FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 SRO-ADMIN #1

VERIFY A BLENDED MAKEUP 2000 GALLON FLUSH OF REACTOR COOLANT MIXED BED DEMINERALIZER

Student Name: _____ Badge #: _____

Evaluator Name: _____ Badge #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: _____ DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: RO

0040100601 Perform a boron change calculation.

Position: SRO

2.1.25 Ability to interpret reference materials, such as graphs, tables, etc.

2.0 Conditions:

A manual blended makeup for flush of the reactor coolant mixed bed demineralizer.

3.0 Standards:

Verify the calculated required flow controller and totalizer setpoints for a 2000 gallon flush of the Reactor Coolant Mixed Bed Demineralizer.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
RS1735, REACTIVITY CALCULATIONS
Primary Chemistry Report (w/ RCS boron concentration at 761 ppm and "A" BAST concentration at 7321 ppm)

5.0 Limitations On Performance:

Verify provided blended makeup calculation.

6.0 References:

Procedures:

- RS1735, REACTIVITY CALCULATIONS
- OS1008.01, CVCS MAKEUP OPERATIONS
- Chemistry Report (w/ "A" BAST concentration at 7321 ppm)

Sys	KA	Description	Value RO/SRO
	2.2.1	2.2.1 Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	3.7/3.6

7.0 Setting:

Classroom

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

15 minutes

10.0 Directions To The Student(s):

Initial Conditions:

1) A 2000 gallon flush of the Reactor Coolant Mixed Bed Demineralizer is required prior to placing the demineralizer in service.
2) Makeup total flow rate should be 80 gallons per minute.
3) Current reactor Coolant boron concentration is 761 ppm.
4) The "A" Boric Acid tank is in service.

Initiating Cue:

The Primary Operator has determined the required flow controller and totalizer setpoints for a 2000 gallon flush of the Reactor Coolant Mixed Bed Demineralizer prior to placing the demineralizer in service.

Verify the calculation prior to commencing the flush.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	UNSAT	INITIALS/DATE
1.	P	Start time	Initiating cue read. Student given copy of RS1735 REACTIVITY CALCULATIONS and completed Form E for verification.			_____
*2.	P	Verifies the desired flows and quantities of boric acid and total makeup from RS1735, REACTIVITY CALCULATIONS				
		a. On Form E, Item 1, VERIFY the desired makeup boron concentration.	Verifies the desired makeup boron concentration. **(761 ppm)**	_____	_____	_____
		b. On Form E, Item 2, VERIFY the desired flowrate makeup setpoint.	Verifies the desired flowrate makeup setpoint. **(80 gpm)**	_____	_____	_____
		c. On Form E, Item 3, VERIFY the actual Boric Acid Storage Tank concentration.	Verifies the actual Boric Acid Storage Tank concentration. **(7321 ppm)**	_____	_____	_____
		d. On Form E, Item 4, VERIFY the desired makeup quantity target.	Verifies the desired makeup quantity target. **(2000 gallons)**	_____	_____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
NOTE	Given Boric Acid Flow rate is incorrect. Student should identify correct values within given range of answer key.				
	*e. On Form E, VERIFY the boric acid flowrate SETPOINT, (F_{BA}).	* IDENTIFIES given boric acid flowrate SETPOINT, (F_{BA}) is incorrect. **(8.3 gpm, acceptable range: 8.2 to 8.4 gpm)**	_____	_____	_____
NOTE	Given Boric Acid quantity target is incorrect. Student should identify correct values within given range of answer key.				
	*f. On Form E, VERIFY the boric acid quantity target, (G_{BA}).	* IDENTIFIES given boric acid quantity target, (G_{BA}) is incorrect. **(206 gallons, acceptable range:201 to 211 gpm)**	_____	_____	_____

Evaluator Cue: Student may ask for an Independent Verification of Form E. If student asks, say **"An independent verification will be performed by a second operator."**

CUE: **"The JPM is complete."**

15.	Stop time _____ Evaluator calculates time to complete task if desired.		_____	_____	_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 SRO-ADMIN #1

Initial Conditions:

1) A 2000 gallon blended flush of the Reactor Coolant Mixed Bed Demineralizer is required prior to placing the demineralizer in service.

2) Makeup total flow rate should be 80 gallons per minute.

3) Current reactor Coolant boron concentration is 761 ppm.

4) The "A" Boric Acid tank is in service.

Initiating Cue:

The Primary Operator has determined the required flow controller and totalizer setpoints for a 2000 gallon flush of the Reactor Coolant Mixed Bed Demineralizer prior to placing the demineralizer in service.

Verify the calculation prior to commencing the flush.

SRO Admin #1 Key

Form E: Blended Makeup Worksheet

(Sheet 1 of 1)

1. Desired Makeup Boron Concentration (C_{MU}) 761 ppm
2. Desired Makeup Flow Rate SETPOINT: FIQ-111 (F_{TOT}) 80 gpm
3. Boric Acid Storage Tank Concentration (C_{BAST}) 7435 ppm
4. Desired Makeup Quantity TARGET: FIQ-111 (G_{TOT}) 2000 gals
5. Boric Acid Flow Rate SETPOINT: FIQ-111 (F_{BA})

$$F_{BA} = \frac{(C_{MU})(F_{TOT})}{C_{BAST}} = \frac{(761)(80)}{(7435)} = 8.2 \text{ gpm}$$

6. Boric Acid Quantity TARGET: FIQ-111 (G_{BA})

$$G_{BA} = \frac{(C_{MU})(G_{TOT})}{C_{BAST}} = \frac{(761)(2000)}{(7435)} = 204.7 \text{ gal}$$

Calculated By: _____ Date: _____

Independently Verified By: _____ Date: _____

Form E: Blended Makeup Worksheet

(Sheet 1 of 1)

1. Desired Makeup Boron Concentration (C_{MU}) 761 ppm
2. Desired Makeup Flow Rate SETPOINT: FIQ-111 (F_{TOT}) 120 gpm
3. Boric Acid Storage Tank Concentration (C_{BAST}) 7050 ppm
4. Desired Makeup Quantity TARGET: FIQ-111 (G_{TOT}) 2000 gals
5. Boric Acid Flow Rate SETPOINT: FIQ-111 (F_{BA})

$$F_{BA} = \frac{(C_{MU})(F_{TOT})}{C_{BAST}} = \frac{(761)(120)}{(7050)} = 13.0 \text{ gpm}$$

6. Boric Acid Quantity TARGET: FIQ-111 (G_{BA})

$$G_{BA} = \frac{(C_{MU})(G_{TOT})}{C_{BAST}} = \frac{(761)(2000)}{(7050)} = 157.5 \text{ gal}$$

Calculated By: Bob Hanley Date: 7.26.09

Independently Verified By: _____ Date: _____

CH-L121
Seabrook Station
PRIMARY CHEMISTRY REPORT

Modes 1 and 2

Parameter (1)	AL 1	AL 2	AL 3	Reactor Coolant System	Sample Date / Time
Chloride (ppm) **(2)**	>0.050	≥0.150	>1.50	0.01	7/26/09 0000
Fluoride (ppm) **(2)**	>0.050	>0.150	>1.50	0.003	7/26/09 0000
Sulfate (ppm)	≥0.025	>0.150	>1.50	0.01	7/26/09 0000
Dissolved O_2 (ppm) **(2)**	>0.005	N/A	≥0.100	0.002	7/26/09 0000
Hydrogen cc/Kg (STP)	<25 >50	<15	<5	34.3	7/26/09 0000
Boron (ppm)	Per COLR	N/A	N/A	761	7/26/09 0000
Lithium (ppm)	Outside Control Band	N/A	N/A	3.5	7/26/09 0000
Dose Equivalent Iodine (µCi/gm) **(3)**			>1.0	0.2	7/26/09 0000
Gross Activity (uCi/gm) (3) LIMIT – DATE : 75.8 7/1/2009 09:24			>100/E	18.6	7/26/09 0000

Parameter	Pressurizer	Sample Date / Time
Boron (ppm)	761	7/26/09 0000

Borated Water Source

Source	Boron (ppm)	Date/Time
BAST A **(5)**	7435	7/26/09 0000
BAST B **(5)**	7050	7/26/09 0000
RWST **(4)**	2798	7/26/09 0000
SFPP **(4)**	2762	7/26/09 0000

RM-6505 Correlation Values for S/G Tube Leak

1 gpd	2 cpm
30 gpd	54 cpm
75 gpd	134 cpm

Note: Values used until 1st chemistry grab sample results.

(1) Circle all parameters exceeding action level specifications and refer to procedure CP3.1, Section 4.2.6.3 for recommended action.
(2) Refer to Technical Requirement 30-3.4.7.
(3) Refer to Technical Specification 3.4.8 and Table 4.4-3.
(4) Refer to COLR for Action Initiation Value.
(5) Refer to Technical Specification 29-3.1.2.6 and COLR

Cation Bed Runs - Normally performed at full flow

	Minutes:
Midshift (~2400):	5
Dayshift(~1200):	5

Cation Bed Preservice Rinse Required: yes/no

Remarks: None

Technician Signature: [signature] 7/26/09 0000

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 SRO–ADMIN #2 L0033J Modified

ECP APPROVAL

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: RO

0010100201 Perform Estimated Critical Position (ECP) Calculations

2.0 Conditions:

A. The plant is preparing for a startup after a 2 day outage following an inadvertent reactor trip.

B. Plant condition/history is as follows:

1. Shift turnover has been completed and no surveillance's are planned or in progress.
2. Mode 3 with RCS at 557°F and 2235 psig.
3. RE has given the US an ECP.
4. The plant has been shutdown for two days as of 0000 today. It is now 0100.
5. Criticality planned for today at 0500, 100 steps, Control Bank D.

3.0 Standards:

A. Determine the critical boron concentration within ± 30 ppm using RS-1735 Form A, Block 6.

B. Determine the zero power rod insertion limit per RS-1735 Form A, Block 9, item "A".

4.0 Student Materials:

Copy of the Tear-Off Sheet.

Copy of completed ECP

Calculator

Copy of RS-1735, Rev. 4, Chg.7.

Figures from the Primary Tech Data Book:

RE-1, Critical Boron Concentration (RE Revision #01-13-00)

RE-3, Differential Boron Worth (RE Revision #01-13-00)

RE-5, Overlap Integral Rod Worth vs Rod Position (RE Revision #01-13-00)

RE-16, Control Bank D Operating Band (RE Revision #01-13-01)

Core Operating Limits Report (SSTR Rev.110)

5.0 Limitations On Performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.

Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

Procedures:

OS1000.07, Approach to Criticality.

RS-1735, Reactivity Calculations.

Primary Technical Data Book.

Technical Specifications:

3.1.1.4, Minimum Temp for Criticality

3.1.3.6, Control Rod Insertion Limits

Sys	KA	Description	Value RO/SRO
192008	K1.07	Calculate ECP using procedures and given plant procedures.	3.5/3.6

7.0 Setting:

Simulator, Plant or Classroom

A. The Examiner must refer to the key to determine satisfactory completion of the JPM. The key is calculated based on the figures listed in section 4.0 and values specified in the body of the JPM.

B. The JPM must be performed with the procedure and figures listed in section 4.0. DO NOT USE OTHER FIGURES such as those found in a current Primary Technical Data Book.

C. The evaluator will act as the US and/or RE Engineer to complete communications with the candidate.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

20 Minutes

10.0 Directions To The Student(s):

Initial Conditions:

1. The plant is preparing for a startup after a 2 day outage following an inadvertent reactor trip.
2. Plant condition/history is as follows:
   a. Shift turnover has been completed and no surveillance's are planned or in progress.
   b. MODE 3 with RCS at 557°F and 2235 psig.
   c. RE has given the US an ECP.
   d. The plant has been shutdown for two days as of 0000 today. It is now 0100.
   e. Criticality planned for today at 0500.
   f. Desired Rod Position for criticality is Control Bank D at 100 steps.
   g. RCS boron concentration (C_B), 1459 ppm. Sample time 0030 today.
   h. Full Out Position is presently CBD @ 225 steps.
   i. Core burnup is 16,000 MWD/MTU.
   j. Net Poison worth will be 500 pcm at 0500 today.
   k. There is no boron depletion.

11.0 Initiating Cue:

Using RS1735, review the provided Estimated Critical Position (ECP) calculation and determine if it can be approved as written. If not, identify all issues you discover with the ECP.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT UNSAT	INITIALS/DATE
1. P	Start time _____	Initiating cue read.		

NOTE: Give the student a copy of procedure RS1735.

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: The provided ECP has errors in three places. Students will be required to identify the mistakes and make corrections as necessary. Mistakes are; (1) block 2 has current boron concentration vice boron concentration from RE-01, (2) block 5 has Hot Full Power (HFP) boron concentration vice Hot Zero Power (HZP) boron concentration, and (3) block 8 incorrectly identifies the Rod Insertion Limit as bank "D" at 0 steps vice bank "C" at 71 steps, then carries that error forward to use bank "D" at 0 steps as the administrative ECP limit.

NOTE: All values should be entered as positive values.

2.	P	Refer to section 4.1, of ECP Procedure (ECP Data & Analysis Form A RS 1735):	Performs the following:			
		a. ENTER the Estimated Condition for Criticality in Section 1. Include the Date, Time, Burnup and Desired Rod Position for the next criticality.	a. Enters Section 1 conditions: • Criticality date • Criticality time • Core burnup • Bank D desired rod position		_____	_____ _____

CUE: If the student asks RE for alternative data as mentioned in NOTE prior to step 4.1.2: **"RE has no alternative data available. Use Figure RE-1 for Critical Boron Concentration".**

		b. RECORD in Section 2 the value of Hot Zero Power, No Xenon, Critical Boron Concentration (C_o), from Figure RE-1, for the Burnup listed in Section 1.	b. Records C_o (Critical Boron Concentration) from Figure RE-1. **(See key)**		_____	_____ _____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
	c. RECORD in Section 3 the value of the Net Poison Worth at the expected Time of Criticality (ρ_I) as determined by Reactor Engineering or computer prediction.	c. Records ρ_I (Net Poison Worth).	_____	_____	_____
	d. RECORD in Section 4 the value of inserted rod worth (ρ_R), from Figure RE-5, for the desired Rod Position listed in Section 1.	d. Records ρ_R (Inserted Rod Worth) from TDB Figure RE-5 **(See key)**	_____	_____	_____
	e. RECORD in Section 5 the Differential Boron Worth (DBW) at HZP, from Figure RE-3, for the Burnup listed in Section 1.	e. Records DBW (Differential Boron Worth) from TDB Figure RE-3 for the Burnup listed in Section 1. **(See key)**	_____	_____	_____
	f. COMPLETE the calculation in Section 6 to determine the estimated Critical Boron Concentration (CB) as follows: $C_B = C_O - [(\rho_I + \rho_R) / DBW]$	*f. Calculates C_B (Est. Critical Boron Conc.) **(See key)**	_____	_____	_____
	g. COMPLETE the calculation in Section 7 to determine the corrected Critical Boron Concentration C_{CB}.	g. Calculates C_{CB} within ± 20 ppm of RE ECP. **(See key)**	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
CUE:	If asked about any changes to boron concentration then respond with, "**No dilutions or borations have been performed since the sample was taken at 0030 this morning.**"				
	h. COMPLETE Section 8 of Form A to determine the ECP administrative rod insertion limit (AIL).	*h. RECORD in block A, from COLR the RIL for Control Bank C at Hot Zero Power. A. Inserts value for Zero Power RIL. **(See key)**	_____	_____	_____
NOTE:	Recording the Zero Power Insertion Limit is considered a "critical step". Since it can be read directly off COLR Figure 1, there is no tolerance. The remaining steps are not critical.				
		RECORD in block B, ρ_R from Form A Section 4 and calculate ρ_{AIL}. **(See key)**	_____	_____	_____
		In block C RECORD Rod Position at ρ_{AIL} using RE-5. **(See key)**	_____	_____	_____
		In block D RECORD ECP administrative Insertion Limit. Highest bank/step of block A and C above. **(See key)**	_____	_____	_____
	i. COMPLETE Section 9 of Form A to determine the ECP administrative rod withdrawal limit (AWL).	i. In block A RECORD Rod Withdrawal Limit using RE-16. **N/A for current cycle.**	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
		RECORD in block B, ρ_R from Form A Section 4 and calculate ρ_{AWL}. **(See key)**	_____	_____	_____
		In block C RECORD Rod Position at ρ_{AWL} using RE-5. **(See key)**	_____	_____	_____
		In block D RECORD ECP Administrative Withdrawal Limit. Lowest bank/step of A and C above. **(See key)**	_____	_____	_____

CUE: "The JPM is complete."

3.	Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.			
4.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 SRO-ADMIN#2

Initial conditions:

1. The plant is preparing for a startup after a 2 day outage following an inadvertent reactor trip.
2. Plant condition/history is as follows:
3. Shift turnover has been completed and no surveillance's are planned or in progress.
4. MODE 3 with RCS at 557°F and 2235 psig.
5. RE has given the US an ECP.
6. The plant has been shutdown for two days as of 0000 today. It is now 0100.
7. Criticality planned for today at 0500.
8. Desired Rod Position for criticality is Control Bank D at 100 steps.
9. RCS boron concentration (C_B), 1459 ppm. Sample time 0030 today.
10. Full Out Position is presently CBD @ 225 steps.
11. Core burnup is 16,000 MWD/MTU.
12. Net Poison worth will be 500 pcm at 0500 today.
13. There is no boron depletion.

Initiating Cue:

Using RS1735, review the provided Estimated Critical Position (ECP) calculation and determine if it can be approved as written. If not, identify all issues you discover with the ECP.

Key SRO - Admin 2

Form A: Estimated Critical Position Data & Analysis Form

(Sheet 1 of 3)

NOTE: Enter all input data as positive values.

1) Estimated Condition for Criticality

Date: Today's date Time: 0500 Burnup: 16,000 MWD/MTU

Desired Rod Position: D (Bank) @ 100 (Steps)

2) Design Critical Boron Concentration @ Current Burnup (HZP, ARO, No Xenon)

C_0 = 1250 ppm from TDB Figure RE-01 1230 - 1270 Acceptable range

1459 given to student ⇒ current boron concentration

3) Net Poison Worth @ Expected Time of Criticality

ρ_I = 500 pcm from computer prediction or Reactor Engineering

4) Inserted Rod Worth @ Criticality

ρ_R = 450 pcm from TDB Figure RE-05 430 to 470 acceptable range

5) Differential Boron Worth @ Current Burnup (HZP)

DBW = 7.07 pcm/ppm from TDB Figure RE-03 7.06 to 7.08

6.72 given to student ⇒ DBW @ HFP

6) Estimated Critical Boron Concentration

$$C_B = C_0 - \left(\frac{\rho_I + \rho_R}{DBW}\right)$$

$$C_B = 1250 \text{ ppm} - \left(\frac{500 \text{ pcm} + 450 \text{ pcm}}{7.07 \text{ pcm/ppm}}\right)$$

C_B = 1116 ppm 1096 to 1136 acceptable range

1317.6 given to student ⇒ error in 2) & in 5) carried forward.

Form A: Estimated Critical Position Data & Analysis Form

(Sheet 2 of 3)

7) Corrected Critical Boron Concentration

A) C_B = 1116 ppm From Form A Section 6

B) ΔC_B = 0 ppm Use 0 if no B^{10} depletion **OR** enter calculated amount from Form B Section 4 **OR** from an RE Calculation **OR** from an RCS isotopic analysis

C_{CB} = $C_B + \Delta C_B$ ppm

C) C_{CB} = 1116 ppm + 0 ppm

D) C_{CB} = 1116 ppm

8) ECP Administrative Control Rod Insertion Limit (AIL)

A) Rod Insertion Limit (RIL) = Bank: C @ 71 steps From COLR
Data ⊙ given to student ⇒ COLR error!

B) ρ_{AIL} = 450 pcm + 500 pcm = 950 pcm From Form A Section 4

C) Rod Position at ρ_{AIL} = Bank: C @ 152 steps From TDB Figure RE-05
or Bank D at 35 steps

D) ECP Administrative Insertion Limit = Bank: C @ 152 steps Higher bank/step of A and C
Data ⊙ given to students or Bank D @ 35 steps

9) ECP Administrative Control Rod Withdrawal Limit (AWL)

A) Rod Withdrawal Limit = Bank N/A @ N/A steps From TDB Figure RE-16

B) ρ_{AWL} = 450 pcm – 500 pcm = 0 pcm From Form A Section 4

C) Rod Position at ρ_{AWL} = Bank: D @ 225 steps From TDB Figure RE-05

D) ECP Administrative Withdrawal Limit = Bank: D @ 225 steps Lower bank/steps of A and C

Completed By: _____ Date/Time: _____

Independently Verified By: _____ Date/Time: _____

Approved By SM: _____ Date/Time _____

Form A: Estimated Critical Position Data & Analysis Form

(Sheet 1 of 3)

NOTE: Enter all input data as positive values.

1) Estimated Condition for Criticality

Date: 10-15-09 Time: 0500 Burnup: 16,000 MWD/MTU

Desired Rod Position: 0 (Bank) @ 100 (Steps)

2) Design Critical Boron Concentration @ Current Burnup (HZP, ARO, No Xenon)

C_0 = 1459 ppm from TDB Figure RE-01

3) Net Poison Worth @ Expected Time of Criticality

ρ_I = 500 pcm from computer prediction or Reactor Engineering

4) Inserted Rod Worth @ Criticality

ρ_R = 450 pcm from TDB Figure RE-05

5) Differential Boron Worth @ Current Burnup (HZP)

DBW = 6.72 pcm/ppm from TDB Figure RE-03

6) Estimated Critical Boron Concentration

$$C_B = C_0 - \left(\frac{\rho_I + \rho_R}{DBW}\right)$$

$$C_B = 1459 \text{ ppm} - \left(\frac{500 \text{ pcm} + 450 \text{ pcm}}{6.72 \text{ pcm/ppm}}\right)$$

C_B = 1317.6 ppm

Form A: Estimated Critical Position Data & Analysis Form

(Sheet 2 of 3)

7) Corrected Critical Boron Concentration

A) C_B = 1317.6 ppm — From Form A Section 6

B) ΔC_B = 0 ppm — Use 0 if no B^{10} depletion **OR** enter calculated amount from Form B Section 4 **OR** from an RE Calculation **OR** from an RCS isotopic analysis

C_{CB} = $C_B + \Delta C_B$ ppm

C) C_{CB} = 1317.6 ppm + 0 ppm

D) C_{CB} = 1317.6 ppm

8) ECP Administrative Control Rod Insertion Limit (AIL)

A) Rod Insertion Limit (RIL) = Bank: D @ 0 steps — From COLR

B) ρ_{AIL} = 450 pcm + 500 pcm = 950 pcm — From Form A Section 4

C) Rod Position at ρ_{AIL} = ρ_R Bank: D @ 35 steps — From TDB Figure RE-05

D) ECP Administrative Insertion Limit = Bank: D @ 0 steps — Higher bank/step of A and C

9) ECP Administrative Control Rod Withdrawal Limit (AWL)

A) Rod Withdrawal Limit = Bank N/A @ N/A steps — From TDB Figure RE-16

B) ρ_{AWL} = 450 pcm – 500 pcm = 0 pcm — From Form A Section 4

C) Rod Position at ρ_{AWL} = ρ_R Bank: D @ 225 steps — From TDB Figure RE-05

D) ECP Administrative Withdrawal Limit = Bank: D @ 225 steps — Lower bank/steps of A and C

Completed By: _____ Date/Time: _____

Independently Verified By: _____ Date/Time: _____

Approved By SM: _____ Date/Time _____

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 SRO-ADMIN #3 - L0082J Rev. 05 Modified

VERIFY RCS STEADY STATE LEAK RATE CALCULATION

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: SRO

0020200201 Verify RC Steady Leak Rate Calculation

2.0 Conditions:

A. The plant is in Mode 1, 100% steady state power.
B. Your shift started the manual RCS leak rate 72-hour surveillance at 0030 with the computer out of service.
C. Chemistry reports that there is no SG tube leakage.

3.0 Standards:

Calculate the manual steady state leak rate.
Time for completion is 30 minutes.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of OX1401.02, RCS Steady State Leak Rate Calculation
Attached RCS Leak Rate Data sheet (JPM tear-off sheet).
Calculator

5.0 Limitations On Performance:

Simulate/Perform all steps.

6.0 References:

Procedures:

- OX1401.02, RCS Steady State Leak Rate Calculation

Technical Specifications:

- 4.4.6.2.1.b, RCS Operational Leakage
- 4.4.6.2.1.d, RCS Operational Leakage

Sys	KA	Description	Value RO/SRO
002	K4.05	Detection of RCS leakage.	3.8/4.2
002	A3.01	Reactor coolant leak detection system.	3.7/3.9

7.0 Setting:

Simulator or classroom.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

30 minutes

10.0 Directions To The Student(s):

Initial Conditions:

1. The plant is in Mode 1 at 100% steady state power.
2. Your shift started the manual RCS leak rate 72-hour surveillance at 0030 with the computer out of service.
3. The following data has been collected:

"Start" Data @0030:		"Finish" Data @0630:	
Tavg	587.6 °F	Tavg	588.7 °F
PRZ Level	60 %	PRZ Level	61.5 %
VCT Level	50 %	VCT Level	47 %
INTEGRATED MAKEUP	15 gal	INTEGRATED MAKEUP	176 gal
PRT Level	60 %	PRT Level	60 %
RCDT Level	46 %	RCDT Level	48 %

11.0 Initiating Cue:

The time is 0630.

Verify the completed manual steady state leak rate calculation using OX1401.02 and the collected data.

There are no sampling losses, accumulator leaks, Steam Generator tube leakage, or leakage from any other known sources.

Report the results to me when you are through.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT UNSAT	INITIALS/DATE

NOTE: 1. The completed Manual RCS Leak Rate worksheet OX1401.02 Form B can be used to show satisfactory completion of the JPM.
2. The evaluator will act as the US to complete communications with the candidate.

1. P Start time _____ Initiating cue read.

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: Student should obtain a copy of OX1401.02 and begin at step 4.2.3. Main plant computer is not available.

2. P Verify that prerequisites are complete — Reviews prerequisites and verifies all requirements are complete

CUE: If the student inquires about chemistry notification, provide the cue, **"All prerequisites of section 2 were met at 0030 this morning."**

*3. P b. CALCULATE and RECORD data as shown on Form B: — b. Records and calculates required data on FORM B of OX1401.02 as follows:

NOTE: Actual difference in time is 360 minutes, but 300 minutes was recorded in error. Student should identify error and correct as necessary.

- TIME — • Time (+360 mins). _____ _____ _____
- T_{AVG} — • T_{avg} (+92.4 gals). _____ _____ _____

NOTE: Actual Pzr level change is positive, but an error has been made so that the "start" data and "finish" data have been transposed. Student should identify error and correct as necessary.

- PZR LEVEL — • PZR Lvl (+92 gals). _____ _____ _____

NOTE: Actual VCT level change is negative, but an error carries this number forward as a positive. Student should identify given increase in volume is incorrect.

- VCT LEVEL — • VCT Lvl (given as 93.42 gals, actual level used in calculation as (-)93.42 gals.). _____ _____ _____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
NOTE:	Actual make up should be 176 gallons MINUS 15 gallons. Given change is expressed as 176 gallons PLUS 15 gallons. Student should identify this as an error.					
		• BAB TOTAL	• BAB Total (+25 gals).	_____	_____	_____
		• PRT LEVEL	• PRT Lvl (+0 gals).	_____	_____	_____
		• RCDT LEVEL	• RCDT Lvl (+7.0 gals).	_____	_____	_____
NOTE:	IAW Note 1 of Form B, SG tube leakage should be included in the next section					
*4.	P	OBTAIN THIS DATA FROM ANY KNOWN SOURCE AND RECORD GALLONS.	Records S/G tube leakage 0.0 gals).	_____	_____	_____
*5.	P	Calculate IDENTIFIED LEAKAGE	Determines **identified** leakage within ± 10% of answer key.	_____	_____	_____
*6.	P	Calculate UNIDENTIFIED LEAKAGE	Determines **unidentified** leakage within ± 10% of answer key.	_____	_____	_____
*7.		Determine if RCS leak rate results are SAT.	Determines RCS Leak Rate results SAT.	_____	_____	_____
CUE:	**"The JPM is complete."**					
13.		Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 30 minutes.			
14.		Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
SRO ADMIN #3

Initial Conditions:

1. The plant is in Mode 1 at 100% steady state power.
2. Your shift started the manual RCS leak rate 72-hour surveillance at 0030 with the computer out of service.
3. The following information has been collected:

"Start" Data @0030:		"Finish" Data @0630:	
Tavg	587.6 F	Tavg	588.7 F
PRZ Level	60 %	PRZ Level	61.5 %
VCT Level	50 %	VCT Level	47 %
INTEGRATED MAKEUP	15 gal	INTEGRATED MAKEUP	176 gal
PRT Level	60 %	PRT Level	60 %
RCDT Level	46 %	RCDT Level	48 %

Initiating Cue:

The time is 0630.

Verify the completed manual steady state leak rate calculation using OX1401.02 and the collected data.

There are no sampling losses, accumulator leaks, Steam Generator tube leakage, or leakage from any other known sources.

Report the results to me when you are through.

SRO-Admin #3

Form B: PM Number 1-LEAK-OT002-000
Test Data Sheet
(Sheet 2 of 4)

MANUAL RCS LEAK RATE						
PARAMETER	INSTRUMENT USED	FINISH	START	CHANGE FINISH-START	CONVERSION	GALLONS OR MINUTES
TIME	MCB CLOCK	0630	0030	6 hrs	60 min/hr	300 min (1)
OBTAIN DATA FROM THE MAIN CONTROL BOARD AND CP-38A						
TAVG	DIGITAL	588.7 °F	587.6 °F	1.1 °F	83.96 gal/°F (Note 2)	92.4 gal (2)
PZR LEVEL	(Note 4)	60 %	61.5 %	-1.5 %	61.31 gal/% (Note 2)	-92 gal (3)
VCT LEVEL	LI-185	47 %	50 %	3 %	31.14 gal/%	93.4 gal (4)
INTEGRATED MAKEUP	CS-FIQ-111 (Note 5)	176 gal	15 gal	191 gal	N/A	191 gal (5)
PRT LEVEL	LI-470	8150 gal (Note 3)	8150 gal (Note 3)	0 gal	N/A	0 gal (6)
RCDT LEVEL	LI-1403 (at CP-38A)	167 gal (Note 3)	160 gal (Note 3)	7 gal	N/A	7 gal (7)
OBTAIN THIS DATA FROM ANY KNOWN SOURCE AND RECORD GALLONS (Note 1)						
						gal (8)
						gal (8)

IDENTIFIED LEAKAGE

$$\frac{(\overset{8}{0}) + (\overset{7}{7}) + (\overset{6}{0})}{\frac{(300)}{1}} = (0.02) \text{ gpm}^{(9)}$$

Identified Leakage Acceptance Criteria ≤ 10 gpm

UNIDENTIFIED LEAKAGE

$$\frac{(\overset{5}{191}) + (\overset{2}{92.4}) - (\overset{3}{-92}) - (\overset{4}{93.4})}{\frac{(300)}{1}} - (\overset{9}{0.94}) \text{ gpm} = 0.92 \text{ gpm}$$

Unidentified Leakage Acceptance Criteria ≤ 1 gpm

Note 1: This is for sampling losses, accumulator leaks, steam generator tube leakage, etc.
Note 2: These conversion factors are only valid for normal operating temperature and pressure. If the plant is stable at a reduced pressure and temp and the computer is **not** available, use the conversion factors from Figure 2.
Note 3: Obtain tank volume from the Primary Technical Data Book and record gallons for calculation. Do **not** use % due to nonlinearity of the tank volume.
Note 4: Record the instrument number and use the same hot calibrated level indicator for both start and finish.
Note 5: Any RWST, BWST, or SF Pool makeups must be subtracted from the integrated makeup total.

Calculations checked by: Larry Walsh

SRO ADMIN 3 KLY

Form B: PM Number 1-LEAK-OT002-000
Test Data Sheet
(Sheet 2 of 4)

MANUAL RCS LEAK RATE						
PARAMETER	INSTRUMENT USED	FINISH	START	CHANGE FINISH-START	CONVERSION	GALLONS OR MINUTES
TIME	MCB CLOCK	0630	0830	6hr	60 min/hr	+360 min (1)
OBTAIN DATA FROM THE MAIN CONTROL BOARD AND CP-38A						
TAVG	DIGITAL	588.7 °F	587.6 °F	+1.1 °F	83.96 gal/°F (Note 2)	+92.4 gal (2)
PZR LEVEL	(Note 4)	61.5 %	60 %	+1.5 %	61.31 gal/% (Note 2)	+92 gal (3)
VCT LEVEL	LI-185	47 %	50 %	-3 %	31.14 gal/%	-93.4 gal (4)
INTEGRATED MAKEUP	CS-FIQ-111 (Note 5)	176 gal	15 gal	161 gal	N/A	+161 gal (5)
PRT LEVEL	LI-470	8150 gal (Note 3)	8150 gal (Note 3)	0 gal	N/A	0 gal (6)
RCDT LEVEL	LI-1403 (at CP-38A)	167 gal (Note 3)	160 gal (Note 3)	7 gal	N/A	7 gal (7)
OBTAIN THIS DATA FROM ANY KNOWN SOURCE AND RECORD GALLONS (Note 1)						
					0	gal (8)
					0	gal (8)

IDENTIFIED LEAKAGE

$$\frac{(8\ 0) + (7\ 7.0) + (6\ 0)}{(360)\ 1} = (+0.02)\ \text{gpm}^{(9)}$$

Identified Leakage Acceptance Criteria ≤ 10 gpm

UNIDENTIFIED LEAKAGE

0.61 to 0.75

$$\frac{(5\ 161) + (2\ +92.4) - (3\ +92) - (4\ -93.4)}{(360)\ 1} - (9\ +0.02)\ \text{gpm} = 0.68\ \text{gpm}$$

Unidentified Leakage Acceptance Criteria ≤ 1 gpm

Note 1: This is for sampling losses, accumulator leaks, steam generator tube leakage, etc.
Note 2: These conversion factors are only valid for normal operating temperature and pressure. If the plant is stable at a reduced pressure and temp and the computer is **not** available, use the conversion factors from Figure 2.
Note 3: Obtain tank volume from the Primary Technical Data Book and record gallons for calculation. Do **not** use % due to nonlinearity of the tank volume.
Note 4: Record the instrument number and use the same hot calibrated level indicator for both start and finish.
Note 5: Any RWST, BWST, or SF Pool makeups must be subtracted from the integrated makeup total.

