ppl

March 1, 2013

Mr. John Caruso
USNRC Chief Examiner
USNRC Region 1
2100 Renaissance Blvd, Suite 100
King of Prussia, PA 19406-2713

Received 3/4/13
Operating Test
Written Submitted
Later JCaruso

Susquehanna Steam Electric Station Units 1 and 2
Facility Operating Licenses NPF-14, NPF-22
NRC Docket Numbers 50-387, 50-388

LOC 25 NRC Initial Operator
Licensing Examination Submittal
PLA 006983

Dear Mr. Caruso:

Enclosed are the examination materials for the operating test portion of the LOC25 NRC Initial License Examination scheduled for the weeks of May 13 and May 20, 2013, at Susquehanna Steam Electric Station. Per our discussions the written examination materials will be submitted no later than the week of March 25, 2013.

This submittal includes the Job Performance Measures, Integrated Plant Operation Scenario Guides, and associated reference material. Also included are the final operating test outlines including all appropriate Examination Standard forms in accordance with NUREG 1021, "Operator Licensing Examination Standards," Revision 9, Supplement 1.

These examination materials have been developed in accordance with NUREG 1021, "Operator Licensing Examination Standards," Revision 9, Supplement 1. Please note that reference materials are attached to each individual operating test examination item.

Some minor modifications have been made to the Integrated Examination Outline with regards to the operational scenarios in response to your feedback. These changes improve examination quality and are in compliance with NUREG 1021, Revision 9, Supplement 1 "Operator Licensing Examination Standards."

In accordance with NUREG 1021, Revision 9, Supplement 1, Section ES-201, "Initial Operator Licensing Examination Process," please ensure that these materials are withheld from public disclosure until after the examinations are complete. Additionally, SSES requests that all examination materials be withheld from public disclosure for two years after the administration of the exams to allow reuse of the examination materials in future initial licensing classes

Should you have any questions concerning this letter, please contact Ron Streeper, Operations Training Manager, at 570-542-3677. For questions concerning examination materials, please contact Robert Thompson at 570-542-3710.

Sincerely,

Lonnie L. Crawford

Lonnie L. Crawford
Assistant Operations Manager, Shift
Facility Representative

Response: No

Enclosures:

Examination Security Agreements (Form ES-201-3)
Examination Outline Quality Checklist (Form ES-201-2)
Operating Test Quality Checklist (Form ES-301-3)
Control Room/In Plant Systems Outline (Form ES-301-2)
Control Room Systems and Facility Walk Through JPMs with references attached
Administrative Topics Outline(s) (Form ES-301-1)
Administrative Topic JPMs with references attached
Simulator Scenario Quality Checklist (Form ES-301-4)
Transient and Event Checklist (Form ES-301-5)
Competencies Checklist (Form ES-301-6)
Scenario Outlines (Form ES-D-1)
Integrated Plant Operation Scenario Guides with associated Off-Normal Procedures attached

cc: (without Attachments)
Chief, NRC Operator Licensing Branch
NRC Senior Resident Inspector Pat Finney, SSES

bcc: Site Vice President
Plant General Manager
General Manager, Operations
Manager, Training
Manager, Operations
Manager, Regulatory Affairs
Ops Electronic Letter File
Nuclear Records - NUCPT

LC post-exam memo pla 006983

LC/RAT/vah

Facility: Susquehanna	Date of Examination: May 2013
Examination Level: SRO	Operating Test Number: 2013

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Calculate Drywell Leakage and Determine Technical Specification Impact SO-100-006, K/A 2.1.7 (4.7) Common SRO/RO
Conduct of Operations	M, R	Determine Work Hour Controls NDAP-QA-0025, K/A 2.1.5 (3.9) Common SRO/RO
Equipment Control	P, D, R NRC 2/2011	Perform LPRM Upscale Alarm Operability Tracking and Determine Required Actions OI-078-001, K/A 2.2.14 (4.3) ~~Common SRO/RO~~
Radiation Control	D, R	Determine Ability to Bypass Secondary Containment Zone 2 Isolation OP-234-002, K/A 2.3.13 (3.8)
Emergency Procedures/Plan	M, R	Classify Emergency Conditions and Make Notification EP-PS-100, K/A 2.4.41 (4.6)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Susquehanna
Examination Level: RO

Date of Examination: May 2013
Operating Test Number: 2013

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Calculate Drywell Leakage SO-100-006, K/A 2.1.7 (4.4) Common
Conduct of Operations	M, R	Determine Work Hour Controls NDAP-QA-0025, K/A 2.1.5 (2.9) Common
Equipment Control	D, R	Perform Jet Pump Operability Check SO-100-007, K/A 2.2.12 (3.7)
Radiation Control		
Emergency Procedures/Plan	D, S	Activate Fire Brigade ON-013-001 Attachment L, K/A 2.4.27 (3.4)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:

(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title: Calculate Drywell Leakage

S/RO	00.AD.037.051	1	01/29/2013	Classroom
Appl To	JPM Number	Revision	Date	Setting

G	2.1.7	4.4/4.7	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/29/2013	15/25
Author	Date	Validation Time (min)

Validated / Approval

	1/28/2013		2/26/13
Operations Instructor	Date	Nuclear Trng Supv R. Snoopl	Date

Examinee Name: ______________________ (Last, First MI) ______________ (Employee Number)

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ (Name) ______________________ (Signature)

Comments

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. SO-100-006, SHIFTLY SURVEILLANCE OPERATING LOG (REV 85)

B. TS 3.4.4, RCS OPERATIONAL LEAKAGE

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. Unit 1 is operating at 100% power.

B. Sometime during the past 24 hours, Drywell sump in-leakage began rising.

C. It is 0900 hours and time to perform SO-100-006, SHIFTLY SURVEILLANCE OPERATING LOGS.

D. The total number of level rises on LR/FR-16103 for Sump A is 6 in the last 12 hours.

E. The 24 hour previous average inleakage for Sump A was 0.03 gpm.

F. The total number of level rises on LR/FR-16103 for Sump B is 5 in the last 12 hours.

G. The 24 hour previous average inleakage for Sump A was 0.03 gpm.

H. Total percent rise in Drywell Equipment Drain Leakage (LR/FR-16103) forwarded over the last 24 hours is 4400%.

V. INITIATING CUE

Determine RCS leakage by completing Item 18 of SO-100-006, SHIFTLY SURVEILLANCE OPERATING LOG, Attachment A and determine if any Tech Spec limits are being exceeded. Record the results of the calculation and determination.

Additional SRO Only Cue (if determines Tech Spec limit(s) exceeded):

Determine the Technical Specification required actions based on your findings.

VI. TASK STANDARD

Unidentified RCS leakage is determined to be 0.31 gpm. A determination is made that RCS leakage is within the Tech Spec allowable value of ≤ 5 gpm. Total unidentified delta leakage is determined to be 0.25 gpm/24 hours. A determination is made that delta leakage is within the Tech Spec allowable value of < 2 gpm/4 hours. Total leakrate is determined to be 26.18 gpm. A determination is made that delta leakage is above the Tech Spec allowable value of ≤ 25 gpm. SROs additionally determine the Tech Spec required action for high total leakage.

VII. TASK SAFETY SIGNIFICANCE

Calculation of Drywell leakage is important to ensure compliance with Technical Specifications and monitor RCS boundary integrity.

Appl. To/JPM No.: 00.AD.037.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE: To begin this JPM, provide the candidate with the Task Conditions and Initiating Cue Sheet, plus SO-100-106 Attachments F and L filled out for the previous 2100 hour surveillance (see Student Handout). See red ink on provided key for expected candidate entries corresponding to the values within the JPM. See green ink on provided key for allowable tolerance on calculated values.			
1.	Obtain a controlled copy of SO-100-006, SHIFTLY SURVEILLANCE OPERATING LOG.	Controlled copy obtained from evaluator.		
2.	Selects the correct section to perform.	Selects item A18.		
3.	Determines Attachment F and L will need to be completed.	Determines Attachment F and L will need to be completed.		
	EVALUATOR NOTE: The candidate may refer to Attachments E and M for the instructions on how to complete Attachments F and L. This JPM is written to follow this guidance. The candidate does not need to use Attachments E and M to complete the JPM, rather the candidate need only correctly complete Attachments F and L to successfully complete this JPM.			

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.AD.037.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
4.	Refers to Attachments E and M for instructions on completing Attachments F and L.	Locates Attachments E and M.		
5.	Determine total number of level increases from the last 12 hour period on DRWL SUMPS FLOW & LVL LR/FR-16103 (Point 1) (Alternate: Computer Pt. RLL004Z) including increase that occurs coincident with start of each pumpdown (indicated by a sharp drop in level; level spike may not be evident). **EVALUATOR NOTE** Candidate may ask if there were any level increases coincident with the shutdown of the pump. If so, tell them NO.	Places 6 in the space provided on SO-100-006 Attachment F. (item b)		
6.	Determine total number of level increases for the last 12 hour period on DRWL SUMPS FLOW & LVL RECORDER LR/FR-16103 (Alternate: Computer Pt. RLL005Z) (Point 2) including increase that occurs coincident with start of each pumpdown (indicated by a sharp drop in level; level spike may not be evident).	Places 5 in the space provided on SO-100-006 Attachment F. (item c)		
7.	Compute total gallons accumulated for DRWL Sump A. (Total Level Increases) (19 gal/level) = total gallons.	Places 114 in the space provided on SO-100-006 Attachment F. (item d) (6 X 19 = 114)		

✶Critical Step #Critical Sequence

Appl. To/JPM No.: 00.AD.037.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
8.	Compute total gallons accumulated for DRWL Sump B. (Total Level Increases) (21 gal/level) = total gallons.	Places 105 in the space provided on SO-100-006 Attachment F. (item e) (5 X 21 = 105)		
9.	Determine average Inleakage for DRWL Sump A (total gallons)/(elapsed time in minutes) = average inleakage. **EVALUATOR NOTE:** 0.03 in item h was provided as a carry-over item from the previous day in the initial conditions.	Places 0.16 in the space provided on SO-100-006 Attachment F. (item g) (114/720=0.16) (±0.02)		
10.	Determine the change in inleakage from the last time the inleakage was determined. (current inleakage) - (previous inleakage) = change in inleakage.	Places 0.13 in the space provided on SO-100-006 Attachment F. (item i) (0.16 – 0.03=0.13) (±0.02)		
11.	Determine average inleakage for DRWL Sump B (total gallons)/(elapsed time in minutes) = average inleakage. **EVALUATOR NOTE:** 0.03 in item k was provided as a carry-over item from the previous day in the initial conditions.	Places 0.15 in the space provided on SO-100-006 Attachment F. (item j) (105/720=0.15) (±0.02)		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.AD.037.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
12.	Determine change in inleakage from the last time the inleakage was determined. (current inleakage) - (previous inleakage) = change in inleakage.	Places 0.12 in the space provided on SO-100-006 Attachment F. (item l) (0.15-0.03=0.12) (±0.02)		
∗13.	Determine the total average inleakage (inleakage Sump A) + (inleakage Sump B). < 5 gpm required.	Places 0.31 in the space provided on SO-100-006 Attachment F. (item m) (0.16 + 0.15 = 0.31) (±0.04)		
∗14.	Determine the total change in inleakage from the last time the inleakage was determined (delta inleakage Sump A) + (delta inleakage Sump B). < 2 gpm/24 hours required.	Places 0.25 in the space provided on SO-100-006 Attachment F. (item n) (0.13 + 0.12 = 0.25) (±0.04)		
15.	After 0900 average inleakage calculation, Enter average inleakage recorded for both 2100 and 0900 in steps g. and j. to next day's worksheet to be used as 24 hour previous values in steps h. and k. for 2100 and 0900, respectively. **EVALUATOR CUE:** If necessary, inform the candidate that it is not required to perform the transposition to tomorrow's surveillance JPM.	N/A		
16.	Compute total gallons accumulated for DRWL Sump A. (Add total from each 12 hour period from Attachment F)	Places 152 in the space provided on SO-100-006 Attachment L. (item 1a) (38 + 114 = 152)		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.AD.037.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
17.	Compute total gallons accumulated for DRWL Sump B. (Add total from each 12 hour period from Attachment F)	Places 147 in the space provided on SO-100-006 Attachment L. (item 1b) (42 + 105 = 147)		
18.	Determine average inleakage for DRWL Sump A. (total gallons)/(elapsed time in minutes) = average inleakage	Places 0.11 in the space provided on SO-100-006 Attachment L. (item 1d) (152/1440=0.11) (±0.02)		
19.	Determine average inleakage for DRWL Sump B. (total gallons)/(elapsed time in minutes) = average inleakage	Places 0.10 in the space provided on SO-100-006 Attachment L. (item 1e) (147/1440=0.10) (±0.02)		
20.	Determine total percent from last 24 hr time mark on DRWL EQUIP DRN TANK LR/FR-16103 (Alternate: Computer Pt. RLL006Z).	Places 4400 in the space provided on SO-100-006 Attachment L. (item 2a)		
21.	Compute total gallons accumulated on LEVEL RECORDER LR/FR-16103 (Alternate: Computer Pt. RLL006Z). (Total %) (8.5 gal/%) = total gallons Example: (380%) (8.5 gal) = 3230 gallons	Places 37400 in the space provided on SO-100-006 Attachment L. (item 2b) (4400 X 8.5 = 37400)		
22.	Determine average inleakage recorded on LEVEL RECORDER LR/FR-16103 (Alternate: Computer Pt. RLL006Z) (total gallons)/(elapsed time in minutes) = average inleakage.	Places 25.97 in the space provided on SO-100-006 Attachment L. (item 2d) (37400/1440=25.97) (25.9-26.0 acceptable)		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.AD.037.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
23.	Compute TOTAL DRYWELL LEAKAGE Record average leakrate from step 1.d.	Places 0.11 in the space provided on SO-100-006 Attachment L. (item 3a) (±0.02)		
24.	Record average leakrate from step 1.e.	Places 0.10 in the space provided on SO-100-006 Attachment L. (item 3b) (±0.02)		
25.	Record average leakrate from step 2.d.	Places 25.97 in the space provided on SO-100-006 Attachment L. (item 3c) (25.9-26.0 acceptable)		
*26.	Sum total leakrate (a+b+c) required <25 gpm. **EVALUATOR CUE:** If necessary, remind candidate that they were asked to report the results to the supervisor.	Places 26.18 in the space provided on SO-100-006 Attachment L. (item 3d) (0.11 + 0.10 + 25.97 = 26.18) (26.07-26.25 acceptable)		

*Critical Step #Critical Sequence

Appl. To/JPM No.: 00.AD.037.051 Student Name:______________________

Step	Action	Standard	Eval	Comments
27.	Compares calculated values to the ACCEPTABLE values listed in SO-100-006 SHIFTLY SURVEILLANCE OPERATING LOG.	Compares calculated values to the ACCEPTABLE values listed in SO-100-006 SHIFTLY SURVEILLANCE OPERATING LOG. AND Determines that the total leakrate calculated in step 3.d of attachment L is GREATER Than Tech Spec allowable value of $\leq$ 25 gpm.		
∗28.	Report the results of the calculation and determination. **<u>EVALUATOR CUE:</u>** Role-play Control room supervisor and acknowledge the report. **<u>EVALUATOR CUE (for ROs):</u>** This completes the JPM. **<u>EVALUATOR CUE (for SROs):</u>** Give the SRO candidate the second cue sheet that addresses the Tech Spec LCO for RCS Leakage.	Reports total leakrate is greater than the $\leq$ 25 gpm limit.		
29.	Obtains a copy of the Tech Specs	References Tech Spec 3.4.4		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.AD.037.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
	EVALUATOR CUE: It may be necessary to ask the candidate what additional actions would be required IF the total leakage cannot be reduced ≤ 25 gpm within 4 hours.			
*30.	Determines required actions **EVALUATOR NOTE** A typo has been identified in Unit 1 TS 3.4.4. A change has been initiated, but may not be completed in time for the examination. TS 3.4.4 erroneously states Required Action C.2 is to be in MODE 4 in 35 hours, vice 36 hours. If the candidate states the requirement is within 35 hours, this is both conservative and in accordance with the exact wording of the TS, and is deemed to meet this critical step.	Determines the following actions will be required as per T.S. 3.4.4 Condition A: Required Action A.1: Restore leakage to ≤ 25 gpm within 4 hours Required Action C.1 and C.2: If leakage cannot be reduced to ≤ 25 gpm within 4 hours then: Be in MODE 3 within 12 hours AND Be in MODE 4 within 36 hours		
	EVALUATOR CUE: This completes the JPM.			

*Critical Step #Critical Sequence

DRYWELL FLOOR DRAIN INLEAKAGE CALCULATION WORKSHEET (1)
(ADHERENCE LEVEL - CONTINUOUS USE)

☐

NOTE:	Normal level changes from pump down to pump down are 4 steps per cycle. Any unexplained anomaly from this normal level change will require an AR written to evaluate the anomaly.

NOTE: Circle Alternate if used.

a.	Time	2100	0900
b.	Total number of times Level rises LR/FR-16103 Sump A (Alternate: Computer Pt. RLL004Z)	2	**6**
c.	Total number of times Level rises LR/FR-16103 Sump B (Alternate: Computer Pt. RLL005Z)	2	**5**
d.	Total Gallons DRWL SUMP A (Total Levels) x (19 gal/level)	38 gal	**114** gal
e.	Total Gallons DRWL SUMP B (Total levels) x (21 gal/level)	42 gal	**105** gal
f.	Total elapsed time	720 min	720 min
g.	Average inleakage DRWL SUMP A (total gal)/(elapsed time) (d/f)	0.05 gpm	**0.16** gpm (±0.02)
h.	Average inleakage from previous day (24 hours previous) for DRWL SUMP A	0.03 gpm	0.03 gpm
i.	Delta inleakage DRWL SUMP A (g-h)	0.02 gpm	**0.13** gpm (±0.02)
j.	Average inleakage DRWL SUMP B (total gal)/(elapsed time) (e/f)	0.06 gpm	**0.15** gpm (±0.02)
k.	Average inleakage from previous day (24 hours previous) for DRWL SUMP B	0.03 gpm	0.03 gpm
l.	Delta inleakage for DRWL SUMP B (j-k)	0.03 gpm	**0.12** gpm (±0.02)
m.	Total average inleakage (g+j) < 5 gpm required	0.11 gpm*	**0.31** gpm* (±0.04)
n.	Total delta inleakage (i+l) < 2 gpm/24 hours required	0.05 gpm**	**0.25** gpm** (±0.04)

* Greater than or equal to 0.2 gpm is an entry condition into ON-100-005.
** A greater than or equal to 0.1 gpm rise in last 24 hours is an entry condition into ON-100-005.

DRYWELL LEAKAGE CALCULATION WORKSHEET
source not found.

Reference source not found.
(ADHERENCE LEVEL - CONTINUOUS USE)

1.	DRYWELL FLOOR DRAIN LEAKAGE (Unidentified Leakage)	2100 to 2100		0900 to 0900	
☐	NOTE: Leakage is calculated for the previous 24 hour period.				
a.	Total gallons DRWL Sump A (From Attachment F)	57	gal	**152**	gal
b.	Total gallons DRWL Sump B (From Attachment F)	42	gal	**147**	gal
c.	Total elapsed time for 24 hr period	1440	min	1440	min
d.	Average inleakage DRWL Sump A (Total gallons)/(elapsed time)	0.04	gpm	**0.11** (±0.02)	gpm
e.	Average inleakage DRWL Sump B (Total gallons)/(elapsed time)	0.03	gpm	**0.10** (±0.02)	gpm
2.	DRYWELL EQUIPMENT DRAIN LEAKAGE (Identified Leakage)				
☐	NOTE: **Circle** Alternate if used.				
a.	Total percent (Primary: LR/FR-16103) (Alternate: Computer Pt. RLL006Z)	170	%	**4400**	%
b.	Total gallons (Total percent) (8.5 gal/%)	1445	gal	**37400**	gal
c.	Total elapsed time for 24 hr period	1440	min	**1440**	min
d.	Average inleakage (Total gallons)/(elapsed time)	1.00	gpm	**25.97** (25.9-26.0)	gpm
3.	TOTAL DRYWELL LEAKAGE				
a.	Drywell Floor Drain (Step 1.d) (Unidentified)	0.04	gpm	**0.11** (±0.02)	gpm
b.	Drywell Floor Drain (Step 1.e) (Unidentified)	0.03	gpm	**0.10** (±0.02)	gpm
c.	Drywell Equipment Drain (Step 2.d) (Identified)	1.00	gpm	**25.97** (25.9-26.0)	gpm

DRYWELL LEAKAGE CALCULATION WORKSHEET

(ADHERENCE LEVEL - CONTINUOUS USE)

d. Total leakrate (a+b+c) required ≤ 25 gpm 1.07 gpm **26.18** gpm (26.07-26.25)

TASK CONDITIONS

A. Unit 1 is operating at 100% power.

B. Sometime during the past 24 hours, Drywell sump in-leakage began rising.

C. It is 0900 hours and time to perform SO-100-006, SHIFTLY SURVEILLANCE OPERATING LOGS.

D. The total number of level rises on LR/FR-16103 for Sump A is 6 in the last 12 hours.

E. The 24 hour previous average inleakage for Sump A was 0.03 gpm.

F. The total number of level rises on LR/FR-16103 for Sump B is 5 in the last 12 hours.

G. The 24 hour previous average inleakage for Sump A was 0.03 gpm.

H. Total percent rise in Drywell Equipment Drain Leakage (LR/FR-16103) forwarded over the last 24 hours is 4400%.

INITIATING CUE

Determine RCS leakage by completing Item 18 of SO-100-006, SHIFTLY SURVEILLANCE OPERATING LOG, Attachment A and determine if any Tech Spec limits are being exceeded. Record the results of the calculation and determination.

TASK CONDITIONS

A. Unit 1 is operating at 100% power.

B. Sometime during the past 24 hours, Drywell sump in-leakage began rising.

C. It is 0900 hours and time to perform SO-100-006, SHIFTLY SURVEILLANCE OPERATING LOGS.

D. The total number of level rises on LR/FR-16103 for Sump A is 6 in the last 12 hours.

E. The 24 hour previous average inleakage for Sump A was 0.03 gpm.

F. The total number of level rises on LR/FR-16103 for Sump B is 5 in the last 12 hours.

G. The 24 hour previous average inleakage for Sump A was 0.03 gpm.

H. Total percent rise in Drywell Equipment Drain Leakage (LR/FR-16103) forwarded over the last 24 hours is 4400%.

INITIATING CUE

Determine RCS leakage by completing Item 18 of SO-100-006, SHIFTLY SURVEILLANCE OPERATING LOG, Attachment A and determine if any Tech Spec limits are being exceeded. Record the results of the calculation and determination.

Additional SRO Only Cue

Determine the Technical Specification required actions based on your findings.

Additional SRO Only Cue

Determine the Technical Specification required actions based on your findings.

DRYWELL FLOOR DRAIN INLEAKAGE CALCULATION WORKSHEET (1)
(ADHERENCE LEVEL - CONTINUOUS USE)

☐

NOTE:	Normal level changes from pump down to pump down are 4 steps per cycle. Any unexplained anomaly from this normal level change will require an AR written to evaluate the anomaly.

