 21 ACCUMULATOR FILL ♦ 22SJ20, 22 ACCUMULATOR FILL ♦ 23SJ20, 23 ACCUMULATOR FILL ♦ 24SJ20, 24 ACCUMULATOR FILL	When level reaches 60% (+/-2%), operator depresses 21SJ20 CLOSE PB and notes change in light status		
	7	Close 2SJ53, 21 SI PUMP DISCHARGE TEST LINE VALVE	Operator depresses 2SJ53 CLOSE PB and notes change in light status.		
	8	Close 2SJ123, TEST LINE TO CVCS HUT.	Operator depresses 2SJ123 CLOSE PB and notes change in light status.		
*	9	Stop 21 Safety Injection Pump	Operator depresses 21 SI Pump STOP PB and notes change in light status.		

NAME: ____________________

DATE: ____________________

SYSTEM: Emergency Core Cooling Systems

TASK: Increase Accumulator Level with a Safety Injection Pump

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	10	IF Accumulator level has increased $\geq$ 1% of tank volume, THEN perform S2.OP-ST.SJ-0008(Q), Emergency Core Cooling Accumulators, within 6 hours.	Identifies the need to perform S2.OP-ST.SJ-0008(Q) within 6 hours.		

Terminating Cue: Applicability determination of S2.OP-ST.SJ-0008 complete. JLL 3/2/99

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ____________________
DATE: ____________________

SYSTEM: Emergency Core Cooling Systems

TASK: Increase Accumulator Level with a Safety Injection Pump

TASK NUMBER: 006 501 01 01

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

Transfer to Cold Leg Recirculation is being performed. SJ67 (SI PUMP MINIFLOW) valve cannot be shut. If the Transfer to Cold Leg Recirculation procedure were to continue from this point, determine the following:

1. Would the RWST be contaminated from the containment sump? Explain.
2. Will the interlock allowing 21 SJ45 and 22 SJ45 RHR Discharge to SI/Charging Pumps valves to be opened be satisfied? Explain.

OPEN REFERENCE

ANSWER:

1. The RWST will not be contaminated because SJ68 is in series with SJ67 and it will be closed.
2. The interlock will be satisfied because either SJ67 or SJ68 will be closed.

KA #: 011 EK3.07 //3.5/3.6//

Objective:	0300-000.00S-LOCA03-02 Obj. 3
Reference:	0300-000.00S-LOCA03-02, Transfer to Cold Leg Recirculation, Section 3.2.5 0300-000.00S-ECCS00-00, Emergency Core Cooling System, Section IV.D.3.a.2) P&ID 205334. 2-EOP-LOCA-3 Basis Document, Transfer to Cold Leg Recirculation, page 26. 2-EOP-LOCA-3 Step 11.3.

Comments: ____

JPM QUESTION #2

A LOCA has occurred. The accumulators are not isolated until RCS Thot temperatures are 250 °F. If the accumulators are not isolated at the required time, what is the potential impact on further LOCA Recovery?

OPEN REFERENCE

ANSWER:

Nitrogen may have been injected into the RCS, which would impede further RCS depressurization.

KA #: 011 EK3.12 //4.4/4.6//

Objective: 0300-000.00S-LOCA01-00, Obj. 6, 9, 10.
Reference: 0300-000.00S-LOCA01-00, Section 5.3.19
2-EOP-LOCA-1, Loss of Reactor Coolant Basis Document, page 40.

Comments: ____
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*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

Transfer to Cold Leg Recirculation is being performed. SJ67 (SI PUMP MINIFLOW) valve cannot be shut. If the Transfer to Cold Leg Recirculation procedure were to continue from this point, determine the following:

1. Would the RWST be contaminated from the containment sump? Explain.

2. Will the interlock allowing 21 SJ45 and 22 SJ45 RHR Discharge to SI/Charging Pumps valves to be opened be satisfied? Explain.

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

A LOCA has occurred. The accumulators are not isolated until RCS Thot temperatures are 250 °F. If the accumulators are not isolated at the required time, what is the potential impact on further LOCA Recovery?

OPEN REFERENCE

INITIAL CONDITIONS:

1. The plant is at 100% power with all systems in their normal alignment with control systems in automatic.

2. 21 Accumulator is at 56% level.

INITIATING CUE:

Fill 21 ECCS Accumulator to 60% using 21 SI pump.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Nuclear Instrumentation System

TASK: Take Corrective Action for a Source Range Instrument Malfunction

TASK NUMBER: 015 527 04 01

JPM NUMBER: 2-6 (44)

K/A NUMBER: 032 AA205

IMPORTANCE FACTOR: 2.9* (RO) 3.2* (SRO)

APPLICABILITY: EO [ ] RO [X] SRO [X]

EVALUATION SETTING/METHOD: Simulator

REFERENCES:

S2.OP-AR.ZZ-0005	Overhead Annunciators Window E
S2.OP-AB.NIS-0001(Q)	Nuclear Instrumentation System Malfunction

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 10 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ______

APPROVED: [signature] for
PRINCIPAL TRAINING SUPERVISOR

for [signature]
OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ______

ACTUAL TIME CRITICAL COMPLETION TIME: ______

JPM PERFORMED BY: ______ **GRADE:** [ ] SAT [ ] UNSAT

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ______ **DATE:** ______

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

SIMULATOR SETUP INSTRUCTIONS

SYSTEM:	Nuclear Instrumentation System
TASK:	Take Corrective Action for a Source Range Instrument Malfunction
TASK NUMBER:	015 527 04 01
SIMULATOR IC:	Shutdown IC-12
MALFUNCTIONS REQUIRED:	NI0190A, N31 fails to 100%
OVERRIDES REQUIRED:	
SPECIAL INSTRUCTIONS:	• Select the Audio CR and Scaler/Timer to the channel that will be failed. • After the first NIS alarm, inform the candidate that the PO will tend to any non-related alarms.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

TASK NUMBER: 015 527 04 01

INITIAL CONDITIONS:

1. The Unit is in Mode 3 with the rod control system de-energized.

INITIATING CUE:

You are the reactor operator. Respond as appropriate to plant conditions.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Operator acknowledges OHA E-13 and F-25. Refers to S2.OP-AR.ZZ-0005(Q) for actions	Acknowledges annunciator *NOTE:* **After the first SR NIS alarm, inform the candidate that the PO will tend to any alarms not related to the NIS problem.** Pulls S2.OP-AR.ZZ-0005(Q) or immediately enters AB.NIS-1. *CUE:* **Alarm Response Procedures for SR NIS do not direct the operator into AB.NIS and could direct entry into EOP-TRIP-1. If necessary (as CRS), direct the candidate to implement AB.NIS-0001.**		
	2	Go to S2.OP-AB.NIS-0001(Q), Nuclear Instrument System Malfunctions.	Refers to S2.OP-AB.NIS-0001(Q). ***NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to proceeding to the next step.***		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	3	IF a Power Range NI is failed, THEN place the ROD BANK SELECTOR SWITCH in MAN.	Operator confirms Source Range instrument failure.		
	4	STOP any Turbine load change.	Operator determines that no action required since the plant is in Mode 3.		
	5	Has a Power Range channel failure occurred as indicated by one or more of the following symptoms? ...	Operator determines that NO Power Range instrument has failed by listed indication, proceeds to appropriate step.		
	6	Has an Intermediate Range Channel failure occurred as indicated by one or more of the following symptoms?	Operator determines that NO Intermediate Range instrument has failed by listed indication, proceeds to appropriate step.		
	7	Has Scaler/Timer or Audio Count Rate channel failure occurred as indicated by one or more of the following symptoms?	Determines if Scaler/Timer or Audio Count Rate channel has been affected by SR instrument malfunction, proceeds to appropriate step. *NOTE: Malfunction may/may not affect indications; dependent on malfunctioning channel.*		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	8	Has a Source Range Channel failed as indicated by one or more of the following symptoms? ♦ Erratic or failed indication ♦ OHA E-5, SR DET VOLT TRBL, in alarm ♦ OHA-E-13, SR HI FLUX AT S/D unsubstantiated by other indications	Operator determines that a Source Range channel has failed, proceeds to appropriate step.		
*	9	Select alternate Source Range Channel for input to Audio Count Rate Circuit.	Operator determines which channel has failed and selects the alternate channel as input to the Audio Count Rate circuit on Rack #81, N34 drawer. ***NOTE:*** This switch must be pulled out to re-position. If the candidate is unaware and calls for an I&C Tech. then provide ***CUE***: Try pulling switch outward and rotate.		
	10.	IF refueling operations are in progress, ...	Determines refueling operations are NOT in progress.		
	11.	IF Source Range Channel has failed, THEN go to step ...	Recognizes failure, proceeds to appropriate step.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	12	REMOVE affected Source Range Channel from service as follows: Place the LEVEL TRIP switch in the BYPASS position (Source Range drawer).	Operator determines the failed channel and at its associated NIS drawer: Rotates Level Trip switch to BYPASS		
	13.	Ensure OHA E-29, SR & IR TRIP BYP is in alarm	Determines OHA E-29 lit.		
*	14.	Place HIGH FLUX AT SHUTDOWN switch in BLOCK position (Source Range drawer).	Rotates High Flux at Shutdown switch to BLOCK.		
	15.	Ensure OHA E-21, SR HI FLUX AT S/D BLOCK.	Determines OHA E-21 is lit.		
*	16.	Remove INSTRUMENT POWER fuses (Source Range drawer).	Rotates and removes BOTH Instrument Power fuses.		
	17.	Ensure OHA E-5, SR DET VOLT TROUBLE is in alarm.	Determines OHA E-5 is lit.		
	18.	IF conditons warrant, THEN place ROD BANK SELECTOR SWITCH in AUTO.	Verifies selector switch in MANUAL.		
	19.	NOTIFY the CRS/OS to refer to Technical Specifications.	Operator informs the CRS/OS to refer to Tech Spec's		

Terminating Cue: **CRS/OS notified**

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ____________________
DATE: ____________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

TASK NUMBER: 015 527 04 01

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

Core re-load is in progress following a RCP seal maintenance outage. The control room staff realizes they have not heard the audio count rate signal for a several minutes but both source range instruments are indicating properly on the control console.

What actions are required?

OPEN REFERENCE

ANSWER:

Immediately suspend all operations involving core alterations or positive reactivity changes.

NOTE: The operator may state that the range switch may need to be adjusted. May have to state that the audio signal does not return when the count rate is adjusted.

KA #: 2.2.22 //3.4/4.1//

Objective:	0300–000.00S–EXCORE–00, Obj. 11
Reference:	TS 3.9.2
	S2.OP-AB.NIS-0001

Comments: ____

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JPM QUESTION #2

A reactor startup is in progress. Power is currently at 5×10^3 cps. A control power fuse for one Source Range instrument blows.

What will be the response and why?

OPEN REFERENCE

ANSWER:

A loss of control power will deenergize the RPS relay and cause a reactor trip.

KA #: 015 A2.01 //3.5/3.9//

Objective: 0300–000.00S–EXCORE–00, Obj. 8
Reference: 0300–000.00S–EXCORE–00, Section V.A.1.b.2)
S2.OP-AB.NIS-0001
Logic Diagram 221052

Comments: ____
____
____
____
____

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

Core re-load is in progress following a RCP seal maintenance outage. The control room staff realizes they have not heard the audio count rate signal for several minutes but both source range instruments are indicating properly on the control console.

What actions are required?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

A reactor startup is in progress. Power is currently at 5×10^3 cps. A control power fuse for one Source Range instrument blows.

What will be the response and why?

OPEN REFERENCE

INITIAL CONDITIONS:

1. The unit is in Mode 3 with the rod control system de-energized.

INITIATING CUE:

You are the reactor operator. Respond as appropriate to plant conditions.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Pressure Control

TASK: Depressurize in accordance with LOCA-2 using Auxiliary Spray

TASK NUMBER: 1150090501

JPM NUMBER:

K/A NUMBER: 009 EA1.09

IMPORTANCE FACTOR: 4.4 (RO) 4.3 (SRO)

APPLICABILITY:
EO [ ] RO [X] SRO [X]

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES: 2-EOP-LOCA-2, Post LOCA Cooldown and Depressurization

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 15 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: [signature] for
PRINCIPAL TRAINING SUPERVISOR

[signature]
for **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**
1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ______________

ACTUAL TIME CRITICAL COMPLETION TIME: ______________

JPM PERFORMED BY: ______________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ______________________ **DATE:** ______________

NAME: ______________________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

DATE: ____________________

SYSTEM: Pressure Control

TASK: Depressurize in accordance with LOCA-2 using Auxiliary Spray

TASK NUMBER: 1150090501

INITIAL CONDITIONS:

1. A LOCA has occurred.
2. Plant conditions are stable.
3. Safeguards Actuations have been reset.
4. AC Buses are energized from offsite power.
5. Actions of 2-EOP-LOCA-2, Post LOCA Cooldown and Depressurization have been completed through step 11.
6. All equipment has functioned normally to this point.
7. A cooldown has been initiated.
8. 2PR6 is closed and tagged

INITIATING CUE:

The CRS directs you to depressurize the RCS to fill the PZR to Greater than 25% (33% if adverse condition exist) starting at step 12 of 2-EOP-LOCA-2.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

JOB PERFORMANCE MEASURE

SIMULATOR SETUP INSTRUCTIONS

SYSTEM:	Pressure Control
TASK:	Depressurize in accordance with LOCA-2 using Auxiliary Spray
TASK NUMBER:	**1150090501**
SIMULATOR IC:	
MALFUNCTIONS REQUIRED:	**IC-81 for 2/99 NRC Exam** (Any IC with a LOCA sized to obtain the conditions below)
OVERRIDES REQUIRED:	MALF VL 298 to 0 to fail second PZR PORV closed MALF PR0019C-D to TRUE to fail Spray valves closed.
SPECIAL INSTRUCTIONS:	The following conditions must be established:

- Break flow equal to injection flow with at least two charging pumps running and MSIVs open.
- RCS pressure approximately 1500 psig (or as appropriate for the cooldown)
- PZR level approximately 10% to 20%.
- PR6 PZR PORV Block valve closed and tagged.
- SI Reset

Ensure major steps of LOCA-1 and LOCA-2 are completed up through step 11

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Pressure Control

TASK: Depressurize in accordance with LOCA-2 using Auxiliary Spray

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	1	Place ALL PZR Heaters in MANUAL and OFF	Verifies 21 BACKUP MANUAL PB illuminated. Verifies 22 BACKUP MANUAL PB illuminated. Verifies 21 BACKUP OFF PB is illuminated. Verifies 22 BACKUP OFF PB is illuminated. Verifies CNTRL GRP HEATERS OFF PB is illuminated.		
	2.	Attempts to open PS1 and PS3, PRZ SPRAY VLVs.	Depress the Master Pressure Controller MANUAL PB and verifies it illuminates. Depress the Master Pressure Controller DECREASE PRESSURE PB and verifies DEMAND indication increases. When DEMAND signal is in the SPRAY range recognize the spray valves have not opened. Depresses the 2PS1 MANUAL PB and verifies PB illuminates. Depress 2PS1 OPEN (INC FLOW) PB. Recognizes 2PS1 demand signal is not increasing. Depresses the 2PS3 MANUAL PB and verifies PB illuminates. Depress 2PS3 OPEN (INC FLOW) PB. Recognizes 2PS3 demand signal is not increasing.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Pressure Control

TASK: Depressurize in accordance with LOCA-2 using Auxiliary Spray

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	3.	Attempts to open PR2 PRZ PORV.	Depress the 2PR2 MANUAL PB and verifies PB illuminates. Depresses the 2PR2 OPEN PB. Determine that the valve does not open.		
	4.	Determines a SI pump is running.	Verifies 21 START PB OR 22 START PB are illuminated. OR Verifies flow on FI922 for 21 SI PUMP OR FI918 for 22 SI PUMP.		
	5.	Determines 21 or 22 Charging Pump is running.	Verifies 21 START PB OR 22 START PB are illuminated. OR Verifies BORON INJ TANK flow on FI917.		
*	6.	Opens Charging Pump Minimum Flow Valves.	Depresses the 2CV139 CHARGING MINI FLOW OPEN PB and verifies the PB illuminates. Depresses 2CV140 CHARGING MINIFLOW OPEN PB and verifies the PB illuminates.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Pressure Control

TASK: Depressurize in accordance with LOCA-2 using Auxiliary Spray

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	7.	Close BIT Isolation Valves ***NOTE: When the BIT is isolated then a loss of subcooling will occur.*** ***CUE: If the operator states that SI is required to be reinitiated or if the operator begins to reinitiate SI then state "From the CRS - Continue the depressurization, EOPs will reestablish subcooling after depressurization is complete."***	Depresses the PB for each of the following and verifies the PB illuminates for each: • 2SJ4 BIT INLET CLOSE • 2SJ5 BIT INLET CLOSE • 2SJ12 BIT OUTLET CLOSE • 2SJ13 BIT OUTLET CLOSE NOTE: Closing either both of the inlet valves or both of the outlet valves will isolate BIT flow.		
	8.	Close the Charging Flow Control Valve	Depresses the CV55 MANUAL PB and verifies it illuminates OR verifies it is illuminated. Depresses the 2CV55 CLOSE (DEC FLOW) PB until the valve is closed (PB illuminates).		
*	9.	Open Charging Discharge Valves	Depresses the 2CV68 CHG OPEN PB and verifies the PB illuminates. Depresses the 2CV69 CHG OPEN PB and verifies the PB illuminates.		
*	10.	Adjust Charging Flow Control Valve to raise charging flow	Depresses the 2CV55 OPEN (INC FLOW) PB until a charging flow rate is established		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________

DATE: ____________

SYSTEM: Pressure Control

TASK: Depressurize in accordance with LOCA-2 using Auxiliary Spray

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	11.	Adjust RCP Seal Injection flow as necessary	Verifies proper RCP seal injection flow.		
*	12.	Open the RCS Aux Spray Valve.	Depress the 2CV75 RCS AUX SPRAY OPEN PB and verifies the PB illuminates.		
*	13.	Close Charging flow to RCS Loops 23 and 24.	Depress the PB and verifies the PB illuminates for the following valves: • 2CV77 CHARGING TO LOOP 23 CLOSE • 2CV79 CHARGING TO LOOP 24 CLOSE		
	14.	Monitor Pressurizer Level	Monitor the following indicators: • LI-459A CHANNEL I LEVEL • LI-460A CHANNEL II LEVEL • LI-461 CHANNEL III LEVEL ***CUE:*** If candidate wants or begins to continue the procedure while depressurization is in progress then, as CRS, direct him to wait until depressurization has been accomplished.		
	15.	When PZR level is greater than 25% (33% Adverse) then stop depressurization.	When PZR level is >25% (33% Adverse) depress RCS AUX SPRAY CLOSE PB and verifies PB illuminates.		

TERMINATING CUE: Auxiliary Spray is secured.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________

DATE: ______________________

SYSTEM: Pressure Control

TASK: Depressurize in accordance with LOCA-2 using Auxiliary Spray

TASK NUMBER: 1150090501

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

A procedure note indicates that the limit for spray head delta temperature may be exceeded during this evolution. Why might this limit be exceeded as is noted in the procedure?

CLOSED REFERENCE

ANSWER:

The Auxiliary spray flow is coming from the RWST and is only being heated by the Regenerative Heat Exchanger, which probably will not be in service. The spray nozzle will be at saturation temperature for the current pressurizer pressure.

KA #: 010 A1.08 //3.2/3.3/

Objective: 0300-000.00S-CVCS00-00, Obj. 3. {The objective is draw the system and this question is based on the flow path}

Reference: P&ID 205328, Sh 2.

Comments: ____

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JPM QUESTION #2

During a plant heatup with the pressurizer at 1000 psig a PORV begins to leak. How can the location of the leak be determined?

FOLLOWUP QUESTION:

If PRT pressure is 3 psig, what would the expected value for tail pipe temperature?

OPEN REFERENCE

ANSWER:

The temperature downstream of the PORVs on the combined header can be read on CC2. Using the temperature it can be determined that the leak is from a PORV but the PORVs would have to be isolated one at a time to determine which one is leaking.

FOLLOWUP ANSWER:

The expected temperature for the leaking PORV would be 330 °F (Accept 310 to 350 °F).

KA #: 010 A1.09 // 3.4/3.7//

Objective: 0300-000.00S-ABRC01-00, Obj. 3

Reference: P&ID 205301, Sheet 1,
Steam Tables
S2.OP-AB.RC-0001, Reactor Coolant System Leak, Att. 2, pg 10.

Comments: ____
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*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

A procedure note indicates that the limit for spray head delta temperature may be exceeded during this evolution. Why might this limit be exceeded as is noted in the procedure?

CLOSED REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

During a plant heatup with the pressurizer at 1000 psig a PORV begins to leak. How can the location of the leak be determined?

OPEN REFERENCE

INITIAL CONDITIONS:

1. A LOCA has occurred.
2. Plant conditions are stable.
3. Safeguards Actuations have been reset.
4. AC Buses are energized from offsite power.
5. Actions of 2-EOP-LOCA-2, Post LOCA Cooldown and Depressurization have been completed through step 11.
6. All equipment has functioned normally to this point.
7. A cooldown has been initiated.
8. 2PR6 is closed and tagged

INITIATING CUE:

The CRS directs you to depressurize the RCS to fill the PZR to Greater than 25% (33% if adverse condition exist) starting at step 12 of 2-EOP-LOCA-2.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: SALEM

SYSTEM: CONTAINMENT SPRAY

TASK: CONTAINMENT SPRAY FAILURE DURING LBLOCA

TASK NUMBER: 115 036 05 01

JPM NUMBER:

APPLICABILITY:
EO [ ] RO [x] SRO [x]

K/A NUMBER: E14 EA1.1
IMPORTANCE FACTOR: RO 3.7/SRO 3.7

EVALUATION SETTING/METHOD: Simulator

REFERENCES: EOP TRIP-1 Step 11

TOOLS AND EQUIPMENT: N/A

VALIDATED JPM COMPLETION TIME: 5 min

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: ______ for
PRINCIPAL TRAINING SUPERVISOR

______ for
OPERATIONS MANAGER

CAUTION:	No plant equipment shall be operated during the performance of a JPM without the following: 1. Permission from the OS Or Unit CRS; 2. Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions). 3. Verification of the "as left" condition by a qualified individual.

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: N/A
JPM PERFORMED BY:
GRADE: [ ] - SAT [ ] - UNSAT

EVALUATOR'S SIGNATURE: ____________ DATE: ____________

JOB PERFORMANCE MEASURE

SIMULATOR SETUP INSTRUCTIONS

SYSTEM:	Containment Spray
TASK:	Containment Spray failure during LBLOCA
TASK NUMBER:	115 036 05 01
SIMULATOR IC:	Saved IC-171 for 2/99 NRC EXAM (21 CS Pp Control Power OFF; 21 CS Pp breaker tagged; Run simulator with 10000 gpm leak; reset 2C SEC; then insert rupture of 21 RCS loop)
MALFUNCTIONS REQUIRED:	NONE
OVERRIDES REQUIRED:	NONE
SPECIAL INSTRUCTIONS:	Complete EOP TRIP-1 to Step 11
NOTE:	

JOB PERFORMANCE MEASURE

NAME:______________________________
DATE: ____________ __________________

SYSTEM: Containment Spray

TASK: Containment Spray failure during LBLOCA

TASK NUMBER: 115 036 05 01

INITIAL CONDITIONS: SI has actuated. The Crew has completed steps 1 through 10 of TRIP-1, Reactor Trip or Safety Injection. 21 CS Pp is tagged OOS. 2C SEC was reset while attempting to start 22 Charging Pump.

INITIATING CUE: Beginning at Step 11, continue with the procedure. Respond only to alarms associated with your task.

Name: ______________ ______
Date: ______________________

System: Containment Spray

Task: Containment Spray failure during LBLOCA

# *	STEP NO.	STEP (*Denotes a Critical Step) (# Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		TRIP-1 marked through Step 10	EOP TRIP-1 provided		
	1	CNMT pressure less than 15 psig?	Recognizes CNMT pressure is greater than 15 psig		
	2	Initiate Phase B and Spray Actuation	Verifies Phase B and Spray Actuation		
*	4	Start 21 and 22 CS pump	Starts 22 CS pump (21 is tagged OOS)		
	5	Initiate Loop 21 through 24 Main Steam Isolation	Verifies or initiates Main Steam Isolation NOTE: If MSLI must be initiated then it becomes a critical task.		
	6	Stop 21 through 24 RCPs	Verifies all RCP's stopped		
	7	Are valve groups in Table D in Safeguards position?	Verifies 2CC117, 118, 131, 190, 136 and 187 closed Verifies 21&22CS2 and 2CS14, 16, 17 open		

Terminating Cue: Step 11 completed

JPM QUESTION #1

Unit 2 is at 98% power. 21 Containment Spray pump and 24 Containment Fan Coil Unit have both been declared inoperable within the past hour. What will happen to containment pressure if a DBA LOCA occurs before either component is returned to service?

OPEN REFERENCE

ANSWER:

Containment Pressure will be maintained within design limits by one CS pump and the remaining CFCUs. (If a vital bus is lost then containment pressure response is bus dependent) ( ) not required for full credit.

KA #: 026 K4.04 //3.7/4.1//

Objective: 0300-000.00S-CSPRAY-00, Obj. 2
Reference: 0300-000.00S-CSPRAY-00, Section III.D
UFSAR, Section 6.2.2
Technical Specifications Basis, 3/4.6.2.1 & 3/4.6.2.3, page B 3/4 6-3.

Comments: ______________________________

JPM QUESTION #2

A LOCA has occurred. Control Room Operators are responding per the EOP's. The SI signal and the SEC's have been reset. Containment pressure has steadily risen and has just reached the HI-HI setpoint.

How will the CS pumps and valves respond to these conditions?

FOLLOWUP QUESTION

Using logic prints show how the starting of the CS pumps is prevented.

OPEN REFERENCE

ANSWER:

The CS pumps will not start but the valves will reposition.

FOLLOWUP ANSWER

Using Logic Diagrams demonstrate how resetting the SEC will prevent the CS pumps from starting.

KA #: 026 A3.01 //4.3/4.5//

Objective: 0300-000.00S-CSPRAY-00, Obj. 8 & 9
Reference: 0300-000.00S-CSPRAY-00, Section IV.A.4.a
Logic Diagrams 239949 and 239952

Comments: ____________________
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*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

Unit 2 is at 98% power. 21 Containment Spray pump and 24 Containment Fan Coil Unit have both been declared inoperable within the past hour. What will happen to containment pressure if a DBA LOCA occurs before either component is returned to service?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

A LOCA has occurred. Control Room Operators are responding per the EOP's. The SI signal and the SEC's have been reset. Containment pressure has steadily risen and has just reached the HI-HI setpoint.

How will the CS pumps and valves respond to these conditions?

OPEN REFERENCE

INITIAL CONDITIONS: SI has actuated. The Crew has completed steps 1 through 10 of TRIP-1, Reactor Trip or Safety Injection. 21 CS Pp is tagged OOS. 2C SEC was reset while attempting to start 22 Charging Pump.

INITIATING CUE: Beginning at Step 11, continue with the procedure. Respond only to alarms associated with your task.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: CVCS

TASK: Makeup to the RWST using CVCS Makeup System

TASK NUMBER: 0040170101

JPM NUMBER:

K/A NUMBER: 004 A4.12

IMPORTANCE FACTOR: 3.8 (RO) 3.3 (SRO)

APPLICABILITY: EO [ ] RO [X] SRO [X]

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES: S2.OP-SO.CVC-0006 section 5.7
S2.RE-RA.ZZ-0012, Figure 110B

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 15 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: for
PRINCIPAL TRAINING SUPERVISOR

for **OPERATIONS MANAGER**

CAUTION:	**No plant equipment shall be operated during the performance of a JPM without the following:** 1. **Permission for the OS Or Unit CRS;** 2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).** 3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________________ **DATE:** ____________

SIMULATOR SETUP INSTRUCTIONS

SYSTEM:	CVCS
TASK:	Makeup to the RWST using CVCS Makeup System
TASK NUMBER:	0040170101
SIMULATOR IC:	IC-2 with REMOTE EC01A to 40.5
MALFUNCTIONS REQUIRED:	
OVERRIDES REQUIRED:	
SPECIAL INSTRUCTIONS:	Reduce RWST level to Technical Specification entry level.

NAME: ______________________

DATE: ______________________

SYSTEM: CVCS

TASK: Makeup to the RWST using CVCS Makeup System

TASK NUMBER: 0040170101

INITIAL CONDITIONS:

1. RWST level has decreased to 40.5 ft.
2. Reactor Makeup is not required at this time.
3. Boric Acid Storage Tank Concentration is 6800 ppm.
4. RCS Boron concentration is 680 ppm.
5. RWST Boron Concentration is 2350 ppm.
6. Technical Specifications have been reviewed by the CRS.
7. The RWST Heater Pump is in service.

INITIATING CUE:

The CRS has directed that a 1000 gallons be added to RWST to raise level using the normal blender. Inform the CRS when makeup has been initiated to the RWST.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: CVCS

TASK: Makeup to the RWST using CVCS Makeup System

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	1	Provide a properly marked up copy of S2.OP-SO.CVC-0006. Inform candidate that all prerequisites have been met and Off-Normal has been reviewed.	Candidate reviews procedure *NOTE:* The procedure should be implemented IAW Work Standards Handbook guidance for Category II procedures.		
	2	Verifies RWST Heater Pump is in service	Given as an initial condition. *Cue: The RWST heater pump is in service.*		
	3.	Ensure VCT level adequate	Verifies VCT level is adequate using LT112 or LT114.		
	4.	Obtain Boric Acid Flow setpoint from S2.RE-RA.ZZ-0012(Q).	Determines boric acid flow rate is to be 25 gpm or greater. NOTE: Using the graph the closest value is 30 gpm. Calculating the value using the formula is 27.8 gpm. Allowing for error the tolerance was determined to be a minimum of 25 gpm.		
*	5.	DEPRESS Makeup Control Mode Selector Stop Pushbutton.	Depresses MODE SELECT STOP PB and verifies PB is illuminated.		
	6.	Reset COUNT A on the Makeup flow register.	On each Make Flow Register select COUNT A then select RESET.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: CVCS

TASK: Makeup to the RWST using CVCS Makeup System

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	7.	Place 2CV179, PRI WTR FLOW CONTROL VALVE, in MANUAL	Depresses the 2CV179 MANUAL PB and verifies PB is illuminated.		
	8.	Place 2CV172, BA FLOW CONTROL VALVE, in MANUAL	Depresses the 2CV172 MANUAL PB and verifies PB is illuminated.		
	9.	Ensure closed 2BR170, BA BLENDER TO CVCS HUT VALVE.	Direct local operator to verify 2BR170 is closed. *CUE: 2BR170 is closed.*		
	10.	OPEN 2CV182, BA BLENDER TO RWST AND HUT VALVE and 2CV184, BA BLENDER TO RWST	Direct an operator TO OPEN 2CV182 & 2CV184 *CUE:* **Simulator Operator open both 2CV182 (REMOTE CV20A to 100%) and 2CV184(REMOTE CV21A to 100%) on 1 minute ramp. Inform Control Room by radio as soon as the valves begin to ramp.**		
*	11.	Start Primary Water Pump.	Depresses either the 21 or 22 PRIMARY WATER PUMP START PB and verifies PB is illuminated.		
*	12..	Place Boric Acid Pump in FAST Speed.	Depresses either the 21 or 22 FAST PB and verifies PB is illuminated.		
*	13..	Manually adjust CV172, BA FLOW CONTROL VALVE.	Using 2CV172 OPEN (INC FLOW) and CLOSE (DEC FLOW) PB to obtain >25 gpm on FI110A.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ________________

DATE: ________________

SYSTEM: CVCS

TASK: Makeup to the RWST using CVCS Makeup System

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	14.	If required BA Flow is not achieved, then close 21 and 22CV160 (Recirculation Valves).	Determine that required BA Flow Rate is achieved.		
*	15.	Manually adjust 2CV179 for 50 gpm.	Depress 2CV179 OPEN (INC FLOW) PB until FI111A indicates 50 gpm		

TERMINTATING CUE: Inform the CRS that makeup flow has be initiated to the RWST.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: CVCS

TASK: Makeup to the RWST using CVCS Makeup System

TASK NUMBER: **0040170101**

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ **-SAT** ☐ **-UNSAT**

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ **-SAT** ☐ **-UNSAT**

JPM QUESTION #1

Utilizing the P&ID, trace the flow path from the Boric Acid Tank to the RWST that will occur while performing this procedure. Identify how boration of the RCS is prevented while performing this procedure.

OPEN REFERENCE

ANSWER:

On 205328 Sh 1 Starting at No 21 or No. 22 BAT (grid G2 or G4) trace to 21 or 22 Boric Acid pump. From the discharge of the pump trace to where it transitions to 205334 (Grid E-7). On 205334 Sh 1 (Grid F-2) trace to the RWST.

CV181, VCT Make-Up Stop Valve, and CV185, Charging Pump SuctionValve, are closed.

KA #: 004 K1.23 //3.4/3.7//

Objective: 0300-000.00S-CVCS00-00 Obj. 3
Reference: 205328 Sh1 and 205334 Sh 1

Comments: ____
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JPM QUESTION #2

Reactor power is 85%. 2A EDG was removed from service for maintenance at 1600 on 2/24/99. All required Technical Specification Action Statements (TSAS's) were entered. 22 Charging pump has been declared inoperable at 0800, 2/25/99, and 2A EDG remains inoperable.

Identify all TSAS's that must be entered when the 22 Charging Pump is declared inoperable.

SRO ONLY – To prevent having to perform a reactor shutdown, when would 2A EDG and 22 charging pump be required to be returned to service?

OPEN REFERENCE

ANSWER:

The following LCOs have to be entered: 3.1.2.2, 3.1.2.4, and 3.5.2

SRO Only:

2A EDG must be returned to service NLT 1600, 2/27/99

AND

22 Charging pump must be returned to service NLT 0800, 2/28/99

KA #: 2.2.22 //3.4/4.1//

Objective: 0300-000.00S-CVCS00-00 Obj. 10
Reference: TS 3.1.2.2, 3.1.2.4, 3.5.2

Comments: ______________________________
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*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

Utilizing the P&ID, trace the flow path from the Boric Acid Tank to the RWST that will occur while performing this procedure. Identify how boration of the RCS is prevented while performing this procedure.

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Reactor power is 85%. 2A EDG was removed from service for maintenance at 1600 on 2/24/99. All required TS LCOs were entered. 22 Charging pump was declared inoperable at 0800 on 2/25/99.

Identify all required Technical Specification LCOs that must be entered when the 22 Charging pump is declared inoperable.

SRO ONLY – To prevent having to perform a reactor shutdown when would 2A EDG and 22 charging pump be required to be returned to service?

OPEN REFERENCE

INITIAL CONDITIONS:

1. RWST level has decreased to 40.5 ft.
2. Reactor Makeup is not required at this time.
3. Boric Acid Storage Tank Concentration is 6800 ppm.
4. RCS Boron concentration is 680 ppm.
5. RWST Boron Concentration is 2350 ppm.
6. Technical Specifications have been reviewed by the CRS.
7. The RWST Heater Pump is in service

INITIATING CUE:

The CRS has directed that a 1000 gallons be added to RWST to raise level using the normal blender. Inform the CRS when makeup has been initiated to the RWST.

Sim. JPMs

Day 2

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Chemical and Volume Control System

TASK: Place Excess Letdown in Service

TASK NUMBER: 004 510 01 01

JPM NUMBER: 21

APPLICABILITY:
EO [ ] RO [X] SRO [X]

K/A NUMBER:	004 A4.06	
IMPORTANCE FACTOR:	3.6	3.1
	RO	**SRO**

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES: S2.OP-SO.CVC-0003(Q) Excess Letdown Flow

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 10 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ______

APPROVED: [signature] for
PRINCIPAL TRAINING SUPERVISOR

[signature]
OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRSS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ______

ACTUAL TIME CRITICAL COMPLETION TIME: ______

JPM PERFORMED BY: ______ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ______ **DATE:** ______

NAME: ______

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

DATE: ______________________

SYSTEM: Chemical and Volume Control System

TASK: Place Excess Letdown in Service

TASK NUMBER: 004 510 01 01

INITIAL CONDITIONS: IC-97

1. The plant is at 100% power with charging at minimum. A leak has been identified in the Letdown Heat Exchanger.

INITIATING CUE:

The CRS/OS has directed you to place excess letdown in service, directed to the VCT.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Chemical and Volume Control System

TASK: Place Excess Letdown in Service

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Obtains S2.OP-SO.CVC-0003(Q), Excess Letdown Flow.	Obtains procedure. ***NOTE: This is a Category II procedure. Work Standards require that the procedure should be at the jobsite. The operator should refer to the procedure at the beginning and end of the job and as frequently as necessary (based on the task, experience of the operator, familiarization with the task, etc) to complete the job in accordance with the procedure.***		
	1	ENSURE OPEN 2CC215, EXC LHX INLET.	Verifies open or opens 2CC215.		
	2	OPEN 2CC113, EXC LHX OUTLET.	Opens 2CC113.		
	3	CHECK CLOSED 2CV132.	Verifies closed or closes 2CV132.		
	4	**IF** flow will be directed to the RCDT, **THEN** SELECT 2CV134 to FLOW TO RCDT.	Operator determines step is NA, flow is to be directed to the VCT.		
*	5	**IF** flow will be directed to the VCT, **THEN** SELECT 2CV134 to FLOW TO VCT.	Places 2CV134 in the FLOW TO VCT position.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Chemical and Volume Control System

TASK: Place Excess Letdown in Service

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	6	OPEN 2CV278.	Opens 2CV278.		
*	7	OPEN 2CV131.	Opens 2CV131.		
*	8	SLOWLY OPEN 2CV132 to allow gradual warming of the Excess Letdown Heat Exchanger.	Opens 2CV132 in increments maintaining temperature <195 degrees F on TI122 and pressure <150 psig on PI121.		
	9	ADJUST 2CV132	***CUE: Direct operator to fully open 2CV132..*** Fully opens 2CV132.		

Terminating Cue: Operator adjusts 2CV132 to maximum flowrate flowrate.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ____________________
DATE: ____________________

SYSTEM: Chemical and Volume Control System

TASK: Place Excess Letdown in Service

TASK NUMBER: 004 510 01 01

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

Given the following conditions:

- Unit 2 is in Mode 3 with preparations in progress for a Reactor Startup.
- Excess Letdown to the VCT is in service with normal letdown isolated.

What effect would a SI signal have on the Excess Letdown system and any other components using that flowpath? Using prints, show the sequence and affects of valve operations with no operator action.

OPEN REFERENCE

ANSWER:

The SI signal also generates a Containment Phase A Isolation. On Phase A, CNMT Isolation valves CV284 and CV116 close, isolating the excess letdown (and seal return) line. At 150 psig, the relief valve inside CNMT to the PRT will open allowing flow. (In the long run, Instrument Air to CNMT Isolation valves close, and without air, control valves in excess letdown line (CV132, CV278 & CV131) will fail closed stopping excess letdown flow.) Note: ( ) not solicited by the question.

use

KA #: 004 A2.12 //4.1/4.3//

Objective: 0300-000.00S-CVCS00-00, Obj. 4
Reference: P&ID 205328, Sh 2,
0300-000.00S-CVCS00-00, section III.A.2, IV.A.4.c&d

Comments: ______________________________

JPM QUESTION #2

What action is necessary if Excess Letdown must be placed in service for one or more shifts? Explain.

OPEN REFERENCE

ANSWER:

Minimum charging minus seal return and excess letdown would result in a continuously rising PZR level. The minimum stop on CV55 must be bypassed or the PDP linkage adjusted.

KA #: 004 A1.04 //3.9/4.1//

Objective: 0300-000.00S-CVCS00-00, Obj. 2, 3
Reference: 0300-000.00S-CVCS00-00, IV.A.3.c
S2.OP-SO.CVC-0001, Section 5.3.2

possible

Comments:

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

Given the following conditions:

- Unit 2 is in Mode 3 with preparations in progress for a Reactor Startup.
- Excess Letdown to the VCT is in service with normal letdown isolated.

What effect would a SI signal have on the Excess Letdown system and any other components using that flowpath? Using prints, show the sequence and affects of valve operations with no operator action.

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

What action is necessary if Excess Letdown must be placed in service for one or more shifts? Explain.

OPEN REFERENCE

JOB PERFORMANCE MEASURE

INITIAL CONDITIONS:

1. The plant is at 100% power with charging at minimum.. A leak has been identified in the Letdown Heat Exchanger.

INITIATING CUE:

The CRS/OS has directed you to place excess letdown in service, directed to the VCT.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Rod Control

TASK: Recover a Dropped Rod

TASK NUMBER: 114 033 0401

JPM NUMBER: DROPROD

K/A NUMBER: APE 003 AA1.02

IMPORTANCE FACTOR: 3.6 (RO) 3.3 (SRO)

APPLICABILITY: **EO** [ ] **RO** [X] **SRO** [X]

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES: **S2.OP-AB.ROD-0002** Dropped Rod

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 15 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ______

APPROVED: JC Lloyd for
PRINCIPAL TRAINING SUPERVISOR

for
OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ______

ACTUAL TIME CRITICAL COMPLETION TIME: ______

JPM PERFORMED BY: ______ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ______ **DATE:** ______

SIMULATOR SETUP INSTRUCTIONS

SYSTEM:	Rod Control
TASK:	Recover a Dropped Rod
TASK NUMBER:	114 033 0401
SIMULATOR IC:	IC6, IC96 ESG disk
MALFUNCTIONS REQUIRED:	
OVERRIDES REQUIRED:	
SPECIAL INSTRUCTIONS:	

NAME: ______________________

DATE: ______________________

SYSTEM: Rod Control

TASK: Recover a Dropped Rod

TASK NUMBER: 114 033 04 01

INITIAL CONDITIONS:

1. You are the Unit RO.
2. Control Rod 1SA2 dropped approximately 45 minutes ago.
3. AB.ROD-0002 has been performed through Step 3.25.
4. Eng has granted permission to recover rod at present power level.
5. All Technical Specification actions have been addressed.
6. Cause for dropped rod has been repaired.
7. Rod recovery is ready to begin.

INITIATING CUE:

You have been directed to recover the dropped rod beginning at Step 3.26 of S2.OP-AB.ROD-0002. The rod may be recovered by continous withdrawal. (NOTE: Inform the candidate that the withdrawal time has been designated specifically to expedite performance of this JPM and is not intended to be an indicator for the time allotted if the event were to occur at the plant.)

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Rod Control

TASK: Recover a Dropped Rod

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	1	Operator reviews the marked up S2.OP-AB.CR-0002.	Evaluator provides copy of S2.OP-AB.CR-0002, marked up through Step 3.25. *NOTE:* AB's should be implemented IAW the Work Standards requirements for Cat. 1 procedures.		
	2	Record the Group Step Counter reading associated with the affected group.	Records 228 steps on the procedure.		
	3	Is the dropped rod a Group 1 rod in a Control Bank?	Determines rod is in a Shutdown Bank (Answers NO) and proceeds to Step 3.29.		
*	4	Set the applicable Group Step Counter to zero steps.	Sets correct Step Counter by depressing ZERO button for SD BANK A Group 1.		
* #	5	Place the Lift Coil Disconnect Switches for all rods in the affected bank, except the dropped rod, in the OFF position.	Using STAR principles, sets all Lift Coil Disconnects except 1SA2 in Shutdown Bank A to OFF.		
	6	Independently verify the Lift Coil Disconnect Switches for all rods in the affected bank, except the dropped rod, are in the OFF position.	(Evaluator can serve as the verifier but should make no corrections.) The operator requests independent verification of Disconnect Switch positions.		

NAME: ______________________

DATE: ______________________

SYSTEM: Rod Control

TASK: Recover a Dropped Rod

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	7	Monitor Tavg for necessary adjustments until the rod has been aligned.	*CUE: An individual is available as PO, taking direction from the RO.* Directs PO to monitor Tavg and maintain within required range of Tref.		
*	8	Select the affected bank with the Rod Bank Selector Switch.	Selects Shutdown Bank A.		
*	9	Withdraw the dropped rod over the duration specified by Reactor Engineering, until the Group Step Counter is returned to the value recorded in Step 3.26.	Withdraws the specified rod to 228 steps on the Step Counter~~, over a 10 mins. period.~~ jw 2/23/99		
	10	Was the dropped rod in Shutdown Bank C or D?	Determines rod was not in SDB or SDC (Answers NO) and proceeds to Step 3.41.		
	11	Are Group 1 and Group 2 Group Step Counters equal?	Verifies and answers YES		
	12	Was the dropped rod in Group 2?	Answers NO		
	13	Perform the following to ensure proper group sequencing logic is maintained: • Withdraw the dropped rod one step • Insert the dropped rod one step	Withdraws and inserts dropped rod one step and verifies proper operation		
*	14	Place all Lift Coil Disconnect Switches in the ON position.	Returns all Lift Coil Disconnect Switches in the affected bank to ON		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Rod Control

TASK: Recover a Dropped Rod

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	15	Independently verify all Lift Coil Disconnect Switches are in the ON position.	(Evaluator can serve as the verifier but should make no corrections.) The operator requests independent verification of Disconnect Switch positions.		
*	16	Place the Rod Bank Selector Switch in MANUAL	Selects MANUAL on the RBSS		
	17	Do indications (IRPI, Rod Bottom Light OFF, rising Tavg during rod motion) confirm the dropped rod is recovered?	Determines that indications are proper for recovered rod (Answers YES) and proceeds to next step.		
	18	If a PR Flux Rate Trip has occurred on any channel, then reset the trip bistable on the NIS Cabinet.	Determines NO Rate Trips present on 2RP 4.		
	19	Depress the ALARM RESET PB to clear the Rod Bank Urgent Failure Alarm (OHA E-40).	Depresses ALARM RESET PB and observes E-40 clears or indicates step does not apply.		

TERMINATING CUE: OHA E-40 cleared.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ____________________
DATE: ____________________

SYSTEM: Rod Control

TASK: Recover a Dropped Rod

TASK NUMBER: 114 033 0401

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

A control rod in Group 1 of Control Bank D is misaligned 20 steps below all other rods in the group. During the realignment, the P/A converter is mistakenly adjusted by 10 steps instead of 20 steps. What would be the effect on Rod Control Interlocks if continued operation were permitted with rods in this configuration?

OPEN REFERENCE

ANSWER:

The P/A converter would be 10 steps higher than what it should be therefore:

1. The Bank D withdrawal limit will occur 10 steps sooner than expected.
2. The RIL alarms will not occur until 10 steps after when they should have.
3. (The Rod Bottom Bistable input will be incorrect by 10 steps.)
   ( ) Not required for full credit.

KA #: 001 K4.01 //3.5/3.8//

Objective: 0300–000.00S–RODS00–00, 6.k
Reference: 0300–000.00S–RODS00–00, Section IV.B.13
S1.OP-AB.ROD-0002, Technical Basis Section 2.4

Comments: ____
____
____
____
____

JPM QUESTION #2

Given the following conditions for Unit 2:

- Startup is underway following refueling (Cycle 10)
- Reactor power is stable at 75%
- Tavg is on program
- RCS boron concentration is 1375 ppm
- All Pre-conditioning limits have been met.

use
(COLR in CCR)

What are the restrictions on control rod position?

SRO Only: And what actions are required per TS if control rods are not in compliance with this restriction?

OPEN REFERENCE

ANSWER:

Group D control rods must be above 110 steps.

SRO Only:

Control rods must be restored to above the limit within 2 hours.

KA #: 001 A3.02 //3.5/3.6//

Objective: 0300–000.00S–RODS00–00, Obj. 13
Reference: Technical Specifications 3.1.3.5
S2.RE-RA.ZZ-0012, Figure 14.

Comments: ____
____
____
____
____

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

A control rod in Group 1 of Control Bank D is misaligned 20 steps below all other rods in the group. During the realignment, the P/A converter is mistakenly adjusted by 10 steps instead of 20 steps. What would be the effect on Rod Control Interlocks if continued operation were permitted with rods in this configuration?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Given the following conditions for Unit 2:

- Startup is underway following refueling (Cycle 10)
- Reactor power is stable at 75%
- Tavg is on program
- RCS boron concentration is 1375 ppm
- All Pre-conditioning limits have been met.

What are the restrictions on control rod position?

SRO Only: And what actions are required per TS if control rods are not in compliance with this restriction?

OPEN REFERENCE

INITIAL CONDITIONS:

1. You are the Unit RO.
2. Control Rod 1SA2 dropped approximately 45 minutes ago.
3. AB.ROD-0002 has been performed through Step 3.25.
4. Eng has granted permission to recover rod at present power level.
5. All Technical Specification actions have been addressed.
6. Cause for dropped rod has been repaired.
7. Rod recovery is ready to begin.

INITIATING CUE:

You have been directed to recover the dropped rod beginning at Step 3.26 of S2.OP-AB.ROD-0002. The rod may be recovered by continous withdrawal.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

TASK NUMBER: 022 526 05 01

JPM NUMBER: 49

K/A NUMBER: 028 A4.01

IMPORTANCE FACTOR:

RO	SRO
4.0*	4.0*

APPLICABILITY: EO [ ] RO [X] SRO [X]

EVALUATION SETTING/METHOD: **Walk-thru in Simulator or Control Room**

REFERENCES: S2.OP-SO.CAN-0001(Q) Hydrogen Recombiner Operation

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 8 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ____________

APPROVED: ____________ for
PRINCIPAL TRAINING SUPERVISOR

____
OPERATIONS MANAGER

CAUTION: No plant equipment shall be operated during the performance of a JPM without the following:

1. Permission for the OS Or Unit CRS;
2. Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).
3. Verification of the "as left" condition by a qualified individual.

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________ **GRADE:** [ ] SAT [ ] UNSAT

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________ **DATE:** ____________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

TASK NUMBER: 022 526 05 01

INITIAL CONDITIONS:

1. A LOCA has occurred on the Unit.
2. Pre-LOCA conditons: Reactor Power - 100%; Pzr Pressure - 2235 psig; Containment Pressure - 0.1 psig; Containment Temperature - 90 degrees F
3. Current pertinent conditions: Pzr Pressure - 1050 psig; Containment Pressure - 4.0 psig; Containment Temperature - 225 degrees F; Containment Hydrogen Concentration - 2.1%

INITIATING CUE:

The CRS directs you to place the 21 Hydrogen Recombiner in service IAW S2.OP-SO.CAN-0001(Q)

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Obtains procedure S2.OP-SO.CAN-0001(Q).	Correct procedure obtained or provided *NOTE:* ***This is a Category II procedure. Work Standards require that the procedure should be at the jobsite. The operator should refer to the procedure at the beginning and end of the job and as frequently as necessary. (Based on the task, experience of the operator, familiarization with the task,etc.) to complete the job in accordance with the procedure.***		
	1	Perform Attachment 1 to determine Recombiner Power Setting.	Obtains Attachment 1		
	2	Determine the Pre-LOCA Temperature from SC.OP-DL.ZZ-0003(Q), Control Room Readings Mode 1-4	Determines Pre-LOCA Containment Temperature is 90°F (from initial conditions).		
	3	Determine the Containment Pressure as indicated on 2PI-948A, 2PI-948B, 2PI-948C or 2PI-948D.	Determines containment pressure is 4 psig (from initial conditions) OR by checking PI-948A-D or recorder PR948A/B.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	4	Using the PRE-LOCA Containment Temperature and Containment Pressure, determine the Power Correction Factor (Cp), IAW Attachment 2.	Determines the Power Correction Factor to be 1.21 (1.20-1.22).		
*	5	Perform the calculation to determine the Recombiner Power Setting:	Using Att. 1, determines power setting to be 53 to 54 KW (52.8-53.7 KW by calculation).		
*	6	Place both Recombiner Control Switches on 2RP5 in the ON position	***Cue: Operate only 21 H2 Recombiner.*** Places 21 H2 Recombiner control switch to ON		
	7	Ensure the white power available lights are illuminated at each Recombiner Control Panels	Verifies power available lights are lit. ***Cue: White power available light is ON.***		
	8	Perform the following for the Recombiner to be operated: Ensure the power adjust Potentiometer is set at zero.	For 21 H2 Recombiner, verifies Power Adjust Pot is at zero.		

NAME: ____________________

DATE: ____________________

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	9	Turn the power out switch to the ON position and ensure the red light is illuminated.	Turns Power Out Switch to ON and verifies red light is lit. ***Cue: Red light is ON.***		
*	10	Turn the power adjust Potentiometer in the clockwise direction until the correct power setting is obtained on the Power Out Wattmeter.	Adjusts Power Out Pot to read 53-54 KW on Wattmeter NOTE: Potentiometer setting of 530-540 corresponds to 53-54KW.		

Terminating Cue: Operator indicates the H2 Recombiner is set IAW calculation.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

TASK NUMBER: 022 526 05 01

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1 (Day 2)

What are the two most significant sources of hydrogen in containment following a LOCA and what is the purpose of maintaining control over hydrogen concentration?

OPEN REFERENCE

ANSWER:

1. Zirconium-water reaction
2. Radiolytic decomposition of reactor coolant and of post-LOCA injection cooling (containment sump) water

Maintaining control of hydrogen concentration prevents a hydrogen burn that could lead to a pressure spike and thereby challenge containment integrity.

KA #: 028 K5.03 //2.9/3.6//

Objective: 0300-000.00S LOCA01, Obj. 9

Reference: 0300-000.00S-CONTMT-00, Section IX.D
EOP-LOCA-1 Basis
UFSAR

Comments: ____

JPM QUESTION (Day 2&3)

A large break LOCA occurred, a H2 Recombiner was placed in service and the setting is now 73 KW. In the past 24 hours, containment hydrogen concentration has risen steadily from 2.8% to 3.3%.

What action can be taken by the shift relative to recombiner operation?

OPEN REFERENCE

ANSWER:

Raise heater output to 75 KW (maximum allowed) and [inform the TSC]

[ ] not required for full credit

KA #: 028 A2.01 //3.4/3.6//

Objective: 0300-000.00S-CONTMT-00, Obj. 12.
Reference: S2.OP-SO.CAN-0001, Step 5.1.7.

Comments: ____

____

____

____

____

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION 1

What are the two most significant sources of hydrogen in containment following a LOCA and what is the purpose of maintaining control over hydrogen concentration?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

A large break LOCA occurred, a H2 Recombiner was placed in service and the setting is now 73 KW. In the past 24 hours, containment hydrogen concentration has risen steadily from 2.8% to 3.3%.

What action can be taken by the shift relative to recombiner operation?

OPEN REFERENCE

JOB PERFORMANCE MEASURE

INITIAL CONDITIONS:

1. A LOCA has occurred on the Unit.
2. Pre-LOCA conditons: Reactor Power - 100%; Pzr Pressure - 2235 psig; Containment Pressure - 0.1 psig; Containment Temperature - 90 degrees F
3. Current pertinent conditions: Pzr Pressure - 1050 psig; Containment Pressure - 4.0 psig; Containment Temperature - 225 degrees F; Containment Hydrogen Concentration - 2.1%

INITIATING CUE:

The CRS directs you to place the 21 Hydrogen Recombiner in service IAW S2.OP-SO.CAN-0001(Q)

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Residual Heat Removal

TASK: Swapping RHR Loops in Shutdown Cooling

TASK NUMBER: 0050050101

JPM NUMBER:

K/A NUMBER:	2.1.23	
IMPORTANCE FACTOR:	3.9	4.0
	RO	**SRO**

APPLICABILITY:
EO [ ] **RO** [X] **SRO** [X]

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES: S2.OP-SO.RHR-001(Q) Initiating RHR

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 10 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ____________

APPROVED: ______________________ for ______________________
PRINCIPAL TRAINING SUPERVISOR **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ______________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ______________________ **DATE:** ____________

NAME: ______________________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

DATE: ______________________

SYSTEM: Residual Heat Removal

TASK: Swapping RHR Loops in Shutdown Cooling

TASK NUMBER: 0050050101

INITIAL CONDITIONS: IC-172 for 2/99 NRC EXAM

1. The unit is in Mode 5 with RHR in service maintaining RCS temperature.

INITIATING CUE:

You have been directed to remove 21 RHR from service and place 22 RHR in service.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Residual Heat Removal

TASK: Swapping RHR Loops in Shutdown Cooling

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Provide operator with properly marked up copy of S2.OP-SO.RHR-0001(Q), Initiating RHR, <u>Swapping RHR Loops In Shutdown Cooling</u>	Obtains S2.OP-SO.RHR-0001(Q), selects correct procedure section. *NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to preceding to the next step.*		
#	1	IF starting 22 RHR Loop and stopping 21RHR Loop, THEN perform the following: Ensure 22RH29 in AUTO.	Verifies 22RH29 in AUTO.		
* #	2.	IF placing 22 RHR Heat Exchanger in service, THEN: 1. Open 22CC16, 22 RHR HX OUTLET. 2. Throttle 22CC15, RHR HX CC FLOW CONT VALVE, as required for Component Cooling flow to control RCS temperature.	Opens 22CC16. Directs Primary NEO to throttle 22CC15 as required to control RCS temperature at current value ± 10°F. CUE: Primary NEO is throttling 22CC15		
* #	3.	Start 22 RHR Pump	Starts 22 RHR pump		

NAME: ____________________

DATE: ____________________

SYSTEM: Residual Heat Removal

TASK: Swapping RHR Loops in Shutdown Cooling

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
#	4.	Throttle either or both RH18s to maintain stable RHR flow to the Reactor Coolant System.	Transfers flow from 21 RHR loop to 22 RHR loop using 21&22RH18's such that stable RHR flow is maintained to the RCS		
* #	5.	Stop 21 RHR Pump.	Stops 21 RHR Pump.		
	6.	Monitor 22 RHR Loop until parameters are stabilized.	Monitors 22 RHR loop flow, system temperatures, and pump motor amps.		
	7.	IF removing 21 RHR Heat Exchanger from service, THEN close 21CC16, 22 RHR HX OUTLET.	Closes 21CC16		
	8.	Record actual valve positions in Attachment 2, Section 6.0.	Records current valve positions in appropriate attachment section.		
	9.	Direct a second Operator to Complete Attachment 2, Section 6.0	Requests CRS direct a second operator to complete verification of valve positions in appropriate attachment section.		

Terminating Cue: When CRS is requested to direct second operator complete Attachment 2, Section 6.0.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: Residual Heat Removal

TASK: Swapping RHR Loops in Shutdown Cooling

TASK NUMBER: 0050050101

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

A loss of RHR cooling has occurred causing an increase in RCS pressure to occur.

List all equipment that will operate to prevent overpressurizing RHR piping as RHR system pressure increased to 650 psig.

OPEN REFERENCE

ANSWER:

1. Pressurizer Over pressure Protection (POPs) will open at 375 psig.
2. (Alarm "1(2) RHR1 (or 1(2) RH2) NOT FULL CLS & RX PRESS HIGH" will alarm at $\geq$ 400 psig.) Not required for full credit.
3. RCS to RHR Inlet Relief Valve RH3 will open at 375 psig.
4. RHR to RCS Hot Leg Relief Valve RH25 will lift at 600 psig.

KA #: 005 K4.01 //3.0/3.2//

Objective:	0300-000.00S-PZRPRT-00, LO 6
	0300-000.00S-RHR000-00, LO 4
Reference:	0300-000.00S-PZRPRT-00, IV.B.5.d
	0300-000.00S-RHR000-00, IV.D.1.c, IV.B.6.a
	P&ID 205332

Comments: ______________________________

JPM QUESTION #2

Given the following conditions:

- 21 RHR pump and 21 HX are inservice for Shutdown Cooling Mode.
- 21RH18 RHR Heat Exchanger Discharge valve is throttled.
- 21SJ49 Flow is 3000 GPM.
- 2RH20 RHR Heat Exchanger Bypass valve is fully closed.

What will be the effect on RHR flow if control air to RHR components is lost? Explain the cause for any change in RHR flow.

OPEN REFERENCE

ANSWER:

RHR flow will increase to maximum due to a loss of air causing:

- RHR Heat Exchanger Discharge valves (21,22) RH 18 to fail open.
- RHR Heat Exchanger Bypass valve (RH20) to fail open.

KA #: 005 A2.04 //2.9/2.9//

Objective:	0300-000.00S-ABCA01-00, LO 4
Reference:	0300-000.00S-RHR0001, IV.B.5.
	0300-000.00S-CCW0001, IV.B.1.b)
	P&ID 205331 Sheet 1.
	S2.OP-AB.CA-0001, pg 18.

Comments: ____
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*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

A loss of RHR cooling has occurred causing an increase in RCS pressure to occur.

List all equipment that will operate to prevent overpressurizing RHR piping as RHR system pressure increased to 650 psig.

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Given the following conditions:

- 21 RHR pump and 21 HX are inservice for Shutdown Cooling Mode.
- 21RH18 RHR Heat Exchanger Discharge valve is throttled.
- 21SJ49 Flow is 3000 GPM.
- 2RH20 RHR Heat Exchanger Bypass valve is fully closed.

What will be the effect on RHR flow if control air to RHR components is lost? Explain the cause for any change in RHR flow.

OPEN REFERENCE

INITIAL CONDITIONS:

1. The unit is in Mode 5 with RHR in service maintaining RCS temperature.

INITIATING CUE:

You have been directed to remove 21 RHR loop from service and place 22 RHR loop in service.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: ECCS

TASK: Respond to a Shutdown LOCA

TASK NUMBER: 1140260401

JPM NUMBER:

K/A NUMBER: 2.1.23

IMPORTANCE FACTOR: 3.9 (RO) 4.0 (SRO)

APPLICABILITY:
EO [ ] **RO** [X] **SRO** [X]

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES: S2.OP-AB.LOCA-0001, Shutdown LOCA

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 10 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: J C Lloyd for
PRINCIPAL TRAINING SUPERVISOR

G W Halley for
OPERATIONS MANAGER

CAUTION:	**No plant equipment shall be operated during the performance of a JPM without the following:**
	1. Permission for the OS Or Unit CRS;
	2. Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).
	3. Verification of the "as left" condition by a qualified individual.

ACTUAL JPM COMPLETION TIME: ______________

ACTUAL TIME CRITICAL COMPLETION TIME: ______________

JPM PERFORMED BY: ______________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ______________________ **DATE:** ______________

JOB PERFORMANCE MEASURE

SIMULATOR SETUP INSTRUCTIONS

SYSTEM: ECCS

TASK: Shutdown LOCA

TASK NUMBER: 1140260401

SIMULATOR IC: **IC-82 for 2/99 NRC Exam** (Shutdown IC with SI pumps, Accumulators, and one centrifugal charging pump removed from service)

MALFUNCTIONS REQUIRED: LOCA – Size to exceed the capabilities of a centrifugal charging pump through the normal charging line but level can be maintained with the centrifugal charging pump through the BIT.

OVERRIDES REQUIRED: **NONE**

SPECIAL INSTRUCTIONS:

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: ECCS

TASK: Respond to a Shutdown LOCA

TASK NUMBER: 1140260401

INITIAL CONDITIONS:

1. Reactor is shutdown and cooldown to 275 °F and 325 psig.
2. The 22 Charging pump and both SI pumps are removed from service.
3. The accumulators have been isolated.

NOTE TO THE EXAMINER: The simulator has been frozen after level has decreased from 34% to 30%. Notify the Simulator Operator when the operator is ready to begin and the simulator should be taken out of freeze.

INITIATING CUE:

Respond to a decreasing pressurizer level. Notify CRS when pressurizer level is rising.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

NAME: ____________________

DATE: ____________________

SYSTEM: ECCS

TASK: Respond to a Shutdown LOCA

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*		Obtains the current revision of the S2.OP-AB.LOCA-0001, Shutdown LOCA.	Obtains correct procedure. ***NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to proceeding to the next step.***		
	1.	Initiate Attachment 1, Continuous Action Summary.	Indicates that Attachment 1 is to be monitored. *CUE: The CRS will monitor Attachment 1, Continuous Action Summary*		
*	2.	Closes 2CV2, Letdown Control.	Depresses 2CV2 MANUAL PB and verifies PB illuminates. Depresses 2CV2 CLOSE PB and verifies PB illuminates.		
	3.	Closes 2CV7, Letdown Line Containment Isolation	Depresses 2CV7 CLOSED PB and verifies PB illuminates.		
	4.	Closes 2CV277, Letdown Control	Depresses 2CV277 MANUAL PB and verifies PB illuminates. Depresses 2CV277 CLOSED PB and verifies PB illuminates.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: ECCS

TASK: Respond to a Shutdown LOCA

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	5.	Closes 2CV8, Letdown ISO for RHR	Depresses 2CV8 CLOSE (DEC FLOW) PB and verifies 2CV8 VALVE DEMAND on FI133 indicates 0% and the PB light is illuminated.		
	6.	Verifies 2CV278, Excess Letdown, is closed.	Verifies 2CV278 CLOSE PB is illuminated.		
	7.	Verifies 2CV131, Excess Letdown, is closed.	Verifies 2CV131 CLOSED PB is illuminated.		
	8.	Checks to determine if Pressurizer Level can be maintained stable or rising.	Determines that pressurizer level is lowering on COLD CAL LEVEL LI462.		
	9.	Determine if a Centrifugal Charging Pump is in service.	Determines that the Centrifugal Charging Pump is in service.		
*	10.	Adjusts 2CV55 to maximize charging flow.	Depresses the 2CV55 OPEN (INCR FLOW) PB until the valve is full open.		
	11.	Determines that Pressurizer level is not stable or rising.	Determines that Pressurizer level is continuing to lower.		
	12.	Open 2SJ1 or 2SJ2, RWST TO CHG PUMP	Depress 2SJ1 OR 2SJ2 MANUAL PB and verifies PB illuminates. Depress 2SJ1 OR 2SJ2 RWST TO CHG PUMP OPEN PB and verifies PB illuminates. NOTE: This may automatically occur on low VCT level.		

NAME: ____________________

DATE: ____________________

SYSTEM: ECCS

TASK: Respond to a Shutdown LOCA

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	13.	Close 2CV40 or 2CV41, VCT DISCH STOP VALVE	Depress 2CV40 OR 2CV41 MANUAL PB and verifies PB illuminates. Depress 2CV40 OR 2CV41 DISCH STOP VALVE CLOSE PB verifies PB illuminates.		
	14.	Stops all but one Centrifugal Charging Pump	Identifies that only one Centrifugal Charging Pump is running.		
*	15.	Open BIT isolation valves.	Depresses the PB and verifies PB illuminates for the following valves: • 2SJ4 BIT INLET OPEN • 2SJ5 BIT INLET OPEN • 2SJ12 BIT OUTLET OPEN • 2SJ13 BIT OUTLET OPEN NOTE: 2SJ4 and 2SJ5 are normally open so it is not critical to operate those valves.		
	16.	Close the Charging isolation valves.	Depresses the PB and verifies the PB illuminates for the following valves: • 2CV68 CHG DISCH CLOSE • 2CV69 CHG DISCH CLOSE		
	17.	Fully open 2CV55, Charging Flow	Notes that 2CV55 was previously fully open to obtain maximum charging flow.		

NAME: ____________________

DATE: ____________________

SYSTEM: ECCS

TASK: Respond to a Shutdown LOCA

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	18.	Close the Charging Miniflow valves	Depresses the PB and verifies the PB illuminates for the following valves: • 2CV139 CHARGING MINIFLOW CLOSE • 2CV140 CHARGING MINIFLOW CLOSE		

TERMINATING CUE: Pressurizer level is increasing.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ____________________
DATE: ____________________

SYSTEM: ECCS

TASK: Respond to a Shutdown LOCA

TASK NUMBER: 1140260401

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

Unit 2 is in Mode 3 during a plant shutdown to cold shutdown when a LOCA occurred. AB.LOCA-0001 step 3.76 is being performed. Given the following conditions, determine if the 22 SI Pump can be secured. Justify your answer.

- No RCPs are running
- 21 Charging Pump is running
- 22 SI Pump is running
- 22 RHR pump is running in the S/D Cooling Mode.
- WRTC = 338°
- WRTH = 345°
- PT403 = 360 psig
- PT405 = 350 psig
- Pressurizer level is 42%

OPEN REFERENCE

ANSWER:

Per step 3.76, 90° subcooling is required.
From Att. 5, Tsat at 350 psi=436°.
Subcool=436°-345°=91°.

The pump can be secured.

Note: Attachment 5 provides saturation temperatures.

KA #: 009 EA2.34 //3.6/4.2//

Objective: 0300-000.00S-ABLOCA-02, Obj. 7
Reference: S2.OP-AB.LOCA0001

Comments: ____________________

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JPM QUESTION #2

Unit 2 was in Mode 3 with shutdown cooling in service when a LOCA occurred. Given the following parameters, determine if natural circulation cooling has been established. How did you determine the status of natural circulation?

Parameter	T=0	T=+15min
PT403	360 psi	360 psi
WRTH	345°	341°
WRTC	338°	336°
S/G Press	100 psi	99 psi

OPEN REFERENCE

ANSWER:

Yes.

RCS subcooling is >0
Steam Generator Pressures are stable
RCS Wide Range Hot Leg temperatures are dropping
RCS Wide Range Cold Leg temperatures are at saturation temperature for Steam Generator pressure.

KA #: 009 EK1.01 //4.2/4.7//

Objective: 0300-000.00S-ABLOCA-02, Obj. 7
Reference: AB.LOCA-0001, Att. 7

Comments: ____________________

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

Unit 2 is in Mode 3 during a plant shutdown to cold shutdown when a LOCA occurred. AB.LOCA-0001 step 3.76 is being performed. Given the following conditions, determine if the 22 SI Pump can be secured. Justify your answer.

- No RCPs are running
- 21 Charging Pump is running
- 22 SI Pump is running
- 22 RHR pump is running in the S/D Cooling Mode.
- WRTC = 338°
- WRTH = 345°
- PT403 = 360 psig
- PT405 = 350 psig
- Pressurizer level is 42%

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Unit 2 was in Mode 3 with shutdown cooling in service when a LOCA occurred. Given the following parameters, determine if natural circulation cooling has been established. How did you determine the status of natural circulation?

Parameter	T=0	T=+15min
PT403	360 psi	360 psi
WRTH	345°	341°
WRTC	338°	336°
S/G Press	100 psi	99 psi

OPEN REFERENCE

INITIAL CONDITIONS:

1. Reactor is shutdown and cooldown to 275 °F and 325 psig.
2. The 22 Charging pump and both SI pumps are removed from service.
3. The accumulators have been isolated.

INITIATING CUE:

Respond to a decreasing pressurizer level. Notify the CRS when level is rising.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Containment System

TASK: Perform a Containment Pressure Relief with R-12A in service

TASK NUMBER: 0225130101

JPM NUMBER: 48

K/A NUMBER: 2.1.23

IMPORTANCE FACTOR: 3.9 (**RO**) 4.0 (**SRO**)

APPLICABILITY:
EO [ ] **RO** [X] **SRO** [X]

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES: S2.OP-SO.CBV-0002(Q) Containment Pressure-Vacuum Relief System Operation

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 10 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: J C Lloyd for ____ **PRINCIPAL TRAINING SUPERVISOR** ____ for **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________ **DATE:** ____________

SIMULATOR SETUP INSTRUCTIONS

SYSTEM:	Containment System
TASK:	Perform a Containment Pressure Relief with R-12A in service
TASK NUMBER:	0225130101
SIMULATOR IC:	IC-161 for 2/99 NRC Exam
MALFUNCTIONS REQUIRED:	
OVERRIDES REQUIRED:	
SPECIAL INSTRUCTIONS:	Mark up procedure up to and including Step 5.2.1.

NAME: ____________________

DATE: ____________________

SYSTEM: Containment Systems

TASK: Perform a Containment Pressure Relief with R-12A in service

TASK NUMBER: 022 513 01 01

INITIAL CONDITIONS:

1. The plant is at 100% power with all systems aligned normally and control systems in automatic. Containment differential pressure is 0.23 psig.