Calculations checked by: _____

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 SRO-ADMIN#4

EMERGENCY DOSE LIMIT EXTENSION

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date On File DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: SRO

SBK 1190402303 Direct Emergency Response as Short Term Emergency Director.

2.0 Conditions:

1) The plant has suffered a LOP due to a Winter Storm.
2) Emergency Diesel Generator "A" and "B" failed to start.
3) Bus 6 has been energized using the SEPS Diesels.
4) The seal of the "D" Reactor Coolant pump has failed completely causing a LOCA in containment.
5) The core has uncovered.
6) COP Valves COP-V-3 and COP-V-4 have lost indication.
7) Local Airborne radiation readings in the PAB are elevated.
8) A General Emergency has been declared on EAL: AG1; Actual or projected offsite dose > 1,000 mRem TEDE or 5,000 mRem Thyroid CDE.
9) The TSC is dispatching a team to the PAB Mechanical Penetration Area to determine if COP-V-4 can be closed.
10) Radiation readings taken at the doorway to the Mechanical Penetration Area are 2 REM/Hr. Dose at COP-V-4 is conservatively estimated at 15 REM/Hr
11) The OSC conservatively estimates 1.5 hours to assess any damage to the valve and make repairs.

3.0 Standards:

Authorize an Emergency Dose Limit Extension per ER 4.3, Radiation Protection During Emergency Conditions.

4.0 Student Materials:

Copy of the Directions Tear-Off Sheet
Calculator
ER 4.3, Radiation Protection During Emergency Conditions

5.0 Limitations on performance:

Even if requested no Peer Checks will be provided during the JPM.

6.0 References:

Procedures
ER 4.3, Radiation Protection During Emergency Conditions.

Sys	KA	Description	Value RO/SRO
103	K1.02	Containment Isolation/Containment integrity	3.9/4.1
Generic	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions	3.2/3.7

7.0 Setting:

Classroom

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

20 minutes

10.0 Directions to the Student(s):

Initial Conditions:

1) The plant has suffered a LOP due to a Winter Storm.
2) Emergency Diesel Generator "A" and "B" failed to start.
3) Bus 6 has been energized using the SEPS Diesels.
4) The seal of the "D" Reactor Coolant pump has failed completely causing a LOCA in containment.
5) The core has uncovered.
6) COP Valves COP-V-3 and COP-V-4 have lost indication.
7) Local Airborne radiation readings in the PAB are elevated.
8) A General Emergency has been declared on EAL: AG1; Actual or projected offsite dose > 1,000 mRem TEDE or 5,000 mRem Thyroid CDE.
9) The TSC is dispatching a team to the PAB Mechanical Penetration Area to determine if COP-V-4 can be closed.
10) Radiation readings taken at the doorway to the Mechanical Penetration Area are 2 REM/Hr. Dose at COP-V-4 is conservatively estimated at 15 REM/Hr
11) The OSC conservatively estimates 1.5 hours to assess any damage to the valve and make repairs.

11.0 Initiating Cue:

Emergency Dose Limit Extensions have been requested for a three person team to enter the Mechanical Penetration Area to attempt closing COP-V-4.

Review the Emergency Dose limit Extensions and provide approval if appropriate.

Provide the completed Forms to me.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP *denotes a critical step		STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
1.	P	Start time _____		Initiating cue read.			

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: Provide the student with the 3 completed Emergency Dose Limit Extension sheets and a copy ER 4.3, Radiation Protection During Emergency Conditions. Students will evaluate and authorize the completed dose extensions.

NOTE: JPM task is approval of a task that is administrative in nature. Student may perform steps in any order, provided that critical tasks are all accomplished.

2	P	ER 4.3, step 5.1.2, 2a: Verifies dose extension for all workers exceeds 4500 mrem/yr (minimum level requiring STED approval)	a	Dose extension for NSO 24000 mrem	_____	_____	_____
			b	Dose extension for Maintenance Mechanic 24000 mrem	_____	_____	_____
			c	Dose extension for HP Technician 24000 mrem	_____	_____	_____
3	P	ER 4.3, Step 5.1.2, 2b, and Figure 2 Verifies dose extension is 25 rem or less for "Protection of large Populations" category	a	Dose extension for NSO 24000 mrem	_____	_____	_____
			b	Dose extension for Maintenance Mechanic 24000 mrem	_____	_____	_____
			c	Dose extension for HP Technician 24000 mrem	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard		EVALUATION SAT	EVALUATION UNSAT	INITIALS/DATE
4	P	ER 4.3, Step 5.1.2, 2c, and Figure 3 Verifies dose extension is up to 25 rem only for Volunteers fully aware of risks for "Protection of large Populations" category, and signified by employee signature on figure 4.	a	NSO has signed figure 4.	_____	_____	_____
			b	Maintenance Mechanic has signed figure 4.	_____	_____	_____
			c	HP Technician has signed figure 4.	_____	_____	_____
5	P	Authorizes Dose Extensions	*a	Dose extensions signed.	_____	_____	_____

CUE: "The JPM is complete."

6.	Stop time_____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.	
7	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM		_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 SRO-ADMIN #4

Initial Conditions:

1) The plant has suffered a LOP due to a Winter Storm.
2) Emergency Diesel Generator "A" and "B" failed to start.
3) Bus 6 has been energized using the SEPS Diesels.
4) The seal of the "D" Reactor Coolant pump has failed completely causing a LOCA in containment.
5) The core has uncovered.
6) COP Valves COP-V-3 and COP-V-4 have lost indication.
7) Local Airborne radiation readings in the PAB are elevated.
8) A General Emergency has been declared on EAL: AG1; Actual or projected offsite dose > 1,000 mRem TEDE or 5,000 mRem Thyroid CDE.
9) The TSC is dispatching a team to the PAB Mechanical Penetration Area to determine if COP-V-4 can be closed.
10) Radiation readings taken at the doorway to the Mechanical Penetration Area are 2 REM/Hr. Dose at COP-V-4 is conservatively estimated at 15 REM/Hr
11) The OSC conservatively estimates 1.5 hours to assess any damage to the valve and make repairs.

Initiating Cue:

Emergency Dose Limit Extensions have been requested for a three person team to enter the Mechanical Penetration Area to attempt closing COP-V-4.

Review the Emergency Dose limit Extensions and provide approval if appropriate.

Provide the completed Forms to me.

Figure 4
Emergency Dose Limit Extension

1) Name Nuclear Systems Operator Age 48 2) Badge Number 0003

3) Reason for Dose Extension Request (Be specific):
Closure of CBP-V-4 to prevent release to public from failed containment Boundary valve

I understand the consequences of the proposed exposure: (See Note 1)

Employee's Signature

Note 1: The signature of the employee may be authorized by verbal reply.

RADIATION PROTECTION USE

4) Current TEDE: YTD - 103 mrem.

5) Individual dose estimate for required work: 22,500 mrem.

6) Emergency Dose Limit Requested: 24,000 mrem.

SHORT TERM EMERGENCY DIRECTOR/SITE EMERGENCY DIRECTOR

A. Individual Extension

I authorize the above-named individual an emergency dose extension not to exceed 24,000 mrem.

This extension is necessary to perform emergency functions for plant/personnel safety, and is valid only for the task specified above.

Short Term Emergency Director/Site Emergency Director

B. Blanket Extension

All emergency center personnel are authorized a blanket extension, not to exceed _____ mrem.

Short Term Emergency Director/Site Emergency Director

Figure 4
Emergency Dose Limit Extension

1) Name Maintenance Mechanic Age 51 2) Badge Number 0002

3) Reason for Dose Extension Request (Be specific):
Closure of COP-V4 to prevent release to public from Failed Containment Boundary valve

I understand the consequences of the proposed exposure: (See Note 1)

Maintenance Mechanic
Employee's Signature

Note 1: The signature of the employee may be authorized by verbal reply.

RADIATION PROTECTION USE

4) Current TEDE: YTD - 250 mrem.

5) Individual dose estimate for required work: 22500 mrem.

6) Emergency Dose Limit Requested: 24000 mrem.

SHORT TERM EMERGENCY DIRECTOR/SITE EMERGENCY DIRECTOR

A. Individual Extension

I authorize the above-named individual an emergency dose extension not to exceed 24000 mrem.

This extension is necessary to perform emergency functions for plant/personnel safety, and is valid only for the task specified above.

Short Term Emergency Director/Site Emergency Director

B. Blanket Extension

All emergency center personnel are authorized a blanket extension, not to exceed _____ mrem.

Short Term Emergency Director/Site Emergency Director

Figure 4
Emergency Dose Limit Extension

1) Name H.P. Technician Age 38 2) Badge Number 0001

3) Reason for Dose Extension Request (Be specific):
Support closure of COP-V14 to prevent release to public from failed Containment Boundary valve

I understand the consequences of the proposed exposure: (See Note 1)

Employee's Signature

Note 1: The signature of the employee may be authorized by verbal reply.

RADIATION PROTECTION USE

4) Current TEDE: YTD - 870 mrem.

5) Individual dose estimate for required work: 22,500 mrem.

6) Emergency Dose Limit Requested: 24,000 mrem.

SHORT TERM EMERGENCY DIRECTOR/SITE EMERGENCY DIRECTOR

A. Individual Extension

I authorize the above-named individual an emergency dose extension not to exceed 24000 mrem.

This extension is necessary to perform emergency functions for plant/personnel safety, and is valid only for the task specified above.

Short Term Emergency Director/Site Emergency Director

B. Blanket Extension

All emergency center personnel are authorized a blanket extension, not to exceed _____ mrem.

Short Term Emergency Director/Site Emergency Director

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 SRO-ADMIN #5 New

(GE PARS) E-PLAN ACTIONS

Student Name: _____ Badge #: _____

Evaluator Name: _____ Badge #: _____

Student Signature: _____ Date: _____
(optional)

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: _____ DATE: _____
TRAINING SUPERVISOR

1.0 Task Number and Description:

Position: SS

3450504203 Classify/reclassify an emergency condition

2.0 Conditions:

1. The plant has tripped from 100% power due to a LOP today at 1300.
2. US has transitioned from E-0 to ECA-0.0.
3. No Emergency Diesel Generator or SEPS Diesel is available.
4. The Event has been classified as a General Emergency based on EAL SG1, Prolonged Loss of Both AC emergency buses. Restoration of either emergency bus is not expected within 4 hours.
5. The time of E-plan declaration was 1323.
6. A release has NOT occurred.
7. Schiller Station has NOT been activated.
8. The States have been notified.
9. There is a 10 MPH wind
10. LOWER wind direction is coming FROM 285 degrees.
11. UPPER wind direction is coming FROM 305 degrees.
12. The appropriate PAR GROUP A has been recommended to the States.
13. At 1355 the Shift Manager is re-assessing plant conditions in accordance with ER 1.2D, General Emergency Checklist – STED, Step 9, Follow-Up PAR ASSESSMENT.
14. Critical Safety Functions have been verified. CSF status indicates:
    1. RED path on (H) recommendation FR-H1.
    2. ORANGE path on (C) recommendation FR-C.2
    3. RED path on (Z) recommendation FR-Z.1.
    4. YELLOW path on (I) recommendation FR-1.2.

3.0 Standards:

Determine Protective Action Recommendations (PAR)

4.0 Student Materials:

Copy of completed ER 2.OB State Notification Fact Sheet.
ER 1.1 and 1.2 E-Plan packages
Copy of the Tear-Off Sheet

5.0 Limitations on performance:

Simulate/Perform all steps.

6.0 References:

Procedures

ER 1.1, Classification of Emergencies.
ER 1.2 Emergency Plan Activation

Sys-Mode	KA	Description	Value RO/SRO
194001	A1.16	Ability to take actions...E-Plan as E Coordinator	3.1-4.4

7.0 Setting:

Classroom.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

15 minutes

10.0 Directions to the Student:

Initial Conditions:

1. The plant has tripped from 100% power due to a LOP today at 1300.
2. US has transitioned from E-0 to ECA-0.0.
3. No Emergency Diesel Generator or SEPS Diesel is available.
4. The Event has been classified as a General Emergency based on EAL SG1, Prolonged Loss of Both AC emergency buses. Restoration of either emergency bus is not expected within 4 hours.
5. The time of E-plan declaration was 1323.
6. A release has NOT occurred.
7. Schiller Station has NOT been activated.
8. The States have been notified.
9. There is a 10 MPH wind
10. LOWER Wind Direction is coming FROM 285 degrees.
11. UPPER Wind Direction is coming FROM 305 degrees.
12. The appropriate PAR GROUP A has been recommended to the States.
13. At 1355 the Shift Manager is re-assessing plant conditions in accordance with ER 1.2D, General Emergency Checklist – STED, Step 9, Follow-Up PAR ASSESSMENT.

14. Critical Safety Functions have been verified. CSF status indicates:

    a. RED path on (H) recommendation FR-H1.
    b. ORANGE path on (C) recommendation FR-C.2
    c. RED path on (Z) recommendation FR-Z.1.
    d. YELLOW path on (I) recommendation FR-1.2.

11.0 Initiating Cue:

Evaluate current plant conditions to determine if upgraded PARs are warranted.

If an upgrade is required then fill out a new ER 2.0B, State Notification Fact Sheet.

This is a TIME CRITICAL task.

- **Inform me when you are ready to make a PAR recommendation.**
- **Inform me when you are ready to make a Notification.**

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT UNSAT	INITIALS/DATE

NOTE: There are TWO time critical aspects to this JPM:

1. A new PAR recommendation is required within 15 minutes of starting the JPM.
2. The state notification must be ready within 15 minutes of making the new PAR recommendation.

Two start/stop fields are provided below to record candidate performance.

1.	P	Initiating cue is read. JPM Start Time: _____			
		New PAR Recommendation completed: End Time _____	* Less than 15 minutes.	____ ____	_____
		New PAR Recommendation completed: Start Time _____			
		New State Notification Fact Sheet completed: End Time _____	* Less than 15 minutes.	____ ____	_____

Step 9 of "General Emergency Checklist – Short Term Emergency Director"

P	Using Form ER 1.2G, General Emergency PAR Worksheet, determine if upgraded protective action recommendations are warranted.	a. Student transitions to ER 1.2G	____ ____	_____

ER 1.2G, "General Emergency PAR Worksheet".

P	Block 1: GENERAL EMERGENCY	b. Student recognizes plant is in a GENERAL EMERGENCY.	____ ____	_____
P	Block 2: "IS THE CORE COOLING CSFST PROCEEDING ALONG A RED PATH?	c. Student recognizes that NO, Core Cooling CSFST is ORANGE.	____ ____	_____
P	Block 3: IS THE CONTAINMENT CSFST PROCEEDING ALONG A RED PATH?	d Student recognizes that YES, Containment CSFST is RED.	____ ____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
P*	Transitions to "PAR GROUP B GO TO PAGE 2 OF THIS FORM.	e* IDENTIFIES transition to PAR 'B' and Continues on next page.	____	____	_____
	1. IF a release is in progress from the plant vent then enter upper wind direction.	f. No release is in progress, student proceeds to step 2.	____	____	_____
	2. IF a release is NOT in progress from the plant vent then enter lower wind direction.	g. Student enters 285 degrees.	____	____	_____
	3. Identify appropriate PAR GROUP B column based on wind direction to determine the towns to be evacuated and sheltered	h*. IDENTIFIES last column (259 degrees to 302.9 degrees).	____	____	_____
	4. Check off "Implement KI plans for the General Public" on form ER 2.0B, Block 4.	i.* Checks of "Implement KI plan" block	____	____	_____
	5. Return to form ER 1.2D, Step 7(e)		____	____	_____
CUE:	Makes out a new ER2.OB.				
		1 Block 1 Name & Date.	____	____	_____
		2*. Block 2 time declared (Same as before 1323).			
		3*. Block 3 Initiating Condition is SG1.	____	____	_____
		4* Block 4 CHECKS OFF towns status on Form ER2.OB: 1. Evacuates: Seabrook, H. Falls, Amesbury, Salisbury, Kensington, South Hampton, N. Hampton and Hampton.	____	____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
		2. Shelters: All the other towns.	____	____	_____
		3. Evacuates: New Hampshire beaches.	____	____	_____
		4. Closes Massachusetts beaches and Parker River National Wildlife Refuge.	____	____	_____
		5. Potassium Iodide: "Implement KI plans for the General Public.	____	____	_____
		5*. Block 5 Rad release has not occurred.	____	____	_____

CUE: <WRGM not in alarm, MSL monitor not in alarm, and Site boundary WB dose has not been done>

		6*. Block 6. Authorized by Name/STD/Date/Time.	____	____	_____

CUE: "The JPM is complete."

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 SRO-ADMIN #5

Initial Conditions:

1. The plant has tripped from 100% power due to a LOP today at 1300.
2. US has transitioned from E-0 to ECA-0.0.
3. No Emergency Diesel Generator or SEPS Diesel is available.
4. The Event has been classified as a General Emergency based on EAL SG1, Prolonged Loss of Both AC emergency buses. Restoration of either emergency bus is not expected within 4 hours.
5. The time of E-plan declaration was 1323.
6. A release has NOT occurred.
7. Schiller Station has NOT been activated.
8. The States have been notified.
9. There is a 10 MPH wind
10. LOWER Wind Direction is coming FROM 285 degrees.
11. UPPER Wind Direction is coming FROM 305 degrees.
12. The appropriate PAR GROUP A has been recommended to the States.
13. At 1355 the Shift Manager is re-assessing plant conditions in accordance with ER 1.2D, General Emergency Checklist – STED, Step 9, Follow-Up PAR ASSESSMENT.
14. Critical Safety Functions have been verified. CSF status indicates:
    e. RED path on (H) recommendation FR-H1.
    f. ORANGE path on (C) recommendation FR-C.2
    g. RED path on (Z) recommendation FR-Z.1.
    h. YELLOW path on (I) recommendation FR-1.2.

TEAR-OFF SHEET FOR JPM
2009 SRO-ADMIN #5

Initiating Cue:

Evaluate current plant conditions to determine if upgraded PARs are warranted.

If an upgrade is required then fill out a new ER 2.0B, State Notification Fact Sheet.

This is a TIME CRITICAL task.

- **Inform me when you are ready to make a PAR recommendation.**
- **Inform me when you are ready to make a Notification.**

SRO ADMIN #5 Key

GENERAL EMERGENCY PAR WORKSHEET
(Continued)

For a PAR Group B selection, use the following instructions and table to determine Protective Action Recommendations.

1. If a release is in progress from the plant vent, enter the current upper wind direction - FROM ____/____ degrees. No release

2. If a release from the plant vent is NOT in progress, enter the current lower wind direction – FROM 285 degrees.

2. Identify the appropriate PAR GROUP B column based on the above wind direction to determine the towns to be evacuated and sheltered.

3. Check off the evacuated and sheltered towns and evacuated and closed beaches on form ER 2.0B, Block 4.

		PAR GROUP B (Evacuate 5 Mile Radius and 10 Miles Downwind-Shelter All Others)					
		WIND DIRECTION FROM (Degrees)					
ERPA	TOWN	303-33.9	34-100.9	101-122.9	123-191.4	191.5-258.9	259-302.9
A	Seabrook	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate
	Hampton Falls	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate
B	Amesbury	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate
	Salisbury	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate
C	Kensington	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate
	South Hampton	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate
D	Hampton	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate
	North Hampton	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate
E	Merrimac	Evacuate	Evacuate	Shelter	Shelter	Shelter	Shelter
	Newburyport	Evacuate	Evacuate	Shelter	Shelter	Shelter	Shelter
	Newbury	Evacuate	Evacuate	Shelter	Shelter	Shelter	Shelter
	West Newbury	Evacuate	Evacuate	Shelter	Shelter	Shelter	Shelter
F	Brentwood	Shelter	Evacuate	Evacuate	Evacuate	Shelter	Shelter
	East Kingston	Shelter	Evacuate	Evacuate	Evacuate	Shelter	Shelter
	Exeter	Shelter	Evacuate	Evacuate	Evacuate	Shelter	Shelter
	Newfields	Shelter	Evacuate	Evacuate	Evacuate	Shelter	Shelter
	Newton	Shelter	Evacuate	Evacuate	Evacuate	Shelter	Shelter
	Kingston	Shelter	Evacuate	Evacuate	Evacuate	Shelter	Shelter
G	Greenland	Shelter	Shelter	Shelter	Evacuate	Evacuate	Shelter
	Stratham	Shelter	Shelter	Shelter	Evacuate	Evacuate	Shelter
	Rye	Shelter	Shelter	Shelter	Evacuate	Evacuate	Shelter
	New Castle	Shelter	Shelter	Shelter	Evacuate	Evacuate	Shelter
	Portsmouth	Shelter	Shelter	Shelter	Evacuate	Evacuate	Shelter
New Hampshire Beaches		Evacuate	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate
Massachusetts Beaches		Close	Close	Close	Close	Close	Close

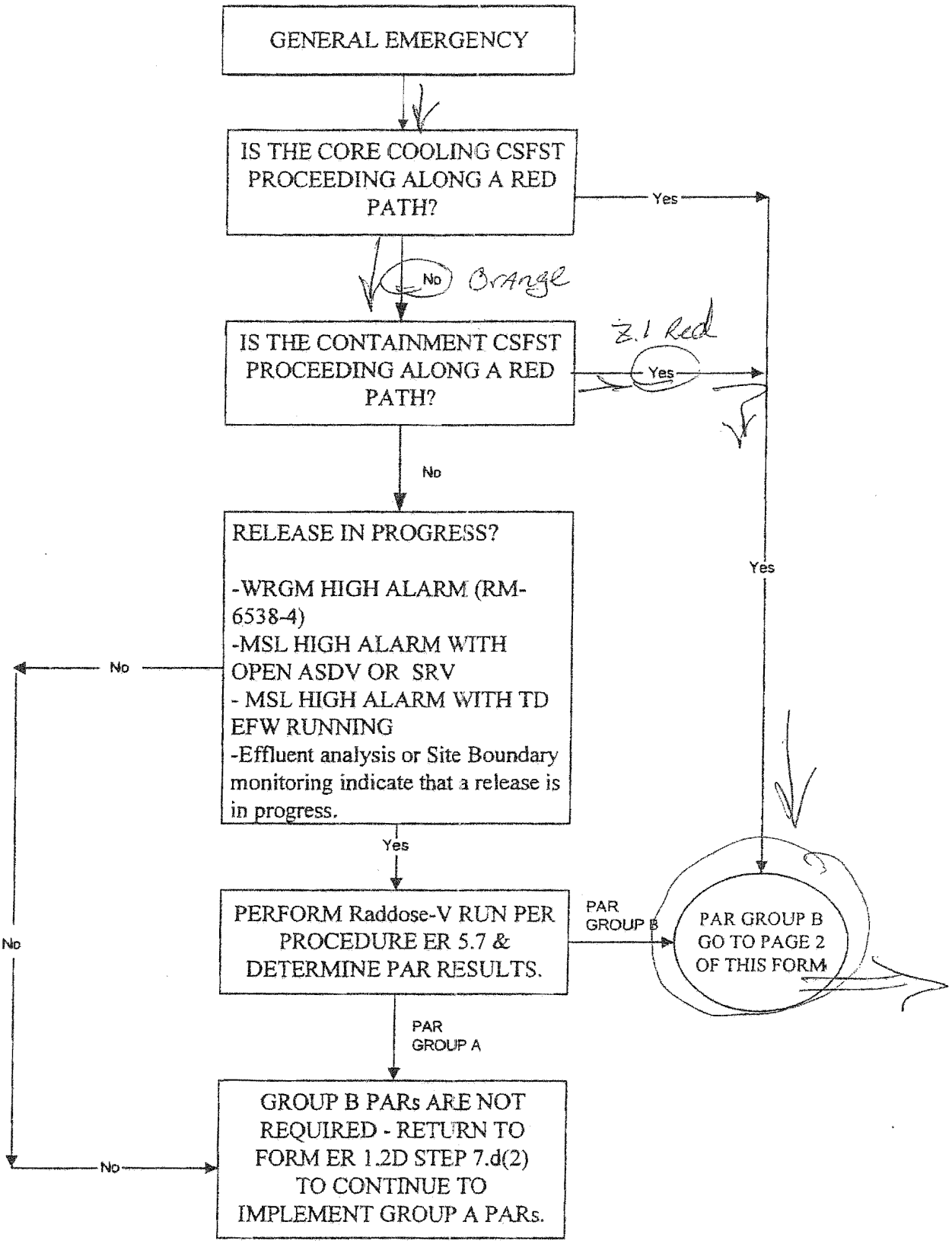
4. Check off "Implement KI plans for the general public" on form ER 2.0B, Block 4.

5. Return to form ER 1.2D, Step 7(e).

Key

Key SRO-ADMIN #5

GENERAL EMERGENCY PAR WORKSHEET



Key

SRO AOMN #5 Key

Seabrook Station State Notification Fact Sheet

Time Notification Initiated:

NH
MA

Block 1: This is : Student Name - title at Seabrook Station.
Name Title

Block 2: We have declared / terminated a(n): (circle one)
Time Declared 1323
Time Terminated _____

[ ] Unusual Event
[ ] Alert
[ ] Site Area Emergency
[✓] General Emergency

Block 3: The emergency initiating condition is SG2.

Block 4: We recommend the following protective actions:

[ ] None [✓] As follows

New Hampshire

ERPA	Town	Shelter	Evacuate
A.	Seabrook	[ ]	[✓]
	Hampton Falls	[ ]	[✓]
C.	Kensington	[ ]	[✓]
	S. Hampton	[ ]	[✓]
D.	Hampton	[ ]	[✓]
	N. Hampton	[ ]	[✓]
F.	Brentwood	[✓]	[ ]
	E. Kingston	[✓]	[ ]
	Exeter	[✓]	[ ]
	Newfields	[✓]	[ ]
	Newton	[✓]	[ ]
	Kingston	[✓]	[ ]
G.	Greenland	[✓]	[ ]
	Stratham	[✓]	[ ]
	Rye	[✓]	[ ]
	New Castle	[✓]	[ ]
	Portsmouth	[✓]	[ ]

Massachusetts

ERPA	Town	Shelter	Evacuate
B.	Amesbury	[ ]	[✓]
	Salisbury	[ ]	[✓]
E.	Merrimac	[✓]	[ ]
	Newburyport	[✓]	[ ]
	Newbury	[✓]	[ ]
	West Newbury	[✓]	[ ]

Beaches

Evacuate
[✓] Seabrook Beach
[✓] Hampton Beach

Close
[✓] Parker River National Wildlife Refuge
[✓] Plum Island Beach
[✓] Salisbury Beach

Potassium Iodide (General Emergency only)
[✓] Implement KI plans for the general public

Block 5: A radiological release
[✓] Has not occurred
[ ] Has occurred and is continuing
[ ] Occurred but has been terminated

Block 6: Authorized by: _____ _____
STED/SED/RM Date/Time

Block 7: Acknowledge receipt of this message with your name.

New Hampshire: _____ _____
Name of Dispatcher Date/Time

Massachusetts: _____ _____
Name of Dispatcher Date/Time

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 RO-ADMIN#1

QPTR CALCULATION

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date On File DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: RO

0150200501 Perform A Manual QPTR Calculation

2.0 Conditions:

A Plant is now at 100% power after recovering from a dropped rod at EOL.
B. The main plant computer has been inoperable since yesterday (It was inoperable when the rod dropped).
C. The seven day QPTR surveillance is scheduled to be done this shift.
D. Incore/Excore calibration was performed yesterday (before the rod dropped).

3.0 Standards:

Perform the manual QPTR surveillance per RX1703, QPTR Surveillance.

4.0 Student Materials:

Copy of the Directions Tear-Off Sheet
Calculator
RX1703, QPTR Surveillance, Rev. 7, Chg. 2.

5.0 Limitations on performance:

Simulate/Perform all steps.

6.0 References:

Procedures

RX1703, QPTR Surveillance.
OS1000.05, Power Increase.
ON1251.01, Loss Of Plant Computer.

Sys	KA	Description	Value RO/SRO
015	A1.04	Ability to monitor changes in QPTR.	3.5/3.7
015	K5.12	Knowledge of QPTR.	3.2/3.6
015	K5.16	Definition and calculation of QPTR.	2.9/3.4

7.0 Setting:

Classroom

1. Give the student a copy of 100% power NI cabinet values.
2. Examiner must prepare a completed RX1703A in advance. It shall reflect the JPM values for NI cabinet detector currents and the RE-17 100% power, 0% AFD values.
3. Use values listed in RE-17.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

20 minutes

10.0 Directions to the Student(s):

Initial Conditions:

1. Plant is now at 100% power following the recovery of a dropped rod at EOL.
2. The main plant computer has been inoperable since yesterday.
3. The QPTR surveillance is scheduled to be done this shift.
4. Incore/Excore calibration was performed yesterday (before the rod dropped).
5. Detector current readings have been taken by the Control Board Monitor.
6. The time is 0800, today's date.

	TOP (A) DETECTORS			
	N41	N42	N43	N44
Detector Current micoamps	179	182	186	179
	BOTTOM (B) DETECTORS			
	N41	N42	N43	N44
Detector Current micoamps	177	199	191	183

11.0 Initiating Cue:

Perform the QPTR Surveillance per RX1703. Step 4.1.1 is complete. The QPTR alarm surveillance work order has been generated. Start at step 4.1.2.

All independent verifications of calculations will be performed after you are completed. Provide your results to me.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
1.	P	Start time _____	Initiating cue read.			

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: For performance of JPM in classroom setting the student is provided with a copy of RX1703, Quadrant Power Tilt Ratio Surveillance from the JPM. Student should refer to section 4.1 Surveillance With QPTR Alarm Inoperable.

2	P	RECORD the Figure RE-17 revision and the date and time the operable power range currents were taken.	Records today's date and the revision number of the RE-17 curve used	_____	_____	_____

NOTE: Detector current data for upper & lower detectors are provided. Detector Current value units are microamps. Student should be able to determine that all Power Range Detectors are operable when given the detector current data.

3.	P	RECORD the current output from the top (A) and bottom (B) detector of each channel on Form A, Quadrant Power Tilt Calculation Sheet Row 1.	Records detector outputs.			
			N41 top (A) detector	_____	_____	_____
			N42 top (A) detector	_____	_____	_____
			N43 top (A) detector	_____	_____	_____
			N44 top (A) detector	_____	_____	_____
			N41 bottom (B) detector	_____	_____	_____
			N42 bottom (B) detector	_____	_____	_____
			N43 bottom (B) detector	_____	_____	_____
			N44 bottom (B) detector	_____	_____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE

CUE: If the student asks for independent verification of the values recorded in Row 1 of Form A, cue, evaluator to student, **" Form A Detector currents have been independently verified."**

NOTE: The student is provided with a copy of RE-17.

4.	P	Using data from Technical Data Book Figure RE-17, RECORD the 100% power, 0% AFD detector current, for the top (A) and bottom (B) detector of each channel on Form A, Quadrant Power Tilt Calculation Sheet Row 2.			
		a. From Technical Data Book fig RE-17, Records 100% power, 0% AFD values: 4 Top (A) Detectors	_____	_____	_____
		b. From Technical Data Book fig RE-17, Records 100% power, 0% AFD values: 4 Bottom (B)Detectors	_____	_____	_____
*5.	P	CALCULATE the normalized detector current by dividing each detector current by its 100% power, 0% AFD current. RECORD the results on Form A, Quadrant Power Tilt Calculation Sheet Row 3.			

D=Discuss P=Perform S=Simulate		ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
			a. Calculates and records Normalized Detector Currents: 4 Top (A) Detectors	_____	_____	_____
			b. Calculates and records Normalized Detector Currents: 4 Bottom (B)Detectors	_____	_____	_____
*6.	P	CALCULATE the average normalized detector current for the top detectors and for the bottom detectors. RECORD the results on Form A, Quadrant Power Tilt Calculation Sheet Row 4.				
			a. Calculates and records average normalized detector currents: Top (A) Detectors	_____	_____	_____
			b. Calculates and records average normalized detector currents: Bottom (B) Detectors	_____	_____	_____

D=Discuss P=Perform S=Simulate		ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	UNSAT	INITIALS/DATE
*7.	P	CALCULATE the Quadrant Power Tilt Ratio for each detector by dividing each normalized detector current by its associated average normalized detector current. COMPLETE Form A, Quadrant Power Tilt Calculation Sheet.				
			*a. Calculates and records QPTR for each detector: 4 Top (A) Detectors	_____	_____	_____
			*b. Calculates and records QPTR for each detector: 4 Bottom (B)Detectors	_____	_____	_____
*8.	P	Indicate the maximum QPTR by circling on Form A Row 5.	Identifies (circles) the maximum power tilt ratio on Form A Row 5.	_____	_____	_____

CUE: If the student asks for independent verification of the Form A calculations, cue, evaluator to student, " **Form A calculations have been independently verified."**

D=Discuss P=Perform S=Simulate		ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
*9.	P	Determine if LCO3.2.4 is/is not met based on maximum QPTR.				
			*a. Identify in step 6 of Form A that LCO 3.2.4 is/is not met	_____	_____	_____
			*b. In Row 6 Form A circle YES/NO	_____	_____	_____

NOTE: See answer key for the correct item to circle in row 6 on Form A

CUE: "The JPM is complete."

10.		Stop time_____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.			
11.		Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 RO-ADMIN#1

Initial Conditions:

1. Plant is now at 100% power following the recovery of a dropped rod at EOL.
2. The main plant computer has been inoperable since yesterday.
3. The QPTR surveillance is scheduled to be done this shift.
4. Incore/Excore calibration was performed yesterday (before the rod dropped).
5. Detector current readings have been taken by the Control Board Monitor.
6. The time is 0800, today's date.

	TOP (A) DETECTORS			
	N41	N42	N43	N44
Detector Current micoamps	179	182	186	179
	BOTTOM (B) DETECTORS			
	N41	N42	N43	N44
Detector Current micoamps	177	199	191	183

Initiating Cue:

Perform the QPTR Surveillance per RX1703. Step 4.1.1 is complete. The QPTR alarm surveillance work order has been generated. Start at step 4.1.2.