NOTE: Circle Alternate if used.

a.	Time	2100	0900
b.	Total number of times Level rises LR/FR-16103 Sump A (Alternate: Computer Pt. RLL004Z)	2	____
c.	Total number of times Level rises LR/FR-16103 Sump B (Alternate: Computer Pt. RLL005Z)	2	____
d.	Total Gallons DRWL SUMP A (Total Levels) x (19 gal/level)	38 gal	____ gal
e.	Total Gallons DRWL SUMP B (Total levels) x (21 gal/level)	42 gal	____ gal
f.	Total elapsed time	720 min	720 min
g.	Average inleakage DRWL SUMP A (total gal)/(elapsed time) (d/f)	0.05 gpm	____ gpm
h.	Average inleakage from previous day (24 hours previous) for DRWL SUMP A	0.03 gpm	0.03 gpm
i.	Delta inleakage DRWL SUMP A (g-h)	0.02 gpm	____ gpm
j.	Average inleakage DRWL SUMP B (total gal)/(elapsed time) (e/f)	0.06 gpm	____ gpm
k.	Average inleakage from previous day (24 hours previous) for DRWL SUMP B	0.03 gpm	0.03 gpm
l.	Delta inleakage for DRWL SUMP B (j-k)	0.03 gpm	____ gpm
m.	Total average inleakage (g+j) < 5 gpm required	0.11 gpm*	____ gpm*
n.	Total delta inleakage (i+l) < 2 gpm/24 hours required	0.05 gpm**	____ gpm**

* Greater than or equal to 0.2 gpm is an entry condition into ON-100-005.
** A greater than or equal to 0.1 gpm rise in last 24 hours is an entry condition into ON-100-005.

DRYWELL LEAKAGE CALCULATION WORKSHEET

(ADHERENCE LEVEL - CONTINUOUS USE)

1. DRYWELL FLOOR DRAIN LEAKAGE (Unidentified Leakage) — 2100 to 2100 / 0900 to 0900

NOTE:	Leakage is calculated for the previous 24 hour period.

		2100 to 2100		0900 to 0900	
a.	Total gallons DRWL Sump A (From Attachment F)	57	gal		gal
b.	Total gallons DRWL Sump B (From Attachment F)	42	gal		gal
c.	Total elapsed time for 24 hr period	1440	min	1440	min
d.	Average inleakage DRWL Sump A (Total gallons)/(elapsed time)	0.04	gpm		gpm
e.	Average inleakage DRWL Sump B (Total gallons)/(elapsed time)	0.03	gpm		gpm

2. DRYWELL EQUIPMENT DRAIN LEAKAGE (Identified Leakage)

NOTE:	**Circle** Alternate if used.

a.	Total percent (Primary: LR/FR-16103) (Alternate: Computer Pt. RLL006Z)	170	%		%
b.	Total gallons (Total percent) (8.5 gal/%)	1445	gal		gal
c.	Total elapsed time for 24 hr period	1440	min	1440	min
d.	Average inleakage (Total gallons)/(elapsed time)	1.00	gpm		gpm

3. TOTAL DRYWELL LEAKAGE

a.	Drywell Floor Drain (Step 1.d) (Unidentified)	0.04	gpm		gpm
b.	Drywell Floor Drain (Step 1.e) (Unidentified)	0.03	gpm		gpm
c.	Drywell Equipment Drain (Step 2.d) (Identified)	1.00	gpm		gpm
d.	Total leakrate (a+b+c) required $\leq$ 25 gpm	1.07	gpm		gpm

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title: Evaluate Overtime Request With Respect to Work Hour Limits per NDAP-QA-0025

S/RO	00.AD.3246.202	0	01/29/2013	Classroom
Appl To	JPM Number	Revision	Date	Setting

G	2.1.5	2.9/3.9	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/29/2013	25/30
Author	Date	Validation Time (min)

Validated | | Approval |

	1/28/2013		2/26/13
Operations Instructor	Date	Nuclear Trng Supv R. Sizemore	Date

Examinee Name: ______________________ ______________________

Last, First MI Employee Number

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________

Name Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 00.AD.3246.202

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. NDAP-QA-0025, WORKING HOUR LIMITS FOR STATION STAFF, REV 12

B. 10CFR26.205, WORK HOURS

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

1. Unit 2 is shutdown for a refueling outage.
2. Current time is 1830 on May 30, 2013.
3. This is day #29 of the outage.
4. An Operator scheduled to work the day shift on May 31, 2013 at Unit 2 has called in sick for that shift.
5. In order to support minimum control room staffing requirements, personnel overtime will be required for the day shift on May 31, 2013 from 0630-1830.
6. All the overtime hours will be spent performing control room activities on Unit 2.
7. Working hours are provided for three Reactor Operators. All of these hours were spent working under outage work hour controls at Unit 2.
8. May 17, 2013 through May 31, 2013 is a fixed 15-day period for work hour rule considerations.

V. INITIATING CUE

From the provided list of personnel working hours (all working under outage work hour controls), determine who is eligible to work a complete 12 hour shift beginning at 0630 on May 31 without exceeding the limits of NDAP-QA-0025.

If a Work Hour Limits Waiver would be required for any individual(s), state the work hour limit(s) which would be exceeded IAW NDAP-QA-0025.

Additional SRO Only Cue (to be provided later):

1. ROs #1 and #3 have not been able to be contacted.

2. RO #2 is the only operator available and will be required to work.

Complete NDAP-QA-0025, Attachment B, 10 CFR 26 Work-Hour Limits Waiver, Section 1, for RO #2 to cover this shift on May 31.

VI. TASK STANDARD

Determine personnel availability for overtime IAW NDAP-QA-0025.

VII. TASK SAFETY SIGNIFICANCE

Managing of fatigue through compliance with work hour limitations is important to ensure control room operators are fit-for-duty.

Appl. To/JPM No.: 00.AD.3246.202 Student Name:________________________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE: To begin this JPM, provide the candidate with the Task Conditions and Initiating Cue Sheet, the Work History handout, the blank Answer Sheet and a copy of NDAP-QA-0025.			
1.	Obtain a controlled copy of NDAP-QA-0025.	Controlled copy obtained from evaluator.		
✳2.	Reviews work hours for Reactor Operator #1.	Determines Reactor Operator #1 is eligible to work.		
✳3.	Reviews work hours for Reactor Operator #2.	Determines Reactor Operator #2 is NOT eligible to work. Determines Reactor Operator #2 would work more than 72 hours in a 7 day period.		
✳4.	Reviews work hours for Reactor Operator #3.	Determines Reactor Operator #3 is NOT eligible to work. Determines Reactor Operator #3 would NOT have at least a 34 hour break in last 9 days (5/23-5/31).		

✳Critical Step #Critical Sequence

Appl. To/JPM No.: 00.AD.3246.202 Student Name:_______________

Step	Action	Standard	Eval	Comments
	EVALUATOR CUE (for ROs): This completes the JPM. **EVALUATOR CUE (for SROs):** Give the SRO candidate the second cue sheet that addresses processing of a waiver and a blank NDAP-QA-0025 Attachment B.			
∗5.	SRO Only - Completes NDAP-QA-0025 Attachment B Section 1 for RO #2. **EVALUATOR NOTE** Only items 1. and 2. of NDAP-QA-0025 Attachment B Section 1 are deemed critical for evaluation of this step. Items 3. and 4. are not critical. **EVALUATOR CUE:** This completes the JPM.	Completes NDAP-QA-0025 Attachment B Section 1 for RO #2 (see attached key).		

∗Critical Step #Critical Sequence

Evaluator's Answer Key

	Eligible to work without a Work Hour Limits Waiver? (Yes/No)	If No, what work hour limit(s) would be exceeded IAW NDAP-QA-0025?
RO #1	Yes	N/A
RO #2	No	Would work more than 72 hours in last 7 days (5/25-5/31)
RO #3	No	Would not have at least a 34 hour break in last 9 days (5/23-5/31)

Evaluator's Answer Key (SRO Only)

10 CFR 26 WORK-HOUR LIMITS WAIVER

Section 1 – Request
(To be completed by Cognizant Supervisor)

Cognizant Supervisor (print name)	Date/Time Waiver Request Initiated
Candidate's name	Current date / Current time

1. Identify individual who will exceed a 10 CFR 26.205 limit:

Name: Reactor Operator #2 Department: Operations

Date/Time Waiver to Start: 05-31-13 / 0630 Date/Time Waiver to End: 05-31-13 / 1830

Waiver Duration (hours beyond limits): 12

2. Identify limits that will be exceeded (check all that apply):

- ☐ > 16 work hours in any 24-hour period
- ☐ > 26 work hours in any 48-hour period
- ☒ > 72 work hours in any 7-day period
- ☐ < 8-hour (consecutive) break when transitioning between shift rotations
- ☐ < 10-hour (consecutive) break between successive work periods
- ☐ < 34-hour (consecutive) break in any 9-day period
- ☐ Minimum required days off:

  ☐ On-line ☐ Outage

  Required number of days off:

  Shift schedule applied to individual: - hour shift

3. Identify work activity for which the waiver will be issued:
(This should be in adequate detail to support the supervisory fatigue assessment.)

Performing Unit 2 control room Reactor Operator duties (outage unit) (or similar).

4. Circumstances that cause the need for exceeding limits:
(Identify why the waiver is required to address conditions that are adverse to security or safety and why the circumstances could not have been reasonably controlled.)

Scheduled worker called in sick. No other operators are available to cover. This is required to meet minimum shift manning (or similar).

TASK CONDITIONS

1. Unit 2 is shutdown for a refueling outage.
2. Current time is 1830 on May 30, 2013.
3. This is day #29 of the outage.
4. An Operator scheduled to work the day shift on May 31, 2013 at Unit 2 has called in sick for that shift.
5. In order to support minimum control room staffing requirements, personnel overtime will be required for the day shift on May 31, 2013 from 0630-1830.
6. All the overtime hours will be spent performing control room activities on Unit 2.
7. Working hours are provided for three Reactor Operators. All of these hours were spent working under outage work hour controls at Unit 2.
8. May 17, 2013 through May 31, 2013 is a fixed 15-day period for work hour rule considerations.

INITIATING CUE

From the provided list of personnel working hours, determine who is eligible to work a complete 12 hour shift beginning at 0630 on May 31 without exceeding the limits of NDAP-QA-0025.

If a Work Hour Limits Waiver would be required for any individual(s), state the work hour limit(s) which would be exceeded IAW NDAP-QA-0025.

TASK CONDITIONS

1. Unit 2 is shutdown for a refueling outage.
2. Current time is 1830 on May 30, 2013.
3. This is day #29 of the outage.
4. An Operator scheduled to work the day shift on May 31, 2013 at Unit 2 has called in sick for that shift.
5. In order to support minimum control room staffing requirements, personnel overtime will be required for the day shift on May 31, 2013 from 0630-1830.
6. All the overtime hours will be spent performing control room activities on Unit 2.
7. Working hours are provided for three Reactor Operators. All of these hours were spent working under outage work hour controls at Unit 2.
8. May 17, 2013 through May 31, 2013 is a fixed 15-day period for work hour rule considerations.

INITIATING CUE

From the provided list of personnel working hours, determine who is eligible to work a complete 12 hour shift beginning at 0630 on May 31 without exceeding the limits of NDAP-QA-0025.

If a Work Hour Limits Waiver would be required for any individual(s), state the work hour limit(s) which would be exceeded IAW NDAP-QA-0025.

Additional SRO Only Cue

1. ROs #1 and #3 have not been able to be contacted.
2. RO #2 is the only operator available and will be required to work.

Complete NDAP-QA-0025, Attachment B, 10 CFR 26 Work-Hour Limits Waiver, Section 1, for RO #2 to cover this shift on May 31.

Additional SRO Only Cue

1. ROs #1 and #3 have not been able to be contacted.
2. RO #2 is the only operator available and will be required to work.

Complete NDAP-QA-0025, Attachment B, 10 CFR 26 Work-Hour Limits Waiver, Section 1, for RO #2 to cover this shift on May 31.

Work History

RO #1																		
5/13	5/14	5/15	5/16	5/17	5/18	5/19	5/20	5/21	5/22	5/23	5/24	5/25	5/26	5/27	5/28	5/29	5/30	5/31
OFF	0630 - 1830	0630 - 1830	OFF	OFF	0630 - 1830	0630 - 1830	0630 - 1830	0630 - 1830	OFF	OFF	0630 - 1830	OFF	0630 - 1830	0630 - 1830	0630 - 1830	0630 - 1830	0630 - 1830	?

RO #2																		
5/13	5/14	5/15	5/16	5/17	5/18	5/19	5/20	5/21	5/22	5/23	5/24	5/25	5/26	5/27	5/28	5/29	5/30	5/31
OFF	0630 - 1830	0630 - 1830	OFF	OFF	0630 - 1830	0630 - 1830	0630 - 1830	0630 - 1830	0630 - 1830	OFF	OFF	0630 - 1830	0630 - 1830	0630 - 1830	0630 - 1830	0630 - 1830	0630 - 1830	?

RO #3																		
5/13	5/14	5/15	5/16	5/17	5/18	5/19	5/20	5/21	5/22	5/23	5/24	5/25	5/26	5/27	5/28	5/29	5/30	5/31
0630 - 1830	0630 - 1830	OFF	0630 - 1830	0630 - 1830	0630 - 1830	0630 - 1830	OFF	OFF	OFF	0630 - 1430	0630 - 1430	0630 - 1430	0630 - 1430	0630 - 1430	0630 - 1430	0630 - 1430	0630 - 1430	?

Answer Sheet

	Eligible to work without a Work Hour Limits Waiver? (Yes/No)	If No, what work hour limit(s) would be exceeded IAW NDAP-QA-0025?
RO #1		
RO #2		
RO #3		

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Perform LPRM Upscale Alarm Operability Tracking and Determine Required Actions

S/RO	78.AD.2319.102	2	01/29/2013	Classroom
Appl To	JPM Number	Revision	Date	Setting

G	2.2.14	3.9/4.3	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/29/2013	25
Author	Date	Validation Time (min)

Validated | | Approval |
|---|---|---|---|
| [signature] | 1/25/2013 | [signature] | 2/26/13 |
| Operations Instructor | Date | Nuclear Trng Supv R. Simmons | Date |

Examinee Name: ______________________ ______________

Last, First MI Employee Number

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________

Name Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 78.AD.2319.102

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. OI-078-001, LPRM STATUS CONTROL (REV 11)

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. Unit 1 is in MODE 1 at 80% power.
B. APRM 2 is INOP and bypassed.
C. APRM Gain Calibration was last performed 5 days ago.
D. LPRM detector 40-57A caused a downscale alarm, I & C determined the detector failed, and Reactor Engineering requested bypassing the detector.
E. The PCOP has just bypassed LPRM detector 40-57A in the lower relay room.

V. INITIATING CUE

Perform LPRM Upscale Alarm operability tracking for LPRM detector 40-57A in accordance with OI-078-001.

VI. TASK STANDARD

For RO and SRO:

- Zone 8 is identified as having LESS THAN 50% upscale alarms operable.
- APRM Channel 1 determined to be INOPERABLE based on < 3 operable LPRM inputs to the "A" Level.

For SROs only:

- Determine that LCO 3.3.3.1 IS NOT MET for APRM required channels, and TS action A.1 is required; place channel in trip within 12 hours.
- Determine that TRO 3.1.3 is NOT MET for APRM rod block functions, and TRM actions B.2 is required; place at least 1 inop channel in trip condition 7 days.

VII. TASK SAFETY SIGNIFICANCE

Operability of the APRM system and associated LPRM detectors provides the primary indication of neutron flux within the core and the resulting Reactor Protection System inputs.

Appl. To/JPM No.: 78.AD.2319.102 Student Name:______________________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE Ensure the following material is available to support performance of this JPM: • A working copy of OI-078-001. **CAUTION: Ensure the answer key is NOT given to the student.** • Previously filled out Attachments A - D (with zone 8 having exactly 50% operable LPRM upscale alarms). • Blank copy of attachments A - D. • A copy of SO-100-008. **EVALUATOR CUE:** To begin this JPM, provide the candidate with: • Task Conditions and Initiating Cue Sheet • Working copy of OI-078-001, and blank attachments A - D • Previously filled out attachments A - D			
1.	Obtain a controlled copy of the procedure.	Controlled copy obtained from evaluator.		
2.	Selects the correct section to perform.	Selects section 4.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 78.AD.2319.102 Student Name:________________________

Step	Action	Standard	Eval	Comments
3.	Determine current LPRM status.	Refers to the previously completed copy of Attachments A & B.		
4.	Complete new Attachment A.	Enters 1 for Unit. Transfers the previous LPRM data to the new Attachment A.		
5.	Enter a check (√) in column (2) for LPRM alarms determined inoperable or bypassed for all other reasons.	Places a checkmark in column 2 adjacent to LPRM detector 40-57A in Zone 8.		
∗6.	Consider all LPRM Upscale Alarms with a check in column (1) or (2) of Attachment A as inoperable. Determine if ≥50% of LPRM Upscale alarms in each zone are operable and circle YES or NO as applicable.	Circles YES for zone 1, 2, 3, 4, 5, 6, 7, and 9. Determines that there are LESS THAN 50% operable LPRMs in zone 8, AND circles NO for zone 8.		
7.	Notify Reactor Engineering of all LPRM upscale alarms determined inoperable.	N/A Previously stated in JPM task conditions.		
8.	Evaluate the need to place placard to 1C651 indicating < required # of LPRM Upscale Alarms. (requires completion of Attachments C & D, which appears in Step 11, below.)	Determines that placard is NOT required.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 78.AD.2319.102 Student Name:________________________

Step	Action	Standard	Eval	Comments
∗9.	Complete an LPRM vs. APRM Status Control Log (Attachment B) each time LPRM operability status is changed. Circle all inoperable LPRMs on LPRM vs. APRM Status Control Log (Attachment B).	Transfer the previous LPRM data to the new Attachment B. Circle LPRM detector 40-57A for APRM 1, under the column 'A' Level, and enter today's date.		
∗10.	Refer to weekly surveillance SO-100-008 to confirm APRM operability requirements maintained.	Compare the following criteria to current APRM/LPRM operability status: • ≥ 20 total operable LPRMs per APRM channel • ≥ 3 LPRM inputs per level (A, B, C, or D) • ≤ 9 LPRMs inop since last APRM gain calibration (after date provided in task conditions) Determine that APRM channel 1 does NOT meet operability requirements due to LESS THAN 3 operable level "A" LPRMs. (The only operable Level A LPRMs in APRM 1 are 40-17A and 08-49A)		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 78.AD.2319.102 Student Name:______________________

Step	Action	Standard	Eval	Comments
11.	Track operability of OPRM cells. **EVALUATOR CUE (for ROs)** This completes the JPM. **EVALUATOR CUE (for SROs)** Give the SRO candidate the second cue sheet that addresses determining required actions.	Transfers the previous LPRM data to the new Attachment C and circles “A LEVEL” for LPRM 40-57. Determines it inputs to APRM1 Cell 03. Transfers the previous LPRM data to the new Attachment D and circles LPRM 40-57A in the Cell 03 row, in the LPRM#2 column. Determines OPRM cell remains operable due to at least two operable LPRMs.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 78.AD.2319.102 Student Name:________________________

Step	Action	Standard	Eval	Comments
∗12.	Evaluate Tech Spec 3.3.1.1 for RPS Instrumentation and TR 3.1.3 for Control Rod Block Instrumentation. **EVALUATOR CUE** This completes the JPM.	Refer to Tech Spec 3.3.1.1 and determine that a minimum of 3 operable APRM channels are required in MODE 1 per table 3.3.1.1-1, therefore action A.1 is required; place channel in trip within 12 hours. **(CRITICAL)** Refer to TRM 3.1.3 and determine that a minimum of 3 operable APRM channels are required in MODE 1 per table 3.1.3-1, therefore action B.2 is required; place 1 channel in tripped condition within 7 days. **(NOT CRITICAL)**		

∗Critical Step #Critical Sequence

TASK CONDITIONS

A. Unit 1 is in MODE 1 at 80% power.
B. APRM 2 is INOP and bypassed.
C. APRM Gain Calibration was last performed 5 days ago.
D. LPRM detector 40-57A caused a downscale alarm, I & C determined the detector failed, and Reactor Engineering requested bypassing the detector.
E. The PCOP has just bypassed LPRM detector 40-57A in the lower relay room.

INITIATING CUE

Perform LPRM Upscale Alarm operability tracking for LPRM detector 40-57A in accordance with OI-078-001.

TASK CONDITIONS

A. Unit 1 is in MODE 1 at 80% power.
B. APRM 2 is INOP and bypassed.
C. APRM Gain Calibration was last performed 5 days ago.
D. LPRM detector 40-57A caused a downscale alarm, I & C determined the detector failed, and Reactor Engineering requested bypassing the detector.
E. The PCOP has just bypassed LPRM detector 40-57A in the lower relay room.

INITIATING CUE

Perform LPRM Upscale Alarm operability tracking for LPRM detector 40-57A in accordance with OI-078-001.

Additional SRO Only Cue

Determine the required actions based on your findings.

Additional SRO Only Cue

Determine the required actions based on your findings.