INITIATING CUE:

You have been directed to perform a containment pressure relief IAW S2.OP-SO.CBV-0002, with R-12A in service. RMS Channels 2R16 and 2R41 are not available. The procedure has been completed up to and including 5.2.1.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Containment Systems

TASK: Perform a Containment Pressure Relief with R-12A in service

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Evaluator should provide a properly marked up copy of the procedure S2.OP-SO.CBV-0002, Containment Pressure-Vacuum Relief System Operation	Correct procedure obtained *NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to proceeding to the next step.*		
	1	RECORD the following on required attachment: • Pressure Relief start • Initial Containment Pressure • Initial reading of monitor 2R12A	Records the required information on Attachment 2 • Time/Date • Cnmt pressure psig • 2R12A reading		
	2	INITIATE Containment Relief as follows:			
	3	Monitor available radiation monitors 2R41D, 2R16 & 2R12A.	Monitors 2R12A indications		
	4	If Containment pressure <0.5 psig , then OPEN:.....	Determines containment pressure <0.5 psig		
*	5	Open 2VC6, ISOL VLV	Opens 2CV6		
*	6	Open 2VC5, ISOL VLV	Opens 2VC5		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Containment Systems

TASK: Perform a Containment Pressure Relief with R-12A in service

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	7	Open PRESSURE RELIEF DAMPER	Opens Pressure Relief Damper		
*	8	RECORD time that 2VC5 and 2VC6 are OPENED in the Control Room Narrative log for the Cyclic Data Monitoring Program IAW required procedure.	Indicates logging time of opening 2VC5 & 2VC6 *CUE:* Opening time is recorded		
*	9	When Containment Pressure decreases to required value, CLOSE • PRESSURE RELIEF DAMPER • 2VC6 • 2VC5	*CUE: Containment differential pressure indicates 0.0 psig* Determines containment pressure at required value and closes Press Relief Damper. Closes Pressure Relief Damper Closes 2VC5 Closes 2VC6		
	10	RECORD the following on applicable attachment: • Final Containment Pressure • Pressure Relief stop • Highest reading on available radiation monitors 2R41D, 2R16, and 2R12A	Records the required information on Attachment 2 • Time/Date *CUE:* • Cnmt Pressure 0.0 psig • Highest 2R12A reading 550 CPM •		

NAME: ______________________

DATE: ______________________

SYSTEM: Containment Systems

TASK: Perform a Containment Pressure Relief with R-12A in service

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	11	RECORD time that 2VC5 and 2VC6 are CLOSED in the Control Room Narrative Log for the Cyclic Data Monitoring Program.	Indicates logging time of closing 2VC5 & 2VC6 *CUE:* Closing time is recorded		

Terminating Cue: Closing time recorded

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________

DATE: ______________________

SYSTEM: Containment Systems

TASK: Perform a Containment Pressure Relief with R-12A in service

TASK NUMBER: 022 513 01 01

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

What would be the potential negative effects if containment internal pressure was allowed to increase to 1.0 psig and an accident occurred before performing a pressure relief?

OPEN REFERENCE

ANSWER:

The design pressure may be challenged if one of the design basis accidents occurs.

NOTE: The procedure would also require a visual inspection of the duct work following the releases. The operator may also provide this correct information but it is not directly elicited by the question.

KA #: 029 K3.01 //2.9/3.3//

Objective: 0300-000.00S-CONTMT-00, 2.b)
Reference: Technical Specification Basis 3/4.6.1.4, page B 3/4 6-2
S2.OP-SO.CBV-0002, Section 5.1.

Comments: ____

JPM QUESTION #2

Why is it necessary to log the time that the Containment Pressure – Vacuum Relief Isolation valves (VC-5 and VC-6) are open?

OPEN REFERENCE

ANSWER:

Salem is committed to maintaining the time the valves are open to less than 1000 hours/year. This is to limit the potential for off-site releases during a LOCA.

KA #: 2.3.11 //2.7/3.2//

Objective: 0300-000.00S-CONTMT-00, LO 12
Reference: SC.OP-AP.ZZ-0004, Attachment 1 and 2.
0300-000.00S-CONTMT-00, Section VIII.H.f.1)

Comments: ______________________________
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*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

What would be the potential negative effects if containment internal pressure was allowed to increase to 1.0 psig and an accident occurred before performing a pressure relief?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Why is it necessary to log the time that the Containment Pressure – Vacuum Relief Isolation valves (VC-5 and VC-6) are open?

OPEN REFERENCE

JOB PERFORMANCE MEASURE

INITIAL CONDITIONS:

1. The plant is at 100% power with all systems aligned normally and control systems in automatic. Containment pressure is 0.23 psig.

INITIATING CUE:

You have been directed to perform a containment pressure relief IAW S2.OP-SO.CBV-0002, with R-12A in service. RMS Channels 2R16 and 2R41 are not available. The procedure has been completed up to and including 5.2.1.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Nuclear Instrumentation System

TASK: Take Corrective Action for an Intermediate Range Instrument Malfunction

TASK NUMBER: 015 529 04 01

JPM NUMBER: 45

K/A NUMBER: 2.4.50

APPLICABILITY: **EO** [ ] **RO** [X] **SRO** [X]

IMPORTANCE FACTOR: 3.3 (**RO**) 3.3 (**SRO**)

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES:

S2.OP-AR.ZZ-0005(Q)	Overhead Annunciators Window E
S2.OP-AB.NIS-0001(Q)	Nuclear Instrumentation System Malfunctions
S2.OP-SO.RPS-0001(Q)	Nuclear Instrumentation Channel Trip /Restoration

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 10 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: J C Lloyd for
PRINCIPAL TRAINING SUPERVISOR

for **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________ **DATE:** ____________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Nuclear Instrumentation System

TASK: Take Corrective Action for an Intermediate Range Instrument Malfunction

TASK NUMBER: 015 529 04 01

INITIAL CONDITIONS: IC-8, 25% power; Malfunction NI0197 set =100.

1. The Unit is at-power.
2. A reactor shutdown is required due to other equipment being out of service.
3. Excessive noise has been observed on N-35 Intermediate Range NI.

INITIATING CUE:

You have been directed to remove N-35 from service.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Nuclear Instrumentation System

TASK: Take Corrective Action for an Intermediate Range Instrument Malfunction.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	1	REMOVE the failed Intermediate Range channel from service IAW S2.OP-SO.RPS-0001(Q), Nuclear Instrumentation Channel Trip/Restoration.	Obtains current copy of procedure S2.OP-SO.RPS-0001 and proceeds to Placing N-35 Intermediate Range NI in Tripped Condition section of procedure. ***NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to proceeding to the next step***		
	2	Verify the tripping of associated bistable(s) will not result in an RPS or ESF actuation.	Determines tripping bistable will NOT result in a coincidence that will cause RPS or ESF actuation.		
	3	Ensure 2N35 Channel is not selected on NIS Recorder 2NR45.	Selects 2N36 Channel to NIS Recorder 2NR45 if required.		
	4	Record time, channel number, and Action Statement in SC.OP-DL.ZZ-0001(Q), Control Room Operator/Supervisor Logs.	Notes the required data is to be recorded in Control Room Operator/Supervisor Logs TSAS 3.3.1.1, Action 3		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Nuclear Instrumentation System

TASK: Take Corrective Action for an Intermediate Range Instrument Malfunction

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	5	At NI Rack No. 78, INTERMEDIATE RANGE 2N35 Drawer, place LEVEL TRIP switch in BYPASS and verify LEVEL TRIP BYPASS light is illuminated.	Place N35 Trip Switch in BYPASS and verify bistable light illuminated. ***CUE:*** ***If the operator calls for an I&C Technician, then inform the operator that I&C is not available and the operator is to perform all actions. A second operator will monitor the Control Room Panels.***		
	6	VERIFY OHA E-29, SR & IR TRIP BYP, is illuminated.	Checks status and acknowledges OHA E-29.		
	7	VERIFY Reactor Panel Status light, NIS INTERMEDIATE RANGE, CH I, TRIP BLOCKED is illuminated.	Checks status of Panel light lit.		
*	8	At NI Rack No. 78, REMOVE both INSTRUMENT POWER fuses from the INTERMEDIATE RANGE 2N35 Drawer and verify INSTRUMENT POWER ON light is off.	Remove BOTH Instrument Power fuses from N35 drawer and verify Instrument Power On bistable light is extinguished.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Nuclear Instrumentation System

TASK: Take Corrective Action for an Intermediate Range Instrument Malfunction

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	9	**IF** (power level)….	Determines reactor power is Greater Than 5% and power operation can continue.		

Terminating Cue: N35 channel OOS and determined power operations can continue.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: Nuclear Instrumentation System

TASK: Take Corrective Action for an Intermediate Range Instrument Malfunction

TASK NUMBER: 015 529 04 01

QUESTION:

RESPONSE:

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION:

RESPONSE:

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

A reactor startup is in progress. The compensating voltage on one intermediate range channel is set too low.

1. How will this affect when the source range can be blocked as power is increased?

2. What will be the effect on indicated SUR during the startup?

CLOSED REFERENCE

ANSWER:

1. The source range instruments could be blocked at a lower power level.
2. Indicated startup rate will be less than actual startup rate [but the effect of the undercompensation will dissipate as power (neutron population) rises].

[ ] not required for full credit

KA #: 015 A2.02 //3.1/3.5//

Objective: 0300–000.00S–EXCORE–00, Obj. 5
Reference: 0300–000.00S–EXCORE–00, Section IV.D.2.h.4) b)

Comments: ____
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JPM QUESTION #2

At 80% what will be the expected status of the "HIGH LEVEL TRIP" light on the Intermediate Range drawer?

OPEN REFERENCE

FOLLOWUP QUESTION

What prevents a reactor trip from occurring?

ANSWER:

The bistable in the NI drawer will be tripped as indicated by the illuminated light.

FOLLOWUP ANSWER:

The bypass circuit (P-10) blocks the output to RPS.

KA #: 015 A3.03 //3.9/3.9//

Objective: 0300–000.00S–EXCORE–00, Obj. 10
Reference: 0300–000.00S–EXCORE–00, IV.D.3.e.3)
Logic diagram 221052

Comments: ____
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*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

A reactor startup is in progress. The compensating voltage on one intermediate range channel is set too low.

1. How will this affect when the source range can be blocked as power is increased?

2. What will be the effect on indicated SUR during the startup?

CLOSED REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

At 80% what will be the expected status of the "HIGH LEVEL TRIP" light on the Intermediate Range drawer?

OPEN REFERENCE

INITIAL CONDITIONS:

1. The Unit is at-power.
2. A reactor shutdown is required due to other equipment being out of service.
3. Excessive noise has been observed on N-35 Intermediate Range NI.

INITIATING CUE:

You have been directed to remove N-35 from service.

Sim. JPMs

Day 1

(sample plan Day 3)

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

TASK NUMBER: 022 526 05 01

JPM NUMBER: 49

K/A NUMBER: 028 A4.01

APPLICABILITY: EO [ ] RO [X] SRO [X]

IMPORTANCE FACTOR:

RO	SRO
4.0*	4.0*

EVALUATION SETTING/METHOD: **Walk-thru in Simulator or Control Room**

REFERENCES: S2.OP-SO.CAN-0001(Q) Hydrogen Recombiner Operation

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 8 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ____________

APPROVED: [signature] for
PRINCIPAL TRAINING SUPERVISOR

[signature] for
OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________ **DATE:** ____________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

TASK NUMBER: 022 526 05 01

INITIAL CONDITIONS:

1. A LOCA has occurred on the Unit.
2. Pre-LOCA conditons: Reactor Power - 100%; Pzr Pressure - 2235 psig; Containment Pressure - 0.1 psig; Containment Temperature - 90 degrees F
3. Current pertinent conditions: Pzr Pressure - 1050 psig; Containment Pressure - 4.0 psig; Containment Temperature - 225 degrees F; Containment Hydrogen Concentration - 2.1%

INITIATING CUE:

The CRS directs you to place the 21 Hydrogen Recombiner in service IAW S2.OP-SO.CAN-0001(Q)

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Obtains procedure S2.OP-SO.CAN-0001(Q).	Correct procedure obtained or provided *NOTE:* ***This is a Category II procedure. Work Standards require that the procedure should be at the jobsite. The operator should refer to the procedure at the beginning and end of the job and as frequently as necessary. (Based on the task, experience of the operator, familiarization with the task,etc.) to complete the job in accordance with the procedure.***		
	1	Perform Attachment 1 to determine Recombiner Power Setting.	Obtains Attachment 1		
	2	Determine the Pre-LOCA Temperature from SC.OP-DL.ZZ-0003(Q), Control Room Readings Mode 1-4	Determines Pre-LOCA Containment Temperature is 90°F (from initial conditions).		
	3	Determine the Containment Pressure as indicated on 2PI-948A, 2PI-948B, 2PI-948C or 2PI-948D.	Determines containment pressure is 4 psig (from initial conditions) OR by checking PI-948A-D or recorder PR948A/B.		

NAME: ____________________

DATE: ____________________

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	4	Using the PRE-LOCA Containment Temperature and Containment Pressure, determine the Power Correction Factor (Cp), IAW Attachment 2.	Determines the Power Correction Factor to be 1.21 (1.20-1.22).		
*	5	Perform the calculation to determine the Recombiner Power Setting:	Using Att. 1, determines power setting to be 53 to 54 KW (52.8-53.7 KW by calculation).		
*	6	Place both Recombiner Control Switches on 2RP5 in the ON position	***Cue: Operate only 21 H2 Recombiner.*** Places 21 H2 Recombiner control switch to ON		
	7	Ensure the white power available lights are illuminated at each Recombiner Control Panels	Verifies power available lights are lit. ***Cue: White power available light is ON.***		
	8	Perform the following for the Recombiner to be operated: Ensure the power adjust Potentiometer is set at zero.	For 21 H2 Recombiner, verifies Power Adjust Pot is at zero.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	9	Turn the power out switch to the ON position and ensure the red light is illuminated.	Turns Power Out Switch to ON and verifies red light is lit. ***Cue: Red light is ON.***		
*	10	Turn the power adjust Potentiometer in the clockwise direction until the correct power setting is obtained on the Power Out Wattmeter.	Adjusts Power Out Pot to read 53-54 KW on Wattmeter NOTE: Potentiometer setting of 530-540 corresponds to 53-54KW.		

Terminating Cue: Operator indicates the H2 Recombiner is set IAW calculation.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________

DATE: ______________________

SYSTEM: Containment System

TASK: Start a Hydrogen Recombiner

TASK NUMBER: 022 526 05 01

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ **-UNSAT**

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ **-UNSAT**

JPM QUESTION #1(Day 3)

List three situations that require placing the Hydrogen Recombiners in service. Include the minimum and maximum hydrogen concentrations, if appropriate.

OPEN REFERENCE

ANSWER:

- When directed by various EOPs (min .5%, maximum 4%)
- When recommended by the TSC
- When chemistry sample indicates containment hydrogen concentration increasing to 2% (maximum of 4.0%)

2/27/99

NOTE: The evaluator may have to prompt ~~that~~ that EOPs ~~is~~ are only considered as one of the three situations.

KA #: 028 A1.01 //3.4/3.8//

Objective:	0300-000.00S-LOCA01-01, Obj. 11
Reference:	2-EOP-LOCA-1, Step 24
	S2.OP-SO.CAN-0001, Step 2.3

Comments: ____

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JPM QUESTION (Day 2&3)

A large break LOCA occurred, a H2 Recombiner was placed in service and the setting is now 73 KW. In the past 24 hours, containment hydrogen concentration has risen steadily from 2.8% to 3.3%.

What action can be taken by the shift relative to recombiner operation?

OPEN REFERENCE

ANSWER:

Raise heater output to 75 KW (maximum allowed) and [inform the TSC]

[ ] not required for full credit

KA #: 028 A2.01 //3.4/3.6//

Objective: 0300-000.00S-CONTMT-00, Obj. 12.
Reference: S2.OP-SO.CAN-0001, Step 5.1.7.

Comments: ____
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*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

List three situations that require placing the Hydrogen Recombiners in service. Include the minimum and maximum hydrogen concentrations, if appropriate.

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

A large break LOCA occurred, a H2 Recombiner was placed in service and the setting is now 73 KW. In the past 24 hours, containment hydrogen concentration has risen steadily from 2.8% to 3.3%.

What action can be taken by the shift relative to recombiner operation?

OPEN REFERENCE

INITIAL CONDITIONS:

1. A LOCA has occurred on the Unit.
2. Pre-LOCA conditons: Reactor Power - 100%; Pzr Pressure - 2235 psig; Containment Pressure - 0.1 psig; Containment Temperature - 90 degrees F
3. Current pertinent conditions: Pzr Pressure - 1050 psig; Containment Pressure - 4.0 psig; Containment Temperature - 225 degrees F; Containment Hydrogen Concentration - 2.1%

INITIATING CUE:

The CRS directs you to place the 21 Hydrogen Recombiner in service IAW S2.OP-SO.CAN-0001(Q)

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem

SYSTEM: CVCS

TASK: Place CVCS make-up control in the MANUAL Mode.

TASK NUMBER: 004 013 01 01

JPM NUMBER:

K/A NUMBER: A4.07

APPLICABILITY: EO [ ] RO [X] SRO [X]

IMPORTANCE FACTOR: 3.9 (RO) 3.7 (SRO)

EVALUATION SETTING/METHOD: Simulator

REFERENCES: S2.OP-SO.CVC-0006, Rev. 6

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 10 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: [signature] for **PRINCIPAL TRAINING SUPERVISOR** [signature] for **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________________ **DATE:** ____________

NAME: ____________________

DATE: ____________________

SYSTEM: CVCS

TASK: Place the CVCS make-up control in the MANUAL mode.

TASK NUMBER: 004 013 01 01

INITIAL CONDITIONS: IC 173, VCT level transmitter LT-112 has failed. RCS boron concentration is 550 ppm.

SIMULATOR SETUP:

- Any @ power IC.
- Lower VCT level to the AUTO M/U setpoint.
- Fail VCT LT-112 HIGH (set MALF CV0037 = 100%)
- Place CV35 in MANUAL.

INITIATING CUE:

You are the Reactor Operator. The CVCS AUTO M/U function is inoperable due to the failure of LT-112. Perform a makeup with the control system in MANUAL.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: CVCS

TASK: Place the CVCS make-up control in the MANUAL Mode.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	1	Operator obtains current revision of S2.OP-SO.CVC-0006.	*NOTE:* As of the development of this JPM the procedure was designated as Category III, a classification no longer in use. The procedure should be implemented IAW Work Standards Handbook guidance for Category II procedures.		
	2	Obtain Boric Acid Flow Setpoint using existing RCS boron concentration from S2.RE-RA.ZZ-0012(Q), Reactor Eng'g Manual, Figure 100A.	*CUE:* RCS boron concentration is 550 ppm.		
*	3	Depress Makeup Control Mode Select STOP PB.	STOP PB illuminated.		
	4	Place 2CV179, PRI WTR FLOW CONTROL VALVE, in MANUAL	2CV179 MANUAL PB illuminated.		
	5	Place 2CV172, BA FLOW CONTROL VALVE, in MANUAL	2CV172 MANUAL PB illuminated.		
*	6	Align outlet of Boric Acid Blender to one of the following: A. Open 2CV185, MAKEUP FROM BLENDER TO CHG PUMP SUCTION, OR, B. Open 2CV181, MAKEUP FROM BLENDER TO VCT.	Either 2CV185 or 2CV181 PB illuminated. Preferred path is through 2CV185.		
	7	Start Primary Water Pump.	START PB on either PW Pump illuminated.		
	8	Place Boric Acid Pump in FAST Speed.	FAST PB on either BA Pump illuminated.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: CVCS

TASK: Place the CVCS make-up control in the MANUAL Mode.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	9	Manually adjust 2CV172 setpoint to REM Figure 100A value. If required BA Flow is not achieved, then close 21 and 22CV160 (Recirculation Valves).	Using INC/DEC PB's, adjusts BA Flow to 5.5-6.5 gpm.		
*	10	Manually adjust 2CV179 Setpoint to 62 gpm.	Using INC/DEC PB's, adjusts PW Flow to 62 +/- 2gpm. *CUE:* If makeup is in progress then inform operator the AUTO STOP setpoint has been reached and the makeup can be terminated.		
	11	When desired to terminate makeup, perform the following: • Close 2CV179 • Close 2CV172 • Close CV185 • Close CV181 • Stop PW Makeup Pump • Place BA Pump selected in SLOW Speed • Return CVCS M/U Control System to AUTO IAW Section 5.1 of this procedure	• CV179 CLOSE PB illuminated • CV172 CLOSE PB illuminated • CV185 CLOSE PB illuminated • CV181 CLOSE PB illuminated • PW Pump STOP PB illuminated • Correct BA Pump SLOW PB illuminated *NOTE:* The JPM is complete when the BA Pump is in SLOW.		

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ____________________
DATE: ____________________

SYSTEM: CVCS

TASK: Place the CVCS makeup control in the MANUAL Mode.

TASK NUMBER: 004 013 01 01

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

A reactor trip has occurred but three control rods fail to fully insert. An SI has not occurred. 2CV175, Rapid Borate Stop Valve cannot be opened. What method of boration is required and how long is this method required to be performed?

OPEN REFERENCE

ANSWER:

The charging pumps suction would have to be aligned to the RWST and the boration would have to occur for 360 minutes.

KA #: 024 AA2.05 //3.3/3.5//

Objective: 0300-000.00S-TRP002-01, LO. 8
Reference: 2-EOP-TRIP-2, Sheet 1 of 4.

Comments: ____
____
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JPM QUESTION #2

Reactor power is 85%. 2A EDG was removed from service for maintenance at 1600 on 2/24/99. All required Technical Specification Action Statements (TSAS's) were entered. 22 Charging pump has been declared inoperable at 0800, 2/25/99, and 2A EDG remains inoperable.

Identify all TSAS's that must be entered when the 22 Charging Pump is declared inoperable.

SRO ONLY – To prevent having to perform a reactor shutdown, when would 2A EDG and 22 charging pump be required to be returned to service?

OPEN REFERENCE

ANSWER:

The following LCOs have to be entered: 3.1.2.2, 3.1.2.4, and 3.5.2

SRO Only:

2A EDG must be returned to service NLT 1600, 2/27/99

AND

22 Charging pump must be returned to service NLT 0800, 2/28/99

KA #: 2.2.22 //3.4/4.1//

Objective: 0300-000.00S-CVCS00-00 Obj. 10
Reference: TS 3.1.2.2, 3.1.2.4, 3.5.2

Comments: ____
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*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

A reactor trip has occurred but three control rods fail to fully insert. An SI has not occurred. 2CV175, Rapid Borate Stop Valve cannot be opened. What method of boration is required and how long is this method required to be performed?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Reactor power is 85%. 2A EDG was removed from service for maintenance at 1600 on 2/24/99. All required Technical Specification Action Statements (TSAS's) were entered. 22 Charging pump has been declared inoperable at 0800, 2/25/99, and 2A EDG remains inoperable.

Identify all TSAS's that must be entered when the 22 Charging Pump is declared inoperable.

SRO ONLY – To prevent having to perform a reactor shutdown, when would 2A EDG and 22 charging pump be required to be returned to service?

INITIAL CONDITIONS:

1. VCT level transmitter LT-112 has failed. RCS boron concentration is 550 ppm.

INITIATING CUE:

You are the Reactor Operator. The CVCS AUTO M/U function is inoperable due to the failure of LT-112. Perform a makeup with the control system in MANUAL.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem

SYSTEM: Emergency Procedures

TASK: Start a CCW Pump IAW APPX-1

TASK NUMBER: 1150420501

JPM NUMBER:

K/A NUMBER: 007 EA1.04

APPLICABILITY: EO [ ] RO [X] SRO [X]

IMPORTANCE FACTOR: 3.6 (RO) 3.7 (SRO)

EVALUATION SETTING/METHOD: Simulator

REFERENCES:

2-EOP-TRIP-1	Rev 22
2-EOP-APPX-1	Rev 21

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 10 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: JC Chloyd for ____ PRINCIPAL TRAINING SUPERVISOR   for ____ OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________ **DATE:** ____________

NAME: ____________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

DATE: ____________________

SYSTEM: Emergency Procedures

TASK: Start a CCW Pump IAW APPX-1

TASK NUMBER: 1150420501

INITIAL CONDITIONS:

1. Place Simulator in a full power IC (IC-99 for 2/99 NRC EXAM)
2. Prevent 22 CCW Pp from starting manually; MALF's MS:090A and EL:0134 TD 35 secs
3. Perform actions of TRIP-1 up to step 17
4. Freeze Simulator and snap to a temporary IC

INITIATING CUE:

A loss of off-site power has occurred with a steam break in containment. The crew has performed the EOPs to step 17 of TRIP-1. The CRS has directed you to perform EOP-APPX-1 and place a CCW Pump in service.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Emergency Procedures

TASK: Start a CCW Pump IAW APPX-1

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
#	1	Check 4Kv Bus Status	Determines all vital busses powered from D/Gs		
#	2	Check ECCS and AFW Pump Status	Determines all ECCS and AFW Pumps running		
#	3	Select Strategy for starting a CCW Pump	Operators selects Step 4		
#	4	Check 22 CCW Pump available	Determines 22 CCW pump available		
# *	5	Block 2B and 2C SEC	Blocks 2B and 2C SEC on 2RP1		
# *	6	Reset 2B and 2C SEC	Resets 2B and 2C SEC @ EDG Bezels		
#	7	Stop 22 and 24 CFCU Stop 22 SWGR Room Supply Fan Stop 22 ABV Supply Fan Start 23 SWGR Supply Fan	Stops 22 and 24 CFCU Stops 22 SWGR Room Supply Fan Stops 22 ABV Supply Fan Starts 23 SWGR Supply Fan		
#	8	Start 22 CCW Pump	Determines 22 CW Pump tripped		
*	9	Start 22 or 24 CFCU	Starts 22 or 24 CFCU		
# *	10	Start 21 CCW Pump: Block 2A and 2B SEC	[Blocks 2A SEC]*, 2B SEC already blocked and reset		
# *	11	Reset 2A and 2B SEC	Resets 2A, 2B already reset		

NAME: ______________________

DATE: ______________________

SYSTEM: Emergency Procedures

TASK: Start a CCW Pump IAW APPX-1

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
#	12	Send an Operator to lockout 21 Chiller	*CUE:* Operator is dispatched		
# *	13	Start 22 SWGR Supply Fan Stop 21 SWGR Supply Fan	Starts 22 SWGR Supply Fan Stops 21 SWGR Supply Fan		
#	14	Start 22 or 24 CFCUs	22 or 24 CFCU already running (This step is critical if not performed earlier)		
# *	15	Stop 21 CFCU	Stops 21 CFCU		
# *	16	Start 22 FHB Exhaust Fan Stop 21 ABV Exhaust Fan	Start 22 FHB Exhaust Fan Stops 21 ABV Supply Fan		
# *	17	Start 21 CCW Pump	Starts 21 CCW Pump		

Terminating Cue: One CCW Pump in service

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: Emergency Procedures

TASK: Start a CCW Pump IAW APPX-1

TASK NUMBER: 1150420501

QUESTION:

RESPONSE:

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION:

RESPONSE:

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

Following a Reactor trip and Safety Injection on Unit 2, the crew is in EOP TRIP-1. The NCO is performing APPX-1 for CCW restoration and reports to the CRS that both 21 and 22CC16, RHR HX Outlet Isolation Valves, have not opened from the Safety injection actuation signal. What conditions must be met for 21 and 22 CC16 to open and is it any different for 11 and 12CC16?

OPEN REFERENCE

ANSWER:

For 21 and 22CC16 Valves to open, both a SI signal and a LO RWST signal must be present. Together, these signals open the CC16 valves on Unit 2. On Unit 1, there is no automatic function. The NCO must open 11 and 12CC16.

KA #: 2.2.3 //3.1/3.5//

Objective:	0300-000.00S-CCW000-01, 6 and 11.
Reference:	0300-000.00S-CCW000-01, Section IV.B.4.b.1.a)(2) Logic Diagram 224403 CCW P&ID 205331 Unit 1 and/or 2EOP-LOCA-3 and Basis Documents

Comments: ____

JPM QUESTION #2

The unit is in MODE 1. 22 CCW pump has just been declared inoperable. When is 22 CCW pump required to be returned service?

OPEN REFERENCE

ANSWER:

Restore the pump to service within 72 hours.

NOTE: Technical Specifications states two loops are required to be operable, but the precautions and limitations for S2.OP-SO.CC-0001 states three CCW pumps are required to be operable in order to consider two loops operable.

KA #: 2.2.22 //3.4/4.1//

Objective: 0300-000.00S-CCW000-01, Obj. 10.
Reference: S2.OP-SO.CC-0001, Step 3.4.
Technical Specifications 3.7.3 and basis.

Comments: ______________________________
____
____
____
____

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

Following a Reactor trip and Safety Injection on Unit 2, the crew is in EOP TRIP-1. The NCO is performing APPX-1 for CCW restoration and reports to the CRS that both 21 and 22CC16, RHR HX Outlet Isolation Valves, have not opened from the Safety injection actuation signal. What conditions must be met for 21 and 22 CC16 to open and is it any different for 11 and 12CC16?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

The unit is in MODE 1. 22 CCW pump has just been declared inoperable. When is 22 CCW pump required to be returned service?

OPEN REFERENCE

INITIAL CONDITIONS:

1. A loss of off-site power has occurred with a steam break in containment. EOP-TRIP-1 has been completed through Step 16.

INITIATING CUE:

The CRS has directed you to perform EOP-APPX-1 and place a CCW Pump in service.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Nuclear Instrumentation System

TASK: Take Corrective Action for a Source Range Instrument Malfunction

TASK NUMBER: 015 527 04 01

JPM NUMBER: 2-6 (44)

K/A NUMBER: 032 AA205

APPLICABILITY: EO [ ] RO [X] SRO [X]

IMPORTANCE FACTOR: 2.9* (RO) 3.2* (SRO)

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES:

S2.OP-AR.ZZ-0005	Overhead Annunciators Window E
S2.OP-AB.NIS-0001(Q)	Nuclear Instrumentation System Malfunction

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 10 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ______

APPROVED: _______ for
PRINCIPAL TRAINING SUPERVISOR

for _______
OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ______

ACTUAL TIME CRITICAL COMPLETION TIME: ______

JPM PERFORMED BY: ______ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ______ **DATE:** ______

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

SIMULATOR SETUP INSTRUCTIONS

SYSTEM:	Nuclear Instrumentation System
TASK:	Take Corrective Action for a Source Range Instrument Malfunction
TASK NUMBER:	015 527 04 01
SIMULATOR IC:	Shutdown IC-12
MALFUNCTIONS REQUIRED:	NI0190A, N31 fails to 100%
OVERRIDES REQUIRED:	
SPECIAL INSTRUCTIONS:	• Select the Audio CR and Scaler/Timer to the channel that will be failed. • After the first NIS alarm, inform the candidate that the PO will tend to any non-related alarms.

NAME: ______________________________

DATE: ______________________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

TASK NUMBER: 015 527 04 01

INITIAL CONDITIONS:

1. The Unit is in Mode 3 with the rod control system de-energized.

INITIATING CUE:

You are the reactor operator. Respond as appropriate to plant conditions.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Operator acknowledges OHA E-13 and F-25. Refers to S2.OP-AR.ZZ-0005(Q) for actions	Acknowledges annunciator *NOTE:* **After the first SR NIS alarm, inform the candidate that the PO will tend to any alarms not related to the NIS problem.** Pulls S2.OP-AR.ZZ-0005(Q) or immediately enters AB.NIS-1. *CUE:* **Alarm Response Procedures for SR NIS do not direct the operator into AB.NIS and could direct entry into EOP-TRIP-1. If necessary (as CRS), direct the candidate to implement AB.NIS-0001.**		
	2	Go to S2.OP-AB.NIS-0001(Q), Nuclear Instrument System Malfunctions.	Refers to S2.OP-AB.NIS-0001(Q). ***NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to proceeding to the next step.***		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	3	IF a Power Range NI is failed, THEN place the ROD BANK SELECTOR SWITCH in MAN.	Operator confirms Source Range instrument failure.		
	4	STOP any Turbine load change.	Operator determines that no action required since the plant is in Mode 3.		
	5	Has a Power Range channel failure occurred as indicated by one or more of the following symptoms? ...	Operator determines that NO Power Range instrument has failed by listed indication, proceeds to appropriate step.		
	6	Has an Intermediate Range Channel failure occurred as indicated by one or more of the following symptoms?	Operator determines that NO Intermediate Range instrument has failed by listed indication, proceeds to appropriate step.		
	7	Has Scaler/Timer or Audio Count Rate channel failure occurred as indicated by one or more of the following symptoms?	Determines if Scaler/Timer or Audio Count Rate channel has been affected by SR instrument malfunction, proceeds to appropriate step. *NOTE:* ***Malfunction may/may not affect indications; dependent on malfunctioning channel.***		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	8	Has a Source Range Channel failed as indicated by one or more of the following symptoms? ♦ Erratic or failed indication ♦ OHA E-5, SR DET VOLT TRBL, in alarm ♦ OHA-E-13, SR HI FLUX AT S/D unsubstantiated by other indications	Operator determines that a Source Range channel has failed, proceeds to appropriate step.		
*	9	Select alternate Source Range Channel for input to Audio Count Rate Circuit.	Operator determines which channel has failed and selects the alternate channel as input to the Audio Count Rate circuit on Rack #81, N34 drawer. ***NOTE:*** This switch must be pulled out to re-position. If the candidate is unaware and calls for an I&C Tech. then provide ***CUE***: Try pulling switch outward and rotate.		
	10.	IF refueling operations are in progress, ...	Determines refueling operations are NOT in progress.		
	11.	IF Source Range Channel has failed, THEN go to step ...	Recognizes failure, proceeds to appropriate step.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	12	REMOVE affected Source Range Channel from service as follows: Place the LEVEL TRIP switch in the BYPASS position (Source Range drawer).	Operator determines the failed channel and at its associated NIS drawer: Rotates Level Trip switch to BYPASS		
	13.	Ensure OHA E-29, SR & IR TRIP BYP is in alarm	Determines OHA E-29 lit.		
*	14.	Place HIGH FLUX AT SHUTDOWN switch in BLOCK position (Source Range drawer).	Rotates High Flux at Shutdown switch to BLOCK.		
	15.	Ensure OHA E-21, SR HI FLUX AT S/D BLOCK.	Determines OHA E-21 is lit.		
*	16.	Remove INSTRUMENT POWER fuses (Source Range drawer).	Rotates and removes BOTH Instrument Power fuses.		
	17.	Ensure OHA E-5, SR DET VOLT TROUBLE is in alarm.	Determines OHA E-5 is lit.		
	18.	IF conditons warrant, THEN place ROD BANK SELECTOR SWITCH in AUTO.	Verifies selector switch in MANUAL.		
	19.	NOTIFY the CRS/OS to refer to Technical Specifications.	Operator informs the CRS/OS to refer to Tech Spec's		

Terminating Cue: **CRS/OS notified**

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ____________________
DATE: ____________________

SYSTEM: Nuclear Instrumentation

TASK: Take Corrective Action for a Source Range Instrument Malfunction

TASK NUMBER: 015 527 04 01

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1 (Day 3)

At 1323 on 2/22/99 reactor power is 99%. Cycle burnup is 10,000 MWD/MTU. Delta I is determined to be –15. A rod control failure prevents adjusting control rods to return delta I to the required band. A power decrease is initiated and power is reduced below 50% at 1351 on 2/22/99. AFD is returned to the target band at 1533.

When can power be returned to above 50% power, provided AFD remains within the target band?

OPEN REFERENCE

ANSWER:

1343 on 2/23/99

Note: TS 3.2.1 Action 2 requires that if power is outside the limits (doghouse) then the Power Range Neutron Flux-High Trip setpoints are required to be reduced. The applicant may state that power cannot be returned until the setpoints are reset. Cue that the setpoints have been reset.

KA #: 2.1.12 //2.9/4.0//

Objective: 0300-000.00S-POWER0-00, LO 5
Reference: Technical Specifications 3.2.1

		Penalty Minutes
Initial Time	2/22/99 13:23	
Time at 50%	2/22/99 13:51	0:28:00 Penalty. @ 1
Time within Limits	2/22/99 15:33	0:51:00 Penalty @ 50%
Time back above 50%	2/23/99 13:43	1:19:00 Total Penalty

Comments: ____
____
____
____
____

JPM QUESTION #2 (Day 3)

Unit 1 is performing a reactor startup with power at 150 cps. Unit 2 is at 100% power. A tagging request to clear the U1 generator output breakers (1-5 and 5-6 500 KV breakers) to restore the drops (main power transfer leads).

What effect can this have on SRNIS indications?

OPEN REFERENCE

ANSWER:

Induced AC noise from [welding machines and] 500 KV switching evolutions can cause Source Range counts to increase signficantly.

[ ] not required for full credit

KA #: 015 K1.02 //3.4/3/6//

Objective: 0300–000.00S–EXCORE–00, Obj. 13
Reference: S2.OP-IO.ZZ-0003, Step 3.12

Comments: ______________________________

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

At 1323 on 2/22/99 reactor power is 99%. Cycle burnup is 10,000 MWD/MTU. Delta I is determined to be –15. A rod control failure prevents adjusting control rods to return delta I to the required band. A power decrease is initiated and power is reduced below 50% at 1351 on 2/22/99. AFD is returned to the target band at 1533.

When can power be returned to above 50% power, provided AFD remains within the target band?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Unit 1 is performing a reactor startup with power at 150 cps. Unit 2 is at 100% power. A tagging request to clear the U1 generator output breakers (1-5 and 5-6 500 KV breakers) to restore the drops (main power transfer leads).

What effect can this have on SRNIS indications?

OPEN REFERENCE

INITIAL CONDITIONS:

1. The unit is in Mode 3 with the rod control system de-energized.

INITIATING CUE:

You are the reactor operator. Respond as appropriate to plant conditions.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem

SYSTEM: Emergency Operating Procedures

TASK: Terminate SI

TASK NUMBER: 1150040501

JPM NUMBER:

K/A NUMBER: E02 EA1.1

APPLICABILITY: EO [ ] RO [X] SRO [X]

IMPORTANCE FACTOR:

4.0	3.9
RO	**SRO**

EVALUATION SETTING/METHOD: Simulator

REFERENCES: EOP-TRIP-3

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 7 minutes

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: G. Blinde, **PRINCIPAL TRAINING SUPERVISOR** J. Konovalchick, **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________________ **DATE:** ____________

NAME: ____________________

DATE: ____________________

SYSTEM: Emergency Operating Procedures

TASK: Terminate SI

TASK NUMBER: 1150040501

INITIAL CONDITIONS: An inadvertent SI occurred due to a technician error. The crew has transitioned from TRIP-1 to TRIP-3.

1. IC-98 for 2/99 NRC Exam - Initiate a MANUAL SI
2. Carry out the steps of EOP-TRIP-1, through the transition to TRIP-3 and snap.

INITIATING CUE:

An inadvertent SI has occurred due to a technician error. The crew just transitioned to 2-EOP-TRIP-3. You are the board operator. Starting at Step 1, carry out the actions of TRIP-3.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Emergency Operating Procedures

TASK: Terminate SI

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	2	Reset SI	Depresses Train A and Train B SI RESET PB's		
		Reset Phase A Isolation	Depresses Train A and Train B PHASE A ISOLATION RESET PB's		
		Reset Phase B Isolation	Depresses Train A and Train B PHASE B ISOLATION RESET PB's		
		Open 21 and 22CA330	Open indication on 21 and 22CA330 ***Note:*** PZR Spray may initiate, lowering RCS pressure		
*		Reset each SEC	Depresses RESET PB's for 2A, 2B, and 2C SEC		
	3	Are all SEC's Reset	Verifies all SEC's are reset		
		Reset all 230V Control Centers	Depresses RESET on 2A, 2B, and 2C 230V Control Centers		
*	4	Stop all but 21 or 22 Charging Pump	Stops 21 OR 22 Charging Pump and 23 Charging Pump		
	5	Is RCS Pressure stable or rising?	Yes		

TERMINATION: Verifies RCS Pressure is stable or rising.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: Emergency Operating Procedures

TASK: Terminate SI

TASK NUMBER: 1150040501

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ **-SAT** ☐ **-UNSAT**

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ **-SAT** ☐ **-UNSAT**

JPM QUESTION #1

A steam break inside containment has occurred causing a SI on high containment pressure. The MSIV's are closed. Reactor Trip Breaker "A" did not open and remains closed. All steps through 29.1 of EOP-TRIP-1 were completed and the crew transitioned to EOP-TRIP-3.

What will be the status of both trains of SI after the operator depresses SI RESET IAW TRIP-3? Explain why.

OPEN REFERENCE

ANSWER:

Both trains will reset because a P-4 jumper was installed in EOP-TRIP-1.

KA #: 013 K4.01 //3.9/4.3//

Objective:	300-000.00S-TRIP-1, Obj. 22
Reference:	221057, Reactor Protection System Sheet 8
	EOP-TRIP-1 and Basis Document

Comments: ____
____
____
____
____

JPM QUESTION #2

A LOCA has occurred on Unit 2. Per direction in the EOPs, the SI signal may have been reset before LOCA-3 is entered.

How is the functionality of the Semi-Automatic Swapover to Cold Leg Recirculation feature affected if the SI actuation signal has been manually reset prior to entering LOCA-3?

OPEN REFERENCE

ANSWER:

The Semi-Automatic Swapover to Cold Leg Recirculation will still function because there is a latching relay that locks in the SI signal. [The locked in signal is reset using the RESET "S" SIGNAL pushbutton on each Safeguards Bezel.]

[ ] not required for full credit

KA #: 013 K4.06 //4.0/4.3//

Objective:	0300-000.00S-ECCS00-00, Obj. 9
Reference:	0300-000.00S-ECCS00-00, Section IV.F.5.b.2)
	S2-OP-SO.SJ-0004, Post SI Systems Re-alignment

Comments: ____

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

A steam break inside containment has occurred causing a SI on high containment pressure. The MSIV's are closed. Reactor Trip Breaker "A" did not open and remains closed. All steps through 29.1 of EOP-TRIP-1 were completed and the crew transitioned to EOP-TRIP-3.

What will be the status of both trains of SI after the operator depresses SI RESET IAW TRIP-3? Explain why.

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

A LOCA has occurred on Unit 2. Per direction in the EOPs, the SI signal may have been reset before LOCA-3 is entered.

How is the functionality of the Semi-Automatic Swapover to Cold Leg Recirculation feature affected if the SI actuation signal has been manually reset prior to entering LOCA-3?

OPEN REFERENCE

INITIAL CONDITIONS:

1. An inadvertent SI occurred due to a technician error. The crew has transitioned from TRIP-1 to TRIP-3.

INITIATING CUE:

An inadvertent SI has occurred due to a technician error. The crew just transitioned to 2-EOP-TRIP-3. You are the board operator. Starting at Step 1, carry out the actions of TRIP-3.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem

SYSTEM: Feedwater

TASK: Prompt Recovery from a SGFP Trip

TASK NUMBER: 1150290501

JPM NUMBER:

K/A NUMBER: 2.1.23

APPLICABILITY: EO [ ] RO [X] SRO [X]

IMPORTANCE FACTOR:

3.9	4.0
RO	**SRO**

EVALUATION SETTING/METHOD:

REFERENCES: S2.OP-SO.CN-0007, Prompt Recovery from SGFP Trip

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 15 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: ______ for
PRINCIPAL TRAINING SUPERVISOR

______ for
OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________ **DATE:** ____________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

SIMULATOR SETUP INSTRUCTIONS

SYSTEM:	Feedwater
TASK:	Prompt Recovery from a SGFP Trip
TASK NUMBER:	1150290501
SIMULATOR IC:	IC-85 for 2/99 NRC Exam (Start from a power IC where only one SGFP would be in service)
MALFUNCTIONS REQUIRED:	• Malfunctions to prevent any AFW pumps from starting. • Malfunction to trip the running SGFP
OVERRIDES REQUIRED:	
SPECIAL INSTRUCTIONS:	Trip the running SGFP. Then complete actions of 2-EOP-FRHS-1 up to step 13. Ensure the Simulator Operator has a copy of S2.OP-SO.CN-0007.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Feedwater

TASK: Prompt Recovery from a SGFP Trip

TASK NUMBER: 1150290501

INITIAL CONDITIONS:

1. The reactor was operating at 38% power.
2. 22 SGFP was running and spuriously tripped during instrumentation testing.
3. During the reactor trip no AFW pumps started.
4. All actions for 2-EOP-TRIP 1 and 2-EOP-FRHS-1 have been completed to step 13 of FRHS-1.
5. An SI has NOT occurred.
6. 21 SGFP is available for starting.

INITIATING CUE:

The CRS has directed that 21 SGFP be promptly started in accordance with S2.OP-SO.CN-0007.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Feedwater

TASK: Prompt Recovery from SGFP Trip

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Obtains S2.OP-SO.CN-0007(Q), Prompt Recovery from SGFP Trip	Correct procedure obtained. ***NOTE: This is a Category II procedure. Work Standards require that the procedure should be at the job site. The operator should refer to the procedure at the beginning and end of the job and as frequently as necessary (based on the task, experience of the operator, familiarization with the task, etc.) to complete the job in accordance with the procedure.***		
	1.	Review prerequisites and precautions and limitations.	*CUE: The CRS has verified all prerequisites have been met and has reviewed the precautions.*		
	2.	Ensure all SGFP trips are clear.	*CUE: A Local Equipment Operator has verified that all trips are clear.*		
	3.	Ensure SGFP suction pressure is greater than 350 psig.	Verifies SGFP suction pressure on PI-509 PUMP SUCT PRESS		
	4.	Verify 21 SGFP is tripped.	Verifies TURBINE TRIP light illuminated or HP and LP Stop valves close indication illuminated.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Feedwater

TASK: Prompt Recovery from SGFP Trip

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	5	Direct a local operator to place 21 SGFP Turbine Enable/disable switch 2ND17482, in Panel 362-2, in the DISABLE position.	Local operator directed to perform the action. *CUE: Local operator reports that the 21 SGFP Turbine Enable/Disable is in the DISABLE position.*		
	6.	Direct an operator to locally at 2SA2805, Woodward governor controller keypad, to depress the CLR key and verify the LCD displays "CONTROLLING PARAM PUSH RUN OR PROGRAM".	Local operator directed to perform the action. *CUE: Local operator reports the CLR key has been depressed and the LCD displays "CONTROLLING PARAM PUSH RUN OR PROGRAM".*		
	7.	Select 21TD24, TURBINE DRAINS, OPEN.	Verifies 21TD24 opens		
	8.	Ensure 21CN36, WARM-UP is OPEN.	Ensures 21CN36 WARM-UP OPEN is illuminated.		
	9.	Verify Pump Casing delta T is ≤ 40 °F.	Verifies pump casing delta T is ≤ 40°F using the process computer.		
	10.	Depress MODULATE RECIRC VALVE pushbutton and ensure 21BF32 RECIRC OPEN indication.	Depresses 21BF32 MODULATE RECIRC VALVE PB. Verifies 21BF32 RECIRC OPEN indication illuminates.		
	11.	Verify 21CN32 PUMP SUCTION VALVE is open.	Verifies 21CN32 PUMP SUCTION VALVE OPEN light is illuminated.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Feedwater

TASK: Prompt Recovery from SGFP Trip

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	12.	Verify 21BF32 RECIRC is open.	Verifies 21BF32 RECIRC OPEN light is illuminated.		
	13.	Verify 21MS43 HP STOP VALVE is closed.	Verifies 21MS43 HP STOP-CLS light is illuminated.		
	14.	Verify 21RS15 LP STOP VALVE is closed.	Verifies 21RS15 LP STOP-CLS light is illuminated.		
	15.	Verify SGFP suction pressure is greater than 215 psig.	Verifies suction pressure is greater than 215 psig on PI-509.		
	16.	Verify speed demand is at minimum.	Operate SPEED DEC PB until speed demand does not decrease further (approx. 1100 rpm) *NOTE:* This can also be accomplished by adjusting the master demand to minimum		
*	17.	Depress TURBINE LATCH pushbutton	Depresses TURBINE LATCH pushbutton.		

NAME: ______________________

DATE: ______________________

SYSTEM: Feedwater

TASK: Prompt Recovery from SGFP Trip

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	18.	Verify indications for turbine latching.	Verifies the following indications: • 21MS43 OPEN light is illuminated. • 21RS15 OPEN light is illuminated. • 21CN36 CLOSED light is illuminated. • 21BF32 OPEN light is illuminated. • 21 SGFP speed on SA5086 is slowly increasing. • 21 SGFP TRIP AFP AUTO ARMED light is extinguished.		
	19.	Direct a local operator to check if the Woodward Governor Controller (2SA2805) displays "TURBINE TURNING/PUSH RUN OR CLR" and to depress the RUN key and ensure LCD momentarily displays "CONTROLLING PARM/SEMI AUTO START".	Local operator directed to perform the action. *CUE: "The RUN key was NOT depressed because TURBINE TURNING/PUSH RUN OR CLR was NOT displayed."*		
	20.	Direct the local operator to monitor during warmup for rubbing, vibration and unusual noises.	Directs the local operator to monitor the SGFP. *CUE: No unusual rubbing, vibration or noises were observed.*		
	21.	Direct a local operator to place 21 SGFP Turbine Enable/Disable switch 2ND17482, in Panel 362-2, in the ENABLE position.	Local operator directed to perform the action. *CUE: Local operator reports that the 21 SGFP Turbine Enable/Disable is in the ENABLE position.*		

NAME: ____________________

DATE: ____________________

SYSTEM: Feedwater

TASK: Prompt Recovery from SGFP Trip

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Transition to section 5.2			
	22.	Ensure the 21CN48 and 22CN48 Pump Bypass valves are closed.	Verifies the following indications: • 21CN48 CLOSE light is illuminated. • 22CN48 CLOSE light is illuminated.		
	23.	Ensure 22 SGFP DEMAND BIAS set at 0%.	Verifies 22SGFP DEMAND BIAS is at 0% on SA8393.		
*	24.	Adjust 21 SGFP PUMP SPEED CONTROL to establish differential pressure on Exhibit 1.	Depress 21 SGFP INCREASE SPEED PB to increase speed until PA 14932 indicates $\geq$ 50 psid.		
	25.	Ensure SGFPs MASTER SPEED CONTROLLER SPEED DEMAND is tracking 21 SGFP PUMP SPEED.	Verifies that MASTER SPEED CONTROLLER SPEED DEMAND FI1500P is tracking 21 SGFP PUMP SPEED SA5086.		
	26.	Place 21 SGFP PUMP SPEED CONTROL in AUTO	Depress 21 SGFP SPEED CONTROL AUTO pushbutton and verifies the PB illuminates.		
	27.	ENSURE MASTER SPEED CONTROLLER SPEED DEMAND is maintaining DP from Exhibit 1	Verifies ENSURE MASTER SPEED CONTROLLER SPEED DEMAND is maintaining $\geq$ 50 psid on PA 14932.		
	28.	SELECT 21TD24, TURBINE DRAINS, closed.	Depresses 21TD24 TURBINE DRAINS CLOSE PB and verifies PB illuminates.		

TERMINATING CUE: The operator reports 21 SGFP is available to feed the SGs.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________

DATE: ______________________

SYSTEM: Feedwater

TASK: Prompt Recovery from a SGFP Trip

TASK NUMBER: 1150290501

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

A SGFP is tripped from the control room, even when it is being removed from service IAW the normal operating procedure. What is the consequence of NOT tripping the SGFP during the procedure?

OPEN REFERENCE

ANSWER: One of the signals required for auto start of the MDAFW Pumps on a trip of both SGFP's will not be present.

KA #: 059 A2.01 //3.4/3.6//

Objective: 0300-000.00S-AFW000-01, Obj. 6
Reference: S2.OP-SO.CN-0002(Q), Precautions and Limitations

Comments: ____
____
____
____
____

JPM QUESTION #2

Reactor power is 100%. 22 SGFP bias is set at 0. Due to instrument failure, the bias signal is going in the negative direction.

What will be the effect on both SGFPs?

CLOSED REFERENCE

ANSWER:

The speed of 22 SGFP will be slowing but 21 SGFP will raise due to the differential pressure controller.

KA #: 059 K4.05 //2.5/2.8//

Objective: 0300-000.00S-CN&FDW-00, Obj. 8
Reference: 0300-000.00S-CN&FDW-00

Comments: ____
____
____
____
____

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

A SGFP is tripped from the control room, even when it is being removed from service IAW the normal operating procedure. What is the consequence of NOT tripping the SGFP during the procedure?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Reactor power is 100%. 22 SGFP bias is set at 0. Due to instrument failure, the bias signal is going in the negative direction.

What will be the effect on both SGFPs?

CLOSED REFERENCE

INITIAL CONDITIONS:

1. The reactor was operating at 38% power.
2. 22 SGFP was running and spuriously tripped during instrumentation testing.
3. During the reactor trip no AFW pumps started.
4. All actions for 2-EOP-TRIP 1 and 2-EOP-FRHS-1 have been completed to step 13 of FRHS-1.
5. A SI has NOT occurred.
6. 21 SGFP is available for starting.

INITIATING CUE:

The CRS has directed that 21 SGFP be promptly started in accordance with S2.OP-SO.CN-0007.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Pressurizer Pressure Control

TASK: Take Corrective Action for a Failed Open Pressurizer Spray Valve (PS3)

TASK NUMBER: 114 024 04 01

JPM NUMBER: ABPZRPS3

K/A NUMBER: 027 AA1.01

IMPORTANCE FACTOR:

RO	SRO
4.0	3.9

APPLICABILITY:
EO [ ] **RO** [X] **SRO** [X]

EVALUATION SETTING/METHOD: **Simulator**

REFERENCES: S2.OP-AB.PZR-0001(Q) Pressurizer Pressure Malfunction

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 5 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ______

APPROVED: H C Lloyd for
✓**PRINCIPAL TRAINING SUPERVISOR**

for **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ______

ACTUAL TIME CRITICAL COMPLETION TIME: ______

JPM PERFORMED BY: ______ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ______ **DATE:** ______

NAME: ______

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

DATE: ______________________

SYSTEM: Pressurizer Pressure Control

TASK: Take Corrective Action fo a Failed Open Pressurizer Spray Valve (2PS3)

TASK NUMBER: 114 024 04 01

INITIAL CONDITIONS: 100% power. Assign MALF PR0019B to Remote Function 1.

1. Plant conditions are stable. You are the Reactor Operator.

INITIATING CUE:

Respond to changing plant conditions as the Reactor Operator.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Pressurizer Pressure Control

TASK: Take Corrective Action for a Failed Open Pressurizer Spray Valve (PS3)

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		NOTE: After informed by the examiner that the applicant is ready to begin and has assumed the watch insert MALF PR0019B (Remote Function 1)			
	1	Operator responds to PZR Pressure dropping and/or alarm and/or change in 2PS3 position.	Enters S2.OP-AB.PZR-0001 directly or via an ARP. *NOTE:* It is acceptable for the operator to attempt closing PS3 prior to entering AB.PZR.		
	2	Is POPS in service?	Determines POPS NOT in service. (NO)		
	3	Is the controlling PZR Pressure Control Channel (I or III) failed?	Checks PZR pressure channels PI455 and PI457 and determines NEITHER failed. (NO)		
	4	Is the Master Pressure Controller controlling pressure consistent with actual pressure as shown on Attachment 1?	Checks PZR Master Pressure Controller output demand and determines "normal" for plant conditions. (YES) *NOTE:* May not refer to Att. 1 if 2PS3 has been noted open with pressure below closing setpoint.		
	5	Are the Spray Valves controlling pressure consistent with Att. 1?	Identifies 2PS3 is open. (NO)		
*	6	Place the Spray Valve(s) in MANUAL	Selects MANUAL on at least 2PS3.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Pressurizer Pressure Control

TASK: Take Corrective Action for a Failed Open Pressurizer Spray Valve (PS3)

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	7	Operate the Spray Valves to control pressure consistent with Att. 1.	Attempts to close 2PS3 using valve pushbuttons Identifies failure of valve to close.		
	8	Has pressure control been regained?	Determines PZR pressure decreasing. (NO)		
	9	Is RCS pressure dropping rapidly?	Determines PZR pressure drop is rapid. (YES)		
*	10	Trip the Reactor	Initiates a Reactor Trip using either MANUAL TRIP handle.		
	11	Is Reactor Trip confirmed?	Determines reactor is tripped : • Rx trip breakers open • Rod Bottom lights lit • Decreasing PR NIS Power and negative IR SUR. (YES) *NOTE:* It may be necessary for evaluator to tell candidate that IA's for the reactor trip will be performed by another individual. Complete AB.PZR.		
*	12	Stop 23 RCP	Depresses STOP PB on 23 RCP and verifies ~~breakers~~ breaker opened.		

Terminating Cue: 23 RCP stopped [initials] 2/27/99

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: Pressurizer Pressure Control

TASK: Take Corrective Action fo a Failed Open Pressurizer Spray Valve (2PS3)

TASK NUMBER: 114 024 04 01

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

If PS1 is suspected to be leaking, both 21 and 23 RCPs are stopped. If PS3 is suspected to be leaking only 23 RCP is stopped. Why is there a difference in the actions?

CLOSED REFERENCE

ANSWER:

Most spray flow is provided by 23 RCP through either PS3 or PS1. An alternative correct answer is that 21RCP produces a negligible amount of flow through PS3

KA #: 010 K1.03 //3.6/3.7//

Objective:	0300-000-00S-ABPZR1-01, Obj. 1
Reference:	0300-000-00S-ABPZR1-01, Explanation for the note prior to Step 3.20. Technical Basis for S2.OP-AB.PZR-0001, Explanation for Steps 3.16 through 3.41.

Comments: ____

JPM QUESTION #2

Prior to stopping a RCP in AB.PZR-1 the operator is directed to select the turbine controls to "IMP OUT" or "TURBINE MANUAL" to prevent a RCS cooldown. How does this action prevent a RCS cooldown?

OPEN REFERENCE

ANSWER:

(In "IMP IN" the turbine is controlled via a first stage pressure signal. If a RCP is tripped steam pressure will lower, causing the turbine governor valves to open to maintain load. The increased steam flow will cause a drop in Tavg.) In "IMP OUT" or "TURBINE MANUAL" the turbine has fixed inputs for valve position therefore it does not respond to steam header pressure changes.

( ) Not required for full credit.

KA #: 027 AK3.03 //3.7/4.1//

Objective: 0300-000-00S-ABPZR1-01, Obj. 2

Reference: Technical Basis for S2.OP-AB.PZR-0001, Explanation for Steps 3.16 through 3.41.

Comments: ____

____

____

____

____

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

If PS1 is suspected to be leaking, both 21 and 23 RCPs are stopped. If PS3 is suspected to be leaking only 23 RCP is stopped. Why is there a difference in the actions?

CLOSED REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

Prior to stopping a RCP in AB.PZR-1 the operator is directed to select the turbine controls to "IMP OUT" or "TURBINE MANUAL" to prevent a RCS cooldown. How does this action prevent a RCS cooldown?

OPEN REFERENCE

INITIAL CONDITIONS:

1. Plant conditions are stable. You are the Reactor Operator.

INITIATING CUE: Respond to changing plant conditions as the Reactor Operator.

In plant

JPMs

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: SALEM

SYSTEM: ABNORMAL PROCEDURES

TASK: TCAF Control Room Evacuation (Trip Turbine, Open Exciter Field Breaker, Trip SGFP's)

TASK NUMBER: 114 013 04 01

JPM NUMBER:

K/A NUMBER: APE 068 AA1.04, EA1.23, AA1.27

APPLICABILITY: EO [X] RO [X] SRO [X]

IMPORTANCE FACTOR:

All >3.0	All>3.0
RO	**SRO**

EVALUATION SETTING/METHOD: In-Plant Simulate

REFERENCES: S2.OP-AB.CR-0001, Att. 8, ~~Rev. 6~~ 2/19/99

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 10 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: for PRINCIPAL TRAINING SUPERVISOR   for OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ______________

ACTUAL TIME CRITICAL COMPLETION TIME: ______________

JPM PERFORMED BY: ______________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ______________________ **DATE:** ______________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: ABNORMAL PROCEDURES

TASK: TCAF Control Room Evacuation (Trip Turbine, Open Exciter Field Breaker, Trip SGFP's)

TASK NUMBER: 114 013 04 01

INITIAL CONDITIONS:

1. The control room has been evacuated due to a bomb threat.

INITIATING CUE:

The control room has been evacuated IAW S2.OP-AB.CR-0001. You are assigned to carry out the actions of Attachment 8, Steps 3.0-5.0: Trip the Mn. Turbine, Open the Exciter Field Breaker, Trip the SGFP's.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: ABNORMAL PROCEDURES

TASK: TCAF Control Room Evacuation: Trip MT, Open Exciter Field Breaker, Trip SGFP's

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Operator reviews procedure.	Evaluator provides copy of AB.CR-0001, Att. 8. *NOTE:* Work Standards Handbook guidance for use of Cat. I procedures applies.		
*	3.0	Proceed to Turbine Front Standard, and place the Reset-Normal-Trip Lever in the TRIP position.	Proceed to front standard, locates Lever and points out TRIP position.		
*	4.0	Proceed to Excitation System Control Cubicle and open Generator Exciter Field Breaker.	Proceeds to Turb. Bldg., El. 120, locates breaker and discusses opening.		
*	5.0	Locally, trip the following: • 21 SGFP • 22 SGFP	Proceeds to Turb. Bldg., El. 100, locates each local trip PB and discusses operation of at least one. *CUE:* Report your actions IAW the procedure.		
	16.0	Notify STA and HSD Panel Operator.	Locates page or discusses use of radio.		

Terminating Cue: Report completed

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ____________________
DATE: ____________________

SYSTEM: ABNORMAL PROCEDURES

TASK: TCAF Control Room Evacuation: Trip MT, Open Exciter Field Breaker, Trip SGFP's.

TASK NUMBER: 114 013 04 01

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

Assume that only a manual reactor trip was accomplished before the control room was evacuated. What would be the expected status of each piece of equipment operated during the task you just performed? Explain why it would be in that condition.

FOLLOWUP QUESTION

Why is it necessary to perform these actions?

CLOSED REFERENCE

ANSWER:

1. The turbine should have tripped from P-4 interlock when the manual reactor trip was initiated.
2. The field breaker would trip following the turbine trip and generator breakers opening.
3. The SGFP would not be tripped automatically [but a feedwater isolation should have occurred]. [ ] not required

FOLLOWUP ANSWER (References can be used for the followup question)

Ensure the heat loads are removed from the Steam Generators to allow temperature control of the reactor.

KA #: 068 AK3.18 //4.2/4.5//

Objective: 0300-000.00S-ABCR01-00, Obj. 2
Reference: S2.OP-AB.CR-0001, Technical Bases for Attachment #8, Immediate Actions

Comments: ____

JPM QUESTION #2

During shutdown outside the control room how can AFST level be determined?

FOLLOWUP QUESTION

What would be the minimum allowable AFW pump suction pressure?

OPEN REFERENCE

ANSWER:

The suction pressure of the AFW pump is compared to a table in AB.CR-0001 that converts suction pressure to AFST level.

FOLLOWUP ANSWER

Minimum pressure would be 23.9 psig. Required to maintain above TS minimum of 94%. 95% is the closest on the chart.

KA #: 2.4.35 //3.3/3.5//

Objective: 0300-000.00S-ABCR01-00, Obj. 2
Reference: S2.OP-AB.CR-0001, Attachment 14

Comments: ______________________________

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

Assume that only a manual reactor trip was accomplished before the control room was evacuated. What would be the expected status of each piece of equipment operated during the task you just performed? Explain why it would be in that condition.

CLOSED REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #2

During shutdown outside the control room how can AFST level be determined?

OPEN REFERENCE

INITIAL CONDITIONS:

1. The control room has been evacuated due to a bomb threat.

INITIATING CUE: The control room has been evacuated IAW S2.OP-AB.CR-0001. You are assigned to carry out the actions of Attachment 8, Steps 3.0-5.0: Trip the Mn. Turbine, Open the Exciter Field Breaker, Trip the SGFP's.

ATTACHMENT 8
(Page 1 of 3)

#2 NEO

___ 1.0 **OBTAIN** the following:

- One copy of this procedure.
- One radio (located in Appendix "R" Cabinet)
- Key ring set and tools (Security Master, Switchyard key, JA Master, Breaker Keyswitch, screwdriver and adjustable wrench). **[C0363]**

___ 2.0 **PROCEED** to Turbine Front Standard,
AND **PLACE** the Reset-Normal-Trip lever in the TRIP position.

___ 3.0 **PROCEED** to Excitation System Control Cubicle (TB Elev 120')
AND **OPEN** Generator Exciter Field Breaker.

___ 4.0 Locally, **TRIP** the following:

___ 4.1 21 Steam Generator Feed Pump

___ 4.2 22 Steam Generator Feed Pump

NOTE

All breaker operations will be accomplished utilizing the Manual Trip or Close button inside breaker cubicles.

___ 5.0 **PROCEED** to No. 2G 4160 Volt Group Bus,
AND **PERFORM** the following:

___ 5.1 **VERIFY** that Breaker 2GD1TB2BGGD, 2A Aux Power Transformer Infeed Breaker, is OPEN.

___ 5.2 **VERIFY** that Breaker 2GD1TB22GSD, 22 Station Power Transformer Infeed Breaker, is CLOSED.

___ 5.3 **ENSURE** that Breaker 2GD1TB2D, 23 Heater Drain Pump, is OPEN.

ATTACHMENT 8
(Page 2 of 3)

#2 NEO

___ 6.0 **PROCEED** to No. 2F 4160 Volt Group Bus,
AND **PERFORM** the following:

___ 6.1 **VERIFY** that Breaker 2FD1TB2BFGD, 2A Aux Power Transformer Infeed Breaker, is OPEN.

___ 6.2 **VERIFY** that Breaker 2FD1TB22FSD, 22 Station Power Transformer Infeed Breaker, is CLOSED.

___ 6.3 **ENSURE** that Breaker 2FD1TB2D, 22 Heater Drain Pump, is OPEN.

___ 7.0 **PROCEED** to No. 2E 4160 Volt Group Bus,
AND **PERFORM** the following:

___ 7.1 **VERIFY** that Breaker 2ED1TB2AEGD, 2B Aux Power Transformer Infeed Breaker, is OPEN.

___ 7.2 **VERIFY** that Breaker 2ED1TB21ESD, 21 Station Power Transformer Infeed Breaker, is CLOSED.

___ 8.0 **PROCEED** to 2H 4160 Volt Group Bus,
AND **PERFORM** the following:

___ 8.1 **VERIFY** that Breaker 2HD1TB2AHGD, 2B Aux Power Transformer Infeed Breaker, is OPEN.

___ 8.2 **VERIFY** that Breaker 2HD1TB21HSD, 21 Station Power Transformer Infeed Breaker, is CLOSED.

___ 8.3 **ENSURE** that Breaker 2H1TB2D, 21 Heater Drain Pump, is OPEN.

___ 9.0 **TRIP** all BUT ONE of the following Condensate Pumps as directed by the CRS:

___ 9.1 Breaker 2ED1TB1D, 22 Condensate Pump

___ 9.2 Breaker 2FD1TB1D, 23 Condensate Pump

___ 9.3 Breaker 2HD1TB1D, 21 Condensate Pump.

___ 10.0 **PROCEED** to switchyard.

ATTACHMENT 8
(Page 3 of 3)

#2 NEO

___ 11.0 **OPEN** 500 KV Bus Section Breakers 1-9, by performing the following at Phase B of Breaker:

___ 11.1 **OPEN** rear door of cabinet

___ 11.2 **PLACE** the local switch in OPEN position.

___ 11.3 **CLOSE** rear door of cabinet.

___ 12.0 **OPEN** 500 KV Bus Section Breakers 9-10, by performing the following at Phase B of Breaker:

___ 12.1 **OPEN** rear door of cabinet

___ 12.2 **PLACE** the local switch in OPEN position.

___ 12.3 **CLOSE** rear door of cabinet.

___ 13.0 **PROCEED** to Steam Generator Feed Pumps, AND **PLACE** both SGFPs on the Turning Gears:

___ 13.1 21 Steam Generator Feed Pump

___ 13.2 22 Steam Generator Feed Pump.

NOTE

Copies of operating procedures may be obtained from the TSC.

___ 14.0 When the Main Turbine stops rotating, **PLACE** the Turning Gear in operation IAW S2.OP-SO.TRB-0004(Q), Turbine Turning Gear Operation.

___ 15.0 **NOTIFY** the CRS and STS that steps 1 through 14 of Attachment 8 are completed.

___ 16.0 **PROCEED** to the Hot Shutdown Panel and provide assistance wherever directed.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Main Steam System

TASK: Locally close a Main Steamline Isolation Valve (MS167) and operate the associated Atmospheric Steam Relief Valve (MS10)

TASK NUMBER: 1140130401

JPM NUMBER:

K/A NUMBER: APE 068 AA1.01

APPLICABILITY:
EO [ ] **RO** [X] **SRO** [X]

IMPORTANCE FACTOR: 4.3 (**RO**) 4.5 (**SRO**)

EVALUATION SETTING/METHOD: Unit Inner Penetration Area

REFERENCES: S2.OP-AB.CR-0001, Control Room Evacuation

TOOLS AND EQUIPMENT: Adjustable Wrench, Flashlight

VALIDATED JPM COMPLETION TIME: 15 minutes

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: J C Lloyd for
PRINCIPAL TRAINING SUPERVISOR

W Galley for
OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________________ **DATE:** ____________

NAME: ____________________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

DATE: ______________

SYSTEM: Main Steam

TASK: Locally close a Main Steamline Isolation Valve (MS167) and operate the associated Atmospheric Steam Relief Valve (MS10)

TASK NUMBER: 1140130401

INITIAL CONDITIONS:

1. A Control Room Evacuation has taken place due to a noxious fumes problem.
2. A manual trip was initiated from 100% power.
3. S2-OP-AB.CR-0001 is being utilized to control the plant.

INITIATING CUE:

The CRS has directed you to locally close 21MS167, place 21MS10 in LOCAL, report the status and then standby to operate 21MS10. The operations are to be accomplished IAW S2.OP-AB.CR-0001, Attachment 7, Step 9 and Step 14. The other steps of the attachment have been completed or are being performed by another operator.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

N ______________

D ______________

SYSTEM: Locally close a Main Steamline Isolation Valve (MS167) and operate the associated Atmospheric Steam Relief Valve (MS10)

TASK: 1140130401

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Evaluator should provide a marked up copy of S2.OP-AB.CR-0001, Attachment 7	Obtains a copy of the procedure [and verifies correct revision]. [ ] Evaluator option *NOTE: This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to proceeding to the next step.*		
*	1	Proceed to 21 Mn Stm & Trb Bypass Stm Gen Press Cont Pnl 684-2A: • PLACE local E/P bypass Line Selector Valve in LOCAL position • Operate hand sender in E/P line to ensure that PL-8907 indicates zero	*21MS10 selector valve to LOCAL PL-8907 should read zero		

N ______________

D ______________

SYSTEM: Locally close a Main Steamline Isolation Valve (MS167) and operate the associated Atmospheric Steam Relief Valve (MS10)

TASK: 1140130401

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	2	Fail open 21MS171, MS ISOL VLV; at No. 2 Unit Main Steam Vent VLV Control Panel 688-2A by: • Close 2CA1318, SUP TO PNL 688-2A • Close 2CA1319, SUP TO PNL 688-2A • Open drain-cock of pressure regulator for SV275 (inside Panel 688-2A)	Closes 2CA1318, SUP TO PNL 688-2A Closes 2CA1319, SUP TO PNL 688-2A Opens draincock for pressure regulator *CUE:* 21MS171 is mechanically-bound, 21MS167 did not close.		
*	3	Fail open 21MS169, MS ISOL VLV; at No. 2 Unit Main Steam Vent VLV Control Panel 689-2A by: • Close 2CA1320, SUP TO PNL 689-2A • Close 2CA1321, SUP TO PNL 689-2A • Open drain-cock of pressure regulator for SV-274 (inside Panel 689-2A)	*Closes 2CA1320, SUP TO PNL 689-2A *Closes 2CA1321, SUP TO PNL 689-2A *Opens draincock for pressure regulator *CUE:* 21MS169 failed open and 21MS167 is closed		
	4	Makes report to HSD Panel Operator	*CUE:* Open 21MS10 approximately 50%		

SYSTEM: Locally close a Main Steamline Isolation Valve (MS167) and operate the associated Atmospheric Steam Relief Valve (MS10)

TASK: 1140130401

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	5	OPERATE hand sender in E/P line to increase pressure indicated on PL-8907	*[Operates hand sender to raise air pressure]* to approx. 8-12 psig on PL-8907		

TERMINATING CUE: Reports 21MS10 open

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________

DATE: ______________________

SYSTEM: Main Steam

TASK: Locally close a Main Steamline Isolation Valve (MS167) and operate the associated Atmospheric Steam Relief Valve (MS10)

TASK NUMBER: 1140130401

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

MS10-167 JPM QUESTION #1

Due to steam being present in the vicinity of the MSIVs, the NEO has suggested closing the MSIVs by opening 125 VDC breakers for the MSIV solenoids. What would be the outcome of opening 125 VDC breakers for the MSIV solenoids?

OPEN REFERENCE

ANSWER:

The MSIVs will remain open because those solenoids are must energize to vent.

KA #: 068 AK3.18 //4.2/4.5//

Objective:	0300-000.00S-ABCR01-00, Obj. 2
	0300-000.00S-MSTEAM-00, Obj. 4f.
Reference:	Logic Diagram 239916 and others

Comments: ______________________________

MS10-167 JPM QUESTION #2

When locally operating MS10's, why is it important to coordinate with the CRS at the HSD panel?

CLOSED REFERENCE

ANSWER:

If a 100# differential pressure develops between steam generators a SI signal will be generated. [Candidate may also discuss staying within cooldown limits]

KA #: 068 AA2.08 //3.9/4.1//

Objective: 0300-000.00S-AB.CR-0001, Obj. 3.b
Reference: S2.OP-AB.CR-0001, Attachment 3

Comments: ____
____
____
____
____

THIS SHEET TO BE GIVEN TO CANDIDATE

JPM QUESTION #1

Due to steam being present in the vicinity of the MSIVs, the NEO has suggested closing the MSIVs by opening 125 VDC breakers for the MSIV solenoids. What would be the outcome of opening 125 VDC breakers for the MSIV solenoids?