All independent verifications of calculations will be performed after you are done. Provide your results to me.

Key KO-Admin #1

Form A: Quadrant Power Tilt Calculation Sheet

Detector Current at: TIME 0800 DATE _____ RE-17 Revision 01-13-01

CAUTION

Record all detector currents in units of microamps.

	TOP (A) DETECTORS				BOTTOM (B) DETECTORS			
	N41	N42	N43	N44	N41	N42	N43	N44
(1) DETECTOR CURRENT 0-500 MICRO	179	182	186	179	177	199	191	183
(2) 100% RTP, 0% AFD DETECTOR CURRENT FROM RE-17	155.53	151.96	167.43	162.61	167.83	188.93	189.10	177.77
(3) NORMALIZED DETECTOR CURRENT = (1)/(2)	1.15	1.20	1.11	1.10	1.05	1.05	1.01	1.03
(4) AVE. NORMALIZED DETECTOR CURRENT	1.14				1.04			
(5) QUADRANT POWER TILT RATIO (QPTR) = (3)/(4)	1.01	1.05	0.97	0.96	1.01	1.01	0.97	0.99
(6) LCO 3.2.4 Met? YES / NO								

Detector Current Obtained by: _____ Date: _____

Detector Current Independently Verified by: _____ Date: _____

Calculations Performed by: _____ Date: _____

Calculations Independently Verified by: _____ Date: _____

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 RO-ADMIN#2

PERFORM RCS STEADY STATE LEAK RATE CALCULATION

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: RO

0020200201 Perform RC Steady Leak Rate Calculation

2.0 Conditions:

A. The plant is in Mode 1, 100% steady state power.
B. Your shift started the manual RCS leak rate 72-hour surveillance at 0030 with the computer out of service.
C. Chemistry reports that there are no sampling losses, accumulator leaks, Steam Generator tube leakage, or leakage from any other known sources.

3.0 Standards:

Calculate the manual steady state leak rate.
Time for completion is 30 minutes.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of OX1401.02, RCS Steady State Leak Rate Calculation
Copy of Tank Curves in Primary Tech Data Book.
Attached RCS Leak Rate Data sheet (JPM tear-off sheet).
Calculator

5.0 Limitations On Performance:

Simulate/Perform all steps.

6.0 References:

Procedures:

- OX1401.02, RCS Steady State Leak Rate Calculation

Technical Specifications:

- 4.4.6.2.1.b, RCS Operational Leakage
- 4.4.6.2.1.d, RCS Operational Leakage

Sys	KA	Description	Value RO/SRO
002	K4.05	Detection of RCS leakage.	3.8/4.2
002	A3.01	Reactor coolant leak detection system.	3.7/3.9

7.0 Setting:

Simulator or classroom.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

30 minutes

10.0 Directions To The Student(s):

A. Initial conditions:

1. The plant is in Mode 1 at 100% steady state power.
2. Your shift started the manual RCS leak rate 72-hour surveillance at 0030 with the computer out of service.
3. The following data has been collected:

"Start" Data @0030:		"Finish" Data @0630:	
Tavg	587.6 °F	Tavg	587.7 °F
PRZ Level	60 %	PRZ Level	60 %
VCT Level	50 %	VCT Level	45 %
INTEGRATED MAKEUP	15 gal	INTEGRATED MAKEUP	176 gal
PRT Level	60 %	PRT Level	60 %
RCDT Level	46 %	RCDT Level	48 %

11.0 Initiating Cue:

Initiating Cue:

Complete a manual steady state leak rate calculation using OX1401.02 and the collected data.

There are no sampling losses, accumulator leaks, Steam Generator tube leakage, or leakage from any other known sources.

Complete the required form.

Identify on the form if Identified and Unidentified leakage are within their Acceptance Criteria.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE

NOTE: 1. The completed Manual RCS Leak Rate worksheet OX1401.02 Form B can be used to show satisfactory completion of the JPM.
2. The evaluator will act as the US to complete communications with the candidate.

1.	P	Start time _____	Initiating cue read.			

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: Student should obtain a copy of OX1401.02 and begin at step 4.2.3. Main plant computer is not available.

2.	P	Verify that prerequisites are complete	Reviews prerequisites and verifies all requirements are complete			

CUE: If the student inquires about chemistry notification, provide the cue, **"All prerequisites of section 2 were met at 0030 this morning."**

*3.	P	b. CALCULATE and RECORD data as shown on Form B:	b. Records and calculates required data on FORM B of OX1401.02 as follows:			
		• TIME	• Time (+360 mins).	_____	_____	_____
		• T_{AVG}	• T_{avg} (+8.396 gals) (8.3 to 8. 45).	_____	_____	_____
		• PZR LEVEL	• PZR Lvl (0 gals).	_____	_____	_____
		• VCT LEVEL	• VCT Lvl (+155.7 gals) (151 to 161).	_____	_____	_____
		• BAB TOTAL	• BAB Total (+161 gals).	_____	_____	_____
		• PRT LEVEL	• PRT Lvl (+0 gals).	_____	_____	_____
		• RCDT LEVEL	• RCDT Lvl (+7.0 gals) (6.5 to 7.5).	_____	_____	_____

NOTE: IAW Note 1 of Form B SG tube leakage should be included in the next section

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	UNSAT	INITIALS/DATE
4.	P	OBTAIN THIS DATA FROM ANY KNOWN SOURCE AND RECORD GALLONS.	Records S/G tube leakage 0.0 gals).	_____	_____	_____
*5.	P	Calculate IDENTIFIED LEAKAGE	Determines **identified** leakage within ± 10% of answer key.	_____	_____	_____
*6.	P	Calculate UNIDENTIFIED LEAKAGE	Determines **unidentified** leakage within ± 10% of answer key.	_____	_____	_____
*7.		Determine if RCS leak rate results are SAT.	Determines RCS Leak Rate results SAT.	_____	_____	_____

CUE: "The JPM is complete."

13.		Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 30 minutes.			
14.		Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 RO- ADMIN #2

Initial Conditions:

1. The plant is in Mode 1 at 100% steady state power.
2. Your shift started the manual RCS leak rate 72-hour surveillance at 0030 with the computer out of service.
3. The following data has been collected:

"Start" Data @0030:		"Finish" Data @0630:	
Tavg	587.6 °F	Tavg	587.7 °F
PRZ Level	60 %	PRZ Level	60 %
VCT Level	50 %	VCT Level	45 %
INTEGRATED MAKEUP	15 gal	INTEGRATED MAKEUP	176 gal
PRT Level	60 %	PRT Level	60 %
RCDT Level	46 %	RCDT Level	48 %

Initiating Cue:

Complete a manual steady state leak rate calculation using OX1401.02 and the collected data.

There are no sampling losses, accumulator leaks, Steam Generator tube leakage, or leakage from any other known sources.

Complete the required form.

Identify on the form if Identified and Unidentified leakage are within their Acceptance Criteria.

RO-Admin #2 Key

Form B: PM Number 1-LEAK-OT002-000
Test Data Sheet
(Sheet 2 of 4)

MANUAL RCS LEAK RATE						
PARAMETER	INSTRUMENT USED	FINISH	START	CHANGE FINISH-START	CONVERSION	GALLONS OR MINUTES
TIME	MCB CLOCK	0630	0030	6hrs	60 min/hr	360 min (1)
OBTAIN DATA FROM THE MAIN CONTROL BOARD AND CP-38A						
TAVG	DIGITAL	587.7 °F	587.6 °F	+.1 °F	83.96 gal/°F (Note 2)	+8.4 gal (2)
PZR LEVEL	(Note 4)	60 %	60 %	Ø %	61.31 gal/% (Note 2)	Ø gal (3)
VCT LEVEL	LI-185	45 %	50 %	-5 %	31.14 gal/%	-155.7 gal (4)
INTEGRATED MAKEUP	CS-FIQ-111 (Note 5)	176 gal	15 gal	+161 gal	N/A	+161 gal (5)
PRT LEVEL	LI-470	8150 gal (Note 3)	8150 gal (Note 3)	Ø gal	N/A	Ø gal (6)
RCDT LEVEL	LI-1403 (at CP-38A)	167 gal (Note 3)	160 gal (Note 3)	+7 gal	N/A	+7 gal (7)
OBTAIN THIS DATA FROM ANY KNOWN SOURCE AND RECORD GALLONS (Note 1)						
					Ø	Ø gal (8)
					Ø	Ø gal (8)

IDENTIFIED LEAKAGE

$$\frac{(\overset{8}{\text{Ø}}) + (\overset{7}{7}) + (\overset{6}{\text{Ø}})}{\underset{1}{(360)}} = (0.02) \text{ gpm}^{(9)}$$

Identified Leakage Acceptance Criteria ≤ 10 gpm

UNIDENTIFIED LEAKAGE (+0.80 to 0.96)

$$\left[\frac{(\overset{5}{161}) + (\overset{2}{8.4}) - (\overset{3}{\text{Ø}}) - (\overset{4}{-155.7})}{\underset{1}{(360)}}\right] - (\overset{9}{0.02}) \text{ gpm} = +0.88 \text{ gpm}$$

Unidentified Leakage Acceptance Criteria ≤ 1 gpm

Note 1: This is for sampling losses, accumulator leaks, steam generator tube leakage, etc.
Note 2: These conversion factors are only valid for normal operating temperature and pressure. If the plant is stable at a reduced pressure and temp and the computer is **not** available, use the conversion factors from Figure 2.
Note 3: Obtain tank volume from the Primary Technical Data Book and record gallons for calculation. Do **not** use % due to nonlinearity of the tank volume.
Note 4: Record the instrument number and use the same hot calibrated level indicator for both start and finish.
Note 5: Any RWST, BWST, or SF Pool makeups must be subtracted from the integrated makeup total.

Calculations checked by: _____

RO-Admin #2 Key

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 RO-ADMIN #3

INITIATE A LIQUID EFFLUENT WASTE SAMPLE REQUEST

Student Name: _____ Badge #: _____

Evaluator Name: _____ Badge #: _____

Student Signature: _____ Date: _____
(optional)

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: _____ DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

0690301502 Authorize a release of liquid waste.

2.0 Conditions:

1. The plant is in MODE 1 with two Ocean Service Water and Three Circulating Water pumps running with no expected change of configuration.
2. BRS-TK-58A, "B" Recovery Test Tank has been filled to 12 feet.
3. The tank will be discharged in accordance with section 4.2.1 of CP 4.1, "Effluent Surveillance Program".
4. The tank will be recirculated at 75 gpm.
5. The Waste NSO will place the tank on recirc at 1200.
6. The Tank will be discharged at 2200 tonight.

3.0 Standards:

Perform verification of CP4.1A, Liquid Effluent Waste Sample Requests.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
ON1018.07, Waste Test Tank Recirculation.
CP-4.1, Effluent Sampling Program.
Recovery Test Tanks capacity vs. level curve.

5.0 Limitations On Performance:

Perform all steps.

6.0 References:

SSCP, Station Chemistry Manual
CP-4.1, Effluent Sampling Program.

Sys	KA	Description	Value RO/SRO

	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9/3.3

7.0 Setting:

Classroom

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

15 minutes

10.0 Directions To The Student(s):

Initial Conditions:

1. The plant is in MODE 1 with two Ocean Service Water and Three Circulating Water pumps running with no expected change of configuration.
2. BRS-TK-58A, "B" Recovery Test Tank has been filled to 12 feet.
3. The tank will be discharged in accordance with section 4.2.1 of CP 4.1, "Effluent Surveillance Program".
4. The tank will be recirculated at 75 gpm.
5. The Waste NSO will place the tank on recirc at 1200.
6. The Tank will be discharged at 2200 tonight.

11.0 Initiating Cue:

Complete Section 1 of Form CP 4.1A to allow a sample of the "B" RTT for release.

Return the completed form to me for approval when complete.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
1.	P	Start time	Initiating cue read. Form 4.1A given to student.			_____

Evaluator CUE: Give the student a copy of the working procedures after they have identified the procedures required.

NOTE: It is assumed that the student will use CP 4.1 to process through the verification and check ON1018.07 to verify the tank volumes and recirculation flow rate. The student may choose to verify the tank volume and recirculation rate prior to referring to CP 4.1. These steps can be performed in any order as long as all steps are completed correctly.

*2	P	Section 1 of CP 4.1A is completed by Operations and provides the following information:				
		a. Name of tank, sump, or SG demin. vessel to be sampled.	*a. Enters "B" RTT (BRS-TK-58B).	____	____	_____
		b. Total tank or sump volume to be discharged or transferred.	*b. Uses Tank curve to determine that Tank volume for 12 feet is 15864 gallons. (15,500 to 16,000 gallons)	____	____	_____
		c. Recirculation rate.	c. Enters recirc. rate of 75 gpm.	____	____	_____
		d. Recirculation time	*d. Calculates recirculation time of 423 minutes. (413 to 426 minutes)			
		e. Recirculation starting time and date.	*e. Enters Recirculation start time of today at 1200.	____	____	_____
		f. Sample date and time	*f. Enters sample time of 1900 (1853 to 1906).	____	____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
	g. The projected CW and SW pump combination for the discharge.	*g. Enters 3 CW pumps and 2 Ocean SW pumps.	_____	_____	_____
	h. Projected release start date and time.	h. Enters 2200 for today's date.	_____	_____	
	i. Date, time of request, and signature of originator.	i. Enters time, date and signature are entered.	_____	_____	
					_____

Evaluator CUE: "The JPM is complete".

4	Stop time_____	Start-Stop time is ≤ 15 minutes.	_____	_____	_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 RO-ADMIN #3

Initial Conditions:

1. The plant is in MODE 1 with two Ocean Service Water and Three Circulating Water pumps running with no expected change of configuration.
2. BRS-TK-58A, "B" Recovery Test Tank has been filled to 12 feet.
3. The tank will be discharged in accordance with section 4.2.1 of CP 4.1, "Effluent Surveillance Program".
4. The tank will be recirculated at 75 gpm.
5. The Waste NSO will place the tank on recirc at 1200.
6. The Tank will be discharged at 2200 tonight.

11.0 Initiating Cue:

Complete Section 1 of Form CP 4.1A to allow a sample of the "B" RTT for release.

Return the completed form to me for approval when complete.

Key

Liquid Effluent Waste Sample Request

RD-Admin #3

Section I — Operational Data (Completed by Operations Department)

Tank, Sump, S/G, CPS or SG Demin. Vessel: BRS-TK-58B

Disposition: X Discharge ____ Recycle

Tank, Sump, or S/G Volume: 15,864 gallons (15,500 to 16,000)

Recirculate Rate: 75 gpm

Minimum Recirc. Time* = 2 x Tank Vol. / Recirc. Rate = 423 min. (413 to 465 minutes)

Recirc. Start Date and Time: Today's Date / 1200

Sample Date and Time: Today's Date / 1853 to 1906

NOTE

CW-V-40 position cannot change once this form is submitted to Chemistry.

Project CW and SW pump combination for discharge: CW 3 SW 2

Project Release Start Date and Time: today's date / 2200

Originator ____ Date ____ Time ____

Verified By ____ Date ____ Time ____

Section II — Chemistry Data (Completed by Chemistry Department)

Sample Date ____ / Sample Time ____ Sample Collected by (Initials) ____

Sample Identification No. ____

LEW Permit Number: ____

Dilution Water Flow Rate: ____ gpm

Volume Discharged: ____ gallons

Composite Volume: ____ mls

Composite Updated by: ____ (Initials)

* or as directed by supervision

Key

RD Admin #3

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 RO–ADMIN #4

ECP CALCULATION

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

1.0 Task Number and Description:

Position: RO

0010100201 Perform Estimated Critical Position (ECP) Calculations

2.0 Conditions:

1. The plant is preparing for a startup after a 2 day outage following an inadvertent reactor trip.
2. Plant condition/history is as follows:
   a. Shift turnover has been completed and no surveillance's are planned or in progress.
   b. MODE 3 with RCS at 557°F and 2235 psig.
   c. The plant has been shutdown for two days as of 0000 today. It is now 0100.
   d. Criticality planned for today at 0500
   e. Desired Rod Position for criticality is Control Bank D at 100 steps.
   f. RCS boron concentration (C_B), 1459 ppm. Sample time 0030 today.
   g. Full Out Position is presently CBD @ 225 steps.
   h. Core Burnup is 16,000 MWD/MTU.
   i. Net Poison worth will be 500 pcm at 0500 today.
   j. There is no boron depletion.

3.0 Standards:

A. Determine the critical boron concentration within ± 30 ppm using RS-1735 Form A, Block 6.

B. Determine the zero power rod insertion limit per RS-1735 Form A, Block 9, item "A".

4.0 Student Materials:

Copy of the Tear-Off Sheet.

Calculator

Copy of RS-1735, Rev. 4, Chg.7.

Figures from the Primary Tech Data Book:

RE-1, Critical Boron Concentration (RE Revision #01-13-00)
RE-3, Differential Boron Worth (RE Revision #01-13-00)
RE-5, Overlap Integral Rod Worth vs Rod Position (RE Revision #01-13-00)
RE-16, Control Bank D Operating Band (RE Revision #01-13-01)
Core Operating Limits Report (SSTR Rev.110)

5.0 Limitations On Performance:

Simulate/Perform all steps.

6.0 References:

Procedures:

OS1000.07, Approach to Criticality.

RS-1735, Reactivity Calculations.

Primary Technical Data Book.

Technical Specifications:

3.1.1.4, Minimum Temp for Criticality

3.1.3.6, Control Rod Insertion Limits

Sys	KA	Description	Value RO/SRO
192008	K1.07	Calculate ECP using procedures and given plant procedures.	3.5/3.6

7.0 Setting:

Simulator, Plant or Classroom

A. The Examiner must refer to the key to determine satisfactory completion of the JPM. The key is calculated based on the figures listed in section 4.0 and values specified in the body of the JPM.

B. The JPM must be performed with the procedure and figures listed in section 4.0. DO NOT USE OTHER FIGURES such as those found in a current Primary Technical Data Book.

C. The evaluator will act as the US and/or RE Engineer to complete communications with the candidate.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

20 Minutes

10.0 Directions To The Student(s):

Initial conditions:

1. The plant is preparing for a startup after a 2 day outage following an inadvertent reactor trip.
2. Plant condition/history is as follows:
   a. Shift turnover has been completed and no surveillance's are planned or in progress.
   b. MODE 3 with RCS at 557°F and 2235 psig.
   c. The plant has been shutdown for two days as of 0000 today. It is now 0100.
   d. Criticality planned for today at 0500
   e. Desired Rod Position for criticality is Control Bank D at 100 steps.
   f. RCS boron concentration (C_B), 1459 ppm. Sample time 0030 today.
   g. Full Out Position is presently CBD @ 225 steps.
   h. Core Burnup is 16,000 MWD/MTU.
   i. Net Poison worth will be 500 pcm at 0500 today.
   j. There is no boron depletion.

11.0 Initiating Cue:

Using RS1735, perform an Estimated Critical Position (ECP) calculation.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
1. P	Start time _____	Initiating cue read.			

NOTE: Give the student a copy of procedure RS1735.

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: All values should be entered as positive values.

2. P	Refer to section 4.1, of ECP Procedure (ECP Data & Analysis Form A RS 1735):	Performs the following:			
	a. ENTER the Estimated Condition for Criticality in Section 1. Include the Date, Time, Burnup and Desired Rod Position for the next criticality.	a. Enters Section 1 conditions: • Criticality date • Criticality time • Core burnup • Bank D desired rod position	_____	_____	_____

CUE: If the student asks RE for alternative data as mentioned in NOTE prior to step 4.1.2: **"RE has no alternative data available. Use Figure RE-1 for Critical Boron Concentration".**

	b. RECORD in Section 2 the value of Hot Zero Power, No Xenon, Critical Boron Concentration (C_o), from Figure RE-1, for the Burnup listed in Section 1.	b. Records C_o (Critical Boron Concentration) from Figure RE-1. **(See key)**	_____	_____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
	c. RECORD in Section 3 the value of the Net Poison Worth at the expected Time of Criticality (ρ_I) as determined by Reactor Engineering or computer prediction.	c. Records ρ_I (Net Poison Worth).	_____	_____	_____
	d. RECORD in Section 4 the value of inserted rod worth (ρ_R), from Figure RE-5, for the desired Rod Position listed in Section 1.	d. Records ρ_R (Inserted Rod Worth) from TDB Figure RE-5 **(See key)**	_____	_____	_____
	e. RECORD in Section 5 the Differential Boron Worth (DBW) at HZP, from Figure RE-3, for the Burnup listed in Section 1.	e. Records DBW (Differential Boron Worth) from TDB Figure RE-3 for the Burnup listed in Section 1. **(See key)**	_____	_____	_____
	f. COMPLETE the calculation in Section 6 to determine the estimated Critical Boron Concentration (CB) as follows: $C_B = C_O - [(\rho_I + \rho_R) / DBW]$	*f. Calculates C_B (Est. Critical Boron Conc.) **(See key)**	_____	_____	_____
	g. COMPLETE the calculation in Section 7 to determine the corrected Critical Boron Concentration C_{CB}.	*g. Calculates C_{CB} within ± 20 ppm of RE ECP. **(See key)**	_____	_____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE

CUE: If asked about any changes to boron concentration then respond with, "**No dilutions or borations have been performed since the sample was taken at 0030 this morning.**"

h. COMPLETE Section 8 of Form A to determine the ECP administrative rod insertion limit (AIL).	*h. RECORD in block A, from COLR the RIL for Control Bank C at Hot Zero Power. A. Inserts value for Zero Power RIL. **(See key)**	_____	_____	_____

NOTE: Recording the Zero Power Insertion Limit is considered a "critical step". Since it can be read directly off COLR Figure 1, there is no tolerance. The remaining steps are not critical.

	RECORD in block B, ρ_R from Form A Section 4 and calculate ρ_{AIL}. **(See key)**	_____	_____	_____
	In block C RECORD Rod Position at ρ_{AIL} using RE-5. **(See key)**	_____	_____	_____
	In block D RECORD ECP administrative Insertion Limit. Highest bank/step of block A and C above. **(See key)**	_____	_____	_____
i. COMPLETE Section 9 of Form A to determine the ECP administrative rod withdrawal limit (AWL).	i. In block A RECORD Rod Withdrawal Limit using RE-16. **N/A for current cycle.**	_____	_____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
		RECORD in block B, ρ_R from Form A Section 4 and calculate ρ_{AWL}. **(See key)**	_____	_____	_____
		In block C RECORD Rod Position at ρ_{AWL} using RE-5. **(See key)**	_____	_____	_____
		* In block D RECORD ECP Administrative Withdrawal Limit. Lowest bank/step of A and C above. **(See key)**	_____	_____	_____

CUE: "The JPM is complete."

3.	Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.			
4.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 RO-ADMIN#4

Initial Conditions:

1. The plant is preparing for a startup after a 2 day outage following an inadvertent reactor trip.
2. Plant condition/history is as follows:
   a. Shift turnover has been completed and no surveillance's are planned or in progress.
   b. MODE 3 with RCS at 557°F and 2235 psig.
   c. The plant has been shutdown for two days as of 0000 today. It is now 0100.
   d. Criticality planned for today at 0500
   e. Desired Rod Position for criticality is Control Bank D at 100 steps.
   f. RCS boron concentration (C_B), 1459 ppm. Sample time 0030 today.
   g. Full Out Position is presently CBD @ 225 steps.
   h. Core Burnup is 16,000 MWD/MTU.
   i. Net Poison worth will be 500 pcm at 0500 today.
   j. There is no boron depletion.

Initiating Cue:

Using RS1735, perform an Estimated Critical Position (ECP) calculation.

Key RO Admin #4

Form A: Estimated Critical Position Data & Analysis Form

(Sheet 1 of 3)

NOTE: Enter all input data as positive values.

1) Estimated Condition for Criticality

Date: Today's date Time: 0500 Burnup: 16300 MWD/MTU

Desired Rod Position: D (Bank) @ 100 (Steps)

2) Design Critical Boron Concentration @ Current Burnup (HZP, ARO, No Xenon)

C_0 = 1250 ppm from TDB Figure RE-01 (1230-1270 Acceptable range)

3) Net Poison Worth @ Expected Time of Criticality

ρ_I = 500 pcm from computer prediction or Reactor Engineering

4) Inserted Rod Worth @ Criticality

ρ_R = 450 pcm from TDB Figure RE-05 (430 to 470 acceptable range)

5) Differential Boron Worth @ Current Burnup (HZP)

DBW = 7.07 pcm/ppm from TDB Figure RE-03 (7.06 to 7.08 acceptable range)

6) Estimated Critical Boron Concentration

$$C_B = C_0 - \left(\frac{\rho_I + \rho_R}{DBW}\right)$$

$$C_B = 1250 \text{ ppm} - \left(\frac{500 \text{ pcm} + 450 \text{ pcm}}{7.07 \text{ pcm/ppm}}\right)$$

C_B = 1116 ppm (1096 to 1136 acceptable range)

Form A: Estimated Critical Position Data & Analysis Form

(Sheet 2 of 3)

7) Corrected Critical Boron Concentration

A) C_B = 1116 ppm — From Form A Section 6

B) ΔC_B = 0 ppm — Use 0 if no B^{10} depletion **OR** enter calculated amount from Form B Section 4 **OR** from an RE Calculation **OR** from an RCS isotopic analysis

C_{CB} = $C_B + \Delta C_B$ ppm

C) C_{CB} = 1116 ppm + 0 ppm

D) C_{CB} = 1116 ppm (1096 to 1136 acceptable range)

8) ECP Administrative Control Rod Insertion Limit (AIL)

A) Rod Insertion Limit (RIL) = Bank: C @ 71 steps — From COLR

B) ρ_{AIL} = 450 pcm + 500 pcm = 950 pcm — From Form A Section 4

C) Rod Position at ρ_{AIL} = ρ_R Bank: C @ 152 steps — From TDB Figure RE-05 or D @ 35 steps

D) ECP Administrative Insertion Limit = Bank: C @ 152 steps — Higher bank/step of A and C or D @ 35 steps

9) ECP Administrative Control Rod Withdrawal Limit (AWL)

A) Rod Withdrawal Limit = Bank N/A @ N/A steps — From TDB Figure RE-16

B) ρ_{AWL} = 450 pcm − 500 pcm = 0 pcm — From Form A Section 4

C) Rod Position at ρ_{AWL} = ρ_R Bank: D @ 225 steps — From TDB Figure RE-05

D) ECP Administrative Withdrawal Limit = Bank: D @ 225 steps — Lower bank/steps of A and C

Completed By: _____ Date/Time: _____

Independently Verified By: _____ Date/Time: _____

Approved By SM: _____ Date/Time _____

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
Pair A1 L0069J AP Rev. 03 –Modified

ISOLATE OPEN PORV – E-0

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

1.0 Task Number and Description:

Position: RO

0020400801 Respond To Excessive Reactor Coolant Leakage
0100101101 Determine Source Of Pressurizer Leakage
0100400201 Operate PORV/Block Valve To Control RCS Pressure

2.0 Conditions:

A. The plant tripped from 100% power, and safety injection initiated.
B. RCPs are tripped due to loss of sub-cooling.
C. The crew completed E-0, steps 1 through 6. EFW flow has been throttled.

3.0 Standards:

Perform E-0, step 7. Isolate the open PORV per E-0 step 7 RNO.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of E-0, Reactor Trip Or Safety Injection, Rev. 46.

5.0 Limitations On Performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

Procedures:

- E-0, Reactor Trip Or Safety Injection

Sys	KA	Description	Value RO/SRO
010	A2.03	PORV Failures.	4.1/4.2
010	A4.03	PORV and block valves.	4.0/3.8
APE 008	AK3.02	PORV exit temp below RCS/PZR temp.	3.6/4.1
APE 008	AA1.01	PZR PORV block valve.	4.2/4.0

7.0 Setting:

NOTE: This JPM is designed to run in parallel with JPM Pair A2, Transfer Service Water from the OCEAN to the Cooling Tower, Manual TA.

A. Reset the simulator to IC #211 (LEN, Pair A1 A2) or any 100% IC which contains the following:
   1) Fail open RC-PCV-456A as follows:
   2) Select MF List
   3) Select Reactor Coolant (Components)
   4) Select avRCPCV456A RC-1-PCV-456A
   5) Select Fail Open
   6) Select Insert.

B. Fail open RC-PCV-456B as follows:
   1) Select MF List
   2) Select Reactor Coolant (Components)
   3) Select avRCPCV456A RC-1-PCV-456B
   4) Select Fail Open
   5) Select Insert.

C. Insert Event Trigger to cause trip of RC-V-124 breaker (B PORV Block valve) when valve is closed.
   1) Select Event Trigger: DEMO EXAMS
   2) Select EXAM 03 RC-V-124 BKR
   3) Select ACTIVATE.

D. Complete all actions of E-0 through step 6.

E. Throttle EFW flow to provide stable RCS temperature control

F. Trip all RCPs when sub-cooling drops below 40°F, and place the simulator in FREEZE.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

15 minutes

10.0 Directions To The Student(s):

1. Ensure task is done correctly.
2. You may be asked follow-up questions to confirm knowledge of the task.

Evaluator gives Tear-Off sheet to the student.
Evaluator reads the following to student (Optional for multiple JPMs):

Initial Conditions:

1. The Plant tripped from 100% power, and safety injection initiated.
2. RCPs are tripped due to loss of sub-cooling.
3. The crew completed E-0, steps 1 through 6, including Attachment A.
4. You are going to continue performance of E-0, Reactor Trip Or Safety Injection, following reactor trip and SI actuation.

Initiating Cue:

"Primary Operator, Continue with E-0, "Reactor Trip or Safety injection" at step 7, "Check RCS Isolated:"

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
1.	P	Start time _____	Initiating cue read.			

NOTE: VERIFY that the SWITCHES for the "A" PORV and "B" PORV are in AUTO.

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: At any time the student recognizes that the PORV is open after the JPM has started and asks to close the valve using skill of the operator provide direction for student to close the valve. If this occurs ensure step 6, 7a, and 7b of E-0 are processed before terminating the JPM.

*2.	P	Check RCS Isolated:				
		a. Check Letdown valve(s) closed: • CS-V-145 OR • RC-LCV-459 OR • RC-LCV-460	a. Check Letdown valve(s) closed: Reports that: CS-V-145 is closed	_____	_____	_____
		b. Check PORVs - CLOSED	b. Reports PORV indications • RC-V-456A NOT CLOSED • RC-V-456B NOT CLOSED	_____	_____	_____
		IF PZR pressure less than 2385 PSIG and LTOP setpoint THEN:	Determines that PZR pressure less than 2385 PSIG and less than LTOP setpoint.	_____	_____	_____
		Manually close "A" PORV	*Attempts to Manually close PORV RC-PCV-456A **Note: Valve Failed Open**	_____	_____	_____
		IF PORV cannot be closed, THEN: manually close the associated block valve.	Closes block valve RC-V-122 to isolate the failed open PORV	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
	Manually close "B" PORV	Attempts to close: PORV RC-PCV-456B	_____	_____	_____

NOTE Breaker for Block valve will open as valve begins stroking, causing a loss of light indication for valve position. Student may determine valve did not close by use of alternate indications on station computer, or by plant response (PZR pressure continues to decrease), or a combination of these two.

CUE **If required: EFW Flow has been throttled.**

IF PORV cannot be closed THEN: Manually close the associated block valve	*Attempts to Close block valve RC-V-124 to isolate the failed open PORV	_____	_____	_____

NOTE: SRO Candidates are expected to correctly recognize required procedure transition. RO Candidates are expected to recognize PORV can not be isolated, and evaluator may prompt RO candidate for recommended actions.

*IF block valve can NOT be closed THEN go to E-1, LOSS OF REACTOR OR SECODARY COOLANT, Step 1	*DETERMINE that PORV block Valve is not closed. RECOMMENDS transition to E-1	_____	_____	_____

CUE: **"The JPM is complete."**

4.	Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 15 minutes.	
5.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM		_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM Pair A1

Directions to the Student:

Initial Conditions:

1. The Plant tripped from 100% power, and safety injection initiated.
2. RCPs are tripped due to loss of sub-cooling.
3. The crew completed E-0, steps 1 through 6, including Attachment A.
4. You are going to continue performance of E-0, Reactor Trip Or Safety Injection, following reactor trip and SI actuation.

Initiating Cue:

"Primary Operator, Continue with E-0, "Reactor Trip or Safety injection" at step 7, "Check RCS Isolated:"

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
PairA2 AP N

TRANSFER SERVICE WATER FROM THE OCEAN TO THE COOLING TOWER (Manual TA)

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

1.0 Task Number and Description:

Position: RO

0760103401 Switch From SW To Cooling Tower Operation

2.0 Conditions:

A. The plant is operating at 100%.
B. A fault in the SW-P-41A will cause a trip of the pump and SW-P-41C will not start causing a need to shift SW Train A to the Cooling Tower.
C. Component malfunctions will prevent SW-V74 from closing (Cooling Tower Boundary Valve) and SW-V34 from opening.
C. Using OS1216.01, Degraded Ultimate Heat Sink, the student will align these two valves to the correct position for a TA.

3.0 Standards:

Align SW Train A to the Cooling Tower per OS1216.01, Degraded Ultimate Heat Sink, and the UL-16 status lights.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of OS1216.01, Degraded Ultimate Heat Sink, Rev. 12.

5.0 Limitations on performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

Procedures:

- OS1216.01, Degraded Ultimate Heat Sink
- SM 7.20, Control of Time Critical Actions.

Sys	KA	Description	Value RO/SRO
076	A2.01	Ability to predict the impacts of loss of SW & use procedures to correct, control or mitigate the consequences of those malfunctions or operations.	3.5/3.7
076	K3.01	Knowledge of the effect that a loss of SW will have on closed cooling water.	3.4/3.6

7.0 Setting:

NOTE: this JPM is designed to be run in parallel with JPM Pair A2, Isolate Open PORV E-0.
Reset the simulator to IC 211, LEN Pair A1 A2, or any 100% IC that contains the following.
Activate Scenario Len/Len SW. This sets the component malfunctions for the SW valves and sets up the trip of SW-P-41A and the failure of SW-P-41C to start.

Place simulator in RUN. Acknowledge all alarms.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

20 minutes

10.0 Directions to the Student(s):

Evaluator gives Tear-Off sheet to the student

Initial Conditions:

You are the Secondary Operator.

The plant has tripped from 100% power.

Step 6 of E-0, "Reactor Trip or Safety Injection", is complete.