LPRM UPSCALE ALARM STATUS CONTROL LOG

UNIT 1

		(1)	(2)		(1)	(2)		(1)	(2)		(1)	(2)		(1)	(2)	As least 50% LPRMs Operable per Zone (Circle YES or NO)
Zone 1	16-49A			16-41A			24-49A			24-41A		✓				
	16-49B	✓		16-41B			24-49B			24-41B						YES/NO (YES circled)
	16-49C			16-41C	✓		24-49C	✓		24-41C						
Zone 2	40-49A	✓		40-41A	✓		48-49A			48-41A						
	40-49B			40-41B			48-49B	✓		48-41B	✓					YES/NO (YES circled)
	40-49C	✓		40-41C	✓		48-49C			48-41C						
Zone 3	16-17A			16-25A			24-17A			24-25A						
	16-17B			16-25B			24-17B			24-25B						YES/NO (YES circled)
	16-17C			16-25C		✓	24-17C			24-25C						
Zone 4	40-17A			40-25A		✓	48-17A			48-25A						
	40-17B			40-25B			48-17B			48-25B						YES/NO (YES circled)
	40-17C			40-25C			48-17C			48-25C	✓					
Zone 5	24-33A		✓	32-25A			32-33A			32-41A			40-33A			
	24-33B		✓	32-25B			32-33B			32-41B		✓	40-33B			YES/NO (YES circled)
	24-33C		✓	32-25C			32-33C			32-41C			40-33C			
Zone 6	16-09A			24-09A	✓		32-09A			40-09A			32-17A			
	16-09B			24-09B			32-09B		✓	40-09B			32-17B			YES/NO (YES circled)
	16-09C			24-09C	✓		32-09C			40-09C		✓	32-17C			
Zone 7	08-17A	✓		08-25A	✓		08-33A			08-41A			16-33A			
	08-17B			08-25B			08-33B			08-41B			16-33B			YES/NO (YES circled)
	08-17C			08-25C			08-33C	✓		08-41C			16-33C			
Zone 8	24-57A			32-57A			40-57A		✓	32-49A		✓				
	24-57B			32-57B		✓	40-57B		✓	32-49B		✓				YES/NO (NO circled)
	24-57C	✓		32-57C			40-57C			32-49C		✓				
Zone 9	48-33A			56-25A			56-33A		✓	56-41A		✓				
	48-33B			56-25B			56-33B			56-41B						YES/NO (YES circled)
	48-33C			56-25C			56-33C		✓	56-41C						

KEY

LPRM Upscale Alarm Status Assessment Complete

(Signature) / (Date) / (Time)
Shift Supervision / Date / Time

KEY

LPRM vs. APRM Status Control Log
(Inoperable LPRM's are circled)

UNIT 1 or 2 (Circle Unit)	LPRM LOCATIONS							
APRM CHANNEL	A LEVEL	Date inop.	B LEVEL	Date inop.	C LEVEL	Date inop	D LEVEL	Date inop.
APRM1	56-33A	4/5/12	32-09B	6/15/12	08-33C	11/2/12	32-57D	
	40-49A	6/10/12	16-25B		40-33C		16-41D	3/5/12
	40-17A		16-57B		24-17C		48-09D	
	24-33A	7/8/12	48-25B		24-49C	3/10/12	32-25D	
	08-17A	9/10/12	32-41B	7/7/12	56-17C		16-09D	
	08-49A		32-33B		56-25C		48-41D	
	08-25A	5/29/12	16-17B		40-41C	5/6/12	32-49D	5/7/12
	40-57A	(Date)	16-49B	9/16/12	24-25C		32-17D	
	24-41A	4/20/12	48-17B		24-57C	12/1/12	48-33D	
	24-09A	4/20/12	48-49B	10/31/12	08-41C		16-33D	
	56-41A	7/11/12			40-09C	10/25/12		
	40-25A	9/9/12						
APRM2	32-57A		56-33B		32-09C		08-33D	
	16-41A		40-17B		32-41C		24-17D	
	48-41A		08-49B		16-25C	5/1/12	56-17D	
	32-25A		40-49B		16-57C		40-33D	7/9/12
	16-09A		24-33B	8/8/12	48-25C	4/11/12	24-49D	
	48-09A		08-17B		56-41C		32-33D	
	08-41A		32-17B		40-25C		48-49D	
	24-25A		32-49B	5/7/12	24-09C	11/25/12	48-17D	
	40-09A		16-33B		24-41C		16-17D	
	24-57A		48-33B		40-57C		16-49D	9/10/12
	56-25A				08-25C			
	40-41A	2/7/12						
APRM3	08-33A		32-57B	6/5/12	56-33C	8/29/12	32-09D	
	24-49A		48-41B	6/5/12	24-33C	8/8/12	48-25D	
	24-17A		16-41B		40-49C	10/3/12	16-25D	8/12/12
	40-33A		48-09B		08-17C		16-57D	
	56-17A		32-25B		08-49C		32-41D	
	32-33A		16-09B		40-17C		08-25D	9/5/12
	16-17A		56-25B		32-49C	5/7/12	24-41D	
	48-17A		40-41B		32-17C		24-09D	
	48-49A		24-57B		48-33C		56-41D	
	16-49A		24-25B		16-33C		40-57D	
			08-41B				40-25D	
			40-09B					

KEY

LPRM vs. APRM Status Control Log
(Inoperable LPRM's are circled)

UNIT 1 or 2 (Circle Unit)	LPRM LOCATIONS							
APRM4	32-09A		08-33B		32-57C		56-33D	
	16-25A		24-49B		32-25C		40-49D	
	48-25A		24-17B		16-41C	4/1/12	08-17D	8/11/12
	32-41A		56-17B		48-41C		24-33D	
	16-57A		40-33B		16-09C		08-49D	
	32-17A		56-41B		48-09C		40-17D	
	32-49A	5/7/12	40-25B		32-33C		08-41D	
	16-33A		24-41B		16-49C		40-09D	4/12/12
	48-33A		08-25B		48-49C		24-25D	
			40-57B	5/30/12	16-17C		56-25D	
			24-09B		48-17C		24-57D	4/13/12
							40-41D	

LPRM Operability Assessment Complete (Signature) / (Date) / (Time)
Shift Supervision / Date / Time

KEY

LPRM vs. OPRM Status				
LPRM	OPRM Cells (APRM/OPRM – Cell)			
08-17	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	APRM1-Cell 21	2-21	3-21	4-21
08-25	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-15	4-15	2-15	3-15
	1-21	4-21	2-21	3-21
08-33	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	3-09	4-09	1-09	2-09
	3-15	4-15	1-15	2-15
08-41	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	2-04	3-04	1-04	4-04
	2-09	3-09	1-09	4-09
08-49	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-04	2-04	3-04	4-04
16-09	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	2-27	3-27	4-27	1-27
16-17	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	3-21	1-21	4-21	2-21
	3-22	1-22	4-22	2-22
	3-27	1-27	4-27	2-27
16-25	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	4-15	1-15	2-15	3-15
	4-16	1-16	2-16	3-16
	4-21	1-21	2-21	3-21
	4-22	1-22	2-22	3-22
16-33	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	4-09	2-09	3-09	1-09
	4-10	2-10	3-10	1-10
	4-15	2-15	3-15	1-15
	4-16	2-16	3-16	1-16
16-41	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	2-04	3-04	4-04	1-04
	2-05	3-05	4-05	1-05
	2-09	3-09	4-09	1-09
	2-10	3-10	4-10	1-10
16-49	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	3-01	1-01	4-01	2-01
	3-04	1-04	4-04	2-04
	3-05	1-05	4-05	2-05
16-57	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	4-01	1-01	2-01	3-01
24-09	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-27	4-27	2-27	3-27
	1-28	4-28	2-28	3-28
24-17	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	3-22	4-22	1-22	2-22
	3-23	4-23	1-23	2-23
	3-27	4-27	1-27	2-27
	3-28	4-28	1-28	2-28

KEY

LPRM vs. OPRM Status				
LPRM	OPRM Cells (APRM/OPRM – Cell)			
24-25	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	APRM2-Cell16	3-16	1-16	4-16
	2-17	3-17	1-17	4-17
	2-22	3-22	1-22	4-22
	2-23	3-23	1-23	4-23
24-33	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-10	2-10	3-10	4-10
	1-11	2-11	3-11	4-11
	1-16	2-16	3-16	4-16
	1-17	2-17	3-17	4-17
24-41	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-05	4-05	2-05	3-05
	1-06	4-06	2-06	3-06
	1-10	4-10	2-10	3-10
	1-11	4-11	2-11	3-11
24-49	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	3-01	4-01	1-01	2-01
	3-02	4-02	1-02	2-02
	3-05	4-05	1-05	2-05
	3-06	4-06	1-06	2-06
24-57	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	2-01	3-01	1-01	4-01
	2-02	3-02	1-02	4-02
32-09	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	4-28	1-28	2-28	3-28
	4-29	1-29	2-29	3-29
32-17	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	4-23	2-23	3-23	1-23
	4-24	2-24	3-24	1-24
	4-28	2-28	3-28	1-28
	4-29	2-29	3-29	1-29
32-25	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	2-17	3-17	4-17	1-17
	2-18	3-18	4-18	1-18
	2-23	3-23	4-23	1-23
	2-24	3-24	4-24	1-24
32-33	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	3-11	1-11	4-11	2-11
	3-12	1-12	4-12	2-12
	3-17	1-17	4-17	2-17
	3-18	1-18	4-18	2-18
32-41	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	4-06	1-06	2-06	3-06
	4-07	1-07	2-07	3-07
	4-11	1-11	2-11	3-11
	4-12	1-12	2-12	3-12
32-49	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	4-02	2-02	3-02	1-02
	4-03	2-03	3-03	1-03
	4-06	2-06	3-06	1-06
	4-07	2-07	3-07	1-07

KEY

LPRM vs. OPRM Status				
LPRM	OPRM Cells (APRM/OPRM – Cell)			
32-57	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	APRM2-Cell 02	3-02	4-02	1-02
	2-03	3-03	4-03	1-03
40-09	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	2-29	3-29	1-29	4-29
	2-30	3-30	1-30	4-30
40-17	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-24	2-24	3-24	4-24
	1-25	2-25	3-25	4-25
	1-29	2-29	3-29	4-29
	1-30	2-30	3-30	4-30
40-25	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-18	4-18	2-18	3-18
	1-19	4-19	2-19	3-19
	1-24	4-24	2-24	3-24
	1-25	4-25	2-25	3-25
40-33	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	3-12	4-12	1-12	2-12
	3-13	4-13	1-13	2-13
	3-18	4-18	1-18	2-18
	3-19	4-19	1-19	2-19
40-41	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	2-07	3-07	1-07	4-07
	2-08	3-08	1-08	4-08
	2-12	3-12	1-12	4-12
	2-13	3-13	1-13	4-13
40-49	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-03	2-03	3-03	4-03
	1-07	2-07	3-07	4-07
	1-08	2-08	3-08	4-08
40-57	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-03	4-03	2-03	3-03
48-09	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	2-30	3-30	4-30	1-30
48-17	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	3-25	1-25	4-25	2-25
	3-26	1-26	4-26	2-26
	3-30	1-30	4-30	2-30
48-25	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	4-19	1-19	2-19	3-19
	4-20	1-20	2-20	3-20
	4-25	1-25	2-25	3-25
	4-26	1-26	2-26	3-26
48-33	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	4-13	2-13	3-13	1-13
	4-14	2-14	3-14	1-14
	4-19	2-19	3-19	1-19
	4-20	2-20	3-20	1-20

KEY

LPRM vs. OPRM Status				
LPRM	OPRM Cells (APRM/OPRM – Cell)			
48-41	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	APRM2-Cell 08	3-08	4-08	1-08
	2-13	3-13	4-13	1-13
	2-14	3-14	4-14	1-14
48-49	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	3-08	1-08	4-08	2-08
56-17	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	3-26	4-26	1-26	2-26
56-25	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	2-20	3-20	1-20	4-20
	2-26	3-26	1-26	4-26
56-33	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-14	2-14	3-14	4-14
	1-20	2-20	3-20	4-20
56-41	A LEVEL	B LEVEL	C LEVEL	D LEVEL
	1-14	4-14	2-14	3-14

KEY

OPRM Status Control Log				
OPRM Cell Assignments for APRM 1				
LPRM(s): 40-57A (to be bypassed) **Impacted Cell(s):** 3 (from Attachment C) **Operable Cells:** 23 (from ODA STABILITY display) Circle LPRMs inoperable in cell with LPRM(s) to be bypassed (already and one to be bypassed).				
CELL ID:	LPRM #1	LPRM #2	LPRM #3	LPRM #4
01	16-57B	24-57C	24-49C	16-49B
02	24-57C	32-57D	32-49D	24-49C
03	32-57D	40-57A	40-49A	32-49D
04	08-49A	16-49B	16-41D	08-41C
05	16-49B	24-49C	24-41A	16-41D
06	24-49C	32-49D	32-41B	24-41A
07	32-49D	40-49A	40-41C	32-41B
08	40-49A	48-49B	48-41D	40-41C
09	08-41C	16-41D	16-33D	08-33C
10	16-41D	24-41A	24-33A	16-33D
11	24-41A	32-41B	32-33B	24-33A
12	32-41B	40-41C	40-33C	32-33B
13	40-41C	48-41D	48-33D	40-33C
14	48-41D	56-41A	56-33A	48-33D
15	08-33C	16-33D	16-25B	08-25A
16	16-33D	24-33A	24-25C	16-25B
17	24-33A	32-33B	32-25D	24-25C
18	32-33B	40-33C	40-25A	32-25D
19	40-33C	48-33D	48-25B	40-25A
20	48-33D	56-33A	56-25C	48-25B
21	08-25A	16-25B	16-17B	08-17A
22	16-25B	24-25C	24-17C	16-17B
23	24-25C	32-25D	32-17D	24-17C
24	32-25D	40-25A	40-17A	32-17D
25	40-25A	48-25B	48-17B	40-17A
26	48-25B	56-25C	56-17C	48-17B
27	16-17B	24-17C	24-09A	16-09D
28	24-17C	32-17D	32-09B	24-09A
29	32-17D	40-17A	40-09C	32-09B
30	40-17A	48-17B	48-09D	40-09C
If bypassing LPRM will results in < 2 LPRMs operable in impacted cell, the cell will become inoperable once the LPRM is bypassed. **Inoperable Cells due to bypassing LPRM(s):** 1 **Operable Cells:** 22 (following bypass of LPRM(s)) If <22 cells remain operable, the OPRM will become inoperable following bypass of LPRM(s).				

KEY

OPRM Status Control Log

OPRM Cell Assignments for APRM 2

LPRM(s): 40-57A (to be bypassed)
Impacted Cell(s): None (from Attachment C)
Operable Cells: 30 (from ODA STABILITY display)
Circle LPRMs inoperable in cell with LPRM(s) to be bypassed (already and one to be bypassed).

CELL ID:	LPRM #1	LPRM #2	LPRM #3	LPRM #4
1	16-57C	24-57A	24-49D	16-49D
2	24-57A	32-57A	32-49B	24-49D
3	32-57A	40-57C	40-49B	32-49B
4	08-49B	16-49D	16-41A	08-41A
5	16-49D	24-49D	24-41C	16-41A
6	24-49D	32-49B	32-41C	24-41C
7	32-49B	40-49B	40-41A	32-41C
8	40-49B	48-49D	48-41A	40-41A
9	08-41A	16-41A	16-33B	08-33D
10	16-41A	24-41C	24-33B	16-33B
11	24-41C	32-41C	32-33D	24-33B
12	32-41C	40-41A	40-33D	32-33D
13	40-41A	48-41A	48-33B	40-33D
14	48-41A	56-41C	56-33B	48-33B
15	08-33D	16-33B	16-25C	08-25C
16	16-33B	24-33B	24-25A	16-25C
17	24-33B	32-33D	32-25A	24-25A
18	32-33D	40-33D	40-25C	32-25A
19	40-33D	48-33B	48-25C	40-25C
20	48-33B	56-33B	56-25A	48-25C
21	08-25C	16-25C	16-17D	08-17B
22	16-25C	24-25A	24-17D	16-17D
23	24-25A	32-25A	32-17B	24-17D
24	32-25A	40-25C	40-17B	32-17B
25	40-25C	48-25C	48-17D	40-17B
26	48-25C	56-25A	56-17D	48-17D
27	16-17D	24-17D	24-09C	16-09A
28	24-17D	32-17B	32-09C	24-09C
29	32-17B	40-17B	40-09A	32-09C
30	40-17B	48-17D	48-09A	40-09A

If bypassing LPRM will results in < 2 LPRMs operable in impacted cell, the cell will become inoperable once the LPRM is bypassed.
Inoperable Cells due to bypassing LPRM(s): None
Operable Cells: 30 (following bypass of LPRM(s))
If <22 cells remain operable, the OPRM will become inoperable following bypass of LPRM(s).

KEY

OPRM Status Control Log

OPRM Cell Assignments for APRM 3

LPRM(s): 40-57A (to be bypassed)
Impacted Cell(s): None (from Attachment C)
Operable Cells: 30 (from ODA STABILITY display)
Circle LPRMs inoperable in cell with LPRM(s) to be bypassed (already and one to be bypassed).

CELL ID:	LPRM #1	LPRM #2	LPRM #3	LPRM #4
1	16-57D	24-57B	24-49A	16-49A
2	24-57B	32-57B	32-49C	24-49A
3	32-57B	40-57D	40-49C	32-49C
4	08-49C	16-49A	16-41B	08-41B
5	16-49A	24-49A	24-41D	16-41B
6	24-49A	32-49C	32-41D	24-41D
7	32-49C	40-49C	40-41B	32-41D
8	40-49C	48-49A	48-41B	40-41B
9	08-41B	16-41B	16-33C	08-33A
10	16-41B	24-41D	24-33C	16-33C
11	24-41D	32-41D	32-33A	24-33C
12	32-41D	40-41B	40-33A	32-33A
13	40-41B	48-41B	48-33C	40-33A
14	48-41B	56-41D	56-33C	48-33C
15	08-33A	16-33C	16-25D	08-25D
16	16-33C	24-33C	24-25B	16-25D
17	24-33C	32-33A	32-25B	24-25B
18	32-33A	40-33A	40-25D	32-25B
19	40-33A	48-33C	48-25D	40-25D
20	48-33C	56-33C	56-25B	48-25D
21	08-25D	16-25D	16-17A	08-17C
22	16-25D	24-25B	24-17A	16-17A
23	24-25B	32-25B	32-17C	24-17A
24	32-25B	40-25D	40-17C	32-17C
25	40-25D	48-25D	48-17A	40-17C
26	48-25D	56-25B	56-17A	48-17A
27	16-17A	24-17A	24-09D	16-09B
28	24-17A	32-17C	32-09D	24-09D
29	32-17C	40-17C	40-09B	32-09D
30	40-17C	48-17A	48-09B	40-09B

If bypassing LPRM will results in < 2 LPRMs operable in impacted cell, the cell will become inoperable once the LPRM is bypassed.
Inoperable Cells due to bypassing LPRM(s): None
Operable Cells: 30 (following bypass of LPRM(s))
If <22 cells remain operable, the OPRM will become inoperable following bypass of LPRM(s).

KEY

OPRM Status Control Log				
OPRM Cell Assignments for APRM 4				
LPRM(s): 40-57A (to be bypassed) **Impacted Cell(s):** None (from Attachment C) **Operable Cells:** 30 (from ODA STABILITY display) Circle LPRMs inoperable in cell with LPRM(s) to be bypassed (already and one to be bypassed).				
CELL ID:	LPRM #1	LPRM #2	LPRM #3	LPRM #4
1	16-57A	24-57D	24-49B	16-49C
2	24-57D	32-57C	32-49A	24-49B
3	32-57C	40-57B	40-49D	32-49A
4	08-49D	16-49C	16-41C	08-41D
5	16-49C	24-49B	24-41B	16-41C
6	24-49B	32-49A	32-41A	24-41B
7	32-49A	40-49D	40-41D	32-41A
8	40-49D	48-49C	48-41C	40-41D
9	08-41D	16-41C	16-33A	08-33B
10	16-41C	24-41B	24-33D	16-33A
11	24-41B	32-41A	32-33C	24-33D
12	32-41A	40-41D	40-33B	32-33C
13	40-41D	48-41C	48-33A	40-33B
14	48-41C	56-41B	56-33D	48-33A
15	08-33B	16-33A	16-25A	08-25B
16	16-33A	24-33D	24-25D	16-25A
17	24-33D	32-33C	32-25C	24-25D
18	32-33C	40-33B	40-25B	32-25C
19	40-33B	48-33A	48-25A	40-25B
20	48-33A	56-33D	56-25D	48-25A
21	08-25B	16-25A	16-17C	08-17D
22	16-25A	24-25D	24-17B	16-17C
23	24-25D	32-25C	32-17A	24-17B
24	32-25C	40-25B	40-17D	32-17A
25	40-25B	48-25A	48-17C	40-17D
26	48-25A	56-25D	56-17B	48-17C
27	16-17C	24-17B	24-09B	16-09C
28	24-17B	32-17A	32-09A	24-09B
29	32-17A	40-17D	40-09D	32-09A
30	40-17D	48-17C	48-09C	40-09D

If bypassing LPRM will results in < 2 LPRMs operable in impacted cell, the cell will become inoperable once the LPRM is bypassed.

Inoperable Cells due to bypassing LPRM(s): None

Operable Cells: 30 (following bypass of LPRM(s))

If <22 cells remain operable, the OPRM will become inoperable following bypass of LPRM(s).

If <22 cells remain operable, the OPRM will become inoperable following bypass of LPRM(s).

OPRM Operability Assessment Complete (Signature) / (Date) / (Time)
Shift Supervision Date Time

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title: Determine LCO Applicability and Ability to Bypass Secondary Containment Zone 2 Isolation

SRO	34.OP.2683.201	1	01/29/2013	Classroom
Appl To	JPM Number	Revision	Date	Setting

G	2.3.13	3.8	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/29/2013	25
Author	Date	Validation Time (min)

Validated | Approval

[signature]	1/25/2013	[signature] R. Sm[illegible]	2/26/13
Operations Instructor	Date	Nuclear Trng Supv	Date

Examinee Name: ______________________ ______________________

Last, First MI | Employee Number

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________

Name | Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 34.OP.2683.201

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. OP-234-002, Reactor Building HVAC Zones 2 and 3 (Rev. 44)

B. NDAP-QA-0321, Secondary Containment Integrity Control (Rev. 12)

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. Unit 2 is shutdown.

B. All rods were inserted 4 hours ago.

C. Plant cool down and equipment shutdown are in progress in preparation for start of a refueling outage.

D. C RHR Pump is in service in Shutdown Cooling.

E. A and B ESW pumps and 2A RHRSW Pump is in service providing cooling to the RHR system.

R. Reactor coolant temperature is 194°F and lowering.

G. Cask Storage Gates are removed.

H. All other equipment is operable.

I. I & C has requested the Secondary Containment Zone 2 Isolation bypassed to support work.

V. INITIATING CUE

Determine the ability to bypass the Secondary Containment Zone 2 Isolation. Record your findings, including any applicable references. Document your approval / disapproval of the request.

VI. TASK STANDARD

Candidate determines Unit 2 Tech Spec 3.6.4.1 is Not Applicable to Mode 4, and may continue with Bypass of Secondary Containment Isolation signal for Zone 2. Candidate authorizes bypassing the Zone 2 Isolation IAW OP-234-002 and NDAP-QA-0321.

VII. TASK SAFETY SIGNIFICANCE

The secondary containment structure completely encloses the primary containment structure such that a dual-containment design is utilized to limit the spread of radioactivity to the environment to within limits. The function of the secondary containment is to contain, dilute, and hold up fission products that may leak from primary containment into secondary containment following a Design Basis Accident (DBA). If the Zone 2 Secondary Containment Isolation Signal is inappropriately bypassed radiological release limits may be exceeded.

Appl. To/JPM No.: 34.OP.2683.201 Student Name:________________________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE Ensure the following material is available to support performance of this JPM: • A copy of OP-234-002. • A copy of NDAP-QA-0321. • A copy of Technical Specifications. **EVALUATOR CUE:** To begin this JPM, provide the candidate with Task Conditions and Initiating Cue Sheet.			
1.	Obtain a controlled copy of the procedure.	Obtains a controlled copy of the applicable procedure(s).		
2.	Selects the correct section to perform.	Selects: • OP-234-002 section 2.12 and/or • NDAP-QA-0321 section 6.4 and/or • Technical Specification 3.6.4.1/3.6.4.2		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 34.OP.2683.201 Student Name:______________________

Step	Action	Standard	Eval	Comments
3.	Review NDAP-QA-0321 section 6.4.	Determines nothing in NDAP-QA-0321 prohibits bypassing the Secondary Containment Zone 2 Isolation. Determines OP-234-002 and Technical Specifications should be referenced.		
4.	Review OP-234-002 section 2.12. **EVALUATOR NOTE** Candidate may refer to TRO 3.7.10 which addresses cross-tying the Fuel Pools. Candidate may also initially refer to GO-200-006 regarding the precautions for SC Integrity.	Determines must evaluate Technical Specifications 3.6.4.1 and 3.6.4.2.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 34.OP.2683.201 Student Name:______________________

Step	Action	Standard	Eval	Comments
✱5.	Evaluate Unit 2 Tech Spec 3.6.4.1. **EVALUATOR CUE** If asked about irradiated fuel movement, inform candidate that no irradiated fuel movement is in progress. **EVALUATOR CUE** If asked about OPDRVs, inform candidate that no OPDRVs are in progress.	Determines plant is currently in Mode 4. Review Technical Specification 3.6.4.1 and determines operability of Secondary Containment is NOT required in Mode 4. Determines irradiated fuel movement and OPDRVs are not in progress based on initial conditions. Determines Technical Specification 3.6.4.1 allows bypassing of Secondary Containment Zone 2 Isolation in present plant conditions.		

✱Critical Step #Critical Sequence

Appl. To/JPM No.: 34.OP.2683.201 Student Name:________________________

Step	Action	Standard	Eval	Comments
∗6.	Evaluate Unit 2 Tech Spec 3.6.4.2. **EVALUATOR CUE** If asked about irradiated fuel movement, inform candidate that no irradiated fuel movement is in progress. **EVALUATOR CUE** If asked about OPDRVs, inform candidate that no OPDRVs are in progress. **EVALUATOR CUE** If asked about release paperwork (OP-234-002 Att J), inform candidate that OP-234-002 Attachment J has been completed and is being maintained by the Operations Outage Manager (OOM).	Determines plant is in currently in Mode 4. Determines Secondary Containment Isolation Valve operability is NOT required in Mode 4. Determines irradiated fuel movement and OPDRVs are not in progress based on initial conditions. Determines Technical Specification 3.6.4.2 allows bypassing of Secondary Containment Zone 2 Isolation in present plant conditions.		
∗7.	Complete OP-234-002 Attachment F. **EVALUATOR NOTE** Provide a blank copy of OP-234-002 Attachment F upon request.	Indicates need to fill out OP-234-002 Attachment F and indicates they would direct an operator to complete it. Indicates that after this form is completed, they would authorize isolation bypass.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 34.OP.2683.201 Student Name:______________________

Step	Action	Standard	Eval	Comments
	EVALUATOR CUE This completes the JPM.			