OPEN REFERENCE

THIS SHEET TO BE GIVEN TO CANDIDATE

JPM QUESTION #2

When locally operating MS10's, why is it important to coordinate with the CRS at the HSD panel?

OPEN REFERENCE

INITIAL CONDITIONS:

- A Control Room Evacuation has taken place due to a noxious fumes problem.
- A manual trip was initiated from 100% power.
- S2-OP-AB.CR-0001 is being utilized to control the plant.

INITIATING CUE:

The CRS has directed you to locally close 21MS167, place 21MS10 in LOCAL, report the status and then standby to operate 21MS10. The operations are to be accomplished IAW S2.OP-AB.CR-0001, Attachment 7, Step 9 and Step 14. The other steps of the attachment have been completed or are being performed by another operator.

ATTACHMENT 7
(Page 1 of 7)

#1 NEO Operator

___ 1.0 **OBTAIN** the following:

- One copy of this procedure.
- One radio (located in Appendix "R" Cabinet)
- Key ring set and tools (Security Master, JA Master, Breaker Keyswitch, screwdriver and adjustable wrench). [C0363]

NOTE

- The following steps will be performed in Mech Pen, Elev 78'.
- The following steps assume the charging system was in a normal operating condition prior to Control Room evacuation.

___ 2.0 **REQUEST** Charging flow rate from the RO who is performing Attachment 5.

___ 3.0 **PROCEED** to 2CV70, Chg Hdr PCV Inlet Vlv, and 2CV73, Chg Hd PCV Byp Valve, AND **SIMULTANEOUSLY CLOSE** 2CV70 while **OPENING** 2CV73.

___ 4.0 After 2CV70 is CLOSED, **REQUEST** the charging flowrate from RO, AND **ADJUST** 2CV73 to the flowrate that was identified in Step 2.0.

___ 5.0 **VERIFY** that a 6-10 gpm flow is maintained for each RCP pump seal as indicated on the following:

___ 5.1 2FI144A, 21 CVC React Cool Pmp Seal Water Flow Ind

___ 5.2 2FI143A, 22 CVC React Cool Pmp Seal Water Flow Ind

___ 5.3 2FI116A, 23 CVC React Cool Pmp Seal Water Flow Ind

___ 5.4 2FI115A, 24 CVC React Cool Pmp Seal Water Flow Ind

ATTACHMENT 7
(Page 2 of 7)

#1 NEO Operator

6.0 **DEFEAT** Safety Injection by opening the following breakers:

___ 6.1 Breaker 2AVIB5, Reactor Protection Output Cabinet Train A #103 in 2A 115VAC Vital Instrument Bus for Train "A" in Relay Room Elev 100'.

___ 6.2 Breaker 2AVIB24, 2A Safeguard Emergency Cabinet.

___ 6.3 Breaker 2BVIB8, Reactor Protection Output Cabinet Train B #37 in 2B 115 VAC Vital Instrument Bus for Train "B" in Relay Room Elev 100'.

___ 6.4 Breaker 2BVIB27, 2B Safeguard Emergency Cabinet.

___ 6.5 Breaker 2CVIB9, 2C Safeguard Emergency Cabinet.

___ 7.0 **PROCEED** to the Inner Pen Area.

CAUTION

The following steps, MSIV Isolation, should be coordinated with the CRS.

___ 8.0 **PROCEED** to No. 21 Steam Gen Press Cont Pnl, 683-2A, **CLOSE** 21MS18A/S, A/S to SV587 in Pnl 683-2A.

___ 9.0 **PROCEED** to Unit No. 21 Mn Stm & Trb Bypass Stm Gen Press Cont Pnl, 684-2A, AND **PERFORM** the following for 21MS10 Atmospheric Relief Valve:

___ 9.1 **PLACE** the selector valve in E/P bypass line to LOCAL position.

___ 9.2 OPERATE hand sender in E/P line to ensure that PL-8907 indicates zero.

___ 10.0 **PROCEED** to No. 23 Steam Gen Press Cont Pnl, 683-2C, **CLOSE** 23MS18A/S, A/S to SV585 in Pnl 683-2C.

___ 11.0 **PROCEED** to 23 Mn Stm & Trb Bypass Stm Gen Press Cont Pnl, 684-2C, AND **PERFORM** the following for 23MS10 Atmospheric Relief Valve:

___ 11.1 **PLACE** the selector valve in E/P bypass line to LOCAL position.

___ 11.2 **OPERATE** hand sender in E/P line to ensure that PL-8909 indicates zero.

ATTACHMENT 7
(Page 3 of 7)

#1 NEO Operator

___ 12.0 At 23MS18, **OPEN** the drain cock on the pressure regulator.

___ 13.0 At 21MS18, **OPEN** the drain cock on the pressure regulator.

___ 14.0 **PERFORM** either of the following to Main Steam Isolate 21MS167, MS ISOL VLV:

NOTE
It is only necessary to fail either 21MS171 or 21MS169 to CLOSE 21MS167.

CAUTION
Steam hazard when opening 21MS169 or 21MS171 because of telltale leakoff drain pinholes downstream of valves.

___ 14.1 **PERFORM** the following to fail open 21MS171, MS ISO V STEAM ASSIST, at No. 2 Unit Main Stm Vent Vlv Control Panel 688-2A:

___ A **CLOSE** 2CA1318, SUP TO PNL 688-2A.

___ B **CLOSE** 2CA1319, SUP TO PNL 688-2A.

___ C **OPEN** drain cock of pressure regulator for SV-275 (located inside No. 2 Unit Main Stm Vent Vlv Control Panel 688-2A).

OR

___ 14.2 **PERFORM** the following to fail open 21MS169, MS ISOL V STEAM ASSIST, at No. 2 Unit Main Stm Vent Vlv Control Panel 689-2A:

___ A **CLOSE** 2CA1320, SUP TO PNL 689-2A.

___ B **CLOSE** 2CA1321, SUP TO PNL 689-2A.

___ C **OPEN** drain cock of pressure regulator for SV-274 (located inside No. 2 Unit Main Stm Vent Vlv Control Panel 689-2A).

ATTACHMENT 7
(Page 4 of 7)

#1 NEO Operator

___ 15.0 **PERFORM** either of the following to Main Steam Isolate 23MS167, MS ISOL VLV:

NOTE

It is only necessary to fail either 23MS171 or 23MS169 to CLOSE 23MS167.

CAUTION

Steam hazard when opening 23MS169 or 23MS171 because of telltale leakoff drain pinholes downstream of valves.

___ 15.1 **PERFORM** the following to fail open 23MS171, MS ISO V STEAM ASSIST, at No. 2 Unit Main Stm Vent Vlv Control Panel 688-2C:

___ A **CLOSE** 2CA1322, SUP TO PNL 688-2C.

___ B **CLOSE** 2CA1323, SUP TO PNL 688-2C.

___ C **OPEN** drain cock of pressure regulator for SV-271 (located inside No. 2 Unit Main Stm Vent Vlv Control Panel 688-2C).

OR

___ 15.2 **PERFORM** the following to fail open 23MS169, MS ISOL V STEAM ASSIST, at No. 2 Unit Main Stm Vent Vlv Control Panel 689-2C:

___ A **CLOSE** 2CA1324, SUP TO PNL 689-2C.

___ B **CLOSE** 2CA1325, SUP TO PNL 689-2C.

___ C **OPEN** drain cock of pressure regulator for SV-270 (located inside No. 2 Unit Main Stm Vent Vlv Control Panel 689-2C).

ATTACHMENT 7
(Page 5 of 7)

#1 NEO Operator

___ 16.0 **PROCEED** to the Outer Pen Area.

CAUTION

The following steps, MSIV Isolation, should be coordinated with the CRS.

___ 17.0 **PROCEED** to 22 Mn Stm & Trb Bypass Stm Gen Press Cont Pnl 684-2B, AND **PERFORM** the following for 22MS10, Atmospheric Relief Valve:

___ 17.1 **PLACE** the selector valve in E/P bypass line to LOCAL position.

___ 17.2 **OPERATE** hand sender in E/P line to ensure that PL-8908 indicates zero.

___ 18.0 **PROCEED** to No. 22 Steam Gen Cont Pnl 683-2B, **CLOSE** 22MS18 A/S, A/S to SV581 in Pnl 683-2B.

___ 19.0 **PROCEED** to No. 24 Steam Gen Cont Pnl 683-2B, **CLOSE** 24MS18 A/S, A/S to SV583 in Pnl 683-2D.

___ 20.0 **PROCEED** to 24 Mn Stm & Trb Bypass Stm Gen Press Cont Pnl 684-2D, AND **PERFORM** the following for 24MS10, Atmospheric Relief Valve:

___ 20.1 **PLACE** the selector valve in E/P bypass line to LOCAL position.

___ 20.2 **OPERATE** hand sender in E/P line to ensure that PL-8910 indicates zero.

___ 21.0 At 22MS18, **OPEN** the drain cock on the pressure regulator.

___ 22.0 At 24MS18, **OPEN** the drain cock on the pressure regulator.

ATTACHMENT 7
(Page 6 of 7)

#1 NEO Operator

___ 23.0 **PERFORM** either of the following to Main Steam Isolate 22MS167, MS ISOL VLV:

NOTE

It is only necessary to fail either 22MS171 or 22MS169 to CLOSE 22MS167.

CAUTION

Steam hazard when opening 22MS169 or 22MS171 because of telltale leakoff drain pinholes downstream of valves.

___ 23.1 **PERFORM** the following to fail open 22MS171, MS ISO V STEAM ASSIST, inside No. 2 Unit Main Stm Vent Vlv Control Panel 688-2B:

___ A. **CLOSE** 22MS171-A/S, 22MS171 AIR SUPPLY.

___ B. **OPEN** draincock of pressure regulator for SV-281.

OR

___ 23.2 **PERFORM** the following to fail open 22MS169, MS ISO V STEAM ASSIST, inside No. 2 Unit Main Stm Vent Vlv Control Panel 689-2B:

___ A. **CLOSE** 22MS169-A/S, 22MS169 AIR SUPPLY.

___ B. **OPEN** draincock of pressure regulator for SV-280.

ATTACHMENT 7
(Page 7 of 7)

#1 NEO Operator

___ 24.0 **PERFORM** either of the following to Main Steam Isolate 24MS167, MS ISOL VLV:

> **NOTE**
>
> It is only necessary to fail either 24MS171 or 24MS169 to CLOSE 24MS167.

> **CAUTION**
>
> **Steam hazard when opening 24MS169 or 24MS171 because of telltale leakoff drain pinholes downstream of valves.**

___ 24.1 **PERFORM** the following to fail open 24MS171, MS ISO V STEAM ASSIST, inside No. 2 Unit Main Stm Vent Vlv Control Panel 688-2D:

___ A. **CLOSE** 24MS171-A/S, 24MS171 AIR SUPPLY.

___ B. **OPEN** draincock of pressure regulator for SV-285.

OR

___ 24.2 **PERFORM** the following to fail open 24MS169, MS ISO V STEAM ASSIST, inside No. 2 Unit Main Stm Vent Vlv Control Panel 689-2D:

___ A. **CLOSE** 24MS169-A/S, 24MS169 AIR SUPPLY.

___ B. **OPEN** draincock of pressure regulator for SV-284.

___ 25.0 **NOTIFY** the CRS and STA that steps 1 through 24 of Attachment 7 are completed.

___ 26.0 **REMAIN** in the Outer Pen Area.

___ 27.0 When directed by the CRS, **SLOWLY THROTTLE OPEN** 22 & 24 MS10s and **MAINTAIN** Steam Generator Pressures @ 1005 psig (Tave = 547°F), by operating the hand sender in E/P bypass line at No. 2 Unit 22 & 24 Steam Generator Press Control Panels 684-2B and 684-2D respectively.

___ 28.0 **VERIFY** opening of the MS10s by observing pressure indication on PL-8908 and PL-8910, respectfully.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem

SYSTEM: Diesel Generators

TASK: Complete actions for Diesel Generator for Shutdown Outside the Control Room

TASK NUMBER: 1140130401

JPM NUMBER:

K/A NUMBER: 068 AA1.31

IMPORTANCE FACTOR:

	RO	SRO
IMPORTANCE FACTOR:	3.9	4.0

APPLICABILITY:

EO [ ] RO [X] SRO [X]

EVALUATION SETTING/METHOD: In-plant

REFERENCES: S2.OP-AB.CR-0002, Control Room Evacuation Due To Fire In Control Room, Relay Room, Or Ceiling Of The 460/230v Switchgear Room

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 15 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ____________

APPROVED: H C Lloyd for
PRINCIPAL TRAINING SUPERVISOR

for OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________________ **GRADE:** [ ] SAT [ ] UNSAT

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________________ **DATE:** ____________

NAME: ______________________

DATE: ______________________

SYSTEM: Diesel Generators

TASK: Complete actions for Diesel Generator for Shutdown Outside the Control Room

TASK NUMBER:

INITIAL CONDITIONS:

1. A fire has occurred in the control room requiring evacuation.
2. You are the Reactor Operator.
3. The 2C 4KV bus is being supplied from off-site power.
4. The 2C D/G is not running.

INITIATING CUE:

You have been directed to perform the actions of Attachment 4 to S2.OP-AB.CR-0002. Start 2C D/G so that 2C 4KV bus can be transferred from off-site to 2C D/G. Inform the CRS when actions have been completed for 2C D/G.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: Diesel Generator

TASK: Complete actions for Diesel Generator for Shutdown Outside the Control Room

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Provide a copy of Attachment 4 of S2.OP-AB.CR-0002.	Operator obtains copy of procedure. NOTE: Category 1 procedure use requirements apply		
	1.	Obtains the required equipment.	CUE: Assume that you have all equipment required to do Attachment 4		
	2.	Establishes communication with CRS via radio.	*CUE:* Assume that communications have been established		
	3.	Proceed to 21SW21 and 22SW21, Diesel Generator Cooling Water, and report valve positions to CRS.	Determines both 21SW21 and 22SW21 are open. *CUE: Valve stem position indicates that the valve is open.*		
	4.	Proceed to 2C DG			

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Diesel Generator

TASK: Complete actions for Diesel Generator for Shutdown Outside the Control Room

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	5.	Places Fire Emergency Keylock switches to bypass.	• Places 69/1, FIRE EMERGENCY BY-PASS (Generator Control Panel) to BYPASS. • Places 69/2, FIRE EMERGENCY BY-PASS (Engine Control Panel) to BYPASS. • Places 69/3, FIRE EMERGENCY BY-PASS (Engine Control Panel) to BYPASS.		
	6.	Contacts operator at 2C 4KV bus to determine the availability of off-site power.	Contacts operator at 2C 4KV bus. *CUE: The operator at the 2C 4KV bus reports that off-site power is supplying the 2C 4KV bus.*		
	7.	Determine 2C D/G is not operating.	Verifies 2C D/G is not operating. *CUE: Provide appropriate cues that the diesel generator is not operating.*		

NAME: ____________________

DATE: ____________________

SYSTEM: Diesel Generator

TASK: Complete actions for Diesel Generator for Shutdown Outside the Control Room

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	8.	At Panel 2CDC1DA, 2C Diesel Generator Alternate DC Starter Terminal Box, place breakers to OFF.	• Places 2CDC1DA1, Normal DC to 2C D/G Engine Controls from 2CCDC-34 to OFF. • Places 2CDC1DA2, Normal DC to 2C D/G Engine Controls from 2CCDC-36 to OFF. • Places 2CDCDA5, Normal DC to 2C D/G Exciter from 2CCDC-32 to OFF.		
*	9.	At Panel 2CDC1DA, 2C Diesel Generator Alternate DC Starter Terminal Box, place breakers to ON.	• Places 2CDC1DA3, Standby DC to 2C D/G Engine Controls from 2CDCDG-10 to ON. • Places 2CDC1DA4, Standby DC to D/G Engine Controls from 2CDCDG-7 to ON. • Places 2CDC1DA6, Standby DC to 2C D/G Exciter from 2CDCDG-9 to ON.		
*	10.	At No 2A, 2B, & 2C 125 VDC Distribution Cabinet place breakers on 2CDC2DA to ON.	• Places 2CDC2DA7, 2C D/G Control & Alarm to ON. • Places 2CDC2DA9, 2C D/G Control & Excitation to ON. • Places 2CDC2DA10, 2C D/G Trip & Breaker Failure Protection to ON. • Places 2CDC2DAX1/2CDC2DA1 (mechanically interlocked) 2CDCDG 125 VDC Distribution Panel Main Breaker to ON.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Diesel Generator

TASK: Complete actions for Diesel Generator for Shutdown Outside the Control Room

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	11.	Verify the white 2C Diesel Generator Loading switch AUTO (ISOCR) indicating light is illuminated at 2PNL11832 2C Generator Control Panel.	Verifies AUTO (ISOCR) indicating light is illuminated. *CUE: If necessary, the Auto (ISOCR) indicating light is illuminated.*		
	12.	Verify the green Exciter Regulator Remote Manual-Automatic Switch AUTO indicating light is illuminated at 2PNL11833 2C Diesel Generator Eng.	Verifies Auto indicating light is illuminated. *CUE: If necessary,the AUTO indicating light is illuminated.*		
	13.	Determine if it is necessary to start 2C D/G.	Initial conditions indicated that the 2C D/G was to be started. *CUE: If the operator asks if the DG is to be started indicate that the CRS has requested that the 2C D/G be started.*		
	14.	Ensure the DUTR is RESET.	Verify DUTR indicates Reset. (2C-DF-GCP-2) *CUE: If necessary, the flag for the DUTR is Green.*		
*	15.	Start 2C D/G by placing the local diesel switch to start position.	Places the local diesel switch to START position (2C-DF-SS). *CUE: Provide indications for engine starting.*		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Diesel Generator

TASK: Complete actions for Diesel Generator for Shutdown Outside the Control Room

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	16.	Verify EDG Voltage and Speed lights are illuminated.	Verifies the following lights are illuminated: • 2DAE38-LT2 EDG Voltage • 2DAE38-LT3 EDG Speed *CUE: EDG Voltage and EDG Speed lights are illuminated.*		
	17.	Notify operators at 4KV Switchgear and CRS that 2C diesel is operating.	Notifies operators at 4KV switchgear and CRS the 2C D/G is operating. *CUE: The operator at the 4KV switchgear and the CRS acknowledge the 2C D/G is operating.*		

TERMINATING CUE: The 4KV Operator and the CRS are notified 2C D/G is available for further loads.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: Diesel Generators

TASK: Complete actions for Diesel Generator for Shutdown Outside the Control Room

TASK NUMBER:

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

EDG JPM QUESTION #1

What is the effect on the Diesel Generator Area Ventilation if DC power is not available to a DG Control Panel?

OPEN REFERENCE

ANSWER:

If the 125 VDC to any Diesel Control Panel is unavailable, the associated fans and dampers will not be automatically locked out by a Fire Suppression Actuation.

KA #: 063 K2.01 //2.9/3.1//

Objective: 0300-000.00S-EDGOOO-00, 12
Reference: S2.OP-SO.DGV-0001, Page 3

Comments: ____
____
____
____
____

EDG JPM QUESTION #2

What, if any, is the difference in the purpose of the FIRE EMERGENCY BYPASS switches on the EDG control panel as compared to the Diesel Generator Supply Fans EMERGENCY BYPASS OF CO2 SHUTDOWN switches on the RP-5 Panel in the Control Room?

OPEN REFERENCE

ANSWER: The FIRE EMERGENCY BYPASS switches allow local control of the EDG, bypassing wiring and controls that could be damaged in a fire. The EMERGENCY BYPASS OF CO2 SHUTDOWN switches allow operation of the DGV equipment in the event that EDG operation is necessary and the DGV equipment is locked out by actual CO2 actuation or equipment failure (earthquake induced).

LESSON: 300-000.00S-EDG000, Obj. 7.b & 8.b
K/A: 064 K4.02 – 3.9/4.2
REFERENCE: S2.OP-AB.CR-0002
S.2.OP-SO.DGV-0001

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

JPM QUESTION #1

What is the effect on the Diesel Generator Area Ventilation if DC power is not available to a DG Control Panel?

OPEN REFERENCE

THIS SHEET TO BE GIVEN TO CANDIDATE *

JPM QUESTION #2

What, if any, is the difference in the purpose of the FIRE EMERGENCY BYPASS switches on the EDG control panel as compared to the Diesel Generator Supply Fans EMERGENCY BYPASS OF CO2 SHUTDOWN switches on the RP-5 Panel in the Control Room?

OPEN REFERENCE

INITIAL CONDITIONS:

1. A fire has occurred in the control room requiring evacuation.
2. You are the Reactor Operator.
3. The 2C 4KV bus is being supplied from off-site power.
4. The 2C D/G is not running.

INITIATING CUE:

You have been directed to perform the actions of Attachment 4 to S2.OP-AB.CR-0002. Start 2C D/G so that 2C 4KV bus can be transferred from off-site to 2C D/G. Inform the CRS when actions have been completed for 2C D/G.

REACTOR OPERATOR

___ 1.0 **OBTAIN** the following:

- One copy of this procedure
- One radio
- One emergency flashlight
- Key ring set and tools (Security Master, Key #5 [T112], and adjustable wrench). **[C0363]**

> **NOTE**
>
> Communication with the CRS and TSC may not be established at first due to the time needed to man the facility. This delay is not a hold point.

___ 2.0 **ESTABLISH** communication with the CRS and TSC via radio.

___ 3.0 **PROCEED** to 21SW21 and 22SW21, Diesel Generator Cooling Water, AND **REPORT** valve positions to CRS.

___ 4.0 **PROCEED** to 2C D/G.

> **NOTE**
>
> The following step will reinstate all non-SEC trips for the diesel and may result in the diesel tripping if it is operating, with no service water.

___ 5.0 **PLACE** the following Keylock switches in BYPASS:

___ 5.1 69/1, FIRE EMERGENCY BY-PASS (Generator Control Panel)

___ 5.2 69/2, FIRE EMERGENCY BY-PASS (Engine Control Panel)

___ 5.3 69/3, FIRE EMERGENCY BY-PASS (Engine Control Panel)

REACTOR OPERATOR

NOTE

The Operator at 2C 4KV Bus will provide information about the availability of Off-site Power.

6.0 Is Off-site Power supplying 2C 4KV Bus?

___ NO ___ YES ——> **GO TO** Step 8.0

↓

___ Time

___ 7.0 **REQUEST** 4KV Vital Bus Operator to perform the following at 2C 4KV Vital Bus:

___ 7.1 **REMOVE** all loads with the exception of the 460/230 transformer

___ 7.2 **OPEN** the 2C Diesel Output Breaker.

8.0 Is 2C D/G operating?

___ YES ___ NO ——> **GO TO** Step 10.0

↓

___ Time

___ 9.0 <u>WHEN</u> notified by the 4KV Vital Bus Operator 2C 4KV Bus is stripped, <u>THEN</u> **STOP** 2C Diesel Generator, by **PLACING** the local diesel switch to STOP position. (2C-DF-SS)

___ 10.0 **PERFORM** the following at Panel 2CDC1DA, 2C Diesel Generator Alternate DC Starter Terminal Box:

___ 10.1 **PLACE** the following breakers in OFF:

___ A. 2CDC1DA1, Normal DC to 2C D/G Engine Controls from 2CCDC-34

___ B. 2CDC1DA2, Normal DC to 2C D/G Engine Controls from 2CCDC-36

___ C. 2CDC1DA5, Normal DC to 2C D/G Exciter from 2CCDC-32

ATTACHMENT 4
(Page 3 of 11)

REACTOR OPERATOR

___ 10.2 **PLACE** the following breakers in ON:

___ A. 2CDC1DA3, Standby DC to 2C D/G Engine Controls from 2CDCDG-10

___ B. 2CDC1DA4, Standby DC to 2C D/G Engine Controls from 2CDCDG-7

___ C. 2CDC1DA6, Standby DC to 2C D/G Exciter from 2CDCDG-9

___ 11.0 **PLACE** the following breakers at 2CDC2DA, NO 2A, 2B, & 2C 125 VDC Distribution Cabinet, in ON:

___ 11.1 2CDC2DA7, 2C D/G Control & Alarm

___ 11.2 2CDC2DA9, 2C D/G Control & Excitation

___ 11.3 2CDC2DA10, 2C D/G Trip & Breaker Failure Protection

___ 11.4 2CDC2DAX1/2CDC2DA1 (mechanically interlocked) 2CDCDG 125 VDC Distribution Panel Main Breaker.

___ 12.0 **VERIFY** the white 2C Diesel Generator Loading switch AUTO (ISOCR) indicating light is illuminated at 2PNL11832 2C Generator Control Panel.

___ 13.0 **VERIFY** the green Exciter Regulator Remote Manual-Automatic Switch AUTO indicating light is illuminated at 2PNL11833 2C Diesel Generator Eng.

14.0 Is it necessary to start 2C D/G?

___ YES ___ NO ——> **GO TO** Step 26.0

V

______ Time

NOTE
Local "ALARM PANEL", Alarms <u>MUST</u> be reset first.

___ 15.0 **ENSURE** the DUTR is RESET. (2C-DF-GCP-2)

ATTACHMENT 4
(Page 4 of 11)

REACTOR OPERATOR

___ 16.0 **START** 2C D/G by **PLACING** the local diesel switch to START position. (2C-DF-SS)

___ 17.0 **VERIFY** the following lights are illuminated:

- 2DAE38-LT2 EDG Voltage
- 2DAE38-LT3 EDG Speed

___ 18.0 **NOTIFY** the Operators at the 4KV Switchgear and the CRS, 2C Diesel is operating.

NOTE

Adequate time should be allotted for the 4KV Operator to close the 2C Diesel Output and 26 Service Water Pump breakers.

CAUTION

A diesel may run for up to 30 minutes unloaded with no service water, but will trip in approximately 5 minutes if operating in a loaded condition.

19.0 Is Service Water available as indicated on 2DP9632I, 23 Service Water Diesel Gen Lube Oil Cooler & Jkt Wtr Ht Exch DP Ind, on Panel 704-2BB.

___ NO ___ YES ——> **GO TO** Step 25.0 ______ Time
|
V

20.0 Is 2C Diesel operating with a load as indicated on 2WM180?

___ NO ___ YES ——> **GO TO** Step 23.0 ______ Time
|
V

REACTOR OPERATOR

21.0 Has 2C Diesel been operating without a load for >25 minutes?

___ NO ___ YES ——> **GO TO** Step 23.0

↓

___ Time

___ 22.0 **NOTIFY** the CRS and 4KV Operator SW valve lineup is not correct. THEN **GO TO** Step 19.0

___ Time

___ 23.0 **PERFORM** the following to STOP 2C D/G:

___ 23.1 **REQUEST** 4KV Vital Bus Operator at 2C 4KV Vital Bus to OPEN the 2C Diesel Output Breaker.

___ 23.2 When notified by the 4KV Vital Bus Operator 2C Diesel Output Breaker is OPEN, **PLACE** the local diesel switch to STOP position. (2C-DF-SS)

___ 24.0 When notified by the CRS the SW valve lineup is correct, **GO TO** Step 15.0.

___ Time

___ 25.0 **NOTIFY** 4KV Operator, 2C D/G is available for further loads.

___ 26.0 **PROCEED** to 2A EDG.

NOTE

The following step will reinstate all non-SEC trips for the diesel.

___ 27.0 **PLACE** following Keylock switches in BYPASS

___ 27.1 69/1, FIRE EMERGENCY BY-PASS (Generator Control Panel)

___ 27.2 69/2, FIRE EMERGENCY BY-PASS (Engine Control Panel)

___ 27.3 69/3, FIRE EMERGENCY BY-PASS (Engine Control Panel)

REACTOR OPERATOR

NOTE
The Operator at 2A 4KV Bus will provide information about the availability of Off-site Power.

28.0 Is Off-site power supplying the 2A 4KV Bus?

___ NO ___ YES ——> **GO TO** Step 30.0 ____ Time

V

___ 29.0 **REQUEST** 4KV Bus Operator to perform the following at 2A 4KV Vital Bus:

___ 29.1 **REMOVE** all loads with the exception of the 460/230V transformer.

___ 29.2 **OPEN** the 2A Diesel Output Breaker.

30.0 Is 2A D/G operating?

___ YES ___ NO ——> **GO TO** Step 32.0 ____ Time

V

___ 31.0 WHEN notified by the 4KV Vital Bus Operator 2A 4KV Bus is stripped, THEN **STOP** 2A Diesel Generator by **PLACING** the local diesel switch in STOP. (2A-DF-SS)

___ 32.0 **PERFORM** the following at Panel 2ADC1DA, 2A Diesel Generator Alternate DC Starter Terminal Box:

___ 32.1 **PLACE** the following breakers in OFF:

___ A. 2ADC1DA1, Normal DC to 2A D/G Engine Controls from 2AADC-26

___ B. 2ADC1DA2, Normal DC to 2A D/G Engine Controls from 2AADC-28

___ C. 2ADC1DA5, Normal DC to 2A D/G Exciter from 2AADC-24

REACTOR OPERATOR

___ 32.2 **PLACE** the following breakers in ON:

___ A. 2ADC1DA3, Standby DC to 2A D/G Engine Controls from 2CDCDG-2

___ B. 2ADC1DA4, Standby DC to 2A D/G Engine Controls from 2CDCDG-4

___ C. 2ADC1DA6, Standby DC to 2A D/G Exciter from 2CDCDG-3

___ 33.0 **PLACE** the following breakers at 2CDC2DA, NO 2A, 2B, & 2C 125VDC Distribution Cabinet, in ON:

___ 33.1 2CDC2DA2, 2A D/G Trip & Breaker Failure Protection

___ 33.2 2CDC2DA3, 2A D/G Control & Excitation

___ 33.3 2CDC2DA4, 2A D/G Control & Alarm

___ 34.0 **VERIFY** the white 2A Diesel Generator Loading switch AUTO (ISOCR) indicating light is illuminated at 2PNL11829 2A Generator Control Panel.

___ 35.0 **VERIFY** the green Exciter Regulator Remote Manual-Automatic Switch AUTO indicating light is illuminated at 2PNL11829 2A DG Eng Control Panel.

36.0 Is it necessary to start 2A D/G?

___ YES ___ NO ——> **GO TO** Step 41.0

|
V

______
Time

NOTE

Local "ALARM PANEL", Alarms MUST be reset first.

___ 37.0 **ENSURE** the DUTR is RESET. (2A-DF-GCP-2)

___ 38.0 **START** 2A Diesel Generator by **PLACING** the local diesel switch in START. (2A-DF-SS)

REACTOR OPERATOR

___ 39.0 **VERIFY** the following lights are illuminated on Generator Control Panel:

- 2DAE4-LT2 Voltage
- 2DAE4-LT3 Speed

___ 40.0 **NOTIFY** the Operators at the 4KV Switchgear and the CRS 2A Diesel is operating.

___ 41.0 **PROCEED** to 2B D/G.

NOTE

The following step will reinstate all non-SEC trips for the diesel.

___ 42.0 **PLACE** the following Keylock switches in BYPASS:

___ 42.1 69/1, FIRE EMERGENCY BY-PASS, (Generator Control Panel)

___ 42.2 69/2, FIRE EMERGENCY BY-PASS (Engine Control Panel)

___ 42.3 69/3, FIRE EMERGENCY BY-PASS (Engine Control Panel)

NOTE

The Operator at 2B 4KV Bus will provide information about the availability of Off-site Power.

43.0 Is Off-site power supplying the 2B 4KV Bus?

___ NO ___ YES ——> **GO TO** Step 45.0 ______ Time

V

___ 44.0 **REQUEST** 4KV Vital Bus Operator to perform the following at 2B 4KV Vital Bus:

___ 44.1 **REMOVE** all loads with the exception of the 460/230V transformer.

___ 44.2 **OPEN** the 2B Diesel Output Breaker.

REACTOR OPERATOR

45.0 Is 2B D/G operating?

___ YES ___ NO ——> **GO TO** Step 47.0

Time

___ 46.0 WHEN notified by the 4KV Bus Operator the 2B 4KV Bus is stripped, THEN **STOP** 2B Diesel Generator by **PLACING** the local diesel switch to STOP position. (2C-DF-SS)

___ 47.0 **PERFORM** the following at Panel 2BDC1DA, No 2B Diesel Generator Alternate DC Starter Terminal Box:

___ 47.1 **PLACE** the following breakers in OFF:

___ A. 2BDC1DA1, Normal DC to 2B D/G Engine Controls from 2BBDC-6

___ B. 2BDC1DA2, Normal DC to 2B D/G Engine Controls from 2BBDC-8

___ C. 2BDC1DA5, Normal DC to 2B D/G Exciter from 2BBDC-4

___ 47.2 **PLACE** the following breakers in ON:

___ A. 2BDC1DA3, Standby DC to 2B D/G Engine Controls from 2CDCDG-6

___ B. 2BDC1DA4, Standby DC to 2B D/G Engine Controls from 2CDCDG-8

___ C. 2BDC1DA6, Standby DC to 2B D/G Exciter from 2CDCDG-5

___ 48.0 **PLACE** the following at 2CDC2DA, No 2A, 2B, & 2C Diesel Generator Standby 125VDC Distribution Panel in ON:

___ 48.1. 2CDC2DA5, 2B D/G Control and Excitation

___ 48.2. 2CDC2DA6, 2B D/G Trip & Breaker Failure Protection

___ 48.3. 2CDC2DA8, 2B D/G Control and Alarm

___ 49.0 **VERIFY** the white 2B Diesel Generator Loading switch AUTO (ISOCR) indicating light is illuminated at 2PNL11831 2B Generator Control Panel.

REACTOR OPERATOR

___ 50.0 **VERIFY** the green Exciter Regulator Remote Manual-Automatic Switch AUTO indicating light is illuminated at 2PNL11831 2B DG Eng Control Panel.

51.0 Is it necessary to start 2B D/G?

___ YES ___ NO ——> **GO TO** Step 56.0

↓

___
Time

> **NOTE**
>
> Local "ALARM PANEL", Alarms MUST be reset first.

___ 52.0 **ENSURE** the DUTR is RESET.

___ 53.0 **START** 2B Diesel Generator by **PLACING** the local diesel switch to START position. (2B-DF-SS)

___ 54.0 **VERIFY** the following lights are illuminated:

- 2DAE23-LT2 EDG Voltage
- 2DAE23-LT3 EDG Speed

___ 55.0 **NOTIFY** the CRS and 4KV Switchgear Operators 2B Diesel is operating.

___ 56.0 **NOTIFY** the CRS and STA, Steps 1 through 55 of Attachment 4 are completed.

57.0 Are any diesels operating?

___ YES ___ NO ——> **GO TO** Step 8.0

↓

___
Time

ATTACHMENT 4
(Page 11 of 11)

REACTOR OPERATOR

___ 58.0 **VERIFY** the following parameters for each operating diesel every 60 minutes:

- 2A EDG Voltage is between 3950 and 4580 volts as indicated on 2VM189.
- 2A EDG Frequency is between 58.8 and 61.2 HZ as indicated on 2FM186.
- 2A EDG load is less then 2600 KW as indicated on 2WM182.
- 2B EDG Voltage is between 3950 and 4580 volts as indicated on 2VM195.
- 2B EDG Frequency is between 58.8 and 61.2 HZ as indicated on 2FM192.
- 2B EDG load is less then 2600 KW as indicated on 2WM181.
- 2C EDG Voltage is between 3950 and 4580 volts as indicated on 2VM201.
- 2C EDG Frequency is between 58.8 and 61.2 HZ as indicated on 2FM198.
- 2C EDG load is less then 2600 KW as indicated on 2WM180.
- Fuel Oil Day Tank levels are being maintained greater than 27 inches.

___ 59.0 IF Fuel Oil Day Tanks are NOT being maintained greater than 27 inches, THEN **PERFORM** the following at 2BY1DA3D, 22 Fuel Oil Transfer Pump, on 2BY1DA No. 2B Diesel Generator 230V Vital Control Center:

___ 59.1 **OPEN** breaker,
AND **OPEN** breaker door.

___ 59.2 **PLACE** Emerg/Norm switch in EMERGENCY position.

___ 59.3 **ENSURE** Red Emergency Light illuminates.

___ 59.4 **CLOSE** breaker door.

___ 59.5 **CYCLE** breaker as necessary to start and stop 22 Fuel Oil Transfer Pump.

___ 60.0 **PROCEED** to Hot Shutdown Panel when relieved by NEO.

In plant JPMs

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: 115 VAC Vital Instrumentation

TASK: Startup Vital Instrument Inverter - Alternate Source Startup and Return the Inverter to Normal

TASK NUMBER: 0625040104

JPM NUMBER: 2-9 (112)

K/A NUMBER: 062 A407

APPLICABILITY: EO [X] RO [X] SRO [X]

IMPORTANCE FACTOR:

	RO	SRO
IMPORTANCE FACTOR	3.1*	3.1*

EVALUATION SETTING/METHOD: Auxiliary Building, Simulate

REFERENCES: S2.OP-SO.115-0011 (-0015) Vital Instrument Bus UPS System Operation

TOOLS AND EQUIPMENT:

VALIDATED JPM COMPLETION TIME: 15 mins.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ____________

APPROVED: J C Kloz for ____________ for ____________

PRINCIPAL TRAINING SUPERVISOR — OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission from the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________ **GRADE:** [ ] SAT [ ] UNSAT

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________ **DATE:** ____________

NAME: ____________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

DATE: ______________________

SYSTEM: 115 VAC Vital Instrumentation

TASK: Startup Vital Instrument Inverter - Alternate Source Startup and Return the Inverter to Normal

TASK NUMBER: 0625040104

INITIAL CONDITIONS:

1. 2A Vital Instrument Bus Inverter is powering its associated bus with Regulator AC INPUT breaker CB301 open.

INITIATING CUE:

The CRS directs you to energize the AC Line Regulator with 2A Inverter supplying its bus.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: 115 VAC Vital Instrumentation

TASK: Startup Vital Instrument Inverter – Alternate Source Startup and Return the Inverter to Normal

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Operator locates or is provided with the correct procedure and Section 5.9: Energizing the AC line Regulator with Inverter Supplying 2A 115 V Vital Instrument Bus NOTE: This JPM is written using the 2A inverter. It may be conducted on ANY Vital Instrument Bus Inverter. The other Vital Bus #'s will be provided in parentheses following the 2A #'s. The evaluator should insure the inverter specific breakers are located.	Operator obtains copy of S2.OP-SO.115-0011 (0012, 0013, 0014) *NOTE:* ***This is a Category I procedure. Work Standards require that the operator refer to the procedure at each step of the task. Individual step documentation shall be complete prior to proceeding to the next step.***		
	1.A	ENSURE the following: • 2AY1AX9Y (2BY1AX6Y/2CY1AX7Y/2BY1AX6Y), 2A (B&D/C/B&D) VITAL INSTRUMENT BUS POWER SUPPLY (ALTERNATE), is CLOSED (2A (B/C/B) 230V Vital Bus, Elev. 84' Swgr Rm).	At 2A (B/C/B) 230 V Vital Bus verifies 2AY1AX9A (2BY1AX6Y/2CY1AX7Y/2BY1AX6Y) is closed.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: 115 VAC Vital Instrumentation

TASK: Startup Vital Instrument Inverter – Alternate Source Startup and Return the Inverter to Normal

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	.B	• MAN. BYPASS switch is set to BYP TO PREF ("2A (B/C/D) Vital Instrument Bus Reg & Static SW Panel). ***EVALUATOR:*** There are caution stickers on this switch that are not described/explained in the procedure. If this becomes a concern to the candidate then tell them the caution stickers were installed by the manufacturer and are related to potential electrical hazards encountered during maintenance---continue with the procedure.	At Static Switch panel verifies Man Bypass switch is in BYP TO PREF position. *CUE:* Switch is in BYP TO PREF		
	.C	• TEST TRANSFER toggle switch is set to N	At Static Switch panel verifies Toggle switch set to N position.		
	2	PLACE MAN. BYPASS switch in preferred ISOLATE.	Indicates taking Man Bypass switch to ISOLATE position.		
	3	CLOSE 2AVII2A3 (2BVII2B3/2CVII2C3/2DVII2D3), NO. 2A (B/C/D) VITAL INSTR BUS INVERTER ALT AC INPUT BREAKER (CB301).	At inverter, indicates taking CB301 to ON.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: 115 VAC Vital Instrumentation

TASK: Startup Vital Instrument Inverter – Alternate Source Startup and Return the Inverter to Normal

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	4	PLACE MAN. BYPASS switch in BYP TO PREF.	Indicates taking Man Bypass switch to BYP TO PREF position.		
	5	IF STATIC SWITCH ON ALTERNATE (white) lamp is illuminated, THEN PRESS THE RESET pushbutton.	If light is lit, depresses RESET pushbutton.		

NAME: ______________________

DATE: ______________________

SYSTEM: 115 VAC Vital Instrumentation

TASK: Startup Vital Instrument Inverter – Alternate Source Startup and Return the Inverter to Normal

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	6	PRESS ALARM CONTACT RESET pushbutton, <u>AND</u> ...	Presses Alarm Contact Reset button. AND Verifies the following light status: ***It may be necessary for the Evaluator to provide necessary CUES*** <u>At 2A (B/C/D) Instrument Bus Rectifier Panel</u> • REG AC OUTPUT AVAILABLE - lit (RED) • REG AC OUTPUT LOW/FAIL - NOT lit (WHITE) <u>At Vital Instr Bus Reg & Static SW panel</u> • LOW AIR FLOW - NOT lit • SYNCHRONIZED - lit (RED) • SYNC MONITOR - NOT lit (CLEAR) • REG AC INPUT AVAILABLE - lit (RED) • STATIC SWITCH ON INVERTER –lit (RED) • STATIC SWITCH ON ALTERNATE - NOT lit (WHITE) • Aux Alarm Typewriter Point 0147 (0155/0134/0159), 2A (B/C/D) VITAL INSTR BUS INV TROUBLE - clear *CUE:* 2A Vital Instr Bus Inv Trbl is clear		

NAME: ____________________

DATE: ____________________

SYSTEM: 115 VAC Vital Instrumentation

TASK: Startup Vital Instrument Inverter – Alternate Source Startup and Return the Inverter to Normal

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	7	ROTATE the SOURCE SELECTOR switch to LINE **AND** ...	Rotates Source Selector switch to LINE position, AND ENSURES: • AC OUTPUT VOLTS: 115 – 130 VAC *CUE:* Per existing reading or 125 VAC • AC OUTPUT FREQ: 59.5 – 60.5 Hz *CUE:* Per existing reading or 60 Hz		
	8	ROTATE the SOURCE SELECTOR switch to OUTPUT.	Rotates Source Selector switch to OUPUT position.		
*	9	PLACE the MAN. BYPASS switch in NORMAL	Indicates taking Man Bypass switch to NORMAL position.		
	10	ENSURE 2A Vital Instrument Bus UPS System status is IAW conditions specified in Attachment 1, STATUS ON NORMAL SOURCE column.	Verifies indications agree with STATUS ON NORMAL SOURCE positions IAW Attachment 1 (Attachment 2 for C/D), Sections 1.0, 2.0 & 3.0.		
	11	Notify the NCO that 2A (B/C/D)Vital Instrument Bus AC Line Regulator is available to the 2A (B/C/D) Vital Instrument Bus.	Notifies NCO of Inverter/Regulator status.		

Terminating Cue: Candidate notifies the NCO that 2A (2B, 2C, 2D) Vital Instrument Bus AC Line Regulator is available to the 2A (2B, 2C, 2D) Vital Instrument Bus.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ______________________
DATE: ______________________

SYSTEM: Vital 115 VAC

TASK: Startup Vital Instrument Inverter - Alternate Source Startup and Return the Inverter to Normal

TASK NUMBER: 0625040104

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ______________________

RESPONSE: ______________________

RESULT: ☐ -SAT ☐ -UNSAT

JPM QUESTION #1

The 2A Instrument Inverter Manual Bypass Switch is in the ISOLATE (Preferred) position. Describe how this position differs from the NORMAL and BYP TO PREF positions.

OPEN REFERENCE

ANSWER:

In the NORMAL position the inverter will automatically transfer to the AC Line Regulator. The BYP TO PREF position and the ISOLATE (Preferred) position both prevent transfer from the Inverter to the AC Line Regulator. The ISOLATE (Preferred) position will isolate power from both power sources to the static switch.

KA #: 062 K4.10 //3.1/3.5//

Objective: 0300-000.00S-115VAC-00, Obj. 6
Reference: S2.OP-SO.115-0011, Exhibit 1.

Comments: ____________________
____
____
____
____

Inverter JPM QUESTION #2

Precaution and Limitation 3.5 of S2.OP-SO.115-0014 states the following:
2RH20, RHR HX BYPASS VALVE, may open when transferring 2D Vital Instrument Bus from Inverter to the AC Line Regulator or when transferring from AC Line Regulator to Inverter.

Assume the RCS is being cooled by RHR and 2RH20 is being used to control temperature. What is the alternative means of controlling RCS temperature if 2RH20 fails open during one of the evolutions described in the precaution?

OPEN REFERENCE

ANSWER: Control RHR HX CCW flow utilizing CC15.

OBJECTIVE: 300-000.00S-115VAC, Obj. 13.b.(i)
K/A: 062A2.10 – 3.0/3.3
REFERENCE: S2.OP-AB.115-0004, Attachment and/or P&ID 205332 (RHR)/205331(CCW)

THIS SHEET TO BE GIVEN TO CANDIDATE

JPM QUESTION #1

The 2A Instrument Inverter Manual Bypass Switch is in the ISOLATE (Preferred) position. Describe how this position differs from the NORMAL and BYP TO PREF positions.

OPEN REFERENCE

THIS SHEET TO BE GIVEN TO CANDIDATE

Inverter JPM QUESTION #2

Precaution and Limitation 3.5 of S2.OP-SO.115-0014 states the following:
2RH20, RHR HX BYPASS VALVE, may open when transferring 2D Vital Instrument Bus from Inverter to the AC Line Regulator or when transferring from AC Line Regulator to Inverter.

Assume the RCS is being cooled by RHR and 2RH20 is being used to control temperature. What is the alternative means of controlling RCS temperature if 2RH20 fails open during one of the evolutions described in the precaution?

OPEN REFERENCE

INITIAL CONDITIONS:

1. Vital Instrument Bus Inverter 2A is powering its associated bus with Regulator AC INPUT breaker CB301 open.

INITIATING CUE:

The CRS directs you to energize the AC Line Regulator with 2A Inverter supplying its bus.

2A VITAL INSTRUMENT BUS
UPS SYSTEM OPERATION

PSE&G CONTROL COPY # 0026

CONTROL COPY #
10-23
OM

USE CATEGORY : I

REVISION SUMMARY

- Revised the wording for Prerequisite 2.5 to include energizing the AC Line Regulator. **(R16256)**
- Revised Step 3.5 and added Step 3.6 to list conditions for operability of the Vital Instrument Bus. This will give more guidance to operations personnel for determining bus status and to ensure Tech Spec compliance. **(R18027)**
- Step 5.1.1.A.2, changed "ON" to "CLOSED" for 2ASDIB7. (Review Comment)
- Added Step 5.1.2 to remove 2A V.I.B. loads prior to deenergizing the bus. (Review Comment, approved change to 2D VIB procedure)
- Steps 5.2.1.C and 5.6.1.B, changed "ON" to "CLOSED" for 2ADC1AX3. (Review Comment)
- Added new Section 5.3 to allow the 2A Vital Instrument Bus to be energized from the AC Line Regulator while the inverter is out of service (AC operation only). Revision Bars are not used for this change. Also, added Step 1.3 to purpose section to align with new section 5.3. **(R17907)**
- Added Steps 5.4.8 and 5.7.10 to notify Controls to reset 21 Hydrogen Analyzer. (Review Comment)
- Added caution statement to Section 5.10 to inform operations that the VIB is inoperable when powered by its 125VDC Battery Backup power supply. The caution also lists the applicable Tech Specs. **(R18025)**
- Incorporated the latest format and content standards IAW the current site writer's guide. Revision bars are not used for these changes.

IMPLEMENTATION REQUIREMENTS

- Effective Date September 23, 1997

APPROVED: [signature] for **Operations Manager** Sept. 9, 1997 **Date**

2A VITAL INSTRUMENT BUS
UPS SYSTEM OPERATION

TABLE OF CONTENTS

CONTROL COPY #

TABLE OF CONTENTS (Continued)

1.0 PURPOSE

1.1 To provide the instructions necessary to perform the following:

1.1.1 Remove 2A Vital Instrument Bus UPS System from service.

1.1.2 Place 2A Vital Instrument Bus UPS System in service.

1.1.3 Place 2A Vital Instrument Bus AC Line Regulator in service.

1.1.4 Manually transfer 2A 115V Vital Instrument Bus from Inverter to AC Line Regulator.

1.1.5 Deenergize Inverter and Rectifier.

1.1.6 Energize Inverter and Rectifier.

1.1.7 Deenergize AC Line Regulator.

1.1.8 Energize AC Line Regulator.

1.1.9 Manually transfer 2A 115V Vital Instrument Bus from AC Line Regulator to Inverter.

1.1.10 Operate Inverter from 125VDC Battery Backup Power Supply.

1.1.11 Return 2A Vital Instrument Bus UPS System to normal following operation from 125VDC Battery Backup Power Supply.

1.1.12 2A Vital Instrument Bus UPS System operation following automatic transfer.

1.2 This procedure is applicable in any Mode.

2.0 PREREQUISITES

jlh 2.1 IF sections of this procedure are NOT to be performed, THEN **IDENTIFY** these sections with "N/A".

jlh 2.2 **REVIEW** Components "Off Normal and Off Normal Tagged" list(s) for the system and support system(s) associated with the evolution to be performed in this procedure.

jlh 2.3 **REVIEW** the following Technical Specifications for applicability to the section(s) to be performed:

- 3.4.10.3, Overpressure Protection System (RCS $\leq$312°F)
- 3.8.2.1, A.C. Distribution - Operating
- 3.8.2.2, A.C. Distribution - Shutdown

2.4 WHEN deenergizing 2A 115V Vital Instrument Bus and removing 2A Vital Instrument Bus UPS System from service (Section 5.1), THEN **EVALUATE** the effects of deenergizing loads powered from 2A 115V Vital Instrument Bus.

2.5 WHEN placing 2A Vital Instrument Bus UPS System OR AC Line Regulator in service AND energizing 2A 115V Vital Instrument Bus (Sections 5.2, 5.3), THEN **ENSURE** the following:

2.5.1 ALL loads are removed from 2A 115V Vital Instrument Bus.

2.5.2 IF a temporary power supply is installed, THEN the temporary power supply is DEENERGIZED, AND temporary power leads are DISCONNECTED by Electrical Maintenance.

3.0 PRECAUTIONS AND LIMITATIONS

___ 3.1 Procedure use and adherence policy as found in NC.NA-AP.ZZ-0001(Q), Nuclear Procedure System, is applicable to this procedure.

___ 3.2 DO NOT attempt to use the Manual Bypass (MAN.BYPASS) switch to transfer inverter load. Use of the Manual Bypass switch will result in inverter failure.

___ 3.3 DO NOT operate 2A Vital Instrument Bus Inverter with the 125VDC battery backup power supply deenergized.

___ 3.4 IF STATIC SWITCH ON INVERTER (red) lamp AND STATIC SWITCH ON ALTERNATE lamp (white) are both extinguished, THEN actual Static Switch status is indeterminate, AND SNSS/NSS notification is required.

___ 3.5 IF in Modes 1 - 4, THEN 2A Vital Instrument Bus and POPS CH I are OPERABLE when: [Reference: Technical Specification 3.8.2.1 and FSAR Section 7.6.3.3 (POPS)]

- 2A Vital Instrument Bus is powered by its Inverter.
- 2A Vital Instrument Bus Inverter is connected to 2A 125VDC Bus.

___ 3.6 IF in Modes 5 or 6,
THEN 2A Vital Instrument Bus and POPS CH I are OPERABLE when:
[Reference: Technical Specification 3.8.2.2 and FSAR Section 7.6.3.3 (POPS)]

- 2A Vital Instrument Bus is powered by its Inverter.
- 2A Vital Instrument Bus Inverter is connected to 2A 125VDC Bus.
- 2A Vital Bus is aligned to an OPERABLE Diesel Generator.

4.0 EQUIPMENT/MATERIAL REQUIRED

4.1 Additional Tools and Equipment:

- UHF Manual Transfer Switch Panel key (Sections 5.1, 5.2)
- 2A Vital Instrument Bus UPS Panels door key (Sections 5.2, 5.6, 5.12)

5.9 Energizing AC Line Regulator with Inverter Supplying 2A 115V Vital Instrument Bus

___ 5.9.1 **ENSURE** the following:

___ A. 2AY1AX9Y, 2A VITAL INSTRUMENT BUS POWER SUPPLY (ALTERNATE), is CLOSED (2A 230V Vital Bus, Elev. 84' Swgr Rm).

___ B. MAN.BYPASS switch is placed in BYP TO PREF (2A VITAL INSTRUMENT BUS REG & STATIC SW Panel).

___ C. TEST TRANSFER toggle switch is set to N.

___ 5.9.2 **PLACE** MAN.BYPASS switch in preferred ISOLATE.

___ 5.9.3 **CLOSE** 2AVII2A3, NO. 2A VITAL INSTR BUS INVERTER ALT AC INPUT BREAKER (CB301).

___ 5.9.4 **PLACE** MAN.BYPASS switch in BYP TO PREF.

___ 5.9.5 IF STATIC SWITCH ON ALTERNATE (white) lamp is illuminated, THEN **PRESS** the RESET pushbutton.

___ 5.9.6 **PRESS** ALARM CONTACT RESET pushbutton, AND **ENSURE** the following (2A INSTRUMENT BUS RECTIFIER panel):

___ A. REG. AC OUTPUT AVAILABLE (red) lamp is illuminated.

___ B. REG. AC OUTPUT LOW/FAIL (white) lamp is extinguished.

CAUTION

Loss of forced cooling to the 2A Vital Instrument Bus Regulator & Static SW panel will result in damage to the panel after ~20 minutes. If both fans in the panel are not operating, or a single fan is operating with a dirty filter, then:

- **System Engineer should be consulted regarding continued Inverter operation, Inverter operability, and alternative cooling methods.**
- **An Action Request should be initiated to determine and correct cause of Low Air Flow alarm.**

___ C. IF LOW AIR FLOW lamp (2A VITAL INSTRUMENT BUS REGULATOR & STATIC SW panel) is illuminated, THEN **ENSURE** the following:

___ 1. At least one fan is operating in the panel.

___ 2. The filter associated with operating fan is clean.

(Step continued on next page)

5.9.6 (Continued)

___ D. SYNCHRONIZED (red) lamp is illuminated.

___ E. SYNCH MONITOR (clear lens) lamp is extinguished.

___ F. REG. AC INPUT AVAILABLE (red) lamp is illuminated.

___ G. STATIC SWITCH ON INVERTER (red) lamp is illuminated.

___ H. STATIC SWITCH ON ALTERNATE (white) lamp is extinguished.

___ I. IF UPS System LOW AIR FLOW alarms are clear,
THEN Aux Alarm Typewriter Point 0147, 2A VITAL INSTR BUS INV TROUBLE, is clear.

___ 5.9.7 **ROTATE** SOURCE SELECTOR switch to LINE,
AND **ENSURE** the following (2A VITAL INSTRUMENT BUS REG & STATIC SW panel):

___ A. AC OUTPUT voltmeter indication is 115 - 130VAC.

___ B. AC OUTPUT frequency meter indication is 59.5 - 60.5 Hz.

___ 5.9.8 **ROTATE** SOURCE SELECTOR switch to OUTPUT.

___ 5.9.9 **PLACE** MAN.BYPASS switch in NORMAL.

___ 5.9.10 **ENSURE** 2A Vital Instrument Bus UPS System status is IAW conditions specified in Attachment 1, STATUS ON NORMAL SOURCE column.

___ 5.9.11 **NOTIFY** NCO that 2A Vital Instrument Bus AC Line Regulator is aligned for automatic transfer to 2A 115V Vital Instrument Bus.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem 1 & 2

SYSTEM: Auxiliary Feedwater System

TASK: Reset Auxiliary Feedwater Turbine Trip Valve (MS-52)

TASK NUMBER: 113 004 05 01

JPM NUMBER: Reset MS-52

K/A NUMBER: 2.1.30

APPLICABILITY: **EO** [X] **RO** [X] **SRO** [X]

IMPORTANCE FACTOR:	3.9	3.4
	RO	**SRO**

EVALUATION SETTING/METHOD: **Simulate / Aux Bldg Elev 84**

REFERENCES: S2.OP-SO.AF-001(Q) Auxiliary Feedwater System Operation

TOOLS AND EQUIPMENT: JA Master key

VALIDATED JPM COMPLETION TIME: 7 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: ________

APPROVED: [signature] for
PRINCIPAL TRAINING SUPERVISOR

[signature] for
OPERATIONS MANAGER

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ________

ACTUAL TIME CRITICAL COMPLETION TIME: ________

JPM PERFORMED BY: ________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ________ **DATE:** ________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: Auxiliary Feedwater System

TASK: Reset Auxiliary Feedwater Turbine Trip Valve (MS-52)

TASK NUMBER: 113 004 05 01

INITIAL CONDITIONS:

1. Unit 2 has just experienced a reactor trip. The 23 AFW Pump has tripped on overspeed.

INITIATING CUE:

You have been directed to reset 23 AFW Pump Turbine Trip Valve (2MS52) in accordance with S2.OP-SO.AF-0001, Attachment 2, Turbine-Driven AFW Pump Restoration

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

NAME: ______________________

DATE: ______________________

SYSTEM: Auxiliary Feedwater System

TASK: Reset Auxiliary Feedwater Turbine Trip Valve (MS-52)

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
		Operator obtains or is provided with the correct procedure. ***NOTE: Evaluator should verify that the Operator has a JA Master Key before entering the controlled area.***	Obtains the correct procedure, S2.OP-SO.AF-0001(Q), Attachment 2. ***NOTE: This is a Category II procedure. Work standards require that the procedure be at the job site. The Operator should refer to the procedure at the beginning and end of the task and as frequently as necessary during performance of the task.***		
# *	1	<u>RESETTING 2MS52</u> SEAT tappet nut by slightly pulling Head Lever away from trip linkage <u>AND</u> VERIFY that the Emergency Trip Lever is in its RESET position (horizontal).	Verifies tappet nut seated and EMERGENCY TRIP LEVER in reset position. ***CUE: Tappet nut seated and EMERGENCY TRIP LEVER is reset.***		
# *	2	ROTATE 2MS52 Handwheel in the closed direction (clockwise). This will cause the Latch-Up Lever to move up toward the Trip Hook.	Rotates MS52 Handwheel clockwise and verifies Latch-Up Lever moving toward Trip Hook.		
# *	3	VERIFY that as the Latch-Up Lever moves up into position, it moves to and engages the Trip Hook.	Verifies Trip Hook engages. ***CUE: Trip Hook is engaged.***		

NAME: ____________________

DATE: ____________________

SYSTEM: Auxiliary Feedwater System

TASK: Reset Auxiliary Feedwater Turbine Trip Valve (MS-52)

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
#	4	IF necessary to assist the Trip Hook in engaging the Latch-Up Lever, THEN PULL UP on the Hand Trip Lever until engaged.	Trip Hook engaged in previous step.		
# *	5	ROTATE 2MS52 Handwheel in the open direction (counter-clockwise) until the Split Coupling raises and makes contact with the bottom of the Sliding Nut.	Rotates Handwheel counter-clockwise and verifies Split Coupling makes contact with Sliding Nut. ***CUE: Split Coupling contacting Sliding Nut.***		
# *	6	ROTATE 2MS52 Handwheel clockwise approximately one turn until Handwheel moves freely. This prevents the valve from binding.	Rotates Handwheel clockwise one turn and verifies Handwheel moves freely.		

TERMINATING CUE: Operator reports 2MS52 are reset.

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ____________________

DATE: ____________________

SYSTEM: Auxiliary Feedwater System

TASK: Reset Auxiliary Feedwater Turbine Trip Valve (MS-52)

TASK NUMBER: 113 004 05 01

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

MS52 JPM QUESTION #1

A Unit 2 shutdown is in progress with reactor power now at 10%. 23 AFW Pump is OOS due to a steam leak on 2MS132. 21AF3, AFWST to 21AFW Pump Suction Valve, is closed due to back-leakage through 21AF4 (check valve). 21 AFW Pump is tagged OOS because AF3 is closed. Directions are that 21 AFW Pump should only be used in an emergency.

What three actions are necessary to feed all four SG's using 22 AFW Pump?

OPEN REFERENCE

ANSWER:

- Open discharge x-connect valves, 21&22AF923
- Restore 125 VDC control power to 21 AFW Pump
- Select PRESS OVERRIDE DEFEAT on the bezel for 21 AFW Pump

KA #: 061 A2.04 //3.4/3.8

Objective: 0300-000.00S-AFW000-00, Obj. 4.h
Reference: S2.OP-SO.AF-0001, pg. 7

Comments: ______________________________
____
____
____
____

MS52 JPM QUESTION #2

During power operations the control air line supplying air to the AFW System components ruptures. Explain how this failure affects the immediate capability of the AFW System to perform its' design function.

OPEN REFERENCE

ANSWER:

The system is still fully capable of performing its' design function. Loss of air does not impact the availability of the MDAFW pumps and the TDAFW pump would start due to loss of air to the steam stop, MS132. All AFW flow control valves (AF11's and AF21's) fail open, resulting in full flow capability to all four SG's.

KA #: 061 A2.02 //3.2/3.6//

Objective: 0300-000.00S-AFW000-00, Obj 4.
Reference: P & ID 205336
S2.OP-AB.CA-0001

Comments: ______________________________
____
____
____
____

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

MS52 JPM QUESTION #1

A Unit 2 shutdown is in progress with reactor power now at 10%. 23 AFW Pump is OOS due to a steam leak on 2MS132. 21AF3, AFWST to 21AFW Pump Suction Valve, is closed due to back-leakage through 21AF4 (check valve). 21 AFW Pump is tagged OOS because AF3 is closed. Directions are that 21 AFW Pump should only be used in an emergency.

What three actions are necessary to feed all four SG's using 22 AFW Pump?

OPEN REFERENCE

*** THIS SHEET TO BE GIVEN TO CANDIDATE ***

MS52 JPM QUESTION #2

During power operations the control air line supplying air to the AFW System components ruptures. Explain how this failure affects the immediate capability of the AFW System to perform its' design function.

OPEN REFERENCE

INITIAL CONDITIONS:

1. Unit 2 has just experienced a reactor trip. The 23 AFW Pump has tripped on overspeed.

INITIATING CUE:

You have been directed to reset 23 AFW Pump Turbine Trip Valve (2MS52) in accordance with S2.OP-SO.AF-0001, Attachment 2, Turbine-Driven AFW Pump Restoration

ATTACHMENT 2
(Page 1 of 4)

TURBINE-DRIVEN AFW PUMP RESTORATION

1.0 RESETTING 2MS52

___ 1.1 **SEAT** tappet nut by slightly pulling Head Lever away from trip linkage AND **VERIFY** that the Emergency Trip Lever is in its RESET position (horizontal). (refer to illustrations Detail "A")

NOTE

The next three steps are interrelated and should occur at about the same time.

___ 1.2 **ROTATE** 2MS52 Handwheel in the closed direction (clockwise), to cause the Latch-Up Lever to move up toward the Trip Hook.

___ 1.3 **VERIFY** that as the Latch-Up Lever moves up into position, the Latch-Up Lever moves to and engages the Trip Hook.

___ 1.4 IF necessary to assist the Trip Hook in engaging the Latch-Up Lever, THEN **PULL UP** on the Hand Trip Lever until engaged.

___ 1.5 **ROTATE** 2MS52 Handwheel in the open direction (counter-clockwise) until the Split Coupling raises and makes contact with the bottom of the Sliding Nut.

CAUTION

Leaving 2MS52 backseated may impose more reaction loading on the Trip Hook than the Trip Linkage can overcome, thus rendering the 2MS52 trip function INOPERABLE.

___ 1.6 **ROTATE** 2MS52 handwheel clockwise approximately one turn until handwheel moves freely, to prevent the valve from binding. **[C0315]**

ATTACHMENT 2
(Page 2 of 4)

TURBINE-DRIVEN AFW PUMP RESTORATION

2.0 STEAM LINE DRAIN VALVES

[C0352]

(✓)	VALVE	DESCRIPTION	REQUIRED POSITION	IV
	2MS902	23 AF PMP DR V	OPEN	
	2MS903	23 AF PMP DR V	OPEN	
	2MS904	23 AF PMP DR V	OPEN	

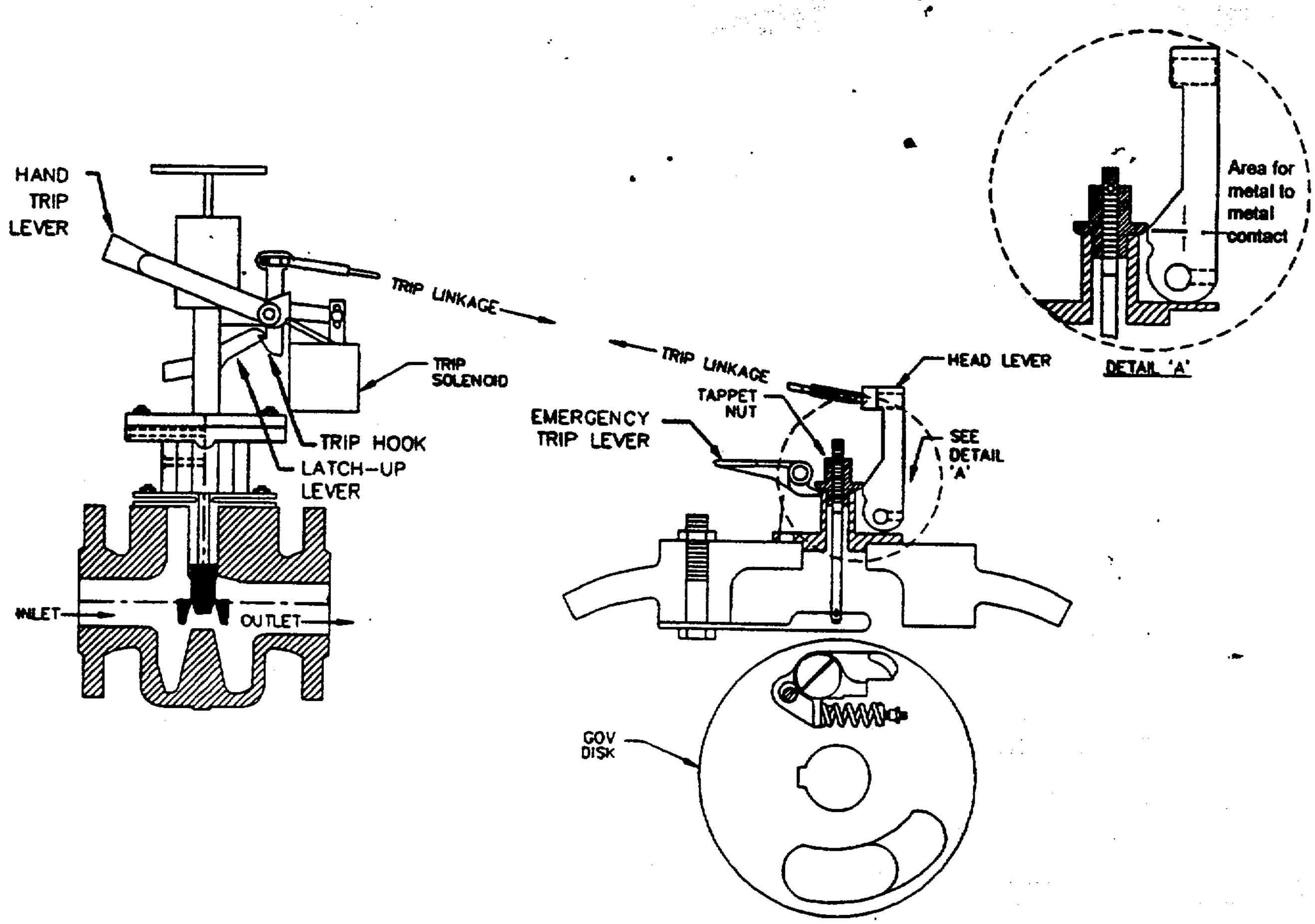
3.0 23 AFW PUMP

COMPONENT	DESCRIPTION	REQUIRED POSITION	IV
2MS52	23 AUX FEED PUMP TRIP VALVE	RESET/OPEN	
23 AFW PUMP	LOCAL MANUAL SPEED CHANGER	MAXIMUM	

ATTACHMENT 2
(Page 3 of 4)

TURBINE-DRIVEN AFW PUMP RESTORATION

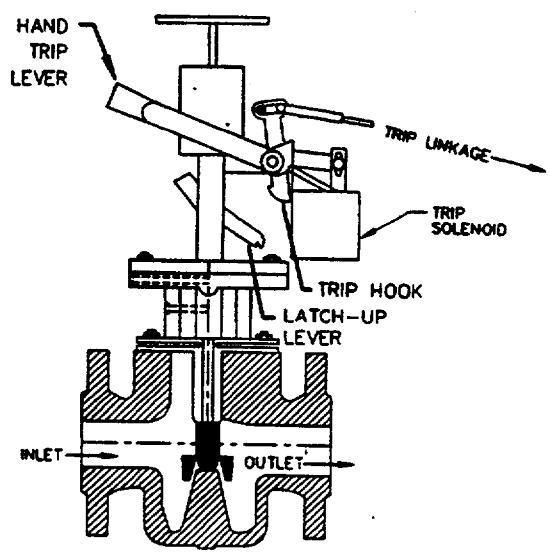
23 AF PUMP TRIP/THROTTLE VALVE & OVERSPEED TRIP MECHANISM
<u>OVERSPEED TRIP MECHANISM/VALVE RESET</u>

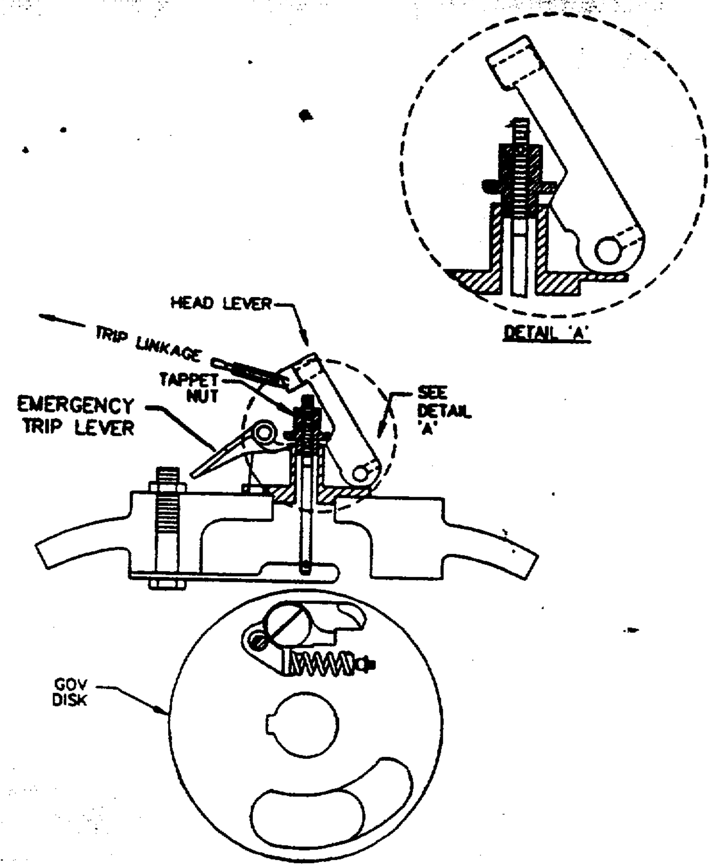


ATTACHMENT 2
(Page 4 of 4)

TURBINE-DRIVEN AFW PUMP RESTORATION

23 AF PUMP TRIP/THROTTLE VALVE & OVERSPEED TRIP MECHANISM
<u>OVERSPEED TRIP MECHANISM/VALVE TRIPPED</u>





OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: Salem

SYSTEM: ECCS

TASK: Align charging pump suction to the RWST IAW EOP-LOPA-1

TASK NUMBER: 1150140501

JPM NUMBER:

K/A NUMBER: 2.1.30

APPLICABILITY: EO [X] RO [X] SRO [X]

IMPORTANCE FACTOR:

	RO	SRO
IMPORTANCE FACTOR	3.9	3.4

EVALUATION SETTING/METHOD: Simulate In-Plant

REFERENCES: 2-EOP-LOPA-1
NC.NA-AP.ZZ-0005

TOOLS AND EQUIPMENT: None

VALIDATED JPM COMPLETION TIME: 10 minutes

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED: [signature] for   [signature]
PRINCIPAL TRAINING SUPERVISOR   **OPERATIONS MANAGER**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission for the OS Or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: ____________

ACTUAL TIME CRITICAL COMPLETION TIME: ____________

JPM PERFORMED BY: ____________________ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: ____________________ **DATE:** ____________

NAME: ____________________

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

DATE: ______________________

SYSTEM: ECCS

TASK: Align charging pump suction to the RWST IAW EOP-LOPA-1

TASK NUMBER: 1150140501

INITIAL CONDITIONS:

1. There has been a complete loss of electrical power. The operating crew has implemented EOP-LOPA-1 and is at the Step 18, Charging Pump Suction Alignment

INITIATING CUE:

The CRS directs you to manually open 2SJ1 and then manually close 2CV40 per the MOV operating instructions in NC.NA-AP.ZZ-0005.