The Roving NSO reports loud noises on SW-P-41A.

11.0 Initiating Cue:

Secondary Operator (or student's name), the US informs you that he and the PSO will continue processing E-0.

You are directed to monitor SW-P-41A.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
1. P	JPM Start time _____ (This is NOT the start time of the Time Critical Action)	Initiating cue read.			

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task."**

NOTE: Because this is a LOIT initial license class JPM the student will act both as procedure reader and performer using OS1216.01, DEGRADED ULTIMATE HEAT SINK.

Student may initially respond using direction in VAS procedure D5523: SW PMP A BKR TRIP L/O. This alarm response procedure will direct start of SW-P-41C and, if not successful, direct Initiating Train A TA actuation. SW-P-41A discharge valve will be verified closed and SW-P-41A control switch placed in PTL. Operator will be directed to enter abnormal operating procedure OS1216.01, "Degraded Ultimate Heat Sink."
Response by entering Abnormal directly or by use of VAS procedure first is acceptable. If the student uses the VAS procedure first it is also appropriate to transition to the Abnormal Operating Procedure after unsuccessfully attempting to start SW-P-41C.

2.	P	Observes the failure of SW-P-41A and the non-start of SW-P-41C	Enters abnormal procedure OS1216.01, Degraded Ultimate Heat Sink (or responds using VAS procedure).	_____	_____	_____

NOTE Start here IF student uses VAS procedure first:

3	P	1.2*	If Available Verify Started/ Start SW-P-41C	1.2 *	Attempts Start of SW-P-41C	_____	_____	_____
NOTE			Time critical action is from TA actuation until isolation and/or re-position of Cooling Tower Boundary Valve		TA Actuation time _____			
	P	1.3*	IF SW-P-41C is not available, Initiate Train A Tower Actuation from Main Control Board	1.3*	Initiates Train A Tower Actuation.	_____	_____	_____
		1.4 *	Verify SW-P-41C Discharge Valve SW-V-2 closes.	1.4 *	Verifies SW-V-2 Closes	_____	_____	_____

D=Discuss P=Perform S=Simulate		ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	UNSAT	INITIALS/DATE
	1.5*	Place Control Switch for SW-P-41C in PTL	1.5* Places SW-P-41C control Switch in PTL	_____	_____	_____
NOTE	When Student Enters Abnormal Operating Procedure OS1216.01, Degraded Ultimate Heat Sink					
4	P	Determine Appropriate Response, If affected SW train aligned to the ocean, then Go to Step 2.	Determines that affected SW train was aligned to the ocean, and transitions to Step 2.	_____	_____	_____
5.	P	Step 2, Check for cause of SW Failure. Ocean service water pumps running – One Pump Running Per Train with Associated Discharge Valve Open.	No => Goes to RNO. Step 2.	_____	_____	_____
NOTE		Time critical action is from TA actuation until isolation and/or reposition of Cooling Tower Boundary Valve	TA Actuation time _____			
4.	P	Step 2 RNO. START the standby ocean service water pump. If the standby pump cannot be started, then actuate TA for the affected train.	Attempts start of SW-P-41C.	_____	_____	_____
			When pump will not start, ACTUATES TA Train A	_____	_____	_____
		Go to Step 4				

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	UNSAT	INITIALS/DATE
*5.	P	Step 4 Verify Tower Actuation Sequence. 4 A. Verify proper TA alignment by status panel indication. A Train UL-16	Align Equipment per status panel. OPENS SW-V34, SW Train A Return to Cooling Tower, after verifying that valve should be OPEN.	_____	_____	_____

NOTE Student may recognize that SW-V-74 did not re-align when checking UL-16 indication in step 4A or during check of boundary valves in step 4B. Either case is acceptable provided that repositioning occurs within Time Critical Action acceptance criteria.

*6.		4 B. Check cooling tower boundary valves CLOSED.				
		•* SW-V4	•* Verifies SW-V-4 Closed	_____	_____	_____
		•* SW-V20	•* Verifies SW-V-20 Closed	_____	_____	_____
		•* SW-V74	•* *From Status Panel notes that SW-V74 is open. Manually closes SW-V74.	_____	_____	_____
NOTE		Time critical action is from TA actuation until isolation and/or reposition of Cooling Tower Boundary Valve	SW-V-74 reposition time _____ (Standard is less than 10 minutes for TA initiation)	_____	_____	_____
*7.	P	4 C IF the TA was in response to a high strainer D/P then open the Bypass valve for the affected strainer. Train A SW-V69	• No Action as it was pump failure. Goes to Step 5.	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
*9	Step 5. Check Both Trains-Aligned to Cooling Tower. **NO =>Performs Step 5 RNO.**	Perform the following for the one train aligned to the cooling tower.			_____
		a. Place the ocean SW pump control switches for train aligned to the cooling tower in Pull To Lock.	_____	_____	
		b. Place the running cooling tower pump control switch in Normal After Start.	_____	_____	

CUE: "The JPM is complete."

9.	Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.			
10.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

rovide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM Pair A2

Directions to the Student:

Initial Conditions:

You are the Secondary Operator.

The plant has tripped from 100% power.

Step 6 of E-0, "Reactor Trip or Safety Injection", is complete.

The Roving NSO reports loud noises on SW-P-41A.

Initiating Cue:

Secondary Operator (or student's name), the US informs you that he and the PSO will continue processing E-0.

You are directed to monitor SW-P-41A.

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
Pair B1 - L0083J Rev. 03 AP

ECCS FLOW REDUCTION/ REINITIATION/TRIP ALL RCPs

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

1.0 Task Number and Description:

Position: RO

0030401501 Monitor RCP Trip Criteria
0030400401 Perform An Emergency RCP Shutdown

2.0 Conditions:

A. An Automatic Reactor trip and safety injection occurred from 100% power.
B. All required actions of E-0, Reactor Trip Or Safety Injection, are complete.
C. The crew determined that SI is not required and has transitioned to ES-1.1, step 7.

3.0 Standards:

Manually operate ECCS and reactor coolant pumps per EOPs.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of ES-1.1, SI Termination, Rev. 34.
Copy of E-1, Loss Of Reactor Or Secondary Coolant, Rev. 37.

5.0 Limitations On Performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided for this JPM.

6.0 References:

Procedures:

- E-0, Reactor Trip Or Safety Injection
- ES-1.1, SI Termination
- E-1, Loss Of Reactor Or Secondary Coolant

Sys	KA	Description	Value RO/SRO
006	A4.01	Ability to manually operate ECCS pumps.	4.1/3.9
003	A2.02	Conditions which exist for an abnormal shutdown of an RCP in comparison to a normal shutdown.	3.7/3.9

7.0 Setting:

NOTE: This JPM is designed to be performed in parallel with JPM Pair B2, Start Hydrogen Recombiners.

A. Reset the simulator to IC #212 (LEN pair B1 B2)

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

10 minutes

10.0 Directions To The Student(s):

1. Ensure task is done correctly.
2. You may be asked follow-up questions to confirm knowledge of the task.

Evaluator gives Tear-Off sheet to the student.
Evaluator reads the following to student (Optional for multiple JPMs):

A. Initial Conditions:

1. The plant sustained an automatic Reactor Trip and Safety Injection from 100% power.
2. All required actions of E-0, Reactor Trip or Safety Injection, are complete.
3. The crew has transitioned to ES-1.1, step 7.

11.0 Initiating Cue:

"You are the Primary Operator, continue with ES-1.1 step 7."

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
1. P	Start time_____	Initiating cue read.			

CUE: When student locates a copy of ES-1.1 SI termination provide student with a copy.

2. P	Checks If SI Pumps Should Be Stopped:				
	a. Check RCS pressure:	*a. Checks:			
	GREATER THAN 1700 PSIG	* Checks and reports RCS pressure > 1700 psig;	____	____	_____
	AND	AND			
	Pressure – STABLE OR INCREASING BY PRESSURE RECORDER	* Checks and reports: RCS pressure stable or Increasing by pressure recorders:	____	____	_____
	*b. Stop SI Pumps and place in standby	b. Positions SI pump switches:			
		* SI Pump A stopped and placed in standby	____	____	_____
		* SI Pump B stopped and placed in Standby.	____	____	_____

NOTE: Simulator Operator Insert the following malfunction:
Select MF List
Select Reactor Coolant Malfunctions
Select mfRC0014 PZR Safety Vlv Seat Leakage
Set Final Value = 1
Select INSERT

3. P	Checks If RHR Pumps Should Be Stopped:				
	a. RHR Pumps –Any running with suction aligned to RWST	a. Determines that RHR pumps are running with suction aligned to RWST.	____	____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
	* b. Stop RHR Pumps And Place In Standby.	b. Positions RHR pump switches:			
		* RHR pump A stopped and placed in standby.	_____	_____	_____
		* RHR pump B stopped and placed in standby.	_____	_____	_____

NOTE: Subcooling may initially be > 40°F but the trend should be lowering. Time should be allowed for subcooling to decrease less than 40°F. Student should manually start ECCS pumps as required based on subcooling either from ES-1.1 OAS page or step 9a RNO.

4.	P	Verify ECCS flow not required:				
		a. RCS Subcooling – Greater than 40 degrees	*a. Verifies and reports that RCS subcooling is NOT> 40°F.	_____	_____	_____
		b. Manually start ECCS pumps as required. Go to E-1 Loss of Reactor or Secondary Coolant step 1.	*b. Manually starts ECCS pumps as required **Note:SI Pumps are the critical pumps.**	_____	_____	_____

NOTE: LOIT Students are expected to be their own procedure reader, however RO candidates would not normally make procedure transitions without an SRO licensed individual. If required the Evaluator can prompt RO candidates to recommend the procedure transition to E-1. **CUE: I understand you are recommending we make a procedure transition to E-1, "Loss of Reactor or Secondary Coolant". We will make the transition. Continue in E-1, step 1.**

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
CUE:	If required US provide the following cue, **"Transitioning to E-1 Loss of Reactor or Secondary Coolant step 1."**				
NOTE:	RCPs can be stopped using E-1, step 1 or the OAS page of E-1				
5. P	Check If RCPs Should Be Stopped:				
	a. ECCS pumps - AT LEAST ONE RUNNING CCP or SI pump	a. Verifies AT LEAST ONE RUNNING CCP or SI pump	_____	_____	_____
	b. RCS subcooling - LESS THAN 40°F.	b. Verifies and reports RCS subcooling is less than 40°F.	_____	_____	_____
	c. Stop all RCPs.	*c. Stops all RCPs.	_____	_____	_____
CUE:	**"The JPM is complete."**				
7.	Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.			
8.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM Pair B1

Directions to the Student:

A. Initial Conditions:

1. The plant sustained an automatic Reactor Trip and Safety Injection from 100% power.
2. All required actions of E-0, Reactor Trip or Safety Injection, are complete.
3. The crew has transitioned to ES-1.1, step 7.

Initiating Cue:

"You are the Primary Operator, continue with ES-1.1, step 7."

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
Pair B2 - L0084J Rev. 04 Modified

START HYDROGEN RECOMBINERS

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: RO

0280500201 Start 'B' H_2 Recombiner From The Main Control Room.

2.0 Conditions:

A. A reactor trip with SI occurred from 100% power due to a large break LOCA.
B. The US transitioned through E-0, E-1, ES-1.3, and back to E-1 and is now at step 17.
C. Hydrogen concentration in containment is 3.4%

3.0 Standards:

Place a hydrogen recombiner in service.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of OS1023.40, Hydrogen Recombiner Operation, Rev. 7, Chg. 2.
Calculator.

5.0 Limitations On Performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

Procedures:

- E-1, Loss of Reactor or Secondary Coolant
- OS1023.40, Hydrogen Recombiner Operation.

Sys	KA	Description	Value RO/SRO
028	A2.02	LOCA condition and concern over hydrogen.	3.5/3.9
028	A2.03	The hydrogen/air concentration in excess of limit flame propagation or detonation with resulting equipment damage in containment.	3.4/4.0
2.1	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of operation.	4.3/4.4
2.1	2.1.8	Ability to coordinate personnel activities outside the control room.	3.4/4.1
2.1	2.1.31	Ability to locate control room switches, controls, and indications, and determine that they are correctly reflecting the desired plant lineup.	4.6/4.3

7.0 Setting:

NOTE: This JPM is designed to be performed in parallel with JPM Pair B1, Trip All RCPs. Reset the simulator to IC #212 (LEN Pair B1 B2) or any 100% IC which contains the following:

A. Using panel graphics display sections PGR06A and PGR06B insert overrides on Hydrogen Analyzer A meter AND Hydrogen Analyzer B meter. Override to 3.4 for both meters.
B. Place the simulator in FREEZE.

The **simulator must be in RUN** to allow the PWR OUT meter to respond to the potentiometer.
Verify the "PWR OUT" potentiometer is at MINIMUM prior to beginning the JPM.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

20 minutes

10.0 Directions To The Student(s):

1. Ensure task is done correctly.
2. You may be asked follow-up questions to confirm knowledge of the task.

Evaluator gives Tear-Off sheet to the student.
Evaluator reads the following to student (Optional for multiple JPMs):

A. Initial Conditions:

1. A reactor trip with SI occurred from 100% power due to a large break LOCA.
2. The US transitioned through E-0, E-1, ES-1.3, and back to E-1.
3. The crew is presently at step 17 of E-1 Loss of Reactor or Secondary Coolant and they have checked containment H_2 concentration, which is 3.4%.

Initiating Cue:

"Secondary Operator, we are in E-1, and containment hydrogen concentration is presently 3.4%. Place Hydrogen Recombiner 'B' in service per OS1023.40, Hydrogen Recombiner Operation."

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE

NOTE: When the student is ready to begin place the simulator in run.

1. P Start time_____ Initiating cue read.

CUE: If the student request a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: If asked by the student, **"The electrical lineup has been completed"**.

2.	S	Verify the white PWR. IN AVAIL. light is energized.	Verifies the PWR. IN AVAIL. light is energized.	_____	_____	_____
3.	P	Set the PWR. ADJ. potentiometer to zero.	Turns PWR ADJ pot to 000.	_____	_____	_____
*4.	P	Place the PWR. OUT SW. switch to the ON position and VERIFY that the red light on the switch plate comes on.	* • Moves switch to ON position.	_____	_____	_____
			• Verifies the red light is on.	_____	_____	_____

CUE: **AT EACH POWER LEVEL, INFORM THE OPERATOR THE STATED TIME HAS ELAPSED.**

*5.		Energize the Hydrogen Recombiner heater by PERFORMING the following:	Energizes the recombiner:			
	P	a. TURN the PWR. ADJ. Potentiometer clockwise until 5 kW is indicated on the PWR. OUT meter. MAINTAIN the 5 kW value for at least 10 minutes.	*a. Turns the PWR ADJ pot clockwise until 5 kW is indicated. Maintain 5 kW for 10 minutes.	_____	_____	_____
	P	b. TURN the PWR. ADJ. Potentiometer clockwise until 10 kW is indicated on the PWR. OUT meter. MAINTAIN the 10 kW value for at least 10 minutes.	*b. Turns the PWR ADJ pot clockwise until 10 kW is indicated. Maintain 10 kW for 10 minutes.	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
P	c. TURN the PWR. ADJ. Potentiometer clockwise until 20 kW is indicated on the PWR. OUT meter. MAINTAIN the 20 kW value for at least 5 minutes.	*c. Turns the PWR ADJ pot clockwise until 20 kW is indicated. Maintain 20 kW for 5 minutes.	_____	_____	_____
P	d. DETERMINE the recombiner power setting per Form A, Power Out Setpoint Calculation.	d. Refers to Form A.	_____	_____	_____
P	e. Calculate the H_2 recombiner power setpoint by performing the following:				

CUE: **JPM will be performed in parallel with a Primary Side BOARD JPM. Because Containment pressure instruments are un-accessible because of the other JPM location THEN:**
When the student locates/requests containment pressure instruments, cue the student: **"Containment pressure is 8.0 psig."**
When the student requests pre-accident containment temperature, cue the student: **"Containment pre-LOCA temperature was 120 degrees.**

DETERMINE the current containment pressure from SI-PI-934 or SI-PI-935, MCB containment pressure indicators.	• Determines the current cntmnt pressure is 8 PSIG.	_____	_____	_____
Current Containment Pressure + 14.7 psi = psia	* • Converts cntmnt pressure to psia and records on data sheet (= 22.7 psia).	_____	_____	_____
Pre-accident Containment Average Temperature is 120°F.	• No action required.	_____	_____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	UNSAT	INITIALS/DATE
	• Using containment absolute pressure, pre-accident containment average temperature and Figure 2, Recombiner Power Correction Factor Curve determine the Pressure Factor (C_p).	* • Determines C_p and Records on data sheet - (C_p = 1.33 to 1.37). Enter student C_p value: C_p =_____	_____	_____	_____
	• MULTIPLY the Pressure Factor (C_p) by Reference Power (45.24 kW). (C_p) x 45.24 = Power Setting kW	* • Multiplies C_p by the reference power. Records on data sheet - (60.2 – 62.0 kW). Enter student KW value: KW =_____	_____	_____	_____

CUE: If the student requests a second person verification, respond: **"For the purpose of this evaluation, a second verification will not be performed. Please continue with the procedure."**

	• Have a second person VERIFY the power setting calculation.	• Requests second person verification.	_____	_____	_____
P	f. Turn the PWR. ADJ. potentiometer clockwise until the power setpoint, as calculated in Step 4.2.4.4, is indicated on the PWR OUT meter.	*f. Turns the PWR ADJ pot clockwise until the power setpoint is indicated on the PWR OUT meter.	_____	_____	_____

CUE: When student mentions that conference with the TSC is necessary to determine recombiner effectiveness, inform the student, **"The STED is aware of this and in contact with the TSC on this matter."**

P	g. CONFER with the TSC to determine recombiner effectiveness and the need to make adjustments to recombiner power.	g. Attempts to confer with the TSC.	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
CUE:	**"The JPM is complete."**				
6.	Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.			
7.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM Pair B2

Directions to the Student:

A. Initial Conditions:

1. A reactor trip with SI occurred from 100% power due to a large break LOCA.
2. The US transitioned through E-0, E-1, ES-1.3, and back to E-1.
3. The crew is presently at step 17 of E-1 Loss of Reactor or Secondary Coolant and they have checked containment H_2 concentration, which is 3.4%.

Initiating Cue:

"Secondary Operator, we are in E-1, and containment hydrogen concentration is presently 3.4%. Place Hydrogen Recombiner 'B' in service per OS1023.40, Hydrogen Recombiner Operation."

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
Pair C1 - NEW

OFFSITE POWER RESTORATION

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: RO

0620402001 Respond To A Low Voltage On Safeguard Bus (LOP).

2.0 Conditions:

A. The plant is at 100% power.
B. The Bus E6 PT fuse cabinet door was momentarily opened which caused Bus E6 to shift from the UAT to DG "B".
C. The US is using OS1246.02, "Degraded Vital AC Power (Plant Operating),RNO for step 21, Attachment L to restore Bus E6 to off site power via the UAT.
D. RMO was previously reset using step 7.
E. DUE TO SIMULATOR SETUP requirements for the corresponding paired JPM (Pair C2, Pressurizer Pressure instrument Failure) components and alarms have been reset on the Primary side of the board. This includes CBA, CAH, and Steam Blowdown.

3.0 Standards:

Restore offsite power to Bus E6 using Attachment L of OS1246.02.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of Attachment L of OS1246.02, Degraded Vital AC Power (Plant Operating).

5.0 Limitations On Performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

Procedures:

OS1246.02, Degraded Vital AC Power (Plant Operating).

Sys	KA	Description	Value RO/SRO
062	K1.04	Knowledge of offsite power sources.	3.7/4.2
062	A4.01	Ability to manually operate and/or monitor breakers.	3.3/3.1
062	A4.07	Synchronizing and paralleling of different AC supplies.	3.1/3.1

7.0 Setting:

NOTE : JPM is designed to be performed in parallel with JPM Pair C-2, Pressurizer Pressure Channel Failure.
Reset the simulator to IC #213 (LEN Pair C1 C2) or any 100% IC which contains the following:

A. Initialize the simulator to a 100% power IC:
B. Bus E-6 RAT breaker in PTL, and power transferred to EDG by OPENING UAT breaker.
C. Place the simulator in run.
D. Perform the actions of OS1246.02, Degraded Vital AC Power (Plant Operating).
E. Restore plant conditions and reset alarms on primary side as required to support parallel JPM performance.

Place simulator in run to ensure all alarms are acknowledged prior to start of JPM then place simulator in FREEZE.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

20 minutes

10.0 Directions To The Student(s):

1. Ensure task is done correctly.
2. You may be asked follow-up questions to confirm knowledge of the task.

Evaluator gives Tear-Off sheet to the student.
Evaluator reads the following to student (Optional for multiple JPMs):

A. Initial Conditions:

1. The plant is at 100% power.

2. The Bus E6 PT fuse cabinet door was momentarily opened which caused Bus E6 to shift from the UAT to DG "B".

3. The US is using OS1246.02, "Degraded Vital AC Power (Plant Operating), RNO for step 21, Attachment L to restore Bus E6 to off site power via the UAT.

4. RMO was previously reset using step 7.

5. The system dispatcher reports grid conditions are stable.

6. The UAT and RAT breaker cubicles for Bus E6 have been walked down and are ready for use.

11.0 Initiating Cue:

"You are the Secondary Operator, restore offsite power to Bus E6 using Attachment L of OS1246.02, Degraded Vital AC Power (Plant Operating)."

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE

NOTE: Ensure that student is ready to begin the JPM before placing simulator in run.

1. P Start time_____ Initiating cue read.

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

ATTACHMENT L
OFFSITE POWER RESTORATION TO BUS E6

CUE: US to student: **"The System Dispatcher reports grid conditions are now stable, and are expected to remain stable".**

2.	P	Raises DG frequency to 60.2 to 60.4 Hz.	Raises DG frequency to required band.	_____	_____	_____
*3.	P	Place DG synch. selector switch in the UAT or RAT position.	Places synch selector switch to UAT position.	_____	_____	_____
4.	P	Reset RMO	Resets RMO.	_____	_____	_____
5.	P	Adjust DG voltage to match INCOMING VOLTS with RUNNING VOLTS	Matches Voltage	_____	_____	_____
*6.	P	Adjust DG frequency so that the sync. meter is going slowly in the fast direction.	* Adjusts speed as required	_____	_____	_____
*7.	P	Close the RAT or UAT breaker when synchronized.	* Closes the UAT breaker.	_____	_____	_____
8.	P	Place the sync. selector switch in OFF.	Turns the synch switch off.	_____	_____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE

NOTE: The evaluator should observe that the operator maintains control over the generator VARs while unloading. Due to simulator bus voltage settings, it is expected that leading VAR loading will initially be observed. Until this issue can be corrected, the following cue must be stated to the student:

CUE: **Leading VARs are expected on the simulator after paralleling the DG. Adjust KVARs to 1000 lagging at this time.**

CUE: Inform the student: **"For the purposes of this JPM, the 10 minute unloading period can be compressed."**

*9.	P	Shutdown DG by performing the following:		Shutdowns DG by performing the following:			
		a.	Over a 10 minute time period: Lower KVARS to less than 200 lagging	a.	Over a 10 minute time period: * Lowers KVARS to less than 200 lagging	_____	_____ _____
			and		and		
			Lower load to 75 to 125 KW.		* Lowers load to 75 to 125 KW.	_____	_____ _____
		*b.	Open DG breaker.	*b.	Opens DG breaker.	_____	_____ _____
		c.	Adjust DG voltage to 4160 volts.	c.	Adjusts DG voltage to 4160 volts.	_____	_____ _____

CUE: When the above step is completed, inform the student: **"For the purpose of this JPM, the ten minute engine cooldown is complete.**

			After running DG unloaded for 10 minutes to cool the engine:				
		*d.	Shut down the diesel by depressing both emergency stop buttons simultaneously.	*d.	Shuts down the diesel by depressing both emergency stop buttons simultaneously.	_____	_____ _____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
CUE:	When the above step is completed, inform the student: **"For the purpose of this JPM, two minutes have elapsed and the DG has stopped rolling."**				
	After waiting two minutes to allow time for diesel to stop:				
	*e. Reset the DG.	*e. Resets the DG.	_____	_____	_____
	*f. Close SW-V16 for DG A, or SW-V18 for DG B.	*f. Closes SW-V18.	_____	_____	_____
CUE:	**"The JPM is complete."**				
13.	Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.			
14.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
Pair C1

A. Initial Conditions:

1. The plant is at 100% power.
2. The Bus E6 PT fuse cabinet door was momentarily opened which caused Bus E6 to shift from the UAT to DG "B".
3. The US is using OS1246.02, "Degraded Vital AC Power (Plant Operating), RNO for step 21, Attachment L to restore Bus E6 to off site power via the UAT.
4. RMO was previously reset using step 7.
5. The system dispatcher reports grid conditions are stable.
6. The UAT and RAT breaker cubicles for Bus E6 have been walked down and are ready for use.

Initiating Cue:

"You are the Secondary Operator, restore offsite power to Bus E6 using Attachment L of OS1246.02, Degraded Vital AC Power (Plant Operating)."

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE

Pair C2 - PRESSURIZER PRESSURE CHANNEL FAILURE - NEW

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: RO

0110400101 Identify A Pressurizer Instrument Failure

2.0 Conditions:

The plant is at 100% power and all systems are normal.

3.0 Standards:

Identify a failed pressurizer pressure instrument channel and restore the system per OS1201.06, PZR Pressure Instrument Failure.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of OS1201.06, PZR Pressure Instrument Failure, Rev. 13.

5.0 Limitations On Performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

Procedures:

- OS1201.06, PZR Pressure Instrument Failure.

Technical Specifications:

- 3.3.1, Rx Trip System Instrumentation.
- 3.3.3.6, Accident Monitoring Instrumentation.

Loops and Logics:

- 1-NHY-509027
- 1-NHY-509046

Sys	KA	Description	Value RO/SRO
010	A4.01	Ability to manually operate and/or monitor in the control room: PZR Spray Valves	3.7/3.5
010	A4.02	Ability to manually operate and/or monitor in the control room: PZR Heaters	3.6/3.4
010	A4.03	Ability to manually operate and/or monitor in the control room: PORV and Block Valves	4.0/3.8

7.0 Setting:

Simulator:

NOTE: JPM is designed to perform in parallel with JPM C1, Offsite Power Restoration.

A. Initialize the simulator to IC 213 (LEN Pair C1 C2) or any 100% power IC. Place the simulator in RUN.

B. Ensure that PT-455 is selected for master pressure control and for the Pressurizer pressure recorder.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

20 minutes

10.0 Directions To The Student(s):

1. Ensure task is done correctly.
2. You may be asked follow-up questions to confirm knowledge of the task.

Evaluator gives Tear-Off sheet to the student.
Evaluator reads the following to student (Optional for multiple JPMs):

A. Initial Conditions:

1. The plant is at 100% power and all systems are normal.

2. Respond to any events on the Primary side of the Main Control Board.

11.0 Initiating Cue:

"You are the Primary Operator. Respond to your indications."

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/ DATE
1. P	Start time _____	Initiating cue read.			

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: **Simulator Operator:**
After the simulator is placed in run, input the following malfunction which causes PZR pressure instrument PT-455 to fail high:
SELECT: MF List
SELECT: Reactor Coolant (component)
Select ptRCPT455
Double Click
SELECT: Fail to Specified Value
SELECT: 2500
SELECT: INSERT.

2. P	Recognize and report that PT-455 is failing high.	Recognizes and reports that PT-455 is failing high.	_____	_____	_____

NOTE: Student may initially respond using Abnormal operating procedure or use "SKILL OF THE OPERATOR" to take master pressure controller to manual and increase RCS pressure back to program before entering the abnormal. Either Response is acceptable.

NOTE: Because this is a LOIT initial license class JPM the student will act both as procedure reader and performer using OS1201.06, PZR PRESSURE INSTRUMENT FAILURE.

	IF Student responds using skill of the operator:				
P*	Recognize that Master Pressure Controller output is increasing and causing RCS pressure to decrease off program.	* Student places Master Pressure Controller to Manual and begins lowering output to close spray valves and energize Pzr heaters	_____	_____	_____
	Student enters OS1201.06, Abnormal Operating Procedure:				
		b. OS1201.06 entered.	_____	_____	_____

NOTE: The remaining steps are performed using OS1201.06.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	UNSAT	INITIALS/ DATE
3.	P	• Check PORVs - CLOSED	Verifies PORVs CLOSED	_____	_____	_____
4.	P	Check Normal PZR Spray Valves - CLOSED	Verifies Spray Valves CLOSED	_____	_____	_____

NOTE: Channel P-455/P-456 is normally selected for pressure control because a failed LOW RC-PT-458 (selected for backup) or RC-PT-457 (selected for control), will Prevent automatic operation of both pressurizer PORVs.

5	P	Check Pressurizer Pressure Channels: • Controlling Channel FAILED - OR- • Backup Channel FAILED - OR – • Recorder channel FAILED	Verifies controlling Channel PT-455 FAILED High.	_____	_____	_____
6	P	Realign Pressurizer Pressure Instruments	* Manually restores Pressurizer Pressure to Program and Selects alternate pressure channels which do **not** include PT-455.			

NOTE: Student may return RCS pressure to normal (green) band before continuing in abnormal

		a. Manually control pressurizer pressure AT PROGRAM. • Master pressurizer pressure controller -OR- • Heaters and sprays	a. Manually controls pressurizer pressure AT PROGRAM. • Master pressurizer pressure controller -OR- • Heaters and sprays	_____	_____	_____
		b. Select an alternate pressure channel for CONTROL/BACKUP as necessary	b. Select an alternate pressure channel for CONTROL/BACKUP as necessary (457/456)	_____	_____	_____
		c. Select an alternate pressure channel for RECORDER as necessary	c. Select an alternate pressure channel for RECORDER as necessary	_____	_____	_____

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	UNSAT	INITIALS/ DATE
		d. Select an alternate deltaT, OT, OP channel for RECORDER as necessary	d. Select an alternate deltaT, OT, OP channel for RECORDER as necessary	____	____	_____
7.	P	5. Align Pressurizer Pressure Control				
		a. RCS Pressure - Trending to 2235 psig.	*a Manually controls pressurizer pressure using heaters and sprays to restore program pressure.	____	____	_____
		b. Verify proper controller setpoint and place controllers in auto, as necessary:	Verify proper controller setpoint and place controllers in auto, as necessary			_____
		Master pressure controller- RC-PK-455A	• Master pressure controller- RC-PK-455A	____	____	_____
		Loop A spray valve control – RC-PK-455C	• Loop A spray valve control – RC-PK-455C (only if taken to manual)	____	____	_____
		Loop C spray valve control – RC-PK-455B	• Loop C spray valve control – RC-PK-455B (only if taken to manual)	____	____	_____
		c. . Check Heaters AUTO/ON	c. Check Heaters AUTO/ON	____	____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/ DATE
8.	P	6. Verify Redundant Channel Bistables-NOT TRIPPED UL-1 • PZR/MS SI AVAILABLE • PZR PRESS LO SI UL-6 • RCS LOOP OTdeltaT • PRESSURIZER PRESS LO • PRESSURIZER PRESS HI	Verifies Redundant Channels NOT failed	_____	_____	_____

CUE: "The JPM is complete."

9.		Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.			
10.		Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM Pair C2

A. Initial Conditions:

1. The plant is at 100% power and all systems are normal.
2. Respond to any events on the Primary side of the Main Control Board.

Initiating Cue:

"You are the Primary Operator. Respond to your indications."

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
Pair D1- L0035J Rev. 05 – Modified - AP

BLENDED MAKEUP PERFORMANCE

Student Name: _____ Badge #: _____

Evaluator Name: _____ Badge #: _____

Student Signature: _____ Date: _____
(optional)

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on File DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: RO

0040100601 Perform A Boron Change Calculation.

2.0 Conditions:

A. A manual blended makeup to the VCT is required due to normal system losses.

B. After the makeup is initiated CS-FCV -110A, Boric Acid Flow to the Blender, will fail closed, stopping boric acid flow while the RMW flow continues.

3.0 Standards:

A. Perform a 500 gallon manual blended makeup to the VCT.

4.0 Student Materials:

Copy of the Tear-Off Sheet
Copy of completed RS1735, Reactivity Calculations, Rev. 3 Change 03.
Copy of OS1008.01, CVCS Makeup Operations, Rev. 08, Change 40.

5.0 Limitations on performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

Procedures:

- RS1735, Reactivity Calculations.
- OS1008.01, CVCS Makeup Operations.
- OGP-1, Control Switch Operation.

Sys	KA	Description	Value RO/SRO
004	A4.07	Ability to manually operate and/or monitor boration/dilution in the control room.	3.9/3.7

7.0 Setting:

Simulator:

NOTE: This JPM is designed to be performed in parallel with JPM Pair D2, AS LONG AS the JPM D2 student is controlled to the back of the Main Control Board.

A. Initialize the simulator to IC 214, LEN Pair D1 D2, or any 100% IC. The student should not refer to the Chemistry Placard for current RCS and BAST concentrations. These values are provided in the body of the JPM and in the key.

B. Verify or Adjust the VCT level to approximately 40%. Click "External Parameters" then "Tanks". Double Click "VCT" and enter a value of 40%.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

15 Minutes

10.0 Directions to the Student(s):

Evaluator gives Tear-Off sheet to the student
Evaluator reads the following to the student (Optional for multiple JPMs)

Student:

A. Initial Conditions:

1. A manual makeup to the VCT is required due to normal system losses.

11.0 Initiating Cue:

"You are the PSO; perform a 500 gallon Manual blended makeup to the Charging Pump suction through CS-FCV-110B at 100 gpm. The blended makeup has been calculated and verified.

Use of STEP BACK is desired.

No FLUSH is required. "

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT UNSAT	INITIALS/DATE
1. P	Start time _____	Initiating cue read.		

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

CUE: Give the student the completed RS1735 for the 500 gallon blended makeup.

NOTE: Operators commonly perform this process during BOL and MOL operation until the amount of dilution exceeds normal system losses. This precludes Automatic Makeup operation.