∗Critical Step #Critical Sequence

TASK CONDITIONS

A. Unit 2 is shutdown.

B. All rods were inserted 4 hours ago.

C. Plant cool down and equipment shutdown are in progress in preparation for start of a refueling outage.

D. C RHR Pump is in service in Shutdown Cooling.

E. A and B ESW pumps and 2A RHRSW Pump is in service providing cooling to the RHR system.

R. Reactor coolant temperature is 194°F and lowering.

G. Cask Storage Gates are removed.

H. All other equipment is operable.

I. I & C has requested the Secondary Containment Zone 2 Isolation bypassed to support work.

INITIATING CUE

Determine the ability to bypass the Secondary Containment Zone 2 Isolation. Record your findings, including any applicable references. Document your approval / disapproval of the request.

TASK CONDITIONS

A. Unit 2 is shutdown.

B. All rods were inserted 4 hours ago.

C. Plant cool down and equipment shutdown are in progress in preparation for start of a refueling outage.

D. C RHR Pump is in service in Shutdown Cooling.

E. A and B ESW pumps and 2A RHRSW Pump is in service providing cooling to the RHR system.

R. Reactor coolant temperature is 194°F and lowering.

G. Cask Storage Gates are removed.

H. All other equipment is operable.

I. I & C has requested the Secondary Containment Zone 2 Isolation bypassed to support work.

INITIATING CUE

Determine the ability to bypass the Secondary Containment Zone 2 Isolation. Record your findings, including any applicable references. Document your approval / disapproval of the request.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Classify Emergency Conditions and Make Notification

SRO	00.EP.003.082	3	01/29/2013	Classroom
Appl To	JPM Number	Revision	Date	Setting

G	2.4.44	4.4	N	Y
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/29/2013	25
Author	Date	Validation Time (min)

Validated

	1/25/2013	Approval	2/26/13
Operations Instructor	Date	Nuclear Trng Supv R. Simmons	Date

Examinee Name: ______________________ ______________

Last, First MI Employee Number

Exam Date: ____________ Exam Duration (Min) ____________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator

______________________ ______________________

Name Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
SRO 00.EP.003.082

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. EP-TP-001, EAL CLASSIFICATION LEVELS (REV 6)

B. EP-PS-100, EMERGENCY DIRECTOR, CONTROL ROOM EMERGENCY PLAN POSITION SPECIFIC INSTRUCTION (REV 27)

III. OPERATIONAL ACTIVITIES

None.

IV. TASK CONDITIONS

A. Unit 1 and Unit 2 were initially operating at 100% power.

B. An earthquake occurred.

C. The earthquake magnitude has been determined to be above the OBE level and below the SSE level.

D. Both Units have scrammed.

E. Power was then lost to both T-10 and T-20.

F. All Emergency Diesel Generators initially failed to start.

G. EDG C has been started and is powering 1C and 2C ESS buses.

H. Damage to other EDGs is expected to prevent start within 15 minutes.

I. A large loss of coolant accident occurred on Unit 1.

J. The following conditions now exist on Unit 1:

- Reactor water level is -210 inches and stable.
- Drywell pressure is 15 psig and down slow.
- The control room crew has implemented EP-DS-002, RPV and Primary Containment Flooding Procedure.
- Containment venting is in progress per EP-DS-004, Primary Containment and RPV Venting.

K. You are the Shift Manager.

L. The Health Physics supervisor has informed you that the first offsite dose projection will not be available for 30 minutes.

M. Wind direction is 10 degrees and speed is 5 mph.

N. No initial emergency classification has been made yet.

V. INITIATING CUE

Classify the event and implement the Emergency Plan as the Control Room Emergency Director in accordance with EP-PS-100.

VI. TASK STANDARD

Candidate declares General Emergency FG1 within 15 minutes. Candidate completes ENR form and directs notification of offsite agencies within 15 minutes of declaration. Candidate makes Protective Action Recommendation (PAR) within 15 minutes of declaration.

VII. TASK SAFETY SIGNIFICANCE

Proper Emergency Plan implementation is required to provide reasonable assurance that public health and safety is not endangered by operation of the facility, and that adequate protective measures can and will be taken in the event of an emergency.

Appl. To/JPM No.: 00.EP.003.082 Student Name:______________________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE Ensure the following material is available to support performance of this JPM: • A copy of EP-TP-001. • A copy of EP-TP-003. • A copy of EP-PS-100. • Extra copies of all forms to be marked up. **EVALUATOR CUE:** To begin this JPM, provide the candidate with Task Conditions and Initiating Cue Sheet. Once the candidate has acknowledged the initial conditions, inform the candidate that this is a time critical JPM and record the start time. JPM Start Time: __________			
1.	Obtain a controlled copy of the procedure.	Obtains a controlled copy of the applicable procedure(s).		
2.	Performs EP-PS-100 Tab A actions.	Proceeds to EP-PS-100 Tab A.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.EP.003.082 Student Name:________________________

Step	Action	Standard	Eval	Comments
3.	Evaluate information. **EVALUATOR CUE** If asked for updated information, report that conditions are the same as in the initial conditions.	Evaluates initial conditions. May ask for updated information from: • STA for rad release. • US for plant status. • SCC for security events.		
4.	Choose most appropriate Emergency Classification level from Emergency Classification Matrix.	Determines General Emergency FG1 is the appropriate classification.		
5.	Manage all Security EALs. Immediately go to appropriate classification TAB for all other EALs.	Proceeds to EP-PS-100 Tab E for a General Emergency.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.EP.003.082 Student Name:________________________

Step	Action	Standard	Eval	Comments
∗8.	Document and communicate the Emergency Classification. JPM Start Time: ________ Time of Emergency Classification Announcement to Control Room: ________ Time Difference: ________ **EVALUATOR NOTE** This time difference must be ≤ 15 minutes.	Announces to the Control Room: • I am assuming duties of Emergency Director. • Emergency classification is General Emergency FG1 (or similar). • Time of classification is (current time).		
9.	Appoint an Emergency Plan Communicator. **EVALUATOR ROLE PLAY** Acknowledge direction.	Directs an individual to perform EP-PS-126 actions as Emergency Plan Communicator.		
10.	Appoint an NRC Communicator. **EVALUATOR ROLE PLAY** Acknowledge direction.	Directs an individual to perform EP-PS-135 actions as NRC Communicator.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.EP.003.082 Student Name:________________________

Step	Action	Standard	Eval	Comments
∗11.	Generate and review ENR form to be transmitted with the E Plan Communicator. Time of Emergency Classification Announcement to Control Room: ________ Time of Direction to Make ENR Notification: ________ Time Difference: ________ **EVALUATOR NOTE** This time difference must be ≤ 15 minutes. **EVALUATOR NOTE** ENR form items 3, 4, and 5 are critical. Other items are NOT critical.	Fills out ENR form (see attached key). Reviews ENR form with Emergency Plan Communicator. Directs Emergency Plan Communicator to make notification.		
12.	When a General Emergency is declared, make Protective Action Recommendation (PAR) within 15 minutes.	Proceeds to EP-PS-100 Tab 5, Public Protective Action Recommendation Guide.		
∗13.	Choose appropriate PAR. • Shelter • Evacuate 0-2 miles/Shelter 2-10 miles • Evacuate 0-10 miles	Chooses PAR to evacuate 0-2 miles, shelter 2-10 miles, and advise citizens to take KI in accordance with the state's emergency plans.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.EP.003.082 Student Name:____________________

Step	Action	Standard	Eval	Comments
✳14.	Shift Manager/ED shall notify the Senior State Official, using the PAR State Notification Form, at 717-651-2148. Time of Emergency Classification Announcement to Control Room: ________ Time of Notification Start to Senior State Official: ________ Time Difference: ________ **EVALUATOR NOTE** This time difference must be ≤ 15 minutes. **EVALUATOR NOTE** PAR State Notification Form items 4, 5, 6, and 7 are critical. Other items are NOT critical. **EVALUATOR CUE** Once the candidate simulates/indicates dialing the number to notify the senior state official, inform the candidate that the JPM is complete.	Completes PAR State Notification Form (see attached key). Indicates need to notify Senior State Official.		

✳Critical Step #Critical Sequence

TASK CONDITIONS

A. Unit 1 and Unit 2 were initially operating at 100% power.

B. An earthquake occurred.

C. The earthquake magnitude has been determined to be above the OBE level and below the SSE level.

D. Both Units have scrammed.

E. Power was then lost to both T-10 and T-20.

F. All Emergency Diesel Generators initially failed to start.

G. EDG C has been started and is powering 1C and 2C ESS buses.

H. Damage to other EDGs is expected to prevent start within 15 minutes.

I. A large loss of coolant accident occurred on Unit 1.

J. The following conditions now exist on Unit 1:

- Reactor water level is -210 inches and stable.
- Drywell pressure is 15 psig and down slow.
- The control room crew has implemented EP-DS-002, RPV and Primary Containment Flooding Procedure.
- Containment venting is in progress per EP-DS-004, Primary Containment and RPV Venting.

K. You are the Shift Manager.

L. The Health Physics supervisor has informed you that the first offsite dose projection will not be available for 30 minutes.

M. Wind direction is 10 degrees and speed is 5 mph.

N. No initial emergency classification has been made yet.

INITIATING CUE

Classify the event and implement the Emergency Plan as the Control Room Emergency Director in accordance with EP-PS-100.

TASK CONDITIONS

A. Unit 1 and Unit 2 were initially operating at 100% power.

B. An earthquake occurred.

C. The earthquake magnitude has been determined to be above the OBE level and below the SSE level.

D. Both Units have scrammed.

E. Power was then lost to both T-10 and T-20.

F. All Emergency Diesel Generators initially failed to start.

G. EDG C has been started and is powering 1C and 2C ESS buses.

H. Damage to other EDGs is expected to prevent start within 15 minutes.

I. A large loss of coolant accident occurred on Unit 1.

J. The following conditions now exist on Unit 1:

- Reactor water level is -210 inches and stable.
- Drywell pressure is 15 psig and down slow.
- The control room crew has implemented EP-DS-002, RPV and Primary Containment Flooding Procedure.
- Containment venting is in progress per EP-DS-004, Primary Containment and RPV Venting.

K. You are the Shift Manager.

L. The Health Physics supervisor has informed you that the first offsite dose projection will not be available for 30 minutes.

M. Wind direction is 10 degrees and speed is 5 mph.

N. No initial emergency classification has been made yet.

INITIATING CUE

Classify the event and implement the Emergency Plan as the Control Room Emergency Director in accordance with EP-PS-100.

KEY

EMERGENCY NOTIFICATION REPORT

Control # CR-1

1. Call Status: ☒ THIS IS A DRILL ☐ THIS IS AN ACTUAL EVENT

2. This is: ____________ at PPL Susquehanna, LLC
(Communicator's Name)

My telephone number is: 570-542 3____ 570-759 4____
(Callback telephone number)

Notification time is: ____________.
(Time notification initiated)

3. **EMERGENCY CLASSIFICATION:**
☐ UNUSUAL EVENT ☐ SITE AREA EMERGENCY
☐ ALERT ☒ GENERAL EMERGENCY ☐ **The event has been terminated.**

UNIT: ☒ ONE ☐ TWO ☐ ONE & TWO

Declaration Time: (Time)
(Time classification/ termination declared)

DATE: (Date)
(Date classification/ termination declared)

THIS REPRESENTS A/AN: ☒ INITIAL DECLARATION ☐ ESCALATION ☐ NO CHANGE } **IN CLASSIFICATION STATUS**

4. **The Classification Designation is:** FG1

BRIEF NON-TECHNICAL DESCRIPTION OF THE:
☒ **EMERGENCY EVENT (Initial declaration and escalations) OR**
☐ **OTHER SIGNIFICANT EVENT (No change in emergency classification or classification time)**

Loss of coolant accident has occurred requiring Reactor and Primary Containment flooding (or similar).

5. **THERE IS:** ☐ NO ☒ AN AIRBORNE ☐ A LIQUID } **RADIOLOGICAL RELEASE IN PROGRESS DUE TO THE EVENT**

6. **WIND DIRECTION IS** 10 degrees **WIND SPEED IS:** 5 mph
(Data from 10 meter meteorological tower, available on PICSY.)

7. **REPEAT:** ☒ **THIS IS A DRILL** ☐ **THIS IS AN ACTUAL EVENT**

(When communicating form, request a repeat back by one of the agencies.)

APPROVED: (Signature) **Time:** (Time) **Date:** (Date)
(ED, RM, or EOFSS) (Time form approved) (Date form approved)

KEY

KEY

Tab 9
EP-PS-100-9

PROTECTIVE ACTION RECOMMENDATION STATE NOTIFICATION FORM

☒ THIS IS A DRILL ☐ THIS IS AN ACTUAL EVENT

(This form is to be used to communicate PPL's Protective Action to the senior state official at 717-651-2148.)

1. This is (Name) of the Susquehanna Steam Electric Station.
(Fill in your name)

2. I am the:
   - ☒ Emergency Director at the Susquehanna SES Control Room
   - ☐ Emergency Director at the Technical Support Center
   - ☐ Recovery Manager at the Emergency Operations Facility

3. I am about to provide a Protective Action Recommendation. Do I have the Senior State Official on the line?

   Name ______________________

4. A General Emergency has been declared as of (Time).

5. This declaration was made due to:

   Loss of coolant accident (or similar).

6. The PPL Susquehanna Protective Action Recommendation is:

   - ☐ Shelter in a 2 mile radius and 5 miles downwind (specify sector ________) and advise the general public in the sheltered areas to take KI in accordance with the state's emergency plans. Advise remainder of the EPZ to monitor EAS messages.
   - ☐ Evacuate 0-10 miles and advise citizens to take KI in accordance with the state's emergency plans.
   - ☒ Evacuate 0-2 miles and shelter 2-10 miles and advise citizens to take KI in accordance with the state's emergency plans.
   - ☐ Divert Danville drinking water supply from the Susquehanna River.
   - ☐ Evacuate beyond 10 miles (specify distance ________) and advise citizens to take KI in accordance with the state's emergency plans.

7. The wind direction is from: 10 ° and wind speed is: 5 mph.

8. Date/Time: (Date / Time)

KEY

EMERGENCY DIRECTOR (ED) - CONTROL ROOM: Emergency Plan Position-Specific Procedure

WHEN:	Anytime a non-routine event is occurring
HOW NOTIFIED:	On shift
REPORT TO:	Duty Manager
WHERE TO REPORT:	Control Room

OVERALL DUTY:

Take charge of the plant from the Control Room during an emergency condition, assigning duties and directing operations as necessary to return to a safe plant condition (NDAP-QA-300).

MAJOR TASKS:	TAB:
Classify the emergency as conditions indicate.	TAB A
Manage the UNUSUAL EVENT.	TAB B
Manage the ALERT EMERGENCY.	TAB C
Manage the SITE AREA EMERGENCY.	TAB D
Manage the GENERAL EMERGENCY.	TAB E
Deleted	TAB F
Manage the Site Specific Security threats or other Security EAL conditions.	TAB G
Determine if there is a Radiological Release in Progress due to the Event.	TAB H

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Activate Fire Brigade

RO	13.ON.003.001	4	01/29/2013	Simulator
Appl To	JPM Number	Revision	Date	Setting

G	2.4.27	3.4	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/29/2013	15
Author	Date	Validation Time (min)

Validated / Approval

	1/25/2013		2/26/13
Operations Instructor	Date	Nuclear Trng Supv R. Smith	Date

Examinee Name: ______________________ ______________________

Last, First MI Employee Number

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________

Name Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
RO 13.ON.003.001

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. ON-013-001, RESPONSE TO FIRE (REV. 34)

B. FP-013-189, DIESEL GENERATOR BAY A ZONE 0-41A (REV. 4)

C. AR-SP-001 (REV. 16)

D. AR-SP-002 (REV. 20)

E. OP-099-004 (REV. 4)

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. A fire alarm has been received for the "A" Diesel Generator building.

B. The following VALID SIMPLEX data print out is available:

FIRE DET X116_Z5 ALM

17:14 THURS 16-MAY-13

44-660 A DIESEL GEN

FIRE DET X116_Z1 ALM

17:16 THURS 16-MAY-13

44-677/710 A DG

FIRE SUP X250_ZI ALM

17:20 THURS 16-MAY-13

44-676 PA011 A DIESL

C. An NPO confirms that a fire does exist in the "A" Diesel Generator building.

V. INITIATING CUE

Activate the Fire Brigade and select the appropriate Pre-Fire Plan.

VI. TASK STANDARD

Fire Brigade activated and Pre-Fire Plan FP-013-189 selected.

VII. TASK SAFETY SIGNIFICANCE

Response to a fire is important to minimize damage to the station. Fire events are a significant contributor to CDF/LERF and must be contained as quickly as possible. The Control Room is responsible for initiating firefighting activities to ensure this is accomplished.

PERFORMANCE CHECKLIST

Appl. To: RO JPM No.: 13.ON.003.001 Student Name: ____________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE • This JPM must be done in the simulator or plant control room. • Ensure the following material is available to support performance of this JPM: o ON-013-001 o Pre-Fire Plans o AR-SP-001 o AR-SP-002 • Provide the candidate with the Task Conditions/Initiating Cue Sheet.			
1.	Obtain SIMPLEX fire alarm panel alarm responses and ON-013-001. **EVALUATOR NOTE** Though not required, candidate may refer to OP-013-002 for the Simplex panel. ON-013-001 Attachment L may be obtained near the SIMPLEX alarm response procedures.	Obtains controlled copies of the following as required: • AR-SP-001 • AR-SP-002 • ON-013-001		

PERFORMANCE CHECKLIST

Appl. To: RO JPM No.: 13.ON.003.001 Student Name: ______

Step	Action	Standard	Eval	Comments
2.*	Determines appropriate Pre-Fire Plan. **EVALUATOR NOTE** The alarm response procedures identify Pre-Fire Plan FP-013-189. **EVALUATOR NOTE** This may be completed later in the JPM based on executing ON-013-001 Attachment L. The remaining JPM steps are from ON-013-001 Attachment L.	Determines Pre-Fire Plan FP-013-189 is to be used.		
3.	Record Date and Time of fire notification.	Records Date and Time of fire notification.		
4.*	Dispatch Fire Brigade Leader to area of reported fire. **EVALUATOR CUE** Role-play as Fire Brigade Leader. Inform the candidate you will be using OPS Channel 1 and setting up the command post at Control Structure Central Area access. Request Fire Engine setup on road East of A through D Diesels. Request additional off-site fire department support.	Dispatches Fire Brigade Leader to the "A" Diesel Generator building using the plant page or radio.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: RO JPM No.: 13.ON.003.001 Student Name: ____________

Step	Action	Standard	Eval	Comments
5.*	Sound Fire Alarm for ~ 10 seconds. **EVALUATOR NOTE** Though not required, candidate may refer to OP-099-004 Att. B Hard Card located in 0C695 for operation of the Plant Alarm System. If another candidate is performing a parallel JPM in the simulator, direct your candidate to simulate actions necessary to sound the fire alarm. This is done for exam security purposes.	At panel 0C695: • Pulls out the Pistol Grip EVACUATION ALARM switch, and turns to 'PLANT ALARM' position.* • Turns the SIREN TONE GENERATOR "FIRE" position.* • Pushes in the Pistol Grip EVACUATION ALARM switch.* • After ~10 seconds, pulls out the Pistol Grip EVACUATION ALARM switch.* • Rotates the Pistol Grip EVACUATION ALARM switch to 'OFF' position and pushes it in.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: RO JPM No.: 13.ON.003.001 Student Name:

Step	Action	Standard	Eval	Comments
6.*	Make plant page announcement. Example: "ATTENTION ALL PERSONNEL: THERE IS A FIRE IN (UNIT/BUILDING/ELEVATION/AREA AND ROOM/AREA NAME IF APPROPRIATE). STATION FIRE BRIGADE HAS BEEN ACTIVATED; STAY CLEAR OF AFFECTED AREAS." **EVALUATOR NOTE** If another candidate is performing a parallel JPM in the simulator, direct your candidate to simulate actions necessary to use the page. This is done for exam security purposes.	Keys the plant page and announces: "Attention all personnel: There is a fire in the 'A' Diesel Generator Building. Station Fire Brigade has been activated. Stay clear of affected areas (or similar)."		
7.	Repeat announcement.	Keys the plant page and announces: "Attention all personnel: There is a fire in the 'A' Diesel Generator Building. Station Fire Brigade has been activated. Stay clear of affected areas (or similar)."		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: RO JPM No.: 13.ON.003.001 Student Name:

Step	Action	Standard	Eval	Comments
8.	Fire Brigade Leader reports location of Command Post, fire brigade shed (or fire engine) and radio channel to be used. **EVALUATOR CUE** If necessary, repeat cue from JPM step 4: Role-play as Fire Brigade Leader. Inform the candidate you will be using OPS Channel 1 and setting up the command post at the Control Structure Central Area access on the east side. Request Fire Engine setup on road East of A through D Diesels. Request additional off-site fire department support.	Records radio channel and location fire shed/engine to be used.		
9.*	Activate the Fire Brigade pagers using the central desk phoneset by pressing blue button and lifting the handset for at least 30 seconds. **EVALUATOR CUE** Role play as all four Fire Brigade members ready to receive the message on the radio.	On central desk phoneset, presses blue button and lifts the handset for at least 30 seconds.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: RO JPM No.: 13.ON.003.001 Student Name:

Step	Action	Standard	Eval	Comments
10.*	Report the following to the Fire Brigade members: 1. Location of fire and Command Post 2. Fire Brigade shed location, or drive fire engine to specific location. Members to dress out and report to Command Post. 3. Radio Channel (N/A if already on channel 1)	Reports to the Fire Brigade members: 1. Fire location is "A" Diesel Generator building and command post is at Control Structure Central Area access on the east side.* 2. Locate Fire Engine on road East of A through D Diesels. 3. Radio channel is OPS Channel 1.		
11.*	Direct a Fire Brigade Member to take Pre-Fire plan for the applicable building to the Command Post. **EVALUATOR CUE** Role play as Fire Brigade Member and state that you will ensure the Fire Pre-plan procedure is at the command post.	Directs a Fire Brigade Member to take Pre-Fire Plan FP-013-189 to the Command Post.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: RO JPM No.: 13.ON.003.001 Student Name: ____________________

Step	Action	Standard	Eval	Comments
12.*	Inform Security (X3114 or X3115) of fire and OPS radio channel being used. **EVALUATOR CUE** Role play as security. **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	Dials extension 3114 or 3115 and informs Security of fire, that OPS Channel 1 is being used, and that offsite assistance is being requested.		

* = Critical Step
\# = Critical Sequence

TASK CONDITIONS

A. A fire alarm has been received for the "A" Diesel Generator building.

B. The following VALID SIMPLEX data print out is available:

FIRE DET X116_Z5 ALM

17:14	THURS	16-MAY-13
44-660	A DIESEL GEN	

FIRE DET X116_Z1 ALM

17:16	THURS	16-MAY-13
44-677/710	A DG	

FIRE SUP X250_ZI ALM

17:20	THURS	16-MAY-13
44-676	PA011	A DIESL

C. An NPO confirms that a fire does exist in the "A" Diesel Generator building.

INITIATING CUE

Activate the Fire Brigade and select the appropriate Pre-Fire Plan.