Successful Completion Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ____________________

DATE: ____________________

SYSTEM: ECCS

TASK: Align charging pump suction to the RWST per EOP-LOPA-1

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
	1	If requested, provide the candidate with a copy of Attachment 5, NC.NA-AP.ZZ-0005	Reviews information for manual operation of MOV's		
	2	Locates breakers for 2SJ1 and 2CV40	*NOTE:* Candidate may indicate they would call the control room for breaker locations. If so, provide the breaker designations (below): • 2SJ1-2CY2AX2A • 2CV40-2CYAX4A Both breakers are located at 2CY2AX 230V Control Center near the MDAFW Pumps *NOTE:* Normally, after a MOV brkr is opened and the valve operated manually, the breaker is safety tagged *CUE:* Since this is an EOP action, the OSC will take care of tagging the breakers		
*	3	Opens both breakers	Indicates open position on local breaker controls for both breakers. It is acceptable for the candidate to open one breaker then operate the valve and repeat the process for the other valve.		

OPERATOR TRAINING PROGRAM

JOB PERFORMANCE MEASURE

NAME: ______________________

DATE: ______________________

SYSTEM: ECCS

TASK: Align charging pump suction to the RWST per EOP-LOPA-1

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT Evaluation)
*	4	Opens 2SJ1	• Locates the valve on El. 84, near Chg'g Pumps • Places declutch lever in hand position • Rotates the handwheel to open the valve *CUE:* The valve is open		
*	5	Closes 2CV40	• Locates the valve on El. 100, near entrance to EDG's • Places declutch lever in hand position • Rotates the handwheel to close the valve *CUE:* The valve is closed		
	6	Candidate reports valve positions to the control room			

TERMINATING CUE: Valve position reported to control room

JOB PERFORMANCE MEASURE
FOLLOW-UP QUESTION DOCUMENTATION:

NAME: ____________________
DATE: ____________________

SYSTEM: ECCS

TASK: Align charging pump suction to the RWST IAW EOP-LOPA-1

TASK NUMBER: 1150140501

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

QUESTION: ____________________

RESPONSE: ____________________

RESULT: ☐ -SAT ☐ -UNSAT

INITIAL CONDITIONS:

1. There has been a complete loss of electrical power. The operating crew has implemented EOP-LOPA-1 and is at the Step 18, Charging Pump Suction Alignment.

INITIATING CUE: The CRS directs you to manually open 2SJ1 and then manually close 2CV40 per the MOV operating instructions in NC.NA-AP.ZZ-0005.

RWST SUCT JPM QUESTION #1

Unit 2 is in the midst of a 55 day run at 100% power. As part of a VCT level control troubleshooting procedure, 2CV40 and 2CV41 (VCT to CHARGING PUMP SUCTION VALVES) and SJ1 and SJ2 (RWST to CHARGING PUMP SUCTION VALVES), are all in MANUAL. 2CV40 and 2CV41 are open. 2SJ1 and 2SJ2 are closed. With the valves aligned as such, an automatic SI and loss of off-site power occurs. While 2B 4KV Vital Bus is loading the in-feed breaker opens due to relay actuation on BUS DIFF. 2A and 2C 4KV Vital Buses energize per design.

What will be the alignment of 2CV40, 2CV41, 2SJ1 and 2SJ2 after the SI?

OPEN REFERENCE

ANSWER: 2CV40 is closed; 2CV41 is open; 2SJ1 is open; 2SJ2 is closed

OBJECTIVE: 300-ECCS, Obj. 6.a
REFERENCE: Respective valve Logic Diagrams and TRIS Power Feed Manual (**SJ1 & CV40 off C Bus, SJ2 & CV41 off B Bus. The valves re-position whether in AUTO or MANUAL)**
K/A: 006 K2.04 – 3.8/4.2

RWST SUCT JPM QUESTION #1

Unit 2 is in the midst of a 55 day run at 100% power. As part of a VCT level control troubleshooting procedure, 2CV40 and 2CV41 (VCT to CHARGING PUMP SUCTION VALVES) and SJ1 and SJ2 (RWST to CHARGING PUMP SUCTION VALVES), are all in MANUAL. 2CV40 and 2CV41 are open. 2SJ1 and 2SJ2 are closed. With the valves aligned as such, an automatic SI and loss of off-site power occurs. While 2B 4KV Vital Bus is loading the in-feed breaker opens due to relay actuation on BUS DIFF. 2A and 2C 4KV Vital Buses energize per design.

What will be the alignment of 2CV40, 2CV41, 2SJ1 and 2SJ2 after the SI?

OPEN REFERENCE

RWST SUCT JPM QUESTION #2

In EOP-LOPA-1, an operator is dispatched to remove 125VDC control power from 21 and 22 AFW Pumps. Why is this done for the AFW Pumps but not for any of the ECCS Pumps?

OPEN REFERENCE

ANSWER: 125VDC is removed from the AFW Pumps to preclude an automatic start on LO-LO SG level, when power is restored. The only automatic start for ECCS Pumps is from the respective SEC. Earlier steps in LOPA-1 de-energize all SEC's to prevent uncontrolled start of the respective equipment when power is restored.

OBJECTIVE: 300-LOPA01, Obj. 8
REFERENCE: EOP-LOPA-1 and Basis Document
Logic Diagram 221064
K/A: 055 EK3.02-4.3/4.6

RWST SUCT JPM QUESTION #2

In EOP-LOPA-1, an operator is dispatched to remove 125VDC control power from 21 and 22 AFW Pumps. Why is this done for the AFW Pumps but not for any of the ECCS Pumps?

OPEN REFERENCE

ATTACHMENT 5
(Page 1 of 6)

VALVE OPERATIONS

[CD-555A, CD-769F]

1.0 __Precautions for Manual Valve Operations__ **[CD-828D]**

1.1 Mispositioning, misoperation or abuse of valves can adversely affect system operability and plant safety.

1.2 Leverage devices are not approved for use on the hand wheels of motor-operated valves (MOV), air-operated valves (AOV), hydraulically operated valves or diaphragm valves. For all other valves, leverage devices are not to be used unless approved by Engineering and the OS/CRS. **[CD-095B]**

1.3 Valves should not be backseated unless specifically authorized by a written procedure or to mitigate equipment failures or degradation. The backseat should only be used while repacking the valve or to stop excess leakage through the packing. Administrative controls should be used to restore backseated valves to their original condition in a timely manner.

1.4 Do not stand directly in front of a valve stem when opening or closing a valve. If the packing blows out, it may results in injury from the packing, escaping steam, air or other fluids.

1.5 Valves located in positions of difficult access should not be operated without first considering means of escape in the event of valve failure. If a ladder is required to reach the valve, carefully place the ladder so you will be safe if the valve should fail while being opened or closed.

1.6 While turning the handwheel of a valve, be certain that the wheel is moving only the stem. For screwed bonnet valves, if the bonnet is loose it may turn with the stem and come apart from the body.

1.7 Never use excessive force when operating a valve in the open or closed direction. Temperature changes may have caused the valve to bind. **[CD-095B]**

1.8 To seat a leaking valve, bring the disk to seat gently, throttle open the valve and repeat this operation several times. This may help flush out any foreign matter.

1.9 If a valve is closed while hot, the disk may become bound as it cools. To prevent binding, the valve should be opened slightly and seated lightly. This may be required several times during cooldown. Do not perform this action unless directed by a procedure or supervisor. **[CD-663D]**

1.10 If a valve does not operate freely or requires excessive torque, contact the OS/CRS or responsible department supervisor.

1.11 The threads of rising stem valves should be kept clean and lubricated at all times. If not already lubricated, clean and oil the threads prior to operating the valve.

1.12 Valves that are not designed for throttling should not be used as throttle valves. **[CD-095B]**

- Gate valves are not suitable for throttling service and, except in special cases, should either be wide open or fully closed.
- Butterfly and globe valves, under normal conditions, should not be throttled to less than 25% open. However, when directed, throttling may be used to meet system needs. If indications of cavitation occurs during throttling, the operator or technician shall immediately inform the OS/CRS or responsible supervisor. **[CD-284B, CD-384B]**

1.13 A new position for MOVs shall not be demanded until the valve is fully stroked to the last demanded position. For example, do not demand "closed" on a MOV while it is stroking open.

1.14 When performing valve alignments the valve shall be checked to ensure that its the correct label plate, installed properly and legible. Refer to NC.NA-AP.ZZ-0044(Q), Station Aids and Labels, for detailed requirements and guidance for submitting a label request.

1.15 When performing partial or total system alignments, contact the Operations Department TRIS Coordinator to obtain the correct lineup work sheets.

2.0 **<u>Valve Locking</u> [CD-658E, CD-555A, CD-147X, CD-107X, CD-408A, CD-390X, CD-318A, CD-125X, CD-272B]**

2.1 For valve position control, "locked" valve shall mean that the valve is in the desired position and a cable or chain with a seal or lock is affixed to indicate the valve is "locked" in that position.

2.2 The cable or chain shall be threaded through the valve handwheel and yoke such that the valve can not be repositioned without removing the cable or chain. **[CD-115B]**

2.3 If it is not possible to thread the cable or chain through the valve yoke, the handwheel should be secured to a structural member, such as a pipe or beam. Electrical conduit, instrument tubing and instrument tubing tray runs are not considered structural members.

2.4 Manually operated valves that do not have position indication in the Control Room and would render an Emergency Core Cooling System (ECCS) inoperable shall be locked to prevent inadvertent or unauthorized valve operation. **[CD-408A, CD-828D, CD-147X]**

2.5 Keys and locking devices for locked manual valves shall be controlled by the OS or the department responsible for the system. **[CD-408A, CD-115B]**

2.6 Verification of the position of HCGS seal wired manual valves outside primary containment shall be performed on a monthly basis in accordance with Operations Technical Specification Surveillance Procedures and as deemed necessary by the OS. **[CD-408A, CD-147X, CD-107X]**

3.0 <u>MOVs</u>

<u>NOTE</u>

1. MOVs are not normally operated by hand. **[CD-128A, CD-716D]**
2. Manual torquing of MOVs is not allowed when performing Integrated Leak Rate Test (ILRT) lineups. **[CD-747A]**
3. Excessive force exerted on a MOV handwheel during manual operation may cause serious valve damage. **[CD-716D, CD-040F, CD-193C]**

3.1 When an MOV is manually seated or backseated to a position that would require the valve to change position in order to fulfill a safety function, the valve shall be declared inoperable. **[CD-189B, CD-716D]**

3.2 If excessive torque is used to manually seat or backseat an MOV to control leakage, an AR shall be written and a Deficiency Report issued to Engineering. **[CD-716D]**

3.3 When manual valve operation is completed, to declare the valve operable, stroke the valve electrically in accordance with the appropriate Tech Spec surveillance test to verify operability (this ensures the clutch has disengaged). **[CD-663D, CD-128A, CD-147X]**

3.4 **MOV Manual Operation** **[CD-769F]**

3.4.1 Open and safety tag the MOV power supply.

3.4.2 Declare the MOV inoperable as applicable.

3.4.3 Hang a caution tag requiring that the valve be unseated by hand prior to the circuit breaker being closed.

3.4.4 Observe the following precautions to minimize valve damage: **[CD-343A]**

A. Do not force the declutch lever into the motor operation position. The lever returns to this position automatically when the motor is energized.

B. Do not force the declutch lever from the motor operation position to the hand operation position.

C. Never depress the declutch lever during motor operation to stop valve travel.

D. Avoid over-travel. Some MOVs are adjusted to stop traveling at far less that 100 percent stroke due to pump or system flow restriction requirements.

3.4.5 Engage the manual handwheel. If necessary, turn the handwheel slightly while depressing the declutch lever to achieve engagement.

3.4.6 Open or close the valve as desired while observing the valve position indication.

3.4.7 After completing the valve positioning, the declutch lever will remain in the engaged position until electrically operated. Do not attempt to force the declutch lever into the motor position as MOV damage may result.

4.0 **Manual Operation of Globe, Gate, and Butterfly Valves** [CD-769F]

4.1 The valve should be positioned using the handwheel or reach-rod if one is attached.

NOTE

Most valves turn clockwise to close and counter-clockwise to open, but some special purpose valves operate in the opposite direction. Refer to TRIS and the operating procedure for special instructions and footnotes that identify these valves.

4.2 **TO CLOSE THE VALVE:** Rotate the handwheel clockwise until one of the following occurs:

- Valve movement can no longer be achieved through normal force applied to the handwheel.
- An attached position indicator or other position verification techniques indicate the valve is closed.
- Changes in system parameters such as flow or pressure indicate the valve is closed.

4.3 **TO OPEN THE VALVE:** Rotate the handwheel counterclockwise until one of the following occurs:

- Valve movement can no longer be achieved through normal force applied to the handwheel.
- An attached position indicator or other position verification techniques indicate the valve is open.
- Changes in system parameters such as flow or pressure indicate the valve is open.

4.4 The valve handwheel is then rotated 1/4 turn closed from the full open position.

4.5 **TO THROTTLE THE VALVE:** The valve should first be fully closed, then opened the required number of turns, or if applicable, match the alignment marks. **[CD-284B]**

5.0 **Manual Operation of Air Operated Valves (AOV)** [CD-769F]

> **NOTE**
>
> Electrical power to the solenoid should be energized before air pressure is applied.

5.1 To manually operate the valve, remove the AOV solenoid from automatic operation as follows:

A. Close the air supply.

B. Bleed air off valve diaphragm.

C. If specified by the supervisor, open the control power circuit breaker, remove the fuse, or otherwise deenergize the solenoid.

D. If required, position the valve using the hand jack.

> **NOTE**
>
> After an AOV is positioned using the hand jack, ensure the hand jack is returned to the neutral position. If the hand jack will remain out of the neutral position, the AOV should be safety tagged in accordance with NAP-15. **[CD-743D, CD-140Y]**

E. When use of the hand jack is no longer required, position the hand jack to the neutral position

6.0 **Manual Operation of Ball or Plug Valves** [CD-769F]

6.1 Position ball or plug valves using the handle or reach-rod if attached.

6.2 **TO CLOSE THE VALVE:** Rotate the handle (normally 1/4 turn) in the clockwise direction until one of the following occurs:

- The handle is perpendicular to the piping.
- Changes in system parameters such as flow and pressure indicate the valve is closed.

6.3 **TO OPEN THE VALVE:** Rotate the handle (normally 1/4 turn) in the counter-clockwise direction until one of the following occurs:

- The handle lines up with the piping.
- Changes in system parameters such as flow and pressure indicate the valve is open.

Facility: Salem Generating Station **Scenario No.:** 1 **Op Test No.:** D1

Examiners: ______________________ **Candidates:** ______________________ CRS

______________________ ______________________ RO

______________________ ______________________ PO

Objectives: Evaluate the ability of the Crew to perform a normal power reduction. Evaluate the response of the crew to the failure of PT-505 during the power reduction. Evaluate the ability of the Crew to recognize and respond to the failure of VCT level instrument LT-112. Evaluate the response of the Crew to the RCS leak. Evaluate the ability of the Crew to recognize and respond to the Main Steam Isolation Valve drifting closed. Evaluate the response of the Crew to the rising leak rate and eventual entry into the EOPs. The crew should recognize the failure of 22 SI Pump to start. Evaluate the response of the Crew to the loss of offsite power and their ability to recognize the need to manually align Safety Injection components.

Initial Conditions: IC-2, MOL at 100% power. 21 Service water Pump and Strainer C/T. N41 removed from service. 24 S/G narrow range level LT-549 is removed from service for I&C testing. 21 SI pump is C/T to repair a leaking drain valve.

Turnover: The plant is in Mode 1 at 100% power. Last shift, 21 Heater Drain Pump developed an abnormal vibration and is to be removed from service. 21 Service Water Pump and Strainer are C/T for strainer maintenance. N41 is out of service for replacement of a failed amplifier card. 24 S/G narrow range level LT-549 is removed from service for I&C testing. 21 SI pump is C/T to repair a leaking drain valve. All other equipment is operating normally with all controls in automatic. Orders for the shift are to perform a power reduction to 90% within the next 30 minutes and remove 21 Heater Drain Pump from service.

Event No.	Malf. No.	Event Type*	Event Description
1		N CRS R PO R RO	Perform a normal power reduction to permit removal of 21 Heater Drain Pump
2	TU0055	I CRS PO RO	Turbine First Stage Pressure transmitter, PT-505 fails low
3	CV0037	I CRS RO	VCT Level transmitter, LT-112 fails high
4	RC0002	C ALL	RCS Leak – Ramp from 0 – 35 gpm over 5 min
5	VL0422	C CRS PO	Main Steam Isolation Valve, 23MS167 drifts closed
6	RC0002	M ALL	Small Break LOCA – 1000 gpm
7	SJ0184B	C CRS RO	22 SI Pump Fails to start on SI signal
8	EL0134	M ALL	Loss of Offsite Power (After the SI is reset)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SIMULATOR EXAM SCENARIO

SCENARIO TITLE:	Small Break LOCA
SCENARIO NUMBER:	1-D1
EFFECTIVE DATE:	2/22/99
EXPECTED DURATION:	1.5 Hours
REVISION NUMBER:	0

PROGRAM:

[ ]	**LO REQUAL**
[X]	**INITIAL LICENSE**
[ ]	**STA**
[ ]	**OTHER**____________

Revision Summary: **Rev 0**

PREPARED BY: Jill Lloyd for
(WD ASSOCIATES) — 2/17/99 (DATE)

APPROVED BY: Edward [illegible] Salem OPS SRO
(TRAINING SUPERVISOR) — 2-18-99 (DATE)

APPROVED BY: [illegible]
(TRAINING SUPERVISOR) — 2/19/99 (DATE)

I. OBJECTIVES

A. Evaluate the ability of the crew to implement normal plant procedures to reduce plant power for the removal of the 21 Heater Drain Pump.

B. Evaluate the ability of the crew to recognize and respond to PT-505 failing low during the power reduction.

C. Evaluate the ability of the crew to recognize and respond to the failure high of VCT level instrument, LT-112.

D. Evaluate the ability of the crew to recognize and to respond to the RCS leak by implementing the appropriate plant procedures.

E. Evaluate the ability of the crew to recognize and respond to the Main Steam Isolation Valve drifting closed.

F. Evaluate the ability of the crew to recognize and respond to the rising RCS leak rate and to implement the EOPs when plant conditions degrade.

G. Evaluate the ability of the crew to recognize the failure of the 22 Safety Injection Pump to start upon receipt of a Safety Injection signal.

H. Evaluate the ability of the crew to recognize the loss of offsite power and the resultant need to manually align Safety Injection components.

II. MAJOR EVENTS

A. Perform a normal power reduction to permit removal of 21A Heater Drain Pump.

B. Turbine First Stage Pressure transmitter, PT-505 fails low during the power reduction.

C. VCT Level transmitter, LT-112 fails high.

D. An RCS leak develops and ramps from 0 – 35 gpm over a 5 minute period.

E. Main Steam Isolation Valve, 23MS167 drifts closed

F. The RCS leak degrades into a Small Break LOCA at approximately 1000 gpm.

G. 22 Safety Injection Pump fails to start upon receipt of a Safety Injection signal.

H. Loss of Offsite Power

III. SCENARIO SUMMARY

A. The crew will assume the watch at 100% power with directions to initiate a power reduction to 90% for the removal of the 21 Heater Drain Pump from service to correct shaft vibrations. All controls are in automatic. The following additional plant conditions exist:

- 21 Service Water Pump and Strainer are C/T for strainer maintenance. The Maintenance Supervisor anticipates the work to be completed in approximately six (6) hours.

- N41 is out of service due to a failed amplifier card and is expected to be returned by the end of shift.

- 24 S/G narrow range level LT-549 is removed from service for I&C testing.

- 21 SI pump is C/T to repair a leaking drain valve.

B. During the power reduction, PT-505 will fail low. When the crew identifies the failure, they should respond by taking Rod Control to manual to stop rod motion.

C. While waiting for the failure of PT-505 to be resolved, VCT Level transmitter, LT-112 will fail high. The crew should respond IAW the appropriate Alarm Response Procedure and by manually diverting CV-35 back to the VCT.

D. When VCT level is stable, a small RCS leak is initiated and ramped from 0-35 gpm over a 5 minute time period.

E. After the initial actions for the RCS leak have been initiated, Main Steam Line Isolation Valve 23MS167 will drift closed.

F. Approximately two minutes after the crew has reopened the Main Steam Line Isolation Valve, the RCS leak will degrade to a Small Break LOCA of approximately 1000 gpm requiring initiation of Safety Injection and entry into the EOPs.

G. When the Safety Injection is initiated, 22 Safety Injection Pump will fail to start but will start manually.

H. When steps to reduce injection flow have been initiated and at the discretion of the examination team, a Loss of Offsite power is initiated. The scenario may be terminated when the crew recognizes that ECCS systems must be manually restored and initiates action to restore proper SI flow or as directed by the examination team.

III. INITIAL CONDITIONS

IC-2 (or IC-88 from the ESG disk), MOL at 100% power with the following conditions:

a. 21 Service Water Pump and Strainer C/T for strainer maintenance.

b. N41 removed from service due to a failed amplifier card.

c. 24 S/G narrow range level LT-549 is removed from service for I&C testing.

d. 21 SI pump is C/T to repair a leaking drain valve.

MALFUNCTIONS

	Malfunction	Severity	Delay	Ramp	Description	
____1.	SG095D	0	0	0	24 S/G Lvl Transmitter LT549 failed low	
____2.	SJ0184B	Fail	0	0	22 SI Pump Fail to start	
____3.	TU0055	0	0	0	PT-505 fails low	(ET-1)
____4.	CV0037	100	0	0	LT-112 Fails High	(ET-2)
____5.	RC0002	35 gpm	0	5 min	RCS Leak into Cont.	(ET-3)
____6.	VL0422	93%	0	0	23MS167 Drifts Closed (Fails to 93% open)	(ET-4)
____7.	EL0134	Fail	0	0	Loss of all 500 KV Offsite Power	(ET-5)

I/O OVERRIDES

	Override/Type	SER Pt.	DI	DO	Condition	Description
____1.	None					

REMOTES

	Remote/Type	Condition	Description
_____1.	SW23D	OFF	21 SW Pump control power
_____2.	SW24D	Tagged	21 SW Pump breaker racked out
_____3.	SJ13D	OFF	21 SI Pump control power
_____4.	SJ14D	Tagged	21 SI Pump breaker racked out
_____5.	RC01D	Trip	OTDT Trip CH I BS (411C)
_____6.	RC05D	Trip	OTDT R/BCK CH I BS (411D)
_____7.	S401D	Trip	24 S/G Lvl Hi-Hi BS

TAGGED EQUIPMENT

	Description
_____1.	21 Service Water Pump and Strainer for strainer maintenance.
_____2.	N41 removed from service due to a failed amplifier card.
_____3.	21 SI pump is C/T to repair a leaking drain valve.
_____4.	Red Stripe LT-549

IV. SEQUENCE OF EVENTS

A. Designate shift positions.

B. Conduct a shift briefing outlining the shift instructions to the crew. (Provide each crew member with a copy of the Shift Turnover Sheet)

C. Inform the crew " The simulator is running and that board walk-downs should be performed. CRS please inform me when your Crew is ready to assume the shift.".

D. Allow sufficient time for panel walk-downs. When informed by the CRS that the Crew is ready to assume the shift, ensure the simulator is cleared of unauthorized personnel.

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
. Power reduction using normal plant procedures. No malfunctions other than those already inserted to start the scenario. The crew will reduce load at 30% per hr until either 90% power is reached or PT-505 fails.	• The **CREW** commences a power reduction IAW Step 5.3 of S2.OP-IO.ZZ-0004, Power Operation. - Notify the Systems Operator and the Condensate Polishing Operator of the upcoming load reduction. • The **CRS** establishes a rate of power reduction. • The **PO** INITIATES a Turbine load reduction with IAW S2.OP-SO.TRB-0002, Turbine Generator Shutdown Operations. - INITIATES monitoring the Main Turbine Data display points on the Plant Computer. - Uses the REF ? and GO pushbuttons to attain desired load. • The **RO** MAINTAINS T_{AVG}/T_{REF} mismatch at minimum value with Auto Rod motion and Boration. • The **RO** adjusts RCS Boron concentration to maintain AFD in target band and Rods above Rod Insertion Limits using OP-SO.CVC-0006, Boron Concentration Control. - DEPRESS Makeup Control Mode Select STOP Pushbutton. - ADJUST 2CV172 Setpoint to the desired value. - SET Boric Acid Flow Register to the number of gallons desired. - DEPRESS Makeup Control Mode Select BORATE Pushbutton. - DEPRESS Makeup Control Mode Select START Pushbutton.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	- When Boration is complete, depress makeup Control Mode Select STOP Pushbutton. - ADJUST 2CV172 Setpoint to the pre-boration value. - DEPRESS Makeup Control Mode Select AUTO Pushbutton. - DEPRESS Makeup Control Mode Select START Pushbutton.	
	• The **PO** verifies that SG Feed Pump suction pressure is being maintained ∃300 psig.	
	• The **PO** monitors Condenser temperatures using the Plant Computer.	
2. PT-505 fails low. After the power reduction has progressed sufficiently, and with the concurrence of the Examination team, initiate the failure of PT-505 failure, ET-1, Malf. TU0055.	The failure of PT-505 causes the following plant response: - Control Rods continuously insert at 72 steps per min. - RC Tave-Tref DEVIATION console alarm - 21-24 S/G HI STM FLOW console alarms - OHA E-5, SR DET VOLT TRBL - OHA E-21, SR HI FLUX AT S/D BLOC - OHA G-15, ADFCS TRBL - OHA A-36, AMSAC BYPASSED (240 Sec Time Delay)	
	• The **CREW** responds to the control rod motion and alarms.	
	• The **RO** determines the rod motion to be unwarranted and places Rod Control in Manual - Verifies no turbine runback in progress or required - Verifies turbine load is not changing - Verifies Tave on program - Places Rod Control in MANUAL	
	• The **CRS** enters and performs actions of S2.OP-AB.ROD-0003, Continuous Rod Motion.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **CREW** identifies the failure of PT-505 as the cause of the transient. • The **PO** places Steam Dumps in Main Steam Pressure Control Mode. • The **CREW** notifies I&C to investigate the failure of PT-505. • The **CREW** reviews the OHAs in alarm • The **CRS** initiates the actions of S2.OP-SO.RPS-0006, Main Turbine Channel Trip/Restoration	
3. VCT Level transmitter, LT-112 fails high. When the plant is stable and actions of AB.ROD-0003 have been completed, initiate the failure of LT-112, ET-2, Malf CV0037.	Failure of LT-112 high will cause the following plant response: - CV35 will full divert to the HUT if in Auto. - Actual VCT level will begin to lower. - No auto makeup will occur with LT-112 failed high. - With no operator action, level will continue to drop until charging pumps cavitate. - Auto swap to RWST will not occur with LT-112 failed high. - VCT HI/LO LEVEL console alarm will actuate due to LT-112 failed high. - Console level indication for the VCT is fed from LT-112 and will indicate upscale. Indication is available via the plant computer from LT-114. • The **RO** responds to HI/LO LEVEL alarm: - Compares console level with computer indications and determines LT-112 is failed. - Manually aligns CV35 to the VCT. - Initiates a manual makeup as necessary to restore and maintain VCT level IAW S2.OP-SO.CV-0006.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **CREW** responds IAW the CC2 Console Alarm response Procedure, S2.OP-AR.ZZ-0012.	
4. RCS Leak inside Containment When VCT Level is stable, insert the RCS Leak at 35 gpm ramped over a 5 min period, ET-3, malfunction RC0002.	• The **CREW** identifies the leak by one or more of the following indications: - The Warning alarm on R-11A - Rising rad levels on R-11A - A rise in Containment temp and pressure - CFCU Leak Detection OHAs - Lowering Pressurizer Level - Charging flow rising to compensate for the Pressurizer level drop. • The **CRS** should enter and direct actions IAW S2.OP-AB.RC-0001, RCS Leak. • The **RO** should place a Centrifugal Charging Pump in service - Ensure Master Flow Controller in AUTO. - Close 2CV55, charging flow control valve. - Start either 21 <u>OR</u> 22 Charging Pump. - Place 23 Charging Pump Speed Controller in MANUAL. - While lowering 23 Charging Pump, adjust 2CV55 to maintain desired flow. - When 23 Charging Pump is at minimum flow, STOP 23 Charging Pump. - Adjust 2CV55 to obtain desired flow. - Place 2CV55 in AUTO • The **RO/PO** should reduce letdown flow - Manually control 2CV18 and maintain letdown pressure approximately 300 psig. - Open 2CV3, 45 gpm orifice - Close 2CV4 and 2CV5, 75 gpm orifice - Return 2CV18 to Auto • The **RO/PO** places two CFCUs in Low speed and two CFCUs in High speed. • The **CRS** refers to Tech Specs.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	- Operational Leakage (3.4.7.2) - Containment Pressure (3.6.1.4)	
	• The **CREW** may initiate a manual makeup due to failed VCT Level.	
	• The **CREW** determines the leak rate to be > TS limits and begins a plant shutdown.	
5. Main Steam Line Isolation Valve, 23MS167 drifts closed. When the decision to shutdown the plant has been made, insert the malfunction to drift 23MS167 closed: ET-4, Malf VL0422. **AS SOON AS** the alarms are received, delete the Malf from the summary page to allow the MSIV to be opened.	• The **PO** responds to OHA G-34, 21-24MS167 VALVES NOT FULL OPEN and takes action IAW S2.OP-AR.ZZ-0007. - Identifies the drifting valve as 23MS167. - Opens the valve using the open pushbutton.	
6. Small Break LOCA When 23MS167 is returned to the full open position, modify Malf RC0002 to 1000 gpm.	• The **CREW** recognizes the degraded condition by observing: - Pressurizer level lowering rapidly. - Pressurizer pressure lowering	
Critical Task # 1: Sat______ Unsat____	• The **RO** manually trips the Reactor and confirms the trip: - At least three PR channels indicate < 5% - IR indications lowering with negative SUR • The **RO** Manually initiates SI.	
	• The **CRS** enters EOP-TRIP-1, Reactor Trip or Safety Injection	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **RO** performs the immediate actions of EOP-TRIP-1: - Trip the reactor - Verify the Reactor is tripped by observing at least three PR channels indicate < 5% and IR indications lowering with negative SUR - Trip the Turbine and verify TSV CLOSED and AST OIL PRESS LOW lights illuminated on RP4 - Verify Vital 4KV Bus status by observing bus voltage > 3900 volts - Manually initiate SI	
Critical Task #2: Sat______ Unsat____	• The **CREW** should notice the failure of 22 SI Pump to start and manually start the pump IAW the appropriate steps of EOP-TRIP-1. - The **PO** blocks and resets the 'C' SEC. - The **RO** starts 22 SI pump.	
	The **CREW** closes CV139 & CV140, Charging Pump Miniflow valves IAW EOP-TRIP-1 CAS when RCS pressure lowers below 1500 psig and BIT flow is established.	
Critical Task #3: Sat______ Unsat____	The **CREW** stops all RCPs IAW EOP-TRIP-1 CAS when RCS pressure lowers to 1350 psig and ECCS flow is established.	
	• The **RO** closes 21 & 22CA330, Containment Control Air Isolation Valves. • The **PO** throttles AFW flow to ≥ 22E4 lbm/hr, then maintains S/G levels 15-33%. • The **RO** initiates Loop 21-24 MSL Isolation.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **CREW** transitions to EOP-LOCA-1, Loss of Reactor Coolant at Step 28 when the following Containment Rad Monitors are observed in Warning, Alarm or Rising: - 2R2 - 2R7 - 2R10A,B	
	• The **CREW** implements the CFSTs	
	• The **RO** performs Safeguards Reset Actions: - Resets SI - Resets Phase A - Resets Phase B - Opens 21 & 22CA330, Containment Control Air Isolation Valves. - Resets A & B SEC	
The Crew may not stop RHR Pumps if pressure is slowly .owering.	• If pressure is stable, then the **RO** stops 21 & 22 RHR Pumps.	
7. Loss of Off-site Power After the SI has been reset and at the discretion of the Lead Examiner, initiate the Loss of Off-site Power by inserting ET-5, malfunction EL0134.	• The **CREW** recognizes the Loss of Off-site power by observing 500KV breaker indication on CC3 Mimic.	
	• The **CRS** directs the actions of the blackout continuous action step (Step 5).	
	• The **PO** verifies loading is complete by observing the LOADING COMPLETE light is illuminated for each D/G.	
	• The **PO** Resets each SEC and monitors D/G loading as loads are started.	
	• The **RO** verifies 21 & 22 Charging Pumps running	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
Critical Task #4: Sat______ Unsat____	• The **RO** starts 22 SI Pump	
The Crew may elect to start RHR pumps if they were not previously removed from service.	• The **PO** verifies 21 & 22 AFW Pumps running • The **RO** starts 21 & 22 RHR Pumps	
The scenario may be terminated after required ECCS Pumps have been restarted and with the concurrence of the examination team.		
After the scenario has been terminated, the CRS should refer to the ECG to Classify the event.	• The CRS refers to the ECG and classifies the event: – Alert - 3.2.2.B or 3.2.2.a depending on the value of subcooling.	

V. SCENARIO REFERENCES

A. ES-301, Preparing Initial Operating Tests
B. K/A Catalog
C. JTA Listing
D. Technical Specifications
E. S2.OP-IO.ZZ-0004
F. S2.OP-SO.TRB-0002
G. Various Alarm Response Procedures
H. S2.OP-AB.ROD-0003
I. S2.OP-SO.RPS-0006
J. S2.OP-SO.CVC-0006
K. S2.OP-AB.RC-0001
L. 2-EOP-TRIP-1
M. 2-EOP-LOCA-1

ATTACHMENT 1
UNIT TWO PLANT STATUS TODAY

MODE: 1	POWER: 100%	RCS BORON: 680 ppm	Mwe: 1150

SHUTDOWN SAFETY SYSTEM STATUS (5, 6 & DEFUELED): N/A

REACTIVITY PARAMETERS: Core Burnup 8000 MWD/MTU

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

3.3.3.1 N41 out of service. Action requirements are complete. QPTR due at 1700 this evening.

3.3.3.1 24LT-549 out of service for I&C testing. Testing is expected to be complete in 4 hrs.

3.5.2 21 SI Pump out of service. 72 hour Action expires at 2200 tomorrow.

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

21 SI O/S to repair a leaking drain valve

21 Service Water Strainer out of service for basket repairs

24 S/G Level transmitter LT-549 OOS for I&C Testing

PLANT TURNOVER IS AS FOLLOWS:

Last shift, 21 Heater drain Pump developed an excessive vibration and is to be removed from service for investigation and repair.

The orders for the shift are to reduce power to 90% at 30%/hr and remove 21 Heater Drain Pump from service.

ABNORMAL PLANT CONFIGURATIONS: NONE

CONTROL ROOM:

Unit 1 and Hope Creek at 80% power.
No penalty minutes in the last 24 hrs.

PRIMARY: NONE

SECONDARY: Heating Steam is aligned to unit 1.

RADWASTE: No discharges in progress

CIRCULATING WATER/SERVICE WATER: 21 SW Strainer C/T for strainer repairs.

ATTACHMENT 2
SIMULATOR READY FOR TRAINING CHECKLIST

______1. Verify simulator is in correct load for training

______2. All required computer terminals in operation

______3. Simulator clocks synchronized

______4. Required chart recorders advanced and ON (proper paper installed)

______5. Rod step counters correct (channel check)

______6. All tagged equipment properly secured and documented (TSAS Log filled out)

______7. DL-10 log up-to-date

______8. Required procedures clean

______9. All OHA lamps operating (OHA Test)

______10. All printers have adequate paper AND functional ribbon

______11. Procedure pens available

______12. Procedures in progress open and signed-off to proper step

______13. Shift manning sheet available

______14. SPDS reset

______15. Reference verification performed with required documents available

______16. Ensure a current RCS Leak Rate Worksheet is placed by Aux Alarm Typewriter with Baseline Data filled out

______17. Required keys available

______18. Video Tape (if applicable)

______19. Ensure ECG Classification is correct – 960502140 CRCA-03

______20. Reset P-250 Rod Counters

ATTACHMENT 3
CRITICAL TASK METHODOLOGY

In reviewing each proposed CT, the examination team assesses the task to ensure, that it is essential to safety. A task is essential to safety if, in the judgement of the examination team, the improper performance or omission of this task by a licensee will result in direct adverse consequences or in significant degradation in the mitigative capability of the plant.

The examination team determines if an automatically actuated plant system would have been required to mitigate the consequences of an individual's incorrect performance. If incorrect performance of a task by an individual necessitates the crew taking compensatory action that would complicate the event mitigation strategy, the task is safety significant.

1. Examples of CTs involving essential safety actions include those for which operation or correct performance prevents...

   - degradation of any barrier to fission product release
   - degraded emergency core cooling system (ECCS) or emergency power capacity
   - a violation of a safety limit
   - a violation of the facility license condition
   - incorrect reactivity control (such as failure to initiate Emergency Boration or Standby Liquid Control, or manually insert control rods)
   - a significant reduction of safety margin beyond that irreparably introduced by the scenario

2. Examples of CTs involving essential safety actions include those for which a crew demonstrates the ability to...

   - effectively direct or manipulate engineered safety feature (ESF) controls that would prevent any condition described in the previous paragraph.
   - recognize a failure or an incorrect automatic actuation of an ESF system or component.
   - take one or more actions that would prevent a challenge to plant safety.
   - prevent inappropriate actions that create a challenge to plant safety (such as an unintentional Reactor Protection System (RPS) OR ESF actuation.

ATTACHMENT 4
SCENARIO REVIEW CHECKLIST

Note: Attach a separate copy of this form to each scenario reviewed. This form is used as guidance for the examination team as they conduct their review for the proposed scenarios.

SCENARIO IDENTIFIER:	REVIEWER:

Initials Qualitative Attributes

_____1. The scenario has clearly stated objectives in the scenario.

_____2. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue crew into expected events.

_____3. The scenario consists mostly of related events.

_____4. Each event description consists of--

- the point in the scenario when it is to be initiated
- the malfunction(s) that are entered to initiate the event
- the symptoms/cues that will be visible to the crew
- the expected operator actions (by shift position)
- the event termination point

_____5. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.

_____6. The events are valid with regard to physics and thermodynamics.

_____7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

_____8. The simulator modeling is not altered.

_____9. All crew competencies can be evaluated.

_____10. The scenario has been validated.

_____11. If the sampling plan indicates that the scenario was used for training during the Requalification cycle, evaluate the need to modify or replace the scenario.

ATTACHMENT 5
ESG – CRITICAL TASKS

CT#1 – CRS orders MANUAL Rx Trip then SI when Pressurizer level cannot be maintained. (E-0--A)

CT#2 – Crew stops all RCPs when RCS pressure lowers below 1350 psig & ECCS flow is established (E-1--C)

CT#3 – Crew manually starts 22 SI Pump following SEC start failure. (E-0--J)

CT#4 – Crew manually starts 22 SI Pump following the Loss of Off-site Power. (E-0--J)

Facility: Salem Units 1 & 2 **Scenario No.:** 2 **Op Test No.:** D2

Examiners: ____________________ **Candidates:** ____________________ **CRS**

____________________ ____________________ **RO**

____________________ ____________________ **PO**

Objectives: Evaluate the ability of the Crew to perform a normal power ascension using the Integrated Operating Procedures. The crew should recognize and respond to the shift of 23BF19/40 to manual. Evaluate the ability of the Crew to recognize and respond to the SGFP trip and stabilize the plant without a plant trip. The crew should recognize and respond to the failure of the Pressurizer Pressure Channel I and take action to stabilize plant pressure. Evaluate the ability of the Crew to respond to the Steam Line break and enter the EOPs. Evaluate the response of the Crew to the trip of 22 AFW Pump. Evaluate the ability of the crew to recognize and respond to the failure of 22 Charging Pump to auto start. Evaluate the ability of the Crew to recognize the trip of 21 AFW Pump and properly transition to EOP-FRHS-1, Response to Loss of Secondary Heat Sink.

Initial Conditions: IC-3 at 70% power with the following conditions:

- 23 S/G Narrow Range Level transmitter, LT-539 failed and has been removed from service.
- 23 AFW Pump C/T for repair of a steam leak on MS132.

Turnover: The plant is in Mode 1 at 70% power with a power ascension in progress. 23 S/G NR Level transmitter, LT-539 is out of service for repairs. 23 AFW Pump is C/T due to a steam leak on. All other equipment is operating normally with all controls in automatic. Orders for the shift are to continue the ascension to 100% power at 10% /hr.

Event No.	Malf. No.	Event Type*	Event Description
1		N CRS R PO R RO	Perform a power ascension to 100 % power
2	I/O BM06 & CL06	I CRS PO	23BF19 & 23 BF40 shift to manual
3	BF0105A	C All	21 SGFP trip
4	PR0016A	I CRS RO	Pressurizer Pressure Channel I fails high
5	MS0247C MS0090C	M All	Main Steam Line Leak/Break in Containment on 23 S/G
6	AF0181B	C CRS PO	22 Aux Feedwater Pump trip
7	CV0185B	C CRS RO	22 Charging Pump fails to start on SEC
8	AF0181A	C CRS PO	21 Aux Feedwater Pump trip

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SIMULATOR EXAM SCENARIO

SCENARIO TITLE: Loss of Secondary Heat Sink

SCENARIO NUMBER: 2-D2

EFFECTIVE DATE: 2/22/99

EXPECTED DURATION: 1.5 Hours

REVISION NUMBER: 0

PROGRAM:

- [ ] **LO REQUAL**
- [X] **INITIAL LICENSE**
- [ ] **STA**
- [ ] **OTHER**____________

Revision Summary: **Rev 0**

PREPARED BY:	J C Lloyd for **(WD ASSOCIATES)**	2/17/99 **(DATE)**
APPROVED BY:	[signature] Salem OPS SRO **(TRAINING SUPERVISOR)**	2-18-99 **(DATE)**
APPROVED BY:	[signature] **(TRAINING SUPERVISOR)**	2/19/99 **(DATE)**

I. OBJECTIVES

A. Evaluate the ability of the crew to implement normal plant procedures to raise plant power to 100% of Rated Thermal Power.

B. Evaluate the ability of the crew to recognize and respond to 2BF19 & 23BF40 shifting to manual during the power reduction.

C. Evaluate the ability of the crew to recognize and respond to the trip of 21 SGFP and stabilize the plant without a reactor trip. The PO should control 23 S/G Level with manual control of 23BF19.

D. Evaluate the ability of the crew to recognize and respond to the Pressurizer Pressure Channel I failing high.

E. Evaluate the ability of the crew to recognize and respond to the Main Steam Line Break inside containment and to implement the EOPs.

F. Evaluate the ability of the crew to recognize and respond to the trip of 22 Aux Feedwater pump and control 23 & 24 S/G levels with the remaining AFW Pump.

G. Evaluate the ability of the crew to recognize and respond to the failure of 22 Charging Pump to auto start.

H. Evaluate the ability of the crew to recognize the trip of 21 AFW Pump as a Loss of Heat Sink and to properly transition to EOP-FRHS-1, Response to Loss of Secondary Heat Sink.

II. MAJOR EVENTS

A. Perform power ascension to 100 % power

B. 23BF19 and 23BF40 shift to MANUAL

C. 21 SGFP trip

D. Pressurizer Pressure Channel I fails high

E. Main Steam Line Break in Containment on 23 S/G

F. 22 Aux Feedwater Pump trip

G. 22 Charging Pump fails to auto start

H. 21 Aux Feedwater Pump trip resulting in a Loss of Heat Sink

III. SCENARIO SUMMARY

A. The crew will assume the watch with the plant in Mode 1 at 70% power. Directions to the shift are to continue the power ascension to 100%. All controls are in automatic and all equipment is operating normally with the following exceptions:

- 23Aux Feedwater Pump is C/T to repair a steam leak on MS132. The Maintenance Supervisor anticipates the work to be completed in approximately nine (9) hours.

- 23 S/G Narrow Range Level transmitter, LT-539 failed and has been removed from service. Work is expected to be complete and the transmitter returned to service by the end of shift.

B. After the power ascension has progressed to the satisfaction of the examination team, 23 S/G Feedwater Reg Valves BF19 and BF40 will shift to manual. The crew should terminate the power ascension and investigate.

C. While waiting for the shift to manual of BF19 and BF40 to be resolved, the 21 SGFP will develop thrust bearing problems, which cause the pump to trip. The PO should control 23 S/G level during the transient with manual operation of 23BF19/40. The crew should enter and perform the actions of S2.OP-AB.CN-0001.

D. When the plant is stable, the Pressurizer Pressure Channel I will fail high. This will cause pressurizer heaters to turn off, both spray valves to open and actual pressurizer pressure to lower. The RO should respond by placing the Master pressure controller in manual and close the spray valves. The crew should enter and perform the actions of S2.OP-AB.PZR-0001, Pressurizer Pressure Malfunction.

E. The major event is a Main Steam Leak on 23 S/G inside Containment. The crew will respond by entering and performing the actions of S2.OP-AB.STM-0001, Excessive Steam Flow. When the crew decides to manually trip the Reactor and enter into EOP-TRIP-1, Reactor Trip or Safety Injection, the leak will degrade into a rupture.

F. During the initial transient, 22 AFW Pump will trip on overcurrent and 22 Charging Pump will fail to auto start. The PO is expected to establish and maintain feed flow to 23 & 24 S/Gs using with 21 AFW Pump and the RO is expected to manually start 22 Charging Pump after the SEC is reset.

F. When flow is established to 24 S/G, 21 AFW Pump will trip resulting in a Loss of Secondary Heat Sink. The Crew is expected to respond by transitioning to EOP-FRHS-1, Response to Loss of Secondary Heat Sink at Step 20 of EOP-TRIP-1 or when the 21 AFW pump trips if past Step 26.

G. The crew will perform the actions of EOP-FRHS-1. The success path will be the restoration of feed by depressurizing the S/Gs and feeding with the Condensate System. The scenario may be terminated when level in at least one S/G is rising and with concurrence of the Examination Team.

IV. INITIAL CONDITIONS

IC-5 or IC-89 on ESG Disk, MOL at 70% power with the following conditions:

a. 23 S/G NR Level transmitter LT-539 is failed and is out of service.

b. 23 AFW Pump C/T for repair of a steam leak on MS132.

MALFUNCTIONS

	Malfunction	Severity	Delay	Ramp	Description	
____1.	SG0095C	0	0	0	23 S/G NR Level LT-539 fails low	
____2.	AF0181B	Trip	0	0	22 AFW Pump trip	
____3.	CV0185B	N/A	N/A	N/A	22 Charging Pump fail to start on SEC	
____4.	AN0363	2			G07 ADFCS Switch to manual	(ET-1)
____5.	AN0360	2			G15 ADFCS Trouble	(ET-1)
____6.	BF0105A	2	0	0	21 SGFP Trip, Thrust Bearing Press Hi	(ET-2)
____7.	PR0016A	100	0	0	Pzr Pressure Channel I fails high	(ET-3)
____8.	MS0247C	850k lb/hr	0	10 min	Main Steam Leak in Containment	(ET-4)
____9.	MS0090C	N/A	0	0	23 Main Steam Line Break in Containment	(ET-5)
____10.	AF0181A	Trip	0	0	21 AFW Pump trip	(ET-6)

I/O OVERRIDES

	Override/Type	SER Pt.	DI	DO	Condition	Description	
____1.	BM06		X		ON	23BF19 MANUAL switch	(ET-1)
____2.	CL07		X		ON	23BF40 MANUAL switch	(ET-1)
____3.	B201			X	OFF	2PR6 CLOSE PB light	
____4.	B201		X		ON	2PR6 CLOSE PB switch	

REMOTES

	Remote/Type	Condition	Description
____1.	S301D	Trip	23 S/G Level HI-HI CH I (LC539A)
____2.	S304D	Trip	23 S/G Level LO-LO CH I (LC539B)
____3.	AF20D	OFF	21 AFW Pump control power off
____4.	AF25D	OFF	22 AFW Pump control power off
____5.	DF38D	Alarm	MSS SG 3 NR level

TAGGED EQUIPMENT

	Description
____1.	Red Stripe 23 S/G NR Level transmitter LT-539
____2.	23 AFW Pump C/T for repair of a steam leak on MS132 - Open the Trip valve and C/T.

IV. SEQUENCE OF EVENTS

A. Designate shift positions.

B. Conduct a shift briefing outlining the shift instructions to the crew. (Provide each crew member with a copy of the Shift Turnover Sheet)

C. Inform the crew " The simulator is running and that board walk-downs should be performed. CRS please inform me when your Crew is ready to assume the shift.".

D. Allow sufficient time for panel walk-downs. When informed by the CRS that the Crew is ready to assume the shift, ensure the simulator is cleared of unauthorized personnel.

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
1. Power ascension using normal plant procedures. No malfunctions other than those already inserted to start the scenario. The crew will raise load at 10% per hr until either 100% power is reached or 23BF19/40 shift to manual.	• The **CREW** commences a power ascension IAW Step 5.2 of S2.OP-IO.ZZ-0004, Power Operation. - Notify the Systems Operator and the Condensate Polishing Operator of the upcoming power ascension. • The **PO** Initiates a Turbine load increase with IAW S2.OP-SO.TRB-0001, Turbine Generator Startup Operations. - INITIATES monitoring the Main Turbine Data display points on the Plant Computer. - Monitor Turbine parameters IAW S2.OP-SO.TRB-0001, Attachment 2. - Uses the REF ▲ and GO pushbuttons to attain desired load. - Monitor condenser ΔT Limits • The **RO** maintains AFD within the target band using Auto Rod motion and Dilution. • The **RO** MAINTAINS T_{AVG}/T_{REF} mismatch at minimum value with Auto Rod motion and Dilution. • The **RO** adjusts RCS Boron concentration to maintain Tavg and AFD using Boron Concentration Control, S2.OP-SO.CVC-0006. - DEPRESS Makeup Control Mode Select STOP Pushbutton. - SET Primary Water Flow Register to the number of gallons desired. - DEPRESS Makeup Control Mode Select DILUTE Pushbutton. - DEPRESS Makeup Control Mode Select START Pushbutton.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	- When dilution is complete, depress Makeup Control Mode Select STOP Pushbutton. - DEPRESS Makeup Control Mode Select AUTO Pushbutton. - DEPRESS Makeup Control Mode Select START Pushbutton.	
2. 23BF19 & 23BF40 shift to MANUAL.	The shift of 23BF19 & 23BF40 to manual causes the following plant response:	
After the power ascension has progressed sufficiently and with the concurrence of the examination team: insert ET-1, malfunctions AN0360 and AN0363 and overrides BM06 and CL07 to shift 23BF19 & 23BF40 MANUAL.	- 23 S/G Feed Reg Valves, 23BF19 & 23BF40 shift to manual. - OHA G-7, ADFCS SWITCH TO MANUAL - OHA G15, ADFCS TROUBLE	
	• The **CREW** responds to the alarms IAW the appropriate Alarm Response Procedures. • The **PO** identifies the problem to be associated with the 23BF19 & 23BF40, 23 S/G Feed Reg Valves by observing the blue MANUAL lights illuminated. - Manually adjusts the position of 23BF19 & 23BF40 as necessary to control 23 S/G level at the program value of 44%. • The **CREW** notifies I&C to investigate the failure shift of 23BF19/40 to manual.	
3. 21 SGFP trip	The Crew will be alerted to the SGFP problem by the following plant response:	
When the plant is stable and at the discretion of the Lead Examiner, insert ET-2, MALF BF0105A to trip 21 SGFP.	- OHA G-6, 21 SGFP TRBL - TURB THRUST BEARING OIL PRESSURE HI console alarm	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
Approximately 2 minutes after the Equipment Operator is dispatched, report that there is a significant amount of oil on the floor adjacent to the 21 SGFP.	• The **CREW** responds to the plant alarms IAW the appropriate Alarm Response Procedures. - Dispatch an Equipment Operator to investigate the SGFP alarms.	
The CREW may decide to initiate a power reduction in anticipation of a Feed Pump failure.	• The **CRS** enters and performs the actions of S2.OP-AB.CN-0001, Main Feedwater/ Condensate System Abnormality. • The **CREW** responds to the SGFP trip IAW S2.OP-AB.CN-0001, Main Feedwater/ Condensate System Abnormality. • The **PO** responds to the SGFP trip. - Maintains 23 S/G level by manually controlling 23BF19 & 23BF40. - Verifies the Turbine Runback is in progress - Ensures the Polisher Bypass valves, 21-23CN108s open. - Ensures the 2CN47, Heater string Bypass Valve opens. • The **RO** maintains Tavg, AFD and RIL within limits using Control Rod motion and Boration.	
4. Pressurizer Pressure Channel I fails high.	The Crew will be alerted to the malfunction by the following plant response:	
When the plant is stable, initiate the failure of Pressurizer Pressure Channel I failure, ET-3, malfunction PR0016A at 100%.	- RC PRESSURE DEVIATION HI console alarm on CC2. - Both Pzr Spray valves, PS-1 & 3 full open - Actual Pressurizer pressure lowering - OHA E-28, PZR HTR ON PRESS LO	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
NOTE: If pressure control is not regained in a timely manner, a reactor trip will occur at 1865 psig and a Safety Injection at 1765 psig	• The **RO** responds to the transient by: - Comparing pressurizer pressure indications will Pressure Controller output and determining the Pressure Channel I has failed. - Place the Master Pressure Controller in Manual. - Close both Spray Valves by depressing the Pressure Increase pushbutton. - Energize all Pressurizer heaters.	
	• The **CRS** enters and initiates actions IAW S2.OP-AB.PZR-0001, Pressurizer Pressure Malfunction.	
NOTE: If pressure falls below 2205 psig, the LCO for DNB (3.2.5) is applicable.	• The **CRS** reviews Tech Specs. – 3.3.1.1, Action 6 – 3.3.2.1, Action 19 – 3.4.5, Action a	
If requested to open the breaker for 2PR6, insert Overrides #3 & #4 (B201-ON) for 2PR6 switch and (B201-OFF) for 2PR6 lamp.	• The **CREW** notifies I&C of the failure and requests they investigate.	
5. Main Steam Leak Inside Containment on 23 S/G.	The Crew will be alerted to the failure by the following initial plant response:	
When Pressurizer pressure is stable and the Tech Spec review is sufficient, initiate the Main Steam Line Break at 850K lbm/hr, ramped over 10 min, ET-4, malfunction MS0247C.	- 23 S/G console alarm, FLOW HI - OHA C38, CFCU LEAK DETECTOR HI - CC1 console alarm, CONT PRESSURE HI - Reactor power rising - Steam flows in all S/Gs rising - Containment Temperatures & Pressures rising.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **CREW** should identify the transient as a steam leak inside containment and respond IAW S2.OP-AB.STM-0001, Excessive Steam Flow.	
When the Crew initiates a MSL Isolation and SI, initiate the Steam Line Rupture by inserting ET-5, malfunction MS0090C.	• The **CRS** should direct the plant to be tripped manually IAW S2.OP-AB.STM-0001, Excessive Steam Flow, Attachment 1.	
Critical Task #1: Sat____ Unsat____	• The **RO** should perform the actions of the Continuous Action Summary as follows: - Manually trip the Reactor - Verify the Reactor is tripped by observing at least three PR channels indicate < 5% and IR indications lowering with negative SUR - Manually initiate Loop 21-24 Main Steam Isolation. - Manually initiate Safety Injection (if an Auto SI has not occurred)	
	• The **CREW** should enter EOP-TRIP-1, Reactor Trip or Safety Injection.	
	• The **RO** performs the immediate actions of EOP-TRIP-1: - Trip the reactor - Verify the Reactor is tripped by observing at least three PR channels indicate < 5% and IR indications lowering with negative SUR - Trip the Turbine and verify TSV CLOSED and AST OIL PRESS LOW lights illuminated on RP4 - Verify Vital 4KV Bus status by observing bus voltage > 3900 volts - Manually initiate SI	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
Critical Task # 2: Sat____ Unsat____ NOTE: Closing 23AF11 is not critical since 23 AFW Pump is tagged.	• The **PO** should identify 23S/G as Faulted and isolate feed by closing 23AF21 & 23AF11.	
If requested to turn off control power to 22 or 21 AFW Pump, enter I/O 3 (AF20D) or I/O 4 (AF25D) for 21 or 22 AFW Pump respectively.	• The **CREW** should recognize the failure of 22 Charging Pump to auto start. • The **PO** should block and reset the C SEC. • The **RO** should manually start 22 Charging Pump. • The **PO** should respond to 22 AFW trip by establishing feed to 24 S/G ≥ 22E4 lbm/hr using 23 AFW Pump. • The **CREW** should respond to the trip of 22 AFW Pump IAW the applicable steps of EOP-TRIP-1.	
5. 21 Aux Feedwater Pump trip. **AS SOON AS** the minimum flow is established to 24 S/G, initiate the trip of 21 AFW Pump by inserting ET-6, malfunction AF0181A. If 21 AFW pump trip is delayed, S/G level may rise above 15% negating the need for FRHS.	• The **CREW** should recognize the loss of all feed and transition to EOP-FRHS-1, Response to Loss of Secondary Heat Sink at step 20 of EOP-TRIP-1.	
NOTE: If FRHS-1 is entered before these conditions occur, the associated actions are not required.	• The **CREW** should close Charging Pump mini flow valves 2CV139 & 2CV140 when RCS pressure falls below 1500 psig IAW TRIP-1 CAS. • The **CREW** should trip all RCPs when RCS pressure falls below 1350 psig IAW TRIP-1 CAS.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
f requested to close the breaker for 2PR6, remove Override #3 (B201-ON) for 2PR6 switch and lamp.		
	• The **RO** stops all RCPs if Running.	
	• The **RO/PO** performs valve alignments per EOP-APPX-3, SI Verification.	
	• The **RO/PO** Reset Safeguards actuations - Reset SI - Reset Phase A Isolation - Reset Phase B isolation - Open 21&22CA330 - Reset each SEC	
	• The **CREW** selects the S/G with the lowest level for depressurization.	
	• The **RO/PO** opens the selected MS10, S/G Atmospheric relief, and depressurizes the S/G to below 575 psig.	
	• The **RO/PO** maintains selected S/G pressure below 575 psig using the MS10.	
Approximately 4 minutes after the EO is dispatched, report that you are standing by at the selected BF19 & BF40.	• The **CREW** sends an Equipment Operator to locally open Feedwater Reg Valve, BF19 or BF40 for the selected S/G.	
Critical Task #3: Sat____ Unsat____ NOTE: The critical task is to establish feed to the S/G and encompasses several steps but is placed here for convenience.	• The **CREW** coordinates with the Equipment Operator to throttle open the selected BF19 & BF40.	
	• The **RO/PO** opens the FW Inlet Stop Valve, BF13 for the selected S/G.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **RO/PO** releases the selected S/G BF22 FW Stop-Check Valve.	
	• The **RO/PO** opens the 21&22CN48, SGFP Bypass Valves.	
When flow is established to the selected S/G and level is rising, with the concurrence of the Examination team the scenario may be terminated.	• The **RO/PO** closes the 21 & 22CN32, SGFP Suction Valves.	
After the scenario has been terminated, the CRS should refer to the ECG to Classify the event.	• The CRS refers to the ECG and classifies the event: – SAE - 3.1.1.B & 3.2.1.B **OR** 8.1.3.C	

V. SCENARIO REFERENCES

A. ES-301, Preparing Initial Operating Tests
B. K/A Catalog
C. JTA Listing
D. Technical Specifications
E. S2.OP-IO.ZZ-0004
F. S2.OP-SO.TRB-0001
G. S2.OP-SO.CVC-0006
H. S2.OP-SO.RPS-0004
F. Various Alarm Response Procedures
G. S2.OP-AB.CN-0001
I. S2.OP-AB.PZR-0001
J. S2.OP-AB.STM-0001
K. 2-EOP-TRIP-1
L. 2-EOP-FRHS-1

ATTACHMENT 1
UNIT TWO PLANT STATUS TODAY

MODE: 1	POWER: 70%	RCS BORON: 680 ppm	Mwe: 800

SHUTDOWN SAFETY SYSTEM STATUS (5, 6 & DEFUELED): N/A

REACTIVITY PARAMETERS: Core Burnup 8000 MWD/MTU

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

3.3.3.1 23LT-539 is failed and is out of service for repair.

3.7.1.2 23 AFW Pump is out of service to repair a steam leak on MS132. The 72 hour action expires at 2200 tomorrow.

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

Power ascension in progress IAW S2.OP-IO.ZZ-0004.

23 AFW Pump is out of service to repair a steam leak on MS132.

23 S/G Level transmitter LT-539 OOS for repairs.

PLANT TURNOVER IS AS FOLLOWS:

Yesterday, and leak developed on the oil cooler transfer valve for 22 SGFP. The pump was removed from service, the leak repaired and the pump placed back in service.

The orders for the shift are to raise power to 100% at 10%/hr.

ABNORMAL PLANT CONFIGURATIONS: NONE

CONTROL ROOM:

Unit 1 and Hope Creek at 80% power.
No penalty minutes in the last 24 hrs.

PRIMARY: NONE

SECONDARY: Heating Steam is aligned to unit 1.

RADWASTE: No discharges in progress

CIRCULATING WATER/SERVICE WATER:

ATTACHMENT 2
SIMULATOR READY FOR TRAINING CHECKLIST

_____1. Verify simulator is in correct load for training

_____2. All required computer terminals in operation

_____3. Simulator clocks synchronized

_____4. Required chart recorders advanced and ON (proper paper installed)

_____5. Rod step counters correct (channel check)

_____6. All tagged equipment properly secured and documented (TSAS Log filled out)

_____7. DL-10 log up-to-date

_____8. Required procedures clean

_____9. All OHA lamps operating (OHA Test)

_____10. All printers have adequate paper AND functional ribbon

_____11. Procedure pens available

_____12. Procedures in progress open and signed-off to proper step

_____13. Shift manning sheet available

_____14. SPDS reset

_____15. Reference verification performed with required documents available

_____16. Ensure a current RCS Leak Rate Worksheet is placed by Aux Alarm Typewriter with Baseline Data filled out

_____17. Required keys available

_____18. Video Tape (if applicable)

_____19. Ensure ECG Classification is correct – 960502140 CRCA-03

_____20. Reset P-250 Rod Counters

ATTACHMENT 3
CRITICAL TASK METHODOLOGY

In reviewing each proposed CT, the examination team assesses the task to ensure, that it is essential to safety. A task is essential to safety if, in the judgement of the examination team, the improper performance or omission of this task by a licensee will result in direct adverse consequences or in significant degradation in the mitigative capability of the plant.

The examination team determines if an automatically actuated plant system would have been required to mitigate the consequences of an individual's incorrect performance. If incorrect performance of a task by an individual necessitates the crew taking compensatory action that would complicate the event mitigation strategy, the task is safety significant.

1. Examples of CTs involving essential safety actions include those for which operation or correct performance prevents...

   - degradation of any barrier to fission product release
   - degraded emergency core cooling system (ECCS) or emergency power capacity
   - a violation of a safety limit
   - a violation of the facility license condition
   - incorrect reactivity control (such as failure to initiate Emergency Boration or Standby Liquid Control, or manually insert control rods)
   - a significant reduction of safety margin beyond that irreparably introduced by the scenario

2. Examples of CTs involving essential safety actions include those for which a crew demonstrates the ability to...

   - effectively direct or manipulate engineered safety feature (ESF) controls that would prevent any condition described in the previous paragraph.
   - recognize a failure or an incorrect automatic actuation of an ESF system or component.
   - take one or more actions that would prevent a challenge to plant safety.
   - prevent inappropriate actions that create a challenge to plant safety (such as an unintentional Reactor Protection System (RPS) OR ESF actuation.

ATTACHMENT 4
SCENARIO REVIEW CHECKLIST

Note: Attach a separate copy of this form to each scenario reviewed. This form is used as guidance for the examination team as they conduct their review for the proposed scenarios.

SCENARIO IDENTIFIER:	**REVIEWER:**

Initials Qualitative Attributes

_____1. The scenario has clearly stated objectives in the scenario.

_____2. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue crew into expected events.

_____3. The scenario consists mostly of related events.

_____4. Each event description consists of--

- the point in the scenario when it is to be initiated
- the malfunction(s) that are entered to initiate the event
- the symptoms/cues that will be visible to the crew
- the expected operator actions (by shift position)
- the event termination point

_____5. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.

_____6. The events are valid with regard to physics and thermodynamics.

_____7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

_____8. The simulator modeling is not altered.

_____9. All crew competencies can be evaluated.

_____10. The scenario has been validated.

_____11. If the sampling plan indicates that the scenario was used for training during the Initial Training Program, evaluate the need to modify or replace the scenario.

ATTACHMENT 5
ESG – CRITICAL TASKS

CT#1 – CRS orders MANUAL Rx Trip, Main Steam Line isolation and SI in response to the Main Steam Line rupture IAW S2.OP-AB.STM-0001, Attachment 1, Continuous Action Summary. (E-0--A)

CT#2 – Isolate feed to the Faulted S/G. (E-2--A)

CT#3 – Establish feed flow to at least one S/G using the Condensate System. (E-0--F)

Facility: Salem Units 1 & 2 **Scenario No.:** 3 **Op Test No.:** D3

Examiners: ____________________ **Candidates:** ____________________ CRS

____________________ ____________________ RO

____________________ ____________________ PO

Objectives: Evaluate the ability of the crew to perform a normal power ascension. The RO should recognize and respond to the inappropriate rod motion caused by PT-505 output failure during the power ascension. Evaluate the response of the crew to the failure of 22 S/G Pressure transmitter, PT-526A. Evaluate the ability of the crew to recognize and respond to a Fuel Element Failure. Evaluate the ability of the crew to respond to a S/G tube failure and their ability to implement the EOPs. Evaluate the ability of the crew to recognize and respond to the trip of 22 Aux Feedwater Pump. The PO should recognize the loss of the Steam Dumps and control S/G pressure with manual operation of the MS10.

Initial Conditions: IC-4 at 90% power. 23 S/G Feed Flow transmitter, FT-510 out of service for I & C testing.

Turnover: The plant is in Mode 1 with power at 90%. All equipment is operating normally with all controls in automatic. Orders for the shift are to continue the power ascension to 100% at 10% per hour.

Event No.	Malf. No.	Event Type*	Event Description
1		N CRS R PO R RO	Perform a normal power ascension.
2	RD0045	I CRS RO	The Output of PT505 fails causing rods to insert at maximum speed (72 spm)
3	SG0129B	I CRS PO	22 S/G Pressure transmitter, PT-526A fails high
4	CV0040	C CRS RO	Fuel Element failure
5	SG0078B	M All	22 SG Tube Leak/Rupture
6	AF0181B	C CRS PO	22 Aux Feedwater Pump trip
7	MS0093	I CRS PO	Loss of Steam Dump Vacuum permissive

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SIMULATOR EXAM SCENARIO

SCENARIO TITLE: SGTR

SCENARIO NUMBER: 3-D3

EFFECTIVE DATE: 2/22/99

EXPECTED DURATION: 1.5 Hours

REVISION NUMBER: 0

PROGRAM:

[ ]	**LO REQUAL**
[X]	**INITIAL LICENSE**
[ ]	**STA**
[ ]	**OTHER**____________

Revision Summary: **Rev 0**

PREPARED BY: J C Lloyd for (WD ASSOCIATES) — 2/17/99 (DATE)

APPROVED BY: Edward Gallagher Salem OPS SRO (TRAINING SUPERVISOR) — 2-18-99 (DATE)

APPROVED BY: [illegible] (TRAINING SUPERVISOR) — 2/19/99 (DATE)

I. OBJECTIVES

A. Evaluate the ability of the crew to implement normal plant procedures to raise plant power to 100% of Rated Thermal Power.

B. The crew should recognize and respond to the inappropriate rod motion caused by PT-505 output failure during the power ascension.

C. Evaluate the response of the crew to the failure of 22 S/G Pressure transmitter, PT-526A.

D. Evaluate the ability of the crew to recognize and respond to a Fuel Element Failure.

E. Evaluate the ability of the crew to respond to a S/G tube failure and their ability to implement the EOPs.

F. Evaluate the ability of the crew to recognize and respond to the failure of 22 Aux Feedwater Pump.

G. The PO should recognize the loss of the Steam Dumps and control S/G pressure and cooldown rate with manual operation of the MS10.

II. MAJOR EVENTS

A. Perform a power ascension to 100 % power.

B. The output of PT-505 fails high causing rods to insert at maximum rod speed (72 spm)

C. 22 S/G Pressûre transmitter, PT-526A fails high

D. Fuel Element failure

E. 22 SG Tube Leak/Rupture

F. 22 Aux Feedwater Pump trip

G. Loss of Steam Dump Vacuum permissive

III. SCENARIO SUMMARY

A. The crew will assume the watch with the plant in Mode 1 at 90% power. Directions to the shift are to continue the power ascension to 100% at 10% per hour. All controls are in automatic and all equipment is operating normally with the following exceptions:

- 23 S/G Feed Flow transmitter, FT-531A is out of service for I&C testing.

B. When the power ascension has progressed to the satisfaction of the Examination Team, the output of PT-505 will fail causing control rods to be inserted at the maximum speed of 72 spm. The RO should recognize the failure, take Rod Control to Manual and stabilize Tave. The crew should enter and take the actions of S2.OP-AB.ROD-0003.

C. After the investigation of the inappropriate rod motion has been initiated, 22 S/G Pressure Transmitter, PT-526A will fail high causing 22 S/G Atmospheric Dump Valve, 22MS10 to shift to manual. The PO should identify the failure and discuss the implications with the crew.

D. After a short delay for the PT-526A failure discussion, a fuel element failure will occur as a small leak at first and then degrade over time. The crew should recognize the Fuel Failure, enter and take the actions of IAW S2.OP-AB.RC-0002, High Activity in the Reactor Coolant and S2.OP-AB.RAD-0001, Abnormal Radiation.

E. The major event is a Steam Generator Tube Leak. The crew will enter and perform the actions of S2.OP-AB.SG-0001, Steam Generator Tube Leak. The leak will eventually degrade requiring a manual Reactor Trip and Safety Injection and implementation of the EOPs.

F. While performing actions EOP-TRIP-1, Reactor Trip or Safety Injection, 22 Aux Feedwater Pump will trip. The crew should respond by controlling S/G levels with 23 Aux Feedwater Pump and/or by throttling flow to 23 & 24 S/Gs.

G. The crew should progress through TRIP-1, Reactor Trip or Safety Injection and transition to EOP-SGTR-1, Steam Generator Tube Rupture at Step 27.

H. After transitioning to EOP-SGTR-1, Steam Generator Tube Rupture the Steam Dump Vacuum Permissive will be lost causing all Steam Dump Valves to close. The PO should control S/G pressures with the Atmospheric Relief Valves, controlling 22MS10 in manual.

I. When the actions for SI termination (Step 25) have been initiated and with the concurrence of the Examination Team, the scenario may be terminated.

IV. INITIAL CONDITIONS

IC-2 or IC-90 from the ESG disk, MOL at 90% power with the following conditions:

a. 23 S/G Feed Flow transmitter, FT-531 is out of service for I&C testing.

MALFUNCTIONS

	Malfunction	Severity	Delay	Ramp	Description	
_____1.	SG097C	0	0	0	23 S/G FF xmtr (FT531) CH II fail low	
_____2.	RD0045	N/A	N/A	N/A	Uncontrolled Rod Insertion in AUTO	(ET-1)
_____3.	SG0129B	1200	0	0	22 S/G Pressure, PT-526A fails high	(ET-2)
_____4.	CV0040	25 pins	0	0	Fuel Element failure	(ET-3)
_____5.	SG0078B	60 gpm	0	5 min	22 S/G tube Leak	(ET-4)
_____6.	AF0181B	0	0	0	22 Aux Feedwater Pump trip	(ET-5)
_____7.	MS0093	0	0	0	Loss of steam Dump vacuum permissive	(ET-6)

I/O OVERRIDES

	Override/Type	SER Pt.	DI	DO	Condition	Description
_____1.	None					

REMOTES

	Remote/Type	Condition	Description
_____1.	AF25D	OFF	22 AFW Pump control power OFF

TAGGED EQUIPMENT	
	Description

_____1. Red Stripe FT-531

IV. SEQUENCE OF EVENTS

A. Designate shift positions.

B. Conduct a shift briefing outlining the shift instructions to the crew. (Provide each crew member with a copy of the Shift Turnover Sheet)

C. Inform the crew " The simulator is running and that board walk-downs should be performed. CRS please inform me when your Crew is ready to assume the shift.".