2. P	Refers to OS1008.01 section 4.6 for Aligning Manual Blended Makeup To The VCT	Performs the following:		
4.6.1	a. DETERMINE the reactor coolant system boron concentration by referring to a recent chemical sample	a. Given with Dilution calculation. (1087 ppm)	____	____
4.6.2	b. DETERMINE the desired flows and quantities of boric acid and total makeup from RS1735, Reactivity Calculations.	b. Given with Dilution calculation	____	____

NOTE: Step 4.6.3 "Have an NSO read the local CS-F-5 Boric Acid Filter DP at least once daily during makeup. If the DP is approaching the MAX value initiate a Work Request.

CUE: If questioned about CS-F-5 DP: **CS-F-5 DP was monitored on the previous shift and is ~4 PSIG.**

4.6.4	c. TURN the BLENDER MODE START SWITCH to STOP.	*c. Turns Blender Mode Start Switch to STOP.	____	____
4.6.5	d PLACE the BORIC ACID BLENDER MODE SELECTOR SWITCH to MANUAL	*d. Places Boric Acid Blender Mode Selector Switch to MANUAL.	____	____
4.6.6	e. SET CS-FIQ-111, RCS makeup flow controller, to	*e. Sets CS-FIQ-111 (500 gallons).	____	____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
	the desired MAKEUP quantity.				
4.6.6.1	SELECT the "MAKEUP TARGET" screen.	Selects MAKEUP Screen	____	____	
4.6.6.2	Using the UP/DOWN arrow keys, SELECT "MAKEUP TARGET"	Selects Makeup Target	____	____	
4.6.6.3	PRESS the F3 key to display the current value.	Presses F3 key	____	____	
4.6.6.4	USE the LEFT/RIGHT arrow keys to select the significant digits.	Selects significant digits	____	____	
4.6.6.5	USE the UP/DOWN arrow keys to change the selected digit.	Changes significant digits	____	____	
4.6.6.6	When the desired MAKEUP quantity has been entered, PRESS the F3 key.	Presses F3 key when value is set.	____	____	
4.6.7	f. SET CS-FIQ-111, RCS makeup flow controller to the desired BORIC ACID quantity.	*f. Sets boric acid supply counter to the desired quantity (76 5 gallons).	____	____	
4.6.7.1	SELECT the "MAKEUP TARGET" screen.	Selects MAKEUP Screen	____	____	
4.6.7.2	Using the UP/DOWN arrow keys, SELECT "BORIC ACID TARGET"	Selects Boric Acid Target	____	____	
4.6.7.3	PRESS the F3 key to display the current value.	Presses F3 key	____	____	
4.6.7.4	USE the LEFT/RIGHT arrow	Selects significant digits	____	____	

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
	keys to select the significant digits.				
4.6.7.5	USE the UP/DOWN arrow keys to change the selected digit.	Changes significant digits	_____	_____	
4.6.7.6	When the desired BORIC ACID quantity has been entered, PRESS the F3 key.	Presses F3 key when value is set.	_____	_____	

NOTE Prior to Step 4.6.8 "The AUTO CAL Function allows the controller to calculate the optimal flow rate setpoint for total makeup and boric acid, based on the batch target volumes selected. Figure 5, AUTO CAL Flowrate Setpoints, contains a table showing flow rate vs target Volume."

CUE: If questioned about use of AUTO CAL: **AUTO CAL will not be used for this makeup.**

4.6.9	g. SET CS-FIQ-111, RCS makeup flow controller to the desired MAKEUP FLOWRATE	*g. Sets Makeup flowrate to the desired quantity 100 gpm.	_____	_____	
4.6.9.1	SELECT the "FLOW RATE SETPOINTS" screen.	Selects FLOW RATE SETPOINTS Screen	_____	_____	
4.6.9.2	Using the UP/DOWN arrow keys, SELECT "MAKEUP"	Selects Makeup	_____	_____	
4.6.9.3	PRESS the F3 key to display the current value.	Presses F3 key	_____	_____	
4.6.9.4	USE the LEFT/RIGHT arrow keys to select the significant digits(flow to the top of the VCT via CS-FCV-111B is limited to 70 gpm).	Selects significant digits	_____	_____	
4.6.9.5	USE the UP/DOWN arrow keys to change the selected digit.	Changes significant digits	_____	_____	

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
4.6.9.6	When the desired MAKEUP quantity has been entered, PRESS the F3 key.	Presses F3 key when value is set.	____	____	
4.6.10	h. SET CS- FIQ-111, RCS makeup flow controller to the desired BORIC ACID FLOWRATE.	*h. Sets Boric Acid flowrate 15.3 gpm.	____	____	
4.6.10.1	SELECT the "FLOW RATE SETPOINTS" screen.	Selects Flow Rate Setpoints Screen	____	____	
4.6.10.2	Using the UP/DOWN arrow keys, SELECT "BORIC ACID"	Selects Boric Acid	____	____	
4.6.10.3	PRESS the F3 key to display the current value.	Presses F3 key	____	____	
4.6.10.4	USE the LEFT/RIGHT arrow keys to select the significant digits.	Selects significant digits	____	____	
4.6.10.5	USE the UP/DOWN arrow keys to change the selected digit.	Changes significant digits	____	____	
4.6.10.6	When the desired MAKEUP quantity has been entered, PRESS the F3 key.	Presses F3 key when value is set.	____	____	

CUE: Per directions Step Back is being used so step 4.6.11 is N/A.

4.6.12	i. SET CS- FIQ-111, RCS makeup flow controller FLOWRATE SETPOINT SCREEN to FLUSH, 0 gallons	*i. Sets FLUSH volume to desired volume (0 gallons).	____	____	
4.6.12.1	Using the CS-FIQ-111 controller, SELECT the "FLOW RATE SETPOINTS"	Selects Flow Rate Setpoints Screen	____	____	

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT	 UNSAT	INITIALS/DATE
	screen.				
4.6.12.2	Using the UP/DOWN arrow keys, SELECT "FLUSH"	Selects FLUSH	____	____	
4.6.12.3	PRESS the F3 key to display the current value.	Presses F3 key	____	____	
4.6.12.4	USE the LEFT/RIGHT arrow keys to select the significant digits.	Selects significant digits	____	____	
4.6.12.5	USE the UP/DOWN arrow keys to change the selected digit or decimal point.	Changes significant digits	____	____	
4.6.12.6	When the desired FLUSH volume has been entered, PRESS the F3 key.	Presses F3 key when value is set.	____	____	
4.6.13	j. If it is desired to align the boric acid blender to the Charging Pumps, OPEN FCV-110B, BORIC ACID BLENDER TO CHG PUMPS.	*j. Opens CS-FCV-110B.	____	____	

NOTE: Insure the student remains "at the makeup controls" during the remainder of the JPM (per the CAUTION in Section 4.6 of OS1008.01). Since this is not a procedurally defined area, it cannot be evaluated as a critical step.

	k. TURN the BLENDER MODE START SWITCH to START and Hold for Approximately 1 second.	*k. Turns Blender Mode Start Switch to START.	____	____	
	l. VERIFY that the boric acid and total makeup flow rates match the preset values and that each flow controller stops flow when its preset quantity has been added.	l. Checks that boric acid and total MU flow rates match their preset values.	____	____	

D=Discuss P=Perform S=Simulate	ELEMENT/STEP *denotes a critical step	STANDARD *denotes critical standard	EVALUATION SAT UNSAT	INITIALS/DATE

CUE: JPM is faulted so that, after flow rates stabilize, CS-V-110A will fail closed causing a loss of Boric Acid flow, with only RMW dilution flow continuing. Students should report to US that blended makeup flow rate is erroneous and stop makeup.

CUE: If student recommends to the US that flow should be stopped: **"I Understand that there is a problem with the blended makeup. Stop the blended makeup."**

	m. TURN the BLENDER MODE START SWITCH to STOP.	*m Turns Blender Mode Start Switch to STOP.	____	____

CUE: When student has stopped RMW flow : **"The JPM is complete."**

3.	Stop time Evaluator calculates the time to complete the task.	Start - Stop time is ≤ 15 minutes.		

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM Pair D1

Directions to the Student:

A. Initial Conditions:

1. A manual makeup to the VCT is required due to normal system losses.

Initiating Cue:

"You are the PSO; perform a 500 gallon Manual blended makeup to the Charging Pump suction through CS-FCV-110B at 100 gpm. The blended makeup has been calculated and verified.

Use of STEP BACK is desired.

No FLUSH is required. "

Form E: Blended Makeup Worksheet

(Sheet 1 of 1)

1. Desired Makeup Boron Concentration (C_{MU}) 1087 ppm
2. Desired Makeup Flow Rate SETPOINT: FIQ-111 (F_{TOT}) 100 gpm
3. Boric Acid Storage Tank Concentration (C_{BAST}) 7100 ppm
4. Desired Makeup Quantity TARGET: FIQ-111 (G_{TOT}) 500 gals
5. Boric Acid Flow Rate SETPOINT: FIQ-111 (F_{BA})

$$F_{BA} = \frac{(C_{MU})(F_{TOT})}{C_{BAST}} = \frac{(1087)(100)}{(7100)} = 15.31 \text{ gpm}$$

6. Boric Acid Quantity TARGET: FIQ-111 (G_{BA})

$$G_{BA} = \frac{(C_{MU})(G_{TOT})}{C_{BAST}} = \frac{(1086)(500)}{(7100)} = 76.5 \text{ gal}$$

Calculated By: Edmund Villoras Date: 5.13.09

Independently Verified By: Timothy Hogan Date: 5.13.09

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
Pair E1 - L0139J

TRANSFER TO COLD LEG RECIRCULATION (CBS-V2 FAILS) AP

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: RO

0050500601 Align RH For SI Recirculation, Cold Leg
0060500301 Transfer SI To Cold Leg Recirculation

2.0 Conditions:

A. A reactor trip with SI occurred from 100% power.
B. The US has transitioned through E-0 to E-1, and is ready to transition to ES-1.3.
C. RWST level is decreasing toward the RWST LEVEL LO-LO setpoint.

3.0 Standards:

A. Align ECCS equipment to the Cold Leg Recirculation Mode within the time limits specified in the body of this JPM. The time limits were determined in DCR 00-0013, "Manual Transfer to Cold Leg Recirculation Timing".

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of ES-1.3, Transfer To Cold Leg Recirculation Rev. 25

5.0 Limitations On Performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

CR 01-07468-01 [DCR 00-0013, Manual Transfer to Cold Leg Recirculation Timing (Entire JPM)]

Procedures:

- ES-1.3, Transfer To Cold Leg Recirculation

Sys	KA	Description	Value RO/SRO
013	A1.06	Predict/monitor changes in RWST levels.	3.6/3.9
013	A1.08	Predict/monitor changes in Ctmt sump level.	3.7/3.8
013	A3.02	Monitor operation of actuated equipment.	4.1/4.2
013	A4.03	Manually operate ESFAS initiation.	4.5/4.7

7.0 Setting:

Reset the simulator to IC 210, LEN Pair E1RO E1SRO, or any 100% IC which contains the following:

A. Initialize to any 100% IC.
B. Using Panel Graphics PBF11, override the control switch for CBS-V2 to the "THR-OPEN" position.
C. Insert malfunction mfRC024A double-ended RCS Cold Leg Break.
D. Run the simulator while performing the following per E-0 and E-1:
   1. Trip RCPs.
   2. Reset SI.
   3. Throttle EFW to 150 gpm per SG.
   4. Shutdown EDGs by stopping both, shutting SW-V16, and 18, resetting both diesels.
   5. Place the simulator in freeze when the RWST is at approximately 135,000 gallons to ensure the automatic swapover signal has not actuated.

Place simulator in run (only as long as needed) to ensure all alarms are acknowledged prior to start of JPM. Excessive simulator run time prior to start of JPM may cause RWST LO LO alarm to annunciate.

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

20 minutes

10.0 Directions To The Student(s):

1. Ensure task is done correctly.
2. You may be asked follow-up questions to confirm knowledge of the task.

Evaluator gives Tear-Off sheet to the student.
Evaluator reads the following to student (Optional for multiple JPMs):

A. Initial Conditions:

a. A reactor trip with SI occurred from 100% power.

b. The US has transitioned through E-0 to E-1, and is ready to transition to ES-1.3.

c. RWST level has decreased to approximately 135,000 gallons.

d. Any required FRPs have been completed.

11.0 Initiating Cue:

"You are the Primary watch. Transfer the Emergency Core Cooling System to Cold Leg Recirculation per ES-1.3 after receiving the RWST Level Lo-Lo alarm."

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT UNSAT	INITIALS/DATE

NOTE: This JPM is faulted – CBS-V2 fails to close. The student must use the RNO Column in Step 2 of ES-1.3. Under this condition, certain ES-1.3 actions have time limits that must be met to pass the JPM. Due to a single active failure the actions and time limits are:

RH-P-8A & CBS-P-9A in PTL: ≤ 5 min. 48 sec. From "RWST LEVEL LO-LO" alarm actuation;
All CCPs and SIPs STOPPED: ≤ 11 min. from "RWST EMPTY" alarm actuation.

NOTE: VERIFY THAT THE CONTROL SWITCH FOR CBS-V2 IS IN THE "AUTO" POSITION!

NOTE: Ensure that student is ready to begin the JPM before placing simulator in run

1. P Start time _____ Initiating cue read.

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

Record time of "RWST LEVEL LO-LO" alarm actuation: TIME _____

2. P Reset SI. Verifies SI reset. _____ _____ _____

3. P Verify Containment sump recirc. Valves – <u>FULL OPEN:</u>

   a. TRAIN A – CBS-V8 — a. Verifies CBS-V-8 is open. _____ _____ _____

   b. TRAIN B – CBS-V14 — b. Verifies CBS-V-14 is open. _____ _____ _____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE

NOTE: IAW SM 7.20 Figure 5.1 the 3 minute time requirement to close CBS-V2 and CBS-V-5 only applies when there is not a single active failure.

*4.	P.	Simultaneously close RWST suction valves.			
	a. TRAIN A – CBS-V2	*a. Attempts to close CBS-V-2. and discovers that CBS-V-2 will not close	_____	_____	_____
	b. TRAIN B – CBS-V5	*b. Closes CBS-V-5.	_____	_____	_____
	c. If a valve cannot be fully closed then place corresponding RHR and CBS pumps in PTL.	*c. Places CBS-P-9A and RH-P-8A in PTL.	_____	_____	_____
	Record time RH- P-8A & CBS-P-9A in PTL	TIME _____			
		*– TIME _____ ≤ 5 Min. 48 sec. after RWST LO LO"	_____	_____	_____

NOTE: If the RWST EMPTY alarm occurs prior to opening RH-V35 & 36, the student is expected to stop all pumps taking suction from the RWST (CCPs & SIPs). The student must leave the Train A RHR and CBS pumps running.

If the RWST EMPTY alarm does not actuate, the following two times are not applicable.

Record time of "RWST EMPTY" alarm actuation TIME _____

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
		Record time all CCPs & SIPs stopped	TIME _____			
			*– TIME _____ ≤ 11 min. after "RWST EMPTY"	_____	_____	_____
5.	P	Align ECCS for Cold Leg recirculation:				
		a. Verify RHR Pumps – at least one running.	a. Verifies RH-P-8B running.	_____	_____	_____
		b. Place running RHR pump switches in NA-START.	b. Places RH-P-8B switch in NA-START.	_____	_____	_____
		c. Close SI pump mini-flow valve SI-V89	*c. Closes SI-V89	_____	_____	_____
		d. Close SI pump mini-flow valve SI-V90	*d. Closes SI-V90	_____	_____	_____
		e. Close SI pump mini-flow valve SI-V93 **Note: Takes CS to CLOSE then turns ON Control Power for SI-V93.**	*e. Closes SI-V93	_____	_____	_____
		f. Energize MCC-E522	*f. Energizes MCC-E522	_____	_____	_____
		g. Energize MCC-E622	*g. Energizes MCC-E 622	_____	_____	_____

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	UNSAT	INITIALS/DATE
	h. Close RH-V14, RHR discharge to cold legs 1 and 2.	*h. Closes RH-V-14.	_____	_____	_____
	i. Open SI and CCP suction cross-connect CS-V460:	*i. Opens CS-V460	_____	_____	_____
	j. Open SI and CCP suction cross-connect CS-V461	*j. Opens CS-V461	_____	_____	_____
	k. Open SI and CCP suction cross-connect CS-V475	k. Verifies open CS-V475	_____	_____	_____
	l. Open RHR supply to SI and CCP suction RH-V35	*l. Opens RH-V35	_____	_____	_____
	m. Open RHR supply to SI and CCP suction RH-V36	m. Opens RH-V36.	_____	_____	_____
	n. Start any pump that was stopped due to RWST empty alarm.	*n. No action required since the empty alarm should not come in.	_____	_____	_____
6. P	Isolate RWST feed to CCPs and SI pumps.	Isolates RWST feed to CCPs and SI pumps.			
	a. Close SI pump suction valve CBS-V47	a. Closes CBS-V47	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
	b. Close SI pump suction valve CBS-V51	b. Closes CBS-V51	_____	_____	_____
	c. Close CCP suction valve CS-LVC-112D.	c. Closes CS-LVC-112D.	_____	_____	_____
	d. Close CCP suction valve CS-LVC-112E.	d. Closes CS-LVC-112E.	_____	_____	_____

CUE: "The JPM is complete."

7.	Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.			
8.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM				_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM pair E1

Directions to the Student:

A. Initial Conditions:

a. A reactor trip with SI occurred from 100% power.

b. The US has transitioned through E-0 to E-1, and is ready to transition to ES-1.3.

c. RWST level has decreased to approximately 135,000 gallons.

d. Any required FRPs have been completed.

Initiating Cue:

"You are the Primary watch. Transfer the Emergency Core Cooling System to Cold Leg Recirculation per ES-1.3 after receiving the RWST Level Lo-Lo alarm."

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
Pair E2 - L0085J Rev. 03 AP

ESTABLISH SG FEED FLOW FROM SUFP

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

Position: RO

0590102101 Start The Startup Feed Pump
0610100401 Feed Steam Generators With EFW System

2.0 Conditions:

A. The plant tripped from 100% power due to SG low-low level.
B. Both feed pumps tripped on low suction pressure, initiated by a loss of 4.16 kV bus 3. Bus 3 has a major fault and is unavailable.
C. The B condensate pump and motor-driven EFW pump are tagged out for major maintenance and are unavailable.
D. The US transitioned from E-0 to FR-H.1 due to lack of EFW flow. The steam-driven EFW pump tripped on over speed, and the roving NSO has been unable to reset MS-V129. The SUFP tripped on over current and is being checked by the duty electrician and the Secondary NSO.
E. RCPs are tripped, and bleed and feed has been established due to 3 SG WR levels <30%.
F. The US is currently at step 21 in FR-H.1.

3.0 Standards:

Establish SUFP flow of greater than 500 gpm to the steam generators.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of FR-H.1, Response To Loss Of Secondary Heat Sink, Rev. 32.
Copy of OS1035.02, Startup Feed Pump Operation, Rev. 08, Chg. 7.

5.0 Limitations On Performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

Procedures:

- FR-H.1, Response To Loss Of Secondary Heat Sink
- OS0135.02, Startup Feed Pump Operation

Sys	KA	Description	Value RO/SRO
061	K4.02	AFW automatic start.	4.5/4.6
061	K4.14	AFW automatic isolation.	3.5/3.7
061	A3.04	Monitor AFW automatic isolation.	4.1/4.2
2.1	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of operation.	4.3/4.4

7.0 Setting:

Reset the simulator to IC 210, LEN Pair E1SRO, or any 100% IC which contains the following:

1. Initialize to the 100% IC. Place the simulator in RUN.
2. Place CO-P30C in service and place control switch for CO-P30B in PTL.
3. Insert component remote function bkCOP30B RF: rackout.
4. Place simulator in FREEZE.
5. Place FW-P37B control switch in PTL
6. Insert component remote function bkFWP37B RF: rackout.
7. Insert component remote function mvFWV347 RF: open breaker.
8. Insert malfunction mfFW041 SUFP FW-P113 Bus E5 faulty 86 device
9. Insert component remote function rmvMSV129 Value=0.
10. Insert malfunctions mfRPS001 and mfRPS002 AUTO reactor trip failure Train A & B.
11. Using panel graphics section PGF07A insert override Bus 3 RAT breaker control switch in PTL.
12. Insert malfunction bkED3UAT Fail open
13. Place the simulator in RUN.
14. Manually trip the reactor when SG wide range levels reach approximately 50%
15. When 3 wide range SG levels reach 30% initiate bleed and feed IAW FR-H.1
16. Stop all RCPs
17. Reset S and T signals
18. Open both PZR. Adverse Containment should result.
19. Place simulator in FREEZE when RCS temperature has decreased from bleed and feed and dry SG conditions exist.

Place the simulator in RUN. Acknowledge all alarms. Place danger tags on CO-P30B, FW-P37B and FW-V347. Ensure RCS temperature is decreasing prior to start of JPM

8.0 Safety Considerations:

None

9.0 Approximate Completion Time:

20 minutes

10.0 Directions To The Student(s):

1. Ensure task is done correctly.
2. You may be asked follow-up questions to confirm knowledge of the task.

Evaluator gives Tear-Off sheet to the student.
Evaluator reads the following to student (Optional for multiple JPMs):

A. Initials Conditions:

1. The steam-driven EFW pump tripped on over speed and is unavailable.

2. The SUFP tripped on over-current and is being checked by the duty electrician and the Secondary NSO.

3. RCPs are tripped, and bleed and feed has been established due to 3 WR SG levels <30%. RCS temperature is stable and Containment Pressure is 6 psig and increasing.

11.0 Initiating Cue:

"An NSO is standing by to switchover the SUFP from bus 5 to bus 4 using OS1035.02, Startup Feed pump Operation. All prerequisites are met in OS1035.02

When power is available to the SUFP continue with step 4 of FR-H.1 to restore feed flow."

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
NOTE:	Ensure that student is ready to begin the JPM before placing simulator in run.					
1.	P	Start time _____	Initiating cue read.			
CUE:	If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**					
CUE:	If student has questions pertaining to prerequisites and initial conditions, US to BOP CRO, **"Secondary operator, all prerequisites and initial conditions are met for OS1035.02."**					
2.	P	Per FR-H.1 step 4a RNO the US directs the secondary operator to initiate switchover of the SUFP from bus 5 to bus 4 per OS1035.02 Sect. 4.4, STARTUP FEED PUMP OPERATION.	Obtains OS1035.02 and refers to applicable step.	_____	_____	_____
*3.	P	Remove SUFP from service per OS1035.02 section 4.2 as follows: Check/PLACE both Bus 4 and 5 SUFP control switches in PULL TO LOCK.	Removes SUFP from service per OS1035.02 section 4.2 as follows: * Places both SUFP control switches in PTL.	_____	_____	_____
CUE:	Provide the following cue when asked about SUFP suction alignment, **"The SUFP is not aligned to condensate cleaning"**					
CUE:	(If required) provide the following cue, **"The Secondary NSO is standing by at Bus E5 to assist you."**					
4.	P	Transfer SUFP to bus 4 per OS1035.02, Section 4.3 or 4.4.	Transfers SUFP to bus 4 per OS1035.02, Section 4.4 as follows:			
NOTE:	Directions to NSO in the following steps may be given one step at a time, as a group, or by direction to perform OS1035.02 steps 4.4.2 through 4.4.8. Steps 4a-4d are not required to be performed due to the way the direction may be given to the NSO.					

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	UNSAT	INITIALS/DATE
	a. Verify SUFP Bus 5 breaker open	a. Verifies SUFP Bus 5 breaker open	_____	_____	_____
	b. Direct NSO to rack out SUFP Bus 5 breaker node A93 and remove Kirk Key	b. Directs NSO to (perform step 4.4.3 and step 4.4.4) rack out SUFP Bus 5 breaker node A93 and remove Kirk key	_____	_____	_____

NOTE: For steps 4.4.3 to 4.4.9, the NSO will have a copy of procedure and the BOP operator may direct the NSO to complete these steps per the procedure without step-by-step direction.

NOTE: Rack out SUFP Bus 5 breaker: - LOCAL PANELS – Feedwater/MVD-SUFP- Bus 5 RACK OUT

	c. Direct NSO to position power supply selector switch to Bus 4 position using GE-75 local/remote key then remove the key	c. Directs NSO to (perform step 4.4.5 and step 4.4.6) position power supply selector switch to Bus 4 position using GE-75 local/remote key then remove the key	_____	_____	_____

NOTE: Control Power for SUFP Bus 4 breaker: LOCAL PANELS – Feedwater/MVD – SUFP-Control Power Bus Selector SW to Bus 4.

	d. Direct NSO to insert Kirk key and rack in SUFP Bus 4 breaker	d. Direct NSO to (perform step 4.4.7 and step 4.4.8) insert Kirk key and rack in SUFP Bus 4 breaker	_____	_____	_____

NOTE: Rack in SUFP Bus 4 breaker: -LOCAL PANELS – Feedwater/MVD – SUFP-Bus 4 RACK IN

CUE: NSO to Secondary operator, **" I have completed the swap of the power supply for the SUFP from Bus 5 to Bus 4."**

CUE: When the student informs the US that the SUFP has been shifted to bus 4:
If necessary: "We will complete Form "B" Independent Verification Checklist later."
If necessary, "We will continue to refer to FR-H.1 step 4 to establish SUFP flow."

5.	P	Check CST level - GREATER THAN 250,000 GALLONS	Verifies and reports CST level - GREATER THAN 250,000 GALLONS	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE

NOTE: The student may shut the EFW flow control valves, prior to opening FW-V156 or FW-V163, then throttle them open to establish flow after FW-V156 and 163 are open. Direction given in step 21 of FR-H.1 was to **refer** to step 4 to establish SUFP flow. Dry SG conditions exist requiring feeding only one SG so EFW flow control valves must be repositioned prior to initiating flow. The same direction is given on the OAS page.

6.	P	Establish feed flow to EFW header:				
		a. RESET RMO , as necessary	a. Resets RMO (not necessary)	_____	_____	_____

CUE: If asked RCS Temperature is stable.

	*b. Start the SUFP	*b. Starts the SUFP	_____	_____	_____
	*c. Open FW-V156	*c. Opens FW-V156.	_____	_____	_____

CUE: Containment pressure is adverse.

	*d. IF any SG wide range level is less than 14% (30% adverse containment) THEN observe dry SG cautions and notes on OAS page.	*d Determines that ALL levels are below dry SG level criteria. SHUTS EFW flow control valves to control dry SG feed flow.			

NOTE: Candidate should close EFW throttle valves for at least three SGs before opening FW-V163. Candidate may also close all EFW throttle valves, open FW-V163 and then open the throttle valves to the selected SG.

	*e. Throttle open FW-V163 to minimize water hammer and establish flow.	*e. Throttles open FW-V163 and one dry SG EFW flow control valve to establish <100 GPM flow to a single intact S/G.	_____	_____	_____

CUE: "The JPM is complete."

13.	Stop time _____ Evaluator calculates the time to complete the task.	Time to complete the task ≤ 20 minutes.			

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT UNSAT	INITIALS/DATE
14.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM			_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM Pair E2

Directions to the Student:

A. Initial Conditions:

1. The steam-driven EFW pump tripped on over speed and is unavailable.
2. The SUFP tripped on over-current and is being checked by the duty electrician and the Secondary NSO.
3. RCPs are tripped, and bleed and feed has been established due to 3 WR SG levels <30%. RCS temperature is stable and Containment Pressure is 6 psig and increasing.

Initiating Cue:

"An NSO is standing by to switchover the SUFP from bus 5 to bus 4 using OS1035.02, Startup Feed pump Operation. All prerequisites are met in OS1035.02

When power is available to the SUFP continue with step 4 of FR-H.1 to restore feed flow."

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 IN PLANT # 1 - L0016J Rev. 06

RESET STEAM DRIVEN EFW PUMP TRIP VALVE

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

1.0 Task Number and Description:

Position: NSO

0610401204 Reset The Turbine Driven EFW Pump Trip Valve.

2.0 Conditions:

A. The plant is in Mode 3 following a trip from 100% power.
B. All station AC electrical power has been lost.
C. The Turbine Driven EFW Pump started and then tripped.

3.0 Standards:

Reset the turbine driven EFW pump trip valve and start FW-P-37A per OS1036.03, Resetting The Steam Driven EFW Pump Trip Valve.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of OS1036.03, Resetting the Steam Driven EFW Pump Trip Valve, Rev. 2, Chg. 8.
Copy of OS1090.01, Manual Operation of Remote Operated Valves, Rev. 6, Chg. 6

5.0 Limitations On Performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

Procedures:

- OS1036.03, Resetting The Steam Driven EFW Pump Trip Valve
- OS1090.01, Manual Operation Of Remote Operated Valves

Technical Specifications:

- 3.7.1.2, AFW System
- 3.7.1.3, CST

Sys	KA	Description	Value RO/SRO
061	A2.04	Ability to predict impact and use procedure to correct, control, mitigate AFW pump failure.	3.4/3.8
2.4	2.4.35	Knowledge of local auxiliary operator tasks during emergency operations.	3.8/4.0

7.0 Setting:

Plant, EFW Pumphouse.

8.0 Safety Considerations:

- Possible automatic pump start.

9.0 Approximate Completion Time:

10 minutes

10.0 Directions To The Student(s):

Evaluator gives Tear-Off sheet to the student.
Evaluator reads the following to student (Optional for multiple JPMs):

A. Initial Conditions:

1. The plant is in Mode 3 following a trip from 100% power.
2. All station AC electrical power has been lost.
3. The Turbine Driven EFW Pump started and then tripped.

11.0 Initiating Cue:

"Roving NSO (or student's name), Reset MS-V-129 using OS1036.03, Resetting The Steam Driven EFW Pump Trip Valve, then restart the steam driven EFW pump."

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
1. P	Start time_____	Initiating cue read.			

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: Student should review note prior to step 4.1.1.

*2. S	Reset MS-V-129, EFW pump turbine trip valve:				
		*a. Simulates pulling and holding the trip rod toward MS-V-129.	_____	_____	_____

CUE: When student simulates pulling and holding trip rod toward MS-V-129, cue, evaluator to student, **"The trip is being held towards MS-V-129."**

	*b. Simulates checking / placing the flat of the washer against the trip rod.	_____	_____	_____

CUE: When student simulates placing the flat of the washer against the trip rod, cue, evaluator to student, **"The flat of the washer is against the trip rod."**

	c. Simulates verifying the trip plunger is in place.	_____	_____	_____

CUE: When student simulates verifying that trip plunger has dropped into place, cue evaluator to student, **"The trip plunger is in place."**

	d. Simulates releasing the tripping rod.	_____	_____	_____

CUE: When student simulates releasing the tripping rod, cue evaluator to student, **"The tripping rod is released and remains in position."**

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
		e. Refers to Figure 2 and verifies the flat side of washer is engaged with the flat side of the head lever and is not tilted or bound			

CUE: When student refers to figure 2 cue evaluator to student, **"The flat side of washer is engaged with the flat side of the head lever and is not tilted or bound."**

		*f. Resets MS-V-129 - simulates turning the handwheel CW until the latch snaps into place.	_____	_____	_____

CUE: When student simulates turning MS-V-129 handwheel CW, cue evaluator to student, **"The latch is engaged, or as you see it."**

NOTE: At this point the student transitions to Section 4.2 of the procedure.

CUE: If the control room is contacted, acknowledge, then US to NSO, **"Restart the steam driven EFW pump locally."**

*3.	S	Verify MS-V-129 is reset.	Verifies MS-V-129 is reset.	_____	_____	_____

CUE: Evaluator to student, **"MS-V-129 is reset."**

NOTE: If student asks about valves in Step 4.1.8, respond: **"No the valves are CLOSED."** This should prompt the student to refer back to step 4.1.7 and return to section 4.2.

*4.	S	Check open/open FW-V-346, EFW pump A mini-flow.	Checks open/opens FW-V-346, EFW pump A mini-flow.	_____	_____	_____

CUE: If the student checks the position of FW-V-346 locally, evaluator to student, **"The valve is as indicated."**

CUE: If the control room is contacted regarding status of FW-V-346, US to NSO, **"No power is available to remotely open FW-V-346. Open FW-V-346 locally."**

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE

NOTE: Provide student required portion of OS1090.01 if requested.

CUE: If required, cue evaluator to student, **"FW-V-346 is deenergized at MCC-515 node C3S."**

CUE: If the control room is contacted regarding step 3.2.4 of OS1090.01 in reference to the de-clutch lever limitations on FW-V-346, US to NSO, **"This is an emergency. Locally open FW-V-346."**

*5. S Open FW-V-346 locally.

*a. Simulates pressing the declutch lever down to engage manual handwheel _____ _____ _____

CUE: When student simulates pressing the declutch lever, cue, evaluator to student, **"The declutch level has been pressed. The manual handwheel is engaged."**

*b. Simulates locally opening FW-V-346 _____ _____ _____

CUE: When student simulates turning the handwheel CCW, cue, evaluator to student, **"The valve is open."**

*6.	S	Slowly open MS-V-129 to increase speed to 3600 rpm. as read on FW-ST-TM-1	Simulates slowly opening MS-V-129 to increase speed to 3600 rpm.	_____	_____	_____

CUE: When student checks local rpm indicator FW-ST-TM-1after simulating turning MS-V-129 handwheel CCW, evaluator to student, **"Speed is increasing to 3600 rpm."**

*7.	S	Verify that speed remains below 3750 rpm while slowly opening MS-V-129 to full open	Slowly opens MS-V-129 to full open while verifying speed remains below 3750 rpm.	_____	_____	_____

CUE: When the student verifies EFW pump speed remains below 3750 rpm as MS-V-129 is simulated being fully opened, evaluator to student, **"Speed is steady at 3675 rpm."**

*8.	S	Close MS-V-129 ¼ turn from backseat.	Close MS-V-129 ¼ turn from backseat.	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT UNSAT	INITIALS/DATE

CUE: When student simulates turning MS-V-129 handwheel ¼ turn, cue, evaluator to student, **"The valve is closed ¼ turn."**

CUE: **"The JPM is complete."**

9.	Stop time _____ Evaluator calculates time to complete task.	Time to complete the task ≤ 10 minutes.		
10.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM			_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 INPLANT #1

A. Initial Conditions:

1. The plant is in Mode 3 following a trip from 100% power.
2. All station AC electrical power has been lost.
3. The Turbine Driven EFW Pump started and then tripped.

Initiating Cue:

"Roving NSO (or student's name), Reset MS-V-129 using OS1036.03, Resetting The Steam Driven EFW Pump Trip Valve, then restart the steam driven EFW pump."