TASK CONDITIONS

A. A fire alarm has been received for the "A" Diesel Generator building.

B. The following VALID SIMPLEX data print out is available:

FIRE DET X116_Z5 ALM

17:14	THURS	16-MAY-13
44-660	A DIESEL GEN	

FIRE DET X116_Z1 ALM

17:16	THURS	16-MAY-13
44-677/710	A DG	

FIRE SUP X250_ZI ALM

17:20	THURS	16-MAY-13
44-676	PA011	A DIESL

C. An NPO confirms that a fire does exist in the "A" Diesel Generator building.

INITIATING CUE

Activate the Fire Brigade and select the appropriate Pre-Fire Plan.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Perform Jet Pump Operability Check

S/RO	00.SO.003.051	2	01/29/2013	Classroom
Appl To	JPM Number	Revision	Date	Setting

G	2.2.12	3.7/4.1	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/29/2013	25
Author	Date	Validation Time (min)

Validated | Approval

[signature]	1/20/2013	[signature]	2/26/13
Operations Instructor	Date	Nuclear Trng Supv R. Sorensen	Date

Examinee Name: ______________________ ______________________

Last, First MI | Employee Number

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________

Name | Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 00.SO.003.051

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. SO-100-007, DAILY SURVEILLANCE LOG, REV 59

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. Unit 1 is operating at 100% power.

B. Both Reactor Recirc pumps and loops are in operation.

C. The necessary data to perform the daily surveillance for Recirc pump and jet pump operability has been taken and recorded on Attachment C, PERFORMANCE DATA SHEET RECIRCULATION SYSTEM DUAL LOOP, of SO-100-007, DAILY SURVEILLANCE LOG.

D. No Tech Spec LCO action statements are in effect.

V. INITIATING CUE

Using the data provided on Attachment C, PERFORMANCE DATA SHEET RECIRCULATION SYSTEM DUAL LOOP, of SO-100-007, DAILY SURVEILLANCE LOG:

- Complete the remaining items in Attachment C.
- Determine Recirc pump and jet pump operability IAW Item 1 of SO-100-007, DAILY SURVEILLANCE LOG.
- Report the results of the surveillance to your supervisor.

VI. TASK STANDARD

Recirculation pumps declared OPERABLE; Jet pumps declared INOPERABLE

VII. TASK SAFETY SIGNIFICANCE

Ensures compliance with Technical Specifications.

Appl. To/JPM No.: 00.SO.003.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE To begin this JPM, provide the candidate with the Task Conditions and Initiating Cue Sheet, a copy of SO-100-007, and the partially completed attachment C (labeled "Candidate's Data Sheet", 1 page). **EVALUATOR NOTE** "Candidate's Data Sheet #2" (1 page) is not given to the candidate until they identify the need to evaluate jet pump delta Ps.			
1.	Obtain a controlled copy of SO-100-007.	Controlled copy obtained from evaluator.		
2.	Selects correct procedure section.	Selects Item 1.		
3.	To determine Recirc Pumps/Jet Pumps and Flow Biased Simulated Thermal Power Upscale (RPS) OPERABLE, Complete APPLICABLE Attachments: IF in Dual Loop Operation, Complete Attachment C. For Recirc Pumps and Jet Pumps.	Selects Attachment C.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.SO.003.051 Student Name:_______________

Step	Action	Standard	Eval	Comments
∗4.	Recirc pumps operable if loop jet pump flow mismatch maintained within a or b: Enter N/A for item that does not apply. a. 5 Mlbm/hr with core flow ≥ 75 Mlbm/hr b. 10 Mlbm/hr with core flow < 75 Mlbm/hr	On Attachment C PERFORMANCE DATA SHEET RECIRCULATION SYSTEM DUAL LOOP: Compares line g to h. Determines that the mismatch between Loop A and Loop B is 2 Mlbm/hr. Records: 2 Mlbm/hr on SR 3.4.1.1 line a. Records: N/A on SR 3.4.1.1 line b. Determines Recirc Pumps are operable. Circles YES and places his/her initials under Confirm column on SR 3.4.1.1 line . Records: SAT on Recirc Pumps line of item 1 of SO-100-007 Daily Surveillance Log Attachment A.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.SO.003.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
∗5.	When recirc pumps operating with flow within limits of a or b above, jet pumps operable if no two (2) following conditions exist simultaneously: Recirculation loop drive flow versus recirculation generator speed differs > 10% from established patterns. (Plot applicable performance data on figures 1 and 2 of this attachment)	On Figure 1 RECIRC PUMP A FLOW VS. SPEED TWO LOOP OPERATION of ATTACHMENT C: Plots a point corresponding to: RECIRC GENERATOR A SPEED (SI 14032A) of 87% AND RECIRC PUMP A FLOW (KGPM) of 38 KGPM On Figure 2 RECIRC PUMP B FLOW VS. SPEED TWO LOOP OPERATION of ATTACHMENT C: Plots a point corresponding to: RECIRC GENERATOR B SPEED (SI 14032B) of 88% AND RECIRC PUMP B FLOW (KGPM) of 33 KGPM Circles YES and places his/her initials under Confirm column SR 3.4.2.1 line a.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.SO.003.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
∗6.	Recirculation loop drive flow versus total core flow differs > 10% from established patterns. (Plot applicable performance data on Figures 3 and 4 of this attachment)	On Figure 3 TOTAL CORE FLOW VS. RECIRC PUMP A FLOW TWO LOOP OPERATION of ATTACHMENT C: Plots a point corresponding to: RECIRC PUMP A FLOW (KGPM) (FR-B31-1R614) of 38 KGPM AND TOTAL CORE FLOW MLB/HR of 92 MLB/HR On Figure 4 TOTAL CORE FLOW VS. RECIRC PUMP B FLOW TWO LOOP OPERATION of ATTACHMENT C Plots a point corresponding to: RECIRC PUMP A FLOW (KGPM) (FR-B31-1R614) of 33 KGPM AND TOTAL CORE FLOW MLB/HR of 92 MLB/HR Circles NO and places his/her initials under Confirm column SR 3.4.2.1 line b.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.SO.003.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
7.	Notifies Reactor Engineering directly that surveillance parameters differ from established values by more than 5% or notifies SRO to contact Reactor Engineering. **EVALUATOR CUE** Role-play Reactor Engineering or SRO and acknowledge the report. **EVALUATOR CUE** Provide the candidate with the Candidate Data Sheet #2 (1 page) (Jet pump delta Ps).	Contacts Reactor Engineering directly and notifies that surveillance parameters differ from established values by more than 5%. OR Notifies SRO to contact Reactor Engineering.		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.SO.003.051 Student Name:_______________________

Step	Action	Standard	Eval	Comments
8.	Calculates LOOP A JET PUMP ΔP PERCENT DEVIATION FROM THE AVERAGE to be used in Plotting applicable performance data on figure 1 of attachment I. **EVALUATOR NOTE** The candidate may round these numbers to the nearest tenth.	Records the following data on Attachment C LOOP A JET PUMP ΔP PERCENT DEVIATION FROM THE AVERAGE: 1. JP11_**34**_[(JP11 - A) ÷ A] X 100 =_**-.87**_ 2. JP12_**35**_[(JP12 - A) ÷ A] X 100=_**2.04**_ 3. JP13_**34**_[(JP13 - A) ÷ A] X 100=_**-.87**_ 4. JP14_**35**_[(JP14 - A) ÷ A] X 100 =_**2.04**_ 5. JP15_**35**_[(JP15 - A) ÷ A] X 100 =_**2.04**_ 6. JP16_**35**_[(JP16 - A) ÷ A] X 100 =_**2.04**_ 7. JP17_**34**_[(JP17 - A) ÷ A] X 100 =_**-.87**_ 8. JP18_**34**_[(JP18 - A) ÷ A] X 100 =_**-.87**_ 9. JP19_**35**_[(JP19 - A) ÷ A] X 100 =_**2.04**_ 10. JP20_**32**_[(JP20 - A) ÷ A] X 100 =_**-6.71**_ A =_**343** X 0.1 = _**34.3**_ (Sum of ΔP%) JP11 thru 20		

Appl. To/JPM No.: 00.SO.003.051 Student Name:_______________________

Step	Action	Standard	Eval	Comments
9.	Calculates LOOP B JET PUMP ΔP PERCENT DEVIATION FROM THE AVERAGE to be used in Plotting applicable performance data on figure 2 of attachment I. **EVALUATOR NOTE** The candidate may round these numbers to the nearest tenth.	Records the following data on Attachment C LOOP B JET PUMP ΔP PERCENT DEVIATION FROM THE AVERAGE: 1. JP1_**39**_[(JP1 - A) ÷ A] X 100 =_**3.17**_ 2. JP2_**39**_[(JP2 - A) ÷ A] X 100 =_**3.17**_ 3. JP3_**37**_[(JP3 - A) ÷ A] X 100 =_**-2.12**_ 4. JP4_**39**_[(JP4 - A) ÷ A] X 100 =_**3.17**_ 5. JP5_**39**_[(JP5 - A) ÷ A] X 100 =_**3.17**_ 6. JP6_**39**_[(JP6 - A) ÷ A] X 100 =_**3.17**_ 7. JP7_**30**_[(JP7 - A) ÷ A] X 100 =_**-20.63**_ 8. JP8_**39**_[(JP8 - A) ÷ A] X 100 =_**3.17**_ 9. JP9_**39**_[(JP9 - A) ÷ A] X 100 =_**3.17**_ 10. JP10_**38**_[(JP10 - A) ÷ A] X 100 =_**.53**_ A =_**378** X 0.1 = _**37.8**_ (Sum of ΔP%) JP1 thru 10		

∗Critical Step #Critical Sequence

Appl. To/JPM No.: 00.SO.003.051 Student Name:________________________

Step	Action	Standard	Eval	Comments
✳10.	Each jet pump to lower plenum differential pressure differs by > 20% from the established patterns, (Plot applicable performance data on figures 1 and 2 of attachment I. **EVALUATOR NOTE** Plotting of points is not critical in this step.	On Figure 1 TWO LOOP JET PUMP DISTRIBUTION LOOP A of ATTACHMENT I Plots the following points: **JP11** and **-.87** % DEVIATION FROM THE MEAN DELTA P VALUE **JP12** and **2.04** % DEVIATION FROM THE MEAN DELTA P VALUE **JP13** and **-.87** % DEVIATION FROM THE MEAN DELTA P VALUE **JP14** and **2.04** % DEVIATION FROM THE MEAN DELTA P VALUE **JP15** and **2.04** % DEVIATION FROM THE MEAN DELTA P VALUE **JP16** and **2.04** % DEVIATION FROM THE MEAN DELTA P VALUE **JP17** and **-.87** % DEVIATION FROM THE MEAN DELTA P VALUE **JP18** and **-.87** % DEVIATION FROM THE MEAN DELTA P VALUE **JP19** and **2.04** % DEVIATION FROM THE MEAN DELTA P VALUE **JP20** and **–6.71** % DEVIATION FROM THE MEAN DELTA P VALUE Determines that all points are within ±20% from the established patterns. ✳		

✳Critical Step #Critical Sequence

Appl. To/JPM No.: 00.SO.003.051 Student Name:____________________

Step	Action	Standard	Eval	Comments
✳10. (cont)	Each jet pump to lower plenum differential pressure differs by > 20% from the established patterns, (Plot applicable performance data on figures 1 and 2 of attachment I. **EVALUATOR NOTE** Plotting of points is not critical in this step.	On Figure 2 TWO LOOP JET PUMP DISTRIBUTION LOOP B of ATTACHMENT I Plots the following points: **JP1** and **3.17** % DEVIATION FROM THE MEAN DELTA P VALUE **JP2** and **3.17** % DEVIATION FROM THE MEAN DELTA P VALUE **JP3** and **–2.12** % DEVIATION FROM THE MEAN DELTA P VALUE **JP4** and **3.17** % DEVIATION FROM THE MEAN DELTA P VALUE **JP5** and **3.17** % DEVIATION FROM THE MEAN DELTA P VALUE **JP6** and **3.17** % DEVIATION FROM THE MEAN DELTA P VALUE **JP7** and **–20.63** % DEVIATION FROM THE MEAN DELTA P VALUE **JP8** and **3.17** % DEVIATION FROM THE MEAN DELTA P VALUE **JP9** and **3.17** % DEVIATION FROM THE MEAN DELTA P VALUE **JP10** and **.53** % DEVIATION FROM THE MEAN DELTA P VALUE Determines that jet pump 7 is NOT within ±20% from the established patterns. ✳ Circles YES and places his/her initials under Confirm column SR 3.4.2.1 line c. ✳		

✳Critical Step #Critical Sequence

Appl. To/JPM No.: 00.SO.003.051 Student Name:____________

Step	Action	Standard	Eval	Comments
∗11.	When recirc pumps operating with flow within limits of a or b above, jet pumps operable if no two (2) following conditions exist simultaneously: **EVALUATOR CUE:** This completes the JPM.	Determines Jet pumps are NOT operable based on two (2) of the conditions under SR 3.4.2.1 not being met simultaneously. Circles NO and places his/her initials under Confirm column SR 3.4.2.1. Records: UNSAT on Jet Pumps line of item 1 of SO-100-007 Daily Surveillance Log Attachment A.		

∗Critical Step #Critical Sequence

ACCEPTANCE CRITERIA for DUAL LOOP	ACCEPTABLE	CONFIRM
SR 3.4.1.1 Recirc Pumps **OPERABLE** if loop jet pump flow mismatch maintained within a or b: **Enter** NA for item that does not apply.	YES/NO	Initials
a. 5 Mlbm/hr with core flow ≥ 75 Mlbm/hr.	2 Mlbm/hr.	
b. 10 Mlbm/hr with Core Flow < 75 Mlbm/hr.	N/A Mlbm/hr.	
SR 3.4.2.1 When recirc pumps operating with flow within limits of a or b above, Jet Pumps **OPERABLE** if no two (2) following conditions exist simultaneously:	YES/NO	Initials
	AS FOUND	

☐ NOTE: IF any of these conditions exist, or, IF any parameter differs by more than 5% of established value, **Notify** System Engineering.

a. Recirculation loop drive flow versus recirculation generator speed differs > 10% from established patterns. (**Plot** applicable performance data on Figures 1 and 2 of this attachment.)	YES/NO	Initials
b. Recirculation loop drive flow versus total core flow differs > 10% from established patterns. (**Plot** applicable performance data on Figures 3 and 4 of this attachment.)	YES/NO	Initials

☐ NOTE: **Perform ONLY IF** a or b above fail. **Record** applicable data on pages 3 and 4 of this attachment.

c. Any jet pump to lower plenum differential pressure differs by ≥ 20% from established patterns, (**Plot** applicable performance data on Figures 1 and 2 of attachment I.)	YES/NO/NA	Initials

LOOP A

JET PUMP ΔP PERCENT DEVIATION FROM THE AVERAGE

A = Average Jet Pump ΔP Loop A (Calculate below)

		JP ΔP%	% JP ΔP Dev.		
1.	JP11	34	[(JP11 - A) ÷ A] X 100 =	-0.87	PLOT ON FIG. 1 ATTACHMENT I
2.	JP12	35	[(JP12 - A) ÷ A] X 100 =	2.04	
3.	JP13	34	[(JP13 - A) ÷ A] X 100 =	-0.87	
4.	JP14	35	[(JP14 - A) ÷ A] X 100 =	2.04	
5.	JP15	35	[(JP15 - A) ÷ A] X 100 =	2.04	
6.	JP16	35	[(JP16 - A) ÷ A] X 100 =	2.04	
7.	JP17	34	[(JP17 - A) ÷ A] X 100 =	-0.87	
8.	JP18	34	[(JP18 - A) ÷ A] X 100 =	-0.87	
9.	JP19	35	[(JP19 - A) ÷ A] X 100 =	2.04	
10.	JP20	32	[(JP20 - A) ÷ A] X 100 =	-6.71	

A = 343 X 0.1 = 34.3
(Sum of ΔP%)
JP11 thru 20

LOOP B

JET PUMP ΔP PERCENT DEVIATION FROM THE AVERAGE

B = Average Jet Pump ΔP Loop B (Calculate below)

		JP ΔP%	% JP ΔP Dev.		
1.	JP1	39	[(JP1 - B) ÷ B] X 100 =	3.17	PLOT ON FIG. 2 ATTACHMENT I
2.	JP2	39	[(JP2 - B) ÷ B] X 100 =	3.17	
3.	JP3	37	[(JP3 - B) ÷ B] X 100 =	-2.12	
4.	JP4	39	[(JP4 - B) ÷ B] X 100 =	3.17	
5.	JP5	39	[(JP5 - B) ÷ B] X 100 =	3.17	
6.	JP6	39	[(JP6 - B) ÷ B] X 100 =	3.17	
7.	JP7	30	[(JP7 - B) ÷ B] X 100 =	-20.63	
8.	JP8	39	[(JP8 - B) ÷ B] X 100 =	3.17	
9.	JP9	39	[(JP9 - B) ÷ B] X 100 =	3.17	
10.	JP10	38	[(JP10 - B) ÷ B] X 100 =	0.53	

B = 378 X 0.1 = 37.8
(Sum of ΔP%)
JP1 thru 10

FIGURE 1
RECIRC PUMP A FLOW VS. SPEED
TWO LOOP OPERATION

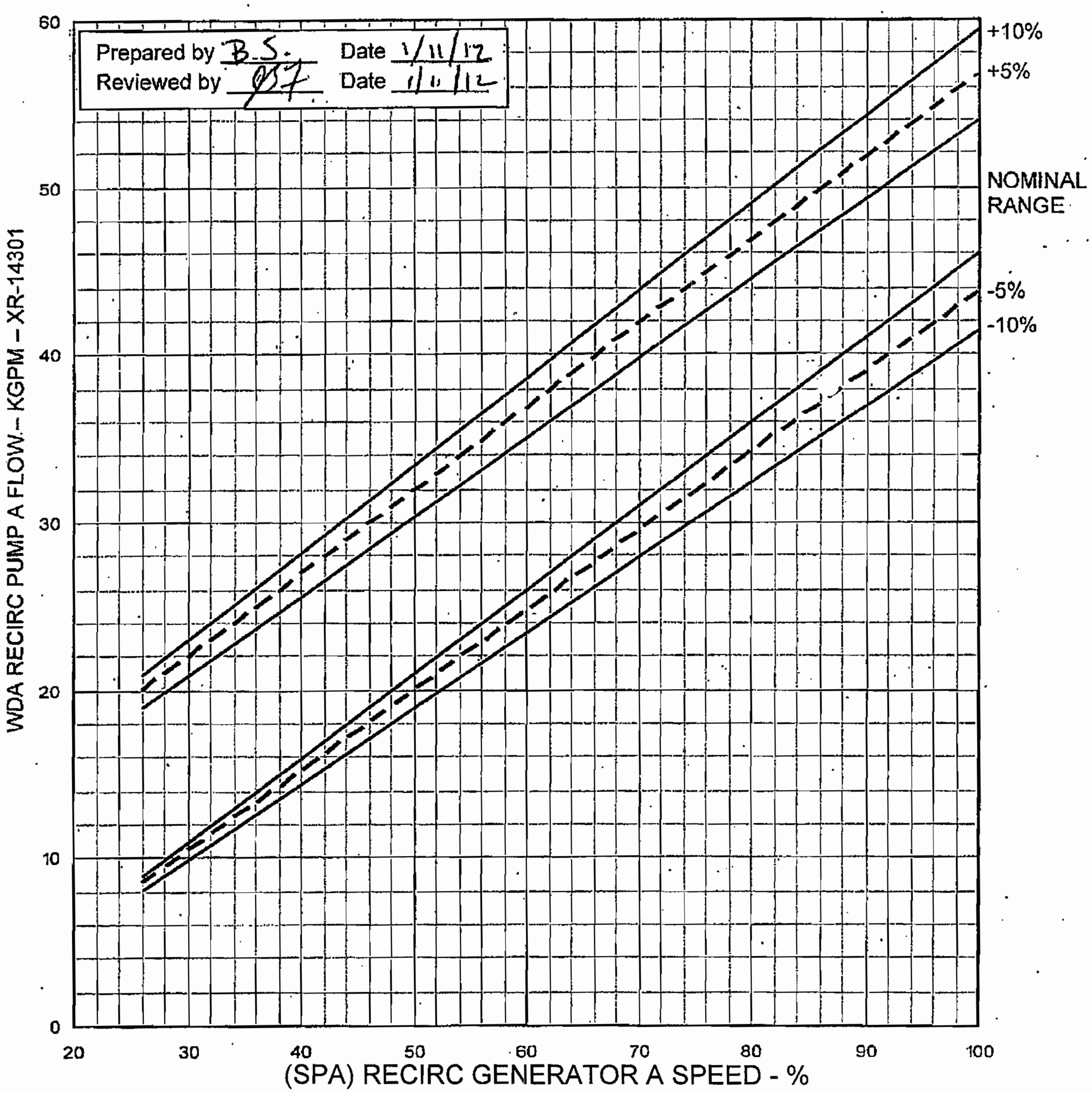
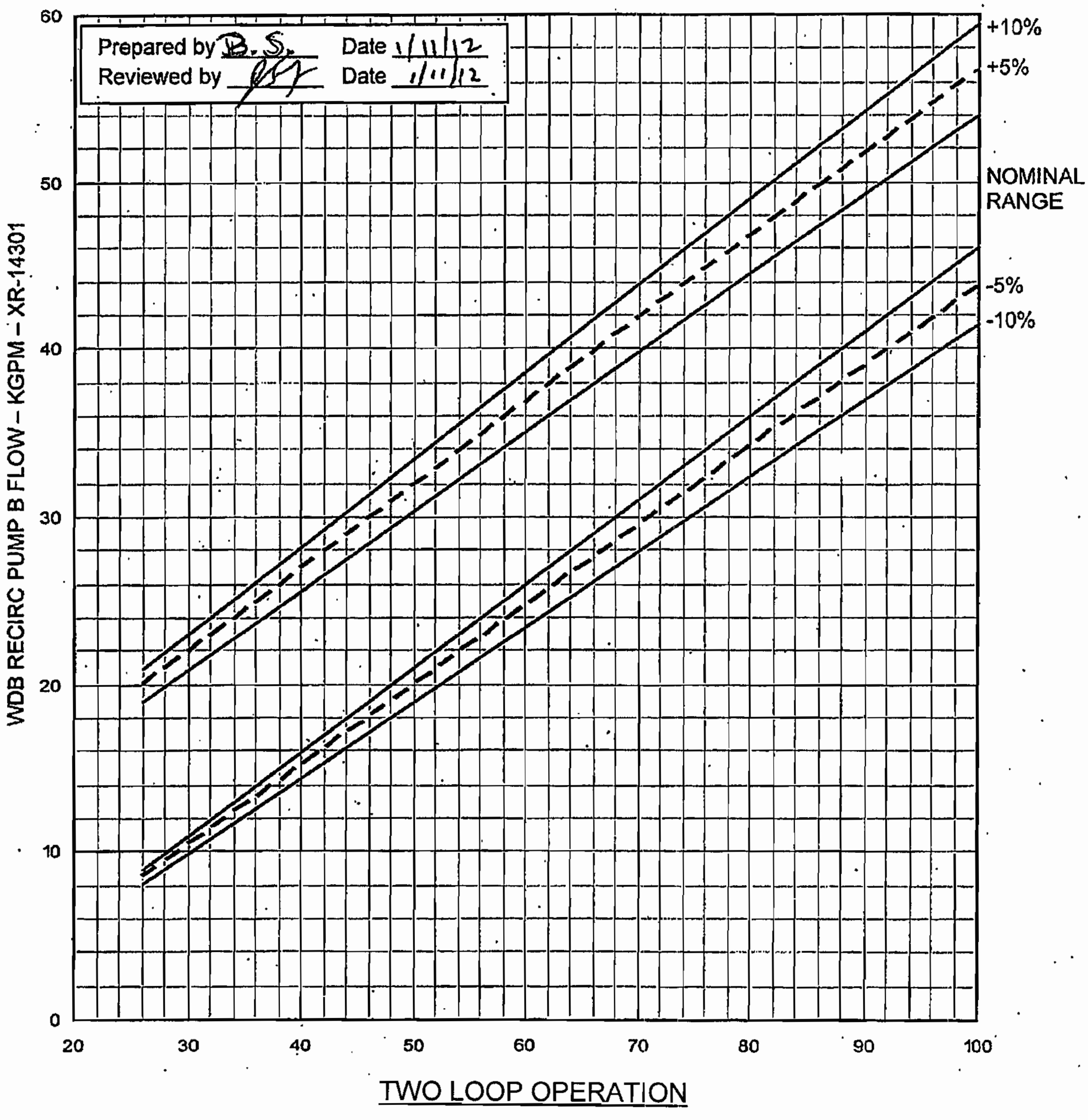