D. Allow sufficient time for panel walk-downs. When informed by the CRS that the Crew is ready to assume the shift, ensure the simulator is cleared of unauthorized personnel.

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
1. Power ascension using normal plant procedures. No malfunctions other than those already inserted to start the scenario. The crew will raise load at 10% per hr until 100% power or the output of PT-505 fails.	• The **CREW** commences a power ascension IAW Step 5.2 of S2.OP-IO.ZZ-0004, Power Operations. - Notify the Systems Operator and the Condensate Polishing Operator of the upcoming power ascension. • The **PO** raises Turbine load IAW S2.OP-SO.TRB-0001, Turbine Generator Startup Operations. - Initiates monitoring the Main Turbine Data display points on the Plant Computer. - Monitor Turbine parameters IAW S2.OP-SO.TRB-0001, Attachment 2. - Uses the REF • and GO pushbuttons to attain desired load. - Monitor condenser ΔT Limits • The **RO** maintains AFD within the target band using Auto Rod motion and Dilution. • The **RO** Maintains T_{AVG}/T_{REF} mismatch at minimum value with Auto Rod motion and dilution. • The **RO** adjusts RCS Boron concentration to maintain Tavg and AFD using S2.OP-SO.CVC-0006, Boron Concentration Control. - DEPRESS Makeup Control Mode Select STOP Pushbutton. - SET Primary Water Flow Register to the number of gallons desired. - DEPRESS Makeup Control Mode Select DILUTE Pushbutton. - DEPRESS Makeup Control Mode Select START Pushbutton. - When dilution is complete, depress Makeup Control Mode Select STOP Pushbutton. - DEPRESS Makeup Control Mode Select AUTO Pushbutton.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	- DEPRESS Makeup Control Mode Select START Pushbutton.	
2. Output of PT-505 fails (Blown Fuse).	• The **RO** should recognize the inappropriate rod motion and place Rod Control in manual.	
When the power ascension has progressed to the satisfaction of the examination team, insert ET-1, malfunction RD0045 to cause continuous rod insertion at 72 spm.	• The **CREW** should terminate the power ascension and stabilize the plant. • The **CRS** should enter and take the actions of S2.OP-AB.ROD-0003, Continuous Rod Motion. • The **RO** should adjust Tavg to within 1.5°F of program using manual rod motion.	
NOTE: This malfunction does not affect PT505 indication on CC3. The crew may recognize the failed input to Steam Dumps and place the dumps in MS Pressure Control Mode IAW S2.OP-AB.ROD-0003.	• The **CREW** should investigate the cause and identify the following affects of the transient and request I&C to investigate: – RC LOOP TAVE-TREF DEVIATION CC2 console alarm. – TAVE-TREF Recorder indicates full upscale – Full demand on steam Dump Controller	
3. PT-526A, 22 S/G Pressure transmitter fails high.	The Crew will be alerted to the failure by the following plant response:	
When I&C has been requested to investigate inappropriate rod motion, initiate the failure of PT-526A by inserting ET-2, malfunction SG129B.	- OHA G7, ADFCS SWAP TO MANUAL - OHA G15, ADFCS TROUBLE • The **CREW** should respond to the alarms IAW appropriate Alarm Response Procedures.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
SIM OP NOTE: One (1) min after Event 3 has been initiated, initiate the fuel failure by inserting ET-3, malfunction CV0040 at 25 pins to allow activity to build up for the next event.	• The **PO** should scan the boards and determine PT-526A, 22 S/G Pressure transmitter has failed and 22MS10, 22 S/G Atmospheric Relief Valve shifted to manual by the blue manual light illuminated.	
	• The **CREW** should request I&C to investigate.	

4. Fuel Element Failure
 	
The first alarm will be a WARNING on 2R31 and will occur approximately 14 min after inserting ET-3, malfunction CV0040.
	The Crew will be alerted to the failure by the following plant response:
	
	- OHA A-6, RMS TROUBLE
	- Radiation levels will begin to increase on the following monitors:
	  ○ Letdown line monitor, 2R31
	  ○ Reactor Coolant Filter, 2R26
	  ○ Seal Water Injection Filter, 2R24A(B)
	  ○ Seal Water Return Filter, 2R25
	  ○ Containment, 2R2	

	• The **CREW** should respond to the alarms IAW the appropriate Alarm Response Procedures.	
	• The **CRS** should enter and take the actions of S2.OP-AB.RAD-0001, Abnormal Radiation. - Direct an announcement be made to warn personnel of the abnormal radiation condition.	
	• The **CRS** should initiate Attachment 1, of S2.OP-AB.RAD-0001, when it is determined that R31 rad level is rising or is in alarm.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **CRS** should enter and take the actions of S2.OP-AB.RC-0002, High Activity in the Reactor Coolant.	
When directed to take samples, request primary sample valves to be opened .	- Request chemistry to sample the RCS for activity. - Request Radiation Protection to initiate surveys of the plant. - Review Tech Specs.	
Five minutes after primary sample valves are opened, report as Chemistry Technician that the results of the sample will take about an hour but sample sink radiation levels were ten (10) times normal indicating a significant fuel failure and Maximum Letdown Flow is recommended.	• The **RO** places a Centrifugal Charging Pump in service: - Ensure Charging Master Flow Controller in AUTO - Close 2CV55, Charging Flow Control Valve - Place 23 Charging Pump Speed Controller in MANUAL - While lowering 23 Charging Pump speed to minimum, Adjust 2CV55 to maintain desired flow. - WHEN 23 Charging Pump is at minimum flow, Stop 23 Charging Pump. - Adjust 2CV55 to obtain desired flow - Place 2CV55 in AUTO.	
	• The **RO** raises Letdown flow to maximum: - Control Letdown pressure at 300 psig using manual control of 2CV18, Non-Regen Hx Outlet Valve. - Open 2CV3, 45 gpm orifice. - Return 2CV18 to auto.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS

5. 22 S/G Tube Leak

When Letdown flow has been maximized, initiate: 22 S/G tube leak by inserting ET-4, MALF SG0078B at 60 gpm, ramped over 5 min.

The Crew will be alerted to the failure by the following plant response:

- OHA E-28 PRZ HTR ON PRESS LOW
- OHA A06 RMS TROUBLE
- Rising level, Warning or Alarm on the following Rad Monitors:
  - R19B, S/G Blowdown
  - R46A-E, Main Stm Line
  - R53A-D, Main Stm Line N16
  - R15, Cond Air Ejector Monitor
  - R40, Cond Polishing Filter
- Pressurizer low level console alarm
- SER point 222, Pressurizer Heater On Pressure Low
- Actual Pzr level will lower
- Charging flow will rise

- The **CREW** should respond to the alarms IAW the appropriate Alarm Response Procedures.
- The **CRS** should enter and take the actions of S2.OP-AB.SG-0001, S/G Tube Leak.
- The **CRS** should enter and take the actions of S2.OP-AB.RAD-0001, Abnormal radiation.
- The **CREW** should identify 22 S/G as the affected S/G by:
  - Rising level on 2R19B
  - Rising level on 2R53 B
- The **CREW** should notify Chemistry:
- The **CREW** should notify Radiation Protection to survey the main Steam lines.
- The **CRS** should notify the operations Manager and commence a Reactor Shutdown IAW AB-LOAD.

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS

6. S/G Tube Rupture

When the decision to shut down the plant has been made, raise the tube leak to maximum by changing SG0078B to 600 gpm.

The crew will be alerted to the increased leak rate by the following plant response:

- Pressurizer level lowering rapidly
- OHA E-28 PRZ HTR ON PRESS LOW
- Pressurizer low level console alarm
- SER point 222, Pressurizer Heater On
- Pressure Low
- Charging flow will rise

- The **CREW** should recognize the change in leak rate and perform the following actions IAW S2.OP-AB.SG-0001, Steam Generator Tube Leak, Attachment 1, Continuous Action Summary.

Critical Step # 1: Sat____
Unsat____

- Initiate a Manual Reactor trip.
- Verify the Reactor is tripped by observing at least three PR channels indicate < 5% and IR indications lowering with negative SUR
- Initiate a Manual Safety Injection

- The **CREW** should enter and perform the actions of EOP-TRIP-1, Reactor Trip or Safety Injection Response.

- The **RO** performs the immediate actions of EOP-TRIP-1:

  - Trip the reactor
  - Verify the Reactor is tripped by observing at least three PR channels indicate < 5% and IR indications lowering with negative SUR
  - Trip the Turbine and verify TSV CLOSED and AST OIL PRESS LOW lights illuminated on RP4
  - Verify Vital 4KV Bus status by observing bus voltage > 3900 volts
  - Manually initiate SI

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
Critical Step #2: Sat____ **(Part 1 of 2) Unsat____**	• The **PO** should isolate Aux Feed Flow to 22 S/G by closing 22AF11 and 22AF21.	
	• The **PO** should reduce total Aux Feed Flow to ≥ 22E4 lbm/hr.	
7. 22 Aux Feed Pump Trip Five minutes after minimum AFW flow is established, initiate 22AFW Pump trip by inserting ET-5, malfunction AF0181B. If the Control Room requests control power removed from 22 AFW Pump, insert Remote AF25D to OFF.	The Crew will be alerted to the failure by the following plant response: - Console alarm on 2CC2 - Flashing STOP indication for 22 AFW Pump - Flow indication to 21 & 22 S/G falls to zero	
Critical Step # 3: Sat____ **Unsat____**	• The **PO** should respond by maintaining total AFW flow ≥ 22E4 lbm/hr by: - Raising 23 AFW Pump speed and throttling 21AF11 **OR** - Throttling 23 & 24AF21s	
	• The **CREW** performs EOP-TRIP-1 actions and transitions to EOP-SGTR-1, Steam Generator Tube Rupture at Step 27 when level in 22 S/G is observed rising in an uncontrolled manner.	
Since Auto mode is failed, 22MS10 setpoint adjustment may not be performed.	• The **PO** should control pressure below 1045 psig to prevent opening the S/G Safeties by manual operation of 22MS10.	
Critical Step #2: Sat____ **(Part 2 of 2) Unsat____**	• The **PO** closes the following valves: - 22MS167, Main Steam Isolation Valve - 22MS18, Main Steam Line Warmup Vlv - 22MS7, MSL Drain Isolation Valve - 22GB4, S/G Blowdown Isolation Valve	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **CREW** dispatches an Equipment Operator to align Secondary valves.	
	• The **RO/PO** performs Safeguards Reset actions: - Reset SI - Reset Phase A Isolation - Reset Phase B isolation - Open 21&22CA330 - Reset each SEC - Stop 21 & 22 RHR Pumps	
	• The **RO** stops 21 & 22 RHR Pumps.	
	• The **CRS** determines the Required RCS Cooldown Temperature IAW Table D.	C/D Temp________
	• The **PO** initiates an RCS Cooldown: - Place Steam Dumps in Manual - Adjusts Stm Pressure Demand to 0% - Selects MS Press Control - Adjusts Stm Press Valve Demand to 25%	
	• The **RO/PO** performs the following: - Stop both SI Pumps - Run only 21 or 22 Charging Pump	
8. Loss of Steam Dump Vacuum Permissive. When the cooldown has been initiated, insert ET-6, malfunction MS0093 to cause a loss of Steam Dump Vacuum Permissive.	The Crew will be alerted to the failure by the following plant response: - The closure of all Steam Dump valves - The CNDSR VAC permissive light on RP4 extinguishes.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
Critical Step #4: Sat____ Unsat____	• The **CREW** responds IAW appropriate steps of EOP-SGTR-1, cooling down using the S/G Atmospheric Relief Valves, 21, 23 &24MS10s • The **PO** places 21,23 &24MS10 in manual and fully opens the valves. • The **PO** maintains RCS temperature no more than 5°F above the Target Temperature of______ °F by throttling the MS10s.	
When the desired RCS temperature is reached and with the concurrence of the Examination Team, the scenario may be terminated.		
After the scenario has been terminated, the CRS should refer to the ECG to Classify he event.	• The CRS refers to the ECG and classifies the event: – Alert - 3.2.3.A	

V. SCENARIO REFERENCES

A. ES-301, Preparing Initial Operating Tests
B. K/A Catalog
C. JTA Listing
D. Technical Specifications
E. S2.OP-IO.ZZ-0004
F. S2.OP-SO.TRB-0001
G. S2.OP-SO.CVC-0006
H. Various Alarm Response Procedures
I. S2.OP-AB.ROD-0003
J. S2.OP-SO.RPS-0006
K. S2.OP-AB.RAD-0001
L. S2.OP-AB.RC-0002
M. S2.OP-AB.SG-0001
N. 2-EOP-TRIP-1
O. 2-EOP-SGTR-1

ATTACHMENT 1
UNIT TWO PLANT STATUS TODAY

MODE: 1	POWER: 90%	RCS BORON: 105 ppm	Mwe: 1000

SHUTDOWN SAFETY SYSTEM STATUS (5, 6 & DEFUELED): N/A

REACTIVITY PARAMETERS: Core Burnup 8000 MWD/MTU

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

I&C functional testing of 23 S/G Feed Flow transmitter, FT-531A.

PLANT TURNOVER IS AS FOLLOWS:

The orders for the shift are to raise power to 100% at 10%/hr.

ABNORMAL PLANT CONFIGURATIONS: NONE

CONTROL ROOM:

Unit 1 and Hope Creek at 80% power.
No penalty minutes in the last 24 hrs.

PRIMARY: NONE

SECONDARY: Heating Steam is aligned to unit 1.

RADWASTE: No discharges in progress

CIRCULATING WATER/SERVICE WATER:

ATTACHMENT 2
SIMULATOR READY FOR TRAINING CHECKLIST

_____1. Verify simulator is in correct load for training

_____2. All required computer terminals in operation

_____3. Simulator clocks synchronized

_____4. Required chart recorders advanced and ON (proper paper installed)

_____5. Rod step counters correct (channel check)

_____6. All tagged equipment properly secured and documented (TSAS Log filled out)

_____7. DL-10 log up-to-date

_____8. Required procedures clean

_____9. All OHA lamps operating (OHA Test)

_____10. All printers have adequate paper AND functional ribbon

_____11. Procedure pens available

_____12. Procedures in progress open and signed-off to proper step

_____13. Shift manning sheet available

_____14. SPDS reset

_____15. Reference verification performed with required documents available

_____16. Ensure a current RCS Leak Rate Worksheet is placed by Aux Alarm Typewriter with Baseline Data filled out

_____17. Required keys available

_____18. Video Tape (if applicable)

_____19. Ensure ECG Classification is correct – 960502140 CRCA-03

_____20. Reset P-250 Rod Counters

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In reviewing each proposed CT, the examination team assesses the task to ensure, that it is essential to safety. A task is essential to safety if, in the judgement of the examination team, the improper performance or omission of this task by a licensee will result in direct adverse consequences or in significant degradation in the mitigative capability of the plant.

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1. Examples of CTs involving essential safety actions include those for which operation or correct performance prevents...

   - degradation of any barrier to fission product release
   - degraded emergency core cooling system (ECCS) or emergency power capacity
   - a violation of a safety limit
   - a violation of the facility license condition
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_____1. The scenario has clearly stated objectives in the scenario.

_____2. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue crew into expected events.

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- the point in the scenario when it is to be initiated
- the malfunction(s) that are entered to initiate the event
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- the event termination point

_____5. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.

_____6. The events are valid with regard to physics and thermodynamics.

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_____8. The simulator modeling is not altered.

_____9. All crew competencies can be evaluated.

_____10. The scenario has been validated.

_____11. If the sampling plan indicates that the scenario was used for training during the Initial training Program, evaluate the need to modify or replace the scenario.

ATTACHMENT 5
ESG – CRITICAL TASKS

CT#1 – Manually trip the Reactor and initiate Safety Injection (E-0--D)

CT#2 – Isolate feed to and steam from the Ruptured S/G (E-3--A)

CT#3 – Establish the min required Aux Feed Flow prior to transition out of EOP-TRIP-1. (E-0--F)

CT#4 – Cooldown the RCS and maintain temperature (E-3--B)

Facility: Salem Units 1 & 2 **Scenario No.:** 4 **Op Test No.:** D4

Examiners: ______________________ **Candidates:** ______________________ CRS

______________________ ______________________ RO

______________________ ______________________ PO

Objectives: Evaluate the ability of the crew to perform a normal power reduction to 75% power. Evaluate the ability of the crew to perform a rapid power reduction. The crew should recognize and respond to the failure of control bank rod D3 to insert during the power reduction. Evaluate the response of the crew to the failure of 21 S/G Feed Flow Transmitter, FT-511 and the automatic transfer of Feedwater Reg Valves 21BF19 & 40 to manual. The crew should recognize and respond to the failure of the LT-459, Pressurizer Level failing low. Evaluate the ability of the crew to recognize and respond to the Main Turbine Lube Oil leak, failure of the Main Turbine Aux Oil Pump to auto start and subsequent abnormal vibrations on the Main Turbine. Evaluate the ability of the crew to recognize and respond to the failure of the Reactor and to implement the EOPs. Evaluate the ability of the crew to recognize the loss of all AC and to properly transition to the LOPA series EOPs.

Initial Conditions: IC-2 at 100% power with 21 S/G Feed Flow transmitter FT-510 out of service for circuit board replacement.

Turnover: The plant is in Mode 1 with power at 100%. 21 S/G Feed Flow transmitter FT-510 out of service for circuit board replacement. All other equipment is operating normally with all controls in automatic. Orders for the shift are to reduce power to 75% to remove 22 Condensate Pump from service for seal replacement.

Event No.	Malf. No.	Event Type*	Event Description
1		N CRS N PO N RO	Perform a normal power reduction
2		R ALL	Rapid power reduction
3	RD0065	C CRS RO	Control Bank Rod D3 fails to insert
4	SG0097A	I CRS PO	21 S/G Feed Flow transmitter FT-511 fails low.
5	PR017A	I CRS RO	LT-459, Pressurizer Level fails low
6	TU0075 TU0083A /B TA0306A	C CRS PO	MTLO Leak - Ramped from 0-90% over a 10 minute period Main Turbine high vibration Main Turbine Aux Bearing Oil Pump fails to auto start
7	RP0058 RP0059A	M ALL	Failure of the Reactor to Trip (Auto & Manual)
8	EL0134 EL0162 EL0146 EL0273A IO2ADD	M ALL	Loss of All AC Power 2B DG Trip 2C 4KV Bus Differential 2A DG Bkr fail to Auto Close 2A DG Bkr Trip upon Closure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SIMULATOR EXAM SCENARIO

SCENARIO TITLE:	ATWS
SCENARIO NUMBER:	4-D4
EFFECTIVE DATE:	2/22/99
EXPECTED DURATION:	1.5 Hours
REVISION NUMBER:	0
PROGRAM:	[ ] **LO REQUAL**
	[X] **INITIAL LICENSE**
	[ ] **STA**
	[ ] **OTHER**______________

Revision Summary: **Rev 0**

PREPARED BY:	J. Cl. Lloyd for **(WD ASSOCIATES)**	2/17/99 **(DATE)**
APPROVED BY:	Edward Hellig / Salem OPS SRO **(TRAINING SUPERVISOR)**	2-18-99 **(DATE)**
APPROVED BY:	[illegible] **(TRAINING SUPERVISOR)**	2/19/99 **(DATE)**

I. OBJECTIVES

A. Evaluate the ability of the crew to implement normal plant procedures to reduce plant power to 75%.

B. Evaluate the ability of the crew to perform a rapid power reduction IAW S2.OP-AB.GRID-0001, Grid Disturbance. The crew should recognize and respond to the failure of Control Bank rod D3 to insert during the power reduction.

C. Evaluate the response of the crew to the failure of 21 S/G Feed Flow Transmitter, FT-511 and the automatic transfer of Feedwater Reg Valves 21BF19 & 40 to manual.

D. The crew should recognize and respond to the failure of the LT-459, Pressurizer Level failing low.

E. Evaluate the ability of the crew to recognize and respond to the Main Turbine Lube Oil leak, failure of the Main Turbine Aux Oil Pump to auto start and subsequent abnormal vibrations on the Main Turbine.

F. Evaluate the ability of the crew to recognize and respond to the failure of the Reactor to trip and to implement the EOPs.

H. Evaluate the ability of the crew to recognize the loss of all AC and to properly transition to the LOPA series EOPs.

II. MAJOR EVENTS

A. Perform a normal power reduction

B. Control Bank Rod D3 fails to insert

C. 21 S/G Feed Flow transmitter FT-511 fails low

D. LT-459, Pressurizer Level fails low

E. MTLO Leak with Main Turbine high vibration and a failure of the Main Turbine Aux Bearing Oil Pump to auto start.

F. Failure of the Reactor to Trip (Auto & Manual)

G. Loss of All AC Power

III. SCENARIO SUMMARY

A. The crew will assume the watch at 100% power with directions to perform a power reduction to 75% for the removal of the 22 Condensate Pump from service for shaft seal replacement. All controls are in automatic and all equipment is operating normally with the following exceptions:

- 21 S/G Feed Flow transmitter FT-510 out of service for circuit board replacement.

B. When the normal power reduction has progressed sufficiently, a report from the systems operator will require a rapid power reduction IAW S2.OP-AB.GRID-0001, Grid Disturbance. During the power reduction, Control Bank Rod D3 will fail to insert. The crew should enter and take the actions of S2.OP-AB.ROD-0001, Misaligned/Immovable Rod and continue the power reduction IAW S2.OP-AB.GRID-0001.

C. 21 S/G Feed Flow Transmitter, FT-511 will fail low causing 21 S/G Feedwater Reg Valves 21BF19 and 21BF 40 to shift to manual.

D. After a short delay to allow conditions to stabilize, Pressurizer Level Transmitter FT-459 will fail low. This will raise charging flow and cause actual Pressurizer level to rise. The RO should take the Master Level Controller to manual and stabilize pressurizer level. The crew should take the actions of Annunciator Response Procedure S2.OP-AR.ZZ-0005 for OHA E-36, PZR HTR OFF LVL LO.

E. When Pressurizer level has been stabilized, a leak will occur in the Main Turbine Lube Oil System at the discharge of the shaft driven pump. All oil will be retained in the system by the guard pipe. As oil pressure lowers, the Aux Bearing Oil Pump will fail to auto start. The PO should recognize the failure of the Aux Bearing Oil Pump to auto start and respond by manually starting the pump to terminate the low oil pressure problem.

F. When the lube oil leak is initiated, a Main Turbine high vibration will also be initiated that will gradually degrade to the point where a manual trip is required.

G. The major event will be a failure of the Reactor to trip. The crew should implement the EOPs, enter and take the actions of EOP-TRIP-1, Reactor Trip or Safety Injection.

H. The crew should perform EOP-TRIP-1, Reactor Trip or Safety Injection and transition to EOP-FRSM-1, Response to Nuclear Power Generation at Step 2.2

I. The crew will perform the actions of EOP-FRSM-1, Response to Nuclear Power Generation. When Rapid Boration actions of Step 3 are complete, a Loss of All AC Power will occur, terminating the ATWS. The crew will transition to EOP-LOPA-1, Loss of All AC Power.

J. The crew will perform actions of EOP-LOPA-1, Loss of All AC Power. When SI Actuation and Reset actions of Steps 21-23 have been initiated, a Diesel Generator will become available. The crew should respond IAW Continuous Action Step 14 and restore power to the 4kV bus. When power is restored and with the concurrence of the Examination Team, the scenario may be terminated.

IV. INITIAL CONDITIONS

IC-2 or IC-91 from the ESG disk, MOL at 100% power with the following conditions:

a. 21 S/G Feed Flow transmitter FT-510 out of service for circuit board replacement.

b. Pressurizer Level Channel I selected for control

MALFUNCTIONS

	Malfunction	Severity	Delay	Ramp	Description	
____1.	TA0306A	N/A	N/A	N/A	2 Aux Brg Oil PP Auto Start Failure	
____2.	RD0065	47	0	0	Control Bank Rod D3 fails to insert	
____3.	RP0058	N/A	0	0	Failure of the Reactor to auto trip	
____4.	RP0059A	N/A	0	0	Failure of the Reactor to manually trip	
____5.	SG0096A	0	0	0	FT-510,21 S/G Feed Flow Fails Low	
____6.	SG0097A	0	0	0	FT-511, 21 S/G Feed Flow fails low	(ET-1)
____7.	PR0017A	0	0	0	LT-459, Pzr Level fails low	(ET-2)
____8.	TU0075	90	0	2 min	Main Turbine Lube Oil leak	(ET-3)
____9.	TU0083A	20 mils	0	10 min	Main Turbine high vibration	(ET-3)
____10.	TU0083B	20 mils	0	10 min	Main Turbine high vibration	(ET-3)
____11.	EL0134	0	0	0	Loss of all AC Power	(ET-4)
____12.	EL0162	Trip	0	0	2B DG Trip	(ET-4)
____13.	EL0146	0	0	0	2C 4KV Bus Differential	(ET-4)
____14.	EL0273A	0	0	0	2A DG Bkr fail to Auto Close	(ET-4)

I/O OVERRIDES

	Override/Type	SER Pt.	DI	DO	Condition	Description
____1.	CB05 (2ADD)		X		OFF	2A DIESEL GEN/BKR CLOSE
____2.	B440 (RTB A)		X		OFF	2A Rx Trip Bkr Open Switch off
____3.	B441 (RTB B)		X		OFF	2B Rx Trip Bkr Open Switch off
____4.	C310 (2E6D)		X		OFF	2E6D Bkr Open Switch off
____5.	C510 (2G6D)		X		OFF	2G6D Bkr Open Switch off

REMOTES

	Remote/Type	Condition	Description
____1.	DG01D	OFF	A SEC POWER (When Requested)
____2.	DG02D	OFF	B SEC POWER (When Requested)
____3.	DG03D	YES	C SEC POWER (When Requested)
____4.	AF20D	YES	21 AFW pp control power off (When Requested)
____5.	AF25D	YES	22 AFW pp control power off (When Requested)

TAGGED EQUIPMENT

	Description
____1.	Red Stripe FT-510

IV. SEQUENCE OF EVENTS

A. Designate shift positions.

B. Conduct a shift briefing outlining the shift instructions to the crew. (Provide each crew member with a copy of the Shift Turnover Sheet)

C. Inform the crew " The simulator is running and that board walk-downs should be performed. CRS please inform me when your Crew is ready to assume the shift.".

D. Allow sufficient time for panel walk-downs. When informed by the CRS that the Crew is ready to assume the shift, ensure the simulator is cleared of unauthorized personnel.

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
.. **Power reduction using normal plant procedures.** No malfunctions other than those already inserted to start the scenario. The crew will reduce load at 30% per hr until notified by the Systems Operator to rapidly reduce load.	• The **CREW** commences a power reduction IAW Step 5.3 of S2.OP-IO.ZZ-0004, Power Operations. - Notify the Systems Operator and the Condensate Polishing Operator of the upcoming load reduction. • The **PO** INITIATES a Turbine load reduction with IAW S2.OP-SO.TRB-0002, Turbine Generator Shutdown Operations. - INITIATES monitoring the Main Turbine Data display points on the Plant Computer. - Uses the REF ? and GO pushbuttons to attain desired load. • The **RO** MAINTAINS T_{AVG}/T_{REF} mismatch at minimum value with Auto Rod motion and Boration. • The **RO** adjusts RCS Boron concentration to maintain AFD in target band and Rods above Rod Insertion Limits using OP-SO.CVC-0006, Boron Concentration Control. - DEPRESS Makeup Control Mode Select STOP Pushbutton. - ADJUST 2CV172 Setpoint to the desired value. - SET Boric Acid Flow Register to the number of gallons desired. - DEPRESS Makeup Control Mode Select BORATE Pushbutton. - DEPRESS Makeup Control Mode Select START Pushbutton.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	- When Boration is complete, depress makeup Control Mode Select STOP Pushbutton. - ADJUST 2CV172 Setpoint to the pre-boration value. - DEPRESS Makeup Control Mode Select AUTO Pushbutton. - DEPRESS Makeup Control Mode Select START Pushbutton. • The **PO** verifies that SG Feed Pump suction pressure is being maintained ∃300 psig. • The **PO** monitors Condenser temperatures using the Plant Computer.	
2. Rapid load reduction IAW AB-GRID and failure of Control Bank Rod D3 to insert. AT the discretion of the examination team, Call as the Systems Operator and inform the crew that a K-6 Solar Disturbance is in affect and an EXCESS MVAR alarm has been received. The malfunction for rod D3 is Pre-inserted.	The crew will respond by entering and taking the actions IAW S2.OP-AB.GRID-0001, Grid Disturbance. • The **PO** should initiate a Turbine load reduction at 15%/min to 80% or less. • The **RO** should initiate a Boration at 25 gpm or more. After rods begin to move, the Crew will be alerted to the failure of Control Bank Rod to insert by the following plant response: - OHA E-24, ROD DEV OR SEQ - Individual Rod Position Indication on CC2. - Individual Rod Position Indication on the Process Computer. • The **CREW** should respond by continuing the power reduction IAW AB-GRID and taking action IAW the appropriate Alarm Response Procedures.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **RO** should identify the faulted rod and respond by placing Rod Control in MANUAL IAW S2.OP-AB.ROD-0001, Immovable/Misaligned Rods.	
	• The **CRS** should enter and take the actions of S2.OP-AB.ROD-0001, Immovable/ Misaligned Rods	
The crew may decide to continue the boration to restore Tave to program IAW AB-GRID.	• The **RO** should stop any boron concentration changes in progress.	
This action is specified by AB.ROD-1 but should NOT perform because raising turbine load is not permitted by AB.GRID.	• The **RO/PO** adjust Tavg to within 1.5 °F of program by adjusting Turbine load.	
	• The **CREW** should dispatch an Equipment Operator to investigate indications at the Rod Control cabinets.	
Three (3) min after told to investigate, report as the I&C Supervisor that the fuse for the moveable coil for rod D3 is blown and a replacement is being obtained.	• The **CREW** should request: - I&C investigate Rod Control. - Reactor Engineering confirm misaligned rod.	
	• The **CREW** should monitor QPTR and AFD.	
	• The **CRS** should review Tech Specs.	
3. FT-511, 21 S/G Feed Flow transmitter fails low.	The Crew will be alerted to the failure by the following plant response:	
When the Tech Spec review has been initiated, initiate the failure of FT-511 low by inserting ET-1, SG0097A at 0%.	- OHA G15, ADFCS TRBL - OHA G7, ADFCS SHIFT TO MAN - 21BF19 & 21BF40 shift to manual.	
	• The **CREW** responds to the alarms IAW the appropriate Alarm Response Procedures.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **PO** identifies the problem to be associated with 21 S/G Feed reg Valves, 21BF19 & 21BF40 by observing the blue MANUAL lights illuminated.	
Both Feed Flow indicators on CC2 for 21 S/G have failed. The PO should adjust 21BF19 by matching S/G levels and BF19 positions	- Manually adjusts the position of 21BF19 & 21BF40 as necessary to control 21 S/G level at the program value of 44%.	
	• The **CREW** identifies the failure of FT-511 as the cause of the transient.	
	• The **CREW** notifies I&C to investigate the failure of FT-511.	
4. LT-459, Pressurizer Level fails low.	The failure of LT-459 low causes the following plant response:	
When the plant is stable and I&C have been notified, initiate the failure if LT-459 by inserting ET-2, PR0017A at 0%.	- Indicated level will fail low causing charging flow to rise to compensate. - Actual Pressurizer level will begin to rise. - OHA E-36, PZR HTR OFF LVL LO - All Pressurizer Heaters de-energize - Letdown isolates	
	• The **CREW** responds to the alarms IAW the appropriate Alarm Response Procedures.	
	• The **RO** compares pressurizer level channels and determines Channel I to be failed.	
	• The **RO** places the Pressurizer Master Flow Controller in Manual and minimizes Charging Flow.	
	• The **RO** selects Pressurizer Level Channel III for Control.	
	• The **RO** restores Pressurizer heaters.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS

- The **RO/PO** Restores Letdown IAW S2.OP-SO.CVC-0001, Charging, Letdown and Seal Injection.
  - Open 2CV2, LTDWN LINE ISOL V.
  - Open 2CV277, LTDWN LINE ISOL V
  - Place 2CV2, LTDWN LINE ISOL V in AUTO.
  - Place 2CV2, LTDWN LINE ISOL V in AUTO.
  - Place 2CV277, LTDWN LINE ISOL V in AUTO.
  - Open 2CV7, LTDWN HX INLET V.
  - Place 2CV18 in MANUAL CLOSE.
  - Open 2CV18 until CLOSE (INC PRESS) pushbutton extinguishes.
  - Ensure Charging flow is 85-90 gpm.
  - Adjust 2CV71, to maintain 6-12 gpm
  - Open 2CV4, 75 GPM ORIFICE.
  - Adjust 2CV18, to maintain Letdown pressure approximately 300 psig
  - Ensure Master Flow Controller in AUTO.
  - Place 2CV55 in AUTO.
  - Adjust 2CV18, to maintain letdown pressure approximately 300 psig and place in AUTO.

- The **CRS** reviews Tech Specs and enters LCO 3.3.1.1 action 6.

- The **CRS** initiates the actions of S2.OP-SO.RPS-0003, Placing Pressurizer Channel I in the tripped condition.

- The **RO** restores Pressurizer Level to the program band IAW S2.OP-AR.ZZ-0005, Overhead Annunciators Window E-36.

EVALUATOR/INSTRUCT OR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
. Main Turbine Lube Oil Leak and High Turbine Vibration. When letdown is restored and pressurizer level is stable, initiate the MT Lube Oil leak and High Vibs by inserting ET-3, for malfunctions TU0075 at 90% with a 2 min ramp and TU0083A&B at 100% with a 10 min ramp.	The leak at the discharge of the Main Turbine Shaft Driven Lube Oil Pump will cause the following plant response: - Bearing Oil Header Pressure will lower. - The HP Seal Oil Backup Pump starts at 12 psig. - CC3 Console Alarm when the HP Seal Oil Backup Pump starts - Turbine vibration will rise resulting in a Turbine trip. - OHA G-35, TSI TROUBLE (Delayed) - SER point 268, TSI Trouble (Delayed) • The **PO** should recognize the failure of the Aux Bearing Oil Pump to start and manually start the pump. • The **CRS** should enter and take the actions of S2.OP-AB.TL-0001, Loss of Main Turbine Lube Oil. • The **PO** should monitor Turbine parameters per S2.OP-AB.TL-0001, Attachment 2. • The **CRS** should direct a load reduction at < 5%/min to reduce Turbine vibration and remove the Turbine from service.	
6. Failure of the Reactor to trip. NOTE: The malfunctions for this event (RP0058 & RP0059A) were pre-inserted at the beginning of the scenario.	• The **CREW** should respond to the Hi vibration alarm IAW the Alarm Response procedure. • The **RO/PO** should trip the Reactor and then trip the turbine at or before bearing vibration reaches 9 mils and then enter EOP-TRIP-1. • The **CREW** should recognize the failure of the Reactor to trip and respond IAW EOP-TRIP-1. • The **CRS** enters and directs the actions of EOP-TRIP-1.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **RO** should perform immediate actions of EOP-TRIP-1 and transition to EOP-FRSM-1.	
NOTE: Auto rod motion should be used if it will result in a higher rod speed.	- Trip the reactor using: → Both Trip Switches → Trip Breaker Bezels → 460V Breakers 2E6D & 2G6D - Verify the Reactor is tripped by observing at least three PR channels indicate < 5% and IR indications lowering with negative SUR - Trip the Turbine - Initiate Rod Insertion in Manual	
	• The **CRS** enters and directs the actions of EOP-FRSM-1, Response to Nuclear Power Generation.	
	• The **RO** starts the second Centrifugal Charging Pump and adjusts CV71 to maintain total RCP Seal Injection flow $\leq$ 40 gpm.	
Critical Step # 1: Sat____ Unsat ____	• The **RO/PO** initiates Rapid Boration as follows: - Starts 21 & 22 Boric Acid transfer Pumps in fast speed. - Opens CV175, Rapid Borate Stop Valve - Close 21 & 22 CV160, BAT Pump Recirc Valves	
	• The **CREW** should send Equipment Operators to: - Open the Reactor Trip Breakers - Trip the Main Turbine. - Close Primary water Valves	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS

'. Loss of All AC Power

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
After Rapid Boration Steps are complete, initiate the Loss of All AC Power by inserting ET-4 for the following malfunctions: - EL0134, Loss of All AC Power - EL0162, 2B DG Trip - EL0146, 2C 4KV Bus Differential - EL0273A, 2A DG Bkr fail to Auto Close Override 2ADD, 2A DG Bkr Trip CLOSE PB OFF	The loss of power will cause all control rods to fully insert and allow the Crew to transition out of EOP-FRSM-1. • The **CREW** should recognize Loss of All AC Power and transition to EOP-LOPA-1.	
When requested to de-energize the SECs, insert the following remote functions **AFTER** a four (4) min delay: – DG01D, A SEC – DG02D, B SEC – DG03D, C SEC	• The **CREW** should send an Equipment Operator to de-energize all SECs.	
	• The **PO** should initiate Blackout Coping Actions IAW S2.OP-AB.LOOP-0001, Loss of Off-site Power, Attachment 1, Part A. • The **CREW** should recognize the 2A DG Breaker did not auto close and attempt to close the breaker manually. • The **RO/PO** Closes the 2A DG Bkr 2ADD: - Press the Mimic Bus 2A DG BKR 2ADD pushbutton. - Verify 2A MIMIC BUS INTERLOCK CLOSE SELECTION light is illuminated. - Press 2A BREAKER CLOSE pushbutton	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **CREW** should recognize when the 2A DG Breaker will not close and two DGs are running without Service Water	
Critical Step # 2: Sat____ Unsat ____	• The **PO** stops the 2A & 2C EDG IAW EOP-LOPA-1 CAS	
	• The **CREW** should send Equipment Operators to: - Open 2SJ1 & 2SJ2, RWST to Charging Pump Valves. - Close 2SW26, Service Water to Turbine Building Isolation.	
<u>**Simulator Operator:**</u> When SI Actuation and Reset actions have been initiated: clear the Override on 2A D/G Bkr to allow breaker closure. THEN: As NEO, make report to the Control Room: 2A EDG Breaker was not racked in properly. The breaker has been racked in and electricians at the breaker recommend a re-closure attempt.	• The **RO/PO** initiates Safety Injection • The **RO/PO** closes: - Phase A Isolation valves (Table D) - Containment Isolation valves (Table E)	
	• The **PO** starts 2A EDG	
The Mimic Bus Pushbutton may have been previously been selected.	• The **PO** closes 2A EDG Bkr 2ADD: - Press the Mimic Bus 2A DG BKR 2ADD pushbutton. - Verify 2A MIMIC BUS INTERLOCK CLOSE SELECTION light is illuminated. - Press 2A BREAKER CLOSE pushbutton and verify bus voltage is > 3900 volts.	
	• The **CRS** should return to Continuous Action Step 14.1 when the 2A 4KV Bus is energized.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
Critical Step # 3: Sat____ Unsat ____	• The **RO/PO** should: - Start either 21 or 22 Service Water Pump. - Close 21SW20, Turbine Area SW Stop Valve.	
When the 2A 4 KV Bus has been energized, Service Water is restored and with the concurrence of the Examination Team, the scenario may be terminated.		
After the scenario has been terminated, the CRS should refer to the ECG to Classify the event.	• The CRS refers to the ECG and classifies the event: – SAE - 5.1.3 – SAE - 7.1.3 After 15 min.	

V. SCENARIO REFERENCES

A. ES-301, Preparing Initial Operating Tests
B. K/A Catalog
C. JTA Listing
D. Technical Specifications
E. S2.OP-IO.ZZ-0004
F. S2.OP-SO.TRB-0002
G. S2.OP-SO.CVC-0001
H. S2.OP-SO.CVC-0006
I. Various Alarm Response Procedures
J. S2.OP-AB.ROD-0001
K. S2.OP-AB.GRID-0001
L. S2.OP-SO.RPS-0003
M. S2.OP-AB.LOOP-0001
N. S2.OP-AB.TL-0001
O. 2-EOP-TRIP-1
P. 2-EOP-FRSM-1
Q. 2-EOP-LOPA-1

ATTACHMENT 1
UNIT TWO PLANT STATUS TODAY

MODE: 1	POWER: 100%	RCS BORON: 680 ppm	Mwe: 1140

SHUTDOWN SAFETY SYSTEM STATUS (5, 6 & DEFUELED): N/A

REACTIVITY PARAMETERS: Core Burnup 8000 MWD/MTU

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

21 S/G Feed Flow transmitter FT-510 out of service for circuit board replacement.

PLANT TURNOVER IS AS FOLLOWS:

The orders for the shift are to reduce power to 75% at 30%/hr and remove 22 Condensate Pump from service for shaft seal replacement.

ABNORMAL PLANT CONFIGURATIONS: NONE

CONTROL ROOM:

Unit 1 and Hope Creek at 80% power.
No penalty minutes in the last 24 hrs.

PRIMARY: NONE

SECONDARY: Heating Steam is aligned to unit 1.

RADWASTE: No discharges in progress

CIRCULATING WATER/SERVICE WATER:

ATTACHMENT 2
SIMULATOR READY FOR TRAINING CHECKLIST

______1. Verify simulator is in correct load for training

______2. All required computer terminals in operation

______3. Simulator clocks synchronized

______4. Required chart recorders advanced and ON (proper paper installed)

______5. Rod step counters correct (channel check)

______6. All tagged equipment properly secured and documented (TSAS Log filled out)

______7. DL-10 log up-to-date

______8. Required procedures clean

______9. All OHA lamps operating (OHA Test)

______10. All printers have adequate paper AND functional ribbon

______11. Procedure pens available

______12. Procedures in progress open and signed-off to proper step

______13. Shift manning sheet available

______14. SPDS reset

______15. Reference verification performed with required documents available

______16. Ensure a current RCS Leak Rate Worksheet is placed by Aux Alarm Typewriter with Baseline Data filled out

______17. Required keys available

______18. Video Tape (if applicable)

______19. Ensure ECG Classification is correct – 960502140 CRCA-03

______20. Reset P-250 Rod Counters

ATTACHMENT 3
CRITICAL TASK METHODOLOGY

In reviewing each proposed CT, the examination team assesses the task to ensure, that it is essential to safety. A task is essential to safety if, in the judgement of the examination team, the improper performance or omission of this task by a licensee will result in direct adverse consequences or in significant degradation in the mitigative capability of the plant.

The examination team determines if an automatically actuated plant system would have been required to mitigate the consequences of an individual's incorrect performance. If incorrect performance of a task by an individual necessitates the crew taking compensatory action that would complicate the event mitigation strategy, the task is safety significant.

1. Examples of CTs involving essential safety actions include those for which operation or correct performance prevents...

   - degradation of any barrier to fission product release
   - degraded emergency core cooling system (ECCS) or emergency power capacity
   - a violation of a safety limit
   - a violation of the facility license condition
   - incorrect reactivity control (such as failure to initiate Emergency Boration or Standby Liquid Control, or manually insert control rods)
   - a significant reduction of safety margin beyond that irreparably introduced by the scenario

2. Examples of CTs involving essential safety actions include those for which a crew demonstrates the ability to...

   - effectively direct or manipulate engineered safety feature (ESF) controls that would prevent any condition described in the previous paragraph.
   - recognize a failure or an incorrect automatic actuation of an ESF system or component.
   - take one or more actions that would prevent a challenge to plant safety.
   - prevent inappropriate actions that create a challenge to plant safety (such as an unintentional Reactor Protection System (RPS) OR ESF actuation.

ATTACHMENT 4
SCENARIO REVIEW CHECKLIST

Note: Attach a separate copy of this form to each scenario reviewed. This form is used as guidance for the examination team as they conduct their review for the proposed scenarios.

SCENARIO IDENTIFIER:	**REVIEWER:**

Initials Qualitative Attributes

_____1. The scenario has clearly stated objectives in the scenario.

_____2. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue crew into expected events.

_____3. The scenario consists mostly of related events.

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- the point in the scenario when it is to be initiated
- the malfunction(s) that are entered to initiate the event
- the symptoms/cues that will be visible to the crew
- the expected operator actions (by shift position)
- the event termination point

_____5. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.

_____6. The events are valid with regard to physics and thermodynamics.

_____7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

_____8. The simulator modeling is not altered.

_____9. All crew competencies can be evaluated.

_____10. The scenario has been validated.

_____11. If the sampling plan indicates that the scenario was used for training during the Initial training Program, evaluate the need to modify or replace the scenario.

ATTACHMENT 5
ESG – CRITICAL TASKS

CT#1 – Initiate a Rapid Boration (FR-S.1--C)

CT#2 – Stop any Diesel Generators running without Service Water (CAS)

CT#3 – Energize a bus and start a Service Water pump to prevent damage to running DGs (ECA-0.0--F)

SIMULATOR EXAM SCENARIO

SPARE

SCENARIO TITLE: FRHS-Feed & Bleed

SCENARIO NUMBER: 5-SP

EFFECTIVE DATE: 2/22/99

EXPECTED DURATION: 1.5 Hours

REVISION NUMBER: 0

PROGRAM:

- [ ] **LO REQUAL**
- [x] **INITIAL LICENSE**
- [ ] **STA**
- [ ] **OTHER**______________

Revision Summary: **Rev 0**

PREPARED BY: J C Lloyd for (WD ASSOCIATES) — 2/17/99 (DATE)

APPROVED BY: Edward Gallagher Salem OPS SRO (TRAINING SUPERVISOR) — 2-18-99 (DATE)

APPROVED BY: [illegible] (TRAINING SUPERVISOR) — 2/19/99 (DATE)

I. OBJECTIVES

A. Evaluate the ability of the crew to perform a normal ascension to 100 % power.

B. Evaluate the ability of the crew to recognize and respond to the failure of a Power Range Nuclear Instrument.

C. The crew should recognize and respond to the trip of 22 Vacuum Pump.

D. The crew should recognize and respond to the leaking PORV.

E. Evaluate the ability of the crew to respond to a FW Line Break on 21 S/G inside containment and eventual implementation of the EOPs.

F. Evaluate the ability of the crew to recognize and respond to the trip of 23 Aux Feedwater Pump during the Reactor Trip transient.

G. The crew should recognize and respond to the Loss of Off-site Power.

H. Evaluate the ability of the crew to recognize and respond to the loss of the 2B 4kV Bus and resultant loss of the 21 AFW Pump and transition to FRHS-1.

II. MAJOR EVENTS

A. Perform a normal ascension to 100 % power

B. Failure of Power Range Nuclear Instrument N43

C. 22 Vacuum Pump trips

D. 2PR1 develops a small leak

E. FW Line Break on 21 S/G inside containment

F. Overspeed trip of 23 Aux Feedwater Pump during the Reactor Trip transient

G. Loss of Off-site Power

H. Loss of the 2B 4kV Bus resulting in a Loss of Secondary Heat Sink

III. SCENARIO SUMMARY

A. The crew will assume the watch at 90% power with directions to perform an ascension to 100% power. All controls are in automatic and all systems are operating normally EXCEPT:

- 21 Aux Feedwater Pump C/T for bearing replacement. The Maintenance Supervisor anticipates the work to be completed in approximately fourteen (14) hours.

B. When the power ascension has progressed to the satisfaction of the Examination Team, Power Range Channel N43 will fail causing the associated bistables to trip. The Crew will enter and take the actions of S2.OP-AB.NIS-0001, Nuclear Instrumentation System Malfunction.

C. After the T/S have been evaluated for the PRNIS failure, 22 Vacuum Pump will trip causing condenser vacuum to degrade. The Crew should respond by entering and performing the actions of S2.OP-AB.COND-0001, Loss of Condenser Vacuum, including starting the out-of-service Vacuum Pumps.

D. After the Crew has stabilized condenser vacuum, 2PR1 will develop a leak causing Pressurizer pressure to lower. The crew is expected to respond IAW S2.OP-AB.PZR-0001, Pressurizer Pressure Abnormality.

E. After the Tech Spec review is complete, a Feed Line Break will occur on 21 S/G inside containment. The Crew should respond by entering S2.OP-AB.STM-0001, Excessive Steam Flow. The crew is expected to determine SG Levels are lowering, Trip the Reactor and enter EOP-TRIP-1, Reactor Trip or Safety Injection. When the reactor Trip is initiated, a Loss of Off-site Power will occur. The crew should respond IAW EOP-TRIP-1.

F. During the Reactor Trip, 23 Aux Feedwater Pump will trip on overspeed leaving only 22 Aux Feedwater Pump available to feed the Steam Generators. The crew should continue performing the actions of EOP-TRIP-1.

G. A loss of the 2B 4KV Vital Bus will occur resulting in the loss of 22 Aux Feedwater Pump. The Crew is expected to recognize the loss of all Aux Feed and will transition to EOP-FRHS-1, Response to Loss of Secondary Heat Sink, at Step 20 of EOP-TRIP-1.

H. When required by FRHS-1, the crew will initiate Feed & Bleed and continue with the actions of FRHS-1. When Containment Spray has been terminated, and with the concurrence of the examination team, the scenario may be terminated.

IV. INITIAL CONDITIONS

IC-2 or IC-94 from the ESG disk, MOL at 90% power with the following conditions:
a. 21 Aux Feedwater Pump C/T for bearing replacement.
b. Remove ALL BUT 22 and 23 Vacuum Pumps from service.

MALFUNCTIONS

	Malfunction	Severity	Delay	Ramp	Description	
____1.	AF0183	0	0	0	23 Aux Feedwater Pump overspeed trip	
____2.	NI0193C	.200	0	0	Power Range Channel N43 fails high	(ET-1)
____3.	VC0087A	0	0	0	22 Condenser Vacuum Pump Trip	(ET-2)
____4.	PR0018A	20k	0	2 min	PZR PORV 2PR1 develops leak	(ET-3)
____5.	BF0111A	10K gpm	0	8 min	21 S/G FW Line Break inside Containment	(ET-4)
____6.	EL0134	N/A	0	0	Loss of Off-site Power	(ET-5)
____7.	EL0145	0	5 min	0	Loss of 2B 4160V Vital Bus	(ET-5)

I/O OVERRIDES

	Override/Type	SER Pt.	DI	DO	Condition	Description

1. None

REMOTES

	Remote/Type	Condition	Description
____1.	AF20D	OFF	21 AFW pp Control Power off
____2.	AF21D	OFF	22 AFW pp Control Power off

TAGGED EQUIPMENT	
	Description

_____1. 21 Aux Feedwater Pump C/T for bearing replacement

OTHER:

Provide marked up copy of S2.OP-IO.ZZ-0004

V. SEQUENCE OF EVENTS

A. Designate shift positions.

B. Conduct a shift briefing outlining the shift instructions to the crew. (Provide each crew member with a copy of the Shift Turnover Sheet)

C. Inform the crew " The simulator is running and that board walk-downs should be performed. CRS please inform me when your Crew is ready to assume the shift.".

D. Allow sufficient time for panel walk-downs. When informed by the CRS that the Crew is ready to assume the shift, ensure the simulator is cleared of unauthorized personnel.

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
.. **Power ascension using normal plant procedures.** No malfunctions other than those already inserted to start the scenario. The crew will raise load at a maximum of 10% per hr until either 100% power is reached or PR N43 fails.	• The **CREW** commences a power ascension IAW Step 5.1 of S2.OP-IO.ZZ-0004, Power Operation. - Notify the Systems Operator and the Condensate Polishing Operator of the upcoming power ascension. • The **PO** raises Turbine load IAW S2.OP-SO.TRB-0001, Turbine Generator Startup Operations. - Initiates monitoring the Main Turbine Data display points on the Plant Computer. - Monitor Turbine parameters IAW S2.OP-SO.TRB-0001, Attachment 2. - Uses the REF ▲ and GO pushbuttons to attain desired load. - Monitor condenser ΔT Limits • The **RO** maintains AFD within the target band using Auto Rod motion and Dilution. • The **RO** Maintains T_{AVG}/T_{REF} mismatch at minimum value with Rod motion and dilution. • The **RO** adjusts RCS Boron concentration to maintain Tavg and AFD using Boron Concentration Control, S2.OP-SO.CVC-0006. - DEPRESS Makeup Control Mode Select STOP Pushbutton. - SET Primary Water Flow Register to the number of gallons desired. - DEPRESS Makeup Control Mode Select DILUTE Pushbutton. - DEPRESS Makeup Control Mode Select START Pushbutton. - When dilution is complete, depress Makeup	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	Control Mode Select STOP Pushbutton. - DEPRESS Makeup Control Mode Select AUTO Pushbutton. - DEPRESS Makeup Control Mode Select START Pushbutton.	
2. Power Range Channel N43 Fails High. When the power ascension has progressed to the satisfaction of the examination team, initiate the failure Power Range Channel N43 by inserting ET-1, for malfunction NI0193C.	• The Crew will be alerted to the failure by the following piant response: - OHA E-15, PR HI RNG FLUX HI - OHA E-31, PR OVRPWR ROD STOP - OHA E-47, PR NEUT FLUX RATE HI - OHA E-39, PR CH DEV • The **CREW** should stop the power ascension and respond to the alarms IAW the appropriate Alarm Response Procedure.	
Crew may enter S2.OP-AB.ROD-0003 first	• The **CRS** should enter and take the actions of S2.OP-AB.NIS-0001, Nuclear Instrumentation System Malfunction.	
RO may place rods in MANUAL when the failure is identified	• The **RO** should place Rod Control in MANUAL • The **CRS** initiates S2.OP-SO.RPS-0001, Nuclear Instrumentation Channel Trip/ Restoration to remove Power Range Channel N43 from service. • The **CREW** should request I&C assistance in removing Power Range N43 from service. • The **CRS** enters T/S 3.3.1.1 Actions 2 and 6	
3. 22 Vacuum Pump trips When the PRNIS TSAS's have been entered and I&C assistance requested, initiate the trip of 22 Vacuum Pump by inserting ET-2, MALF VC0087A	• The Crew will be alerted to the failure by the following plant response: - CC2 console alarm when the Vacuum Pump Trips. - Condenser vacuum will begin to lower. • The **RO/PO** should determine that the 22 Vacuum Pump tripped.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **CRS** should enter and take the actions of S2.OP-AB.COND-0001, Loss of Condenser Vacuum.	
Five minutes after the Equipment Operator is dispatched, report that the breaker for 22 Vacuum Pump has tripped on overcurrent. The vacuum pumps just started are running normally.	• The **CREW** should send an Equipment Operator to check operation of the Vacuum Pumps locally. • The **PO** should start the standby vacuum pumps.	
4. PR1 Develops a Leak When condenser vacuum has stabilized, initiate the leak on PR1 by inserting ET-3, malfunction PR0018A at 20000 lbm/hr with a 2 min ramp.	The crew will be alerted to the malfunction by the following plant response: - Pressurizer pressure lowers - Heaters energize - Spray valves close - Tail Pipe temperature rises - OHA E-28 • The **RO** should place heaters in manual and evaluate pressure control for proper operation.	
Crew may enter S2.OP-AB.RC-0001 and then transition to S2.OP-AB.PZR-0001	• The **CREW** should enter and take the actions of S2.OP-AB.PZR-0001, Pressurizer Pressure Abnormality and close PR6 and/or PR7 to attempt to isolate the leaking PORV followed by re-opening PR6 and PR7 sequentially to determine 2PR1 is leaking • The **CRS** should refer to Tech Specs and declare PR1 inoperable IAW 3.4.5.a.	
5. 21 S/G Feed Line Break. When the Tech Spec review is complete, initiate the Feed Line Break inside containment by inserting ET-4, malfunction BF0111D at 10k gpm with an 8 min ramp.	The Crew will be alerted to the failure by the following plant response: - CC2 Console Alarm for 24 S/G, Program Deviation Setpoint Actual - 24 S/G level will begin to lower - 24BF19, Feed Reg Valve will open to maintain level. - OHA G-15 ADFCS TROUBLE - Contmnt Press HI Bezel Alarm	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
	• The **CREW** should respond to the Console Alarms IAW the appropriate Alarm response Procedure.	
Crew may elect to initiate a MANUAL Rx Trip, SI and MSLI w/o entering S2.OP-AB.STM-0001	• The **CRS** should enter and take the actions of S2.OP-AB.STM-0001, Excessive Steam Flow.	
	• The **RO/PO** should identify the lowering level in 24 S/G and initiate a MANUAL Reactor trip, Safety Injection and MSLI	
	• The **CREW** should enter and take the actions of EOP-TRIP-1, Reactor Trip or Safety Injection.	
	• The **RO** performs the immediate actions of EOP-TRIP-1: - Trip the reactor - Verify the Reactor is tripped by observing at least three PR channels indicate < 5% and IR indications lowering with negative SUR - Trip the Turbine and verify TSV CLOSED and AST OIL PRESS LOW lights illuminated on RP4 - Verify Vital 4KV Bus status by observing bus voltage > 3900 volts - Initiate a MANUAL SI	
Critical Task #1: Sat_____Unsat_____	• Crew should isolate AFW flow to 21 SG by closing 21AF11 and 21AF21 NLT 10 minutes after the break	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
6. Loss of Off-Site Power and Trip of 23 AFW Pump		
30 seconds after the reactor is tripped, initiate the Loss of Off-site Power by inserting ET-5, malfunction EL0134. The trip of 23 AFW Pump is pre-inserted.	• The **CREW** should recognize the Loss of Off-site Power and continue with the actions of EOP-TRIP-1.	
Critical Task #2: Sat____ Unsat____	• Establish and maintain total Aux Feed Flow to 22 S/Gs at $\geq$ 22E4 lbm/hr. • PO should recognize and report loss of 23 AFW Pump	
7. Loss of the 2B 4KV Vital Bus Five minutes after the loss of off-site power, loss of the 2B 4KV Vital Bus will occur (ET-5) on MALF EL0145.	The Crew will be alerted to the failure by the following plant response: - The 2B 4KV Bus will de-energize - 2B D/G will remain running - All 4KV load breakers will trip (Not 460V Fds) - OHA J-2, 2B4KV VTL BUS DIFF PROT - OHA J-12, 2B DG URGENT TRBL - OHA J-18, 2B 4KV BUS UNDRVOLT - Loss of 22 AFW Pump • CRS directs an operator to start one CCW Pp per EOP-APPX-1	
When Feed & Bleed criteria is met, the Crew will proceed to Step 23.	• The **CREW** should recognize the loss of 22 Aux Feedwater Pump causing a Loss of Secondary heat Sink and should transition to EOP-FRHS-1, Response to Loss of Secondary Heat Sink, at Step 20, EOP-TRIP-1 • The **CREW** should send an Equipment Operator to investigate AFW Pump problems.	

EVALUATOR/INSTRUCTOR ACTIVITY	EXPECTED PLANT/STUDENT RESPONSE	COMMENTS
'hese valves are supplied with power from the 2B Vital Bus and will be de-energized.	• The **CREW** should dispatch Equipment Operators to position the following valves: - 2CV41, VCT Discharge Stop - 2CV68, Charging Discharge - 2SJ12,BIT Outlet	
Critical Task #3: Sat____ Unsat____	• The **RO** opens 2PR6 and opens both Pressurizer PORVs.	
	• The **CRS** directs EOP-APPX-3, SI Verification be performed.	
	• The **RO** performs Safeguards Reset Actions: - Reset SI - Reset Phase A Isolation - Reset Phase B Isolation - Open 21 & 22CA330, Containment Control Air Isolation Valves - Reset each SEC	
	• If Containment Spray has actuated, the **RO** should terminate Containment Spray: - Reset Spray Actuation - Stop both CS Pumps - Close 21 & 22CS2, CS Pump Discharge Valves	
When safeguards have been reset, and with the concurrence of the examination team, the scenario may be terminated.		
After the scenario has been terminated, the CRS should refer to the ECG to Classify the event.	• The CRS refers to the ECG and classifies the event: – SAE - 3.1.1.b & 3.2.1.b **OR** – SAE - 8.1.3.C	

VI. SCENARIO REFERENCES

A. ES-301, Preparing Initial Operating Tests
B. K/A Catalog
C. JTA Listing
D. Technical Specifications
E. S2.OP-IO.ZZ-0004
F. S2.OP-SO.TRB-0001
G. S2.OP-SO.CVC-0006
H. Various Alarm Response Procedures
I. S2.OP-AB.COND-0001
J. S2.OP-AB.NIS-0001
K. S2.OP-AB.PZR-0001
L. S2.OP-AB.STM-0001
M. S2.OP-SO.RPS-0001
N. 2-EOP-TRIP-1
O. 2-EOP-FRHS-1
P. 2-EOP-APPX-3

ATTACHMENT 1
UNIT TWO PLANT STATUS TODAY

MODE: 1	POWER: 90%	RCS BORON: 104 ppm	Mwe: 1040

SHUTDOWN SAFETY SYSTEM STATUS (5, 6 & DEFUELED): N/A

REACTIVITY PARAMETERS: Core Burnup 14,000 MWD/MTU

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

3.7.2 21 Aux Feedwater Pump out of service for bearing replacement. The 72 hr LCO expires at 2330 tomorrow.

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

Power ascension to 100%.

PLANT TURNOVER IS AS FOLLOWS:

- 21 Aux Feedwater Pump out of service for bearing replacement. Maintenance estimates the work will be complete in approximately 14 hours.
- The orders for the shift are to raise power to 100% at a rate not to exceed 10%/hr.

ABNORMAL PLANT CONFIGURATIONS: NONE

CONTROL ROOM:

Unit 1 and Hope Creek at 100% power.
No penalty minutes in the last 24 hrs.

PRIMARY: NONE

SECONDARY: Heating Steam is aligned to unit 1.

RADWASTE: No discharges in progress

CIRCULATING WATER/SERVICE WATER:

ATTACHMENT 2
SIMULATOR READY FOR TRAINING CHECKLIST

_____1. Verify simulator is in correct load for training

_____2. All required computer terminals in operation

_____3. Simulator clocks synchronized

_____4. Required chart recorders advanced and ON (proper paper installed)

_____5. Rod step counters correct (channel check)

_____6. All tagged equipment properly secured and documented (TSAS Log filled out)

_____7. DL-10 log up-to-date

_____8. Required procedures clean

_____9. All OHA lamps operating (OHA Test)

_____10. All printers have adequate paper AND functional ribbon

_____11. Procedure pens available

_____12. Procedures in progress open and signed-off to proper step

_____13. Shift manning sheet available

_____14. SPDS reset

_____15. Reference verification performed with required documents available

_____16. Ensure a current RCS Leak Rate Worksheet is placed by Aux Alarm Typewriter with Baseline Data filled out

_____17. Required keys available

_____18. Video Tape (if applicable)

_____19. Ensure ECG Classification is correct – 960502140 CRCA-03

_____20. Reset P-250 Rod Counters

ATTACHMENT 3
CRITICAL TASK METHODOLOGY

In reviewing each proposed CT, the examination team assesses the task to ensure, that it is essential to safety. A task is essential to safety if, in the judgement of the examination team, the improper performance or omission of this task by a licensee will result in direct adverse consequences or in significant degradation in the mitigative capability of the plant.

The examination team determines if an automatically actuated plant system would have been required to mitigate the consequences of an individual's incorrect performance. If incorrect performance of a task by an individual necessitates the crew taking compensatory action that would complicate the event mitigation strategy, the task is safety significant.

1. Examples of CTs involving essential safety actions include those for which operation or correct performance prevents...

   - degradation of any barrier to fission product release
   - degraded emergency core cooling system (ECCS) or emergency power capacity
   - a violation of a safety limit
   - a violation of the facility license condition
   - incorrect reactivity control (such as failure to initiate Emergency Boration or Standby Liquid Control, or manually insert control rods)
   - a significant reduction of safety margin beyond that irreparably introduced by the scenario

2. Examples of CTs involving essential safety actions include those for which a crew demonstrates the ability to...

   - effectively direct or manipulate engineered safety feature (ESF) controls that would prevent any condition described in the previous paragraph.
   - recognize a failure or an incorrect automatic actuation of an ESF system or component.
   - take one or more actions that would prevent a challenge to plant safety.
   - prevent inappropriate actions that create a challenge to plant safety (such as an unintentional Reactor Protection System (RPS) OR ESF actuation.

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_____9. All crew competencies can be evaluated.

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_____11. If the sampling plan indicates that the scenario was used for training during the Initial training Program, evaluate the need to modify or replace the scenario.

ATTACHMENT 5
ESG – CRITICAL TASKS

CT#1 – Isolate AFW flow to 21 SG within 10 mins. (Salem UFSAR Accident Analysis assumption)

CT#2 – Establish minimum Aux Feedwater flow to 22 S/Gs. (E-0--F)

CT#3 – Establish Feed & Bleed before the Pressurizer PORVs auto open. (FR-H.1--B)

Facility	Salem	Date of Exam: 02/22/99							Exam Level: SRO				
Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	3	3	7				3	6			2	24
	2	3	2	5				1	3			2	16
	3	1						1	1				3
	Tier Totals	7	5	12				5	10			4	43
2. Plant Systems	1	4			4	1	1	2	2	2	3		19
	2	2	1	1	3		1	1	3	1	3	1	17
	3	1			1					1		1	4
	Tier Totals	7	1	1	8	1	2	3	5	4	6	2	40
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		
					5		4		3		5		17

Note:
- Attempt to distribute topics among all K/A Categories: select at least one topic from every K/A category within each tier.
- Actual point totals must match those specified in the table.
- Select topics from many systems: avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
- Systems/evolutions within each group are identified on the associated outline.
- The shaded areas are not applicable to the category/tier.

As Given Written

Required
24
16
3
43
19
17
4
40
17

Facility Salem	Date: February 22, 1999		Exam Level: Imp.	SRO Points
Category	KA #	KA Topic	Imp.	Points
Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements.	3.8	1
	2.1.9	Ability to direct personnel activities inside the control room.	4.0	1
	2.1.18	Ability to make accurate, clear and concise logs, records, status boards, and reports.	3.0	1
	2.1.20	Ability to execute procedure steps.	4.2	1
	2.1.32	Ability to explain and apply all system limits and precautions.	3.8	1
	Total			5
Equipment Control	2.2.13	Knowledge of tagging and clearance procedures.	3.8	1
	2.2.20	Knowledge of the process for managing troubleshooting activities.	3.3	1
	2.2.22	Knowledge of limiting conditions for operations and safety limits.	4.1	1
	2.2.29	Knowledge of SRO fuel handling responsibilities.	3.8	1
	Total			4
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	3.0	1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	3.1	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1
	Total			3
Emergency Procedures and Plan	2.4.1	Knowledge of EOP entry conditions and immediate action steps.	4.6	1
	2.4.11	Knowledge of abnormal condition procedures.	3.6	1
	2.4.13	Knowledge of crew roles and responsibilities during EOP flowchart use.	3.9	1
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control 2. Core cooling and heat removal 3. Reactor coolant system integrity 4. Containment conditions 5. Radioactivity release control.	4.3	1
	2.4.30	Knowledge of which events related to system operations/status should be reported to outside agencies.	3.6	1
	Total			5
Tier 3 Target Point Total (RO/SRO)				17

Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
005	Residual Heat Removal System											X	2.2.24 Ability to analyze the affect of maintenance activities on LCO status.	3.8	1
007	Pressurizer Relief Tank/Quench Tank System	X											K1.03 RCS	3.2	1
008	Component Cooling Water System									X			A3.05 Control of the electrically operated, automatic isolation valves in the CCWS	3.1	1
041	Steam Dump System and Turbine Bypass Control				X								K4.17 Reactor trip	3.9	1
045	Main Turbine Generator System														
076	Service Water System														
078	Instrument Air System														
	K/A Category Point Totals:	1	0	0	1	0	0	0	0	1	0	1	Group Point Total:		4

Plant Systems - Tier 2/Group 2

Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
002	Reactor Coolant System	X											K1.07 Reactor vessel level indication system	3.7*	1
006	Emergency Core Cooling System									X			A3.03 ESFAS-operated valves	4.1	1
006	Emergency Core Cooling System				X								K4.05 Autostart of HPI/LPI/SIP.	4.4	1
010	Pressurizer Pressure Control System							X					A1.07 RCS pressure	3.7	1
011	Pressurizer Level Control System						X						K6.03 Relationship between PZR level and PZR heater control circuit	3.3	1
012	Reactor Protection System				X								K4.01 Trip logic when one channel OOC or in test	4.0	1
016	Non-Nuclear Instrumentation System			X									K3.01 RCS	3.6*	1
027	Containment Iodine Removal System														
028	Hydrogen Recombiner and Purge Control System														
029	Containment Purge System	X											K1.01 Gaseous radiation release monitors	3.7	1
033	Spent Fuel Pool Cooling System								X				A2.02 Loss of SFPCS	3.0	1
034	Fuel Handling Equipment System														
035	Steam Generator System										X		A4.01 Shift of S/G controls between manual and automatic control, by bumpless transfer	3.6	1
039	Main and Reheat Steam System								X				A2.05 Increasing steam demand, its relationship to increases in reactor power	3.6	1
055	Condenser Air Removal System														
062	A.C. Electrical Distribution								X				A2.01 Types of loads that, if de-energized, would degrade or hinder plant operation	3.9	1
062	A.C. Electrical Distribution		X										K2.01 Major system loads	3.4	1
064	Emergency Diesel Generators											X	2.1.12 Ability to apply technical specifications for a system.	4.0	1
064	Emergency Diesel Generators				X								K4.02 Trips for ED/G while operating (normal or emergency)	4.2	1
073	Process Radiation Monitoring System										X		A4.02 Radiation monitoring system control panel	3.7	1
073	Process Radiation Monitoring System										X		A4.01 Effluent release	3.9	1
075	Circulating Water System														
079	Station Air System														
086	Fire Protection System														
103	Containment System														
	K/A Category Point Totals:	2	1	1	3	0	1	1	3	1	3	1	Group Point Total:		17

Plant Systems - Tier 2/Group 1

Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
001	Control Rod Drive System								X				A2.06 Effects of transient xenon on reactivity	3.7	1
001	Control Rod Drive System	X											K1.05 NIS and RPS	4.4	1
001	Control Rod Drive System					X							K5.05 Interpretation of rod worth curves, including proper curve to use: all rods in (ARI), all rods out (ARO), hot zero power (HZP), hot full power (HFP)	3.9	1
003	Reactor Coolant Pump System	X											K1.03 RCP seal system	3.6	1
003	Reactor Coolant Pump System							X					A1.07 RCS temperature and pressure	3.4	1
004	Chemical and Volume Control System									X			A3.14 Letdown and charging flows	3.1	1
004	Chemical and Volume Control System	X											K1.18 CCWS	3.2	1
013	Engineered Safety Features Actuation System							X					A1.05 Main steam pressure	3.6	1
013	Engineered Safety Features Actuation System				X								K4.01 SIS reset	4.3	1
014	Rod Position Indication System														
015	Nuclear Instrumentation System						X						K6.04 Bistables and logic circuits	3.2	1
017	In-Core Temperature Monitor System														
022	Containment Cooling System									X			A3.01 Initiation of safeguards mode of operation	4.3	1
022	Containment Cooling System				X								K4.02 Correlation of fan speed and flowpath changes with containment pressure	3.4*	1
025	Ice Condenser System														
026	Containment Spray System										X		A4.01 CSS controls	4.3	1
056	Condensate System														
059	Main Feedwater System	X											K1.02 AFW System	3.4*	1
059	Main Feedwater System				X								K4.16 Automatic trips for MFW pumps	3.2*	1
061	Auxiliary / Emergency Feedwater System								X				A2.03 Loss of dc power	3.4	1
063	D.C. Electrical Distribution				X								K4.02 Breaker interlocks, permissives, bypasses and cross-ties.	3.2*	1
063	D.C. Electrical Distribution										X		A4.03 Battery discharge rate	3.1	1
068	Liquid Radwaste System														
071	Waste Gas Disposal System										X		A4.27 Opening and closing of the decay tank discharge control valve	2.7*	1
072	Area Radiation Monitoring System														
	K/A Category Point Totals:	4	0	0	4	1	1	2	2	2	3	0	Group Point Total:		19

Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
028	Pressurizer Level Control Malfunction				X			AA1.02 CVCS	3.4	1
036	Fuel Handling Incidents	X						AK1.01 Radiation exposure hazards	4.1	1
056	Loss of Off-Site Power					X		AA2.53 Status of emergency bus under voltage relays	3.2	1
E13	Steam Generator Overpressure									
E15	Containment Flooding									
	K/A Category Point Totals:	1	0	0	1	1	0	Group Point Total:		3

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
007	Reactor Trip									
008	Pressurizer Vapor Space Accident					X		AA2.22 Consequences of loss of pressure in RCS; methods for evaluating pressure loss	4.2	1
009	Small Break LOCA			X				EK3.21 Actions contained in EOP for small break LOCA/leak	4.5	1
009	Small Break LOCA			X				EK3.24 ECCS throttling or termination criteria	4.6	1
022	Loss of Reactor Coolant Makeup				X			AA1.08 VCT level	3.3	1
025	Loss of Residual Heat Removal System	X						AK1.01 Loss of RHRS during all modes of operation	4.3	1
027	Pressurizer Pressure Control Malfunction			X				AK3.04 Why, if PZR level is lost and then restored, that pressure recovers much more slowly	3.3	1
032	Loss of Source Range Nuclear Instrumentation									
033	Loss of Intermediate Range Nuclear Instrumentation						X	2.1.1 Knowledge of conduct of operations requirements.	3.8	1
037	Steam Generator Tube Leak					X		AA2.01 Unusual readings of the monitors; steps needed to verify readings	3.4	1
038	Steam Generator Tube Rupture			X				EK3.08 Criteria for securing RCP	4.2	1
038	Steam Generator Tube Rupture			X				EK3.08 Criteria for securing RCP	4.2	1
054	Loss of Main Feedwater	X						AK1.01 MFW line break depressurizes the S/G (similar to a steam line break)	4.3	1
058	Loss of DC Power						X	2.1.32 Ability to explain and apply all system limits and precautions.	3.8	1
060	Accidental Gaseous Radwaste Release									
061	Area Radiation Monitoring System Alarms									
065	Loss of Instrument Air									
E03	LOCA Cooldown and Depressurization	X						EK1.2 Normal, abnormal and emergency operating procedures associated with (LOCA Cooldown and Depressurization).	4.1	1
E05	Loss of Secondary Heat Sink		X					EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	4.2	1
E11	Loss of Emergency Coolant Recirculation					X		EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.2	1
E16	High Containment Radiation		X					EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.0	1
	K/A Category Point Totals:	3	2	5	1	3	2	Group Point Total:		16

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
E09	Natural Circulation Operations									
E10	Natural Circulation with Steam Void in Vessel with/without RVLIS	X						EK1.2 Normal, abnormal and emergency operating procedures associated with (Natural Circulation with Steam Void in Vessel with/without RVLIS).	3.6	1
E12	Uncontrolled Depressurization of all Steam Generators									
E14	High Containment Pressure			X				EK3.1 Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.	3.6	1
	K/A Category Point Totals:	3	3	7	3	6	2	Group Point Total:		24

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
001	Continuous Rod Withdrawal					X		AA2.04 Reactor power and its trend	4.3	1
003	Dropped Control Rod			X				AK3.04 Actions contained in EOP for dropped control rod	4.1*	1
005	Inoperable/Stuck Control Rod						X	2.1.12 Ability to apply technical specifications for a system.	4.0	1
011	Large Break LOCA			X				EK3.14 RCP tripping requirement	4.2	1
015	Reactor Coolant Pump Malfunctions	X						AK1.02 Consequences of an RCPs failure	4.1	1
017	Reactor Coolant Pump Malfunctions (Loss of RC Flow)									
024	Emergency Boration									
026	Loss of Component Cooling Water				X			AA1.05 The CCWS surge tank, including level control and level alarms, and radiation alarm	3.1	1
029	Anticipated Transient Without Scram			X				EK3.12 Actions contained in EOP for ATWS	4.7	1
029	Anticipated Transient Without Scram					X		EA2.04 CVCS centrifugal charging pump operating indication	3.3*	1
040	Steam Line Rupture					X		AA2.03 Difference between steam line rupture and LOCA	4.7	1
051	Loss of Condenser Vacuum					X		AA2.02 Conditions requiring reactor and/or turbine trip	4.1	1
051	Loss of Condenser Vacuum			X				AK3.01 Loss of steam dump capability upon loss of condenser vacuum	3.1*	1
055	Station Blackout			X				EK3.02 Actions contained in EOP for loss of offsite and onsite power	4.6	1
057	Loss of Vital AC Instrument Bus				X			AA1.01 Manual inverter swapping	3.7	1
059	Accidental Liquid Radwaste Release					X		AA2.02 The permit for liquid radioactive-waste release	3.9	1
062	Loss of Nuclear Service Water				X			AA1.05 The CCWS surge tank, including level control and level alarms, and radiation alarm	3.1	1
067	Plant Fire on Site						X	2.4.25 Knowledge of fire protection procedures.	3.4	1
068	Control Room Evacuation		X					AK2.03 Controllers and Positioners	3.1	1
069	Loss of Containment Integrity									
074	Inadequate Core Cooling		X					EK2.01 RCP	3.8	1
076	High Reactor Coolant Activity					X		AA2.02 Corrective actions required for high fission product activity in RCS	3.4	1
E02	SI Termination		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.9	1
E04	LOCA Outside Containment	X						EK1.2 Normal, abnormal and emergency operating procedures associated with (LOCA Outside Containment).	4.2	1
E06	Degraded Core Cooling									
E07	Saturated Core Cooling									
E08	Pressurized Thermal Shock			X				EK3.1 Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.	3.9	1

Facility Salem Date of Exam: 02/22/99 Exam Level: RO

Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	1	2	6				3	4				16
	2	2	2	5				2	5			1	17
	3							1	2				3
	Tier Totals	3	4	11				6	11			1	36
2. Plant Systems	1	4			7	1	1	4	1	2	2	1	23
	2	2	1	1	5		1	1	3	1	4	1	20
	3	2		1	2				2	1			8
	Tier Totals	8	1	2	14	1	2	5	6	4	6	2	51

3. Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	6	2	2	3	13

Note:
- Attempt to distribute topics among all K/A Categories: select at least one topic from every K/A category within each tier.
- Actual point totals must match those specified in the table.
- Select topics from many systems: avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
- Systems/evolutions within each group are identified on the associated outline.
- The shaded areas are not applicable to the category/tier.