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 IN PLANT #2 – NEW

ASDV LOCAL OPERATION

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: Signature/Date on file DATE: _____
TRAINING SUPERVISOR

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT UNSAT	INITIALS/DATE

1.0 Task Number and Description:

Position: NSO

0410150104 Locally Operate The ASDVs To Cooldown The RCS

2.0 Conditions:

A. The reactor tripped due to a loss of offsite power.
B. All SGs pressures are being controlled using POSITION MAINTAINED on the ASDVs. SG pressures are now decreasing to less than 250 psig. The "D" ASDV did not respond when the valve demand was changed from POSITION MAINTAINED to CLOSE. Local control of the "D" ASDV is required to CLOSE the ASDV and restore control of the SG pressure boundary.

3.0 Standards:

Simulate local operation of partially failed OPEN ASDV per ECA-0.0, Attachment J.

4.0 Student Materials:

Copy of the Tear-Off Sheet.
Copy of ECA-0.0, Attachment J

5.0 Limitations On Performance:

Simulate/Perform all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

6.0 References:

Procedures:

- ECA-0.0, Loss Of All AC Power, Attachment J.

Sys	KA	Description	Value RO/SRO
2.4	2.4.35	Knowledge of local auxiliary operator tasks during emergency operations.	3.8/4.0
035	K6.02	Knowledge of the effect of a loss or malfunction of an ASDV on S/Gs.	3.1/3.5

7.0 Setting:

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT UNSAT	INITIALS/DATE

Plant, east or west pipe chase.

8.0 Safety Considerations:

Pipe chase posted entry instructions.
Do not climb on handrails or piping during simulation.

9.0 Approximate Completion Time:

15 minutes

10.0 Directions To The Student(s):

Evaluator gives Tear-Off sheet to the student.
Evaluator reads the following to student (Optional for multiple JPMs):

A. Initial Conditions:

1. The reactor tripped due to a loss of offsite power.
2. The US has been using ECA-0.0 at step 17, Manually Control SG ASDV to maintain SG pressures at 250 psig using POSITION MAINTAINED.
3. SG pressures are now decreasing to less than 250 psig. When the BOP operator took "D" ASDV from POSITION MAINTAINED to CLOSE the valve did not respond.
4. You will be required to take local control of the "D" ASDV and CLOSE the ASDV.

11.0 Initiating Cue:

"Get a copy of ECA-0.0 Attachment J, and take local manual control of MS-PV-3004, the 'D' ASDV and close the valve."

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
1. P	Start time _____	Initiating cue read.			

CUE: If the student requests a Peer Check at any time during the JPM, "respond, **"No one is available to peer check your actions. Please continue with the task".**

NOTE: Do not permit climbing on railings or plant equipment for safety concerns.

2. S	Use ladder staged in pipe chase stairwell for ASDV operation.	Uses ladder staged in pipe chase stairwell for ASDV operation.	_____	_____	_____

NOTE: When the student indicates he will obtain the staged ladder locked to the hand rail next to the D ASDV, the evaluator may allow student to SIMULATE using the ladder.

NOTE The ASDV is an AIR to OPEN, SPRING PRESSURE to CLOSE valve. For this JPM the ASDV is partially OPEN with the Instrument Air not bleeding off the valve actuator correctly, preventing the spring pressure from fully closing the valve. When the student looks at the valve the Actuator Shaft is partially exposed above the manual override shaft, but the clevis notch in the actuator shaft is not exposed.

CUE: **"The ASDV is HERE (point at 20% on valve stem). The Actuator Shaft is partially exposed, but the clevis notch is not visible.**

*3. S	Unscrew clevis from manual override shaft.	Unscrews clevis from manual override shaft.	_____	_____	_____

CUE: When student simulates turning clevis CCW at the top of the actuator, cue, evaluator to student, **"The clevis has been unscrewed."**

*4. S	Turn handwheel in the engaged direction to expose actuator shaft above manual override shaft.	Exposes actuator shaft by turning handwheel in the engaged direction (CCW).	_____	_____	_____

CUE: When student simulates turning handwheel in the engaged CCW direction, cue, evaluator to student, **"The actuator shaft is exposed above the manual shaft override."** If candidate turns the valve in Clockwise direction, the valve does not move.

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT	 UNSAT	INITIALS/DATE
*5.	S	Slide clevis onto actuator shaft notch.	Engages actuator by inserting clevis onto notch.	_____	_____	_____

CUE: When student simulates engaging actuator by sliding clevis onto actuator shaft notch, cue, evaluator to student, **"The clevis is on the actuator shaft notch."**

*6.	S	Request that the control room places the selector switch for the ASDV in the MODULATE position.	Simulates contacting the Control Room to request ASDV control switch in MODULATE position	_____	_____	_____

CUE: When the student calls control, respond: **"The selector switch for "D" ASDV is in the MODULATE position".**

*7.	S	Place bypass valve on the Bailey positioner in MAN.	Places bypass valve on the Bailey positioner in MAN.	_____	_____	_____

CUE When student simulates pressing and turning the bypass valve to MAN, cue, evaluator to student, **"The Bailey Positioner is in manual."**

NOTE: When the bypass valve is taken to MAN, Air pressure should begin to bleed off the valve.

CUE: **Air Bleeds Off the Valve.**

8.	S	Inform control room that the "D" ASDV is in local manual control.	Informs control room that the, "D" ASDV is in local manual control.	_____	_____	_____

CUE: When student calls control, respond, **"I copy, you have manual control of the "D" ASDV. Close the "D" ASDV."**

*9.	S	Throttle the ASDV to desired position using the handwheel.	Turns handwheel in the CLOSE direction until ASDV is full closed.	_____	_____	_____

CUE: When student simulates turning handwheel in the CLOSED direction, cue, evaluator to student, **"The valve CLOSES."**

*10.	S	Inform control room that the "D" ASDV is closed.	Informs control room that the "D" ASDV is CLOSED.	_____	_____	_____

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT UNSAT	INITIALS/DATE
CUE:	When student calls control, respond, **"I copy, the "D" ASDV is CLOSED.",**			
CUE:	**"The JPM is complete."**			
11.	Stop time _____ Evaluator calculates time to complete task.	Time to complete the task ≤ 15 minutes.		
12.	Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM			_____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 INPLANT #2

A. Initial Conditions:

1. The reactor tripped due to a loss of offsite power.
2. The US has been using ECA-0.0 at step 17, Manually Control SG ASDV to maintain SG pressures at 250 psig using POSITION MAINTAINED.
3. SG pressures are now decreasing to less than 250 psig. When the BOP operator took "D" ASDV from POSITION MAINTAINED to CLOSE the valve did not respond.
4. You will be required to take local control of the "D" ASDV and CLOSE the ASDV. .

Initiating Cue:

"Get a copy of ECA-0.0 Attachment J, and take local manual control of MS-PV-3004, the 'D' ASDV and close the valve."

FPL Energy

Seabrook Station

JOB PERFORMANCE MEASURE
2009 INPLANT -3- L0162J RSS

DEENERGIZE BUS 5 DUE TO FIRE DURING RSS

Student Name: _____ LMS #: _____

Evaluator Name: _____ LMS #: _____

Student Signature: _____ Date: _____
(optional)

Evaluator Signature: _____ Date: _____

SAT UNSAT

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: _____ DATE: _____
TRAINING SUPERVISOR

JOB PERFORMANCE WORKSHEET

1.0 Task Number and Description:

SBK 1180400904 DEENERGIZE BUS 5 DUE TO FIRE DURING RSS

2.0 Conditions:

A. Plant is in Mode 1.
B. A valid fire condition exists in the Cable Spreading Room.
C. OS1200.00 has been entered
D. RSS-CRO has been directed to go to B Essential Switchgear Room IAW OS1200.00 step 2 RNO.
E. RSS-NSO has been directed to DG 1A local control panel IAW OS1200.00 step 2 RNO.
F. Train A Essential Switchgear is not habitable due to smoke

3.0 Standards:

During Remote Safe Shutdown Event deenergize Bus E5 in accordance with OS1200.02B Remote Safe Shutdown Control – Train B.

4.0 Student Materials:

Copy of the Tear-Off sheet.
OS1200.02B Rev 12 Chg 01
Student should have a flashlight.

5.0 Limitations on performance:

Simulate all steps. Verbalize all actions to the evaluator.
Even if requested, no Peer Checks will be provided during the JPM.

Times recorded are at the completion of the referenced step.

6.0 References:

Procedures:

- OS1200.00 Response to Fire or Fire Alarm Actuation
- OS1200.02B Remote Safe Shutdown Control – Train B.
- SM 7.20, Time Critical Action policy

Sys	KA	Description	Value RO/SRO
2.4	2.4.35	Knowledge of local auxiliary operator tasks during emergency operations.	3.8/4.0
068	K1.01	Knowledge of the physical connections and/or cause effect relationships between the ED/G system and the AC distribution system.	4.1/4.4
2.1	2.1.30	Ability to locate and operate components, including local controls.	4.4/4.0

7.0 Setting:

B DG room

8.0 Safety Considerations:

Potential high noise from automatic DG start (Potential for inadvertent ESFA exists). DO NOT climb on top of the DG or any sensitive structure such as instrument lines. DO NOT operate any equipment.

9.0 Approximate Completion Time:
10 minutes
Performance of this task is time critical

10.0 Directions to the Student:

Evaluator gives Tear-Off sheet to the student
Evaluator reads the following to the student (Optional for multiple JPMs)

Take the applicant to the "A" DG Room.

Student

1. Ensures task is done correctly.
2. You may be asked follow-up questions to confirm knowledge of task.

A. Initial Conditions:

1. Plant is in Mode 1
2. There is a fire in the Cable Spreading Room.
3. OS1200.00 Response to Fire or Fire Alarm Actuation has been entered.
4. RSS-CRO is presently at step 25b of OS1200.02B
5. Train "A" Essential Switchgear is not habitable due to smoke
6. You have the necessary keys on your key ring.

11.0 Initiating Cue:

"RSS-NSO De-energize Bus E5 per OS1200.02B Attachment C, beginning at Step 1.c. This is a time critical JPM."

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate	ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT UNSAT

NOTE: When student demonstrates the ability to obtain a controlled copy of OS1200.02B Remote Safe Shutdown Control – Train B provide the student with a copy of OS1200.02B Remote Safe Shutdown Control – Train B.

CUE: If the student requests a Peer Check at any time during the JPM, respond: **"No one is available to peer check your actions. Please continue with the task".**

NOTE: **This JPM is time critical**. Start timing when student begins simulating performance of Attachment C step 1.b.

1.	P	Start Time _____	RSS-NSO commences the performance of Attachment C step 1.b.	
*2.	S	Place the following breaker selector switches to local: • Generator Breaker	Simulates placing the following selector switches to local: * • Generator Breaker	_____ _____

CUE: When student correctly simulates placing selector switch in local, evaluator to NSO, **"Generator breaker selector switch is in local."**

	*	• UAT breaker	* • UAT breaker	_____ _____

CUE: When student correctly simulates placing selector switch in local, evaluator to NSO, **"UAT breaker selector switch is in local."**

	*	• RAT breaker	* • RAT breaker	_____ _____

CUE: When student correctly simulates placing selector switch in local, evaluator to NSO, **"RAT breaker selector switch is in local."**

3.	S	Open DG 1A generator breaker	Simulates opening DG 1A generator breaker	_____ _____

CUE: When student correctly simulates opening DG 1A breaker evaluator to NSO, **"Diesel Generator 1A breaker is open." NOTE:** Green light ON, Red light OFF

*4.	S	Open UAT-X-2A breaker	Simulates opening UAT-X-2A breaker	_____ _____

CUE: When student correctly simulates opening UAT-X-2A breaker, evaluator to NSO, **"UAT breaker is open."**

PERFORMANCE CHECKLIST

D=Discuss P=Perform S=Simulate		ELEMENT/STEP * denotes a critical step	STANDARD * denotes a critical step	EVALUATION SAT UNSAT
5.	S	Open RAT-X-3A breaker	Simulates opening RAT-X-3A breaker	_____ _____

CUE: When student correctly simulates opening RAT-X-3B breaker evaluator to NSO, **"RAT breaker is open." NOTE:** Green light ON, Red light OFF

CUE: Provide the following cue, evaluator to NSO," **DG 1A is running."**

*6.	S	Depress **BOTH** DG 1A emergency stop buttons	Simulates depressing **BOTH** DG 1A emergency stop buttons	_____ _____

CUE: When student correctly simulates depressing **BOTH** DG 1A emergency stop buttons and checks for diesel shutdown, evaluator to NSO, **"DG 1A is not running."**

7.	P	Record time that **BOTH** emergency stop push buttons were depressed	Time _____	
* 8.		Calculate time required to complete task (step 7 - step1)	Δ Time _____ < 7 minutes	_____ _____

NOTE: Student should report to RSS-CRO that Bus E5 has been deenergized and DG1A has been stopped.

CUE: When NSO informs RSS-CRO that Bus E5 has been deenergized and DG1A has been stopped, RSS-CRO to NSO**," Understand, Bus E5 has been deenergized and DG1A has been stopped."**

CUE: **"The JPM is complete."**

		Obtain from student: Tear Off Sheets and any other training materials used in the performance of the JPM		_____ _____

PERFORMANCE SUMMARY

Provide comments on unsatisfactory performance of an element/step or for deviation from performance as stated. Record interruptions in performance such as retraining, shift change, and processing of procedure changes. Recommend remedial training, if necessary.

TEAR-OFF SHEET FOR JPM
2009 INPLANT #3

A. Initial Conditions:

1. Plant is in Mode 1
2. There is a fire in the Cable Spreading Room.
3. OS1200.00 Response to Fire or Fire Alarm Actuation has been entered.
4. RSS-CRO is presently at step 25b of OS1200.02B
5. Train "A" Essential Switchgear is not habitable due to smoke
6. You have the necessary keys on your key ring.

Initiating Cue:

"RSS-NSO De-energize Bus E5 per OS1200.02B Attachment C, beginning at Step 1.c. This is a time critical JPM."

FPL Energy

Seabrook Station

SIMULATOR EXAMINATION

2007-2009 LOIT NRC Examination Scenario D

Rev. 0

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SME (OPTIONAL)

APPROVED BY: Signature on File DATE: _____
TRAINING SUPERVISOR

SCENARIO

Mode 1, 52% power. The crew will commence a power increase of 10% per hour to 100% power.

After the power increase has begun, the seal water pump of the "A" Air Removal pump will fail causing a loss of Condenser Vacuum. The automatic start of the standby Air removal pump has been defeated. The crew will address the failure by starting the standby Air removal pump, then securing the "A" Air Removal pump to isolate the failed seal.

When the plant is stable Pressurizer Level transmitter RC-LT-459 will fail low, causing a letdown isolation. The crew will address the failure with OS1201.07, PZR Level Instrument Failure and restore letdown flow and recover PZR level to programmed level.

The "B" SG will have a SG tube Rupture creating a Primary to Secondary leak. The crew will address this with OS1227.02, Steam Generator Tube leak. The crew should stabilize the plant and quantify the leak.

The STGR leak rate increases. The crew should determine that PZR Level can not be maintained. The crew should trip the reactor and initiate a Safety Injection.

On the Manual Reactor trip the "A" PCCW pump will trip, and the "C" PCCW pump will fail to auto start. The crew should recognize no PCCW cooling is available for Train A components and manually start the "C" PCCW pump.

On the Manual Reactor trip the SG "B" Atmospheric Steam Dump Valve (ASDV) will fail partially open, causing a reactor coolant release to atmosphere. The crew should recognize and close the open ASDV. The crew should transition from E-0 to E-2.

Subsequently a safety valve opens on the "B" SG. They will isolate the Faulted Ruptured SG in E-2 and transition to E-3.

Prior to the crew performing a cooldown of the RCS, the SG pressure will have decreased to <350 psig, creating a transition to ECA-3.1. The crew should recognize that the "B" SG pressure can not be maintained high enough above the intact SGs.

The Crew should transition to ECA-3.1.

The E-Plan Classification is an Alert classification based on EAL FA1, Reactor Coolant System Barrier potential loss with Unisolable leak > capacity of one Centrifugal charging pump in the normal charging mode. An upgrade Site Area Emergency E-plan classification is based on Fission Product Barrier Degradation Matrix: FS1, Reactor Coolant System Barrier potential loss with Unisolable leak > capacity of one Centrifugal charging pump in the normal charging mode, plus Containment Barrier Loss for Ruptured Faulted SG outside of containment.

Terminate the exam at Chief Examiner discretion.

SIMULATOR SETUP

1. Reset to a 52% Power MOL IC. **The setup has been snapped to IC 223. Reset to IC 223 and verify the following setup:**

2. Rackout the SEPS breaker to Bus 6 and prevent Auto Start of SEPS:
   - ☐ Select: Sim Diagram SEPS
   - ☐ Select: bkSEPSA7A to Bus 6
   - ☐ Select: RACK OUT
   - ☐ Place Danger Tags on Bus 5 and Bus 6 SEPS Breaker control switches.
   - ☐ Verify that both RED and GREEN lights are out above the Bus 5 & 6 SEPS breakers

   Disable Auto Start of SEPS with the following REMOTE Functions SEPS:
   - ☐ rfSEP003, SEPS DG 2A Auto Start Disable (No Alarm)
   - ☐ rfSEP004, SEPS DG 2B Auto Start Disable (No Alarm)

   Note: rfSEP003 & rfSEP004 do not appear in the Remote Function Summary. Check the Remote Functions listing for Supplemental Emergency Power System and verify they are set to OFF.

3. For the PCCW Train "A" Pump Failures:
   - ☐ Select: Malfunctions Primary Component Cooling
   - ☐ Select: mfCC014, CC-P-11C Fails to Auto Start
   - ☐ Select: Insert
   - ☐ Activate the Trigger to Trip the CC-P-11A pump on the reactor trip
   - ☐ Select: Event Triggers: Len\Len PCCW PMP A Trip, Activate

4. Activate the Triggers for the Condenser Air Leak:
   - ☐ Select: Event Triggers: Len\Condenser Air Leak, Activate
   - ☐ Select: Event Triggers: Demo Exams\ Exam 04 Delete Vacuum Malf

5. Activate the Triggers to set up the ASDV and MS Safety Valve Failures:
   - ☐ Select: Event Triggers: Len\ASDV Failure On Trip, Activate
   - ☐ Select: Event Triggers: Len\Safety Open On ASDV Close
   - ☐ Select: Event Triggers: Len\Safety Open On ASDV Close Backup

6. Insert the Failure of Automatic Main Steamline Isolation Train "A" and Train "B"
   - ☐ Select: Malfunctions Reactor Protection
   - ☐ Select: mfRPS019, MS Isolation Fails to Auto Actuate (Train "A")
   - ☐ Select: INSERT
   - ☐ Select: mfRPS020, MS Isolation Fails to Auto Actuate (Train "B")
   - ☐ Select: INSERT

7. To set up the ASDV "A" Closure and Isolation with MS-V5:
   - ☐ On Sim Diagram MS1 for MS-V5 Select the Remote Function, rfMS009, and Set Final value to 0
   - ☐ On MS-PK-3001, place the controller to Manual and Minimum Output

- ☐ On Sim Diagram MS1, MS-PV-3001, Component Malfunction
- ☐ SELECT: FAIL CLOSED
- ☐ SELECT: INSERT
- ☐ PLACE MCB jog switch to CLOSED for MS-PV-3001 and Danger Tag switch

8. Initiation of a failure of the "B" Main Steam Isolation Valve, MS-V-88, OPEN. This will set up a later failure of a B SG ASDV.
   - ☐ Insert Malfunction: Main Steam (Component)
   - ☐ SELECT: svMSV88
   - ☐ SELECT: FAIL OPEN
   - ☐ SELECT: INSERT

SHIFT TURNOVER

- The plant is at 52% power preparing to do a power increase of 10%/hr to 100% following repairs to FW-P-32B.
- The plant has been stable at current power level for 12 hrs.
- SEPs is Tagged out for work on the Engine Air cooler radiators.
- Main Steam Atmospheric Steam Dump ("A"ASDV) valve, MS-PV-3001 is Danger Tagged closed due to excessive seat leakage. MS-V-5 is closed and tagged. Tech. Spec. 3.7.1.6 and 3.6.3 were entered 4 hours ago.
- The Crew is in OS1000.05, Power Increase at step 4.3.15.
- RCS Boron is 1150 ppm.

SCENARIO OUTLINE

EVENT	INSTRUCTION	COMMENTS
Shift Turnover	Shift turnover information as stated.	
Event 1: Power Increase at 10%/hr from 52%	Crew makes preparations for rod withdrawal/boron dilution to raise power.	Once calculations are completed and power change has begun continue with exam. **Unit Supervisor:** A brief reactivity review will take place discussing the temperature limits for Tave to be used in the power increase. The temperature band will normally be -2°F to +3°F. Control rods will be used for AFD and temperature control. **Turbine Operations**: The BOP will monitor the Feed Station and control the power increase with the turbine controls, monitoring for RCS temperature increase and adjusting turbine load control potentiometer 3 to 5 increments, or 'flats' as it is called here at Seabrook, to raise load. **Reactor Power change**: Using ODI-56, a dilution value will be determined to change the boron concentration and increase power/temperature. Control rods may be used for power/temperature increase, but would most likely be used for AFD control during the power increase. If control rods are used in manual the operator will verify rod speed, place the Rod Motion Selector (in-Hold-Out) switch to the OUT direction and WITHDRAW the rods a maximum of three steps. He will monitor temperature and power as confirmation of his actions. The high level steps for the dilution are: • Verify the pumps in AUTO • Verify the makeup valves are in AUTO • Place Blender Mode Start Switch to STOP

EVENT	INSTRUCTION	COMMENTS
		• Place the Mode Selector Switch to Dilute • Set the quantity on CIS-FIQ-111 and CIS-FIQ-110 controllers • Set the Mode Start Switch to START • Verify the pumps and valves respond • Verify Plant Response.
		Restore System to Automatic control
Event 2: Condenser Air Leak	Go to Malfunctions, Reactor Coolant	The BOP responds to start the third (standby) Air Removal pump. BOP should identify that the seal pump has failed on "A" AR pump and isolate the pump.
	☐ SELECT: MF List ☐ SELECT: Condenser Air Evacuation System ☐ SELECT: mfAR006C, AR-P-50C Fails to Auto Start ☐ SELECT: SELECT INSERT ☐ SELECT panel PFF21 ☐ Override AR-P-50A Seal Water Pump RED Light (right most one) to OFF.	Verify that the Malfunction is deleted when "A" AR pump control switch is placed in the PTL position. The crew responds with ON1233.01, Loss of Condenser Vacuum.
	This begins the vacuum leak **NOTE: Scenario triggers insert the condenser vacuum leak. Putting the 'A' AR pump in PTL, deletes the condenser leak.**	**ON1233.01, Loss of Condenser Vacuum.** 1. Verify All Mechanical Vacuum Pumps Running. RNO: Manually start vacuum pump(s).

EVENT	INSTRUCTION	COMMENTS
		2. Check Condenser Vacuum – DECREASING RNO: IF cause of the loss of vacuum has been corrected AND vacuum is greater than 25 inches, THEN: • Stop generator load reduction, as necessary. • Go to Step 6. 6. Locate Source Of Vacuum Loss:
	CUE: NSO verifies and reports the Seal Water Pump Failure and that the "A" Air Removal Pump is drawing a lot of air through the seals.	• Condenser vacuum breaker • Water box priming system operation • Steam packing exhauster operation • Main feed pump seal drop out tank • Condensate pump seals • Air removal pump seal water tank • MSR scavenging lines • Feedwater heater vents • Condensate Polishing System • Condenser penetrations. Refer to ON1433.01, CONDENSER/ MECHANICAL VACUUM PUMP AIR INLEAKAGE SURVEILLANCE for a detailed listing of condenser penetrations • Any work in progress affecting vacuum or systems required to support condenser vacuum

EVENT	INSTRUCTION	COMMENTS
		7. Notify Chemistry As Required: 8. Check If Turbine Generator Operation Can Continue: a. Condenser vacuum - GREATER THAN 25 INCHES OF HG VACUUM b. Loss of vacuum condition - IDENTIFIED AND CORRECTED c. Notify Dispatcher and increase load as necessary RNO: Return to Step 3;
	By the end of the procedure where they return to Step 3, the crew should have corrected AR Pump issues and would be able to exit the abnormal procedure.	
Event 3: Pressurizer Level Transmitter RC-LT-459, Fails Low	☐ SELECT: MALFUNCTIONS Reactor Coolant (Component) ☐ SELECT: ltRCLT459 ☐ SELECT: Fails Low ☐ SELECT: INSERT	Initiation of a failure of Pressurizer level Transmitter, RC-LT-459, LOW. This will cause an isolation of letdown flow and increasing charging flow. The PSO using 'Skill of the Operator' and direction from the US, may reduce charging flow to seal injection flow only before entering the abnormal procedure. **OS1201.07, PZR Level Instrument Failure.** NOTE: *Channel L-459/L-460 are normally selected for level control because the channel selector relays are deenergized in this position. Relay failure should not cause protective actuation.* 1. Check Pressurizer Level Channels: • Controlling channel – FAILED YES, LT-459 Failed LOW OR -

EVENT	INSTRUCTION	COMMENTS

- Backup channel - FAILED

  OR -

- Recorder channel - FAILED

Caution: *Selecting an alternate channel on the PZR level may cause letdown isolation and heater trip if the channel currently selected is failed high or low.*

NOTE: *Charging may have to be reduced to flow to the RCP seals only, in order to control pressurizer level.*

2. Realign Pressurizer Level Instruments:

   a. Manually control pressurizer level - AT PROGRAM:

   - Pressurizer level controller - RC-LK-459

     OR

   - Letdown and charging flow

   b. Select an alternate level channel for CONTROL/BACKUP as necessary

   c. Select an alternate level channel for RECORDER as necessary

3. Verify Pressurizer Heaters – ON **NO, performs step a. below**

   RNO a. Reset or manually control pressurizer heaters as necessary.

4. Check If Letdown Was Isolated: YES

EVENT	INSTRUCTION	COMMENTS
		a. Letdown isolation valves – CLOSED **Yes, RC-LCV-459 Closed** - RC-LCV-459 OR - RC-LCV-460 5. Check If Normal Letdown Can Be Established: a. Verify charging flow - GREATER THAN 50 GPM b. Pressurizer level - GREATER THAN 17% c. Establish normal letdown: 1. Align PCCW to letdown heat exchanger: 1. CC-V341 – OPEN 2. CS-TK-130 - AUTO 2. Close letdown flow control valves: • CS-HCV-189 • CS-HCV-190 3. Open letdown line isolation valves: • RC-LCV-459 • RC-LCV-460 • CS-V145

EVENT	INSTRUCTION	COMMENTS
		4. Manually control OR monitor CS-PK-131 response AND establish letdown flow using letdown flow control valves • CS-HCV-189 • CS-HCV-190 5. Go to Step 7
		7. Align Pressurizer Level Control: a. Verify proper controller setpoint and place controller in - AUTO • Pressurizer level control - RC-LK-459 • Charging flow control - CS-FK-121
	At discretion of Lead Examiner move on to the next event.	8. Verify Redundant Channel Bistables - NOT TRIPPED UL-6 PRESSURIZER LEVEL HI
		9. Verify Technical Specification Compliance: a. Refer to technical specifications: 1. T.S. 3.3.1, Reactor Trip System Instrumentation; Table 3.3-1, Item 11 2. T.S. 3.3.3.6, Accident Monitoring Instrumentation; Table 3.3.10, Item 5 3. T.S. 3.3.3.5, Remote Shutdown Systems; Table 3.3-9, Item 5

EVENT	INSTRUCTION	COMMENTS
		b. Coordinate with I&C to perform the following: 1. If desired for testing or troubleshooting, place bistable to bypass using BTI panel toggle switches for up to 6 hours. Placing the channel in bypass does NOT satisfy compliance with the technical specification action statement 2. Within 6 hours trip appropriate bistables per ATTACHMENT A, BISTABLES TO BE TRIPPED FOR PRESSURIZER LEVEL CHANNEL FAILURE END of procedure.
Continue with the next event at the direction of the Lead Examiner.		
Event 4: "B" SG Tube Leak at 75 gpm	Initiation of a "B" Steam Generator Tube rupture at 75 gpm. ☐ SELECT MALFUNCTIONS: Steam Generator ☐ SELECT: mfSG002B	The crew responds with OS1227.02, Steam Generator Tube Leak. PSO controls charging and letdown flow to maintain PZR level stable in order to quantify the leakage. Crew should determine that plant shutdown is required.

EVENT	INSTRUCTION	COMMENTS
	☐ SELECT: Final Value: 75 ☐ SELECT: Ramp: 300 ☐ SELECT: INSERT	**OS1227.02, Steam Generator Tube Leak** 1. Check RCP Status: a. RCPs - AT LEAST ONE RUNNING 2. Check If Pressurizer Level Can Be Maintained: a. Control charging and letdown flow as necessary to maintain PZR level on program b. Level - STABLE OR INCREASING 3. Try To Identify Affected SG: a. Notify chemistry to implement CS0905.08, RESPONSE TO A PRIMARY TO SECONDARY LEAK b. Try to identify affected SG: - Unexpected increase in any SG narrow range level Or - High radiation from any SG steamline--**YES** Or - High radiation from any SG blowdown line Or - High radiation from any SG blowdown line sample **NOTE: Crew determines "B" SG has tube leak.** 4. Check if VCT Level Can Be Maintained a. VCT level - MAINTAINED GREATER THAN 15%

EVENT	INSTRUCTION	COMMENTS
		NOTE: *Leak rate is defined as gallons per day (GPD) and Leak rate of change is defined as change in gallons per day per hour (GPD/HR).* *Leak rate of change criterion applies to progressively increasing leak rates and does not apply to leak rate spikes followed by decreasing leak rates. The leak rate of change, in GPD per hour, should be evaluated over a time interval of 30 minutes.* 5. Determine SG Tube Leakage: a. Check primary to secondary leak rate - LESS THAN 1 GPM (1440 GPD) • VCT level trend • PZR/VCT mass balance • Steady state leak rate calculation b. Determine steam generator tube leakage and monitoring requirements per ATTACHMENT A • Leak rate • Leak rate of change • Leak monitoring requirements
NOTE to Examiner	Applicant evaluation of Steam Generator Tube Leakage vs. RCS Leakage T.S. is required. If Applicant does not demonstrate knowledge during scenario, then follow-up questions be required. T.S. 3.4.6.2, action c: Steam Generator tube leakage greater than 150 gpd on any Steam Generator.	
	Once crew has determined a leak rate based on step 5 of OS1227.02, move on to the next event at the direction of the Chief Examiner.	**Based on change in VCT level and direction of the Operator Action Summary page of OS1227.02, crew may perform the following:** IF VCT level can NOT be maintained greater than 15% using normal makeup, THEN perform the following:

EVENT	INSTRUCTION	COMMENTS
		a. Open RWST suction valves: • CS-LCV-112D • CS-LCV-112E b. Close VCT suction valves: • CS-LCV-112B • CS-LCV-112C c. IF reactor trip breakers closed, THEN trip the reactor and go to E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1 while continuing with Step 7 of this procedure. Depending on the SG Leak increase rate, the PZR level decrease may not be sufficient yet to drive the Safety Injection. Crew will proceed with E-0 and transition to ES-0.1. After the SG leak rate reaches the full 300 gpm the PZR level decease will be sufficient to cause an SI and crew will return to E-0 Step 1.
Event 5: "B" SGTR increases in size Event 6 PCCW pump trip occurs on the Reactor Trip	☐ From the MFS SELECT mfSG002B ☐ SELECT: Final Value: 300 ☐ SELECT RAMP: 300 ☐ MODIFY	The crew recognizes that OS1227.02 ability to control PZR level has been exceeded. Crew should manually trip the Reactor and Actuate SI. The crew should transition from OS1227.02 to E-0 or from ES-0.1 back to E-0.

EVENT	INSTRUCTION	COMMENTS
Event 7 ASDV opens on reactor trip occurs with the reactor trip	**CUE: Verify triggers actuate for ASDV opening.** **When crew closes the ASDV, VERIFY the triggers actuate to insert the SG Safety valve lift.**	Crew enters E-0, Reactor Trip or Safety injection: NOTE: • *Steps 1 through 4 are IMMEDIATE ACTION steps.* • *Initiate monitoring of critical safety function status trees at step 17 OR if exiting from this procedure.* • *Review OPERATOR ACTION SUMMARY periodically.* 1. Verify Reactor Trip: 2. Verify Turbine Trip: 3. Verify Power To AC Emergency Busses: 4. Check If SI Is Actuated: Check SI annunciators lit • TRAIN A - OR - • TRAIN B **RNO: a.** Check if SI is required: • RCS pressure - LESS THAN 1800 PSIG Or • Pressurizer level - LESS THAN 7% Or • Containment pressure - GREATER THAN 4 PSIG Or • RCS subcooling - LESS THAN 40°F Or • Any SG pressure - LESS THAN 585 PSIG IF SI is required, THEN manually actuate.