FIGURE 2
RECIRC PUMP B FLOW VS. SPEED



(SPB) RECIRC GENERATOR B SPEED - %

FIGURE 3
TOTAL CORE FLOW VS. RECIRC PUMP A FLOW
TWO LOOP OPERATION

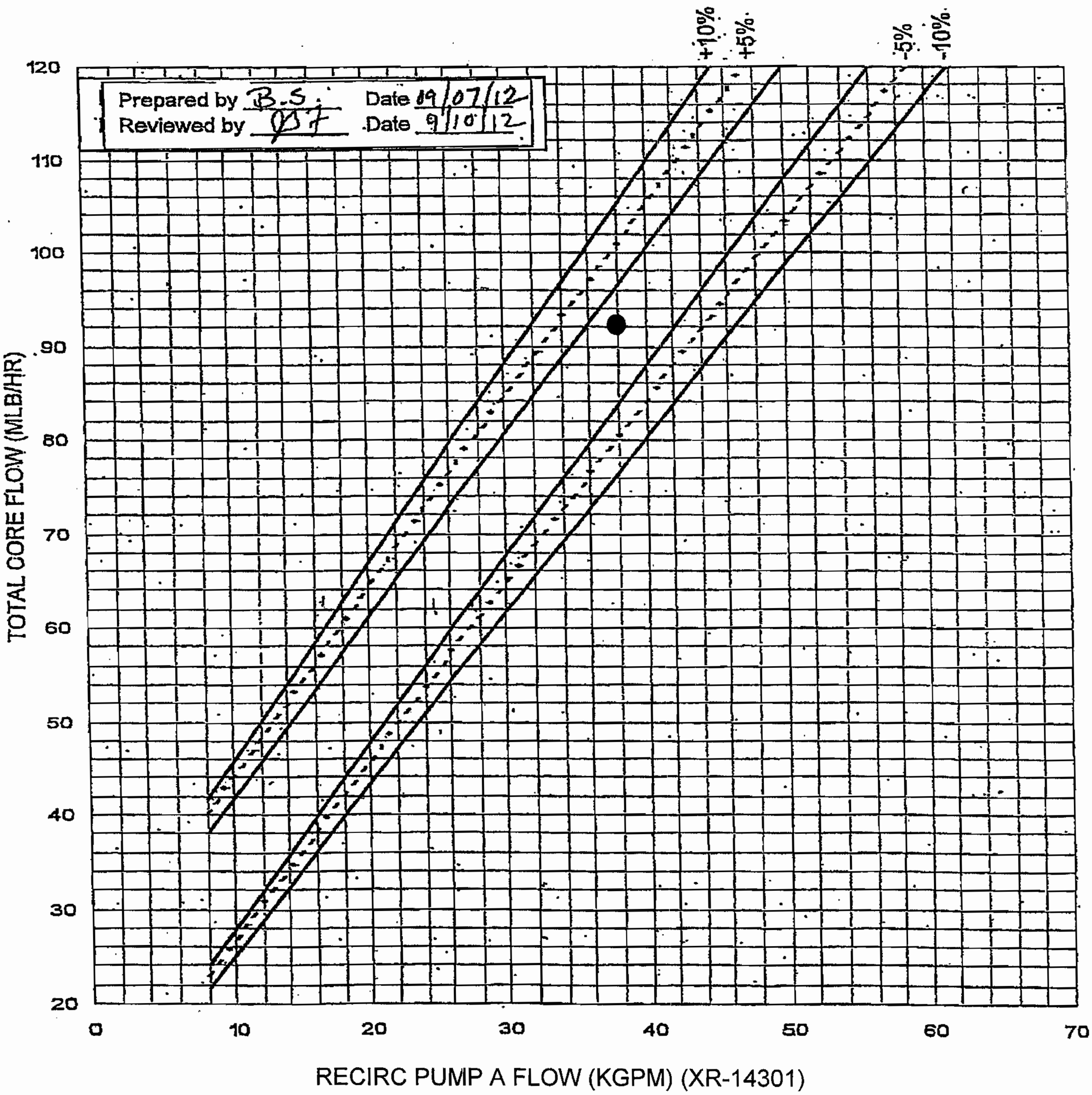


FIGURE 4
TOTAL CORE FLOW VS. RECIRC PUMP B FLOW
TWO LOOP OPERATION

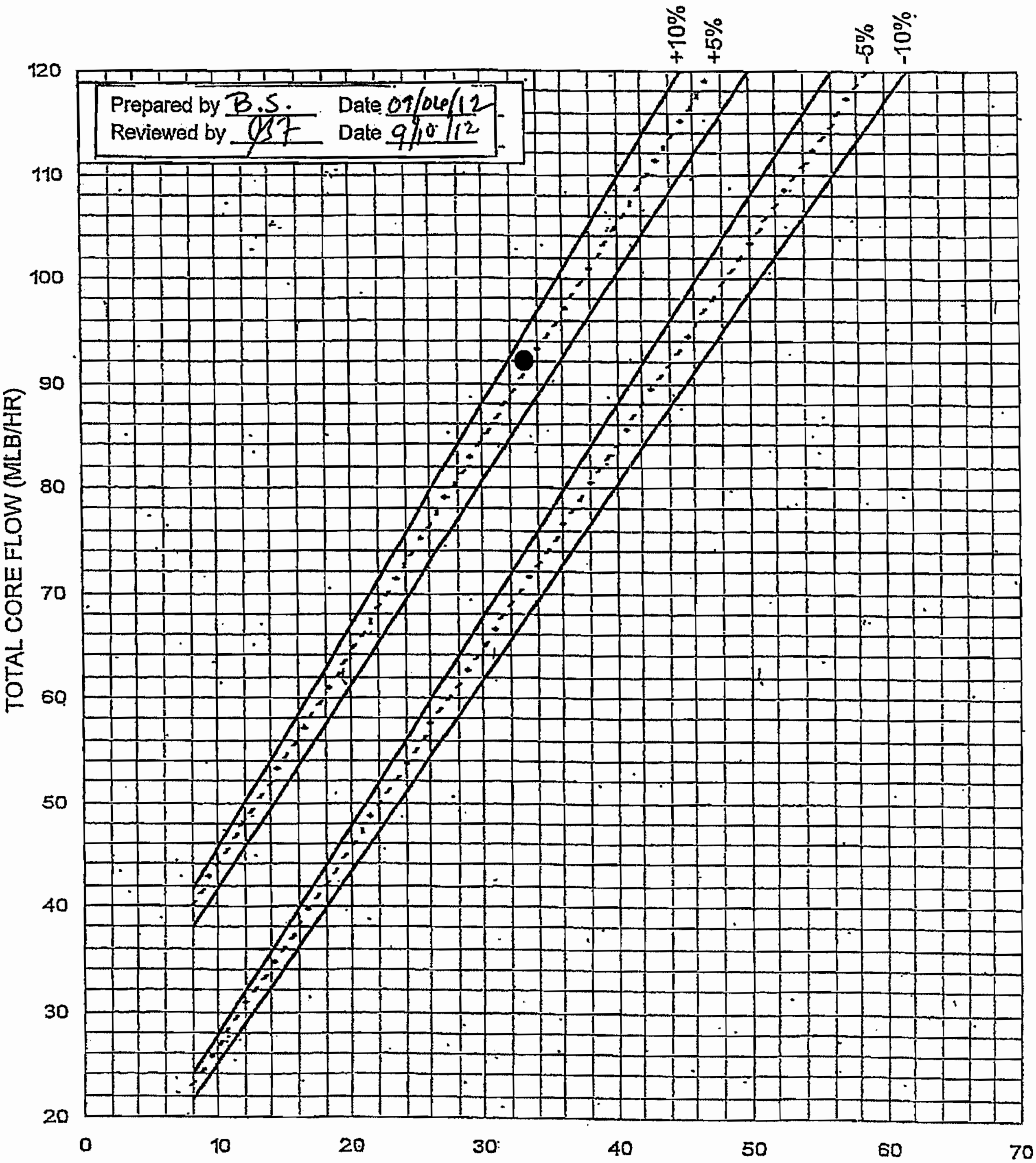


FIGURE 1
TWO LOOP JET PUMP DISTRIBUTION LOOP A
(CONTINUOUS USE)

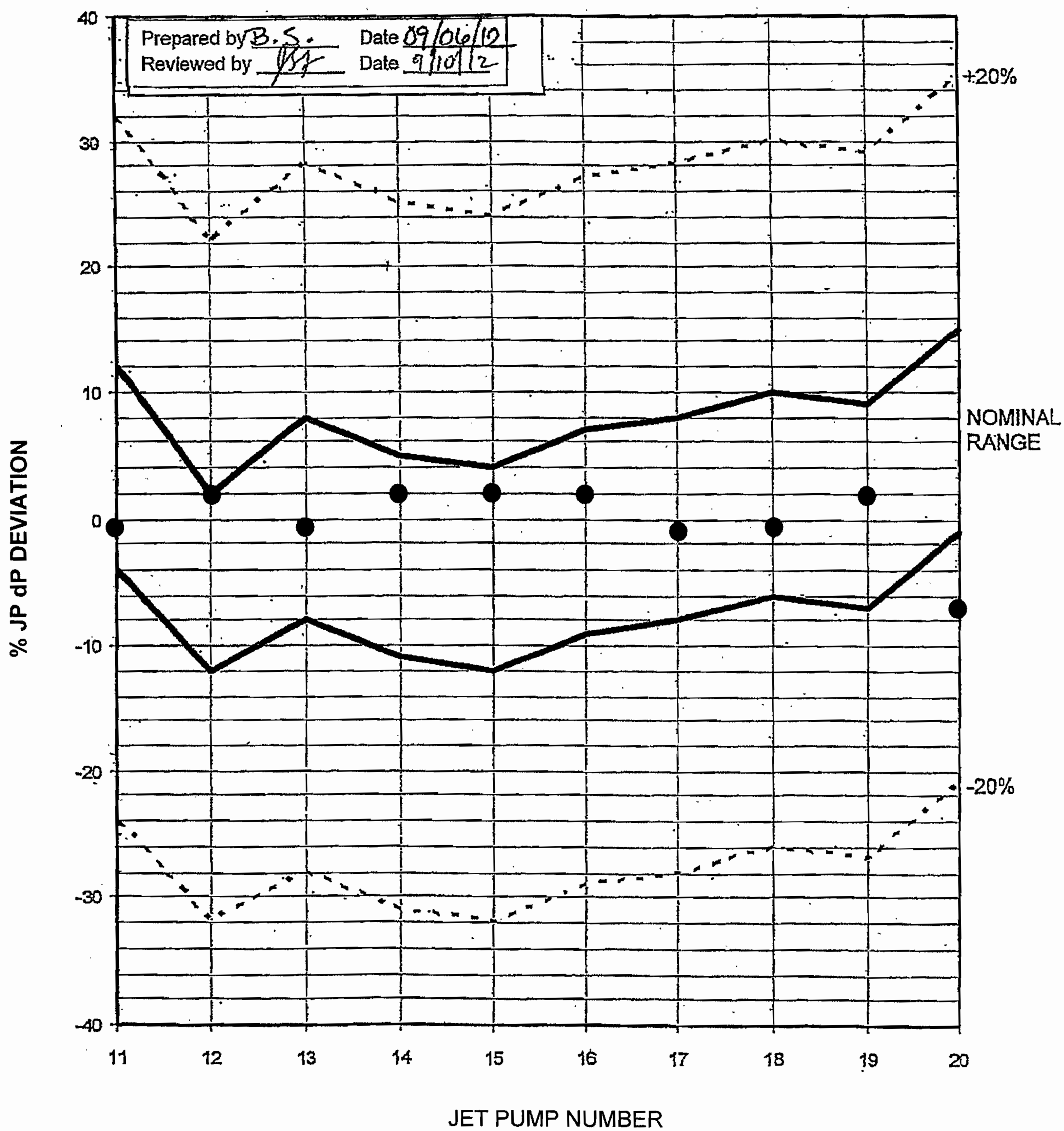
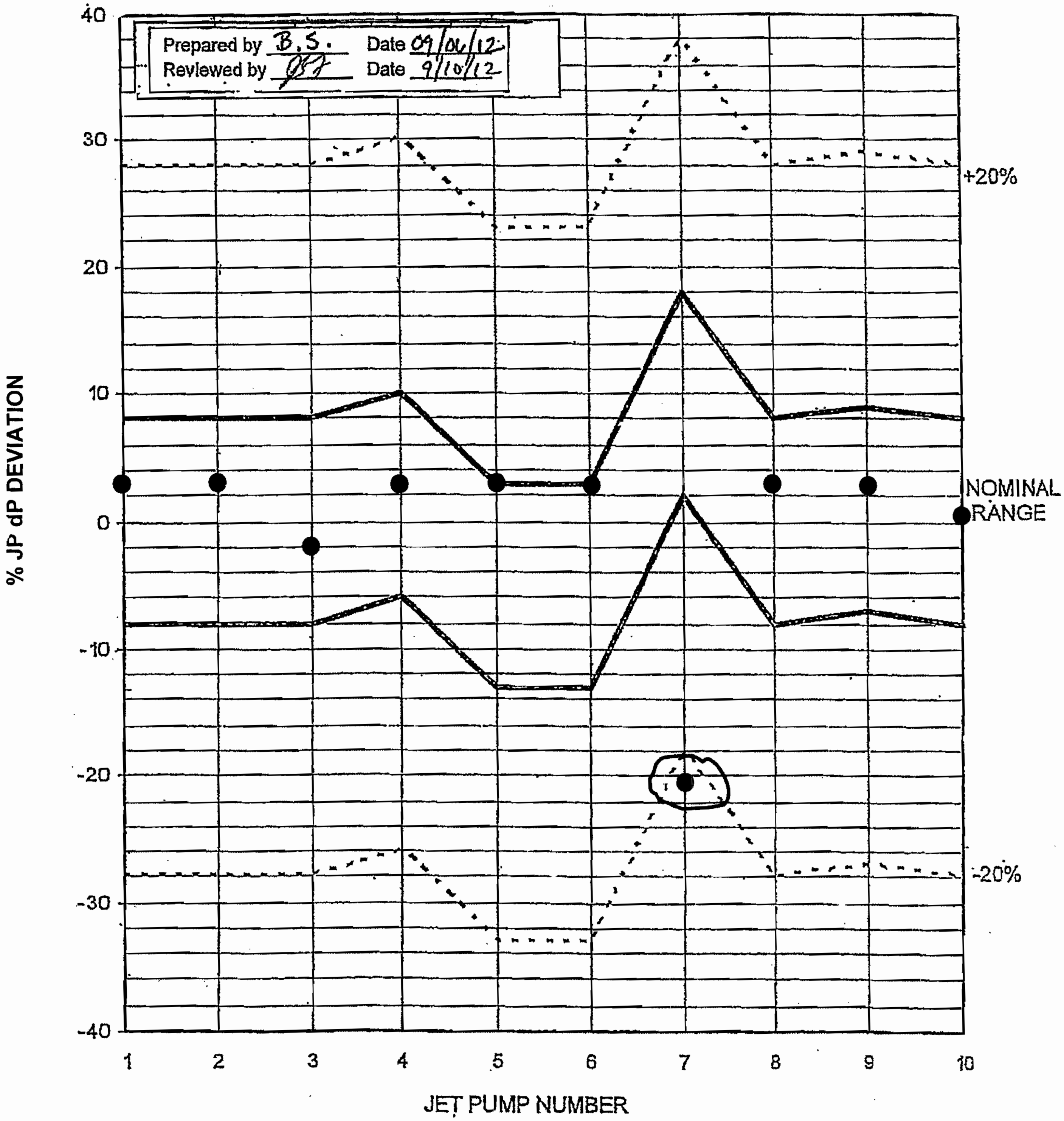


FIGURE 2
TWO LOOP JET PUMP DISTRIBUTION LOOP B



Candidate's Data Sheet (Pg 1 of 1)

PERFORMANCE DATA SHEET
RECIRCULATION SYSTEM DUAL LOOP
(CONTINUOUS USE)

☐ NOTE: The data collection steps in this attachment may be performed in any order.

Record following data:

	PARAMETER/INSTRUMENT		PANEL	READING	
a.	GEN 1A SPEED	Primary: SI-14032A	1C651	87	%
		Alternate: SI-14375A	0C630	1460	RPM
		(Note 1)		87	%
b.	GEN 1B SPEED	Primary: SI-14032B	1C651	88	%
		Alternate: SI-14375B	0C630	1480	RPM
		(Note 1)		88	%
c.	RECIRC DRIVE FLOW A	Primary: XR-14301	1C652	38	Kgpm
		Alternate: FI-B31-1R617			
d.	RECIRC DRIVE FLOW B	Primary: XR-14301	1C652	33	Kgpm
		Alternate: FI-B31-1R613			
e.	TOTAL CORE FLOW	Primary: NJF01B	1C652	92	Mlb/hr
		Alternate: XR-14301			
f.	CORE PLATE DP	XR-14301	1C652	53	%
g.	LOOP A JET PP FLOW	FI-B21-1R611A	1C652	45	Mlb/hr
h.	LOOP B JET PP FLOW	FI-B21-1R611B	1C652	47	Mlb/hr

I.	JET PUMP DELTA P'S	JET PUMP INST PANEL 1C619 UPPER RELAY ROOM

☐ NOTE: It is only necessary to record Jet Pump Delta P data if it is required to complete the evaluation of SR 3.4.2.1 criteria c on page 2 of this attachment.

JP1 ____ %	JP2 ____ %	JP3 ____ %	JP4 ____ %	JP5 ____ %
JP6 ____ %	JP7 ____ %	JP8 ____ %	JP9 ____ %	JP10 ____ %
JP11 ____ %	JP12 ____ %	JP13 ____ %	JP14 ____ %	JP15 ____ %
JP16 ____ %	JP17 ____ %	JP18 ____ %	JP19 ____ %	JP20 ____ %

Continue Recirc Pump/Jet Pump OPERABILITY determination on page 2 of this Form using data above.

NOTE (1): Convert RPM to % using the following: RPM/1680 x 100 = % Pump Speed

PERFORMANCE DATA SHEET
RECIRCULATION SYSTEM DUAL LOOP
(CONTINUOUS USE)

☐ NOTE: The data collection steps in this attachment may be performed in any order.

Record following data:

	PARAMETER/INSTRUMENT		PANEL	READING	
a.	GEN 1A SPEED	Primary: SI-14032A	1C651	87	%
		Alternate: SI-14375A	0C630	1460	RPM
		(Note 1)		87	%
b.	GEN 1B SPEED	Primary: SI-14032B	1C651	88	%
		Alternate: SI-14375B	0C630	1480	RPM
		(Note 1)		88	%
c.	RECIRC DRIVE FLOW A	Primary: XR-14301	1C652	38	Kgpm
		Alternate: FI-B31-1R617			
d.	RECIRC DRIVE FLOW B	Primary: XR-14301	1C652	33	Kgpm
		Alternate: FI-B31-1R613			
e.	TOTAL CORE FLOW	Primary: NJF01B	1C652	92	Mlb/hr
		Alternate: XR-14301			
f.	CORE PLATE DP	XR-14301	1C652	53	%
g.	LOOP A JET PP FLOW	FI-B21-1R611A	1C652	45	Mlb/hr
h.	LOOP B JET PP FLOW	FI-B21-1R611B	1C652	47	Mlb/hr

I.	JET PUMP DELTA P'S	JET PUMP INST PANEL 1C619 UPPER RELAY ROOM

☐ NOTE: It is only necessary to record Jet Pump Delta P data if it is required to complete the evaluation of SR 3.4.2.1 criteria c on page 2 of this attachment.

JP1	39 %	JP2	39 %	JP3	37 %	JP4	39 %	JP5	39 %
JP6	39 %	JP7	30 %	JP8	39 %	JP9	39 %	JP10	38 %
JP11	34 %	JP12	35 %	JP13	34 %	JP14	35 %	JP15	35 %
JP16	35 %	JP17	34 %	JP18	34 %	JP19	35 %	JP20	32 %

Continue Recirc Pump/Jet Pump OPERABILITY determination on page 2 of this Form using data above.

NOTE (1): Convert RPM to % using the following: RPM/1680 x 100 = % Pump Speed

TASK CONDITIONS

A. Unit 1 is operating at 100% power.

B. Both Reactor Recirc pumps and loops are in operation.

C. The necessary data to perform the daily surveillance for Recirc pump and jet pump operability has been taken and recorded on Attachment C, PERFORMANCE DATA SHEET RECIRCULATION SYSTEM DUAL LOOP, of SO-100-007, DAILY SURVEILLANCE LOG.

D. No Tech Spec LCO action statements are in effect.

INITIATING CUE

Using the data provided on Attachment C, PERFORMANCE DATA SHEET RECIRCULATION SYSTEM DUAL LOOP, of SO-100-007, DAILY SURVEILLANCE LOG:

- Complete the remaining items in Attachment C.
- Determine Recirc pump and jet pump operability IAW Item 1 of SO-100-007, DAILY SURVEILLANCE LOG.
- Report the results of the surveillance to your supervisor.

TASK CONDITIONS

A. Unit 1 is operating at 100% power.

B. Both Reactor Recirc pumps and loops are in operation.

C. The necessary data to perform the daily surveillance for Recirc pump and jet pump operability has been taken and recorded on Attachment C, PERFORMANCE DATA SHEET RECIRCULATION SYSTEM DUAL LOOP, of SO-100-007, DAILY SURVEILLANCE LOG.

D. No Tech Spec LCO action statements are in effect.

INITIATING CUE

Using the data provided on Attachment C, PERFORMANCE DATA SHEET RECIRCULATION SYSTEM DUAL LOOP, of SO-100-007, DAILY SURVEILLANCE LOG:

- Complete the remaining items in Attachment C.
- Determine Recirc pump and jet pump operability IAW Item 1 of SO-100-007, DAILY SURVEILLANCE LOG.
- Report the results of the surveillance to your supervisor.