Required
16
17
3
36
23
20
8
51
13

Facility Salem	Date:	February 22, 1999	Exam Level:	RO
Category	KA #	KA Topic	Imp.	Points
Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements.	3.7	1
	2.1.18	Ability to make accurate, clear and concise logs, records, status boards, and reports.	2.9	1
	2.1.20	Ability to execute procedure steps.	4.3	1
	2.1.3	Knowledge of shift turnover practices.	3.0	1
	2.1.32	Ability to explain and apply all system limits and precautions.	3.4	1
	2.1.9	Ability to direct personnel activities inside the control room.	2.5	1
	Total			6
Equipment Control	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0	1
	2.2.13	Knowledge of tagging and clearance procedures.	3.6	1
	Total			2
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	2.6	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	1
	Total			2
Emergency Procedures and Plan	2.4.1	Knowledge of EOP entry conditions and immediate action steps.	4.3	1
	2.4.12	Knowledge of general operating crew responsibilities during emergency operations.	3.4	1
	2.4.39	Knowledge of the RO's responsibilities in emergency plan implementation.	3.3	1
	Total			3
Tier 3 Target Point Total (RO/SRO)				13

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
005	Inoperable/Stuck Control Rod									
015	Reactor Coolant Pump Malfunctions	X						AK1.02 Consequences of an RCPs failure	3.7	1
017	Reactor Coolant Pump Malfunctions (Loss of RC Flow)									
024	Emergency Boration									
026	Loss of Component Cooling Water				X			AA1.05 The CCWS surge tank, including level control and level alarms, and radiation alarm	3.1	1
027	Pressurizer Pressure Control Malfunction			X				AK3.04 Why, if PZR level is lost and then restored, that pressure recovers much more slowly	2.8	1
040	Steam Line Rupture					X		AA2.03 Difference between steam line rupture and LOCA	4.6	1
051	Loss of Condenser Vacuum					X		AA2.02 Conditions requiring reactor and/or turbine trip	3.9	1
051	Loss of Condenser Vacuum			X				AK3.01 Loss of steam dump capability upon loss of condenser vacuum	2.8*	1
055	Station Blackout			X				EK3.02 Actions contained in EOP for loss of offsite and onsite power	4.3	1
057	Loss of Vital AC Instrument Bus				X			AA1.01 Manual inverter swapping	3.7*	1
062	Loss of Nuclear Service Water				X			AA1.05 The CCWS surge tank, including level control and level alarms, and radiation alarm	3.1	1
067	Plant Fire on Site					X		AA2.06 Need for pressurizing control room (recirculation mode)	3.3	1
068	Control Room Evacuation		X					AK2.03 Controllers and Positioners	2.9	1
069	Loss of Containment Integrity									
074	Inadequate Core Cooling		X					EK2.01 RCP	3.6	1
076	High Reactor Coolant Activity					X		AA2.02 Corrective actions required for high fission product activity in RCS	2.8	1
E06	Degraded Core Cooling									
E07	Saturated Core Cooling									
E08	Pressurized Thermal Shock			X				EK3.1 Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.	3.4	1
E09	Natural Circulation Operations			X				EK3.2 Normal, abnormal and emergency operating procedures associated with (Natural Circulation Operations).	3.2	1
E10	Natural Circulation with Steam Void in Vessel with/without RVLIS									
E12	Uncontrolled Depressurization of all Steam Generators									

Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
E14	High Containment Pressure			X				EK3.1 Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.	3.2	1
	K/A Category Point Totals:	1	2	6	3	4	0	Group Point Total:		16

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
001	Continuous Rod Withdrawal					X		AA2.04 Reactor power and its trend	4.2	1
003	Dropped Control Rod			X				AK3.04 Actions contained in EOP for dropped control rod	3.8*	1
007	Reactor Trip									
008	Pressurizer Vapor Space Accident									
009	Small Break LOCA			X				EK3.21 Actions contained in EOP for small break LOCA/leak	4.2	1
011	Large Break LOCA				X			EA1.09 Core flood tank initiation	4.3	1
011	Large Break LOCA			X				EK3.14 RCP tripping requirement	4.1	1
022	Loss of Reactor Coolant Makeup				X			AA1.08 VCT level	3.4	1
025	Loss of Residual Heat Removal System	X						AK1.01 Loss of RHRS during all modes of operation	3.9	1
029	Anticipated Transient Without Scram					X		EA2.04 CVCS centrifugal charging pump operating indication	3.2*	1
032	Loss of Source Range Nuclear Instrumentation									
033	Loss of Intermediate Range Nuclear Instrumentation					X		AA2.04 Satisfactory overlap between source-range, intermediate-range and power-range instrumentation	3.2	1
037	Steam Generator Tube Leak					X		AA2.01 Unusual readings of the monitors; steps needed to verify readings	3.0	1
038	Steam Generator Tube Rupture			X				EK3.06 Actions contained in EOP for RCS water inventory balance, S/G tube rupture, and plant shutdown procedures	4.2	1
038	Steam Generator Tube Rupture			X				EK3.08 Criteria for securing RCP	4.1	1
054	Loss of Main Feedwater	X						AK1.01 MFW line break depressurizes the S/G (similar to a steam line break)	4.1	1
058	Loss of DC Power						X	2.1.32 Ability to explain and apply all system limits and precautions.	3.4	1
059	Accidental Liquid Radwaste Release					X		AA2.02 The permit for liquid radioactive-waste release	2.9	1
060	Accidental Gaseous Radwaste Release									
061	Area Radiation Monitoring System Alarms									
E02	SI Termination		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.4	1
E03	LOCA Cooldown and Depressurization									
E04	LOCA Outside Containment									
E05	Loss of Secondary Heat Sink									
E11	Loss of Emergency Coolant Recirculation									
E16	High Containment Radiation		X					EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	2.6	1
	K/A Category Point Totals:	2	2	5	2	5	1	Group Point Total:		17

Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
028	Pressurizer Level Control Malfunction				X			AA1.02 CVCS	3.4	1
036	Fuel Handling Incidents									
056	Loss of Off-Site Power					X		AA2.53 Status of emergency bus under voltage relays	2.9	1
065	Loss of Instrument Air					X		AA2.08 Failure modes of air-operated equipment	2.9*	1
E13	Steam Generator Overpressure									
E15	Containment Flooding									
	K/A Category Point Totals:	0	0	0	1	2	0	Group Point Total:		3

Plant Systems - Tier 2/Group 1

Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
001	Control Rod Drive System				X								K4.02 Control rod mode select control (movement control)	3.8	1
001	Control Rod Drive System					X							K5.05 Interpretation of rod worth curves, including proper curve to use: all rods in (ARI), all rods out (ARO), hot zero power (HZP), hot full power (HFP)	3.5	1
001	Control Rod Drive System							X					A1.02 T-ref	3.1	1
003	Reactor Coolant Pump System	X											K1.03 RCP seal system	3.3	1
003	Reactor Coolant Pump System				X								K4.04 Adequate cooling of RCP motor and seals	2.8	1
003	Reactor Coolant Pump System							X					A1.07 RCS temperature and pressure	3.4*	1
004	Chemical and Volume Control System	X											K1.18 CCWS	2.9	1
004	Chemical and Volume Control System									X			A3.14 Letdown and charging flows	3.4	1
013	Engineered Safety Features Actuation System							X					A1.05 Main steam pressure	3.4	1
013	Engineered Safety Features Actuation System	X											K1.01 Initiation signals for ESF circuit logic	4.2	1
013	Engineered Safety Features Actuation System				X								K4.01 SIS reset	3.9	1
015	Nuclear Instrumentation System						X						K6.04 Bistables and logic circuits	3.1	1
015	Nuclear Instrumentation System				X								K4.05 Reactor trip	4.3	1
017	In-Core Temperature Monitor System							X					A1.01 Core exit temperature	3.7	1
022	Containment Cooling System									X			A3.01 Initiation of safeguards mode of operation	4.1	1
022	Containment Cooling System				X								K4.02 Correlation of fan speed and flowpath changes with containment pressure	3.1*	1
025	Ice Condenser System														
056	Condensate System														
059	Main Feedwater System	X											K1.02 AFW System	3.4	1
059	Main Feedwater System				X								K4.16 Automatic trips for MFW pumps	3.1*	1
061	Auxiliary / Emergency Feedwater System								X				A2.03 Loss of dc power	3.1	1
061	Auxiliary / Emergency Feedwater System				X								K4.02 AFW automatic start upon loss of MFW pump, S/G level, blackout, or safety injection	4.5	1
068	Liquid Radwaste System										X		A4.04 Automatic isolation	3.8	1
071	Waste Gas Disposal System										X		A4.27 Opening and closing of the decay tank discharge control valve	3.0*	1

Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
072	Area Radiation Monitoring System											X	2.1.27 Knowledge of system purpose and or function.	2.8	1
	K/A Category Point Totals:	4	0	0	7	1	1	4	1	2	2	1	Group Point Total:		23

Plant Systems - Tier 2/Group 2

Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
002	Reactor Coolant System	X											K1.07 Reactor vessel level indication system	3.5*	1
006	Emergency Core Cooling System									X			A3.03 ESFAS-operated valves	4.1	1
006	Emergency Core Cooling System				X								K4.05 Autostart of HPI/LPI/SIP.	4.3	1
010	Pressurizer Pressure Control System											X	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9	1
010	Pressurizer Pressure Control System							X					A1.07 RCS pressure	3.7	1
011	Pressurizer Level Control System						X						K6.03 Relationship between PZR level and PZR heater control circuit	2.9	1
012	Reactor Protection System				X								K4.01 Trip logic when one channel OOC or in test	3.7	1
014	Rod Position Indication System														
016	Non-Nuclear Instrumentation System			X									K3.01 RCS	3.4*	1
026	Containment Spray System				X								K4.01 Source of water for CSS, including recirculation phase after LOCA	4.2	1
026	Containment Spray System										X		A4.01 CSS controls	4.5	1
029	Containment Purge System	X											K1.01 Gaseous radiation release monitors	3.4	1
033	Spent Fuel Pool Cooling System								X				A2.02 Loss of SFPCS	2.7	1
035	Steam Generator System										X		A4.01 Shift of S/G controls between manual and automatic control, by bumpless transfer	3.7	1
039	Main and Reheat Steam System								X				A2.05 Increasing steam demand, its relationship to increases in reactor power	3.3	1
055	Condenser Air Removal System														
062	A.C. Electrical Distribution								X				A2.01 Types of loads that, if de-energized, would degrade or hinder plant operation	3.4	1
062	A.C. Electrical Distribution		X										K2.01 Major system loads	3.3	1
063	D.C. Electrical Distribution				X								K4.02 Breaker interlocks, permissives, bypasses and cross-ties.	2.9*	1
064	Emergency Diesel Generators										X		A4.09 Establishing power from the ring bus (to relieve ED/G)	3.2*	1
064	Emergency Diesel Generators				X								K4.02 Trips for ED/G while operating (normal or emergency)	3.9	1
073	Process Radiation Monitoring System										X		A4.01 Effluent release	3.9	1
075	Circulating Water System														
079	Station Air System														
086	Fire Protection System														
	K/A Category Point Totals:	2	1	1	5	0	1	1	3	1	4	1	Group Point Total:		20

Plant Systems - Tier 2/Group 3

Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
005	Residual Heat Removal System								X				A2.03 RHR pump/motor malfunction	2.9	1
007	Pressurizer Relief Tank/Quench Tank System	X											K1.03 RCS	3.0	1
008	Component Cooling Water System									X			A3.05 Control of the electrically operated, automatic isolation valves in the CCWS	3.0	1
027	Containment Iodine Removal System	X											K1.01 CSS	3.4*	1
028	Hydrogen Recombiner and Purge Control System														
034	Fuel Handling Equipment System														
041	Steam Dump System and Turbine Bypass Control				X								K4.17 Reactor trip	3.7	1
045	Main Turbine Generator System								X				A2.17 Malfunction of electrohydraulic control	2.7*	1
076	Service Water System				X								K4.03 Automatic opening features associated with SWS isolation valves to CCW heat exchangers	2.9*	1
078	Instrument Air System			X									K3.02 Systems having pneumatic valves and controls	3.4	1
103	Containment System														
	K/A Category Point Totals:	2	0	1	2	0	0	0	2	1	0	0	Group Point Total:		8

Question Topic:	Requirements for manual rod motion

Which one of the choices below correctly completes the following statement concerning the Rod Selector switch?

The Rod Selector Switch should remain in AUTO…

a. except as directed by the CRS.

b. but may be placed in MANUAL for Tave adjustments.

c. unless inserting rods during an ATWS, then MANUAL shall be selected immediately.

d. but if required to be placed in MANUAL, the CRS must directly observe all rod movement.

Ans:	b	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	b. Correct. Manual rod motion for Tave adjustments is permitted. a. While the CRS may direct the use of MANUAL Rod Control, the RO may use MANUAL control if necessary without direction from the CRS. c. If AUTO rod insertion will result in a higher rod speed, AUTO is preferred. d. There is no requirement for the CRS to directly observe MANUAL rod motion.

Tier:	Generic Knowledge and Abilities			**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	GENERIC	**System/Evolution Title:**	

Category:	1	Conduct of Operations
KA:	2.1.1	Knowledge of conduct of operations requirements.

RO Value:	3.7	**SRO Value:**	3.8	**CFR:**	**41.10 / 45.13**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
CONDUCT OF OPERATIONS	0300-00.00S-CONDOP-00	III.C.3	15	00	7
OPERATIONS STANDARDS	SH.OP-DD.ZZ-0004			1	

Question Source	New	**Question Modification Method**	

Question Source Comments:	
Material Required for Examination:	

Question Topic:	Caution tagging manually operated MOVs

A motor operated valve (MOV) SJ12, Boron Injection Tank Outlet Isolation Valve has been manually seated. In accordance with NC.NA-AP.ZZ-0005, Station Operating Practices, which one of the following correctly identifies the specific information required to be printed on the White Caution Tag that is installed on the breaker of that MOV?

a. The date and time the LCO for the Inoperable MOV expires.

b. The Technical Specification LCOs in effect due to the Inoperable MOV.

c. Direction for the MOV to be unseated by hand prior to the circuit breaker being closed.

d. Direction for the MOV to be electrically cycled as part of the return to Operability Requirements.

Ans:	c	Exam Level:	S	Cognitive Level:	Memory	

Explanation of Answer	c. - correct answer, must ensure valve will move manually prior to putting power on it a. - not procedurally required d. - caution tags cannot direct component operation b. - LCOs tracked via other means

Tier:	Generic Knowledge and Abilities						**RO Group:**	1	**SRO Group:**	1
System/Evolution Number:		GENERIC	**System/Evolution Title:**							
Category:	1	Conduct of Operations								
KA:	2.1.1	Knowledge of conduct of operations requirements.								
RO Value:	3.7	**SRO Value:**	3.8	**CFR:**	**41.10 / 45.13**					

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Station Operating Practices	NC.NA-AP.ZZ-0005(Q)	Attachment 5, 3.4.3	34	8	

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Log review for shift turnover

Given the following conditions:

- The on-coming Day Shift Reactor Operator (RO) is returning to shift after 4 days vacation
- Today is February 22, 1999

Which one of the following correctly identifies the date of the earliest Control Room Narrative Log the RO is required to review prior to participating in the shift turnover today?

a. February 20, 1999.

b. February 18, 1999.

c. February 17, 1999.

d. February 15, 1999.

Ans:	a	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	a. - correct answer, review last 48 hours prior to taking shift b. - 5 days, last time on shift, after turnover complete c. - 4 days, after turnover if vacation longer than 7 days d. - 7 days

Tier:	Generic Knowledge and Abilities			**RO Group:**	1	**SRO Group:**	1
System/Evolution Number:	GENERIC	**System/Evolution Title:**					
Category:	1	Conduct of Operations					
KA:	2.1.3	Knowledge of shift turnover practices.					
RO Value:	3.0	**SRO Value:**	3.4	**CFR:**	**41.10 / 45.13**		

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Shift Turnover Responsibilities	SC.OP-AP.ZZ-0107(Q)	3.4	3	10	
Shift Turnover And Logkeeping	0300-000.00S-TNOVER			1	2, 4

Question Source	NRC Exam Bank	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Tech Spec equipment log taking requirements

Given the following conditions:

- Unit 1 is performing a startup on Day Shift
- The crew is preparing to synchronize the main generator to the grid
- The PO reports to the Control Room Supervisor (CRS) that the 0730 Technical Specification log readings are not completed
- Current time is 1030

In accordance with SC.OP-AP.ZZ-0110. Use and Development of Operating Logs, which one of the following correctly identifies the required actions?

The Log readings…

a. shall be completed and reviewed before 1130.

b. shall be completed and reviewed before 1330.

c. have been missed. Make an entry in the narrative log that readings have been missed.

d. have been missed. Make an entry in the narrative log that readings have been missed and refer to Technical Specifications for any required actions.

Ans:	a	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	b, c, and d. - the Tech Spec logs SHALL be completed and reviewed within 4 hours of specified time, no exceptions a. - correct answer

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	1	Conduct of Operations

KA:	2.1.9	Ability to direct personnel activities inside the control room.

RO Value:	2.5	SRO Value:	4.0	CFR:	45.5 / 45.12 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Use And Development Of Operating Logs	SC.OP-AP.ZZ-0110(Q)	5.2.2.E	13	5	
Shift Turnover And Logkeeping	0300-000.00S-TNOVER			01	5.a, 8

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Documentation of incorrect logs from previous shift

The Unit 1 on-shift RO has noticed an obviously incorrect value logged on the previous shift's Control Room logs.

In accordance with SH.OP-DD.ZZ-0004, Operations Standards, which one of the following correctly describes all of the actions you shall take to correct the log reading?

a. The incorrect value shall be circled in red and the correct value, with an explanation, placed in the comments section.

b. The incorrect value shall be circled in red and the correct value logged . These changes will be initialed and dated by the original operator when next on shift.

c. A single line shall be drawn through the incorrect value, the correct value logged and the change dated and initialed. The correct value should then be circled in red with an explanation placed in the comments section.

d. A single line shall be drawn through the incorrect value, the correct value logged and the change dated and initialed. The log cannot be submitted until the reading is also initialed by the original log taker.

Ans:	c	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	a. - incorrect value should be lined out with single line d. - correct value should be red circled b. - log changes shall be initialed and dated immediately and by the operator making the changes c. - correct answer

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	1	Conduct of Operations

KA:	2.1.18	Ability to make accurate, clear and concise logs, records, status boards, and reports.

RO Value:	2.9	SRO Value:	3.0	CFR:	45.12 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Nuclear Business Unit Operations Standards	SH.OP-DD.ZZ-0004(Z)	5.4.1	36	1	
Shift Turnover And Logkeeping	0300-000.00S-TNOVER			01	8

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Reactivity Control Requirements

Which one of the choices below correctly completes the following statement concerning control of plant power changes?

For Mode 1 power changes ...

a. neither the CRS nor OS is required to be notified in advance of a normal dilution for Axial Flux Difference (AFD) control.

b. the CRS does NOT need to be informed prior to reducing load in response to a Feedwater problem.

c. the STA must be present at the controls for a power change of greater than 5%.

d. the STA must verify all boration and dilution calculations prior to the evolution.

Ans:	b	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	b. - correct answer, RO may take immediate action to respond to a plant transient without first notifying the CRS. a. - Either the CRS or OS are required to be notified. c. - not required d. - The CRS may review in place of the STA.

Tier:	Generic Knowledge and Abilities			**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	GENERIC	**System/Evolution Title:**	

Category:	1	Conduct of Operations
KA:	2.1.20	Ability to execute procedure steps.

RO Value:	4.3	**SRO Value:**	4.2	**CFR:**	**41.10 / 43.5 / 45.12**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Operations Standards	SH.OP-DD.ZZ-0004	4.1.3	14	1	7
Use And Control Of Procedures	0300-000.00S-PROCED			02	6.b

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	MOV operation

Excessive stroking of motor operated valves (MOV's) during surveillance testing has been identified as a reason for premature failure of motor actuators.

Which one of the following correctly identifies the procedural limit for full strokes on a MOV during surveillance testing in accordance with S1.OP-ST.SJ-0003, Inservice Testing Safety Injection Valves Modes 1-6?

a. 2 per hour

b. 3 per hour

c. 4 per hour

d. 5 per hour

Ans:	b	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	INPO OMR-312 has identified that excessive stroking of MOV's during surveillance testing activities can lead to premature motor actuator failures. Salem has committed to limiting the number of Full Stroke MOV cycles to no more than 3 per hour.

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	1	Conduct of Operations

KA:	2.1.32	Ability to explain and apply all system limits and precautions.

RO Value:	3.4	SRO Value:	3.8	CFR:	41.10 / 43.2 / 45.12

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
SURVEILLANCES AND TESTING	0300-000.00S-SURV00-00	IV.B	27	8	13.b
INSERVICE TESTING SAFETY INJECTION VALVES MODES 1-6	S1.OP-ST.SJ-0003(Q)	3.3	3	5	

Question Source	Previous 2 NRC Exams	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Power operation in excess of 100%

Unit 2 has been operating at power for several months. Due to an inadvertent dilution, the following power history occurred:

0300 - 100%
0315 - 100.1%
0320 - 100.3%
0325 - 100.5%
0330 - 100.8%
0335 - 101.2%
0340 - 101.8%
0345 - 101.5%
0350 - 100.9%
0355 - 100.2%
0400 - 100%

Which one of the following correctly completes the statement concerning Reactor Power?

The Control Room crew shall...

a. begin a shutdown due to exceeding Rated Thermal Power.

b. reduce power to obtain a 24 hour average power of no greater than 100%.

c. maintain power less than or equal to 100%. Since the transient is over no further action is required.

d. reduce power so the average for the 12 hour shift is no greater than 100% power.

Ans:	d	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	d. - correct answer. Power is permitted to be greater than 100% for short periods due to transient conditions provided the average for a 12 hour shift does not exceed 100%.

Tier:	Generic Knowledge and Abilities	**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	GENERIC	**System/Evolution Title:**	

Category:	2	Equipment Control

KA:	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.

RO Value:	4.0	**SRO Value:**	3.5	**CFR:**	**45.2**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
IOP-4, Power Operations	0300-000.S-IOP004	II.C.6	12	01	2

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Control Room indications of a MOV that has been manually operated

SJ1, RWST to Charging Pump Suction valve has been manually operated and positioned fully open.

Which one of the following correctly describes how the Reactor Operator/Plant Operator know that particular valve has been manually operated?

a. The OPEN indication will be illuminated and an Info Tag (sticker) will be affixed to the bezel.

b. The OPEN indication will be illuminated and a White Caution Tag (sticker) will be affixed to the bezel.

c. The position indication will be extinguished and a Red Blocking Tag (sticker) will be affixed to the bezel.

d. The position indication will be extinguished and an Info Tag (sticker) will be affixed to the bezel.

Ans:	d	Exam Level:	R	Cognitive Level:	Application	

Explanation of Answer	d. - correct answer, MOV power removed (position lights out) and an info tag is placed on the bezel. b. - no position indication available c. - RBT on the power supply, not on switch a. - no position indication available, RBT on the power supply, not on switch

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	2	Equipment Control

KA:	2.2.13	Knowledge of tagging and clearance procedures.

RO Value:	3.6	SRO Value:	3.8	CFR:	41.10 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Station Operating Practices	NC.NA-AP.ZZ-0005(Q)	Attachment 5, 3.4.1 & 3.4.3	34	8	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Tags on breakers to be removed from their cicle

Given the following conditions:

- A Red Blocking Tag (RBT) is hung on a 480 VAC breaker
- This breaker is tagged in the OPEN position
- The bus associated with this breaker is energized

Which one of the following correctly completes the description of the required tagging actions if this breaker is required to be removed from its cubicle for maintenance?

The RBT shall...

a. be removed from the breaker but kept active and maintained in the physical possession of the Supervisor responsible for the job while the breaker is out of the cubicle.

b. remain on the breaker. A White Caution Tag is installed on the safety rope/tape placed across the cubicle opening.

c. be removed from the breaker. The same RBT is installed on the Foreign Material Exclusion device placed in the cubicle opening.

d. remain on the breaker. An additional RBT is installed on the Foreign Material Exclusion device placed in the cubicle opening.

Ans:	c	Exam Level:	S	Cognitive Level:	Memory	

Explanation of Answer	d. - RBT shall be removed from the breaker a. - Tags cannot be kept "active" while removed for their designated equipment, component b. - rope required for energized bus but WCT not placed on it, RBT removed from breaker c. - correct answer

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	2	Equipment Control

KA:	2.2.13	Knowledge of tagging and clearance procedures.

RO Value:	3.6	SRO Value:	3.8	CFR:	41.10 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
TRIS+ Tagging Operation	SH.OP-AP-ZZ-0015(Q)	Attachment 2, Electrical A	53	3	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Time limits on partial temporary tagging releases

Unit 1 is operating at 100% power. During a scan of control board indications, the RO observed the "VCT LEVEL HI-LO" & "VCT LEVEL LO MAKEUP NOT IN AUTO" console alarms illuminated and determined makeup controls were not restored to AUTO following a recent dilution. Makeup controls were placed in AUTO, VCT level restored and the console alarms cleared. No other audible or visual alarms were received. A check of annunciators indicates the CC2 Group alarm function is not working.

In accordance with SC.OP-AP.ZZ-0108, Removal/Return of Nuclear Safety Equipment, which one of the following correctly identifies the actions you shall take for these conditions?

a. Make a One Hour Report for a Loss of Annunciators.

b. Initiate a Priority 3 AR to address the failure of the CC2 Group Console Alarm.

c. Initiate a Priority "A" Action Request to address the failure of the CC2 Group Console Alarm.

d. Begin a controlled shutdown due to loss of annunciators.

Ans:	c	Exam Level:	S	Cognitive Level:	Comprehension	

Explanation of Answer	c. - Correct. a. - Group console alarms are not considered "Annunciators" and do not require a one hour report. b. – Priority 3 is typically assigned to normal maintenance activities. d. - No requirement for a shutdown and certainly not until the problem can be quantified.

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	2	Equipment Control

KA:	2.2.20	Knowledge of the process for managing troubleshooting activities.

RO Value:	2.2	SRO Value:	3.3	CFR:	43.5 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Removal/Return of Nuclear Safety Equipment	SC.OP-AP.ZZ-0108	Att. 7	45	8	
Action Request Process	NC.NA-AP.ZZ-0000	Att. 2	20	3	
Work Control Process	0300-000.00S-WORK00-00	VIII.A	30,31		7

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	1.25 surveillance extensions

Given the following conditions with Unit 1 operating at 100% power:

- 11 Safety Injection (SI) Pump is out of service for repairs to 1SW169, SW Isolation to 11 SI Pump. Repairs are expected to be completed within the next 24 hours.
- A routine QA Audit of completed surveillance procedures has determined the quarterly surveillance performed on 12 SI Pump (Per S1.OP-ST.SJ-0002) 35 days ago was not properly completed.

In accordance with Technical Specifications, which one of the following actions is correct for this situation?

a. Enter T.S. 3.0.3 but the required actions can be delayed for 24 hours in accordance with T.S. 4.0.3.

b. Per T.S. 4.0.3, re-perform the surveillance on 12 SI Pump within 24 hours, otherwise enter T.S. 3.0.3

c. Enter T.S. 3.0.3. The 25% allowance of T.S. 4.0.2 has been exceeded.

d. Enter T.S. 3.0.3 until the LCO applicable to the SI Pumps is met.

Ans:	a	Exam Level:	S	Cognitive Level:	Comprehension

Explanation of Answer	a. Correct answer. 3.0.3 must be entered but the actions may be delayed in accordance with 4.0.3. b. 3.0.3 must be entered at the time of the discovery. c. 4.0.2 is the wrong specification. d. 3.0.3 may be exited when either SI Pump operability is restored.

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	2	Equipment Control

KA:	2.2.22	Knowledge of limiting conditions for operations and safety limits.

RO Value:	3.4	SRO Value:	4.1	CFR:	43.2 / 45.2

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Technical Specifications Surveillance Program	NC.NA-AP.ZZ-0012(Q)	4.5.1	8	7	
Surveillances And Testing	0300-000.00S-SRUV00			00	1.d, 2.b

Question Source	Utility Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Refueling SRO responsibilities for non-core alteration fuel handling activities

Given the following conditions:

- Both Units are operating at 100% power
- Reactor Engineering has determined that a single fuel assembly in the spent fuel pool needs to be moved to a new storage location and has initiated an Action Request for this movement
- This assembly has been in the pool (out of the reactor vessel) for 100 months
- The Operations Superintendent has given permission for this movement
- Radiation Protection has been notified of the movement

Which one of the following correctly completes the statement concerning the operations requirements for this evolution?

A Senior Reactor Operator...

a. is not required for this evolution.

b. shall be in the Fuel Handling Building during any fuel movement.

c. is not required if SFP boron concentration is verified to be >2000 ppm.

d. shall be on the crane trolley during any fuel movement.

Ans:	a	Exam Level:	S	Cognitive Level:	Application	

Explanation of Answer	c. - not a requirement for stationing an SRO b. - not required for non-core alt fuel handling a. - correct answer d. - An SRO is not required for fuel movement in the Fuel Handling Building.

Tier:	Generic Knowledge and Abilities		**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	GENERIC	**System/Evolution Title:**	

Category:	2	Equipment Control
KA:	2.2.29	Knowledge of SRO fuel handling responsibilities.

RO Value:	1.6	**SRO Value:**	3.8	**CFR:**	**43.6 / 45.12**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Conduct Of Fuel Handling	NC.NA-AP.ZZ-0049(Q)	5.1.2.A	7	1	
Conduct of Operations	0300-000.00S-CONDOP-00	V.A.5	38	00	2

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	10CFR20 exposure limits versus all exposure received

In 1999, an Equipment Operator received 450 mrem while visiting a foreign nuclear plant as part of a Technical Exchange Program. The Operator's prior exposure at Salem was 175 mrem for the current year.

If no exposure limit extensions have been authorized, which one of the following correctly lists the MAXIMUM additional non-emergency Total Effective Dose Equivalent (TEDE) that this individual could receive at Salem for the remainder of 1999?

a. 1375 mrem

b. 1825 mrem

c. 3375 mrem

d. 3825 mrem

Ans:	a	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	a. - Correct 2000 mrem - 450 - 175 = 1375 mrem b. - All occupational is considered c&d 4000 limit is incorrect.

Tier:	Generic Knowledge and Abilities			**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	GENERIC	**System/Evolution Title:**	

Category:	3	Radiation Control

KA:	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.

RO Value:	2.6	**SRO Value:**	3.0	**CFR:**	**41.12 / 43.4. 45.9 / 45.10**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Standard For Protection Against Radiation	10CFR20	10CFR20.3.a(10)	325	1-1-92	
Radiation Protection Program	NC.NA-AP.ZZ-0024(Q)	5.2.1, 5.2.2.B & Attachment 1	10, 11 & 32	8	
Radiation Protection Program	0300-000.00S-RADCON				2.a), b)

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Automatic radiation exposure extensions

During implementation of the Emergency Plan, the Extended Yearly Dose Limit (TEDE) for a fully qualified Radiation Worker with documented lifetime dose is set at 4500 mrem.

Which of the following choices below correctly describes the process that accomplishes this extension?

The extension to 4500 mrem is....

a. made upon the authorization of the Radiological Assessment Coordinator (RAC) for an Alert or higher.

b. made upon the authorization of the of the Emergency Duty Officer (EDO) for a Site Area Emergency or higher.

c. made automatically upon declaration of an Alert or higher.

d. made automatically only upon declaration of a General Emergency.

Ans:	c	Exam Level:	S	Cognitive Level:	Memory	

Explanation of Answer	c. Correct answer. a&b No authorization is required to raise the limit. d. Incorrect. Limit is raised at an Alert or higher.

Tier:	Generic Knowledge and Abilities	**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	GENERIC	**System/Evolution Title:**	

Category:	3	Radiation Control

KA:	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

RO Value:	2.5	**SRO Value:**	3.1	**CFR:**	**43.4 / 45.10**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Radiation Protection Program	0300-000.00S-RADCON	IV.E.1.a	15	01	3.a
OSC Radiation Protection Response	EPIP-304S	3.1	2	12	

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Independent verification vs. radiation exposure

Given the following conditions:

- An independent verification is required on two valves in an area with a 75 mr/hour dose rate

Which of the following correctly identifies the maximum time allowed for the independent verification before the requirement for the "hands-on" verification may be waived?

a. 5 minutes

b. 8 minutes

c. 10 minutes

d. 12 minutes

Ans:	b	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	Rad exposure limit for independent verification is 10 mrem. 75 mrem/hour/60 min/hour 1.25 mrem/minute 10 mrem/1.25 mrem/minute = 8 minutes b. - correct answer

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	3	Radiation Control

KA:	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

RO Value:	2.9	SRO Value:	3.3	CFR:	**43.4 / 45.10**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Station Operating Practices	NC.NA-AP.ZZ-0005(Q)	Attachment 6, 1.4	37	8	
Conduct of Operations	0300-000.00S-CONDOP-00	III.J	24	00	10

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Additional actions on a reactor Trip

Unit 2 is operating at 100% power with all systems in automatic. Intermediate Range (IR) Channel N35 failed several days ago and has been properly removed from service.

Which one of the following correctly identifies an expected crew response if a Reactor Trip were to occur?

a. The Reactor Trip can be confirmed with one IR Channel.

b. The Reactor Trip cannot be confirmed with only one IR Channel.

c. The Reactor Trip can be confirmed after the crew manually energizes the Source Range detectors.

d. The Reactor Trip cannot be confirmed since Source Range detectors will not energize until jumpers are installed.

Ans:	a	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	a. - correct answer. The Reactor Trip can be confirmed with one IR Channel. b&d - The Reactor Trip can be confirmed. c. - The Reactor Trip can be confirmed with one IR.

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	4	Emergency Procedures / Plan

KA:	2.4.1	Knowledge of EOP entry conditions and immediate action steps.

RO Value:	4.3	SRO Value:	4.6	CFR:	41.10 / 43.5 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Use Of Procedures	SC.OP-AP.ZZ-0102(Q)	5.3.5.D.1	11	5	
Use And Control Of Procedures	0300-000.00S-PROCED			02	3.c

Question Source	1/98 Salem NRC Exam	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Progression through the Abnormal Procedures

While directing Unit 2 operation in accordance with an Abnormal Procedure (AB), the Control Room Supervisor (CRS) reaches a step that reads: "SEND an operator to secure turbine gland sealing steam".

Which one of the following correctly completes the description of the actions the CRS shall take?

The CRS may progress to the next step in the AB...

a. if that next step is prefaced with: "IF AT ANY TIME".

b. at any time, since ABs allow step performance in non-sequential order.

c. after the Nuclear Equipment Operator has completed the step and has reported back to the Control Room.

d. after the Nuclear Equipment Operator has been directed to perform the step and has acknowledged the order.

Ans:	d	Exam Level:	S	Cognitive Level:	Application	

Explanation of Answer	d. - correct answer, requirement here is to "send" an operator, once that is met can move to next step b. - no procedural guidance for this c. - not required, the required action was to "send" a. - continuous action steps are placed in effect once reached the first time.

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	4	Emergency Procedures / Plan

KA:	2.4.11	Knowledge of abnormal condition procedures.

RO Value:	3.4	SRO Value:	3.6	CFR:	41.10 / 43.5 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Use Of Procedures	SC.OP-AP.ZZ-0102(Q)	5.4.2.C	23	5	
Use And Control Of Procedures	0300-000.00S-PROCED			02	2.a & 3.b

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Plant Operator responsibilities in the EOPs

While Unit 2 was operating at 100% power, a LOCA occurred. The crew has just transitioned from EOP-TRIP-1 to EOP-LOCA-1. The following conditions exist:

- All rods are fully inserted
- No RCPs are operating
- Nine (9) CETs are >700 degrees, no CETs are >1200 degrees
- Pressurizer level is 96%
- Containment pressure is 28 psig
- Containment Sump level is 52%
- RWST level is 17 ft.
- All loop Tc's are 300 degrees
- RVLIS indicates 43%
- RCS pressure is 265 psig

Which one of the following statements correctly identifies the next procedure to be implemented?

a. EOP-LOCA-5, Loss of Emergency Recirc.

b. EOP-FRCC-2, Response to Degraded Core Cooling.

c. EOP-FRCI-1, Response to High Pressurizer Level.

d. EOP-FRCE-1, Response to Excessive Containment Pressure.

Ans:	b	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	b. - Correct. Purple path exists for FRCC a. CAS requires Emerg Recirc to be established and then lost. c. - Yellow path d. - FRCC is a higher priority.

Tier:	Generic Knowledge and Abilities			**RO Group:**	1	**SRO Group:**	1
System/Evolution Number:	GENERIC	**System/Evolution Title:**					
Category:	4	Emergency Procedures / Plan					
KA:	2.4.12	Knowledge of general operating crew responsibilities during emergency operations.					
RO Value:	3.4	**SRO Value:**	3.9	**CFR:**	**41.10 / 45.12**		

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Use Of Procedures	SC.OP-AP.ZZ-0102(Q)	5.3.12	18	5	
Operator Fluency	0300-000.00S-FLUNCY-01			02	2.J

Question Source		**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	EOP usage as the Narrative Log during an event

Given the following conditions on Unit 1:

- A trip has occurred from 100% power
- The Control Room Supervisor (CRS) is directing the actions of EOP-TRIP-1, "Reactor Trip Or Safety Injection"
- The Shift Technical Advisor is monitoring the Continuous Action Summaries
- The RCPs are tripped in accordance with the CAS

Which one of the following correctly describes how the trip of the RCPs is captured as a permanent record?

a. After the event, the Unit 2 CRS shall update the narrative log from data recorded on the EOP Flow Charts.

b. The PO shall log the event in the Narrative log.

c. The CRS shall log the event directly on the EOP Flow Charts.

d. The STA shall log all major plant manipulations during EOP usage.

Ans:	c	Exam Level:	S	Cognitive Level:	Memory	

Explanation of Answer	a. - no procedural requirement for this b. - EOP Flow Charts are used in place of the narrative log c. - Correct d. - The STA is an advisory position only and does not perform shift functions.

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	4	Emergency Procedures / Plan

KA:	2.4.13	Knowledge of crew roles and responsibilities during EOP flowchart use.

RO Value:	3.3	SRO Value:	3.9	CFR:	41.10 / 45.12

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Use Of Procedures	SC.OP-AP.ZZ-0102(Q)	5.3.8	12	5	
Use And Control Of Procedures	0300-000.00S-PROCED			02	2.e, 3.b

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Status Tree monitoring

Given the following conditions for Unit 1:

- Reactor trip from 100% power due to steamline break and RCS leak.
- All RCPs have been tripped.
- SI and Steamline Isolation have actuated.

The STA notes the following:

- Intermediate Range NIs – 10E-03 Amps, -0.3 dpm
- RCS Tcold temperatures – 460 degrees F, lowering slowly
- RVLIS Full Range – 95% AND LOWERING
- All SG NR Levels – Off-scale Low
- Aux Feedwater Flow - 23E04lbm/hr to TWO S/Gs
- Containment Pressure - 11 psig, rising
- Pressurizer Level - Off-scale Low

Which one of the following correctly identifies the monitoring frequency required for the Critical Safety Function Status Trees?

a. Continuous.

b. Every 5 minutes.

c. Every 15 minutes.

d. Every 30 minutes.

Ans:	a	Exam Level:	S	Cognitive Level:	Application	

Explanation of Answer	Once EOP-CFST-1 has been initiated, the following rules apply to usage of the EOP network: 1) Monitoring should be continuous. 2) CFST monitoring frequency may be reduced to 10-20 minutes if no RED or PURPLE paths exist and plant conditions are stable. While no PURPLE or RED paths currently exist, plant conditions are not stable since containment pressure is approaching a Purple Path value and RVLIS indication is lowering.

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	4	Emergency Procedures / Plan

KA:	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control 2. Core cooling and heat removal 3. Reactor coolant system integrity 4. Containment conditions 5. Radioactivity release control.

RO Value:	3.7	SRO Value:	4.3	CFR:	**43.5 / 45.12**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
OP-TRIP-1, REACTOR TRIP OR SAFETY INJECTION AND INTRODUCTION TO THE USE OF EOPs	0300-000.00S-TRP001-01	3.3.4	28		7, 10
USE OF PROCEDURES	SC.OP-AP.ZZ-0102(Q)	5.3.12.G	20	5	

Question Source	Previous 2 NRC Exams	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Tech Spec deviations

Plant conditions are such that a deviation from a Technical Specification LCO is "foreseen and required".

In accordance with NC.NA-AP.ZZ-0005, Station Operating Practices, which one of the following correctly describes the actions required for this entry?

Invoking 10CFR50.54(x) will:

a. require immediate commencement of a unit shutdown.

b. require notifying the NRC in advance if possible.

c. be accompanied by declaring an Alert.

d. require a notification of the NRC within 15 minutes .

Ans:	b	Exam Level:	S	Cognitive Level:	Memory	

Explanation of Answer	a. - not a requirement for a 50.54(X) invocation although will eventually be required b. - correct answer d. - one hour report must be made if 10CFR50.54(x) is invoked c. - 10CFR50.54(x) requires only a one hour report

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	4	Emergency Procedures / Plan

KA:	2.4.30	Knowledge of which events related to system operations/status should be reported to outside agencies.

RO Value:	2.2	SRO Value:	3.6	CFR:	43.5 / 45.11

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Station Operating Practices	NC.NA-AP.ZZ-0005	5.4	7	9	
Event Classification Guide		11.1	1	00	
Tech Spec Lesson Plan	0300-000.00S-TECHSP-01	VII	48		26

Question Source	New	Question Modification Method	
Question Source Comments:			

Material Required for Examination:	

Question Topic:	Primary communicator notification time limits

Which one of the following correctly completes the statement of requirements for making notifications to the State and Local Agencies?

The Primary Communicator shall complete the notifications within 15 minutes after…

a. the NRC Emergency Operations Center is notified.

b. the Emergency Action Level condition is met.

c. the Emergency Coordinator makes the event classification.

d. receiving the Initial Contact Message Form from the Emergency Coordinator.

Ans:	c	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	a., b. & d. - the 15 time clock for completing notifications begins with the EC classifying the event c. - correct answer

Tier:	Generic Knowledge and Abilities	RO Group:	1	SRO Group:	1

System/Evolution Number:	GENERIC	System/Evolution Title:	

Category:	4	Emergency Procedures / Plan
KA:	2.4.39	Knowledge of the RO's responsibilities in emergency plan implementation.

RO Value:	3.3	SRO Value:	3.1	CFR:	45.11

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Primary Communicator Log	ECG Attachment 6	A.2 Caution	1	06	

Question Source	New	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Variable Gain Unit

During normal power increases, as turbine load is increased, which one of the following parameters is utilized to determine the output value of the Variable Gain Unit of the Rod Control Reactor Control Unit ?

a. Total Steam Flow

b. Auctioneered Hi Tavg

c. Turbine impulse pressure

d. Auctioneered Hi Nuclear Power

Ans:	c	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	c. Correct. b,c,and d incorrect because while each of the distractors provide inputs to Rod Control, only Turbine Impulse Pressure inputs to the VGU.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	001	System/Evolution Title:	Control Rod Drive System

Category:	A1	Ability to predict and/or monitor changes in parameters associated with operating the Control Rod Drive System controls including:

KA:	A1.02	T-ref

RO Value:	3.1	SRO Value:	3.4	CFR:	41.5 / 45.5

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Rod Control Lesson Plan	0300-000.00S-RODS00-0	IV.4.6.d	27-28		6

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Effect of Xenon Transient & compensation

A SG feed pump trip occurred resulting in a turbine runback on Unit 2. Power was reduced from 100% steady-state conditions using a combination of rods and boration. The following conditions exist for Unit 2 following stabilization:

- Reactor Power - 60%
- Delta-I target value - -2.0%
- Actual Delta-I - -10.5%
- Control Bank D position - 160 steps withdrawn
- Tavg - 562 F

Which one of the following correctly describes actions that will maintain the current power level and maintain Delta-I within its normal operating band over the next FIVE hours?

a. Boration and control rod insertion for AFD, followed by dilution for xenon compensation.

b. Dilution and control rod insertion for AFD, followed by boration for xenon compensation.

c. Boration and control rod withdrawal for AFD, followed by dilution for xenon compensation.

d. Dilution and control rod withdrawal for AFD, followed by boration for xenon compensation.

Ans:	c	Exam Level:	S	Cognitive Level:	Comprehension

Explanation of Answer	Xenon will begin to build in the upper portion of the core causing delta-I to become more negative if no action is taken. With delta-I currently near its lower limit, action must be taken to move the flux back toward the top of the core. This is accomplished by rod withdrawal, requiring boration to compensate for the reactivity addition. With control rods at desired location, then as xenon continues to build in, dilution is required to maintain power over the 5 hours. (NOTE: the initial boration also helps to move the flux profile upward due to redistribution associated with boron concentration effects.) Boration and control rod insertion will tend to drive delta-I further negative, and will lower Tave. Dilution and insertion will tend to drive delta-I further negative even if Tave is maintained. Dilution and control rod withdrawal will tend to raise Tave, which is NOT acceptable (even though delta-I tends to become more positive).

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	001	System/Evolution Title:	Control Rod Drive System

Category:	A2	Ability to (a) predict the impacts of the following on the Control Rod Drive System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

KA:	A2.06	Effects of transient xenon on reactivity

RO Value:	3.4	SRO Value:	3.7	CFR:	41.5 /43.5/ 45.3/45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
POWER DISTRIBUTION LIMITS	0300-000.00S-POWER0-00	I.C.2.a	21-22	1	

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Power Mismatch

Given the following:

- Reactor power at 90%
- Power Range N-41 failed HIGH fifteen (15) minutes ago
- Control rods are in MANUAL control
- An operator bypassed the rod stop, but did not defeat the N-41 input to the power mismatch circuit
- Tavg is greater than Tref by one (1) degree F

Which one of the following correctly describes the response of the rod control system if the Rod Selector Switch is placed in AUTOMATIC?

a. Rods will not move.

b. Rods will step in a few steps and stop.

c. Rods will step in at 8 steps per minute.

d. Rods will step in at 72 steps per minute.

Ans:	a	Exam Level:	S	Cognitive Level:	Comprehension	

Explanation of Answer	Rods will not move because the power mismatch circuit only produces an output when there is a rate of change between Rx and turbine power. Other answers are incorrect for the same reason.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	001	System/Evolution Title:	Control Rod Drive System

Category:	K1	Knowledge of the physical connections and/or cause-effect relationships between Control Rod Drive System and the following:

KA:	K1.05	NIS and RPS

RO Value:	4.5	SRO Value:	4.4	CFR:	41.2 to 41.9 / 45.7 to 45.8

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Rod Control Lesson Plan	RODS-00-00	IV.6.D.a)	27	5b	

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Use if Individual Bank

Given the following:

- Reactor Power is 75%
- A failure of control rods to move in AUTO or MANUAL has occurred

Which one of the following correctly lists the function that is impaired if control bank D rods are moved using the CBD position of the Rod Selector Switch?

a. The Pulse-To-Analog display for Control Bank D.

b. Bank overlap function when rods are inserted.

c. Rod Insertion Limit alarms when inserting control rods.

d. Control Rod Stop alarm actuation when C-11 is reached.

Ans:	b	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	When Individual Bank positions are used, the Bank Overlap Unit is bypassed (GO pulses are not counted). Choices a, c, d, are not affected by operation with Individual Banks selected.

Tier:	Plant Systems			**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	001	**System/Evolution Title:**	Control Rod Drive System

Category:	K4	Knowledge of Control Rod Drive System design feature(s) and or interlock(s) which provide for the following:

KA:	K4.02	Control rod mode select control (movement control)

RO Value:	3.8	**SRO Value:**	3.8	**CFR:**	**41.7**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Rod control LP	RODS00-00	IV.B.8.f.7).	39	7d	

Question Source	Other Facility	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Identification of rod worth differences

During the performance of an Estimated Critical Position for a given RCS boron concentration, the operator uses the BOL HFP Curves instead of the BOL HZP curves for determining rod worth for the current ECP at 58 steps on Control Bank D.

Which one of the following correctly describes the effect of this error when criticality is reached during the reactor startup using rod withdrawal?

a. The ECP administrative limits for criticality will be exceeded.

b. The critical rod position will be lower than calculated for the ECP.

c. The critical rod position will be higher than calculated for the ECP.

d. Additional boron must be added to attain the desired control rod position.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension

Explanation of Answer	The integral rod worths are BOL HZP - 800 pcm and BOL HFP- 870 pcm. With rod worth at ECP subtracted from critical rod worth in reactivity balance, Then contribution from rod worth in balance becomes more negative. Therefore, the calculated critical boron concentration will be less and criticality will occur sooner than expected (+ 70 pcm added to the BOL rod worth) or at 870 pcm on BOL curve which is at 50 steps on CBD. This is well within the TS limits and minimum admin limits of +/- 300 pcm.

Tier:	Plant Systems	**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	001	**System/Evolution Title:**	Control Rod Drive System

Category:	K5	Knowledge of the operational implications of the following concepts as they apply to the Control Rod Drive System:
KA:	K5.05	Interpretation of rod worth curves, including proper curve to use: all rods in (ARI), all rods out (ARO), hot zero power (HZP), hot full power (HFP)

RO Value:	3.5	**SRO Value:**	3.9	**CFR:**	**41.5 / 45.7**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
ESTIMATED CRITICAL POSITION	0300-000.00S-ECP000-00	I.C.1; II.B.9; IV.C.1.b	10; 14;20-21	2	
ESTIMATED CRITICAL POSITION	S2.RE-RA.ZZ-0001(Q)	Attachment 1,5.1 & 6	10-11		6
FIGURES	S2.RE-RA.ZZ-00132(Q)	Figure 4	8		33

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:	BOL and EOL rod worth curve - S2.RE-RA.ZZ-0012(Q) Figure 4		

Question Topic:	RVLIS

A loss of coolant accident has occurred. The RVLIS Summary Display Page is displaying dynamic range. During a cooldown and depressurization, void content indication remains constant at 80%.

Which one of the following correctly describes actual void content response during this cooldown and depressurization?

Actual void content:

a. increased due to change in density as pressure and temperature decreased.

b. decreased due to change in density as pressure and temperature decreased.

c. remained constant; differential pressure alone is an accurate indication of void content.

d. remained constant; indicated void content is compensated using pressure and temperature signals.

Ans:	d	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	a&b assume not density compensated. C is incorrect because density compensation is required.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	002	System/Evolution Title:	Reactor Coolant System

Category:	K1	Knowledge of the physical connections and/or cause-effect relationships between Reactor Coolant System and the following:

KA:	K1.07	Reactor vessel level indication system

RO Value:	3.5*	SRO Value:	3.7*	CFR:	41.2 to 41.9 / 45.7 to 45.8

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
RVLIS LP	0300-000.00S-RVLIS0-00	IV.B.9	23		3,4

Question Source	Other Facility	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Starting an RCP

The following conditions exist:

- Unit 1 is in Mode 4
- RCS temperature is 280 degrees F as indicated by In-core Thermocouples
- Pressurizer level indicates 30%
- RCS pressure is 350 psig
- 11 Residual Heat Removal (RHR) Pump is operating and all RCPs are OFF
- Loops 11 and 12 cold leg temperatures are 285 degrees F
- Steam Generator secondary temperatures are 330 degrees F

Which one of the following correctly describes the anticipated RCS pressure response and the reason for that response if the 12 RCP is started?

a. Rises due to heating the RCS fluid as it passes through the Steam Generators.

b. Lowers due to higher temperature loop water being cooled as it passes through the core region.

c. Lowers because Pressurizer spray is initiated via bypass flow.

d. Rises because letdown flow will be reduced.

Ans:	a	**Exam Level:**	B	**Cognitive Level:**	Application	

Explanation of Answer	a. Correct. RCS pressure will rise during starting due to heat transfer from the secondary side of the S/G since they are hotter than the RCS. b. Water in core region is at the same temperature as the RCS so no pressure change as the RCS water passes through the core. c. 12 RCP will not initiate spray flow. d. Letdown flow is from RHR via CV8 and should not be affected by an RCP start.

Tier:	Plant Systems				**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	003	**System/Evolution Title:**	Reactor Coolant Pump System

Category:	A1	Ability to predict and/or monitor changes in parameters associated with operating the Reactor Coolant Pump System controls including:
KA:	A1.07	RCS temperature and pressure

RO Value:	3.4*	**SRO Value:**	3.4	**CFR:**	**41.5 / 45.5**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
RCP Operation	S1.OP-SO.RC-0001(Q)	3.2.7,8	4		15
IOP-2, Cold Shutdown to Hot Standby- LP	0300-000.00S-IOP002-00	II.D.2.b.5)	32	6d	

Question Source	NRC Exam Bank	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	#1 Seal leakoff bypass valve opening reqs

Unit 1 is in Mode 5, with the following conditions:

- RCS pressure is 120 psig
- Seal inlet temperatures, and #1 seal leakoff temperatures are approaching their alarm setpoints
- 11-14 CV104, #1 seal leakoff valves are open, but leakoff flowrates range from 0.4-0.8 gpm
- Total seal injection flow is 22 gpm

Which one of the following correctly describes a condition that must exist before the combined #1 seal leakoff bypass valve, 1CV114, may be opened per S1.OP-SO.RC-0001(Q), "Reactor Coolant Pump Operation"?

a. Seal leakoff flow must be raised to > 1 gpm for each pump.

b. RCS pressure must be reduced below 100 psig.

c. Seal injection flow must be greater than 6 gpm to each RCP.

d. CCW must be available to all RCP Thermal Barrier Hxs.

Ans:	c	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	RCS pressure must be 100-1000 psig to open the seal bypass valve, and seal injection flow must be greater than 6 gpm to each RCP. Seal leakoff flow must be 1 gpm or less to each pump. CCW flow is not a requirement to open the CV114.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	003	System/Evolution Title:	Reactor Coolant Pump System

Category:	K1	Knowledge of the physical connections and/or cause-effect relationships between Reactor Coolant Pump System and the following:

KA:	K1.03	RCP seal system

RO Value:	3.3	SRO Value:	3.6	CFR:	**41.2 to 41.9 / 45.7 to 45.8**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
RCP Operation	S1.OP-SO.RC-0001(Q)	5.2.1	8		15
RCP LP	0300-000.00S-RCPUMP-01	IV.B.15.c.7).a).	29	3biv	

Question Source	NRC Exam Bank	Question Modification Method	
Question Source Comments:			

Material Required for Examination:	

Question Topic:	reason for dp on seals

Which one of the following correctly describes the reason that a minimum of 200 psid across the RCP seals is required for RCP operation?

a. Prevents physical contact between the thermal barrier Hx and the seal package.

b. Ensures that adequate seal cooling flow from the RCS is available.

c. Prevents the #1 RCP seal from swapping from a face rubbing to a film riding seal.

d. Prevents the weight of the seal ring from limiting cooling flow through the seal gap.

Ans:	d	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	d. Correct. 200 psid will support the seal ring and prevent contact with the runner. a. Contact with the thermal barrier Hx is not a concern. b. The 200 psid is not the driving force for cooling flow. c. Backwards. 200 psid prevents face rubbing operation.

Tier:	Plant Systems					**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	003	**System/Evolution Title:**	Reactor Coolant Pump System

Category:	K4	Knowledge of Reactor Coolant Pump System design feature(s) and or interlock(s) which provide for the following:

KA:	K4.04	Adequate cooling of RCP motor and seals

RO Value:	2.8	**SRO Value:**	3.1	**CFR:**	**41.7**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
RCP Lesson Plan	0300-000.00S-RCPUMP-01	IV.B.8.f.11).c)&12).b)	20	12	
RCP Operation	S1.OP-SO.RC-0001(Q)	Prerequisites-2.3.3	2		

Question Source	NRC Exam Bank	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Charging flow at minimum

Unit 2 is at 100% power with all systems in normal alignment and 21 Charging Pump in service. Due to a failure of the Master Flow Controller, the charging flow control valve, CV-55 has gone to the minimum flow position.

Which one of the following correctly describes the flow into the RCS?

a. All pump flow will be through the mini flow valves CV139 and CV140.

b. All flow will be to the charging header.

c. All flow will be to the RCP seals.

d. Reduced flow to the charging header and RCP seals.

Ans:	d	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	When CV-55 goes to minimum flow stop, total flow will be 47 gpm. Since no other system changes were made, there will be reduced flow to both the charging header and to the RCP seals.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	004	System/Evolution Title:	Chemical and Volume Control System

Category:	A3	Ability to monitor automatic operations of the Chemical and Volume Control System including:
KA:	A3.14	Letdown and charging flows

RO Value:	3.4	SRO Value:	3.1	CFR:	41.7 / 45.5

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
CVCS Lesson Plan	0300-000.00S-CVCS00-00	B.20.d.10.b)	47	4.a.xxv	
CVCS P&ID	205328				

Question Source	Other Facility	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	letdown temp vs. RCS temp

The following plant conditions exist:

- Reactor power: 70%
- Rod control: automatic
- Letdown flow: 40 GPM

2CC71 (letdown heat exchanger temperature control valve) fails to the full closed position due to a temperature sensor failing low.

Which one of the following correctly describes the plant response to this event?

a. VCT temperature rises causing a reduction in charging pump NPSH.

b. Letdown flow increases due to decreasing backpressure.

c. RCS boron concentration will slowly rise with the CVCS demineralizers bypassed.

d. Pressurizer level will rise and VCT level will lower when CV7 closes.

Ans:	a	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	a. Correct. Since cooling to the letdown HX is lost. VCT & charging pump suction temperature will rise causing a reduction in pump NPSH. b. Backpressure is not affected by CC71. c. Demins isolate but no affect on boron concentration will be seen. d. Backwards. CC71 will close if CV7 closes.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	004	System/Evolution Title:	Chemical and Volume Control System

Category:	K1	Knowledge of the physical connections and/or cause-effect relationships between Chemical and Volume Control System and the following:

KA:	K1.18	CCWS

RO Value:	2.9	SRO Value:	3.2	CFR:	41.2 to 41.9 / 45.7 to 45.8

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
CVCS LP	0300-000.00S-CVCS00-00	IV.C.9,12	36	4,6	

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	RHR CL alignment

A Large Break LOCA has occurred on Unit 2. All equipment started normally except the 21 RHR pump which tripped on overcurrent.

Which one of the following correctly describes all the ECCS Pump suctions that are supplied from the discharge of the 22 RHR Pump following completion of the transfer to Cold Leg Recirculation?

a. The 21 and 22 Charging Pumps.

b. The 22 Charging Pump and 22 SI Pump.

c. The 21 and 22 Charging Pumps, and the 22 SI Pump.

d. The 21 and 22 Charging Pumps, and the 21 and 22 SI Pumps.

Ans:	d	Exam Level:	R	Cognitive Level:	Comprehension

Explanation of Answer	During CL recirc, The outlet from the 22 RHR Hx (Discharge of 22 RHR Pump) is aligned to Charging Pumps suction header by opening 22SJ45. The 21 RHR Hx is aligned to SI Pumps suction header by opening 21SJ45. The SI and Charging Pumps suctions headers are then crosstied by opening 21SJ113 or 22SJ113. The 22 RHR (or 21 RHR) Pump alone can feed both the Charging Pumps and through the cross-over the SI Pumps. Typical alignment is supplying train-related components (such as RHR to CNMT Spray headers - 22 RHR supplies 22 CS spray header only).

Tier:	Plant Systems	RO Group:	3	SRO Group:	3

System/Evolution Number:	005	System/Evolution Title:	Residual Heat Removal System

Category:	A2	Ability to (a) predict the impacts of the following on the Residual Heat Removal System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

KA:	A2.03	RHR pump/motor malfunction

RO Value:	2.9	SRO Value:	3.1	CFR:	41.5 /43.5/ 45.3/45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
RESIDUAL HEAT REMOVAL SYSTEM	0300-000.00S-RHR000-01	IV.C.2.2).f)	34-35		3.b

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	RHR Operability

Given the following conditions on Unit 2:

- Reactor power - 50%
- 21 RHR Pump tagout in progress
- Maintenance has requested that 21RH19, RHR Train Cross-connect Valve, and 21SJ49, Cold Leg Injection Isolation Valve be tagged out to facilitate work

In accordance with Technical Specifications, which one of the following correctly completes the description of the required response for this request?

The tagout…

a. can be approved as long as 22RH19 is open.

b. can be approved and covered under the umbrella of the TSAS for the RHR Pump.

c. Should NOT be allowed since this would require stationing operators at manual RH12, RHR HX Bypass Valves.

d. Should NOT be allowed because an entry into Tech Spec 3.0.3 would be required.

Ans:	d	Exam Level:	S	Cognitive Level:	Comprehension	

Explanation of Answer	d. Correct. Closure of either RH19 or either SJ49 makes both trains inoperable, in accordance with Tech Specs since each train is required to inject into all four cold legs. a. Water will still be injected into all four cold legs but not from each train. b. 3.5.2 does not address both trains inoperable. c. RH12 will not change the situation.

Tier:	Plant Systems		**RO Group:**	3	**SRO Group:**	3

System/Evolution Number:	005	**System/Evolution Title:**	Residual Heat Removal System

Category:	G	Equipment Control
KA:	2.2.24	Ability to analyze the affect of maintenance activities on LCO status.

RO Value:	2.6	**SRO Value:**	3.8	**CFR:**	**43.2 / 45.13**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
RESIDUAL HEAT REMOVAL SYSTEM	0300-000.00S-RHR000-01	X.A.1	59		13
Technical Specifications		3.5.2		183	

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:	TS Section 3.5.2		

Question Topic:	SI valve operation

Which one of the following correctly describes an AUTOMATIC action that occurs when RWST level is <15 ft after a large break LOCA on Unit 2?

a. RHR to SI suction valves (SJ45) OPEN.

b. SI pump miniflow valve (SJ67, SJ68) CLOSE.

c. SI to Charging Pump Crossover Valves (SJ113s) OPEN.

d. RWST to Charging Pump suction valves (SJ1, SJ2) CLOSE.

Ans:	c	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	c. Correct a&b. Valves are not affected by swapover. d. SJ1 & SJ2 open not close.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	006	System/Evolution Title:	Emergency Core Cooling System

Category:	A3	Ability to monitor automatic operations of the Emergency Core Cooling System including:
KA:	A3.03	ESFAS-operated valves

RO Value:	4.1	SRO Value:	4.1	CFR:	41.7 / 45.5

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
ECCS LP	0300-000.00S-ECCS00-00	IV.F.5.b.3)	42	11	

Question Source	NRC Exam Bank	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	SI actuation on cooldown

During a Unit 1 cooldown per S1.OP-IO.ZZ-0006, PS1 malfunctioned. The following temperatures and pressures were observed during a review of P250 trends:

Time	T cold	RCS pressure
0940	510 F	1700 psig
1000	500 F	1750 psig
1020	490 F	1850 psig
1040	483 F	1950 psig
1100	475 F	1850 psig
1120	470 F	1785 psig

Assume NO operator action occurred between 0940-1120 and all appropriate actions were taken per S1.OP-IO.ZZ-0006 prior to 0940.

In accordance with S1.OP-IO.ZZ-0006, which one of the following correctly describes the appropriate operator action if the current trends continue?

a. Continue cooldown, no problem exists.

b. Continue cooldown, but reduce cooldown rate.

c. Stop the cooldown. Depressurize to 1500 psig to comply with pressure-temperature limits.

d. Stop the cooldown and depressurization and block the low pressure SI.

Ans:	d	Exam Level:	B	Cognitive Level:	Comprehension

Explanation of Answer	d. Correct. a-c. During cooldown and depressurization, the low Pressurizer SI is blocked at 1915 psig. As pressure INCREASES above 1915 psig the SI is automatically UNBLOCKED. When pressure again drops below 1765 psig, an SI will occur. Therefore the SI will need to be re-blocked prior to 1765 to prevent an auto SI.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	006	System/Evolution Title:	Emergency Core Cooling System

Category:	K4	Knowledge of Emergency Core Cooling System design feature(s) and or interlock(s) which provide for the following:

KA:	K4.05	Autostart of HPI/LPI/SIP.

RO Value:	4.3	SRO Value:	4.4	CFR:	41.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
ESF LP	0300-000.00S-ESF000-00	VII.B.1	50		21

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Affects of leakage into the PRT

Given the following conditions on Unit 2:

- RCS Tavg - 305 F and stable
- PRT parameters
  - Pressure - 3.5 psig
  - Level - 70%
  - Temperature - 98 F

One hour later when PRT PRESS HI (CC2) alarmed, the operator noted the following PRT parameters:

- Pressure - 10.2 psig
- Level - 81%
- Temperature - 126 F

Which one of the following correctly describes the conditions that resulted in the change in parameters?

a. CVCS Letdown Relief Valve 2CV6 lifted.

b. PRT to Vent Header Isol Valve 2PR15 failed closed.

c. NT25, Nitrogen to the PRT was opened.

d. PRT Water Supply Isolation Valve 2WR82 opened while filling RCP standpipes.

Ans:	a	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	a. While filling RCP standpipes, the operator opens 2WR80, PW TO CONTMT STOP Valve. If 2WR82 were to open, PW would begin to fill PRT. This increase in level would also raise PRT pressure but would not raise temperature. Failure of CVCS letdown relief or POPS actuation would result in higher temperature water going to PRT which will raise PRT temperature pressure and level. Closure of the vent valve and opening NT25 may raise pressure by would NOT affect level or temperature.

Tier:	Plant Systems	RO Group:	3	SRO Group:	3

System/Evolution Number:	007	System/Evolution Title:	Pressurizer Relief Tank/Quench Tank System

Category:	K1	Knowledge of the physical connections and/or cause-effect relationships between Pressurizer Relief Tank/Quench Tank System and the following:

KA:	K1.03	RCS

RO Value:	3.0	SRO Value:	3.2	CFR:	**41.2 to 41.9 / 45.7 to 45.8**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
PRESSURIZER AND PRESSURIZER RELIEF TANK	0300-000.00S-PZRPRT-00	IV.B.8.g	37-39		3, 4
CONTROL CONSOLE 2CC2	S2.OP-AR.ZZ-0012(Q)	Bezel 3-22: G.1.a & b	51-55	10	

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	RCS P&ID 205301 sh.1

Question Topic:	RCP Thermal Barrier valves

Which one of the following correctly describes the operation of the 2CC131, RCP Thermal Barrier Discharge Flow Control Valve?

The valve will close on Phase B Isolation…

a. and high flow if in AUTO.

b. and high flow if in AUTO or MANUAL.

c. if in AUTO, but will close on high flow if in AUTO or MANUAL.

d. if in AUTO or MANUAL, but will close on high flow only if in AUTO.

Ans:	d	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	As given the RCP Thermal Barrier Isol valve CC-131 closes on CNMT Phase B signal regardless of whether it is selected to AUTO or MANUAL. The valve will close on sensed high flow of >/= 175 gpm (for at least 4 sec), but is inhibited from automatic closure on high flow if selected to MANUAL.

Tier:	Plant Systems	RO Group:	3	SRO Group:	3

System/Evolution Number:	008	System/Evolution Title:	Component Cooling Water System

Category:	A3	Ability to monitor automatic operations of the Component Cooling Water System including:
KA:	A3.05	Control of the electrically operated, automatic isolation valves in the CCWS

RO Value:	3.0	SRO Value:	3.1	CFR:	41.7 / 45.5

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
COMPONENT COOLING WATER	0300-000.00S-CCW000-01	V.A.5.a	38-39		4.d, 6.b

Question Source	New	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Pressurizer master controller setpoint change

The following plant conditions exist:

- Steady state operation at 100% power
- The PZR Pressure Master Controller is in AUTO with I&C testing in progress
- Assume Pressurizer pressure control remains in automatic

Which one of the following correctly describes the IMMEDIATE automatic response of the system if a Technician error results in a step change in the Master Pressure Controller setpoint to 2360 psig?

a. Spray valves close and Pressurizer heaters energize.

b. Spray valves open and Pressurizer heaters de-energize.

c. Power operated relief valves PR1 and PR2 open and spray valves close.

d. Power operated relief valve PR1 opens, spray valves open.