EVENT	INSTRUCTION	COMMENTS
	PSO performs E-0, Attachment A, while US and BOP Continue procedure steps beyond Step 6. NOTE: *At least one train of ESF components should be aligned before aligning the redundant train.* *Verbal communication of manual actions is not required.* 1. Verify Containment Isolation Phase A Actuation - ALL STATUS PANEL LIGHTS LIT • Train A • Train B	5 .Perform ESF Actuation Verification Per ATTACHMENT A. 6. Monitor RCS Temperature - STABLE AT OR TRENDING TO 557°F
Event 6: On the Manual Reactor trip the "A" PCCW pump will trip, and the "C" PCCW pump will fail to auto start. The crew should recognize no PCCW cooling is available for Train A components and manually start the "C" PCCW pump. (CCT) during E-0, Attachment A	2. Verify Safeguard Equipment Alignment - PROPER ALIGNMENT BY STATUS PANEL • TRAIN A - COLD LEG INJECTION • TRAIN B - COLD LEG INJECTION 3. Verify Feedwater Isolation - PROPER ALIGNMENT BY STATUS PANEL 4. Verify PCCW Pumps Running: • Loop A – ONE PUMP RUNNING • Loop B – ONE PUMP RUNNING • Thermal barrier cooling pumps – AT LEAST ONE PUMP RUNNING	

EVENT	INSTRUCTION	COMMENTS
	5. Verify ECCS Flow: • CCP flow indicator - CHECK FOR FLOW TO RCS COLD LEGS • RCS pressure - LESS THAN 1700 PSIG • SI pump flow indicators - CHECK FOR FLOW - TRAIN A - TRAIN B • RCS pressure - LESS THAN 300 PSIG • RHR pump flow indicators - CHECK FOR FLOW - TRAIN A - TRAIN B	7. Check RCS Isolated: a. Check letdown valve(s) - CLOSED • CS-V145 - OR - • RC-LCV-459 - OR - • RC-LCV-460 b. PORVs – CLOSED c. Normal PZR spray valves – CLOSED 8. Check If RCPs Should Be Stopped: a. ECCS pumps - AT LEAST ONE RUNNING • CCP Or • SI Pump b. RCS subcooling - LESS THAN 40°F--**NO, Go to Step 9.** c. Stop all RCPs

EVENT	INSTRUCTION	COMMENTS
	6. Verify MS-V129 – OPEN	9. Check If SG Pressure Boundary Is Faulted: Yes
	7. Verify Service Water Pumps Running: • Train A - ONE PUMP RUNNING • Train B - ONE PUMP RUNNING	**Transitions to E-2, Faulted SG Isolation**
	8. Verify SW Flow To Train A And Train B Diesels - GREATER THAN REQUIRED 900 GPM on OCEAN Or 1800 GPM on cooling tower	

EVENT	INSTRUCTION	COMMENTS
PSO may close the MSIVs at this point, but the pressure drop may not be large enough at this time to force the closure of the MSIVs.	9. Check If Main Steamlines Should Be Isolated: a. Check Main Steam Isolation required: • Any SG pressure - LESS THAN 585 PSIG WITHOUT PRIOR P-11 BLOCK Or • Main steam line isolation annunciator – LIT Or • Containment pressure - GREATER THAN 4 PSIG Or • SG pressure rate high bistable - LIT WITH PRIOR P-11 BLOCK b. Verify MSIV and MSIV bypass valves – CLOSED 10. Check Containment Pressure - HAS REMAINED LESS THAN 18 PSIG BY PRESSURE RECORDING 11. Verify Total EFW Flow – GREATER THAN 500 GPM 12. Reset RMO, as necessary 13. Notify US Of Actuation Verification Status **END of ATTACHMENT A**	

EVENT	INSTRUCTION	COMMENTS
Event 7: ASDV Fails 20% Open occurs on reactor trip	Verify the Trigger has fired to fail the "B" ASDV to 20% open on the reactor trip. If not perform the following:	
	☐ SELECT: MF List ☐ SELECT: Main Steam (Component) ☐ SELECT: svMSV3002 ☐ SELECT: Go To Position ☐ SELECT: Final Value: 20 ☐ SELECT: Ramp Time: 0 ☐ SELECT: INSERT	The BOP operator should recognize the "B" SG ASDV is open without a valid demand. BOP operator should manually close the "B" ASDV with direction from the US.

EVENT	INSTRUCTION	COMMENTS
Event 8: "B" SG Safety Valve Opens	After a time delay a Safety Valve on the "B" SG will lift below setpoint re-initiating the release. The crew should transition from E-0 to E-2 The crew should isolate the remaining three intact Steam generators by closure of the other Main Steam Isolation valves (AUTO isolation defeated in set up). **NOTE: If crew does not close the ASDV, Force the trigger for the SG Safety valve to drive to proper point in E-3.** **CUE: If directed by the crew to locally close the "B" MSIV report back that it appears to be mechanically bound and will not close.**	When the ASDV is closed the trigger for the SG Safety will actuate and with a short time delay a safety valve on the "B" SG will fail open. **E-2, Faulted SG Isolation:** Caution: • *At least one SG must be maintained available for RCS cooldown.* • *Any faulted SG or secondary break should remain isolated during subsequent recovery actions, unless needed for RCS cooldown.* 1. Check Main Steamline Isolation And Bypass Valves Of All SGs CLOSED----NO "B" SG MSIV Open RNO: Manually close valves. IF valves can NOT be closed, THEN locally close valves. 2. Check If SG Pressure Boundary Is Intact: a. Check pressure in all SGs - ANY STABLE OR INCREASING 3. Identify Faulted SG(s): a. Check pressures in all SGs: • ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER Or • ANY SG COMPLETELY DEPRESSURIZED

EVENT	INSTRUCTION	COMMENTS
		Caution: *If the turbine driven EFW pump is the only available source of feed flow, steam supply to the EFW pump must be maintained from one SG.* 4. Check Faulted SG(s) Isolated: a. Main feedline - ISOLATED b. EFW flow - ISOLATED c. Isolate the faulted SG steam supply to the turbine driven EFW pump by closing the applicable valve: SG A MS-V393 SG B MS-V394 d. SG ASDV - CLOSED e. Main steam drain(s) - CLOSED SG A MSD-V44 SG B MSD-V45 SG C MSD-V46 SG D MSD-V47 f. SG blowdown - ISOLATED SG A SB-V9 SG B SB-V10 SG C SB-V11 SG D SB-V12 CAUTION: *CST makeup should be commenced as soon as possible to avoid low inventory problems.* 5. Check CST Level - GREATER THAN 250,000 gallons 6. Check Secondary Radiation: a. Main steamline radiation - NORMAL ON EACH LINE

EVENT	INSTRUCTION	COMMENTS
		b. Condenser air evacuation radiation - NORMAL c. Steam generator blowdown radiation - NORMAL d. SG narrow range level - NO UNCONTROLLED LEVEL INCREASE **NO, "B" SG Ruptured** **RNO: Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.** 1. Check If RCPs Should Be Stopped: a. ECCS pumps - AT LEAST ONE RUNNING • CCP Or • SI pump b. RCS subcooling - LESS THAN 40°F **NO Go to Step 2** **2. Identify Ruptured SGs:**
	CUE: Crew Should identify "B" SG as Ruptured.	• Uncontrolled increase in any SG narrow range level OR - • High radiation from any SG steamline OR - • High radiation from any SG sample OR - • High radiation from any SG blowdown line

EVENT	INSTRUCTION	COMMENTS
		CAUTION: • *If the turbine-driven EFW pump is the only available source of feed flow, steam supply to the turbine-driven EFW pump should be maintained from at least one SG.* • *At least one SG must be maintained available for RCS cooldown.*
		3. Isolate Flow From Ruptured SG(s): a. Adjust ruptured SG(s) ASDV controller setpoint to 1125 PSIG b. Check ruptured SG(s) ASDV – CLOSED c. Isolate the ruptured SG(s) steam supply to turbine driven EFW pump by closing the applicable valve: ▪ SG A MS-V393 ▪ SG B MS-V394 d. Verify blowdown isolation valve(s) from ruptured SG(s) – CLOSED ▪ SG A SB-V9 ▪ SG B SB-V10 ▪ SG C SB-V11 ▪ SG D SB-V12 e. Close ruptured SG(s) upstream drain valves: ▪ SG A MSD-V44 ▪ SG B MSD-V45 ▪ SG C MSD-V46 ▪ SG D MSD-V47
	Due to Safety being open on B SG the RNO for this step should be done.	f. Close ruptured SG(s) MSIV and bypass valve(s)
		f. RNO Perform the following

EVENT	INSTRUCTION	COMMENTS
		1. Close all remaining MSIVs and MSIV bypass valves. 2. Verify following valves closed: • Main turbine stop valves • MSR steam supply valves • Dispatch operator to locally close valves per ATTACHMENT A while continuing with this procedure. 3. Transfer RCS temperature control from steam dumps to intact SG ASDVs as follows: a. Use intact SG ASDVs to lower RCS temperature to 557°F. b. Disable condenser steam dumps by placing both steam dump interlock control switches to OFF.
	CUE: If directed by the crew to locally close the "B" MSIV report back that it appears to be mechanically bound and will not close.	
	CUE: The "B" SG should be able to be isolated from the other SGs at this point in the procedure.	IF any ruptured SG can NOT be isolated from at least one intact SG, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1
		CAUTION: *If any ruptured SG is faulted, feed flow to that SG should remain isolated during subsequent recovery actions unless needed for RCS cooldown.*
	CUE: EFW Flow should remain isolated to "B" SG as it is faulted.	4. Check Ruptured SG(s) Level: a. Narrow range level - GREATER THAN 6% [15% FOR ADVERSE CONTAINMENT] b. Open EFW pump mini-flow valves AND stop feed flow to ruptured SG(s).

EVENT	INSTRUCTION	COMMENTS
		5. Check Ruptured SG(s) Isolated From Intact SG(s): • Ruptured SG(s) MSIV and MSIV bypass valves – CLOSED OR • At least ONE intact SG MSIV and MSIV bypass valve - CLOSED 6. Check Ruptured SG(s) Pressure - GREATER THAN 350 PSIG
	At this time in validation "B" SG Pressure was <350 psig requiring transition to ECA-3.1.	**NO Pressure is <350 psig in "B" SG** **RNO: Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1** **NOTE: If the "B" SG pressure is not less than 350 psig at this transition point, the next procedural transition is after Step 14 and the completion of the cooldown.** NOTE: *If the ruptured SG pressure decreases after RCS cooldown is stopped, isolation of the SG should be verified before transferring to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED.* 15. Check Ruptured SG Pressure - STABLE OR INCREASING— **NO** **RNO:** IF pressure continues to decrease to less than 250 PSIG above the pressure of the intact SGs used for cooldown, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
Terminate Exam	Terminate the exam at the Chief Examiner's discretion.	

CREW CRITICAL TASKS

1. Manually start at least one PCCW pump for the available train, to provide adequate cooling for the operating safeguards train before transition out of E-0.
2. Isolate the faulted Steam Generator by closing the ASDV before transition out of E-2.

FPL Energy

Seabrook Station

SIMULATOR EXAMINATION

2007-2009 LOIT NRC Examination Scenario B

Rev. 0

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SME (OPTIONAL)

APPROVED BY: Signature on File DATE: _____
TRAINING SUPERVISOR

SCENARIO

Mode 1, 8% power (IC #190, This IC has been stabilized).

Auto start of CS-P-2A is defeated. Both trains of Safety Injection fail to auto actuate. Both CBS pumps fail to auto start. The Supplemental Emergency Diesel Generator (SEPS) is unavailable (tagged out). The "A" ASDV is isolated and failed closed for maintenance.

Pressurizer pressure controlling channel, RC-PT-455, fails low. This causes RCS pressure to increase as the Master Pressure Controller output is driven low and all PZR heaters energize. All PZR Spray valves also close. Crew responds with OS1201.06, PZR Pressure Instrument/Component Failure.

Failure of a SG Level transmitter, FW-LT-549, LOW will cause the "D" Bypass Feed Reg valve to fail open if it is automatic mode. The crew will respond per OS1235.03, SG Level Instrument Failure and manually control "D" SG Level.

During the power increase a leak inside containment will develop that is within the capability of a centrifugal charging pump, and therefore will not require a Safety Injection. The crew should recognize this as a Technical specification entry.

The initial leak is on the reactor vessel flange. Crew enters OS1201.05, Loss of Reactor Vessel Flange Seal to initially isolate the leak. Subsequently, the outer flange fails and the RCS leak is re-initiated.

After OS1201.02, RCS Leak abnormal has been entered and the leak rate estimated, MS-PT-507 fails HIGH. This will necessitate the manual closing of the condenser steam dumps via the P-12 Bypass/Interlock switches per ON1230.01, Steam Header Pressure PT-507 Instrument Failure. The crew may also enter OS1290.02, Response to Condensate or Feedwater Heater System Transient.

Upon exiting ON1230.01, two control rods will simultaneously drop, causing the crew to call for a reactor trip, based upon the dropped rod abnormal procedure, OS1210.05. Upon entry into E-0, Reactor Trip or Safety Injection, the reactor coolant leak will increase requiring a Safety Injection. SI will fail to auto actuate and must manually actuated. The CBS pumps fail to auto start and must be manually started. CS-P-2B trips at the time of the reactor trip. The crew will transition from E-0 to E-1 to ES-1.2.

E-plan: EAL SU5 (Unidentified or Pressure boundary leakage >10 GPM) Unusual Event.
Upgrade E-plan: SAE FS1 Loss and Potential Loss of Reactor Coolant system barrier.

Terminate the exam at Chief Examiner discretion

SIMULATOR SETUP

1. Reset to IC 221, Verify Protected Train "B" **NOTE: This set up has been snapped with IC 221. Reset to IC 221 and verify the following:**
2. Rackout the SEPS breaker to Bus 6 and prevent Auto Start of SEPS:
   - ☐ Select: Sim Diagram SEPS
   - ☐ Select: bkSEPSA7A to Bus 6
   - ☐ Select: RACKOUT
   - ☐ Place Danger Tags on Bus 5 and Bus 6 SEPS Breaker control switches.
   - ☐ Verify both RED and GREEN lights are out above Bus 5 & 6 SEPS breakers

   Disable Auto Start of SEPS with following REMOTE Functions SEPS:
   - ☐ rfSEP003, SEPS DG 2A Auto Start Disable (No Alarm)
   - ☐ rfSEP004, SEPS DG 2B Auto Start Disable (No Alarm)

   Note: rfSEP003 & rfSEP004 do not appear in the Remote Function summary. Check status under Remote Functions; Supplemental Emergency Power System listing.
3. Prevent Automatic SI Actuation on Both Trains:
   - ☐ Select: Malfunctions Reactor Protection
   - ☐ Select: mfRPS007, SI Fails to Actuate (Train "A")
   - ☐ Select: Insert
   - ☐ Select: mfRPS008, SI Fails to Actuate (Train "B")
   - ☐ Select: INSERT

4. Prevent the Containment Spray Pumps From Starting:
   - ☐ Select: Malfunctions; Containment Building Spray
   - ☐ Select: mfCBS004, CBS-P-9A, Fails to Auto Start
   - ☐ Select: Insert
   - ☐ Select: mfCBS005, CBS-P-9B, Fails to Auto Start
   - ☐ Select: Insert

5. Set up Trigger for CS-P-2B Trip
   - ☐ Activate Event Trigger Len\CS-P-2B Trip on Rx Trip
   - ☐ Verify IMF mfCS017 is in the trigger

6. ☐ Ensure that FW-LT-549, is the controlling level channel on SG D.

7. To set up the ASDV "A" Closure and Isolation with MS-V5:
   - ☐ On Sim Diagram MS1 for MS-V5 Select the Remote Function, rfMS009, and Set Final value to 0
   - ☐ On MS-PK-3001, place the controller to Manual and Minimum Output
   - ☐ On Sim Diagram MS1, MS-PV-3001, Component Malfunction
   - ☐ SELECT: FAIL CLOSED
   - ☐ SELECT: INSERT
   - ☐ PLACE MCB jog switch to CLOSED for MS-PV-3001 and Danger Tag switch

SHIFT TURNOVER

- The plant is at 8% power.
- Increase plant power to 18% to warm up Main Turbine.
- No fuel preconditioning guidelines in effect.
- "A" MFP is in service. OS1000.02, "Plant Startup from Hot Standby to Minimum Load", step 4.2.7 in progress.
- SEPs is Tagged out for work on the Engine Air cooler radiators.
- Main Steam Atmospheric Steam Dump ("A"ASDV) valve, MS-PV-3001 is Danger tagged closed due to excessive seat leakage. MS-V-5 is closed and tagged. Tech. Spec. 3.7.1.6 and 3.6.3 were entered 4 hours ago.
- RCS temperature is being verified greater than minimum temp for criticality per T.S. 3.1.1.4.
- RE recommends using control rods for initial power increase up to 144 steps on Bank D. Then coordinate with rods and dilution for power increase and AFD control.

SCENARIO OUTLINE

EVENT	INSTRUCTION	COMMENTS
Shift Turnover	Shift turnover information as stated.	
Event 1: Increase Plant Power to 18%	Crew makes preparations for rod withdrawal/boron dilution to raise power.	Once calculations are completed and power change has begun continue with exam. The crew should prepare for and initiate a power increase. **Unit Supervisor:** A brief reactivity review will take place discussing the temperature limits for Tave to be used in the power increase. The temperature band will normally be -2°F to +3°F. Control rods will be used for AFD and temperature control. **Turbine Operations**: The BOP will monitor the Feed Station and review the procedure for turbine startup. **Reactor Power change**: The crew will use control rods initially to increase temperature during the power increase. Using ODI-56, a dilution value will be determined to change the boron concentration and increase power/temperature. If control rods are used in manual the operator will verify rod speed, place the Rod Motion Selector (in-Hold-Out) switch to the OUT direction and WITHDRAW the rods a maximum of three steps. He will monitor temperature and power as confirmation of his actions. The high level steps for the dilution are: • Verify the pumps in AUTO • Verify the makeup valves are in AUTO • Place Blender Mode Start Switch to STOP • Place the Mode Selector Switch to Dilute • Set the quantity on CIS-FIQ-111 and CIS-FIQ-110 controllers • Set the Mode Start Switch to START • Verify the pumps and valves respond • Verify Plant Response. Restore System to Automatic control

EVENT	INSTRUCTION	COMMENTS
Event 2: Controlling Pressurizer Pressure Channel PT-455 Fails LOW	☐ Insert Malfunction: Reactor Coolant Component. ☐ **ptRCPT455** ☐ Select: FAIL LOW ☐ INSERT	The crew responds using OS1201.06, PZR Pressure Instrument/Component Failure **Conditions:** PT-455 fails low driving the MPC output low. This energizes all PZR heaters and closes the Spray valves. RCS pressure will slowly increase until the crew takes manual control of the MPC to restore pressure. **Alarms:** VAS F7434, PZR Pressure Low Channel Low (RX) VAS F7435, PZR Pressure Low Channel Trip (SI) UA-52, D8, Master Press CTRL Output LO **OS1201.06, PZR Pressure Instrument/Component Failure:** **Step 1)** Check PORVs CLOSED ----- **YES** **Step 2)** Check Normal PZR Spray Valves CLOSED ----**YES** **NOTE:** *Channel P-455/P-456 is normally selected for pressure control because a failed LOW – RC-PT-458 (selected for backup) or RC-PT-457 (selected for control), will prevent automatic operation of both pressurizer PORVs.* **Step 3)** Check PZR Pressure Channels • Controlling Channel Failed ----**YES** OR • Back Up Channel Failed -----**NO** OR • Recorder Channel Failed ----**NO**

EVENT	INSTRUCTION	COMMENTS
		Step 4) Realign Pressurizer Pressure Instruments a) Manually control pressurizer pressure - AT PROGRAM : • Master pressurizer pressure controller Or • Heaters and spray valves b) Select an alternate pressure channel for CONTROL/BACKUP as necessary c) Select an alternate pressure channel for RECORDER as necessary d) Select an alternate ΔT, OT, OP channel for RECORDER as necessary **Step 5)** Align Pressurizer Pressure Control a) RCS Pressure - TRENDING TO 2235 PSIG b) Verify proper controller setpoint and place controllers in auto, as necessary: • Master pressure controller - RC-PK-455A • Loop A spray valve control - RC-PK-455C • Loop C spray valve control - RC-PK-455B **c)** Check Heaters - AUTO/ON

EVENT	INSTRUCTION	COMMENTS

Step 6) Verify redundant Channel Bistables NOT tripped
UL-1

- PZR/MS SI AVAILABLE (P-11)
- PZR PRESS LO SI

UL-6

- RCS LOOP OTΔT
- PRESSURIZER PRESS LO
- PRESSURIZER PRESS HI

NOTE: *Pressure Channels P-458 and P-457 provide the non-selectable opening interlock to A and B PORVs respectively. A low failure of either channel will prevent automatic actuation of its associated PORV.*

Step 7) Verify technical Specification Compliance
a. Refer to technical specifications:

- T.S. 3.3.1, Reactor Trip System Instrumentation; Table 3.3-1, Items 7,9 and 10
- T.S. 3.3.2, ESFAS Instrumentation; Table 3.3-3, Items 1.d. and 10.a.
- T.S. 3.2.5, DNB Parameters

b. Evaluate PORV operability and refer to technical specifications:

- T.S. 3.4.4, Relief Valves
- T.S. 3.4.11, Reactor Coolant System Vents

c. Coordinate with I&C to perform the following:

- If desired for testing or troubleshooting, place bistables to bypass using BTI panel toggle switches for up to 6 hours. Placing the channel in bypass does NOT satisfy compliance with the technical specification action statement

EVENT	INSTRUCTION	COMMENTS
		• Within 6 hours trip appropriate bistables per ATTACHMENT C, BISTABLES TO BE TRIPPED FOR PRESSURIZER PRESSURE CHANNEL FAILURE

Allow the crew to complete the abnormal procedure or at Lead Examiners discretion prior to entering the next event.

Event 3: FW-LT-549 Fails Low on SG D	Initiation of a malfunction of controlling level transmitter on SG D Feed Regulating Bypass Valve, fails LOW. ☐ Insert Malfunction: FEEDWATER (component) ☐ SELECT: ltFWLT549 ☐ SELECT: Fails LOW ☐ SELECT: INSERT	The crew responds with OS1235.03, SG Level Instrument Failure. The Feed Regulating Bypass Valve for SG D will open fully when in automatic control. The BOP operator will take manual control to restore level before high SG level trip. Enter T.S. 3.3.1, table 3.3-1, Item 13 and T.S 3.3-3, items 5.b, 6.a, 7.c, and 10C. **OS1235.03, SG Level Instrument Failure** Caution: *Failure of channels 519, 529, 539 or 549 will require manual feedwater regulating bypass valve control since a redundant level channel is not provided.* 1. Check Steam Generator Water Level Control: A. Identify failed instrument - CONTROLLING CHANNEL FAILED B. Place affected steam generator feed control valve – MANUAL C. Control feed flow to maintain narrow range level - 45% TO 55% o Steam generator feedwater regulating valve OR o Steam generator feedwater regulating bypass valve OR o Main feed pump speed controllers

EVENT	INSTRUCTION	COMMENTS
		2. Realign Steam Generator Level Instruments: a. Monitor feedwater system response and select an alternate level channel for control ***NOTE**: Feed regulating valve controller setpoint meter indicates level error and controller input meter indicates flow mismatch error. The Error signals will be zero if both input and setpoint indicators are matched at 50%.* **3. Align Steam Generator Water Level Control:** **a.** Check the following: o Steam flow/feed flow signals – MATCHED o Steam generator level - AT PROGRAMMED LEVEL 50% (45% TO 55%) b. Verify proper feed regulating valve controller setpoint and place controller – AUTO **(Note to examiner: Only applicable to Main Feed reg Valve. The Bypass valve must remain in manual.)** 4. Verify Redundant Channels Bistables - NOT TRIPPED o UL-1 - SG LVL HI HI FW ISO TURB TRIP o UL-6 - SG LVL LO LO UL-12 - SG LVL HI HI FW ISO TURB TRIP 5. Verify Technical Specification Compliance: A. Refer to technical specifications: 1. T.S. 3.3.1, Reactor Trip System Instrumentation; Table 3.3-1, Item 13 2. T.S. 3.3.2, Engineered Safety Features Actuation System Instrumentation; Table 3.3-3, Items 5.b, 6.a, 7.c, 10.c T.S. 3.3.3.6, Accident Monitoring Instrumentation; Table 3.3-10, Item 7

EVENT	INSTRUCTION	COMMENTS
		B. Coordinate with I&C to perform the following: 1. If desired for testing or troubleshooting, place bistables to bypass using BTI panel toggle switches for up to 6 hours. Placing the channel in bypass does NOT satisfy compliance with the technical specification action statement. 2. Within 6 hours trip appropriate bistables per Attachment A, BISTABLES TO BE TRIPPED FOR SG LEVEL CHANNEL FAILURE NOTE: *ATWS actuation requires a 3/4 logic from the steam generator level input.* 6. Verify ATWS Mitigation Input Status: a. Check for an ATWS mitigation channel – FAILED SG: A 551; SG: B 552; SG C: 538; SG D: 547 b. Verify alternate ATWS mitigation channel bistables - NOT TRIPPED UL-28 SG LVL LO ATWS EFW INIT TURB TRIP c. Notify I&C and place failed channel in 1-MM-CP-519, ATWS mitigation system cabinet to - OPERATE BYPASS

After step 6 of this abnormal or at lead examiners discretion, continue to the next event.

Event 4: Reactor Vessel Flange Leak at 45 gpm	Go to Malfunctions, Reactor Coolant ☐ SELECT: MF List	VAS Alarm, D4320, Rx Vessel Flange Leakoff Temp High actuates Crew enters OS1201.05, Loss of Reactor Vessel Flange Seal Note: High temperature for the reactor vessel flange leak off alarms at 200 ^{0}F

EVENT	INSTRUCTION	COMMENTS
	☐ SELECT: Reactor Coolant System ☐ SELECT: mfRC019, Reactor Vessel Flange Leak ☐ SELECT: Final Value: 45 ☐ SELECT: Ramp Time: 60 seconds ☐ SELECT: Insert	Note: Reactor Vessel flange leak off is classified as identified leakage. 1. Check Reactor Vessel Flange Leakoff Temperature—LEAKAGE INDICATED D4320 RX VESSEL FLANGE LEAKOFF TEMP HIGH - IN ALARM or RC-TI-401, reactor vessel flange leakoff temperature - GREATER THAN 200°F 2. Realign Reactor Vessel Flange Leakoff: a) Close RC-V147, reactor vessel flange leakoff isolation b) Align reactor vessel flange leakoff valves: 1. Refer to 0N1090.04 CONTAINMENT ENTRY to enter containment 2. Close RC-V145, inner seal leakoff 3. Open RC-V146, outer seal leakoff c) Open RC-V147, reactor vessel flange leakoff isolation 3. Verify Reactor Vessel Flange Seal Integrity a. Reactor vessel flange leakoff temperature – DECREASING b. Containment activity – NORMAL c. Containment temperature - NORMAL 4. Verify Technical Specification Compliance a. Refer to T.S. 3.4.6.2, Reactor Coolant System Leakage
	CUE: As crew is completing STEP 4, restart the RCS leak as indicated below: ☐ SELECT: MF List ☐ SELECT: Reactor Coolant System ☐ SELECT: mfRC050A, Loop 1 Leak ☐ SELECT: Final Value: 20	Crew may use Skill of the Operator to take manual control of Charging and Letdown flow to prevent loss of Pressurizer heaters on low PZR level. PSO will maintain PZR level stable.

EVENT	INSTRUCTION	COMMENTS
	☐ SELECT: Ramp Time: 120 seconds ☐ SELECT: Insert	The crew should enter OS1201.02, RCS Leak Abnormal. 1. Check If Pressurizer Level Can Be Maintained: a. Control charging and letdown flow as necessary to maintain PZR level on program • Check pressurizer level – STABLE OR INCREASING 2. Refer to ER 1.1, Classification of Emergencies: • Category S - System Malfunction (SU5) • Category F – Fission Product Barrier Degradation Matrix • Category C – Cold Shutdown/Refueling System Malfunction Once the crew estimates the RCS leakage is greater than 10 gpm the E-plan classification is: EAL SU5 (Unidentified or Pressure boundary leakage >10 GPM) Unusual Event 3. Determine Appropriate Procedure Step Transition: IF the source of the leak is not readily apparent, THEN go to Step 4.

EVENT	INSTRUCTION	COMMENTS
		4. Isolate Potential RCS Leakage Sources: (Protected Ref: 1.0) a. Check for pressurizer safety or PORV leakage: o Safety valve or PORV tailpipe temperature – NORMAL o Acoustic monitor indications – NORMAL b. Check reactor head vent - ISOLATED: o RC-FV-2881 – CLOSED o RC-V323 – CLOSED c. Check excess letdown line - ISOLATED: o CS-V175 – CLOSED o CS-V176 – CLOSED d. Check RCS sample lines – CLOSED BY PHASE A STATUS PANELS: o Train A o Train B e. Check reactor vessel flange leakoff temperature: o RC - TI - 401 RX VESSEL FLANGE LEAKOFF TEMP – NORMAL f. Check valve stem leakoff header temperature: o D7805 INSIDE BARRIER STEM LEAKOFF TEMP HI – RESET o D7804 OUTSIDE BARRIER STEM LEAKOFF TEMP HI – RESET g. Check steam generator tubes - INTACT: o Main steamline radiation – NORMAL o Steam generator blowdown radiation – NORMAL o Condenser air evacuation radiation – NORMAL o Steam generator sample – NORMAL h. Check SI discharge header pressure - LESS THAN 800 PSIG i. Evaluate RCS Leakage - LEAKAGE ISOLATED **NO** **RNO:** Go to step 16.

EVENT	INSTRUCTION	COMMENTS
		16. Continue Efforts To Locate And Identify Source Of Leakage While Continuing With This Procedure: o Refer to Step 3 o Plant walkdown: o Consult with HP when dispatching operators to perform plant walkdowns to determine leakage source o Containment entry: o Perform SH 6.5 Job Hazard Analysis prior to sending personnel into containment o Perform containment entry per ON1090.04, Containment Entry o Notify HP to perform HN0960.03, Radiological Requirements for Containment Entries 17. Estimate RCS Leak Rate: o Maintain Tavg – STABLE o Maintain pressurizer level – STABLE o Estimate leak rate using any of the following: o VCT level trend o Containment sump level trends o PZR/VCT mass balance o Steady state leak rate calculation 18. Verify Technical Specification Compliance: a) T.S. 3.4.6.2, Reactor Coolant System Leakage b) T.S. 3.4.10, Structural Integrity 19. Check VCT Makeup Control System: a) Makeup set for desired RCS boron concentration b) Makeup set for automatic control 20. Evaluate Continued Plant Operation: Check RCS leak – ISOLATED IF RCS leakage is greater than Tech spec limits THEN go to Step 21. **Goes to Step 21.**

EVENT	INSTRUCTION	COMMENTS
CUE: Complete Step 20, of Abnormal before moving on to next event.		
Event 5: Main Steam Pressure Instrument, MS-PT-507 Fails High	☐ SELECT: MALFUNCTIONS Main Steam (Component) ☐ SELECT: ptMSPT507 ☐ SELECT: Fails High ☐ SELECT: INSERT	The crew responds with ON1230.01, Steam Header Pressure PT-507 Instrument Failure. Steam Dump Valves fail open in the STM Pressure mode. The BOP may close the Steam Dumps using the P-12 Interlock switches, or by operating MS-PK-507 in manual as a 'Skill of the Operator' task prior to entry into the abnormal procedure. Crew will have to monitor for minimum temperature for criticality, T.S. 3.1.1.4, and DNB T.R. 3.2.5, #2185 RCS psig. 1. Check Condenser Steam Dump System: a. Steam dumps in - TAVG MODE **NO** **RNO a.** IF steam dumps in steam press mode and PT-507 failed high THEN: 1) Close steam dumps by placing either steam dump interlock control switch to OFF position. 2) Place steam dump controller MS-PK-507 in MANUAL with minimum output. 3) Place steam dump interlock control switch to NA RESET NA BYPASS INTERLOCK position. 4) Manually control steam dumps as required. 5) Go to Step 2. 2. Transfer Main Feed Pump Master Speed Control To – MANUAL o Maintain feed header/steam header ΔP - AT PROGRAMMED ΔP 3. Check Secondary Plant Conditions - STABLE 4. Check Third Condensate Pump - NOT RUNNING 5. Initiate Instrument Repairs

EVENT	INSTRUCTION	COMMENTS

The next sequence of events require a manual reactor trip and safety injection demand due to two drop control rods and an increase in the RCS leak rate. The crew will very briefly enter OS1210.05, Dropped Rod. Based on the Caution prior to Step 1, the crew should initiate a reactor trip and transition to E-0, Reactor Trip or Safety Injection.

Event 6:

2 Dropped Rods

☐ SELECT MALFUNCTIONS: Rod Control and Position

☐ SELECT: mfCP011

☐ SELECT: INSERT

The crew should enter OS1210.05, Dropped Rod. Based on the caution prior to step 1 the Crew should trip the reactor and transition to E-0.

Crew Manually trips the reactor and verifies the need for safety injection.

E-plan: ALERT, FA1, Any Loss or Potential Loss of either Fuel Clad or RCS Barrier.