Facility: Susquehanna
Exam Level: RO

Date of Examination: May 2013
Operating Test No.: 2013

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. Synchronize Diesel Generator D; Voltage Regulator Failure K/A 264000 A4.04 (3.7/3.7), SO-024-001D	D, A, EN, S	6
b. Lineup RHRSW to the Spent Fuel Pool K/A 233000 A2.02 (3.1/3.3), ON-135-001	P, D, S 2011 NRC	9
c. Swap Core Spray Loops K/A 209001 A4.01 (3.8/3.6), OP-151-001	N, EN, L, S	2
d. Reset Recirc Runback; Pump Speed Oscillates K/A 202002 A4.07 (3.3/3.2), ON-164-002	M, A, S	1
e. Main Steam Line Isolation Recovery K/A 239001 A4.01 (4.2/4.0), ON-184-001	D, L, S	3
f. Start HPCI in Pressure Control Mode; Steam Leak Develops K/A 206000 A4.13 (4.1/4.0), OP-152-001	M, A, EN, S	4
g. Perform Control Room Evacuation Immediate Actions; Mode Switch Fails to Insert Rods, RPS Pushbuttons Work K/A 212000 A4.01 (4.6/4.6), ON-100-109	M, A, EN, S	7
h. Vent the Drywell (RO Only) K/A 223001 A2.07 (4.2/4.3), OP-173-003	D, EN, S	5

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

System / JPM Title	Type Code*	Safety Function
i. Pull Scram Fuses; Vent Scram Air Header K/A 295037 EA1.01 (4.6/4.6), ES-158-001, EO-100-113	M, A, E, R	7
j. Start Containment Hydrogen Recombiner K/A 223001 A2.01 (4.3/4.4), OP-173-001	D, E, L	5
k. Lineup Fire Protection System to RHRSW to Inject Into the RPV K/A 295031 EA1.08 (3.8/3.9), ES-013-001	D, E, L, R	8

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Simulator Pairings:

A then B
D then H
F then E
C alone
G alone

Facility: Susquehanna	Date of Examination: May 2013
Exam Level: SROI	Operating Test No.: 2013

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. Synchronize Diesel Generator D; Voltage Regulator Failure K/A 264000 A4.04 (3.7/3.7), SO-024-001D	D, A, EN, S	6
b. Lineup RHRSW to the Spent Fuel Pool K/A 233000 A2.02 (3.1/3.3), ON-135-001	P, D, S 2011 NRC	9
c. Swap Core Spray Loops K/A 209001 A4.01 (3.8/3.6), OP-151-001	N, EN, L, S	2
d. Reset Recirc Runback; Pump Speed Oscillates K/A 202002 A4.07 (3.3/3.2), ON-164-002	M, A, S	1
e. Main Steam Line Isolation Recovery K/A 239001 A4.01 (4.2/4.0), ON-184-001	D, L, S	3
f. Start HPCI in Pressure Control Mode; Steam Leak Develops K/A 206000 A4.13 (4.1/4.0), OP-152-001	M, A, EN, S	4
g. Perform Control Room Evacuation Immediate Actions; Mode Switch Fails to Insert Rods, RPS Pushbuttons Work K/A 212000 A4.01 (4.6/4.6), ON-100-109	M, A, EN, S	7

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

System / JPM Title	Type Code*	Safety Function
i. Pull Scram Fuses; Vent Scram Air Header K/A 295037 EA1.01 (4.6/4.6), ES-158-001, EO-100-113	M, A, E, R	7
j. Start Containment Hydrogen Recombiner K/A 223001 A2.01 (4.3/4.4), OP-173-001	D, E, L	5
k. Lineup Fire Protection System to RHRSW to Inject Into the RPV K/A 295031 EA1.08 (3.8/3.9), ES-013-001	D, E, L, R	8

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

<u>Simulator Pairings:</u>
A then B
D then H
F then E
C alone
G alone

Facility: Susquehanna	Date of Examination: May 2013
Exam Level: SROU	Operating Test No.: 2013

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. Synchronize Diesel Generator D; Voltage Regulator Failure K/A 264000 A4.04 (3.7/3.7), SO-024-001D	D, A, EN, S	6
c. Swap Core Spray Loops K/A 209001 A4.01 (3.8/3.6), OP-151-001	N, EN, L, S	2
f. Start HPCI in Pressure Control Mode; Steam Leak Develops K/A 206000 A4.13 (4.1/4.0), OP-152-001	M, A, EN, S	4

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

System / JPM Title	Type Code*	Safety Function
i. Pull Scram Fuses; Vent Scram Air Header K/A 295037 EA1.01 (4.6/4.6), ES-158-001, EO-100-113	M, A, E, R	7
k. Lineup Fire Protection System to RHRSW to Inject Into the RPV K/A 295031 EA1.08 (3.8/3.9), ES-013-001	D, E, L, R	8

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U

(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Simulator Pairings:

A then B
D then H
F then E
C alone
G alone

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Perform The Monthly Diesel Generator Operability Test For "D" D/G IAW SO–024–001D

S/RO	24.SO.002.151	6	01/28/2013	Simulator
Appl To	JPM Number	Revision	Date	Setting

264000	A4.04	3.7/3.7	Y	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/28/2013	25
Author	Date	Validation Time (min)

Validated | Approval

	1/25/2013	R. Strope	2/26/13
Operations Instructor	Date	Nuclear Trng Supv	Date

Examinee Name: ____________________ ____________________

Last, First MI | Employee Number

Exam Date: ____________ Exam Duration (Min) ____________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ____________________ ____________________

Name | Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 24.SO.002.151

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. SO–024–001D (REV 12), MONTHLY DIESEL GENERATOR ‘D’ OPERABILITY TEST

B. AR–016–001 (C03) (REV 47), DG D PANEL 0C521D LO PRIORITY TROUBLE

C. LA–0521–004 (F06) (REV 16), GENERATOR FIELD GROUND

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

Both Units are operating in Mode 1.

SO–024–001D, Monthly Diesel Generator Operability Test for D/G D, is in progress.

The prerequisites for the surveillance have been completed.

An operator is stationed at the diesel generator with communications established with the Control Room.

Other operators will record START times per steps 5.1.8, 5.1.9, 5.1.10 and 5.1.11.

Prelube operation is complete per step 5.1.5.

V. INITIATING CUE

Complete SO–024–001D, Monthly Diesel Generator Operability Test for ‘D’ D/G, beginning at step 5.1.7, synchronizing to ESS Bus 2D.

VI. TASK STANDARD

Synchronize the Diesel Generator to the grid via ESS Bus 2D and shutdown D/G based on Generator terminal voltage decay.

VII. TASK SAFETY SIGNIFICANCE

Failure to synchronize the Diesel Generator to the grid would prevent the Technical Specification required Demonstration of Diesel Generator operability. Inability to identify the need to trip the Diesel Generator and then have it shutdown would result in equipment damage to a Safety related piece of equipment

Appl. To: S/RO JPM No.: 24.SO.002.151 Student Name:

Step	Action	Standard	Eval	Comments
EVALUATOR NOTE • This JPM must be performed in the simulator. • Reset the simulator to IC-381. • Ensure the simulator is setup in accordance with the attached Simulator Setup Instructions				
EVALUATOR NOTE The FAULTED step in this JPM is preceded by a fault statement in **BOLD TYPE WITH ALL CAPITAL LETTERS**.				
EVALUATOR CUE Provide the examinee a marked–up copy of SO–024–001D complete through step 5.1.6.				
BOOTH OPERATOR CUE Depress KEY 11 to reset DG D local alarms as desired.				
EVALUATOR CUE When student is ready to begin JPM, place the simulator in RUN.				
*1	**Starts** DG D.	Depresses HS–00051D, DG D START PB.		
2	**Verifies** DG D response to start.	Directs NPO to report status of DG D.		
EVALUATOR CUE DG D response was satisfactory per SO–024–001D Step 5.1.11. **BOOTH OPERATOR** Depress KEY 11 to clear local EDG alarms.				
3	**Records** DG starting air receiver pressures and **confirms** air start system operability.	Performs the following: • Directs NPO to report left bank and right bank starting air pressures from PI–02438D at OC521D • Records values in Step 5.1.14 • Verifies reported pressures are within 10 psig		
EVALUATOR CUE Left bank pressure 180 psig. Right bank pressure 180 psig.				

Appl. To: S/RO JPM No.: 24.SO.002.151 Student Name:

Step	Action	Standard	Eval	Comments
4	**Confirms** both start air compressors for DG D start.	Directs NPO to report DG D starting air compressor status.		
EVALUATOR CUE Both Number 1 and Number 2 starting air compressors started for DG D.				
EVALUATOR CUE Another operator has completed OP–024–005 Attachment A, DG Start Log.				
5	**Records** steady–state DG D frequency.	Performs the following: • Records on Attachment A indication on XI–00034D, DG D FREQ • Verifies DG D frequency ≥ 58.8 Hz and ≤ 61.2 Hz		
6	**Records** steady–state DG D voltage.	Performs the following: • Records on Attachment A indication on XI–00034D, DG D VOLTS • Verifies DG D voltage ≥ 3793 V and ≤ 4400 V		
EVALUATOR CUE Five minutes have elapsed.				
7	**Ensures** all synchroscope switches are off.	Observes all synchroscope keyswitches in OFF.		
*8	**Turns** ESS Bus 2D feeder from DG D synch switch ON.	Places DG D TO BUS 2D SYNC SEL to ON.		
9	**Checks** for excessive sparking of generator brushes.	Directs NPO to check for excessive sparking of generator brushes.		
EVALUATOR CUE No sparking of the generator brushes has been observed.				

Appl. To: S/RO JPM No.: 24.SO.002.151 Student Name:

Step	Action	Standard	Eval	Comments
10	**Adjusts** DG D voltage (incoming) to match offsite power voltage (running).	Places HS–00053D, DG D VOLTAGE ADJUST, to RAISE and LOWER as necessary to obtain INCOMING and RUNNING volts matched in green band of XI–00036, 4KV DIFF AC VOLTS.		
11	**Adjusts** DG D speed to match offsite power frequency.	Places HS–00054A, DG A SPEED GOVERNOR, to RAISE and LOWER as necessary to obtain XI–00037, SYNCHROSCOPE, rotating slowly in FAST (clockwise) direction, not exceeding 1 revolution per 60 seconds.		
EVALUATOR NOTE The following 2 steps must be performed in rapid succession to prevent DG reverse power trip.				
*#12	**Closes** ESS Bus 2D feeder from DG D when DG D in phase with offsite power.	Performs the following simultaneously: • Observes XI–00037, SYNCHROSCOPE, at or slightly before "12 O'CLOCK" position • Places DG D TO BUS 2D BKR 2A20404 to CLOSE		
*#13	**Raise** DG D load to 1000 KW over a 30–45 second period.	Places HS–00054D, DG D SPEED GOVERNOR, to RAISE (and LOWER as necessary) to obtain approximately 1000 KW as indicated on XI–00032D, DG D WATTS, over approximately 30-45 seconds.		
14	**Adjust** DG D voltage to maintain 0±900 KVAR.	Places HS–00053D, DG D VOLTAGE ADJUST, to RAISE and LOWER as necessary to obtain 0±900 KVAR indicated on PICSY.		
15	**Turns** ESS Bus 1D feeder from DG D synch switch OFF.	Places DG D TO BUS 1D SYNC SEL to OFF.		

Appl. To: S/RO   JPM No.: 24.SO.002.151   Student Name: ____

Step	Action	Standard	Eval	Comments
BOOTH OPERATOR CUE With evaluator concurrence, depress KEY 2 to initiate a failure of the DG D voltage regulator.				
FAULT STATEMENT THE DG VOLTAGE REGULATOR WILL MALFUNCTION DUE TO A GENERATOR FIELD GROUND CONDITION. DG INDICATED VOLTAGE WILL LOWER.				
16	**Observes** AR–016–001 (C03) in alarm.	Performs the following: • Directs NPO to report alarms at 0C521D • Observes XI–00035D, DG D VOLTS, lowering • Observes DG D TO BUS 1D BKR 1A20404 open		
EVALUATOR CUE F06, GENERATOR FIELD GROUND, is in alarm at 0C521D.				
BOOTH OPERATOR CUE To perform local trip of DG D depress KEY 3.				
*17	**Promptly shutdown** DG D.	Performs EITHER of the following: • Depresses HS–00052D, DG D STOP, PB OR • Directs NPO to place DG D control mode select switch to LOCAL and depress EMERGENCY STOP PB		
EVALUATOR CUE (If local DG trip is directed) DG D is tripped.				
EVALUATOR CUE That completes the JPM.				
EVALUATOR: Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?				

SIMULATOR SETUP INSTRUCTIONS
JOB PERFORMANCE MEASURE
S/RO 24.SO.002.151

Start ESW Pumps C and D

Perform the following expert commands to assign keys to the required malfunctions (may utilize n13jpmA.scn)

```
IMF annLA521DE01 f:ALARM_OFF

{Key[1]} SCN n13jpmA_A

{Key[2]} IOR doL56AD f:ON
{Key[2]} IOR doL56MD f:OFF
{Key[2]} IOR diHS00056D f:MANUAL
{Key[2]} IOR aoXI00035D r:2:00 f:2400
{Key[2]} IMF annLA521DF06 d:10 f:ALARM_ON
{Key[2]} IRF crfBR06_1A20404 d:5 f:TRIP
{Key[2]} IRF crfBR06_2A20404 d:5 f:TRIP
{Key[2]} IOR diHS00053D f:NEUTRAL

{Key[3]} IOR di43CMD_Q f:LOCAL
{Key[3]} IOR di5ESD_Q c:1 f:STOP
{Key[3]} DOR aoXI00035D

{Key[11]} SCN n13jpmA_B
```

n13jpmA_A.scn

```
IOR di5ESD_Q f:STOP
+1 MOR di5ESD_Q f:NORMAL
+1 DOR di5ESD_Q
+1 IOR di5ESRD_Q f:RESET
+1 MOR di5ESRD_Q f:NORMAL
+1 DOR di5ESRD_Q
+1 IOR di0C521DRST_Q f:NORMAL
+1 MOR di0C521DRST_Q f:RESET
+1 MOR di0C521DRST_Q f:NORMAL
+1 DOR di0C521DRST_Q
```

n13jpmA_B.scn

```
+1 IOR di0C521DACK_Q f:ACK
+1 MOR di0C521DACK_Q f:NORMAL
+1 DOR di0C521DACK_Q
```

TASK CONDITIONS

Both Units are operating in Mode 1.

SO–024–001D, Monthly Diesel Generator Operability Test for D/G D, is in progress.

The prerequisites for the surveillance have been completed

An operator is stationed at the diesel generator with communications established with the Control Room.

Other operators will record START times per steps 5.1.8, 5.1.9, 5.1.10 and 5.1.11.

Prelube operation is complete per step 5.1.5.

INITIATING CUE

Complete SO–024–001D, Monthly Diesel Generator Operability Test for ‘D’ D/G, beginning at step 5.1.7, synchronizing to ESS Bus 2D.

TASK CONDITIONS

Both Units are operating in Mode 1.

SO–024–001D, Monthly Diesel Generator Operability Test for D/G D, is in progress.

The prerequisites for the surveillance have been completed

An operator is stationed at the diesel generator with communications established with the Control Room.

Other operators will record START times per steps 5.1.8, 5.1.9, 5.1.10 and 5.1.11.

Prelube operation is complete per step 5.1.5.

INITIATING CUE

Complete SO–024–001D, Monthly Diesel Generator Operability Test for D/G D, beginning at step 5.1.7, synchronizing to ESS Bus 2D.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title: Add Water to Fuel Pool via RHRSW IAW ON-135-001

S/RO	35.ON.1662.101	1	01/28/2013	Simulator
Appl To	JPM Number	Revision	Date	Setting

233000	A2.02	3.1/3.3	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/28/2013	20
Author	Date	Validation Time (min)

Validated / Approval

	1/25/2013	L. Stroman	2/26/13
Operations Instructor	Date	Nuclear Trng Supv	Date

Examinee Name: ______________________ ______________________

Last, First MI — Employee Number

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator

______________________ ______________________

Name — Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 35.ON.1662.101

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. ON-135-001 (REV 34), LOSS OF FUEL POOL COOLING/COOLANT INVENTORY, REV 34

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. A Seismic event has occurred.

B. Unit 1 is in Mode 1.

C. Unit 1 Fuel Pool inventory is lowering due to a system breach.

D. Normal Fuel Pool makeup is unavailable.

E. A system walkdown was unable to locate the leak, however the rate of inventory loss is not severe.

F. The Unit 1 Fuel Pool Cooling System has been shutdown.

G. The Cask Storage Pit Gate is closed.

H. The Unit 1 Fuel Pool has been isolated from Non-Q piping by another operator.

I. Adding water to the fuel pool was attempted using ESW and Fire Protection, but was unsuccessful.

J. Current Unit 1 Pool level is 21' 11" down slow.

V. INITIATING CUE

Add water to the Unit 1 Fuel Pool via RHRSW through RHR Loop 'A' IAW ON-135-001 section 3.6.7.e.

VI. TASK STANDARD

Water is added to Fuel Pool using the RHRSW system.

VII. TASK SAFETY SIGNIFICANCE

Maintaining Fuel Pool inventory will prevent fuel element overheating and cladding damage.

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 35.ON.1662.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE • This JPM must be performed in the simulator. • Reset the simulator to IC–381. • Ensure the simulator is setup in accordance with the attached Simulator Setup Instructions. • Prior to performing this JPM, obtain a copy of the latest revision of ON-135-001 mark it up as if it were actually to be performed, up to step 3.6.7.e, and provide it to the student along with the Task Conditions/Initiating Cue Sheet.			
1.	Obtain a controlled copy of ON-135-001, Loss of Fuel Pool Cooling / Coolant Inventory.	Obtains Controlled copy from evaluator.		
2.	Review Sections 1.0 through 3.0.	Reviews Sections 1.0 through 3.0.		
	EVALUATOR CUE If asked about Step 3.2 or 3.3.2, inform Candidate that TS are being complied with.			

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 35.ON.1662.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
3.	Ensure the following valves CLOSED: • HV-151F023 RHR Reactor Head Spray Flow Control Vlv	Observes HV-151F023 amber light on, red light off.		
	• HV-151F015A RHR Loop A Injection OB Iso Vlv	Observes HV-151F015A amber light on, red light off.		
	• HV-151F010A RHR Loop A Cross Tie	Observes HV-151F010A amber light off, red light off (normally closed and de-energized).		
	• HV-151F010B RHR Loop B Cross Tie	Observes HV-151F010B amber light off, red light off (normally closed and de-energized).		
	• HV-11210A Unit 1 RHR SW Hx A Inlet	Observes HV-11210A amber light on, red light off.		
	• HV-21210A Unit 2 RHRSW Hx A Inlet	Contacts Unit 2 regarding position of HV-21210A.		
	EVALUATOR CUE If asked about the position of valves HV-151F010A/B, Role Play as Unit Supervisor and report that the valves were determined to be closed by the current surveillance. Role Play as Unit 2 PCOP and report valve HV-21210A is Closed.			

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 35.ON.1662.101 Student Name:

Step	Action	Standard	Eval	Comments
4.	Momentarily Place HS-E11-1S17A LOCA Isolation Manual Override Keylock Switch to override.	Rotates HS-E11-1S17A LOCA Isolation Manual Override Keylock Switch clockwise to OVRD.		
5.	Observe the following:			
	• LOCA Isolation Manual Override White Indicating Light ILLUMINATED.	Observes LOCA Isolation Manual Override White Indicating Light ILLUMINATED while HS-E11-1S17A is in OVRD, and then clears.		
	• LOCA Iso Switch Loop A Manual Override Annunciator ALARMED.	Observes annunciator does not alarm due to no LOCA signal present.		
	EVALUATOR CUE If asked about LOCA Isolation Manual Override not sealing in, Role Play as Unit Supervisor and ask if you would expect to have to override LOCA isolations based on initial conditions.			

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 35.ON.1662.101 Student Name:

Step	Action	Standard	Eval	Comments
*6.	Close the following valves:			
	• HV-151F048A-RHR Hx A Shell Side Bypass Vlv.*	Closes HV-151F048A by rotating control switch counterclockwise to CLOSE.*		
	• HV-151F017A-RHR Loop A Injection Flow Control Vlv.	Closes HV-151F017A by rotating control switch counterclockwise to CLOSE and holding until red light is off **(NOT CRITICAL)**.		
	• HV-151F003A-RHR Hx A Shell Side Outlet Vlv.*	Closes HV-151F003A by rotating control switch counterclockwise to CLOSE and holding until red light is off.*		
7.	Ensure the following valves CLOSED:			
	• HV-151F016A RHR Loop A Drwl Spray OB Iso Vlv.	Observes HV-151F016A amber light on, red light off.		
	• HV-151F028A RHR Loop A Supp Cbr Spray Test Shutoff Vlv.	Observes HV-151F028A amber light on, red light off.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 35.ON.1662.101 Student Name:

Step	Action	Standard	Eval	Comments
*8.	Open the following valves: • 151070 RHR to Refuel Pool Clg and Clnup Return (Rm I 202 'B' RHR Pipeway 28 683' Act 708')* • 153070A Fuel Pool Fill Vlv from RHR (Rm I 514 Fuel Pool Pump and Hx Room 29 749' Act 753') • 153070B Fuel Pool Fill Vlv from RHR (Rm I 514 Fuel Pool Pump and Hx Room 29 749' Act 753.5') **EVALUATOR NOTE** Only opening 151070 is critical in this step. **BOOTH OPERATOR CUE** Press **{Key[22]}** to open manual valve 151070. (Found on **P&ID RH1**) Valves 153070A/B are already open. (Found on **P&ID FP1**) **BOOTH OPERATOR CUE** Role Play as In-Plant Operator and report the valves are Open.	Dispatches NPO to open 151070*, 153070A, and 153070B.		
9.	IF necessary, Momentarily Place HS-11202A3 RHRSW Pump A Loca Trip to RESET.	Determines NOT necessary to place HS-11202A3 to RESET.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 35.ON.1662.101 Student Name:

Step	Action	Standard	Eval	Comments
*10.	Start 1(2)P506A RHRSW Pump A.	Starts1P506A by rotating control switch clockwise to START.		
*11.	Open HV112F073A RHRSW Crosstie.	Opens HV-112-F073A by rotating control switch clockwise to OPEN.		
*12.	Open HV112F075A RHRSW Crosstie.	Opens HV-112-F075A by rotating control switch clockwise to OPEN.		
13.	Ensure HV-112F074A RHRSW/RHR LOOP A CROSSTIE DRAIN VLV CLOSES. (Rm I 104 29 645' Act 671') **EVALUATOR CUE** As In-Plant operator, when asked about valve HV-112F074A, report valve is closed. **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	Dispatches NPO to determine HV-112-F074A position.		

* = Critical Step
\# = Critical Sequence

SIMULATOR SETUP INSTRUCTIONS
JOB PERFORMANCE MEASURE
S/RO 35.ON.1662.101

- Insert the following malfunctions:
  IMF annAR016G06 f:ALARM_ON
  IMF annAR016H14 f:ALARM_ON
  IMF annAR016H16 f:ALARM_ON
  IMF annAR106A17 f:ALARM_ON
- Insert the following remote function:
  IRF rfFP135007 f:RHR_BACKUP
- Insert the following over-ride:
  IOR aoLRTR15347A f:815.92
- This JPM uses the following Event Trigger:
  aet n13jpmBet1
  Which consists of conditions:
  diHS11275A.CurrValue = #OR.diHS11275A.OPEN
  And linked commands:
  MOR aoLRTR15347A i:AsIs f:816 r:3:00
- Assign the following Keys:
  {Key[21]} MOR aoLRTR15347A r:30:00 i:AsIs f:815.75
  {Key[22]} IRF rfRH149026 f:100
- Place the simulator in Freeze.
- Consider snapping an IC for multiple performances of this JPM.
- When student is ready to begin **JPM**, place the simulator in **RUN**.
- Press **{Key[21]}** to begin lowering the level in the fuel pool.

TASK CONDITIONS

A. A Seismic event has occurred.

B. Unit 1 is in Mode 1.

C. Unit 1 Fuel Pool inventory is lowering due to a system breach.

D. Normal Fuel Pool makeup is unavailable.

E. A system walkdown was unable to locate the leak, however the rate of inventory loss is not severe.

F. The Unit 1 Fuel Pool Cooling System has been shutdown.

G. The Cask Storage Pit Gate is closed.

H. The Unit 1 Fuel Pool has been isolated from Non-Q piping by another operator.

I. Adding water to the fuel pool was attempted using ESW and Fire Protection, but was unsuccessful.

J. Current Unit 1 Pool level is 21' 11" down slow.

INITIATING CUE

Add water to the Unit 1 Fuel Pool via RHRSW through RHR Loop 'A' IAW ON-135-001 section 3.6.7.e.