Ans:	a	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	A step increase in the controller setpoint is seen as system pressure being too low. This will cause the spray valves to close and heaters to energize to raise pressure. Other distracters assume pressure is too high and/or controller failure.

Tier:	Plant Systems				**RO Group:**	2	**SRO Group:** 2

System/Evolution Number:	010	**System/Evolution Title:**	Pressurizer Pressure Control System

Category:	A1	Ability to predict and/or monitor changes in parameters associated with operating the Pressurizer Pressure Control System controls including:

KA:	A1.07	RCS pressure

RO Value:	3.7	**SRO Value:**	3.7	**CFR:**	**41.5 / 45.5**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Pressurizer Pressure and Level control LP	0300-000.00S-PZRP&L-00	IV.B.h-K	20-24	4a,5a,9	

Question Source	NRC Exam Bank	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Indications of Pressurizer Bubble

Unit 1 is in Mode 5 performing steps to draw a bubble in the Pressurizer. The following steps have been completed:

- The Pressurizer is filled as indicated on the cold calibrated level channel
- All Pressurizer heaters have been energized
- Pressure is controlled at approximately 65 psig

The next major action is to manually open PR1 & PR2 for 10-15 minutes when the Pressurizer reaches approximately 300 degrees F.

Which of the following correctly describes the reason for opening PR1 & PR2?

a. Required as part of the operability check for PR1 & PR2.

b. Verification that the PORV tailpipe temperature device will respond to changes in temperature.

c. Establishes flow from the RCS into the Pressurizer to ensure boron concentrations are equalized.

d. Provides a flowpath for venting non-condensable gases out of the Pressurizer during bubble formation.

Ans:	d	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	d. Correct. a. No procedural direction for this. b. Tailpipe temperature response can be verified by means other than fully opening PR1 & PR2. c. The RCS and Pressurizer are filled from the same source so there should be little difference in boron concentration.

Tier:	Plant Systems			**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	010	**System/Evolution Title:**	Pressurizer Pressure Control System

Category:	G	Conduct Of Operations
KA:	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.

RO Value:	3.9	**SRO Value:**	4.0	**CFR:**	**45.2 / 45.6**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
CVCS LP	0300-000.00S-CVCS00-00	V.B.2.v.2)	82-83		8

Question Source	Previous two NRC Exam	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	LT-460 fails low

The following plant conditions exist:

- Unit 1 is at 100% power
- Pressurizer Level Channel 1 is selected for control
- Pressurizer Level Channel 2 is selected for alarm
- Pressurizer Level Channel 2 fails LOW

Which one of the following correctly completes the description of the immediate plant response assuming no operator intervention?

Charging flow…

a. does NOT change, letdown isolates, and ALL Pressurizer Heaters shut off.

b. will rise to maximum, letdown isolates, and ONLY Backup Pressurizer Heaters shut off.

c. will rise to maximum, letdown isolation does NOT occur, and ALL Pressurizer Heaters shut off.

d. does NOT change, letdown isolation does NOT occur, and ONLY Backup Pressurizer Heaters shut off.

Ans:	a	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	letdown will isolate and all heaters will de-energize. Since channel was selected for alarm, no change in charging flow demand.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	011	System/Evolution Title:	Pressurizer Level Control System

Category:	K6	Knowledge of the of the effect of a loss or malfunction on the following will have on the Pressurizer Level Control System:

KA:	K6.03	Relationship between PZR level and PZR heater control circuit

RO Value:	2.9	SRO Value:	3.3	CFR:	41.7 / 45.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Pressurizer Pressure and Level control LP	0300-000.00S-PZRP&L-00	IX.B.2.d	43	12	

Question Source	NRC Exam Bank	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Protection System response with channel out of service.

Given the following plant conditions:

- Unit 1 is at 100% power
- Containment pressure Channel I indication becomes erratic
- The channel is removed from service in accordance with S1.OP-SO.RPS-0005.

Which one of the following correctly describes plant response if Containment Pressure Channel IV subsequently fails high?

a. No response other than channel related alarms.

b. An AUTO SI actuation on 2/3 channel tripped.

c. AUTO SI, Containment Spray, Main Steamline Isolation and Phase B Isolation all actuate.

d. Main Steamline Isolation and Phase B Isolation. Containment Spray valves reposition but the Containment spray pumps do not start.

Ans:	a	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	a. Correct. Channel I does not input to the SI logic so the required coincidence is not satisfied and only the alarms associated with Channel IV will actuate. Channel I for Containment Spray will be bypassed.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	012	System/Evolution Title:	Reactor Protection System

Category:	K4	Knowledge of Reactor Protection System design feature(s) and or interlock(s) which provide for the following:

KA:	K4.01	Trip logic when one channel OOC or in test

RO Value:	3.7	SRO Value:	4.0	CFR:	41.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
REACTOR PROTECTION SYSTEM	0300-000.00S-RXPROT-00	V	34	00	12

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	ESF actuation

RCS pressure has decreased to 1859 psig during a plant cooldown. Appropriate actions have been taken as required by S2.OP-IO.ZZ-0005, Minimum Load to Hot Standby. Subsequently, a large steamline break occurs downstream of the MSIVs.

Which one of the following correctly describes the ESF response to this break?

a. No SI or Main Steamline Isolation will occur.

b. BOTH a Main Steamline Isolation and an SI will occur.

c. A Main Steamline Isolation will occur, but an SI will NOT occur.

d. An SI will occur, but a Main Steamline Isolation will NOT occur.

Ans:	c	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	The SI has been blocked below P-11so will not occur. The Hi Steam Flow SI was blocked when Tave dropped below 543 degrees so a High Steam Flow SI will not occur.

Tier:	Plant Systems				**RO Group:**	1	**SRO Group:** 1

System/Evolution Number:	013	**System/Evolution Title:**	Engineered Safety Features Actuation System

Category:	A1	Ability to predict and/or monitor changes in parameters associated with operating the Engineered Safety Features Actuation System controls including:
KA:	A1.05	Main steam pressure

RO Value:	3.4	**SRO Value:**	3.6	**CFR:**	**41.5 / 45.5**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
ESF LP	0300-000.00S-ESF000-00	VII.B.1	50-51	21	

Question Source	Other Facility	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Sequencer actuation

A valid Safety Injection (SI) signal is generated while a Blackout sequence is in progress.

Which one of the following correctly completes the description of SEC operation?

The MODE II sequence will…

a. reset, and the MODE I Sequence starts.

b. restart, and the MODE I Sequence is blocked.

c. terminate and reset, loads started will be stripped and the MODE III sequence will load appropriate ECCS equipment.

d. continue to completion, and then the MODE III Sequence will load appropriate ECCS equipment.

Ans:	c	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	If a MODE II signal occurs, followed by a MODE I signal, the SEC will reset to MODE III and go through the proper sequence. The other distracters are possible MODE II actions with other signals.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	013	System/Evolution Title:	Engineered Safety Features Actuation System

Category:	K1	Knowledge of the physical connections and/or cause-effect relationships between Engineered Safety Features Actuation System and the following:

KA:	K1.01	Initiation signals for ESF circuit logic

RO Value:	4.2	SRO Value:	4.4	CFR:	**41.2 to 41.9 / 45.7 to 45.8**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
SEC LP	0300-000.00S-SEC000-00	IV.D.1,5	21-23	8	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Reset SI Interlocks

Unit 2 was operating at 100% power when an automatic Safety Injection occurred due to a high steamline flow coincident with LO-LO Tave. The following conditions now exist:

- The leak has been isolated
- All SI signals have been cleared
- Reactor Trip Breaker A failed to open and remains closed
- An I&C Technician has completed installing the P-4 jumper for Reactor Trip Breaker A in accordance with the required procedure
- All SI and RHR Pumps are stopped
- 21 CVC Pump is running and the BIT is isolated in accordance with EOP-TRIP-3, SI Termination

Which one of the following correctly describes Safety System response if a Pressurizer safety valve fails open and RCS pressure lowers below the automatic SI setpoint?

a. SI automatically initiates only from Train A.

b. SI automatically initiates only from Train B.

c. SI automatically initiates from both Train A & B.

d. MANUAL SI must be initiated or equipment must be started/aligned individually.

Ans:	d	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	With ECCS Pumps stopped, the SI must have been reset. Since the RTBs have not been cycled, auto SI will not occur so d. is the only correct answer.

Tier:	Plant Systems			**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	013	**System/Evolution Title:**	Engineered Safety Features Actuation System

Category:	K4	Knowledge of Engineered Safety Features Actuation System design feature(s) and or interlock(s) which provide for the following:
KA:	K4.01	SIS reset

RO Value:	3.9	**SRO Value:**	4.3	**CFR:**	**41.7**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Reactor Protection System	0300-000.00S-RXPROT-00	VII.B.6	49-50	20d	10

Question Source	NRC Exam Bank	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	N42 fuses

Given the following:

- Unit 1 is operating at 30% steady state reactor power.
- I&C technician receives permission to perform a calibration on PR N-41.
- The I&C technician mistakenly pulls the fuses on N-42, realizes the mistake and immediately reinserts the fuses for N-42 and pulls the fuses for the correct channel, N-41.

Which one of the following correctly identifies the actions that occur after the technician pulls the fuses for N41?

a. High power rod stop

b. PR rate trip

c. PR neutron flux high setpoint trip

d. Only expected alarms for N41

Ans:	b	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	Pulling the fuses on the N-42 drawer causes the Power Range circuitry to fail Upscale actuating the rate trip for that channel. When the fuses are reinstalled, the Upscale trip clears but the rate trip requires manual reset. When the fuses are pulled for the second channel the Rate Trip for N41 occurs completing the 2/4 coincidence and the reactor trips.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	015	System/Evolution Title:	Nuclear Instrumentation System

Category:	K4	Knowledge of Nuclear Instrumentation System design feature(s) and or interlock(s) which provide for the following:
KA:	K4.05	Reactor trip

RO Value:	4.3	SRO Value:	4.5	CFR:	41.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Excore Nuclear Instrument System LP	0300-000300S-EXCORE-00	IV.G.3.h	40	10e	

Question Source	NRC Exam Bank	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	IR fails to reinstate SRs

Intermediate Range (IR) compensating voltage fails LOW on one of the IR detectors. The reactor subsequently trips due to other causes, but the IR current on the failed detector does NOT go below 5.0 E-5 amps.

Which one of the following items correctly describes how the source range instruments will be energized as reactor power DECREASES below 7.0 E-11 amps?

a. P-6 will be unblocked and the source range detectors will automatically reenergize.

b. The failed IR detector will be bypassed allowing the source range detectors to energize.

c. The source range manual reset pushbuttons will be used to manually reenergize the source range detectors.

d. One source range detector will automatically reenergize and the other will be manually re-energized using the reset pushbuttons.

Ans:	c	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	Both IRs must be below P-6 to reinstate the SRs. Both A&B RESET switches must be pressed.

Tier:	Plant Systems	**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	015	**System/Evolution Title:**	Nuclear Instrumentation System

Category:	K6	Knowledge of the of the effect of a loss or malfunction on the following will have on the Nuclear Instrumentation System:
KA:	K6.04	Bistables and logic circuits

RO Value:	3.1	**SRO Value:**	3.2	**CFR:**	**41.7 / 45.7**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Excore NIS LP	0300-000.00S-EXCORE-00	IV.D.2.h.4).a)	29		5b

Question Source	NRC Exam Bank	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	POPS/PT failure

The plant is shutdown in Mode 5 with RCS temperature at 100 degrees F. RCS pressure control is in a normal lineup for the current RCS pressure and temperature.

The following control board indications are noted:

- POPS INITIATED PRESSURE HI Bezel Alarm for Channel I
- CHANNEL I PRESSURE HI Bezel Alarm for Channel I
- PR1 NOT FULL CLSD OHA E-6
- PR1 indicates open

Which one of the following correctly identifies the transmitter that will give the above indications when it fails HIGH?

a. PT403

b. PT405

c. PT456

d. PT474

Ans:	b	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	PT403 only feeds PR2. PT 456 and 474 are alarm channels and are bypassed when POPS is in service.

Tier:	Plant Systems	**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	016	**System/Evolution Title:**	Non-Nuclear Instrumentation System

Category:	K3	Knowledge of the effect that a loss or malfunction of the Non-Nuclear Instrumentation System will have on the following:

KA:	K3.01	RCS

RO Value:	3.4*	**SRO Value:**	3.6*	**CFR:**	**41.7 / 45.6**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Pressurizer Pressure and Level Control LP	0300-000.00S-PZRP&L-00	V.I.3.a	27		8

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Environment affects on CET readings

Unit 2 is operating at 100% power and has experienced a LOCA. The CET Display for the hottest in-core thermocouple reading is 688 degrees F. Temperature in the area of the reference junction boxes for the thermocouples is 100 degrees higher than it was prior to the LOCA.

Which one of the following correctly describes how the CET readings are affected by the temperature change in the area of the reference junction boxes?

The thermocouple readings will:

a. read lower due to lower voltage differential between metals at the cold junction.

b. read higher due to higher voltage differential between metals at the cold junction.

c. remain the same because the reference junction boxes are thermally insulated

d. remain the same because the temperature change is compensated for by the CET processor.

Ans:	d	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	A temperature sensor monitors the temperature at the reference junction boxes and provides an input to the CET processor to allow provide compensation for changes in ambient temperature.

Tier:	Plant Systems	**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	017	**System/Evolution Title:**	In-Core Temperature Monitor System

Category:	A1	Ability to predict and/or monitor changes in parameters associated with operating the In-Core Temperature Monitor System controls including:

KA:	A1.01	Core exit temperature

RO Value:	3.7	**SRO Value:**	3.9	**CFR:**	**41.5 / 45.5**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Incore Instrument System - LP	0300-000.00S-INCORE-00	IV.D.2	30	00	7b

Question Source	NRC Exam Bank	**Question Modification Method**	
Question Source Comments:			

Material Required for Examination:	

Question Topic:	CFCU Operations

Given the following:

- Both Units are at 100% power
- All systems are normally aligned
- A loss of off-site power occurs

Which one of the following correctly completes the description of the response of the Containment Fan Cooling Units (CFCUs)?

The CFCUs are tripped and…

a. must be manually restarted.

b. one CFCU is started on each bus in high speed.

c. then sequenced onto the safety-related electrical buses in the slow speed mode.

d. then sequenced onto the safety-related electrical buses in normal high speed mode.

Ans:	a	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	Bkrs 1&2 are tripped by the SEC, an interlock trips bkr 3. There is no restart in MODE II.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	022	System/Evolution Title:	Containment Cooling System

Category:	A3	Ability to monitor automatic operations of the Containment Cooling System including:
KA:	A3.01	Initiation of safeguards mode of operation

RO Value:	4.1	SRO Value:	4.3	CFR:	**41.7 / 45.5**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Containment and Containment Support Systems LP	0300-0000.00S-CONTMT-00	IV.H.1.f.s)	70	5a	4

Question Source	NRC Exam Bank	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	LOCA Operation of CFCU

Which one of the following describes the flowpath through the Containment Fan Coil Units during a LOCA?

a. Low speed flow through demister, then HEPA filter, then charcoal filter, then cooling coils.

b. Low speed flow through demister, then roughing filter, then HEPA filter, then cooling coils.

c. Low speed flow through demister, then HEPA filter, then cooling coils.

d. Low speed flow through roughing filter, then demister, then cooling coils, then HEPA filter.

Ans:	c	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	c. Correct. a,b&c. CFCUs do not have charcoal Filters or roughing filters.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	022	System/Evolution Title:	Containment Cooling System

Category:	K4	Knowledge of Containment Cooling System design feature(s) and or interlock(s) which provide for the following:

KA:	K4.02	Correlation of fan speed and flowpath changes with containment pressure

RO Value:	3.1*	SRO Value:	3.4*	CFR:	41.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Containment and Support Systems	0300-000.00S-CONTMT-00	III.	57	00	4

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Inadvertent actuation of CS

Which one of the following correctly describes the protection specifically designed to prevent a spurious actuation of Containment Spray (CS) as a result of a loss of power or a voltage fluctuation?

a. A normally OFF key switch is provided in the CS pump start circuitry.

b. The CS bistables energize to trip on Hi-Hi Containment Pressure.

c. The CS bistables are powered from 125 VDC battery buses.

d. An SI signal must be present for CS to actuate.

Ans:	b	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	a. The key switch is for manual actuation only. b. Correct. The CS bistables are the only SEC bistables that are energized to actuate. c. The bistables are DC powered but this does not prevent actuation on loss of power. d. An SI will be present but does not relate to a loss of power.

Tier:	Plant Systems					**RO Group:**	2	**SRO Group:**	1

System/Evolution Number:	026	**System/Evolution Title:**	Containment Spray System

Category:	A4	Ability to manually operate and/or monitor in the control room:

KA:	A4.01	CSS controls

RO Value:	4.5	**SRO Value:**	4.3	**CFR:**	**41.7 / 45.5 to 45.8**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Containment Spray LP	0300-000.00S-CSPRAY-00	IV.B.15.e	29	4	

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Interlock for the RHR-CS isolation valves

A Large Break LOCA has occurred. The 21 RHR pump has tripped on Overcurrent. The Recirculation phase is being implemented with Containment Spray required. The following conditions are noted:

- RWST level is at the LO LO alarm setpoint
- The second Containment Spray pump has been stopped
- The sump to RHR isolation valve 21SJ44 is CLOSED
- The sump to RHR isolation valve 22SJ44 is OPEN
- The RCS to RHR isolation valve 2RH1 is OPEN
- The RCS to RHR isolation valve 2RH2 is CLOSED

Which one of the following correctly describes the response of the RHR to CS System isolation valves 21CS36 and 22CS36 when their respective Open Pushbutton is depressed?

a. Both valves will OPEN.

b. Neither valve will OPEN.

c. 21CS36 will OPEN and 22CS36 will NOT OPEN.

d. 21CS36 will NOT OPEN and 22CS36 will OPEN.

Ans:	d	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	Either RH1 or RH2 must be closed AND the associated train SJ44 valve must be OPEN before the CS36 valve will open.

Tier:	Plant Systems			**RO Group:**	2	**SRO Group:**	1

System/Evolution Number:	026	**System/Evolution Title:**	Containment Spray System

Category:	K4	Knowledge of Containment Spray System design feature(s) and or interlock(s) which provide for the following:

KA:	K4.01	Source of water for CSS, including recirculation phase after LOCA

RO Value:	4.2	**SRO Value:**	4.3	**CFR:**	**41.7**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Containment Spray LP	0300-000.00S-CSPRAY-00	V.B.1.k.	37	8	

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Iodine removal systems

Which one of the following correctly identifies the mechanisms for gaseous iodine removal from containment atmosphere?

a. Iodine Removal Units both during accident conditions and during normal conditions.

b. Containment Spray during accident conditions, and Iodine Removal Units during normal conditions.

c. Containment Spray and Iodine Removal Units during accident conditions, and neither during normal conditions.

d. Containment Spray and Iodine Removal Units during accident conditions, and Iodine Removal Units during normal conditions.

Ans:	b	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	Two iodine removal units (IRU) and fans are installed to reduce the airborne radioactivity levels, facilitate access to the containment, and to minimize doses to personnel. These units remove gaseous iodine and particulate radioactivity from the containment atmosphere as required for containment access during normal operation. b. A secondary purpose is to remove iodine from Containment atmosphere. A primary purpose is to maintain containment pressure less than design pressure following a high-energy line break (Main Steam Line Break or Large-Break Loss of Coolant Accident) inside Containment. C and d. incorrect because IRUs are not used during accident conditions.

Tier:	Plant Systems	**RO Group:**	3	**SRO Group:**	2

System/Evolution Number:	027	**System/Evolution Title:**	Containment Iodine Removal System

Category:	K1	Knowledge of the physical connections and/or cause-effect relationships between Containment Iodine Removal System and the following:
KA:	K1.01	CSS

RO Value:	3.4*	**SRO Value:**	3.7*	**CFR:**	**41.2 to 41.9 / 45.7 to 45.8**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
CONTAINMENT SPRAY SYSTEM	0300-000.00S-CSPRAY-00	II.B	14		1, 4.c
CONTAINMENT AND CONTAINMENT SUPPORT SYSTEMS	0300-000.00S-CONTMT-00	IV.A.1	74		1.e

Question Source	New	**Question Modification Method**	

Question Source Comments:	
Material Required for Examination:	

Question Topic:	Auto. Termination of Containment purge

Containment Purge operations are in progress during MODE 5 operations. The following conditions are noted:

- 1R41D was determined to be inoperable prior to the start of the purge operation
- 1R12A is being continuously monitored

Which one of the following correctly describes conditions that will require immediate MANUAL termination of the purge operation in accordance with the Containment Purge to Plant Vent procedure, S1.OP-SO.WG-0006?

a. 1R12B becomes inoperable.

b. A downscale failure of 1R12A.

c. A downscale failure of 1R11A.

d. 1R11A becomes inoperable during the purge operation.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	b. Correct. R12A is unique in that it does NOT have a downscale failure function. Continuous monitoring is required and if a downscale failure occurs, any release in progress must be terminated. a&d cause automatic isolation of purge due to Containment Vent Isolation signal. 1R11A is not required to be operable in MODE 5.

Tier:	Plant Systems	**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	029	**System/Evolution Title:**	Containment Purge System

Category:	K1	Knowledge of the physical connections and/or cause-effect relationships between Containment Purge System and the following:

KA:	K1.01	Gaseous radiation release monitors

RO Value:	3.4	**SRO Value:**	3.7	**CFR:**	**41.2 to 41.9 / 45.7 to 45.8**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Containment Purge to Plant vent	S1.OP-SO.WG-0006(Q)	P&R	4		
Aux. Bldg. Vent LP	0300-000.00S-ABVENT-00			12	

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Loss of Spent Fuel Cooling

Unit1 Spent Fuel Cooling System requires cross-connecting to Unit 2 Spent Fuel Cooling System to support naintenance activities.

Which of the following statements correctly describes the flowpaths associated with this evolution?

a. Unit 1 Spent Fuel Pit is cooled by Unit 2 Spent Fuel Cooling Pumps and Heat Exchanger.

b. Unit 1 Spent Fuel Pit is cooled by Unit 2 Spent Fuel Cooling Pumps using Unit 1 Spent Fuel Cooling Heat Exchanger.

c. Unit 2 Spent Fuel Cooling System provides limited cooling to both Unit 1 & Unit 2 Spent Fuel Pits.

d. Unit 1 Spent Fuel Pit is cooled by Unit 2 Spent Fuel Cooling System Heat Exchanger using Unit 1 Spent Fuel Cooling Pumps.

Ans:	d	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	During crossconnect operation, with Unit 2 SFPC System supplying, Unit 2 Pit receives no cooling flow. Unit 1 pit is cooled by Unit 2 heat exchanger using Unit 1 pumps.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	033	System/Evolution Title:	Spent Fuel Pool Cooling System

Category:	A2	Ability to (a) predict the impacts of the following on the Spent Fuel Pool Cooling System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

KA:	A2.02	Loss of SFPCS

RO Value:	2.7	SRO Value:	3.0	CFR:	41.5 /43.5/ 45.3/45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Loss of SFP LP	0300-000.00S-ABSF01-00	18	9	00	2
Spent Fuel Cooling P&ID	205233			24	
SFPC Operation	S2.OP-SO.SF-0002	5.7	13		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Action by ADFWCS for bumpless transfer

The Unit 2 Advanced Digital Feedwater Control System (ADFWCS) average steam pressure calculation output has failed.

Which one of the following correctly describes the expected response of the Feedwater Control System?

a. Only 21-24BF19 valves will switch to manual control mode.

b. Only SGFP controllers will switch to manual control mode.

c. Only 21-24BF19 and BF40 valves will switch to manual control mode.

d. The 21-24BF19s, BF40s and both feed pump controllers will switch to manual control mode.

Ans:	d	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	The average loop steam pressure output is marked as Bad Quality and will carry over to all steam flow calculations. This will cause all BF19s, BF40s and both feed pump controllers will switch to manual control mode.

Tier:	Plant Systems				**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	035	**System/Evolution Title:**	Steam Generator System

Category:	A4	Ability to manually operate and/or monitor in the control room:
KA:	A4.01	Shift of S/G controls between manual and automatic control, by bumpless transfer

RO Value:	3.7	**SRO Value:**	3.6	**CFR:**	**41.7 / 45.5 to 45.8**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
ADFWCS-LP	0300-000.00S-ADFWCS-00	V.E.4.b.8).	26	6	

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	capacity of Safety valve

The following plant conditions exist:

- Plant is operating at 55 percent power with all systems normally aligned
- One main steam code safety valve inadvertently fully opens
- The plant continues to operate

Which one of the following correctly describes the approximate power level the plant will stabilize at if the valve remains OPEN and no operator action is taken?

a. 57.5 percent.

b. 60.5 percent.

c. 65 percent.

d. 75 percent.

Ans:	b	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	20 main steam safety valves (5 per loop) rated at 110%. One valve is approx. 5.5%. Other values math error choices.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	039	System/Evolution Title:	Main and Reheat Steam System

Category:	A2	Ability to (a) predict the impacts of the following on the Main and Reheat Steam System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

KA:	A2.05	Increasing steam demand, its relationship to increases in reactor power

RO Value:	3.3	SRO Value:	3.6	CFR:	41.5 /43.5/ 45.3/45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Main Steam LP	0300-000.00S-MSTEAM-00	III.B.4.	16	2	

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Steam dumps operations with Rx trip breaker closed

Given the following conditions on Unit 2:

- Reactor power was 65% when the turbine tripped and an ATWS occurred
- The reactor tripped 20 seconds later when Train A reactor trip breaker was locally opened
- Train B reactor trip breaker is failed closed
- No controls other than control rods and boration controls have been operated

Which one of the following correctly describes the operation of the steam dumps for these conditions?

Steam Dumps will...

a. open immediately following the turbine trip and modulate to stabilize Tavg at its no-load value.

b. open when the trip breaker is opened and modulate to stabilize Tavg at its no-load value.

c. open immediately following the turbine trip and modulate to stabilize Tavg 5 degrees above its no-load value.

d. open when the trip breaker is opened and will be blocked closed when Tavg falls below its low-low value.

Ans:	c	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	The following signals of concern will energize the arming solenoids: 1) Turbine load rejection as sensed by PT506 (>5% per minute or 10% step decrease); 2) Reactor Trip Breaker Train A open. Since the A breaker initially failed to open on the trip, the arming signal was provided by the loss of load. 1) If TAVG Control is selected and Reactor Trip Breaker, Train B (P-4) is closed (as in this case), the Load Rejection Controller controls Dump valve position based on TAVG error with an initial 5 degree dead band. So 'c' is correct. 'a'. Would occur on "normal" trip or if the B Train breaker is open. "b" and "d" assume the steam dump arming signal does NOT occur until the A Train breaker is opened.

Tier:	Plant Systems	**RO Group:**	3	**SRO Group:**	3

System/Evolution Number:	041	**System/Evolution Title:**	Steam Dump System and Turbine Bypass Control

Category:	K4	Knowledge of Steam Dump System and Turbine Bypass Control design feature(s) and or interlock(s) which provide for the following:

KA:	K4.17	Reactor trip

RO Value:	3.7	**SRO Value:**	3.9	**CFR:**	**41.7**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
STEAM DUMP SYSTEM	0300-000.00S-STDUMP-01	VI.A.1.a, V.A.9.c, IX.B.4	32, 36, 38-39		8, 10

Question Source		**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Turbine control input channel failure

The following conditions exist on Unit 2:

- Reactor power 30%
- Turbine EHC Panel settings:
  - -Turbine SETTER & REFERENCE - 36
  - - IMP IN is selected
- Turbine Valve Position Limiter is set at the 100% power value
- The turbine impulse pressure channel input to EHC slowly fails to zero

Which one of the following correctly describes the response of the EHC controls to these conditions?

Turbine load will...

a. remain constant. When the difference between REFERENCE and the input signal exceeds the setpoint, EHC will transfer to MANUAL control.

b. increase until the difference between REFERENCE and the input signal exceeds the setpoint, then load will stabilize in IMP OUT control.

c. increase until the difference between REFERENCE and the input signal exceeds the setpoint, then an alarm will alert the operator to select IMP OUT control.

d. remain constant. When the difference between REFERENCE and the input signal exceeds the setpoint, an alarm will alert the operator to select MANUAL control.

Ans:	b	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	During "IMP IN" mode, if difference between actual 1st stage impulse pressure and the REFERENCE value exceeds the setpoint the following will occur: (1) LOAD CHAN light is illuminated; (2) Turbine automatically shifts to IMP OUT. The light is indicative of a loss of actual turbine impulse pressure signal.

Tier:	Plant Systems	RO Group:	3	SRO Group:	3

System/Evolution Number:	045	System/Evolution Title:	Main Turbine Generator System

Category:	A2	Ability to (a) predict the impacts of the following on the Main Turbine Generator System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

KA:	A2.17	Malfunction of electrohydraulic control

RO Value:	2.7*	SRO Value:	2.9*	CFR:	41.5 /43.5/ 45.3/45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
ELECTRIC-HYDRAULIC CONTROL (EHC) SYSTEM	0300-000.00S-EHC000-01	V.B.2.c.2).o)	63		8
CONTROL CONSOLE 2CC3	S2.OP-AR.ZZ-0013(Q)	E.3 (Bezel 6-9)	43	10	

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	SGFP/AFW Pump interlocks

Unit 2 is at 50% power. 21 SGFP is manually tripped. 22 SGFP subsequently trips on a loss of Lube oil.

Which one of the following correctly describes the status of the Aux Feedwater Pumps?

a. The motor driven AFW Pumps immediately start when the 22 SGFP trips.

b. The motor driven AFW Pumps will not start until S/G levels drop below 9%.

c. All AFW pumps auto start only if the jumpers were installed in the 21 SGFP trip circuit.

d. All AFW Pumps immediately start when the 22 SGFP trips.

Ans:	a	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	a. Correct. Manual or auto trip of a SGFP is seen the same way by the AFW Pump start ckt so both MDAFW Pumps will start immediately. b. Same as a. c. Jumpers are no longer required due to circuit modifications. d. 23 AFW Pump does not start on SGFP trips.

Tier:	Plant Systems	**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	059	**System/Evolution Title:**	Main Feedwater System

Category:	K1	Knowledge of the physical connections and/or cause-effect relationships between Main Feedwater System and the following:

KA:	K1.02	AFW System

RO Value:	3.4	**SRO Value:**	3.4*	**CFR:**	**41.2 to 41.9 / 45.7 to 45.8**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Operator Fluency	0300-000.00S-FLUNCY-04			04	2

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	SGFP Trips

The following is a list of conditions that will result in SGFP trips.

Which condition will trip both SGFPs simultaneously.

a. Condenser vacuum decays to 20" Hg.

b. Main Turbine trip with power at 83%.

c. Containment pressure rises to 4.4psig.

d. Inadvertent actuation of the Feedwater Interlock.

Ans:	c	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	c. Correct. Containment pressure at 4.4 psig will generate an SI signal which will trip both SGFPs simultaneously. a. SGFP trip is at 0' Hg. b. No direct trip of SGFP s from a MT trip. d. Feedwater interlock signal (P-4 with low Auctioneered Tave) closes the 19 and 40 valves only. A Feedwater isolation closes the 19,13, and 40 valves trips the feed pumps and the main turbine.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	059	System/Evolution Title:	Main Feedwater System

Category:	K4	Knowledge of Main Feedwater System design feature(s) and or interlock(s) which provide for the following:
KA:	K4.16	Automatic trips for MFW pumps

RO Value:	3.1*	SRO Value:	3.2*	CFR:	41.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
SGFP	0300-000.00S-SGFP00-00				

Question Source	NRC Exam Bank	Question Modification Method	
Question Source Comments:			

Material Required for Examination:	

Question Topic:	AFW inhibit in LOCAL

The reactor is at full power. Auxiliary Feedwater pump 23 LOCAL/REMOTE switch has been inadvertently left in LOCAL at the Hot Shutdown Panel.

Which one of the following correctly describes the consequences of this error?

The 23 AFW Pump will start…

a. if both SGFPs trip.

b. when actuated by an AMSAC signal.

c. on a loss of 125VDC control power.

d. if the START switch in the control room is operated.

Ans:	c	**Exam Level:**	B	**Cognitive Level:**	Comprehension

Explanation of Answer	c. Correct. On a loss of 125VDC control power, the steam inlet valve will fail open starting the pump. a. 23 AFW Pump does not start on SGFP trips. b.&d. Control Room Controls and all AUTO starts are disabled with the LOCAL/REMOTE switch is in LOCAL.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	061	System/Evolution Title:	Auxiliary / Emergency Feedwater System

Category:	A2	Ability to (a) predict the impacts of the following on the Auxiliary / Emergency Feedwater System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

KA:	A2.03	Loss of dc power

RO Value:	3.1	SRO Value:	3.4	CFR:	**41.5 /43.5/ 45.3/45.13**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
AFW LP	0300-000.00S-AFW000-01	V.A.3.e	44	01	7

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	AMSAC time delay

A failure of the RPS has occurred from 50% power following the loss of the only available feed pump. Steam Generator narrow range levels are off-scale low.

Which one of the following correctly describes the plant response due to AMSAC actuation?

a. All AFW pumps start and the main turbine trips 25 seconds after 3 of 4 S/G levels go below 5%.

b. All AFW pumps start immediately after 3 of 4 S/G levels go below 5%.

c. Main Turbine trips immediately and all AFW Pumps start 25 seconds after 3 of 4 S/G levels go below the reactor trip setpoint.

d. All AFW Pumps start and the Main Turbine trips immediately after 3 of 4 S/G levels go below the reactor trip setpoint.

Ans:	a	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	The time delay is 25 sec. after 3/4 S/Gs is less than 5%.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	061	System/Evolution Title:	Auxiliary / Emergency Feedwater System

Category:	K4	Knowledge of Auxiliary / Emergency Feedwater System design feature(s) and or interlock(s) which provide for the following:

KA:	K4.02	AFW automatic start upon loss of MFW pump, S/G level, blackout, or safety injection

RO Value:	4.5	SRO Value:	4.6	CFR:	41.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
AMSAC Lesson Plan	0300-000.00S-AMSAC0-00	III.B.1	11	2	

Question Source	New	Question Modification Method	
Question Source Comments:			

Material Required for Examination:	

Question Topic:	Power to Circ water

Given the following conditions:

- Unit 1 is in MODE 3
- Unit 2 reactor power - 18%
- The Main Generator is synchronized to the grid
- Steam Dumps are closed.
- 21A, 22A and 23A Circulators have tripped.

Which one of the following correctly identifies the failure which would cause the simultaneous trip of these Circulators?

a. An undervoltage condition lasting 0.2 seconds occurred on the 2CW bus section 23.

b. 3 SPT Differential Overcurrent.

c. Breaker failure on 500 kV BS 9-10 (30X) breaker.

d. Phase to Ground fault on the Salem 2CW 4KV bus Section 23.

Ans:	d	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	d. Correct. A phase to ground fault would open the normal feeder breaker(23CW1AD) to 2CW bus sect 23. The crosstie breaker would NOT close and the Circulators would be lost. a. a 0.7 sec time delay should prevent circulator trips on momentary undervoltage conditions allowing the cross-tie to close and maintain voltage on the bus. b. 3 SPT Diff protection will de-energize the normal feed to the CW bus sect 23 but the CW bus cross-tie should close and maintain power to the circulators. c. The 30 X breaker failure opens the other generator output breaker (BS 1-9, 32X) and the BS 2-10 breaker (31X) which isolates the Hope Creek line.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	062	System/Evolution Title:	A.C. Electrical Distribution

Category:	A2	Ability to (a) predict the impacts of the following on the A.C. Electrical Distribution and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

KA:	A2.01	Types of loads that, if de-energized, would degrade or hinder plant operation

RO Value:	3.4	SRO Value:	3.9	CFR:	41.5 /43.5/ 45.3/45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
CIRCULATING WATER SYSTEM	0300-000.00S-CW0000-00	IV.B.11.e.11)	33		5
4160 ELECTRICAL SYSTEM	0300-000.00S-4KVAC0-00	V.C.6.c	57		3.a
500KV ELECTRICAL SYSTEM	0300–000.00S–500KV0–00				6, 8

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Power to major loads

Which one of the following correctly describes the normal flowpath for power to the 115 Vital Instrument Bus D on Unit 2?

a. DC power from the 2B 125 VDC Bus rectified to 120 VAC.

b. AC power from 2C 230 VAC Vital Bus transformed to 120 VAC.

c. AC power from the 2B 230 VAC Vital Bus, rectified to 140 VDC inverted to 120 VAC.

d. AC power from 2C 230 VAC, stepped down to 140 VAC to the AC Line Regulator and reduced to 120 VAC.

Ans:	c	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	The D VIB is powered from the D VIB Inverter. Each Inverter receives power from an AC/DC Power Supply. The D AC/DC Power Supply receives power from the B 230 VAC Vital Bus and the B 125 VDC Bus. The normal supply is the AC input (correct answer) and the backup source of power is the B 125 VDC Bus (selection a). Other VIBs are supplied from their respective 230 VAC Vital buses (A-A, B-B, C-C, with D being the "odd" one) (Selection b). The emergency or "alternate" source of power is supplied to the output of each Inverter, supplied from the same associated 230 Vital Bus as above. The alternate power feed enters the AC Line Regulator Cabinet, passes through the Regulator AC Input Circuit Breaker and is stepped down to about 140 VAC. The voltage is the input to the AC Line (Static) Regulator which provides a constant 120 VAC output with a variable input (selection c).

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	062	System/Evolution Title:	A.C. Electrical Distribution

Category:	K2	Knowledge of bus power supplies to the following:

KA:	K2.01	Major system loads

RO Value:	3.3	SRO Value:	3.4	CFR:	41.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
115VAC ELECTRICAL SYSTEMS	0300-000.00S-115VAC-00	V.A.b	17		3, 5

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Loss of Bat. Charger

A loss of off-site power has occurred, the emergency diesel generators are running and loaded. The 2A1 3attery Charger output breaker has tripped open.

Assuming no operator action, which one of the following correctly identifies the battery capacity of Class 1E 125 VDC buses during these conditions?

a. All batteries will carry all DC loads until completely discharged, which is estimated to be approximately TWO hours.

b. All batteries will be supplied by the chargers from the 230 VAC buses indefinitely, 2A battery automatically shifted to the 2A2 Battery Charger.

c. The 2A battery will provide adequate power to loads for approximately TWO hours. The other batteries will be supplied by the chargers from the 230 VAC buses indefinitely.

d. The 2A battery will provide adequate power to loads for approximately TWO hours. The other batteries will discharge at a rate of 2320 amps for approximately FOUR hours until depleted.

Ans:	c	Exam Level:	S	Cognitive Level:	Comprehension	

Explanation of Answer	With the 2A1 charger OOS, the 2A2 Charger is a 100% charger and will supply the battery if required. But this charger must be manually aligned. The batteries are designed to last 2 hours at full discharge.

Tier:	Plant Systems	RO Group:	2	SRO Group:	1

System/Evolution Number:	063	System/Evolution Title:	D.C. Electrical Distribution

Category:	A4	Ability to manually operate and/or monitor in the control room:

KA:	A4.03	Battery discharge rate

RO Value:	3.0*	SRO Value:	3.1	CFR:	41.7 / 45.5 to 45.8

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
DC Electrical Systems LP	0300-000.00S-DCELEC-00	IV.B.2	16-18		3.b

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	DC loads

125 VDC breaker 2BDC1AX12, 2G 4KV Bus Control Power Supply (Reg) tripped due to a breaker malfunction.

Which one of the following correctly describes the impact this malfunction will have?

a. 24 RCP will trip immediately.

b. 24 RCP will remain running but will not trip if required.

c. Emergency control power from the 2A 125 VDC bus will automatically be provided.

d. 24 RCP breaker will trip if required but will not close to start the pump.

Ans:	b	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	b. Correct. Breaker trip coils are energize to function. Without control power, the RCP will not trip. a. Same as b. c. No auto backup is provided. d. Same as b.

Tier:	Plant Systems	**RO Group:**	2	**SRO Group:**	1

System/Evolution Number:	063	**System/Evolution Title:**	D.C. Electrical Distribution

Category:	K4	Knowledge of D.C. Electrical Distribution design feature(s) and or interlock(s) which provide for the following:

KA:	K4.02	Breaker interlocks, permissives, bypasses and cross-ties.

RO Value:	2.9*	**SRO Value:**	3.2*	**CFR:**	**41.7**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
DC ELECTRICAL SYSTEMS	0300–000.00S–DCELEC–00		9	0	12
2A 125VDC BUS OPERATION	S2.OP-SO.125-0005(Q)	3	7		

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	DG controls during parallel operations

Given the following conditions on Unit 2:

- The 2A 4KV Vital bus experienced a loss of bus voltage
- The 2A EDG energized the 2A 4KV bus
- The SEC sequenced loads in accordance with MODE II*
- The normal source to the bus is now available

Which one of the following correctly completes the description of the method for restoration of the normal power supply to the 2A 4KV Vital Bus in accordance with S2.OP-SO.DG-0001, 2A DIESEL GENERATOR OPERATION?

The EDG is...

a. unloaded in Isochronous Mode and removed from the bus before the normal feeder breaker is closed.

b. unloaded in Isochronous Mode, placed in parallel with the normal feeder breaker closed and then removed from the bus.

c. transferred to Droop Mode, placed in parallel with the normal feeder breaker closed and then removed from the bus.

d. transferred to Droop Mode when the SEC is reset, unloaded and removed from the bus before the normal feeder breaker is closed.

Ans:	a	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	When conditions return to normal, Diesel Generator Operation operating procedure S1/2.OP-SO.DG-0001(Q), is used to return the EDGs to Normal-Standby mode. This involves unloading and removing EDG from the bus in current mode. This action is taken from the Control Room, and requires that vital bus be de-energized before a normal feeder breaker is closed. B. &c. require parallel operation.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	064	System/Evolution Title:	Emergency Diesel Generators

Category:	A4	Ability to manually operate and/or monitor in the control room:

KA:	A4.09	Establishing power from the ring bus (to relieve ED/G)

RO Value:	3.2*	SRO Value:	3.3*	CFR:	41.7 / 45.5 to 45.8

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EMERGENCY DIESEL GENERATORS	0300-000.00S-EDGOOO-00	VII.A.2	87		8, 12
2A DIESEL GENERATOR OPERATION	S2.OP-SO.DG-0001(Q)	5.8	18	22	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	EDG Tech Spec

Given the following conditions on Unit 2:

- Reactor power - 100%
- 2A Emergency Diesel Generator (EDG) was being run to maintain engine oil temperature due to failure of the prelube pump during Preventive Maintenance
- The breaker feeding the jacket water heater on the 2A EDG tripped and CANNOT be re-closed
- Electrical Maintenance determines breaker and circuit wiring will need to be replaced
- Repairs are expected to take 30 hours

in accordance with Technical Specifications, which one of the following correctly describes the required actions?

a. 2B or 2C EDG must be tested within the next 24 hours.

b. 2B and 2C EDG must be tested independently within the next 24 hours.

c. Periodically run 2A EDG to maintain Lube oil temperature.

d. 2B and 2C EDG must be verified operable but neither EDG need be run within the next 24 hours.

Ans:	b	Exam Level:	S	Cognitive Level:	Comprehension

Explanation of Answer	With both the prelube pump and the jacket water heater inoperable, the EDG is considered inoperable. Per action of Tech Spec, the remaining EDGs must be started and run per surveillance to ensure operability. If the EDG had been made inoperable for preventive maintenance, the Tech Specs do NOT require operation of the remaining two EDGs. The Ops procedures direct that running of redundant diesel generator units for purposes of testing shall be performed independently (non-concurrently) to minimize common failure modes resulting from undetected interdependencies among diesel generator units (Reg Guide 1.108, Section C.2.b). Running the 2A D/G to maintain Lube Oil temperatures is not required since the D/G is inoperable.

Tier:	Plant Systems	**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	064	**System/Evolution Title:**	Emergency Diesel Generators

Category:	G	Conduct Of Operations

KA:	2.1.12	Ability to apply technical specifications for a system.

RO Value:	2.9	**SRO Value:**	4.0	**CFR:**	**43.2 / 43.5 / 45.3**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
EMERGENCY DIESEL GENERATORS	0300-000.00S-EDGOOO-00	VI.A, VII.C.1.b	95, 99-100		10, 12
Salem - Unit 2 Technical Specifications		3.8.1.1 Action b.	3/4 8-1	Amend 152	
2A DIESEL GENERATOR OPERATION	S2.OP-SO.DG-0001(Q)	3.6 & 3.15	5-6		

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	TS 3.8.1.1

Question Topic:	D/G Protection during accidents

A steamline break inside containment and loss of off-site power have occurred on Unit 1. All D/Gs are running loaded in SEC Mode 3. All required equipment started and the crew has implemented 1-EOP-TRIP-1, Reactor Trip or Safety Injection. The SECs have not been reset. OHA alarm J-20, 1C DG URGENT TRBL and console bezel alarm 1C TROUBLE have actuated. The NEO dispatched to investigate reports the local annunciator panel alarm is HIGH LUBE OIL TEMPERATURE and Lube oil temperature is 208 degrees F.

Which one of the following is the correct response for this situation?

a. Direct an NCO to block 1C SEC on the RP-1 Panel to avoid losing 1C 4KV Vital Bus when 1C SEC is reset in the EOPs.

b. Direct the NEO to investigate and attempt to correct the problem. 1C 4KV Vital Bus will be lost if the SEC is reset with this problem standing.

c. Direct the NEO to push the local EMERGENCY TRIP pushbutton. 1C EDG should have tripped automatically.

d. Direct the NEO to trip 1C EDG at the fuel rack. The local EMERGENCY TRIP is not functional on a SEC start.

Ans:	b	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	b. Correct. Oil temp will not trip the D/G during a Mode OP. But if the SEC is reset and the oil temp is still valid, the D/G will trip. a. Blocking the SEC will a trip when reset occurs. c. Auto trip for oil temp is disabled during a Mode-Op. d. During an actual accident, it is not appropriate to trip the D/G for a Lube Oil temp problem.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	064	System/Evolution Title:	Emergency Diesel Generators

Category:	K4	Knowledge of Emergency Diesel Generators design feature(s) and or interlock(s) which provide for the following:
KA:	K4.02	Trips for ED/G while operating (normal or emergency)

RO Value:	3.9	SRO Value:	4.2	CFR:	41.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EDG LP	0300-000.00S-EDG000-00	V.A.3.b.1).a)	82		6,9

Question Source	NRC Exam Bank	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	SG blowdown isolation

Which one of the following correctly describes the condition that will cause the Steam Generator Blowdown Isolation Valves (GB4) to CLOSE on the Unit 2 Steam Generators?

a. Auto start of Auxiliary Feed Pumps.

b. High setpoint reached on any Main Steam Line Monitor, 2R46A-E.

c. High setpoint reached on Condenser Air Ejector Monitor, 2R15.

d. Warning on Steam Generator Blowdown Monitor, 2R19.

Ans:	a	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	The warning for 2R19 only closes GB10, 185, 50. 2R46's & 2R15High Flow cause no auto action.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	068	System/Evolution Title:	Liquid Radwaste System

Category:	A4	Ability to manually operate and/or monitor in the control room:

KA:	A4.04	Automatic isolation

RO Value:	3.8	SRO Value:	3.7	CFR:	**41.7 / 45.5 to 45.8**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Steam Generator LP	003-000.00S-STMGEN-01	IV.B.10.g	31		6,9

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Design of WG41

Which one of the following correctly completes the description of the condition that ensures release limits are NOT exceeded when discharging the contents of a WGDT?

The Radioactive Gaseous Waste Release Valve (WG41)...

a. will close when pressure exceeds 2.9 psig upstream of WG41.

b. will close when pressure exceeds 5.3 psig downstream of WG41.

c. must be throttled by the operator to limit the discharge flowrate to 32 scfm during the release.

d. is designed to limit the discharge flowrate to 32 scfm when the valve is full open.

Ans:	d	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	the valve stroke is adjusted to limit the flowrate at 100% open, NOT throttled. There are no AUTO actions as a result of high pressure associated with WG41. 2.9 psig is an interlock preventing WG41 from opening. 5.3 psig is the constant pressure maintained upstream of WG41.

Tier:	Plant Systems	RO Group:	1	SRO Group:	1

System/Evolution Number:	071	System/Evolution Title:	Waste Gas Disposal System

Category:	A4	Ability to manually operate and/or monitor in the control room:
KA:	A4.27	Opening and closing of the decay tank discharge control valve

RO Value:	3.0*	SRO Value:	2.7*	CFR:	41.7 / 45.5 to 45.8

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Rad. Waste Gas System LP	0300-000.00S-WASGAS00-00	IV.B.3	25		3.a.xi,4.k

Question Source	New	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	ARM Interlocks

Which one of the following Radiation Monitors initiates safety related actions?

a. WGDT (R42) Alarm.

b. Control Room (R1A) Alarm.

c. Containment Low Range (R2) Alarm.

d. Fuel Handling Building-Spent Fuel Pit Area (R5) Alarm.

Ans:	d	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	d. Correct. Stops upward motion of the Fuel Handling crane. a&c. These monitors initiate no automatic action. b. R1B initiates Control room Vent Isolation but the R1A performs no auto action.

Tier:	Plant Systems			**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	072	**System/Evolution Title:**	Area Radiation Monitoring System

Category:	G	Conduct Of Operations
KA:	2.1.27	Knowledge of system purpose and or function.

RO Value:	2.8	**SRO Value:**	2.9	**CFR:**	**41.7**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
RMS LP	0300-00.00S-RMS000-01	III.C.1.a	16		2

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	SG Blowdown Isol

Which one of the following correctly describes the effect on the GB4s (S/G Blowdown Outlet Isolation Valves) of a rising radiation condition on Unit 1 and Unit 2 R19D, Steam Generator Blowdown Liquid Monitor (14, 24 SG)?

a. On Unit 1, only 14GB4 will close on warning alarm condition.
   On Unit 2, all GB4 valves will close on high alarm condition.

b. On Unit 1, all GB4 valves will close on high alarm condition.
   On Unit 2, only 24GB4 will close on high alarm condition.

c. On Unit 1, only 14GB4 will close on warning alarm condition.
   On Unit 2, all GB4 valves will close on warning alarm condition.

d. On Unit 1, all GB4 valves will close on warning alarm condition.
   On Unit 2, only 24GB4 will close on high alarm condition.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	Unit 1 has NO warning alarm actions; Unit 2 does have warning alarm actions for other SGBD valves. On Unit 1, any R19 alarm closes all GB4 valves; On Unit 2 only the affected SG isolation valve is closed.

Tier:	Plant Systems	**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	073	**System/Evolution Title:**	Process Radiation Monitoring System

Category:	A4	Ability to manually operate and/or monitor in the control room:
KA:	A4.01	Effluent release

RO Value:	3.9	**SRO Value:**	3.9	**CFR:**	**41.7 / 45.5 to 45.8**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
STEAM GENERATOR, SG BLOWDOWN AND DRAIN SYSTEMS	0300-000.00S-STMGEN-01	IV.B.10.g	31		9
RADIATION MONITORING SYSTEM	0300-000.00S-RMS000-01	IV.B.1.j	24		6.k, 11

Question Source	Previous 2 NRC Exams	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Shield Coolant flow alarms

RP-1 OH Annunciator, MN STM MON R46A-D FAIL was received. Investigation reveals:

- LOW COOLANT FLOW and VALVE SHUT-OFF indicating lights on panel 158 have illuminated for Steam Line Radiation Monitors (2R46).
- It is noted that 2R46A and E monitors have lost coolant flow to their shields.

Which one of the following correctly describes the condition that will allow steam to be admitted to the remaining shields that are verified to have sufficient coolant flow?

a. When the individual loop low coolant flow alarm is clear, the corresponding solenoid valve can be manually opened.

b. All low coolant flow alarms must clear before the solenoid valves can be opened manually.

c. The OVERRIDE key switch for each of the shields that have proper cooling flow is utilized to open their solenoid valves.

d. The MANUAL STEAM SHUTOFF key switch for R46A is utilized to close its solenoid valve. Then the remaining solenoid valves can be opened manually.

Ans:	c	Exam Level:	S	Cognitive Level:	Comprehension	

Explanation of Answer	An override key switch is used to manually admit steam to shields which have not lost cooling flow. R46 does not have a manual steam shutoff or override keyswitch.

Tier:	Plant Systems	RO Group:	2	SRO Group:	2

System/Evolution Number:	073	System/Evolution Title:	Process Radiation Monitoring System

Category:	A4	Ability to manually operate and/or monitor in the control room:

KA:	A4.02	Radiation monitoring system control panel

RO Value:	3.7	SRO Value:	3.7	CFR:	41.7 / 45.5 to 45.8

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
RMS LP	0300-000.00S-RMS000-01	IV.B.4	49-50	8	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	CFCU SW design

Which one of the following correctly describes the protective feature for the CFCUs Service Water System on Unit 1 for a loss of off-site power?

a. A travel stop on closing for SW-223, Outlet flow control valve, protects the piping from overpressure.

b. A bypass line with orifices installed around SW-223, Outlet flow control valve, protects the piping from overpressure.

c. A relief valve installed around SW-223, Outlet flow control valve, mitigates waterhammer when SW flow is re-initiated.

d. A SW accumulator installed just upstream of SW-223, Outlet flow control valve, maintains CFCU Flow until Service Water Pumps are started by the Blackout sequencer.

Ans:	b	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	On Unit 1 (and to be installed on Unit 2 - but currently provided only with relief valve) the orifices provide a path for overpressure protection around the 1SW223 valves. This is for the case of a LOOP where coastdown of the CFCU fans continue to add heat to water in CFCU with discharge valve closed (and inlet check valves closed) causing pressure to rise. As stated the relief valves provide same function on Unit 2. The accumulators are provided to maintain the CFCU piping full to prevent waterhammer when the SW pumps are re-started on the SEC. Only the SW57s Inlet Pressure Control have incorporated the travel stop. The travel stops are set at 100 gpm minimum flow position. This is in excess of the 67 gpm design flow through its respective relief valve SW-531 (Unit 2 only), so a stuck open relief valve will not drain the CFCU.

Tier:	Plant Systems	RO Group:	3	SRO Group:	3

System/Evolution Number:	076	System/Evolution Title:	Service Water System

Category:	K4	Knowledge of Service Water System design feature(s) and or interlock(s) which provide for the following:

KA:	K4.03	Automatic opening features associated with SWS isolation valves to CCW heat exchangers

RO Value:	2.9*	SRO Value:	3.4*	CFR:	41.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
SERVICE WATER - NUCLEAR HEADER	0300-000.00S-SW0NUC-01	IV.B.2.a 1) & 5)	21-24		4, 11

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Control Air loss protection

A rupture of the A Control Air header has occurred downstream of the supply from the Control Air Dryer and has resulted in lowering air pressure.

Which one of the following correctly completes the statement concerning operation of the 1CV3,4,5, Letdown Orifice Isolation Valves, on Unit 1 during this event?

The 1CV3,4,5, Letdown Orifice Isolation Valves, will be supplied adequate air for control due to...

a. auto start of #3 Station Air Compressor on Unit 2.

b. auto start of the Unit 1 Emergency Control Air Compressor.

c. actuation of the Excess Flow Check Valve (EFCV) 1CA920.

d. swap of the 1CV3,4,5, Letdown Orifice Isolation Valves Redundant Air Panel (Lunkenheimer) to the B header.

Ans:	d	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	d. Correct. The Lunkenheimer ensures that a loss of an individual CA header does not result in a loss of CA to instruments and/or air-operated devices required for an orderly and controlled shutdown. b. The header is backed up by #2 ECAC, NOT backed up by the #1 ECAC. a. The start of #3 SAC also does NOT provide assurance of maintenance of air supply due to location of leak. c. Excess flow check valves close to isolate loads or section of headers from the main supply. EFCV actuation will not occur here and would not help if it did.

Tier:	Plant Systems	**RO Group:**	3	**SRO Group:**	3

System/Evolution Number:	078	**System/Evolution Title:**	Instrument Air System

Category:	K3	Knowledge of the effect that a loss or malfunction of the Instrument Air System will have on the following:
KA:	K3.02	Systems having pneumatic valves and controls

RO Value:	3.4	**SRO Value:**	3.6	**CFR:**	**41.7 / 45.6**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
CONTROL AIR SYSTEM	0300-000.00S-CONAIR-00	IV.B.9	26-27		4.I
LOSS OF CONTROL AIR	S1.OP-AB.CA-0001(Q)	Attachment 2	5	6	

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Rod withdrawal at lower power

Unit 2 is at the end of life with the following conditions:

- A plant startup is in progress
- Reactor power - 8%
- RCS boron concentration 100 ppm
- Control Bank D is at 138 steps
- Circuit failure at the RAISE RODS pushbutton results in outward rod motion

Which one of the following correctly identifies the condition that will terminate the power increase if NO operator action is taken?

a. Power Range High Flux HI setpoint trip.

b. Power Range High Flux LO setpoint trip.

c. C-11, Control Bank D Fully Withdrawn Rod Stop.

d. C-1, Intermediate Range High Flux Rod Withdrawal Stop.

Ans:	d	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	The rod stops and trips are applied in sections of rod control (Logic Cabinet and SSPS/reactor trip breakers) NOT affected by the given failure. From 8% power to 20% power, the power defect requires a reactivity insertion of approximately 200 pcm (S2.RE-RA.ZZ0012, Fig. 2). This corresponds to rod position of change from 138 steps to about 178-180 steps (S2.RE-RA.ZZ0012, Fig. 4). At this point C-1 actuates well below the associated C-11 position of 225 steps, Auto Rod Stop. Also C-11 is an AUTO rod stop only. The power range trips are at 25% and 109% power, respectively.

Tier:	Emergency and Abnormal Plant Evolutions	**RO Group:**	2	**SRO Group:**	1

System/Evolution Number:	001	**System/Evolution Title:**	Continuous Rod Withdrawal

Category:	A2	Ability to determine and interpret the following as they apply to Continuous Rod Withdrawal:
KA:	AA2.04	Reactor power and its trend

RO Value:	4.2	**SRO Value:**	4.3	**CFR:**	**43.5 / 45.13**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
ROD CONTROL AND POSITION INDICATION SYSTEMS	0300–000.00S–RODS00–00	V.B.1.a & e; V.B.2.a.2	55-57		6, 12
REACTOR PROTECTION SYSTEM	0300-000.00S-RXPROT-00	V.A & V.D	34, 37		12, 13
Figures	S2.RE-RA.ZZ-0012(Q)	Figures 2 & 4	6, 8		

Question Source	New	**Question Modification Method**	
Question Source Comments:			

Material Required for Examination:	S2.RE-RA.ZZ-0012(Q) Figure 2 (page 6) and Figure 4 (page 8).

Question Topic:	Urgent alarm during dropped rod/recovery

Given the following conditions on Unit 2:

- A reactor startup is in progress
- All Shutdown Bank rods are fully withdrawn
- Control Banks A, B are fully withdrawn
- Control Bank C is being withdrawn at 210 steps
- Control Bank C rod H-14 dropped due to a fuse failure

Which one of the following correctly completes the statement about the status of the ROD BANK URGENT FAIL alarm (OHA E-40)?

The alarm actuates…

a. only when the rod is being recovered.

b. after the fuse failed and rod motion was commanded.

c. as soon as the rod is misaligned by at least 12 steps.

d. both when the rod dropped during motion and when the rod is being recovered.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	The alarm initially actuates due to Regulation failure in the power cabinet for SDC due to loss of power to the stationary coil. Since the rod is in Shutdown Bank C & D which have only ONE group of rods, the alarm is NOT actuated due to the motion of rods with the Lift Coil Disconnect switches open. Bank position has NO affect on alarm actuation.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	1

System/Evolution Number:	003	System/Evolution Title:	Dropped Control Rod

Category:	K3	Knowledge of the reasons for the following responses as they apply to Dropped Control Rod:

KA:	AK3.04	Actions contained in EOP for dropped control rod

RO Value:	3.8*	SRO Value:	4.1*	CFR:	41.5,41.10 / 45.6 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
ROD CONTROL AND POSITION INDICATION SYSTEMS	0300–000.00S–RODS00–00	IV.B.15.b.2), V.B.15.b.2)	48, 59		11
DROPPED ROD	0300-000.00S-ABROD2-00	II.C.1.e	8		4.A
DROPPED ROD	S2.OP-AB.ROD-0002(Q)	NOTE - 3.24	5		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Actions for more than one misaligned rod

Unit 2 was at 95% power with a power ascension in progress when PT-505 failed high causing control rods to be withdrawn at 72 steps per minute. When rods were placed in manual, the following conditions existed :

- Reactor power is 95%
- Current Group Counter positions for Control Bank D
  - Group 1 - 200 steps
  - Group 2 - 199 steps
- Current rod positions indications (IRPI and Plant Computer)
  - 1D1 - 180 steps
  - 1D2 - 199 steps
  - 1D3 - 200 steps
  - 1D4 - 200 steps
  - 2D1 - 186 steps
  - 2D2 - 199 steps
  - 2D3 - 199 steps
  - 2D4 - 200 steps
  - 2D5 - 200 steps
- All rods were determined to be trippable.

In accordance with Technical Specifications, which one of the following correctly describes the action required to be taken?

a. Enter and take the actions of Tech Spec 3.0.3.

b. Reduce reactor power to less than 85% within 1 hour.

c. Reduce power to less than 50% within 1 hour.

d. No action is required until a 1 hour soak is completed.

Ans:	d	Exam Level:	S	Cognitive Level:	Application	

Explanation of Answer	d. Correct. Two control rods in the same bank are misaligned by > 12 steps (1D1 & 2D1). Since reactor power is >85% RTP, the 12 step limit applies, and Tech Specs 3.1.3.1 ACTION b and the AB requires the Unit be shutdown after one hour is allowed for a thermal soak. a. TS 3.0.3 does not apply since TS 3.1.3.1 action b covers these conditions. b. The 85% power applies only for allowed value of misalignment and is NOT applicable to action. d. The 1 hour soak is allowed by the LCO following rod motion.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	005	System/Evolution Title:	Inoperable/Stuck Control Rod

Category:	G	Conduct Of Operations

KA:	2.1.12	Ability to apply technical specifications for a system.

RO Value:	2.9	SRO Value:	4.0	CFR:	43.2 / 43.5 / 45.3

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
IMMOVABLE/MISALIGNED CONTROL ROD	0300-000.00S-ABROD1-01	steps 35-38	11		2.C
IMMOVABLE/MISALIGNED CONTROL RODS	S2.OP-AB.ROD-0001(Q)	3.35-3.37	6	6	
Salem - Unit 2 Technical Specifications		3.1.3.1 ACTION b.	3/4 1-13		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	Technical Specification 3.1.3.1

Question Topic:	PORV Evaluation

Unit 2 is operating at 50% power. PR1 inadvertently opens.

Assuming no operator action, which one of the following correctly describes the plant response to this condition?

a. Reactor Trip and Safety Injection on low pressure.

b. Reactor Trip on OPDT and Safety Injection on low pressure.

c. Pressurizer level will rise causing a Reactor Trip on high Pressurizer level and Safety Injection on low pressure.

d. Safety Injection and Reactor Trip on High Containment Pressure

Ans:	a	Exam Level:	S	Cognitive Level:	Application	

Explanation of Answer	a. Correct. With no operator actions, a vapor space leak will result in a reduction in Pressurizer pressure and an automatic Reactor Trip and Safety injection. b. OPDT is not affected by Pressure and will not cause a Reactor Trip on low pressure. c. With an open PORV, pressurizer level will drop until voiding occurs in the RCS. The Reactor will be tripped long before this occurs.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	008	System/Evolution Title:	Pressurizer Vapor Space Accident

Category:	A2	Ability to determine and interpret the following as they apply to Pressurizer Vapor Space Accident:

KA:	AA2.22	Consequences of loss of pressure in RCS; methods for evaluating pressure loss

RO Value:	3.8	SRO Value:	4.2	CFR:	**43.5 / 45.13**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-LOCA-01	0300-000.00S-LOCA01-00	2.1.3	6,21	00	3

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Basis for Pressurizer level during LOCA

Operators are performing the actions of 2-EOP-LOCA-2 "POST LOCA COOLDOWN AND DEPRESSURIZATION". A Pressurizer PORV is opened to de-pressurize the RCS to fill the Pressurizer. No RCPs are operating.

Which one of the following correctly describes the basis for stopping the depressurization when Pressurizer level is above 33%?

a. Prevents isolation of CVCS letdown when a RCP is started.

b. Ensures RCS subcooling is maintained when SI flow reduction is initiated.

c. Maintains Pressurizer level above the SI reinitiation criteria when a RCP is started.

d. Provides adequate Pressurizer level to maintain Pressurizer heaters operable as RCS voids collapse.

Ans:	c	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	As stated in basis for the depressurization, maintenance of > 33% Pressurizer level is NOT required following depressurization except for the condition of starting a RCP if none are running. This ensures that SI re-initiation is NOT likely since the potential for collapse of a head void could occur, lowering Pressurizer level below the SI reinitiation requirement. The other selections are considerations but are NOT specifically designated as basis for this level.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	009	System/Evolution Title:	Small Break LOCA

Category:	K3	Knowledge of the reasons for the following responses as they apply to Small Break LOCA:

KA:	EK3.21	Actions contained in EOP for small break LOCA/leak

RO Value:	4.2	SRO Value:	4.5	CFR:	41.5,41.10 / 45.6 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-LOCA-2, POST LOCA COOLDOWN AND DEPRESSURIZATION	0300-000.00S-LOCA02-01	3.3.15.3, 3.3.18.2	25, 27		5
POST LOCA COOLDOWN AND DEPRESSURIZATION	2-EOP-LOCA-2	step 18.2	2	20	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	SI Reinitiation

The following conditions exist on Unit 2:

- A LOCA has occurred
- SI has been reset
- Pressurizer pressure - 2000 psig
- Pressurizer level - 25%
- SPDS CET temperature - 576 F
- Adverse containment conditions do NOT exist

The actions of 2-EOP-TRIP-1 and 2-EOP-LOCA-1 have been completed and the crew is performing actions of 2-EOP-LOCA-2.

In accordance with 2-EOP-LOCA-2, which one of the following correctly identifies the conditions that would require the operator to manually start ECCS pumps and realign SI?

a. RCP seal injection flow remains below 24 gpm total.

b. A steam generator atmospheric relief valve fails open reducing RCS temperature to 530 F.

c. A Pressurizer PORV fails open causing RCS pressure to decrease to 1200 psig prior to PORV isolation.

d. Establishing normal charging following SI reduction results in Pressurizer level decreasing to 17%.

Ans:	c	Exam Level:	S	Cognitive Level:	Comprehension	

Explanation of Answer	c. Correct. CAS for 2-EOP-LOCA 2 states: RCS subcooling 0 F OR PZR level CANNOT be maintained > 11%, Start ECCS Pumps as necessary to restore subcooling and Pressurizer level. At 1200 psig and 576 F, subcooling is <0 F which requires restarting ECCS Pumps in accordance with the CAS. a. Normal seal injection flow is between 6 gpm and 12 gpm per pump, so that flow < 24 gpm is outside the normal range but NO specific actions are required (and definitely starting ECCS pumps is NOT required). b. A cooldown may reduce Pressurizer level but no data is given to suggest level is below the 11% value of the CAS and a cooldown will raise subcooling. d. Pressurizer level of 17% is not at the CAS value.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	009	System/Evolution Title:	Small Break LOCA

Category:	K3	Knowledge of the reasons for the following responses as they apply to Small Break LOCA:

KA:	EK3.24	ECCS throttling or termination criteria

RO Value:	4.1	SRO Value:	4.6	CFR:	41.5,41.10 / 45.6 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-LOCA-2, POST LOCA COOLDOWN AND DEPRESSURIZATION	0300-000.00S-LOCA02-01	3.2.7	14		2, 5
POST LOCA COOLDOWN AND DEPRESSURIZATION	2-EOP-LOCA-2	CAS	1	20	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Accumulator

Given the following conditions:

- 23SJ54 is closed due to high level in the accumulator caused by leakage past 23SJ55
- 23SJ54 is energized with the VALVE OPERABLE position selected on Panel 2RP4
- 23SJ29 has lifted and reduced nitrogen pressure to 675 psig
- 23 SI Accumulator level is 78%

In accordance with UFSAR accident analysis, which one of the following correctly states the response of the 23 SI Accumulator if a Design Basis LOCA occurs on the 22 Loop Cold Leg, at this time?

a. 23SJ54 automatically opens and 23 SI Accumulator will deliver a greater volume of water than design.

b. 23SJ54 automatically opens and 23 SI Accumulator will deliver a smaller volume of water than design.

c. 23SJ54 must be opened by the Control Room Operators and will deliver a greater volume of water than design.

d. 23SJ54 must be opened by the Control Room Operators and will deliver a smaller volume of water than design.

Ans:	b	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	b. Correct. As long as 2SJ54 operator is energized, the valve will open automatically if an SI Signal is received. Since the Nitrogen relief lifted briefly, a reduced amount of nitrogen is present.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	1

System/Evolution Number:	011	System/Evolution Title:	Large Break LOCA

Category:	A1	Ability to operate and / or monitor the following as they apply to Large Break LOCA:
KA:	EA1.09	Core flood tank initiation

RO Value:	4.3	SRO Value:	4.3	CFR:	41.7 / 45.5 / 45.6

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Loss Of Coolant Accident	0300-000.00S-LOCA01-00	2.3.3	7,25	00	4

Question Source	New	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	RCP operation

A LOCA has occurred on Unit 2.

Which one of the following correctly identifies the reason RCPs are stopped if containment pressure exceeds 15 psig?

a. RCP seal flow cooling is lost.

b. RCP motor bearings will be damaged.

c. RCP control may be lost since the electrical insulation is NOT qualified.

d. Continued RCP heat input will contribute to containment pressure exceeding design limits.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	At 15 psig in the CNMT a Containment Isolation Phase B signal is generated, which will isolate CCW to the RCPs. The loss of CCW will particularly affect RCP motor bearings.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	1

System/Evolution Number:	011	System/Evolution Title:	Large Break LOCA

Category:	K3	Knowledge of the reasons for the following responses as they apply to Large Break LOCA:

KA:	EK3.14	RCP tripping requirement

RO Value:	4.1	SRO Value:	4.2	CFR:	**41.5,41.10 / 45.6 / 45.13**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-TRIP-1, REACTOR TRIP OR SAFETY INJECTION AND INTRODUCTION TO THE USE OF EOPs	0300-000.00S-TRP001-02	7.2.5	36		22
INTRODUCTION TO ENGINEERED SAFETY FEATURES AND DESIGN CRITERIA	0300-000.00S-ESF000-00	VII.B.4	52		21
REACTOR TRIP OR SAFETY INJECTION	EOP-TRIP-1	CAS	1		

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Effect of RCP trip

The following conditions exist on Unit 2:

- Reactor power - 100% power for 4 months
- 24 RCP trips resulting in a reactor and turbine trip
- Plant stabilizes with steam dumps controlling at no-load Tavg

Which one of the following correctly completes the description of 24 SG pressure and steam flow parameters as compared with those of the unaffected loops?

24 SG pressure will be...

a. lower and steam flow will be lower.

b. the same and steam flow will be lower.

c. the same and steam flow will the same.

d. higher and steam flow will be the same.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	With the RCP in the loop stopped, flow in the idle loop is reduced and heat transfer to the associated SG is less. Since all steam lines are connected, SG pressures will be the same. Steam flow will be lower due to reduced heat transfer.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	015	System/Evolution Title:	Reactor Coolant Pump Malfunctions

Category:	K1	Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions:

KA:	AK1.02	Consequences of an RCPs failure

RO Value:	3.7	SRO Value:	4.1	CFR:	41.8 / 41.10 / 45.3

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
REACTOR COOLANT PUMP ABNORMALITY	0300-000.00S-ABRCP1-01	V.C	18		5.A

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	VCT level failure

Given the following Unit 2 conditions:

- Reactor power - 100%
- No dilutions or borations in progress
- VCT level transmitter, 2LT-114, fails HIGH

Which one of the following correctly completes the description of what occurs if NO operator action is taken?

VCT level...

a. rises until CV35 modulates to HUT and maintains VCT level.

b. lowers when CV35 diverts to the HUT.

c. lowers faster than auto makeup capability causing charging suction to shift to the RWST.

d. lowers with NO auto makeup capability causing charging suction to shift to the RWST.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	b. Correct. LT-114 will modulate to the HUT at 80% to maintain level. a. When LT-114 fails high, CV35 will divert to the HUT and actual level will lower. c&d. Shift to the RWST requires low level from LT114 & LT-112 and will not occur with LT-114 failed high.