UPON the manual reactor trip verify the Event Trigger fires to increase the RCS Leakage to 50,000 gpm. If not do the following:

☐ MFS SELECT mfRC050A

☐ SELECT: Final Value: 50000

☐ SELECT RAMP: 120

☐ MODIFY

Crew enters E-0, Reactor Trip or Safety injection: NOTE:

- *Steps 1 through 4 are IMMEDIATE ACTION steps.*
- *Initiate monitoring of critical safety function status trees at step 17 OR if exiting from this procedure.*
- *Review OPERATOR ACTION SUMMARY periodically.*

1. Verify Reactor Trip:

2. Verify Turbine Trip:

EVENT	INSTRUCTION	COMMENTS
		3. Verify Power To AC Emergency Busses: a. AC emergency busses - AT LEAST ONE ENERGIZED b. AC emergency busses – BOTH ENERGIZED 4. Check If SI Is Actuated: Check SI annunciators lit • TRAIN A - OR - • TRAIN B **RNO: a.** Check if SI is required: • RCS pressure - LESS THAN 1800 PSIG Or • Pressurizer level - LESS THAN 7% Or • Containment pressure - GREATER THAN 4 PSIG Or • RCS subcooling - LESS THAN 40°F Or • Any SG pressure - LESS THAN 585 PSIG
	SI Fails to Auto actuate. The Crew Manually Initiates SI based on E-0 Step 4 immediate actions.	IF SI is required, THEN manually actuate. **(Note: Manual actuation will be required.)**
	E-0, ATTACHMENT A **PSO performs E-0, Attachment A while, US and BOP Continue procedure steps beyond Step 6.** **NOTE: E-0 Attachment A will require manual start of CS-P-2B and both CBS-P-9A and CBS-P-9B.** **ATTACHMENT A is below in center column.**	5. Perform ESF Actuation Verification Per Attachment A. **(Located in center column for reference.)**

EVENT	INSTRUCTION	COMMENTS
	NOTE: *At least one train of ESF components should be aligned before aligning the redundant train.* *Verbal communication of manual actions is not required.*	6. Monitor RCS Temperature - STABLE AT OR TRENDING TO 557°F
	1. Verify Containment Isolation Phase A Actuation - ALL STATUS PANEL LIGHTS LIT • Train A • Train B	7. Check RCS Isolated: a. Check letdown valve(s) - CLOSED • CS-V145 - OR - • RC-LCV-459 - OR - • RC-LCV-460 b. PORVs – CLOSED c. Normal PZR spray valves – CLOSED
	2. Verify Safeguard Equipment Alignment - PROPER ALIGNMENT BY STATUS PANEL • TRAIN A - COLD LEG INJECTION • TRAIN B - COLD LEG INJECTION	8. Check If RCPs Should Be Stopped: a. ECCS pumps - AT LEAST ONE RUNNING • CCP Or • SI Pump b. RCS subcooling - LESS THAN **40°F** c. Stop all RCPs **CREW STOPS RCPS** **Crew Stops RCPs Based on Subcooling <40°F**

EVENT	INSTRUCTION	COMMENTS
	3. Verify Feedwater Isolation - PROPER ALIGNMENT BY STATUS PANEL 4. Verify PCCW Pumps Running: • Loop A – ONE PUMP RUNNING • Loop B – ONE PUMP RUNNING • Thermal barrier cooling pumps – AT LEAST ONE PUMP RUNNING	9. Check If SG Pressure Boundary Is Faulted: NO Goes to Step 10 10. Check If SG U-Tubes Are Intact: Yes No SGTR, continues with Step 11. 11. Check If RCS Is Intact: NO **RNO:** Go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1. **Crew Transitions to E-1, Loss of REACTOR OR SECONDARY COOLANT, Step 1**
Event 7: Manual Start of 'B' CCP	5. Verify ECCS Flow: • CCP flow indicator - CHECK FOR FLOW TO RCS COLD LEGS • RCS pressure - LESS THAN 1700 PSIG • SI pump flow indicators - CHECK FOR FLOW - TRAIN A - TRAIN B • RCS pressure - LESS THAN 300 PSIG • RHR pump flow indicators - CHECK FOR FLOW - TRAIN A - TRAIN B 6. Verify MS-V129 – OPEN 7. Verify Service Water Pumps Running: • Train A - ONE PUMP RUNNING • Train B - ONE PUMP RUNNING	

EVENT	INSTRUCTION	COMMENTS
	8. Verify SW Flow To Train A And Train B Diesels - GREATER THAN REQUIRED 900 GPM on OCEAN Or 1800 GPM on cooling tower	
	9. Check If Main Steamlines Should Be Isolated: a. Check Main Steam Isolation required: • Any SG pressure - LESS THAN 585 PSIG WITHOUT PRIOR P-11 BLOCK Or • Main steam line isolation annunciator – LIT Or • Containment pressure - GREATER THAN 4 PSIG Or • SG pressure rate high bistable - LIT WITH PRIOR P-11 BLOCK b. Verify MSIV and MSIV bypass valves – CLOSED	
Event 7: Manual Start of CBS Pumps	10. Check Containment Pressure - HAS REMAINED LESS THAN 18 PSIG BY PRESSURE RECORDING **PSO manually starts CBS Pumps.**	
	11. Verify Total EFW Flow – GREATER THAN 500 gpm	

EVENT	INSTRUCTION	COMMENTS
	12. Reset RMO, as necessary	
	13. Notify US Of Actuation Verification Status	
Terminate Exam	When the crew has completed Attachment A of E-0 and transitioned to E-1, Loss of Reactor or Secondary Coolant, or at Chief Examiner's discretion.	Terminate the exam at Chief Examiner discretion.

CREW CRITICAL TASKS

1. Manually actuate at least one train of SI before any of the following: Transition to any E-1 series, or E-3 series procedure or transition to any FRG.

2. Manually actuate at least one train of CBS or start at least one train of Containment Building Spray Equipment per the ATTACHMENT A, E-0.

FPL Energy

Seabrook Station

SIMULATOR EXAMINATION

2007-2009 LOIT NRC Examination Scenario C

Rev. 0

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PREPARED BY: _____ DATE: _____
INSTRUCTOR

REVIEWED BY: _____ DATE: _____
SME (OPTIONAL)

APPROVED BY: Signature on File DATE: _____
TRAINING SUPERVISOR

SCENARIO

Mode 1, 75% power. The motor driven EFW pump is removed from service (tagged out). The "A" ASDV is isolated and tagged closed due to seat leakage. MS-PV3001 was tagged out, and T.S 3.6.3 and TS 3.7.1.6 were entered 4 hours ago. The ASDV isolation valve MS-V5 is also closed.

Main Steam line isolation fails to auto actuate for Train 'A' and Train 'B'. The Reactor Trip Breakers are failed closed. An Automatic turbine trip is defeated. The manual turbine trip pushbutton is overridden to prevent a manual turbine trip from the Main Control room. The Start up feed pump will trip on overcurrent when a manual start attempt is made.

An RCS Loop 3 Tcold failure LOW will occur. At the time of the Loop 3 Tcold failure, a 30 gpm RCS leak will start from the Tcold instrument line. The diagnosis of this event should lead the crew to commence a power decrease.

The "A" Steam Generator Steam Flow channel, FW-FT-512, will fail LOW. The "A" Feed regulating valve will CLOSE resulting in a decreasing "A" SG level. The total plant steam flow will also decrease, causing Main Feed Pump speed to decrease, resulting in the other SG levels also decreasing. The crew responds with OS1235.04, Steam Generator Steam Flow/Feed flow instrument failure. The BOP operator will place the "A" Feed Regulating Valve in manual and restore Steam Generator level to program (50%). The Crew will deselect the affected channel, and restore the Feed Pump and Feed Regulating Valve back to Automatic.

The "A" MFP Slave controller, FW-FK-509B, Auto output will fail to zero causing a SG level transient that requires the crew to take manual control of the "A" MFP slave controller to recover. Once the plant is stabilized the next event will occur.

Main Feedwater Pump FW-P-32A will trip causing a setback of the turbine to less than 55% power. Rods will not insert in Auto. The crew will manually insert rods to decrease RCS temperature and stabilize the plant.

A trip of the remaining MFP will cause entry into E-0. Failure of the Reactor to trip will require transitioning to FR-S.1, Response to Nuclear Power Generation/ATWS. The turbine will fail to automatically or manually trip, and Turbine Control Valve 2 will stick open, requiring closure of the Main Steam Isolation Valves (MSIVs). The MSIVs will be prevented from automatically closing on rapidly decreasing SG pressure to ensure this must be done manually. A loss of the turbine driven EFW pump will cause a transition to FR-H.1, Response to Loss of Secondary Heat Sink upon completion of FR-S.1.

E-plan: Alert classification on EAL SU5 (RCS leakage due to unidentified leakage >10GPM).

Upgrade to Site Area Emergency based on SS2, ATWS and manual reactor shutdown from main control board NOT successful.

Terminate the exam at Chief Examiner discretion.

SIMULATOR SETUP

1. Select an IC for 75 % power. 1139 ppm Boron **NOTE: This set up has been snapped to IC 222. Reset to IC 222 and verify the following:**

2. To set up the ASDV "A" Closure and Isolation with MS-V5:
   - ☐ On Sim Diagram MS1 for MS-V5 Select the Remote Function, rfMS009, and Set Final value to 0
   - ☐ On MS-PK-3001, place the controller to Manual and Minimum Output
   - ☐ On Sim Diagram MS1, MS-PV-3001, Component Malfunction
   - ☐ SELECT: FAIL CLOSED
   - ☐ SELECT: INSERT
   - ☐ PLACE MCB jog switch to CLOSED for MS-PV-3001 and Danger Tag switch

3. INSERT the following malfunctions to prevent an Automatic Turbine Trip
   - ☐ Select Malfunctions: Reactor Protection:
   - ☐ Select: mfRPS003, Automatic Turbine Trip Failure
   - ☐ Select: INSERT
   - ☐ On Panel PFF14 Override the Turbine Trip Pushbutton to "RELEASE"

4. Rack out the Motor Driven EFW pump, FW-P-37B
   - ☐ Place the MCB switch for FW-P-37B in PTL and place a Danger Tag on the switch
   - ☐ SELECT: Remote Functions Feedwater, Component:
   - ☐ SELECT: bkFWP37B, right click
   - ☐ SELECT: RF: RACK-OUT
   - ☐ SELECT: INSERT
   - ☐ SELECT: mvFWV347, Right Click: SELECT: Open Breaker

5. Set up the SUFP to trip when started on Bus E5.
   - ☐ SELECT: Malfunctions: Feedwater
   - ☐ SELECT: mfFW041, FW-P-113, Trip Bus E5 (Faulty 86 Device)
   - ☐ SELECT: INSERT

6. Set up the failure of the reactor to trip
   - ☐ SELECT: Malfunctions: Reactor Protection:
   - ☐ SELECT: mfRPS001 Automatic Reactor Trip Failure (Train "A")
   - ☐ SELECT: INSERT
   - ☐ SELECT: mfRPS002 Automatic Reactor Trip Failure (Train "B")
   - ☐ SELECT: INSERT
   - ☐ SELECT: Malfunctions Rod Control and Position (Component)
   - ☐ SELECT: bkCPRTA
   - ☐ SELECT: FAIL CLOSE
   - ☐ SELECT: INSERT
   - ☐ SELECT: bkCPRTB
   - ☐ SELECT: FAIL CLOSE
   - ☐ SELECT: INSERT

SHIFT TURNOVER

- Plant is at ~75% power. Cb = 1139 ppm
- Current power level was achieved 12 hrs ago.
- The Motor driven EFW pump has been tagged out for motor inspection. T.S. Action Statement 3.7.1.2 was entered at 0600.
- Plant is being held at 75% power, waiting ISO direction to return plant power to 100%.
- Main Steam Atmospheric Steam Dump ("A"ASDV) valve, MS-PV-3001 is Danger Tagged closed due to excessive seat leakage. MS-V-5 is closed and tagged. Tech. Spec. 3.7.1.6 and 3.6.3 were entered 4 hours ago.

SCENARIO OUTLINE

EVENT	INSTRUCTION	COMMENTS
Shift Turnover	Shift turnover information as stated.	

Allow the crew to perform a board walkdown and assume the watch prior to inserting the first malfunction:

Event 1: Tcold Fails Low and RCS Leak	Initiate a failure of RCS Tcold Temperature instrument, RC-TI-431, fails LOW. This failure is caused by a 30 gpm RCS leak with a 5 minute ramp. (leak not counted towards I/C requirements; added to provide realistic cause of failed instrument)	Upon the initial instrument failure the crew responds with "OS1201.08, Tavg/Delta T Instrument Failure". After verifying Secondary Load is STABLE the PSO will place rod control to MANUAL and defeat affected instrument.
RC-TT-431 Fails Low	☐ SELECT: MF List	The crew should respond to the RCS leak using OS1201.02. PSO controls charging and letdown flow to restore PZR level.
	☐ SELECT: Reactor Coolant Component ☐ SELECT: ttRCtt431 SELECT: FAIL LOW ☐ SELECT: Insert	**OS1201.08, Tavg/Delta T Instrument Failure** 1. Check Any Tavg Channel – FAILED- YES 2. Stabilize Plant Conditions: • Place rod control – MANUAL • Check condenser steam dump valves – CLOSED
RCS Leak Loop 3 30 gpm ramped over 5 minutes	☐ SELECT: MF List ☐ SELECT: Reactor Coolant ☐ SELECT: mfRC049C ☐ SELECT: Final Value=30	• As necessary, manually restore pressurizer level to program using: o RC-LK-459 master level controller - OR - o CS-FK-121 controller

EVENT	INSTRUCTION	COMMENTS
	☐ SELECT: RAMP Time= 300	3. Defeat Affected Loop ΔT And Tavg Inputs: • Depress affected loop ΔT channel defeat pushbutton • Depress affected loop Tavg channel defeat pushbutton • Select a non affected channel forΔT,OT,OP recorder 4. Verify Operation Of Control Systems: a. Check Tavg - WITHIN 1°F OF Tref 1. If desired, place rod control in - AUTO b. Check pressurizer level - AT PROGRAMMED LEVEL c. Restore pressurizer level control to automatic, as necessary: 1. Adjust RC-LK-459 as needed to match the input on CS-FK-121 2. Place CS-FK-121 in AUTO 3. Adjust RC-LK-459 input to match program level setpoint 4. Place RC-LK-459 in AUTO d. Verify both steam dump interlock selector switches in the NA RESET NA BYPASS INTERLOCK (neutral) position 5. Verify Redundant Channel Bistables - NOT TRIPPED

EVENT	INSTRUCTION	COMMENTS
		UL-1: T AVG LO LOOP TO FW ISO T AVG LO-LO LOOP STM DMP ISO UL-6: RCS LOOP OTΔT RCS LOOP OPΔT UL-12: TAVG LO LOOP TO FW ISO
		6. Verify Technical Specification And Technical Requirement Compliance: • T.S. 3.3.1, Reactor Trip System Instrumentation; Table 3.3-1, Items 7 & 8 • T.R. 19, Feedwater Isolation On Low Tavg Coincident With Reactor Trip 7. Coordinate Repairs End of Procedure
	NOTE: Crew may process the instrument failure and RCS Leak abnormal procedures in parallel when the RCS leak is diagnosed.	**OS1201.02, RCS LEAK** 1. Check If Pressurizer Level Can Be Maintained: a. Control charging and letdown flow as necessary to maintain PZR level on program b. Check pressurizer level – STABLE OR INCREASING

EVENT	INSTRUCTION	COMMENTS

2. Refer to ER 1.1, Classification of Emergencies:
   - Category S - System Malfunction (SU5)
   - Category F – Fission Product Barrier Degradation Matrix
   - Category C – Cold Shutdown/Refueling System Malfunction

Once the crew estimates the RCS leakage is greater than 10 gpm the E-plan classification is: EAL SU5 (Unidentified or Pressure boundary leakage >10 GPM) Unusual Event

3. Determine Appropriate Procedure Step Transition:

   IF RCS leak is suspected, THEN go to Step 4.

4. Isolate Potential RCS Leakage Sources:
   a. Check for pressurizer safety or PORV leakage:
      - Safety valve or PORV tailpipe temperature – NORMAL
      - Acoustic monitor indications - NORMAL
   b. Check reactor head vent - ISOLATED:
      - RC-FV-2881 – CLOSED
      - RC-V323 - CLOSED
   c. Check excess letdown line - ISOLATED:
      - CS-V175 – CLOSED
      - CS-V176 - CLOSED
   d. Check RCS sample lines – CLOSED BY PHASE A STATUS PANELS

EVENT	INSTRUCTION	COMMENTS

e. Check reactor vessel flange leakoff temperature:
   - RC - TI - 401 RX VESSEL FLANGE LEAKOFF TEMP – NORMAL

f. Check valve stem leakoff header temperature:
   - D7805 INSIDE BARRIER STEM LEAKOFF TEMP HI – RESET
   - D7804 OUTSIDE BARRIER STEM LEAKOFF TEMP HI - RESET

g. Check steam generator tubes - INTACT:
   - Main steamline radiation – NORMAL
   - Steam generator blowdown radiation – NORMAL
   - Condenser air evacuation radiation – NORMAL
   - Steam generator sample - NORMAL

h. Check SI discharge header pressure - LESS THAN 800 PSIG

i. Evaluate RCS Leakage - LEAKAGE ISOLATED: RNO NO

RNO: Go to step 16.

16. Continue Efforts To Locate And Identify Source Of Leakage While Continuing With This Procedure:

17. Estimate RCS Leak Rate:

18. Verify Technical Specification Compliance:
    - T.S. 3.4.6.2, Reactor Coolant System Leakage
    - T.S. 3.4.10, Structural Integrity

19. Check VCT Makeup Control System: Normal

20. Evaluate Continued Plant Operation:

EVENT	INSTRUCTION	COMMENTS
Event 2: Plant Shutdown due to RCS Leakage	**CUE: Allow the crew to begin a controlled TS shutdown or prompt them from Operations management to begin the shutdown.**	21. Commence Controlled Plant Shutdown While Continuing With This Procedure:
	If asked for power decrease rate respond "What do you recommend?"	22. Check CST level - GREATER THAN 390,000 GALLONS
	If further questioned reply "10% per hour rate for shutdown."	23. Isolate Offsite Release Paths:
		24. Minimize Effects Of Release To Containment:
	Crew calculates boration total gallons, flow rate and turbine decrease load schedule and begins power decrease.	25. Verify Plant In Hot Standby: RNO NO Continue shutdown to Hot Standby. Do NOT continue to Step 26 until Step 25 is complete.
	NOTE: Continue to next Event at Chief Examiner's discretion.	
Event 3: A SG Steam Flow Channel Failure	☐ SELECT: Malfunctions Feedwater (Component) ☐ SELECT: ftFWFT512 ☐ SELECT: FAIL LOW ☐ SELECT: INSERT	The "A" Feed regulating valve will CLOSE resulting in a decreasing "A" SG level. The total plant steam flow will also decrease, causing Main Feed Pump speed to decrease, resulting in the other SG levels also decreasing. The BOP operator will place the "A" Feed Regulating Valve in manual and restore Steam Generator level to program 50%. The Crew will deselect the affected channel, and restore the controls to Feed Pump back to Automatic.

EVENT	INSTRUCTION	COMMENTS
		The crew responds with OS1235.04, Steam Generator Steam Flow/Feed flow instrument failure. NOTE: *Failure of a SG pressure instrument used for steam flow density-compensation will cause invalid steam flow indication.* *Steam flow channels provide input to the Main Feed Pump programmed DP signal for speed control.* 1. Check Steam Generator Water Level Control: a. Identify failed instrument - CONTROLLING CHANNEL FAILED - Steam flow channel - Feed flow channel b. Place affected steam generator feed control valve – MANUAL c. Control feed flow to maintain narrow range level - 45% TO 55% 4. Realign Steam Generator Level Control Instruments: a. Monitor feedwater system response and select an alternate channel for control: - Steam flow channel OR - Feed flow channel 5. Align Steam Generator Water Level Control: a. Check the following: - Steam flow/feed flow signals – MATCHED - Steam generator level - AT PROGRAMMED LEVEL 50% (45% TO 55%) b. Verify proper feed regulating valve controller setpoint and place controller - AUTO

EVENT	INSTRUCTION	COMMENTS
		4. Check For Failure Of A Steam Generator Pressure Instrument: None: Return to Procedure and step in Effect.

Initiate the next event while crew after the SG levels have been stabilized from previous failure, or at the Lead Examiners discretion.

Event 4;	FW-P-32A Slave Controller Auto Output Fails to Zero	
A MFP Speed Controller FW-FK-509B Fails	☐ SELECT: Malfunctions; Feedwater (Component) ☐ SELECT: ctFWSK509B ☐ SELECT: Right Click; ☐ SELECT: Fail Output (AUTO) ☐ SELECT: 0 ☐ SELECT: Ramp Time: 30 seconds ☐ SELECT: Insert	All 4 SG Level deviation alarms will occur both on VAS and the hardwired UA. **Note: If the crew attempts to close the FW pump Recirc valve FW-V4064, the malfunction effects will still be seen.** **After 5 minutes B8347, Feed Reg Vlv AVG Position >90% Open; alarms. This provides direction to restore by increasing the speed of the Feed Pump.** **Crew takes manual control of FW-FK-509B and restores SG Level.**

Initiate the next event while crew is stabilizing from previous failure and before crew has rods in AUTO

Control Rods Fail to Insert In AUTO	**On Sim Diagram PDF12A, Override the Rod Bank Selector Switch to MANUAL**

EVENT	INSTRUCTION	COMMENTS
Event 5: MFP-32A trip on low lube oil pressure.	☐ SELECT: Malfunctions; Feedwater ☐ SELECT: mfFW038, MFP-32A trip on low lube oil pressure ☐ SELECT: INSERT	The crew responds using OS1231.03, Turbine Runback/Setback Abnormal. PSO will be required to insert control rods in MANUAL in order to decrease RCS temperature. Plant will trip on Low SG level if RCS temp/steam demand is not lowered below the capability of one MFP. The crew will verify load decreases and plant responds as required. **OS1231.03, Turbine Runback/Setback Abnormal** 1. Verify Turbine Generator Load - DECREASING 2. Verify Proper Rod Control Response: a. Verify Rod bank selector switch position – AUTO b. Verify Rod motion – INWARD 3. Verify Proper Steam Dump Operation 4. Check Steam Generator Pressure - LESS THAN 1150 PSIG 5. Check Main Feed Pump Bias Control Status: • Check Main feed pump master speed controller bias potentiometer set – AT GREATER THAN OR EQUAL TO 5.0 • Check BOTH main feed pump slave speed controller bias potentiometers set – AT ZERO NOTE: *Plant may not survive a runback/setback at higher power levels due to a challenge to the SG level low-low reactor trip setpoint.* 6. Verify Steam Generator Narrow Range Levels - TRENDING TO 50%

EVENT	INSTRUCTION	COMMENTS
		7. Monitor Control Rod Position: • Check rod insertion limit LO-LO alarms – RESET • Check ΔI -AFD WITHIN ADMINISTRATIVE LIMIT 8. Check Generator VARs – AT ZERO NOTE: *IF the steam dumps have opened due to a load rejection, THEN Tref indications may not reflect actual program temperature. T cold can be used to ensure RCS is at program temperature.* 9. Monitor RCS Temperature: a. Check turbine load condition: • Turbine generator load – STABLE • EHC load set meter - STABLE b. Verify steam dump system response: 1. Steam dump valves modulating closed as RCS temperature is restored 2. WHEN steam dumps are closed and Tavg is within 2°F of Tref, THEN reset condenser steam dump arming signal C-7

EVENT	INSTRUCTION	COMMENTS
	NOTE: During rod insertion, RCS temperature and pressure decrease may cause RCS pressure to drop below the value for DNB. TS 3.2.5 PZR Pressure Shall Be Greater Than or Equal To 2185 psig.	c. Verify Tavg - STABLE AT OR TRENDING TO PROGRAM VALUE • T cold - STABLE AT PROGRAM TEMPERATURE - OR - • Tavg indication - OR - • Tavg/Tref indication 10. Stop Any Boron Dilution In Progress: 11. Determine Cause of Runback/Setback Condition On UL-29: a. Check for turbine generator setback condition: • FEEDWATER PUMP LOST (55%) b. Initiate repair activities to clear system malfunctions: Go to Step 14 14. If Power Reduction Exceeded 15%, Notify Chemistry To Sample The RCS 15. Notify Load Dispatcher Of Load Capabilities 16. Verify Technical Specification Compliance: a. T.S. 3.2.1, Axial Flux Difference b. T.S. 3.1.3.6, Control Rod Insertion Limits

After plant stabilization initiate a failure of Main Turbine Stop valve to FAIL AS IS. This failure provides a CCT on subsequent plant trip. Initiate trip of Second Main Feed Pump to require plant trip, and a Loss of Feedwater event.

EVENT	INSTRUCTION	COMMENTS
Event 6: Failure of #2 MS Stop Valve	☐ SELECT: Main Steam Component	The crew should recognize that insufficient feedwater is available and there is a need for a Reactor Trip. The crew will enter E-0, Reactor Trip or Safety Injection.
	☐ SELECT: avMSVSV2	An AUTO Reactor Trip will not occur so the PSO will perform a MANUAL Trip.
	☐ SELECT: FAIL OPEN	The Reactor will not trip and the crew will transition to FR-S.1, Response to Nuclear Power Generation/ATWS.
	☐ SELECT: INSERT	
Event 6: FW-P-32B Trip for Loss of FW	☐ SELECT: Malfunctions Feedwater	
	☐ SELECT: mfFW054	
	☐ SELECT: INSERT	
	CUE: **45 seconds after the crew directs a local trip the Trip breakers will be opened locally to Shutdown the reactor.**	
	☐ **Go to Components Malfunction Summary on toolbar**	
	SELECT: bkCPRTA	
	☐ **Right Click and SELECT DELETE**	
	☐ **SELECT: bkCPRTB**	
	☐ **Right Click and SELECT DELETE**	
	☐ **Delete Reactor Trip Auto Fails Train A and Train B from Malfunction Summary**	

EVENT	INSTRUCTION	COMMENTS
	BOP should recognize that AUTO turbine trip has not occurred. After performing a MANUAL Turbine trip the BOP operator should recognize #2 Turbine Stop valve has FAILED OPEN (malfunction previously inserted). BOP operator will follow up with direction to the NSO to trip the Main Turbine from the front standard per FR-S.1. **CUE: When directed by crew remove Main Turbine trip override** ☐ **SELECT Malfunction Summary on the tool bar** ☐ **Select: mfRPS003** ☐ **Select: Delete** ☐ **Select: EXECUTE** ☐ **Select Override Summary on the toolbar** ☐ **Delete override for turbine trip pushbutton.**	**E-0, Reactor Trip or Safety Injection:** 1. Verify Reactor Trip: No **RNO:** Manually trip reactor. IF reactor will NOT trip, THEN go to: **FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS, Step 1.** 1. Verify Reactor Trip: • Rod bottom lights - LIT ON DRPI • Reactor trip AND bypass breakers - OPEN • Neutron flux – DECREASING **RNO:** Manually trip reactor. IF reactor will NOT trip, THEN: • Verify control rods are being inserted in auto Or • Manually insert control rods 2. Verify Turbine Trip a. All turbine stop valves – CLOSED NO RNO: Manually trip turbine. IF turbine will NOT trip, THEN manually run back turbine. IF turbine can NOT be run back, THEN close MSIVs and bypass valves. WHEN generator output is ZERO MWe, THEN open generator breaker. b. Generator breaker – OPEN Yes

EVENT	INSTRUCTION	COMMENTS
Event 7: Loss of EFW Turbine Driven Pump, FW-P-37A	**CUE: After the crew has passed step 3 of FR-S.1 AND Wide Range level on all SGs >/= 35% and increasing then TRIP MS-V-129, Steam Supply to Turbine Driven EFW pump.** ☐ **Go to Sim Diagram FW3:** ☐ **Select: rmvMSV129** ☐ **Select: manual adjust** ☐ **Select: Final Value = 0** ☐ **Select: INSERT** **NOTE: Delay local restart of Turbine driven EFW pump until the crew has entered FR-H.1, Loss of Heat Sink and attempted start of the SUFP, per step 4 of FR-H.1.**	3. Check EFW Pumps Running: a. Motor driven pump – RUNNING **NO** a. **RNO:** Manually start motor driven EFW pump. **(Can not be started due to tag out)** IF motor driven EFW pump can NOT be started, THEN start the SUFP per Attachment A; **SUFP NOT Available due to 86 LO Fault on breaker.** b. Turbine-driven pump – RUNNING • MS-V393 - OPEN • MS-V394 - OPEN • MS-V395 - OPEN • MS-V129, Trip Valve – OPEN—**NO** **b. RNO:** Open valves to establish at least one steam supply path. IF the turbine driven pump can NOT be started from the control room, THEN perform the following: Locally start turbine driven pump per OS1036.03, RESETTING THE STEAM DRIVEN EFW PUMP TRIP VALVE. Crew should dispatch an operator to restart the EFW Pump turbine. The NSO will ask for the recirc valve FW-V346 to be opened.

EVENT	INSTRUCTION	COMMENTS
	NOTE: The crew should exit FR-S.1 at step 7. o **If a RED "H": does not exist, transition from FR-S.1 to E-0. When heat sink becomes RED or at step 7 of E-0 , transition to FR-H.1.** o **If a RED "H" exists, transition to FR-H.1 from FR-S.1.**	4. Initiate Emergency Boration Of RCS: a. At least one CCP running. b. Align boration path: 1. Start at least one - BORIC ACID PUMP 2. Open emergency borate valve - CS-V426 c. Align charging flow path: 1. Place CS-FK-121 in manual and charge at maximum rate 2. Align CCP suction to RWST • OPEN CS-LCV-112D • OPEN CS-LCV-112E 3.Isolate VCT: • CLOSE CS-LCV-112B • CLOSE CS-LCV-112C d. Check PZR pressure - LESS THAN 2385 PSIG 5. Verify Containment Ventilation Isolation: a. Containment purge isolation valves – CLOSED • COP-V1 • CAP-V1 • COP-V2 • CAP-V2 • COP-V3 • CAP-V3 • COP-V4 • CAP-V4
Event 8: Loss of SUFP, FW-P-113	The crew will attempt to start the SUFP. The SUFP will trip (faulty 86 device) due to an event trigger inserted prior to the scenario.	

EVENT	INSTRUCTION	COMMENTS
		CAUTION: *If an SI signal exists or occurs, ATTACHMENT A of E-0, REACTOR TRIP OR SAFETY INJECTION should be performed while continuing with this procedure.*
		6. Check If The Following Trips Have Occurred: a. Reactor Trip
		Yes Reactor Trip Breakers have been opened locally.
		b. Turbine trip- NO
		RNO Dispatch operator to locally trip turbine at the turbine front standard.
		7. Check If Reactor Is Subcritical:
		a. Check power range channels - LESS THAN 5%
		b. Check intermediate range flux rate – ZERO OR NEGATIVE
		c. Check gammametrics intermediate range flux level - LESS THAN 5%
		d. Check gammametrics intermediate range flux rate - ZERO OR NEGATIVE
		e. Continue boration to obtain adequate shutdown margin during subsequent actions
		f. Return to procedure and step in effect

EVENT	INSTRUCTION	COMMENTS

The crew should exit FR-S.1 at step 7.

- If a RED "H": does not exist, transition from FR-S.1 to E-0. When heat sink becomes RED or at step 7 of E-0 , transition to FR-H.1.
- If a RED "H" exists, transition to FR-H.1 from FR-S.1.

A RED Path will exist so crew should go to FR-H.1.

FR-H.1, Response to Loss of Secondary Heat Sink

1. Check If Secondary Heat Sink Is Required:
   a. RCS pressure - GREATER THAN ANY NON-FAULTED SG PRESSURE
   b. RCS hot leg temperature - GREATER THAN 350°F [320°F FOR ADVERSE CONTAINMENT]
2. Check CCP Status - AT LEAST ONE AVAILABLE

CAUTION: *If wide range level in any 3 SGs is less than 30% [51% for adverse containment] OR PZR pressure is greater than or equal to 2385 PSIG due to loss of secondary heat sink, Steps 1 through 10 should be immediately initiated for bleed and feed.*

EVENT	INSTRUCTION	COMMENTS
Event 9: Recovery of FW-P-37A	**CUE: After entry into FR-H.1 and the crew has dispatched an NSO to start the Turbine Driven EFW Pump, and attempted a start of the SUFP, then restore MS-V-129.** **Go to Sim Diagram FW3:** **Select: rmvMSV129** **Select: manual adjust** **Select: Ramp Time = 0** **Select: Final Value = 1** **Select: INSERT**	3. Establish EFW Flow To At Least One SG: a. Check SG Blowdown isolation valves - CLOSED AS INDICATED ON PHASE A STATUS PANEL • SB-V9 • SB-V10 • SB-V11 • SB-V12 b. Check control room indications for cause of EFW failure: • CST level low • EFW pump power supply (Bus E6 or steam) • EFW valve alignment (MCB) • EFW pump failure
	SG WR Levels should be greater than 35%.	c. IF any SG wide range level is less than 14% [30% ADVERSE CONTAINMENT], THEN OBSERVE dry SG cautions and notes on OAS page.
	When EFW flow is restored the crew should return to FR-H.1, step 3 to determine procedure transition. o If FR-H.1 was entered from FR.S.1 then procedure and step in effect is E-0, step 1. As FR-H.1 was entered from FR-S.1 the transition is back to E-0, Step 1 and verification of Immediate action steps 1-4, and then transition to ES-0.1, Reactor Trip Response, Step 1.	d. Try to restore EFW flow • FW-P-37A • FW-P-37B e. Check total flow to SGs - GREATER THAN 500 GPM f. Determine procedure transition: • IF bleed and feed is NOT in progress, THEN return to procedure and step in effect Or • IF bleed and feed is in progress, THEN return to bleed and feed step in effect

EVENT	INSTRUCTION	COMMENTS
		4. Try to Establish SUFP Flow to SG(s): a. Check power to SUFP and pre-lube pump – IMMEDIATELY AVAILABLE. b. Check CST level - GREATER THAN 250,000 gallons
	Perform restart of EFW Pump here.	c. Establish feed flow to EFW header: 1. Reset RMO, as necessary 2. Start the SUFP **Note: Upon start attempt of SUFP, it trips and breaker disagreement amber light comes on indicating failure of the pump.**
		E-0 Reactor Trip or Safety injection NOTE: • *Steps 1 through 4 are IMMEDIATE ACTION steps.* • *Initiate monitoring of critical safety function status trees at step 17 OR if exiting from this procedure.* • *Review OPERATOR ACTION SUMMARY periodically.* 1. Verify Reactor Trip: • Rod bottom lights – LIT • Reactor trip and bypass breakers – OPEN • Neutron flux - DECREASING 2. Verify Turbine Trip: • All turbine stop valves – CLOSED • Generator breaker - OPEN

EVENT	INSTRUCTION	COMMENTS
		3. Verify Power to AC Emergency Busses: • AC emergency busses - AT LEAST ONE ENERGIZED • AC emergency busses – BOTH ENERGIZED 4. Check If SI Is Actuated: Check SI annunciators lit • TRAIN A OR - • TRAIN B Step 4 RNO: a. Check if SI is required: • RCS pressure - LESS THAN 1800 PSIG - OR - • Pressurizer level - LESS THAN 7% - OR - • Containment pressure - GREATER THAN 4 PSIG - OR - • RCS subcooling - LESS THAN 40°F - OR - • Any SG pressure - LESS THAN 585 PSIG IF SI is required, THEN manually actuate.

EVENT	INSTRUCTION	COMMENTS
		IF SI is NOT required, THEN go to ES-0.1, REACTOR TRIP RESPONSE, Step 1
Terminate Exam	Terminate the Exam on the Transition to ES-0.1.	Site Area Emergency E-plan classification based on SS2, ATWS and manual reactor shutdown from main control board NOT successful.
	Terminate the exam at Chief Examiner discretion.	

CREW CRITICAL TASKS

1. Insert negative reactivity into the core by at least one of the following methods in accordance with FR-S.1:
    - Automatic and or manual insertion of the RCCAs.
    - Establish Emergency Boration flow to the RCS.
2. Establish feedwater flow into at least one SG before RCS bleed and feed is required.
3. Isolate the main turbine from the SGs by closing the Control Valves via running back the turbine controls, before proceeding to step 5 of FR-S.1 on an ATWS initiated by a loss of Feedwater.