Tier:	Emergency and Abnormal Plant Evolutions			**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	022	**System/Evolution Title:**	Loss of Reactor Coolant Makeup

Category:	A1	Ability to operate and / or monitor the following as they apply to Loss of Reactor Coolant Makeup:
KA:	AA1.08	VCT level

RO Value:	3.4	**SRO Value:**	3.3	**CFR:**	**41.7 / 45.5 / 45.6**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
CHEMICAL AND VOLUME CONTROL SYSTEM	0300-000.00S-CVCS00-00	IV.G.1, IV.C.15, V.B.1.o	59, 38, 77		8.c, 9

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Action for loss RHR

Given the following for Unit 2:

- The reactor was shutdown 220 hours ago after extended power operation
- RCS Tavg - 155 F
- Pressurizer level - 20%
- RHR flow is 1600 gpm
- Time to core boiling is approximately 15 min.
- The 21 RHR Pump is available for immediate start

22 RHR Pump was in service for cooldown but has been stopped due to indications of cavitation. S2.OP-AB.RHR-0001, Loss of RHR has been entered.

In accordance with S2.OP-AB.RHR-0001, Loss of RHR, which one of the following correctly describes the action(s) required for this situation?

a. A normal restoration and venting of the entire RHR System.

b. Start any RHR pump and cycle the RH18s to rapidly change flow and sweep voids away.

c. 21 or 22 RHR pump shall be started at full flow to sweep voids away.

d. The 21 RHR Pump shall be started with suction from the RWST for adequate NPSH.

Ans:	c	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	c. Correct. a. Based on given conditions, the time to boiling is too short to allow a normal vent and restoration of RHR. b. No direction to cycle the RH18s. d. When aligned for Shutdown Cooling, RH69 is closed.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	025	System/Evolution Title:	Loss of Residual Heat Removal System

Category:	K1	Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System:

KA:	AK1.01	Loss of RHRS during all modes of operation

RO Value:	3.9	SRO Value:	4.3	CFR:	**41.8 / 41.10 / 45.3**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
LOSS OF RHR	0300-000.00S-ABRHR1-01	I.B.3, C.7 8 & 10	6, 12		3, 4.c
LOSS OF RHR	S2.OP-AB.RHR-0001(Q)	3.9, 3.10, 3.19	3, 6	8	
LOSS OF RHR TECHNICAL BASES DOCUMENT	S2.OP-AB.RHR-0001(Q)	2.4	7		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Evaluation of leakage

Which one of the following correctly identifies the leakage location for a CCW leak that would result in the fastest rate of rise of CCW Surge Tank? (Assume the size of the leak is equal at 0.25 square inches for each component.)

a. 21 RHR Heat Exchanger with RHR providing shutdown cooling.

b. 21 CCW Heat Exchanger aligned for cooling, at power.

c. No. 2 Spent Fuel Pit Heat Exchanger when in service, at power.

d. No. 2 Excess Letdown Heat Exchanger when in service, at power.

Ans:	d	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	The rate of rise of the CCW Surge tank level is dependent on in-leakage to CCW. With the leak size being the same size, the rate is directly proportional to the differential pressure across the leak site. In this case the expected (maximum) DP is experienced across the Excess letdown Hx. CCW pressure is 95 psig; Excess letdown is 2235 psig (RCS pressure); RHR is 420 psig; SFPCS is 55 psig and SW (at CCW Hx) is 120 psig.

Tier:	Emergency and Abnormal Plant Evolutions	**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	026	**System/Evolution Title:**	Loss of Component Cooling Water

Category:	A1	Ability to operate and / or monitor the following as they apply to Loss of Component Cooling Water:
KA:	AA1.05	The CCWS surge tank, including level control and level alarms, and radiation alarm

RO Value:	3.1	**SRO Value:**	3.1	**CFR:**	**41.7 / 45.5 / 45.6**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
COMPONENT COOLING ABNORMALITY	0300-00S.000-ABCC01-00	III.A.2.e	13		1.B, 5.B
COMPONENT COOLING WATER	0300-000.00S-CCW000-01	IV.A.	16-18		3
COMPONENT COOLING ABNORMALITY	S2.OP-AB.CC-0001(Q)	Step 3.8	2		

Question Source		**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Pressurizer cooling

Following a cooldown caused by a Steam Dump malfunction, Pressurizer level fell below 17% and was rapidly restored by increasing charging flow. Pressurizer pressure also fell to 2185 psig.

Which one of the following correctly identifies the reason why the pressure recovery from 2185 psig takes a longer time for this event, than it does if a PORV fails open and the PORV block valve was closed at 2185 psig?

a. The volume of steam generation and cooling is greater with the level change.

b. Subcooled water insurge during refill reduced the Pressurizer liquid space temperature.

c. When the PORV opens, only the steam space needs to be reheated to raise pressure.

d. The heaters are less effective since they had tripped off and cooled off on low PZR level.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	The level recovery introduces a large amount of subcooled water inventory into the Pressurizer. The process of heating the water to the saturation temperature takes a longer time than for the case where the water inventory remains saturated but at a lower pressure. This case does not require additional sensible heat to reach saturation.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	2

System/Evolution Number:	027	System/Evolution Title:	Pressurizer Pressure Control Malfunction

Category:	K3	Knowledge of the reasons for the following responses as they apply to Pressurizer Pressure Control Malfunction:

KA:	AK3.04	Why, if PZR level is lost and then restored, that pressure recovers much more slowly

RO Value:	2.8	SRO Value:	3.3	CFR:	**41.5,41.10 / 45.6 / 45.13**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
PRESSURIZER PRESSURE AND LEVEL CONTROL	0300-000.00S-PZRP&L-00	III.B.1	15		2, 4
REACTOR COOLANT SYSTEM	0300-000.00S-RCS000-02	IV.C.3.a, c	19		4.c

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Failed level channel low

Given the following conditions for Unit 2:

- 21 Charging Pump is in service
- Reactor power - 100%
- CVCS parameters:
  - Letdown flow (FI134) - 75 gpm
  - Charging flow (FI128B1) - 87 gpm
  - Total seal injection flow (FI115, 116, 143, 144) - 33 gpm
- Controlling Pressurizer level channel LT-459 fails low

Assuming NO operator action is taken, which one of the following correctly completes the description of the effect of the Pressurizer Level Channel failure on total seal injection flow?

Total seal injection flow will...

a. be off-scale high on CC2 indication.

b. decrease to about 20 gpm.

c. remain at 33 gpm.

d. increase to no more than 40 gpm.

Ans:	d	Exam Level:	B	Cognitive Level:	Comprehension

Explanation of Answer	d. Correct. The failure of the level instrument low increases charging flow and charging discharge header pressure. Since seal injection flow is normally increased by throttling close on CV71 to increase backpressure, the result is the same and seal injection flow will increase but will be limited to 40 gpm by the CV98s, Seal Injection Throttle Valves. a. Flow will increase but to not more than 10 gpm each which is on scale. b. If failed high, flow would decrease but not drop to zero due to flow stop on CV-55 which is set for 47 gpm. (Note with CV-71 in current throttled position, part of that flow would still go to RCS.) c. Flow will increase.

Tier:	Emergency and Abnormal Plant Evolutions	**RO Group:**	3	**SRO Group:**	3

System/Evolution Number:	028	**System/Evolution Title:**	Pressurizer Level Control Malfunction

Category:	A1	Ability to operate and / or monitor the following as they apply to Pressurizer Level Control Malfunction:

KA:	AA1.02	CVCS

RO Value:	3.4	**SRO Value:**	3.4	**CFR:**	**41.7 / 45.5 / 45.6**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
PRESSURIZER PRESSURE AND LEVEL CONTROL	0300-000.00S-PZRP&L-00	IX.B.2	42		12
CHEMICAL AND VOLUME CONTROL SYSTEM	0300-000.00S-CVCS00-00	IV.C.20.d & 21	45, 47-48		3, 4

Question Source	NRC Exam Bank	**Question Modification Method**	
Question Source Comments:			

Material Required for Examination:	

Question Topic:	Actions for boration

An ATWS has occurred on Unit 2 and actions are being taken in accordance with 2-EOP-FRSM-1 "Response to Nuclear Power Generation." The operator initiated rapid boration flow by starting both Boric Acid Pumps, opening 2CV175 Rapid Borate Stop Valve, and closing 21 and 22CV160 BAT Recirc valves.

The following conditions exist:

- Reactor power - 3% ; SUR just negative
- RCS temperature (Tavg) - 550 F
- Pressurizer pressure - 2340 psig & rising slowly
- Pressurizer level - 29% & lowering slowly
- Control rods being inserted in MANUAL; Control Bank D is fully inserted
- Turbine is tripped
- Charging flow (FI128B) - 52 gpm
- Boration flow (FI113A) - 35 gpm

In accordance with 2-EOP-FRSM-1, Response to Nuclear Power Generation, which one of the following correctly describes the action the operator shall take to increase the boration rate?

a. Manually actuate Safety Injection.

b. Locally open 2CV-174, Manual Boration Valve.

c. Close 2CV40 and 2CV41, the VCT Discharge Stop Valves.

d. Open a Pressurizer PORV and its associated PORV Stop Valve.

Ans:	d	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	High RCS pressure results in a condition which would reduce charging or SI pump injection into the RCS and, therefore, boration. The contingent action is a rapid depressurization to a pressure which would allow increased injection flow, and is accomplished by opening at least one PORV (until pressure lowers to < 2135 psig). Manually actuating SI will start & realign valves but may NOT result in significant increase in flow due to the high pressure. Aligning other valves in CVCS may be considered but will NOT increase the charging (boration) flow to the RCS. The VCT valves are considered since these provide for lower boron conc. water to be included in injection to RCS.

Tier:	Emergency and Abnormal Plant Evolutions		**RO Group:**	2	**SRO Group:**	1

System/Evolution Number:	029	**System/Evolution Title:**	Anticipated Transient Without Scram

Category:	A2	Ability to determine and interpret the following as they apply to Anticipated Transient Without Scram:

KA:	AA2.04	CVCS centrifugal charging pump operating indication

RO Value:	3.2*	**SRO Value:**	3.3*	**CFR:**	**43.5 / 45.13**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
EOP-FRSM-1 and 2 RESPONSE TO NUCLEAR POWER GENERATION	0300-000.00S-FRSM00-02	3.2.4	21-22		4.A, 5.A
RESPONSE TO NUCLEAR POWER GENERATION	1EOP-FRSM-1	step 4, 4.4	1	20	

Question Source	New	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	FRSM-1 Exit Criteria

Which one of the following correctly identifies the parameters that must be satisfied in order to transition from 2-EOP-FRSM-1 "Response To Nuclear Power Generation"?

a. The Cold Shutdown SDM value is achieved.

b. No more than two control rods failed to insert.

c. Either reactor trip breaker or the associated trip bypass breaker is open.

d. Three Power Range NIS channels less than 5% and Intermediate Range SUR negative.

Ans:	d	Exam Level:	S	Cognitive Level:	Memory	

Explanation of Answer	d. Correct. The parameters for adequate shutdown is subcriticality as indicated on 3 PR NIS and a negative SUR on IR NIS. a. Boration is initiated and SDM verified before transition; however, the Cold Shutdown value is NOT required to be satisfied for transition. b&c. Attempts are made in performance of the procedure to insert rods and to open the reactor trip breakers; however, these are NOT satisfactory measures for ensuring the reactor shutdown and must NOT be met to transition.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	1

System/Evolution Number:	029	System/Evolution Title:	Anticipated Transient Without Scram

Category:	K3	Knowledge of the reasons for the following responses as they apply to Anticipated Transient Without Scram:

KA:	AK3.12	Actions contained in EOP for ATWS

RO Value:	4.4	SRO Value:	4.7	CFR:	41.5,41.10 / 45.6 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-FRSM-1 and 2 RESPONSE TO NUCLEAR POWER GENERATION	0300-000.00S-FRSM00-02	3.2.16, 3.2.17	32-34		7.B
RESPONSE TO NUCLEAR POWER GENERATION	2-EOP-FRSM-1	Step 16-17	2	20	

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	IR failure response

The following conditions exists on Unit 2:

- Plant shutdown is in progress
- All power range channels indicate 6% reactor power
- Intermediate range channel N36 fails HIGH

Which one of the following correctly completes the description of the plant response to this failure?

The reactor will…

a. NOT trip, but the Source Range channels will NOT automatically reinstate if the plant trips.

b. trip on high IR flux, and Source Range channels will NOT automatically be reinstated.

c. trip on high IR flux, and Source Range channels are automatically reinstated when N35 decreases to P6.

d. NOT trip, but the Source Range channels will automatically be reinstated if the plant trips.

Ans:	b	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	With PR channels below P10, the IR high level trip is instated and when the one channel fails high this will generate a reactor trip. When power falls below P6 setpoint on IR channels, normally the SR channels are automatically energized and unblocked. However for this to occur BOTH IR channels must be below P6. Only one would be in this case, so operator action is required to energize the SR. If power was above 10% on 2/4 PR channels, the reactor would NOT trip on the failure with IR trips blocked.

Tier:	Emergency and Abnormal Plant Evolutions	**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	033	**System/Evolution Title:**	Loss of Intermediate Range Nuclear Instrumentation

Category:	A2	Ability to determine and interpret the following as they apply to Loss of Intermediate Range Nuclear Instrumentation:

KA:	AA2.04	Satisfactory overlap between source-range, intermediate-range and power-range instrumentation

RO Value:	3.2	**SRO Value:**	3.6	**CFR:**	**43.5 / 45.13**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
NUCLEAR INSTRUMENTATION SYSTEM MALFUNCTION	0300-000.00S-ABNIS1-00	II.A.2, III.C.11	5, 11		1
EXCORE NUCLEAR INSTRUMENTATION SYSTEM	0300–000.00S–EXCORE–00	IV.D.3.e, IV.E.3.g	32-33, 39		9.d, 10
NUCLEAR INSTRUMENTATION SYSTEM MALFUNCTION	S2.OP-AB.NIS-0001(Q)	3.11 CAUTION	3		

Question Source	NRC Exam Bank	**Question Modification Method**	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Failure of protection circuit

Given the following conditions on Unit 2:

- A Unit Startup is in progress
- Reactor power has been raised to 8%
- Intermediate channel N-35 fails high
- Plant conditions remain stable at current power level

In accordance with NC.NA-AP.ZZ-0005, Station Operating Practices, which one of the following correctly describes required operator actions?

a. Manually trip the reactor.

b. Reduce power to <5% within 15minutes.

c. Maintain power below P10.

d. Raise power to greater than P10 setpoint and block both intermediate ranges.

Ans:	a	Exam Level:	S	Cognitive Level:	Memory	

Explanation of Answer	Operations is charged to operate the plant within the limits of established regulations, policies, procedures, specifications, and analysis. If we have failed to control the equipment within limits, we will always place the plant in a safe condition and investigate. In this case a rector trip should have occurred due to the N-35 channel failure but for unknown reasons the trip did NOT occur. The should be manually tripped and EOP-TRIP-1 should be entered. Any action other than a plant trip is not correct.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	033	System/Evolution Title:	Loss of Intermediate Range Nuclear Instrumentation

Category:	G	Conduct Of Operations

KA:	2.1.1	Knowledge of conduct of operations requirements.

RO Value:	3.7	SRO Value:	3.8	CFR:	**41.10 / 45.13**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
CONDUCT OF OPERATIONS	0300-000.00S-CONDOP-00	III.B.3.a & b	13		4, 7
STATION OPERATING PRACTICES	NC.NA-AP.ZZ-0005(Q)	5.2.2	5	8	
OPERATIONS STANDARDS	SC.OP-DD.ZZ-0004 (Z)	5.3.1	3, 17		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Fuel drop response

During Unit 1 core off-load, a fuel bundle is dropped during the transit from the core to the upender. Only :he bundle that was dropped is damaged.

Which one of the following correctly describes the potential radiation hazard, if any, associated with this event?

a. None. All Iodine will be removed by absorption into the Refueling Cavity water.

b. Minimal to personnel inside containment. A small % of Iodine will enter containment and will be removed by starting the Iodine Removal Units (IRUs).

c. An off-site release will occur through any open containment penetrations and will exceed 10CFR100 limits.

d. None. The IRUs are required to be operating during refueling operations and will remove all Iodine released from the bundle.

Ans:	b	Exam Level:	S	Cognitive Level:	Comprehension	

Explanation of Answer	b. Correct. If water level is >23 ft, 99% of the iodine contained in 10% of the gap space will be removed by the water as the gas bubbles to the surface. The 1% that is released to the containment is removed by the IRUs. a. See 'b' Some Iodine is released to containment atmosphere. c. Accident analyses show that CFR100 limits will not be exceeded. d. IRUs are only started if Iodine is detected in containment by chemistry sample.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	3	SRO Group:	3

System/Evolution Number:	036	System/Evolution Title:	Fuel Handling Incidents

Category:	K1	Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents:

KA:	AK1.01	Radiation exposure hazards

RO Value:	3.5	SRO Value:	4.1	CFR:	41.8 / 41.10 / 45.3

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
FUEL HANDLING ACCIDENT	0300-000.00S-ABFUEL1-00	III.C.11	12		3
FUEL HANDLING INCIDENT	S2.OP-AB.FUEL-0001(Q)	Attachment 1	7	1	
FUEL HANDLING INCIDENT TECHNICAL BASES DOCUMENT	S2.OP-AB.FUEL-0001(Q)	2.3	4		

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Leak detection monitors

Given the following conditions on Unit 2:

- Primary to secondary leak has been diagnosed in the 21 S/G
- Operators are performing actions of S2.OP-AB.SG-0001(Q) "STEAM GENERATOR TUBE LEAK"
- Unit cooldown from Hot Shutdown conditions has been commenced
- 21 SG has been isolated

Which one of the following correctly identifies the radiation monitor that would be used to continue trending of the primary to secondary leak rate?

a. Main Steam Line Monitor 2R46A.

b. Main Steam Line Process (N-16) Monitor 2R53A.

c. Steam Generator Blowdown Liquid Monitor 2R19A.

d. Condenser Air Removal and Priming System Process Monitor 2R15.

Ans:	c	Exam Level:	B	Cognitive Level:	Comprehension

Explanation of Answer	All monitors can be used to determine Rad levels associated with a S/G tube leak. By procedural direction 2R19, 2R15 and 2R53 are particularly trended for determination of action. The steamline monitors, in particular the N-16 monitor, is NOT effective once the unit is shutdown (< MODE 1). 2R15 would NOT be effective since the Main Steam Stop for 21 SG is closed and the cooldown is being performed by cooling the remaining SGs. Therefore only the SG Blowdown monitor (sample) would be the only monitor directly aligned to the leaking SG.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	037	System/Evolution Title:	Steam Generator Tube Leak

Category:	A2	Ability to determine and interpret the following as they apply to Steam Generator Tube Leak:

KA:	AA2.01	Unusual readings of the monitors; steps needed to verify readings

RO Value:	3.0	SRO Value:	3.4	CFR:	43.5 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
STEAM GENERATOR TUBE LEAK	0300-000.00S-ABSG01-01	II.A.1.c, III.C.8	8, 12		3
STEAM GENERATOR TUBE LEAK	S2.OP-AB.SG-0001(Q)	Attachment 1, CAS	2	10	
STEAM GENERATOR TUBE LEAK TECHNICAL BASES DOCUMENT	S2.OP-AB.SG-0001(Q)	2.1	6		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	SGTR cooldown with backfill

Given the following conditions on Unit 2:

- A SGTR has occurred on the 22 S/G
- 2-EOP-SGTR-2 "POST SGTR COOLDOWN" is the procedure in effect
- 23 RCP is running
- During backfill operation the Plant Operator inadvertently allows 22 SG narrow range level to go off-scale low

Which one of the following correctly identifies the negative consequence of this action?

a. Primary dilution from the excess SG back leakage will result in a transition to 2-EOP-FRSM-2.

b. S/G depressurization will occur reinitiating primary-to-secondary leakage.

c. Pressurizer level will fall below the minimum value resulting in automatic starting of SI Pumps.

d. Heat removal from the RCS is reduced such that the optimal cooldown rate CANNOT be maintained.

Ans:	b	Exam Level:	R	Cognitive Level:	Comprehension

Explanation of Answer	If the U-tubes uncover, the ruptured SG pressure could rapidly decrease due to condensation of steam on the cooler surface of the U-tubes. This rapid depressurization could reinitiate break flow. Re-criticality is a concern in the event the first RCP started is in the ruptured loop following natural circulation. Pressurizer level is a concern but under given condition auto starting of ECCS equipment is NOT expected (SI blocked). Heat removal from the RCS is accomplished through the intact S/Gs. However, by allowing ruptured S/G level to fall in the NR (where the tubes remained covered) without feed, the S/G will remain at higher pressure (temperature).

Tier:	Emergency and Abnormal Plant Evolutions			**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	038	**System/Evolution Title:**	Steam Generator Tube Rupture

Category:	K3	Knowledge of the reasons for the following responses as they apply to Steam Generator Tube Rupture:
KA:	EK3.06	Actions contained in EOP for RCS water inventory balance, S/G tube rupture, and plant shutdown procedures

RO Value:	4.2	**SRO Value:**	4.5	**CFR:**	**41.5,41.10 / 45.6 / 45.13**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
EOP-SGTR-2, POST STEAM GENERATOR TUBE RUPTURE COOLDOWN	0300-000.00S-SGTR02-01	2.1.2	9		1, 6
STEAM GENERATOR, SG BLOWDOWN AND DRAIN SYSTEMS	0300-000.00S-STMGEN-01	TP-16			4

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	RCP trip during SGTR

While attempting to identify a ruptured S/G in accordance with 2-EOP-SGTR-1, Steam Generator Tube Rupture, the Reactor Operator notes that RCS pressure has dropped to 1330 psig, even with maximum ECCS flow.

Which one of the following correctly states why the operator is required to trip the RCPs under these conditions?

a. Minimize heat transfer to the ruptured S/G.

b. Ensure against possible misdiagnosis, operator error, or multiple events.

c. Ensure natural circulation is established prior to pressure equalization steps.

d. Minimize the likelihood of RCS voiding impeding heat transfer to the intact S/Gs.

Ans:	b	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	RCP trip is required to ensure core cooling for certain small LOCA sizes and conditions. Although RCP trip to ensure core cooling is not necessary for a SGTR, RCP trip is required if the specified criteria are met to insure against possible operator misdiagnosis, operator error or a multiple failure event scenario.

Tier:	Emergency and Abnormal Plant Evolutions			**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	038	**System/Evolution Title:**	Steam Generator Tube Rupture

Category:	K3	Knowledge of the reasons for the following responses as they apply to Steam Generator Tube Rupture:
KA:	EK3.08	Criteria for securing RCP

RO Value:	4.1	**SRO Value:**	4.2	**CFR:**	**41.5,41.10 / 45.6 / 45.13**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
Steam Generator Tube Rupture Basis Document	2 EOP-SGTR-1				
Steam Generator Tube Rupture	0300-000.00S-SGTR01-01	4.2	27	01	7

Question Source	1/97 Salem NRC Exam Bank	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	RCP operation during SGTR

Given the following conditions on Unit 2:

- A Steam Generator Tube Rupture has occurred
- Operators are performing 2-EOP-SGTR-1 "STEAM GENERATOR TUBE RUPTURE"
- Condenser steam dumps were used to cooldown to the required cooldown temperature
- RCS depressurization with Pressurizer spray valves is about to start
- The RO reports Pressurizer level is now indicating 0%
- Pressurizer pressure is 1230 psig
- RCS Subcooling is 20 F
- High Head charging flow and SI flow have been verified

In accordance with 2-EOP-SGTR-1, STEAM GENERATOR TUBE RUPTURE, which one of the following correctly describes the actions to be taken for the conditions stated above?

a. Maintain RCPs running. Continue depressurization using normal sprays.

b. Trip all RCPs. Depressurize the RCS using a PORV.

c. Trip all RCPs. Maintain stable RCS pressure.

d. Stop all RCPs except the 21 RCP, if available. Use this RCP to continue depressurization with normal sprays.

Ans:	a	Exam Level:	S	Cognitive Level:	Comprehension

Explanation of Answer	RCP trip criteria (RCS pressure < 1350 psig & ECCS flow established) as listed in the CAS no longer applies once the operator controlled cooldown has been initiated. The intent of this portion of the procedure is to depressurize the RCS to equalize break flow (RCS pressure = ruptured SG pressure) and to raise ECCS flow to fill RCS. This action restores Pressurizer level and has specific stop criteria. Using the 21 RCP is the least desired configuration since this minimizes spray flow (scoop on loop opposite Pressurizer surge line). RCS subcooling is monitored in CAS but this is for ECCS reinitiation (which should not have been reduced at this point).

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	038	System/Evolution Title:	Steam Generator Tube Rupture

Category:	K3	Knowledge of the reasons for the following responses as they apply to Steam Generator Tube Rupture:
KA:	EK3.08	Criteria for securing RCP

RO Value:	4.1	SRO Value:	4.2	CFR:	41.5,41.10 / 45.6 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-SGTR-1, STEAM GENERATOR TUBE RUPTURE	300S-000.00S-SGTR01-01	4.2.1, 4.3.15	26, 56		3, 8
STEAM GENERATOR TUBE RUPTURE	2-EOP-SGTR-1	17	3	20	

Question Source	NRC Exam Bank	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Steam Line Rupture vs. LOCA

The following conditions were observed while Unit 2 was operating at 100% power:

- Pressurizer level lowering rapidly at 42%
- Pressurizer pressure lowering rapidly at 2100 psig
- All S/G pressures lowering at 682 psig
- 2R11A indication is normal and not changing
- Containment pressure is 2 psig and rising
- Reactor power is 103%

Choose the statement below that correctly describes these conditions:

These conditions are caused by:

a. a LOCA inside containment.

b. a S/G safety valve opening.

c. A Steam Line Break downstream of 21MS167.

d. A Steam Line Break upstream of the Main Steam Line flow element.

Ans:	d	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	d. Correct. a&c. R11A will rise for a LOCA inside Containment. b. Containment pressure will not rise.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	040	System/Evolution Title:	Steam Line Rupture

Category:	A2	Ability to determine and interpret the following as they apply to Steam Line Rupture:

KA:	AA2.03	Difference between steam line rupture and LOCA

RO Value:	4.6	SRO Value:	4.7	CFR:	43.5 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
ADVANCED DIGITAL FEEDWATER CONTROL SYSTEM	0300-000.00S-ADFWCS-00	V.I.3	37		13.a
AUXILIARY FEEDWATER SYSTEM	0300-000.00S-AFW000-01	IV.B.5.b & c	31-32		9

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Affect of Loss of Vacuum

A rapid loss of condenser vacuum has occurred due to a leak in the condenser.

Which one of the following correctly identifies the first automatic function to occur as vacuum degrades?

a. Steam Generator Feed Pump trip.

b. Circulating Water Pump start permissive is lost.

c. Main Turbine Trip.

d. LP Turbine rupture disks break.

Ans:	c	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	The condenser interlock will prevent steam dump operation at pressure < 20 in. Hg vacuum (10 in. Hga). Alarms for condenser vacuum also come in at various levels: 25 in. Hg vacuum for 2CC3 Bezel Alarm 6-22 "CONDENSER VACUUM LO" and OHA G-5 "CNDSR VAC LO"; OHA G-13 "CNDSR VAC LO-LO" at 22 (±1) in. Hg vacuum. The main turbine trips between 18 and 22 in. Hg vacuum. b. CW Pump permissive is sensed on the waterbox side not on the shell side.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	051	System/Evolution Title:	Loss of Condenser Vacuum

Category:	A2	Ability to determine and interpret the following as they apply to Loss of Condenser Vacuum:

KA:	AA2.02	Conditions requiring reactor and/or turbine trip

RO Value:	3.9	SRO Value:	4.1	CFR:	43.5 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
LOSS OF CONDENSER VACUUM	0300-000.00S-ABCOND-01	III.C.5	11		1.A, 4.B
STEAM DUMP SYSTEM	0300-000.00S-STDUMP-01	V.A.7.b	23		10
LOSS OF CONDENSER VACUUM	S2.OP-AB.COND-0001(Q)	3.9 NOTE	3		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Steam Dump operation on trip

An electrical disturbance resulted in a loss of all Unit 2 Circulators and a reactor trip from 50% power. Significant decay heat causes RCS temperature to increase following the trip.

Which one of the following correctly identifies the temperature at which the RCS Tavg stabilizes 10 minutes after the trip?

a. 555 F, the value of the lowest set Main Steam Safety Valve.

b. 552 F, per the Steam Dump Load Rejection Controller.

c. 548 F, per the MS10, Main Steam Atmospheric Relief setpoint at 1015 psig.

d. 543 F, per the Steam Dump Plant Trip Controller.

Ans:	c	Exam Level:	B	Cognitive Level:	Application	

Explanation of Answer	The condenser would NOT be available for steam dumps (either on trip controller or load rejection controller). The S/G pressure would stabilize based on the secondary PORV opening setpoint normally set at 1015 psig (548 F). The Main Steam safety valve setting is 1070 psig (555 F). At 543 F the steam dumps would be blocked (P12). If the Steam Dumps were controlled on Load Rejection controller, RCS temperature would be at No-load + 5 F (552 F).

Tier:	Emergency and Abnormal Plant Evolutions			**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	051	**System/Evolution Title:**	Loss of Condenser Vacuum

Category: K3	Knowledge of the reasons for the following responses as they apply to Loss of Condenser Vacuum:
KA: AK3.01	Loss of steam dump capability upon loss of condenser vacuum

RO Value:	2.8*	**SRO Value:**	3.1*	**CFR:**	**41.5,41.10 / 45.6 / 45.13**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
MAIN STEAM SYSTEM	0300-000.00S-MSTEAM-00	IV.B.4.g	21		4.c, 9
STEAM DUMP SYSTEM	0300-000.00S-STDUMP-01	V.A.7.a, f	22-23		10

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	FW line break evaluation

Given the following conditions on Unit 2:

- A break has occurred on the Feedwater line to the 23 SG inside containment
- SI is actuated
- The following parameters are noted:
  - Pressurizer pressure - 1920 psig
  - Lowest Tavg - 544 F
  - Lowest S/G pressure - 980 psig (23)
  - Containment pressure 4.2 psig

Assuming no operator action has been taken, which one of the following correctly describes the expected S/G conditions?

a. Only the 23 S/G pressure would be decreasing from the break.

b. All S/G pressures would be decreasing from the break via interconnection of the Main Steam lines.

c. All S/G pressures would be decreasing from the break via interconnection of the Main Feedwater lines.

d. All S/G pressures would be decreasing from the break via interconnection of the Auxiliary Feedwater lines.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	All S/Gs would still be connected via the main steam lines and pressure would be dropping in all due to the FW line leak. If (and it would soon occur) a steamline isolation had occurred then only the 23 SG pressure would be dropping. The FW lines are no longer intertied since the SI would have closed FW Isol Stops. The AFW lines have check valves which prevent this type of interaction.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	054	System/Evolution Title:	Loss of Main Feedwater

Category:	K1	Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater:

KA:	AK1.01	MFW line break depressurizes the S/G (similar to a steam line break)

RO Value:	4.1	SRO Value:	4.3	CFR:	41.8 / 41.10 / 45.3

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
MAIN STEAM SYSTEM	0300-000.00S-MSTEAM-00	III.C.4, IV.B.5	16, 23		3, 4
INTRODUCTION TO ENGINEERED SAFETY FEATURES AND DESIGN CRITERIA	0300-000.00S-ESF000-00	VII.B.1, 2, 3	50-51		21

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	SI actuation for Loss of All AC

Which one of the following correctly completes the operator action concerning Safety Injection actuation in the event of an extended loss of all AC power?

The SI signal will be manually actuated...

a. and reset while the 4KV Vital buses are de-energized.

b. and reset after power is restored to at least ONE 4KV Vital bus.

c. only if automatic actuation is present and is reset while the 4KV Vital buses are de-energized.

d. only if an automatic actuation signal is present and is reset after power is restored to at least ONE 4KV Vital bus.

Ans:	a	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	If power is NOT immediately restored during performance of 2-EOP-LOPA-1, then SI is manually actuated and reset to provide controlled loading of equipment when power is restored to Vital Bus(es).

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	055	System/Evolution Title:	Station Blackout

Category:	K3	Knowledge of the reasons for the following responses as they apply to Station Blackout:

KA:	EK3.02	Actions contained in EOP for loss of offsite and onsite power

RO Value:	4.3	SRO Value:	4.6	CFR:	41.5,41.10 / 45.6 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-LOPA-1, 2, 3; LOSS OF ALL AC POWER AND RECOVERY	0300-000.00S-LOPA00-02	4.3.21	38		7, 8
LOSS OF ALL AC POWER	2-EOP-LOPA-1	step 21	2	20	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Evaluation of electric bus status

The following conditions exist on Unit 1:

- 1A 4KV Vital Bus is powered from 13 SPT
- 1B & 1C 4KV Vital Bus is powered from 14 SPT
- 1B Emergency D/G surveillance is being performed with the D/G paralleled to the bus and loaded to 2600 kW

An overcurrent condition results in the loss of the 14 Station Power Transformer.

Which one of the following correctly describes the final electrical alignment?

a. 1A 4KV Vital Bus remains powered from 13 SPT.
1B 4KV Vital Bus is powered from the 1B D/G only.
1C 4KV Vital Bus swaps to the 13 SPT.

b. All busses are stripped and aligned to their respective D/G in accordance with Mode II SEC Loading.

c. 1A 4KV Vital Bus remains powered from 13 SPT.
1B 4KV Vital Bus swaps to the 13 SPT with the 1B D/G running and its output breaker open.
1C 4KV Vital Bus swaps to the 13 SPT.

d. 1A 4KV Vital Bus remains powered from 13 SPT.
1B 4KV Vital Bus swaps to the 13 SPT with the 1B D/G paralleled to the bus.
1C 4KV Vital Bus swaps to the 13 SPT.

Ans:	a	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	a. Correct. When the 14 SPT is lost, the 1A bus will be unaffected since it is already powered from 13 SPT. The 1C bus transfer relay will sense voltage <70% which will cause the normal feeder breaker, 14ASD to open. When 1A bus voltage drops below 35%, the 35% transfer relay will initiate closure of the alternate feeder breaker, 13ASD. This transfer will occur fast enough to prevent the blackout relays from actuating and fast enough to prevent the loss of any bus loads. The 1B bus normal feed transfer relay will see low voltage since the relay is on the transformer side of the feeder breaker and will open the normal feeder breaker 14BSD. Since the 1B D/G is paralleled to the bus, bus voltage will not drop to pick up the 35% transfer relay so the alternate feeder breaker, 13BSD will not close. The 1B D/G will remain on the bus as the only source since no fault or SEC signals are generated that affect the D/G or its output breaker.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	3	SRO Group:	3

System/Evolution Number:	056	System/Evolution Title:	Loss of Off-Site Power

Category:	A2	Ability to determine and interpret the following as they apply to Loss of Off-Site Power:

KA:	AA2.53	Status of emergency bus under voltage relays

RO Value:	2.9	SRO Value:	3.2	CFR:	**43.5 / 45.13**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
4160 ELECTRICAL SYSTEM	0300-000.00S-4KVAC0-00	V.C.1	47	00	6, 9

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	VIB Inverter operation

Power for the 2A Vital Instrument Bus transferred from the 2A Vital Instrument Inverter to AC Line Regulator due to a momentary overload on the Inverter.

Which one of the following correctly identifies when the 2A Vital Instrument Bus will revert to the Inverter?

a. Automatically as Inverter voltage rises.

b. When the Return Mode toggle switch is placed in MAN.

c. Following rotation of the Static Switch to the INV position.

d. When the ALARM CONTACT RESET pushbutton is depressed.

Ans:	a	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	An automatic transfer from the inverter to the AC Line Regulator is indicative of an overload on the affected VIB or failure of an inverter. If the VIB is automatically transferred back to the inverter, then the overload was only momentary. In the event that the loss (overload) was sustained (NOT momentary), then operation of the ALARM CONTACT RESET pushbutton is required. The Static Switch is involved with manual transfer of other inverters (to prevent auto transfer). RETURN MODE toggle switch is normally in AUTO. This selects mode of return to preferred source; either MAN. or AUTO. Auto. - return transfer is not affected by the switch. MAN. - Return transfer is inhibited until the switch is moved to AUTO or the RESET switch is pushed (will cause a transfer to occur).

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	057	System/Evolution Title:	Loss of Vital AC Instrument Bus

Category:	A1	Ability to operate and / or monitor the following as they apply to Loss of Vital AC Instrument Bus:
KA:	AA1.01	Manual inverter swapping

RO Value:	3.7*	SRO Value:	3.7	CFR:	41.7 / 45.5 / 45.6

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
LOSS OF 2A VIB	0300-000.00S-AB115-01	III.A.2	8		1.A
115VAC ELECTRICAL SYSTEMS	0300-000.00S-115VAC-00	V.C.2	24		3.b
LOSS OF 2A VIB	S2.OP-AB.ZZ-115-0001	3.12	4		

Question Source	NRC Exam Bank	Question Modification Method	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	28 V DC loss evaluation

During the performance of 2-EOP-LOPA-1, Loss of All AC Power, the operating crew is directed to implement AB.LOOP-0001, Loss of Off-Site Power, Attachment 1, Blackout Coping Actions. An operator is sent to place both Unit 3 engines in LOCKOUT and open the 125 VDC distribution panel main breaker.

Which one of the following correctly describes the reasons for these actions?

a. Unload the Unit 3 battery while the switchyard is prepared for the Unit 3 startup.

b. Prepare the Unit 3 battery charger to feed into the station 125 VDC System.

c. Reduce heat loads in the Jet Control House until power can be restored.

d. Prevent Auto start of Unit 3 until the switchyard is prepared.

Ans:	a	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	a. Correct. EOP-LOPA-1 directs concurrent completion of AB.LOOP-1 for mitigating, coping and recovery actions on a loss of off-site power. All Unit 3 battery loads are removed to ensure that DC power will be available for Unit 3 startup after the switchyard has been aligned in accordance with the procedure. b. The Unit 3 battery and charger are independent of the station 125 VDC System. c. The Unit 3 actions are only for conservation of the Jet batteries and are not part of the Backout study. d. Once the Jet is started, it will automatically accelerate up to speed and the generator breaker will automatically close but there is no auto start of the engine.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	058	System/Evolution Title:	Loss of DC Power

Category:	G	Conduct Of Operations

KA:	2.1.32	Ability to explain and apply all system limits and precautions.

RO Value:	3.4	SRO Value:	3.8	CFR:	41.10 / 43.2 / 45.12

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
LOSS OF ALL AC POWER AND RECOVERY	0300–000.00S–abLOP01–00	III.C.1	13	00	1,2
LOSS OF OFF-SITE POWER	S1.OP-AB.LOOP-0001(Q)	Att. 1	38	8	

Question Source	C Grp NRC Exam	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Permit conditions

Given the following:

- All Unit 1 & 2 Circulating Pumps are in service
- Unit 1 is in Mode 3
- Unit 2 is at 100% power
- 21,23 & 26 Service Water Pumps are running
- 21 CVCS Monitor Tank is being released via 21 CCW Hx to the Circulating Water System

In accordance with S2.OP-SO.WL-0001, RELEASE OF RADIOACTIVE LIQUID WASTE FROM 21 CVCS MONITOR TANK, which one following correctly identifies the condition that would require termination of the liquid release?

a. The 21A & 21B Circulators trip.

b. The 11A & 11 B Circulators trip.

c. 21 CCW Pump trips.

d. 23 Service Water Pump trips and service Water header pressure drops from 115 to 105 psig.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	b. Correct. Procedure requires the release to be terminated if both circulators for the affected condenser are lost. a. Unit 2 SW Headers do not discharge to Unit 2 CW. c. A CCW pump trip will start the third pump and will not affect the release. d. 23 SW Pump trip will result in the flow control valve for the CCW Hx opening to maintain header Flow or in the start of the Auto SW pump but will not affect the release.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	1

System/Evolution Number:	059	System/Evolution Title:	Accidental Liquid Radwaste Release

Category:	A2	Ability to determine and interpret the following as they apply to Accidental Liquid Radwaste Release:

KA:	AA2.02	The permit for liquid radioactive-waste release

RO Value:	2.9	SRO Value:	3.9	CFR:	**43.5 / 45.13**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
RADIOACTIVE LIQUID WASTE SYSTEM	0300-000.00S-WASLIQ-00	IV.D.5	45		3.b, 12
RELEASE OF RADIOACTIVE LIQUID WASTE FROM 21 CVCS MONITOR TANK	S2.OP-SO.WL-0001(Q)	5.3.2	7	12	
CIRC WATER MALFUNCTION	S2.OP-AB.CW-0001	3.2	1		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	SW Leak

Unit 2 is operating at 100% power. A Service Water leak has occurred in the 21 CCW Hx with CCW Surge Tank level rising at 68%.

Which one of the following correctly describes the consequence of this event?

a. RCPs may need to be tripped due to a reduction in CCW header pressure.

b. The Aux Building Exhaust System filters and in service Waste Holdup Tanks may become contaminated with chromates.

c. Chromates will be transported to the Delaware river by the Service Water System.

d. Components cooled by CCW will experience a reduction in cooling that could cause a plant shutdown.

Ans:	b	**Exam Level:**	B	**Cognitive Level:**	Comprehension	

Explanation of Answer	b. Correct. The Surge Tank vent and relief valves are piped to a common line that is connected to the Aux Bldg Exh Filters and also to the Waste Holdup Tank. If chromates were to be released from the tank, the Filters and WHUT would both be contaminated. a. The CCW system is a vented system and header pressure will not lower during a SW leak. c. Since SW pressure is higher than CCW pressure, SW will leak into the CCW System and not the other way around. d. SW temperature will always be lower than CCW temperature so a SW leak into CCW will not result in a reduction in cooling.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	062	System/Evolution Title:	Loss of Nuclear Service Water

Category:	A1	Ability to operate and / or monitor the following as they apply to Loss of Nuclear Service Water:

KA:	AA1.05	The CCWS surge tank, including level control and level alarms, and radiation alarm

RO Value:	3.1	SRO Value:	3.1	CFR:	41.7 / 45.5 / 45.6

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Component Cooling Water	0300-000.00S-ABCC01-00		7	0	4
Component Cooling Abnormality	S2.OP-AB.CC-0001(Q)	3.8	2	3	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Operations with loss of Control Air

The following conditions exist on Unit 2:

- A loss of Control Air has occurred
- The operators have tripped the reactor and stabilized the unit at no-load Tavg
- Restoration of air is expected to take up to TWO hours

Which one of the following correctly identifies the basis associated with the preferred CVCS pump operation during this time period?

a. Run 23 Charging Pump to provide the minimum RCS makeup.

b. Run 23 Charging Pump because CCP Flow Control Valve, CV55 failed closed.

c. Run any Centrifugal Charging Pump to provide more stable seal flow to the RCPs.

d. Run any Centrifugal Charging Pump because the mini-flow provides automatic pump protection.

Ans:	a	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	It is recommended to operate 23 Charging Pump (if available), since its speed controller is failed at the low speed stop (minimum RCP seal flow). With 2CV55 failed open and 2CV71 failed closed, operating a Centrifugal Charging Pump (CCP), will result in higher flow and pressure to the RCP seals. This will result in higher flow into the RCS and thus raise Pressurizer level faster. The other problem with running a CCP concerns the recirc. This is normally lined up to the VCT (2CV130). The mini-flow can never be assured, so the recirc must remain in service. If it is left to the VCT, 60 gpm of RWST inventory (3,600 gal/hr) will be lost to the holdup tanks.

Tier:	Emergency and Abnormal Plant Evolutions				**RO Group:**	3	**SRO Group:**	2	

System/Evolution Number:	065	**System/Evolution Title:**	Loss of Instrument Air

Category:	A2	Ability to determine and interpret the following as they apply to Loss of Instrument Air:
KA:	AA2.08	Failure modes of air-operated equipment

RO Value:	2.9*	**SRO Value:**	3.3	**CFR:**	**43.5 / 45.13**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
LOSS OF CONTROL AIR	0300-000.00S-ABCA01-01	25- 2	14		2, 3
LOSS OF CONTROL AIR	S2.OP-AB.CA-0001(Q)	Attachment 8	1	5	

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Operation of CR HVAC

In response to a fire found in the Aux Building Ventilation Charcoal Filters, the operators on BOTH units have actuated FIRE OUTSIDE THE CONTROL ROOM.

Which one of the following correctly describes the Control Area HVAC operation in this condition?

a. The Control Room Envelope (Zone 1) is recirculated through BOTH Emergency Air Conditioning Systems (EACS). The remaining Control Area Zones are recirculated through BOTH Control Area Air Conditioning Systems (CAACS).

b. The Control Room Envelope (Zone 1) is recirculated through BOTH EACS. The remaining Control Area Zones are recirculated through CAACS for the Unit which actuated first while the other CAACS provides outside air.

c. The Control Room Envelope (Zone 1) is recirculated through EACS for the Unit which actuated first. The remaining Control Area Zones are recirculated through and provided outside air by BOTH CAACS.

d. The Control Room Envelope (Zone 1) is recirculated through EACS for the Unit which actuated first. The remaining Control Area Zones are recirculated through CAACS for the Unit which actuated first while the other CAACS provides outside air.

Ans:	a	Exam Level:	R	Cognitive Level:	Comprehension	

Explanation of Answer	If both units have selected Fire Outside Control Area, zone 1 is on recirc through both EACS. Remaining zones are on recirc through both CAACS. If it is actuated on only one Unit, the EACS for the actuating unit recircs zone 1. EACS for non-affected unit is not in service. CAACS for non-affected unit recircs and supplies outside air to all zones. CAACS for actuating unit recircs remaining zones

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	067	System/Evolution Title:	Plant Fire on Site

Category:	A2	Ability to determine and interpret the following as they apply to Plant Fire on Site:

KA:	AA2.06	Need for pressurizing control room (recirculation mode)

RO Value:	3.3	SRO Value:	3.6	CFR:	43.5 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
CONTROL AREA VENTILATION SYSTEM	0300-000.00S-CAVENT-00				3.a.iii.c)
DESIGN CHANGE PACKAGES	0300S-000.00S-DCP963-00	II.A.5 & 11	7, 9		2

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Loss of Fire Water Supply

A fire occurs in Unit 2 Turbine Building with all Fire Systems in a normal lineup. While en route to the scene, a fire truck crashed into # 1 FW Storage Tank, rupturing the tank.

Which one of the following correctly describes the status of the alternate sources to the Salem Fire Water header?

The Salem Fire Water Header will be supplied by:

a. #2 Diesel Fire Pump with suction from the #2 FW Storage Tank even if #1 FW Tank. No operator action is required.

b. #1 Diesel Fire Pump with suction from #2 FW Tank provided an operator opens the normally closed suction valve.

c. Hope Creek Fire Pumps via a normally open cross-tie. No operator action is required.

d. Hope Creek Fire Pumps provided an operator opens the normally closed cross-tie valve.

Ans:	d	Exam Level:	S	Cognitive Level:	Comprehension	

Explanation of Answer	d. Correct. The cross-tie is opened as directed by procedure to allow Hope Creek Fire Header to supply Salem Fire System. a. Both FW Tanks are cross-tied with normally open isolation valves and no check valves. #2 FW Tank will also drain if not isolated from the ruptured tank. b. The suction valve is normally open but #2 tank will drain to #1 Tank if the common suction line is not also isolated. c. The cross-tie is normally closed

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	067	System/Evolution Title:	Plant Fire on Site

Category:	G	Emergency Procedures / Plan

KA:	2.4.25	Knowledge of fire protection procedures.

RO Value:	2.9	SRO Value:	3.4	CFR:	**41.10 / 45.13**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
FIRE PROTECTION SYSTEM MALFUNCTION	0300-000.00S-ABFP01-00	III.A.3	7		2, 3
FIRE PROTECTION SYSTEM MALFUNCTION	S2.OP-AB.FP-0001	3.0	1-2	1	
FIREP ROTECTION P&ID	205222		sh. 4		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Required operations during CR Evacuation

The operators are initiating seal injection to the RCPs in accordance with S2.OP-AB.CR-0002 "CONTROL ROOM EVACUATION DUE TO FIRE IN CONTROL ROOM, RELAY ROOM, OR CEILING OF THE 460/230V SWITCHGEAR ROOM". The following systems have been verified in-service:

Which one of the following correctly describes a requirement for establishing seal injection?

a. Control Air is in service for control of 2CV55.

b. 125 VDC is in service for breaker control on 21 or 22 Charging Pump.

c. 230 VAC power is available for operation of 2CV68 or 2CV69, Charging Header Isolation Valves.

d. CCW is available for the thermal barrier heat exchangers.

Ans:	a	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	To establish seal injection flow, a Charging pump must be started and requires support from AC Power, SW and CCW. Control Air is necessary to operate CV55. Charging Pump breakers can be closed without 125 VDC power available. 2CV71 is isolated in the procedure, 2CV68 and 2CV69 do not need to be closed and could be manually operated, if necessary. CCW is not required to the Thermal Barrier HX's in order to establish seal flow.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	068	System/Evolution Title:	Control Room Evacuation

Category:	K2	Knowledge of the interrelations between Control Room Evacuation and the following:

KA:	AK2.03	Controllers and Positioners

RO Value:	2.9	SRO Value:	3.1	CFR:	41.7 / 45.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
CONTROL ROOM EVACUATION DUE TO FIRE	0300-000.00S-ABCR02-01	II.B.4.a	11		2, 3.B
CONTROL ROOM EVACUATION DUE TO FIRE IN CONTROL ROOM, RELAY ROOM, OR CEILING OF THE 460/230V SWITCHGEAR ROOM	S2.OP-AB.CR-0002(Q)	5.0	37	8	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Operation of RCP during ICC

Which one of the following correctly describes the reason for starting a RCP when performing 2-EOP-FRCC-1"Response to Inadequate Core Cooling"?

a. Facilitate rapid RCS depressurization using a normal Pressurizer Spray valve.

b. Improve heat transfer until additional makeup flow to the RCS can be established.

c. Allow the use of RVLIS dynamic head range for a better indication of RCS level.

d. Minimize the inventory loss by using two-phase heat transfer when rapidly de-pressurizing the S/Gs.

Ans:	b	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	RCPs cannot be expected to run indefinitely under highly voided RCS conditions. Action to establish a makeup source to the RCS to restore adequate long term cooling must be taken. During NON-accident conditions it is desirable to start a RCP to allow for Pressurizer sprays in controlling pressure; however, in this case voiding in the head is at least expected and Pressurizer spray would NOT be effective. Inventory loss is increased by running the RCP but is allowed to provide the temporary cooling enhancement. RVLIS dynamic head is used if RCP running but is NOT preferential.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	074	System/Evolution Title:	Inadequate Core Cooling

Category:	K2	Knowledge of the interrelations between Inadequate Core Cooling and the following:

KA:	EK2.01	RCP

RO Value:	3.6	SRO Value:	3.8	CFR:	41.7 / 45.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-FRCC-1, 2, and 3 ACCIDENT MITIGATION STRATEGY	0300-000.00S-FRCC00-01	II.C.6	22		2, 6

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Response to high rads in RCS

S2.OP-AB.RC-0002, HIGH ACTIVITY IN REACTOR COOLANT SYSTEM is being performed. Which one of the following correctly completes the statement below to describe the action taken to minimize the likelihood of a radioactive release to the environment in the event that a subsequent Steam Generator Tube Rupture were to occur with the elevated RCS activity.

The Reactor is shut down and...

a. the MSIVs are closed.

b. S/G blowdown is maximized.

c. the RCS is cooled down below 500 F.

d. CVCS letdown flow is maximized with all demineralizers in service.

Ans:	c	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	Maximizing letdown is a step in the procedure to expedite cleanup for a valid elevated RCS activity but is NOT related to potential secondary release. Closure of MSIV may actually increase potential for release since any cooling is accomplished by steam release from MS10s. Maximizing blowdown flow may provide for earlier detection of primary to secondary leakage but does NOT reduce the likelihood of release.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	076	System/Evolution Title:	High Reactor Coolant Activity

Category:	A2	Ability to determine and interpret the following as they apply to High Reactor Coolant Activity:

KA:	AA2.02	Corrective actions required for high fission product activity in RCS

RO Value:	2.8	SRO Value:	3.4	CFR:	43.5 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
HIGH ACTIVITY IN REACTOR COOLANT SYSTEM	0300-000.00S-ABRC02-00	III.C.2	9		4.c
HIGH ACTIVITY IN REACTOR COOLANT SYSTEM	S2.OP-AB.RC-0002(Q)	CAS 2.0	1	2	

Question Source	Previous 2 NRC Exams	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Blackout following SI reset

The following conditions exist on Unit 2:

- An inadvertent SI resulted in a reactor trip
- Transition has been made to 2-EOP-TRIP-3 "Safety Injection Termination"
- Immediately following the reset of SI and Phase A Isolation, off-site power is lost

Which one of the following correctly describes the response of the 4 kV vital buses?

a. Electrical load shed occurs, the EDG output breakers shut, and then the SEC actuates in MODE II Blackout.

b. Electrical load shed occurs, the EDG output breakers shut, and then the SEC actuates in MODE III SI and Blackout.

c. The Emergency Diesel Generators start, the EDG output breakers shut and then the SEC actuates in MODE II Blackout.

d. The Emergency Diesel Generators start, the EDG output breakers shut and then the SEC actuates in MODE III SI and Blackout.

Ans:	a	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	For SI (MODE I) only, auto initiation will NOT occur until the Reactor Trip Breakers are reset and should a subsequent blackout occur, the SEC would strip the ECCS loads, and load in the blackout loads. The EDGs will already be running due to the MODE 1 for the SEC. If RX trip had been cleared, then SEC would start in MODE III.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	1

System/Evolution Number:	E02	System/Evolution Title:	SI Termination

Category:	K2	Knowledge of the interrelations between SI Termination and the following:

KA:	EK2.1	Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

RO Value:	3.4	SRO Value:	3.9	CFR:	41.7 / 45.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-TRIP-3, SAFETY INJECTION TERMINATION	0300-000.00S-TRP003-01	3.3.3	13		3, 10.A.5
SAFEGUARDS EQUIPMENT CONTROL SYSTEM	0300-000.00S-SEC000-00	IV.D.3	22		8
Safety Injection Termination	2-EOP-TRIP-3	Steps 1 & 2	1		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Stopping SI pumps

A LOCA has occurred on Unit 2 and all equipment has operated as designed. Actions are being taken in accordance with EOP-LOCA-2. The following stable plant conditions are observed after stopping ONE Charging Pump:

- Pressurizer pressure - 830 psig
- Pressurizer level - 28%
- RCS temperature (CETs) - 480 F
- Containment pressure has risen to 3.4 psig
- Containment Radiation levels have risen to 1000 R/hr

In accordance with EOP-LOCA-2, which one of the following correctly describes the action that should be taken for these conditions?

a. SI should be manually re-initiated.

b. The Charging pump should be restarted based on subcooling value.

c. Stopping of ONE SI pump should be evaluated using the normal values for subcooling and Pressurizer level.

d. Stopping of ONE SI Pump should be evaluated using the Adverse Containment values for subcooling and Pressurizer level.

Ans:	c	Exam Level:	S	Cognitive Level:	Application	

Explanation of Answer	Evaluation of stopping the SI Pump(s) is the next action. SI would be reinitiated per CAS only if Subcooling falls to 0 F OR Pressurizer level falls below 11% (19%). Under current conditions Adverse CNMT does NOT exist (CNMT pressure < 4 psig and Radiation levels <1E5 R/hr.).

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	E03	System/Evolution Title:	LOCA Cooldown and Depressurization

Category:	K1	Knowledge of the operational implications of the following concepts as they apply to LOCA Cooldown and Depressurization:

KA:	EK1.2	Normal, abnormal and emergency operating procedures associated with (LOCA Cooldown and Depressurization).

RO Value:	3.6	SRO Value:	4.1	CFR:	**41.8 / 41.10 / 45.3**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-LOCA-2, POST LOCA COOLDOWN AND DEPRESSURIZATION	0300-000.00S-LOCA02-01	3.3.21, 3.3.22	27, 29-30		4, 7
EOP-TRIP-1, REACTOR TRIP OR SAFETY INJECTION AND INTRODUCTION TO THE USE OF EOPs	0300-000.00S-TRP001-01	2.14	27		1.G
POST LOCA COOLDOWN AND DEPRESSURIZATION	2-EOP-LOCA-2	22	3		

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	Steam Tables

Question Topic:	LOCA Outside CNMT actions

The following conditions exist on Unit 2:

- A small break LOCA has occurred outside containment.
- Actions of 2-EOP-LOCA-6 “LOCA Outside Containment” have failed to isolate the break.
- At the completion of 2-EOP-LOCA-6, RCS pressure is continuing to drop.

Which one of the following correctly identifies the procedural transition from 2-EOP-LOCA-6 “LOCA Outside Containment”?

a. 2-EOP-TRIP-7 “Re-diagnosis” in an attempt to diagnosis the break location.

b. 2-EOP-LOCA-1 "Loss of Reactor Coolant" to resume actions to address the LOCA.

c. 2-EOP-TRIP-1 “Reactor Trip or Safety Injection” in order to re-verify that all automatic actions have been completed.

d. 2-EOP-LOCA-5 “Loss of Emergency Coolant Recirculation” in order to deal with the loss of available inventory for core cooling.

Ans:	d	Exam Level:	S	Cognitive Level:	Comprehension	

Explanation of Answer	With the location of the LOCA NOT identified nor located, and RCS pressure continuing to drop, the concern is directed toward maintaining/restoring RCS inventory. The operator actions in LOCA-5 deals with actions to maximize available resource and deal with the loss of recirculation capability. If the leakage were isolate such that RCS pressure was rising, LOCA-1 would be the appropriate transition to address other actions associated with LOCA conditions (SI termination, cooldown). Trip-1 and Trip-7 are NOT appropriate for these conditions but could be credible since either procedure has potential for being transferred to under other circumstances.

Tier:	Emergency and Abnormal Plant Evolutions			**RO Group:**	2	**SRO Group:**	1

System/Evolution Number:	E04	**System/Evolution Title:**	LOCA Outside Containment

Category:	K1	Knowledge of the operational implications of the following concepts as they apply to LOCA Outside Containment:
KA:	EK1.2	Normal, abnormal and emergency operating procedures associated with (LOCA Outside Containment).

RO Value:	3.5	**SRO Value:**	4.2	**CFR:**	**41.8 / 41.10 / 45.3**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
EOP-LOCA-6 LOCA OUTSIDE CONTAINMENT	0300-000.00S-LOCA06-01	1.2.3	6		1, 7.2
LOCA OUTSIDE CONTAINMENT	2-EOP-LOCA-6	Step 6	1	20	

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Core cooling evaluation

A Unit 2 Reactor Trip occurred after a 200 day continuous run at 100% power. Following the trip, all AFW flow was lost and the Crew transitioned to FRHS-1. Due to distractions caused by a pressure channel failure, bleed and feed steps were not initiated until WR S/G levels were all <10%.

Which one of the following correctly describes the general consequence of the delay?

a. Core uncovery will not occur as long as one PZR PORV is open and one centrifugal charging pump is injecting prior to SG dryout.

b. Core uncovery will not occur as long as both PZR PORVs are open and both centrifugal charging pumps are injecting prior to SG dryout.

c. Core uncovery will be more severe because RCS pressure will remain at a higher value for a longer time, limiting ECCS flow.

d. Core uncovery will be more severe only if the PRT rupture disk fails, increasing the loss of mass, while ECCS flow is limited by RCS pressure.

Ans:	c	Exam Level:	S	Cognitive Level:	Memory	

Explanation of Answer	c. Correct. Boiling begins when reactor coolant reaches saturation temperature. RCS steam generation results in large volumetric increases and PZR PORVs may not be able to compensate for this. RCS pressure will remain high thus limiting ECCS flow. This will result in a more severe core uncovery. a&b. The only recovery method that will be successful once the plant reaches this stage is to restore feed to the S/Gs. d. The PRT has a minimal affect on cooling flow and flow will be enhanced when the rupture disk breaks.

Tier:	Emergency and Abnormal Plant Evolutions	**RO Group:**	2	**SRO Group:**	2

System/Evolution Number:	E05	**System/Evolution Title:**	Loss of Secondary Heat Sink

Category:	K2	Knowledge of the interrelations between Loss of Secondary Heat Sink and the following:
KA:	EK2.2	Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

RO Value:	3.9	**SRO Value:**	4.2	**CFR:**	**41.7 / 45.7**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
EOP-FRHS-1, 2, 3, 4, and 5 HEAT SINK FUNCTIONAL RESTORATION	0300-000.00S-FRHS00-03	1.2.9; 2.7.6	9, 13		2, 3
FRHS Basis Document		Step 26	33	24	

Question Source	Previous 2 NRC Exams	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Action for excessive cooldown/LOCA

Given the following conditions for Unit 2:

- A LOCA has been identified
- 2-EOP-FRTS-1 "Response To Imminent Pressurized Thermal Shock Conditions" has been entered due to a PURPLE path condition
- SI has actuated and is reset
- All RCPs are stopped
- ECCS flow CANNOT be terminated
- Support conditions required to start an RCP have been met
- RCS Subcooling is 0 degrees

Which one of the following correctly describes the basis for not starting an RCP?

An RCP should not be started because:

a. the subsequent pressure surge could aggravate the flaw.

b. the sudden flow change could cause rapid temperature changes.

c. the loss of RCS inventory may be aggravated.

d. natural circulation will slowly remove thermal gradients.

Ans:	c	Exam Level:	B	Cognitive Level:	Memory	

Explanation of Answer	c. Correct. In the event of SBLOCA condition, restart of an RCP is NOT appropriate since it can result in a degraded core cooling scenario due to additional inventory loss. a&b. For FRTS conditions without a LOCA, RCPs are started to provide mixing and reduce thermal gradients without a significant affect on the flaw. EOP Basis document indicate that starting an RCP will not cause any further crack propogation. d. Natural Circulation will not provide sufficient flow to reduce thermal gradients.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	E08	System/Evolution Title:	Pressurized Thermal Shock

Category:	K3	Knowledge of the reasons for the following responses as they apply to Pressurized Thermal Shock:
KA:	EK3.1	Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.

RO Value:	3.4	SRO Value:	3.9	CFR:	**41.5,41.10 / 45.6 / 45.13**

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-FRTS-1 AND 2, RESPONSE TO PRESSURIZED THERMAL SHOCK CONDITIONS	0300-000.00S-FRTS00-01	3.2.9.4	23		3,7
RESPONSE TO PTS CONDITIONSBASIS DOCUMENT	2-EOP-FRTS-01	Step 9	11	24	

Question Source	Previous 2 NRC Exams	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Reason for cooldown to specific value

Which one of the following correctly describes the reason for waiting for RCS T-hot values to lower below 543 F before continuing with RCS depressurization during the initial cooldown performed in 2-EOP-TRIP-4 "Natural Circulation Cooldown"?

a. To allow time for Natural Circulation to develop.

b. Provide for raising Pressurizer level to at least 22% for the establishment of letdown.

c. Ensure a minimum RCS subcooling of 50 F during subsequent depressurization.

d. Prevent the delta-T between the Pressurizer Spray nozzle and Pressurizer vapor space from exceeding limits.

Ans:	c	Exam Level:	R	Cognitive Level:	Memory	

Explanation of Answer	c. Correct. The cooldown is required to ensure a minimum RCS subcooling of 50 F during subsequent depressurization necessary to block SI circuitry. a. At this point in the event, natural circulation will have already been established. Thot dropping to 543 is not significant with respect to natural circulation. b. Pressurizer level is established at least 22% for ensuring Pressurizer pressure control (letdown and heaters ops) but is not related to delaying the depressurization until Thot is <543. d. There is a limit of 320 F between Pressurizer Aux spray and Pressurizer vapor space for thermal stress but it is not related to delaying the depressurization until Thot is <543.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	1	SRO Group:	1

System/Evolution Number:	E09	System/Evolution Title:	Natural Circulation Operations

Category:	K3	Knowledge of the reasons for the following responses as they apply to Natural Circulation Operations:

KA:	EK3.2	Normal, abnormal and emergency operating procedures associated with (Natural Circulation Operations).

RO Value:	3.2	SRO Value:	3.6	CFR:	41.5,41.10 / 45.6 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-TRIP 4, 5, 6; NATURAL CIRCULATION COOLDOWN	0300-000.00S-TRP004-01	3.3.10	18		5
NATURAL CIRCULATION COOLDOWN	2-EOP-TRIP-4	Step 10	1	20	

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	RCS cooldown w/o RVLIS

Given the following Unit 2 conditions:

- Off-site power is unavailable
- RCS temperature - 540 F
- Pressurizer pressure - 2200 psig
- All RCPs are stopped
- RVLIS is NOT available
- A rapid cooldown, with the potential for vessel upper head void formation, is required.

For these conditions, which one of the following correctly describes the difference in actions between a rapid cooldown when RVLIS is NOT available as compared to a rapid cooldown when RVLIS is available?

The maximum cooldown rate is...

a. 100 F/hr with RVLIS and 50 F/hr without RVLIS.

b. 100 F/hr with or without RVLIS.

c. 100 F/hr with RVLIS and 50 F/hr without RVLIS only for the initial cooldown to 500 F, and then is 100 F/hr with or without RVLIS for subsequent cooldown steps.

d. 100 F/hr with or without RVLIS only for the initial cooldown to 500 F, and then is 100 F/hr with RVLIS and 50 F/hr without RVLIS for subsequent cooldown steps.

Ans:	c	Exam Level:	S	Cognitive Level:	Memory	

Explanation of Answer	W/O RVLIS, in order to prevent head void during the initial phase, the cooldown rate is limited 50 F/hr. Thereafter, the cooldown rate is limited to 100 F/hr. Also to minimize the effects development of a head void, the cooldown and depressurization are performed stepwise with specified plateaus given for each depressurization and cooldown step. If RVLIS is available the development of a void can be monitored directly by the operator. Therefore the cooldown and depressurization is allowed initially from the higher rate of 100 F/hr and the cooldown and depressurization can be performed concurrently within RCS cooldown curve limits. The RVLIS parameter dictates stopping cooldown/depressurization if void growth is excessive.

Tier:	Emergency and Abnormal Plant Evolutions	**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	E10	**System/Evolution Title:**	Natural Circulation with Steam Void in Vessel with/without RVLIS

Category:	K1	Knowledge of the operational implications of the following concepts as they apply to Natural Circulation with Steam Void in Vessel with/without RVLIS:

KA:	EK1.2	Normal, abnormal and emergency operating procedures associated with (Natural Circulation with Steam Void in Vessel with/without RVLIS).

RO Value:	3.4	**SRO Value:**	3.6	**CFR:**	**41.8 / 41.10 / 45.3**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
EOP-TRIP 4, 5, 6; NATURAL CIRCULATION COOLDOWN	0300-000.00S-TRP004-01	5.3.7, 5.3.8, 7.3.7	44, 46, 73		5, 6
NATURAL CIRCULATION RAPID COOLDOWN WITHOUT RVLIS	2-EOP-TRIP-5	7, 8, 9, 13	1	20	
NATURAL CIRCULATION RAPID COOLDOWN WITH RVLIS	2-EOP-TRIP-6	7	1		

Question Source	New	**Question Modification Method**	
Question Source Comments:			

Material Required for Examination:	

Question Topic:	EOP priority

Given the following conditions on Unit 2:

- A LOCA has occurred
- 2-EOP-LOCA-5 "LOSS OF EMERGENCY RECIRCULATION" is the procedure in effect
- A PURPLE path exists for Containment Environment due to high pressure

Which one of the following correctly describes the reasons for the operator's actions associated with the Containment Spray System?

The Containment Spray System is operated as directed in...

a. LOCA-5 because it establishes minimum required containment spray flow and conserves RWST inventory.

b. LOCA-5 since FRPs are not implemented during the performance of LOCA-5.

c. 2-EOP-FRCE-1 "RESPONSE TO EXCESSIVE CONTAINMENT PRESSURE" because actions concerning Containment Spray operation are more restrictive.

d. 2-EOP-FRCE-1 "RESPONSE TO EXCESSIVE CONTAINMENT PRESSURE" since restoration of the critical safety function takes precedence.

Ans:	a	Exam Level:	S	Cognitive Level:	Comprehension	

Explanation of Answer	Step 3.1 of 2-EOP-FRCE-1 checks if LOCA-5 is in effect and if so directs that spray be operated in accordance with LOCA-5. This is done to minimize the depletion of RWST volume by reducing operation of CS and utilizing CFCUs. The comparison of usage due to CSF hierarchy is NOT appropriate since LOCA-5 is a contingency EOP. FRCE-1 is less restrictive but NOT appropriate for use in conditions as step directs operation of CS per LOCA-5.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	E11	System/Evolution Title:	Loss of Emergency Coolant Recirculation

Category:	A2	Ability to determine and interpret the following as they apply to Loss of Emergency Coolant Recirculation:

KA:	EA2.1	Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

RO Value:	3.4	SRO Value:	4.2	CFR:	43.5 / 45.13

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
EOP-FRCE-1, 2, and 3 CONTAINMENT ENVIRONMENT FUNCTIONAL RESTORATION	0300-000.00S-FRCE00-02	3.2.3.1	14-15		6
EOP-LOCA-5, LOSS OF EMERGENCY RECIRCULATION	0300-000.00S-LOCA05-01	1.2.3	7		1
RESPONSE TO EXCESSIVE CONTAINMENT PRESSURE	2-EOP-FRCE-1	3.1	1		

Question Source	NRC Exam Bank	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	

Question Topic:	Containment failure

Which of the following correctly describes the post-accident condition that can lead to high containment pressure and subsequent containment failure early in the progression of an accident?

a. Hydrogen gas buildup and ignition.

b. Loss of all CFCUs.

c. Loss of one Containment Spray Subsystem and 2 CFCUs.

d. RCPs are not tripped at 1350 psig.

Ans:	a	Exam Level:	B	Cognitive Level:	Comprehension	

Explanation of Answer	Dynamic severe accident phenomena, such as hydrogen combustion can challenge containment by producing a sufficiently large spike in containment internal pressure that failure might occur during the transient. Gradual pressurization is driven by decay heat which, over a period of many hours or a few days, finally produce an accumulation of steam and non-condensable gases sufficient to severely challenge containment. A delay in tripping RCPs will not have a short term affect on containment pressure.

Tier:	Emergency and Abnormal Plant Evolutions	**RO Group:**	1	**SRO Group:**	1

System/Evolution Number:	E14	**System/Evolution Title:**	High Containment Pressure

Category:	K3	Knowledge of the reasons for the following responses as they apply to High Containment Pressure:
KA:	EK3.1	Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.

RO Value:	3.2	**SRO Value:**	3.6	**CFR:**	**41.5,41.10 / 45.6 / 45.13**

Reference	**Reference Number**	**Reference Section**	**Page Number(s)**	**Revision**	**Learn. Obj**
RESPONSE TO EXCESSIVE CONTAINMENT PRESSURE BASIS DOCUMENT	EOP-FRCE-1	Step 9	11	20	
EOP-FRCE-1, 2, and 3 CONTAINMENT ENVIRONMENT FUNCTIONAL RESTORATION	0300-000.00S-FRCE00-02	1.4.4	11		3,6

Question Source	New	**Question Modification Method**	
Question Source Comments:			
Material Required for Examination:			

Question Topic:	Radiation affects on Key Instrumentation

Which of the choices below correctly completes the following statement?

If radiation level inside containment is determined to be 1E8 R/hr during an accident:

a. Control Room instrumentation will no longer be reliable.

b. Adverse containment values for key parameters must be used for the remainder of the accident until permission to return to normal values is granted by the TSC.

c. Only environmentally qualified instrumentation may be used because it is not susceptible to radiation damage.

d. Containment failure may occur due to radiation embrittlement.

Ans:	b	Exam Level:	B	Cognitive Level:	Comprehension

Explanation of Answer	b. Correct. Adverse containment values must be used if containment pressure >4 psig OR radiation >1E5 R/hr. Normal values may be used if pressure falls below 4 psig but the TSC must perform an assessment of radiation damage before normal values may be used following a high radiation condition. a. Control room instrumentation is reliable but adverse values must be used. c. Even environmentally qualified instrumentation is susceptible to radiation damage. d. Embrittlement has not been shown as a containment failure mechanism.

Tier:	Emergency and Abnormal Plant Evolutions	RO Group:	2	SRO Group:	2

System/Evolution Number:	E16	System/Evolution Title:	High Containment Radiation

Category:	K2	Knowledge of the interrelations between High Containment Radiation and the following:

KA:	EK2.2	Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

RO Value:	2.6	SRO Value:	3.0	CFR:	41.7 / 45.7

Reference	Reference Number	Reference Section	Page Number(s)	Revision	Learn. Obj
Use of Procedures PROGRESSION AND PHENOMENA	SC.OP-AP.ZZ-0102	5.3.10	17	6	
EOP-TRIP-1 PROGRESSION AND PHENOMENA	0300-000.00S-TRP001-01	2.14	27	1	1

Question Source	New	Question Modification Method	

Question Source Comments:	

Material Required for Examination:	