TASK CONDITIONS

A. A Seismic event has occurred.

B. Unit 1 is in Mode 1.

C. Unit 1 Fuel Pool inventory is lowering due to a system breach.

D. Normal Fuel Pool makeup is unavailable.

E. A system walkdown was unable to locate the leak, however the rate of inventory loss is not severe.

F. The Unit 1 Fuel Pool Cooling System has been shutdown.

G. The Cask Storage Pit Gate is closed.

H. The Unit 1 Fuel Pool has been isolated from Non-Q piping by another operator.

I. Adding water to the fuel pool was attempted using ESW and Fire Protection, but was unsuccessful.

J. Current Unit 1 Pool level is 21' 11" down slow.

INITIATING CUE

Add water to the Unit 1 Fuel Pool via RHRSW through RHR Loop 'A' IAW ON-135-001 section 3.6.7.e.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Swap Core Spray Loops

S/RO	51.OP.1934.101	0	01/28/2013	Simulator
Appl To	JPM Number	Revision	Date	Setting

209000	A4.01	3.8/3.6	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/28/2013	15
Author	Date	Validation Time (min)

Validated | Approval

	1/25/2013		2/26/13
Operations Instructor	Date	Nuclear Trng Supv R. Scozzafava	Date

Examinee Name: ______________________ ______________________
Last, First MI | Employee Number

Exam Date: ____________ Exam Duration (Min) ____________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________
Name | Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 51.OP.1934.101

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. OP-151-001, CORE SPRAY SYSTEM, REV 34

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. A loss of coolant accident occurred 24 hours ago.

B. EO-000-112, Rapid Depressurization, has been performed.

C. Reactor water level is being controlled +13" to +54" using Core Spray loop A.

D. Core Spray loop B has previously been shutdown per OP-151-001 section 2.7.3.

E. No other high capacity injection systems are available.

F. It is desired to swap from Core Spray loop A to loop B.

V. INITIATING CUE

Start Core Spray loop B per OP-151-001 section 2.7.5.b. Secure Core Spray loop A per OP-151-001 section 2.7.3.b. Control Reactor water level +13" to +54".

VI. TASK STANDARD

Core Spray loop B injecting to the Reactor. Core Spray loop A secured. Reactor water level controlled above -161".

VII. TASK SAFETY SIGNIFICANCE

Maintaining Reactor water inventory will prevent fuel element overheating and cladding damage.

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 51.OP.1934.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE • This JPM must be performed in the simulator. • Reset the simulator to IC–382. • Ensure the simulator is setup in accordance with the attached Simulator Setup Instructions. • Prior to performing this JPM, obtain a copy of the latest revision of OP-151-001. Mark up step 2.7.3.a and provide it to the student along with the Task Conditions/Initiating Cue Sheet.			
1.	Obtain a controlled copy of OP-151-001, Core Spray System.	Obtains Controlled copy from evaluator.		
2.	Review Section 2.7.	Reviews Section 2.7.		
	EVALUATOR CUE If asked about how many pumps to start in Core Spray Loop B, direct the candidate to start both pumps.			
3.	Close CORE SPRAY LOOP B IB INJ SHUTOFF HV 152F005B.	Observes CORE SPRAY LOOP B IB INJ SHUTOFF HV 152F005B closed by amber light on, red light off.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 51.OP.1934.101 Student Name:

Step	Action	Standard	Eval	Comments
*4.	Start Core Spray Pump 1P206B and/or D.	Starts Core Spray Pump 1P206B by rotating control switch clockwise to START. and/or Starts Core Spray Pump 1P206D by rotating control switch clockwise to START.		
*5.	Throttle Open CORE SPRAY LOOP B IB INJ SHUTOFF HV-152F005B to establish loop flow ≤ 90 amps and ≤ 3950 gpm for single pump operation OR ≤ 90 amps and ≤ 7900 gpm for two pump operation. **EVALUATOR NOTE** Throttling of injection valve may not be done until after the other loop of Core Spray is being taken out of service.	Throttles open HV-152-F005B by rotating control switch clockwise to OPEN.		
6.	WHEN flow to reactor vessel ≥ 635 gpm, Ensure CORE SPRAY LOOP B MIN FLOW HV-152F031B CLOSES.	If Core Spray loop flow rises to 635 gpm, observes HV-152F031B amber light on, red light off.		
7.	Check Core Spray Room Unit Coolers 1V211B and/or D AUTO STARTS indicated on Heating and Ventilation Panel 1C681.	Observes 1V211B and/or D red light on, amber light off.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 51.OP.1934.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
8.	May throttle CORE SPRAY LOOP A INJ SHUTOFF HV-152F005A.	Closes / throttles closed HV-152-F005A by rotating control switch counterclockwise to CLOSE.		
*9.	Place Core Spray pump A and C control switches to STOP and Release.	Stops Core Spray pump A by rotating control switch counterclockwise to STOP. Stops Core Spray pump C by rotating control switch counterclockwise to STOP.		
10.	Observe white pump override lights ILLUMINATED.	Observes Core Spray pump A white light on. Observes Core Spray pump C white light on.		
11.	Observe no Core Spray pump running (in loop).	Observes Core Spray pump A amber light on, red light off. Observes Core Spray pump C amber light on, red light off.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 51.OP.1934.101 Student Name:

Step	Action	Standard	Eval	Comments
*12.	Throttle CORE SPRAY LOOP B IB INJ SHUTOFF HV-152F005B to control Reactor water level above -161". **EVALUATOR ROLE PLAY** If Reactor water level drops below +13" and candidate requests new/wider Reactor water level band, direct Reactor water level controlled -129" to +54". **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	Throttles HV-152-F005B by rotating control switch as necessary to maintain Reactor water level above -161".		

* = Critical Step
\# = Critical Sequence

SIMULATOR SETUP INSTRUCTIONS
JOB PERFORMANCE MEASURE
S/RO 51.OP.1934.101

- Insert the following malfunctions to initiate a LOCA and fail all high-capacity injection sources other than Core Spray:

  IMF mfRR164011A f:2
  IMF mfRH149007A
  IMF mfRH149007C
  IMF mfRH149007B
  IMF mfRH149007D
  IMF mfRC150007
  IMF mfHP152011
  IMF mfFW144003D
  IMF mfFW144003C
  IMF mfFW144003B
  IMF mfFW144003A

- Place the Mode Switch in SHUTDOWN.
- Place all ADS valve control switches to OPEN.
- Place the simulator in RUN.
- Secure Core Spray loop B per OP-151-001 section 2.7.3.b (shutdown both pumps and close inboard injection valve).
- Throttle Core Spray loop A inboard injection valve as necessary to maintain Reactor water level +13" to +54".
- Allow plant conditions to stabilize.
- Place the simulator in Freeze.
- Consider snapping an IC for multiple performances of this JPM.
- When student is ready to begin **JPM**, place the simulator in **RUN**.

TASK CONDITIONS

A. A loss of coolant accident occurred 24 hours ago.

B. EO-000-112, Rapid Depressurization, has been performed.

C. Reactor water level is being controlled +13" to +54" using Core Spray loop A.

D. Core Spray loop B has previously been shutdown per OP-151-001 section 2.7.3.

E. No other high capacity injection systems are available.

F. It is desired to swap from Core Spray loop A to loop B.

INITIATING CUE

Start Core Spray loop B per OP-151-001 section 2.7.5.b. Secure Core Spray loop A per OP-151-001 section 2.7.3.b. Control Reactor water level +13" to +54".

TASK CONDITIONS

A. A loss of coolant accident occurred 24 hours ago.

B. EO-000-112, Rapid Depressurization, has been performed.

C. Reactor water level is being controlled +13" to +54" using Core Spray loop A.

D. Core Spray loop B has previously been shutdown per OP-151-001 section 2.7.3.

E. No other high capacity injection systems are available.

F. It is desired to swap from Core Spray loop A to loop B.

INITIATING CUE

Start Core Spray loop B per OP-151-001 section 2.7.5.b. Secure Core Spray loop A per OP-151-001 section 2.7.3.b. Control Reactor water level +13" to +54".

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Reset Recirculation Pump Runback, Pump Speed Oscillates

S/RO	64.OP.004.155	0	12/5/2012	Simulator
Appl To	JPM Number	Revision	Date	Setting

202002	A4.07	3.3/3.2	Y	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	12/5/2012	20
Author	Date	Validation Time (min)

Validated   Approval

[signature]	1/25/2013	[signature]	2/26/13
Operations Instructor	Date	Nuclear Trng Supv R. Strong	Date

Examinee Name: ______________________ ______________

Last, First MI   Employee Number

Exam Date: ____________   Exam Duration (Min) ____________

Evaluation Result: ☐ Satisfactory   ☐ Unsatisfactory

Evaluator ______________________ ______________________

Name   Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 64.OP.004.155

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. ON-164-002, LOSS OF REACTOR RECIRCULATION FLOW, REV 36

III. OPERATIONAL ACTIVITIES

036 Reset Recirc Pump Runback

IV. TASK CONDITIONS

A. The plant is in Mode 1.

B. A trip of Circulating Water pump 1D has caused a Reactor Recirculation runback to occur.

C. ON-164-002, Loss of Reactor Recirculation Flow, has been executed up to step 4.4.14.

V. INITIATING CUE

Reset the Recirculation pump A runback in accordance with ON-164-002, starting at step 4.4.14.

VI. TASK STANDARD

Recirc pump limiter #2 reset for Recirculation pumps A. Scoop tube locked for Recirculation pump A.

VII. TASK SAFETY SIGNIFICANCE

Inability to reset limiter would prevent control of Recirculation pump speed.

Failure to recognize a speed control malfunction for a Recirculation pump would allow a power excursion.

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 64.OP.004.155 Student Name: ____________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE • This JPM must be performed in the simulator. • Reset the simulator to IC–383. • Setup the simulator in accordance with the attached Simulator Setup Instructions. • Prior to performing this JPM, obtain a copy of the latest revision of ON-164-002. Markup the procedure to step 4.4.14.			
1.	Obtain a controlled copy of ON-164-002, Loss of Reactor Recirculation Flow.	Obtains Controlled copy from evaluator.		
2.	Determine signal that initiated runback from following: • For a Limiter #2, Touch the LIM 2 STATUS button on the bottom of the screen.	Touches the LIM 2 STATUS button on the HMI screen.		
3.	On the corresponding overlay screen, the condition which caused the Limiter #2 Initiation will have a red background (assuming the associated input is Enabled) • Any Circulating Water Pump protective trip.	Observes red background for CWP TRIPS.		

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 64.OP.004.155 Student Name: ______________________

Step	Action	Standard	Eval	Comments
4.	As required, Touch the DEFAULT TO MANUAL MODE button for the applicable Rx Recirc Pump A(B) controller(s).	Determines step not required.		
5.	Ensure the MANUAL MODE SELECTED button is backlit yellow on the Rx Recirc Pump A(B) Manual Mode HMI screen. **EVALUATOR ROLE PLAY** If asked about Recirc pump critical speeds, report that another operator is monitoring Recirc pump speed for critical speeds.	Observes the MANUAL MODE SELECTED button is backlit yellow on the Rx Recirc Pump A(B) Manual Mode HMI screen.		
6.	IF resetting a Limiter #1 Runback on the 'A' RRP, Ensure positive control of Recirc Pump by performing the following on RRP_A HMI screen:	Determines step not applicable.		
7.	IF resetting a #1 Limiter on the 'B' RRP, Ensure positive control of Recirc Pump by performing the following on RRP_B HMI screen.	Determines step not applicable.		
8.	For Limiter #2 runback Perform following for one or both pumps as required: • Perform a Critical Brief. **EVALUATOR CUE** Inform the candidate that a Critical Brief has been completed for the upcoming evolution.	Informs evaluator of need for Critical Brief.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 64.OP.004.155 Student Name:

Step	Action	Standard	Eval	Comments
9.	For Reactor Feed Pump(s) NOT feeding the vessel, Perform the following:	Determines all three Reactor Feed pumps are feeding the vessel and the step is not applicable.		
10.	For Reactor Feed Pump(s) feeding the vessel, with < 16.4% (~ 0.9 Mlbm/hr) flow, Perform the following:	Determines all three Reactor Feed pump flows are > 16.4% and the step is not applicable.		
11.	For Reactor Feed Pump(s) feeding the vessel with > 16.4% (~ 0.9 Mlbm/hr) flow, Perform the following: On the RRP_A(B) HMI screen, Ensure RFP A(B)(C) IND FLOW < 16.4% Input to RX RECIRC RUNBK CKT are ENABLED, by observing the appropriate RFP status block is not backlit orange. IF required, ENABLE RFP A(B)(C) IND FLOW < 16.4% Input to RX RECIRC RUNBK CKT in accordance with OP-164-001.	Observes all three RFP status blocks not backlit orange on RRP_A(B) HMI screen(s).		
12.	IF resetting a # 2 Limiter on 'A' RRP, Ensure positive control of the Recirc pump by performing the following on the RRP_A HMI screen: Verify the SY-B31-1R621A % Controller Output signal has tracked Limiter Signal and is ~ 27.10%.	Observes SY-B31-1R621A indicates ~27.10%.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 64.OP.004.155 Student Name:

Step	Action	Standard	Eval	Comments
*13.	Touch a REACTOR RECIRC PUMP A SPEED SY-B31-1R621A Controller DEC button as necessary to lower speed AND	Touches a REACTOR RECIRC PUMP A SPEED SY-B31-1R621A Controller DEC button.		
14.	Observe a change in ALL of the following:			
	Decrease in GEN 1A Speed on SI-14032A or TRA036 AND	Observes GEN 1A Speed on SI-14032A or TRA036 lowers.		
	Decrease in Gen 1A Demand on XI-14032A, AND	Observes Gen 1A Demand on XI-14032A lowers.		
	Decrease in Scoop Tube 1A Position, TRA044, AND	Observes Scoop Tube 1A Position lowers.		
	Decrease in Loop 1A Drive Flow NRF01	Observes Loop 1A Drive Flow lowers.		
15.	Observe the HS-B31-1S12A Rx RECIRC LIMITER #2 (48%) RUNBACK RESET button is active (blue background).	Observes the HS-B31-1S12A Rx RECIRC LIMITER #2 (48%) RUNBACK RESET button is active (blue background).		
16.	Wait for at least one minute, for the Scoop Tube Positioner to make its final (0.111%) position adjustment, prior to continuing. **EVALUATOR CUE** One minute has passed.	Waits before proceeding to next step.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 64.OP.004.155 Student Name:

Step	Action	Standard	Eval	Comments
*17.	Touch HS-B31-1S12A Rx RECIRC LIMITER #2 (48%) RUNBACK RESET button.	Touches HS-B31-1S12A Rx RECIRC LIMITER #2 (48%) RUNBACK RESET button.		
*18.	Touch the RESET LIMITER # 2 button on the confirmation overlay screen, AND	Touches the RESET LIMITER # 2 button on the confirmation overlay screen.		
FAULT STATEMENT Recirculation pump A speed will begin to oscillate when the candidate resets Limiter #2. This will require the candidate to lock the scoop tube.				
19.	Monitor GEN 1A SPEED SI-14032A on RRP_A HMI screen.	Observes GEN 1A SPEED SI-14032A on RRP_A HMI screen rises and then oscillates.		

* = Critical Step
# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 64.OP.004.155 Student Name: ______

Step	Action	Standard	Eval	Comments
*20.	IF speed increases rapidly, Trip Scoop Tube on affected generator by Depressing SCOOP TUBE A LOCK OR RESET HS-B31-1S03A TRIP pushbutton or Trip the affected pump. **EVALUATOR NOTE** Recirculation pump A speed will initially rise, and then oscillate. If the initial rise does not trigger the candidate to lock the scoop tube at this step, alternate guidance to lock the scoop tube can be found in ON-156-001, Unanticipated Reactivity Change, Immediate Action 3.2. The immediate action also allows tripping the Recirculation pump. **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	Locks RRP A scoop tube by depressing SCOOP TUBE A LOCK OR RESET HS-B31-1S03A TRIP Or Trips Recirculation pump A by depressing MG SET A DRV MTR BRK HS-14001A STOP pushbutton.		

* = Critical Step
# = Critical Sequence

SIMULATOR SETUP INSTRUCTIONS
JOB PERFORMANCE MEASURE
S/RO 64.OP.004.155

- Ensure the following are loaded to trip Circulating Water pump D, initiate a Lim #2 runback, and oscillate Recirculation pump A speed (n13jpmD.scn may be used to accomplish this):
  IMF cmfPM03_1P501D
  aet n13jpmDet1

- Ensure n13jpmDet1.et is available with the following condition:
  ;Recirc A oscillation after resetting LIM 2 runback
  fx1A_LIMITERS_B420.BI03=1

- Ensure n13jpmDet1.scn is available with the following commands:
  SCN n13jpmD_1

- Ensure n13jpmD_1.scn is available with the following commands:
  +3 set fx1RRPA_1RRPASTD.OUT=27.7
  +3 set fx1RRPA_1RRPASTD.OUT=28.7
  +3 set fx1RRPA_1RRPASTD.OUT=29.4
  +3 set fx1RRPA_1RRPASTD.OUT=29.9
  +3 set fx1RRPA_1RRPASTD.OUT=30.2
  +3 set fx1RRPA_1RRPASTD.OUT=29.9
  +3 set fx1RRPA_1RRPASTD.OUT=29.4
  +3 set fx1RRPA_1RRPASTD.OUT=28.7
  +3 set fx1RRPA_1RRPASTD.OUT=27.7
  +3 set fx1RRPA_1RRPASTD.OUT=26.7
  +3 set fx1RRPA_1RRPASTD.OUT=26.0
  +3 set fx1RRPA_1RRPASTD.OUT=25.5
  +3 set fx1RRPA_1RRPASTD.OUT=25.2
  +3 set fx1RRPA_1RRPASTD.OUT=25.5
  +3 set fx1RRPA_1RRPASTD.OUT=26.0
  SCN n13jpmD_2

- Ensure n13jpmD_2.scn is available with the following commands:
  ABORT n13jpmD_1
  SCN n13jpmD_1

- Place the simulator in RUN.
- Allow plant conditions to stabilize.
- Perform actions of ON-164-002 through step 4.4.13.
- Load monitored parameter rrn1p401a.
- Place the simulator in Freeze.
- Consider snapping an IC for multiple performances of this JPM.
- When student is ready to begin **JPM**, place the simulator in **RUN**.

TASK CONDITIONS

A. The plant is in Mode 1.

B. A trip of Circulating Water pump 1D has caused a Reactor Recirculation runback to occur.

C. ON-164-002, Loss of Reactor Recirculation Flow, has been executed up to step 4.4.14.

INITIATING CUE

Reset the Recirculation pump A runback in accordance with ON-164-002, starting at step 4.4.14.

TASK CONDITIONS

A. The plant is in Mode 1.

B. A trip of Circulating Water pump 1D has caused a Reactor Recirculation runback to occur.

C. ON-164-002, Loss of Reactor Recirculation Flow, has been executed up to step 4.4.14.

INITIATING CUE

Reset the Recirculation pump A runback in accordance with ON-164-002, starting at step 4.4.14.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Main Steam Line Isolation and Quick Recovery in accordance with ON-184-001

S/RO	84.ON.003.101	4	01/28/2013	Simulator
Appl To	JPM Number	Revision	Date	Setting

239001	A4.01	4.2/4.0	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/28/2013	30
Author	Date	Validation Time (min)

Validated

[signature]	1/25/2013
Operations Instructor	Date

Approval

[signature] R. Strasser	2/26/13
Nuclear Trng Supv	Date

Examinee Name: ______________________ ______________

Last, First MI Employee Number

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________

Name Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 84.ON.003.101

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. ON-184-001, MAIN STEAM LINE ISOLATION AND QUICK RECOVERY, REV 16

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. An MSIV isolation and Reactor scram occurred from 100% reactor power.
B. The cause of the MSIV isolation was a faulty isolation logic surveillance test procedure.
C. RCIC injection is controlling Reactor water level.
D. Reactor pressure is controlled by manual SRV actuation.
E. Restoration of normal steam loads and turbine bypass system is required for a reactor cooldown.

V. INITIATING CUE

Perform a quick recovery from a Main Steam Line Isolation and reopen the MSIVs per ON-184-001.

VI. TASK STANDARD

MSIVs open.

VII. TASK SAFETY SIGNIFICANCE

Inability to reopen the MSIVs would eliminate a heat sink requiring additional unnecessary energy to be added to the Primary Containment.

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 84.ON.003.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE • This JPM must be performed in the simulator. • Reset the simulator to IC–384. • Setup the simulator in accordance with the attached Simulator Setup Instructions. • Prior to performing this JPM, obtain a copy of the latest revision of ON-184-001 and provide to candidate.			
1.	Obtain a controlled copy of ON-184-001, Main Steam Line Isolation and Quick Recovery.	Obtains Controlled copy from evaluator.		
*2.	Place control switches for following to CLOSE: • Mn Stm Line A IB Iso HV-141-F022A • Mn Stm Line B IB Iso HV-141-F022B • Mn Stm Line C IB Iso HV-141-F022C • Mn Stm Line D IB Iso HV-141-F022D • Mn Stm Line A OB Iso HV-141-F028A • Mn Stm Line B OB Iso HV-141-F028B • Mn Stm Line C OB Iso HV-141-F028C • Mn Stm Line D OB Iso HV-141-F028D	Rotates the following control switches counterclockwise to CLOSE (Panel 1C601): • Mn Stm Line A IB Iso HV-141-F022A • Mn Stm Line B IB Iso HV-141-F022B • Mn Stm Line C IB Iso HV-141-F022C • Mn Stm Line D IB Iso HV-141-F022D • Mn Stm Line A OB Iso HV-141-F028A • Mn Stm Line B OB Iso HV-141-F028B • Mn Stm Line C OB Iso HV-141-F028C • Mn Stm Line D OB Iso HV-141-F028D		
3.	Ensure Mn Stm Line IB Drain HV-141-F016 CLOSED.	Observes HV-141-F016 amber light on, red light off (Panel 1C601).		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 84.ON.003.101 Student Name:

Step	Action	Standard	Eval	Comments
4.	Ensure Mn Stm Line OB Drain HV-141-F019 CLOSED.	Observes HV-141-F019 amber light on, red light off (Panel 1C601).		
5.	Ensure Mn Stm Line Drain to Cdsr HV-141-F021 CLOSED.	Observes HV-141-F021 amber light on, red light off (Panel 1C601).		
6.	Ensure following TRIPPED: • Main Turbine • Reactor Feed Pump Turbine A • Reactor Feed Pump Turbine B • Reactor Feed Pump Turbine C	Observes Main Turbine stop valves indicate closed and/or trip annunciator (Panel 1C651). Observes Reactor Feed pumps A, B, and C tripped on HMI screen and/or trip annunciators AR-101-001 (A10, A12, A14) (Panel 1C651).		
7.	IF isolation due to EHC System malfunction:	Determines step not applicable.		
8.	Close following by Depressing Drip Leg Drn HS-10112 AUTO pushbutton: • Drip Leg Drn HV-10112A1. • Drip Leg Drn HV-10112B1. • Drip Leg Drn HV-10112C1. • Drip Leg Drn HV-10112D1.	Observes the following valves closed by amber light on, red light off (Panel 1C668): • Drip Leg Drn HV-10112A1. • Drip Leg Drn HV-10112B1. • Drip Leg Drn HV-10112C1. • Drip Leg Drn HV-10112D1.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 84.ON.003.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
9.	Close BPV Hdr Drip Leg Drn Byps HV-10108A by Depressing HS-10108A AUTO pushbutton. **EVALUATOR NOTE** The candidate may depress the CLOSE pushbutton due to the wording of the procedure step, even though the valve is already closed.	Observes closed HV-10108A by amber light on, red light off (Panel 1C668).		
10.	Close MSV Bst Drn HV-10101 A,B,C,D by Depressing common CLOSE pushbutton. **EVALUATOR NOTE** The candidate may depress the CLOSE pushbutton due to the wording of the procedure step, even though the valve is already closed.	Observes HV-10101 A,B,C,D closed by amber light on, red light off (Panel 1C668).		
11.	Close SSE Mn Stm Sup CV HV-10703.	Closes HV-10703 by depressing CLOSE pushbutton (Panel 1C668).		
12.	Ensure SSE Mn Stm Sup Ln Drn HV-10767 CLOSED.	Observes HV-10767 amber light on, red light off (Panel 1C668).		
13.	Ensure SSE Mn Stm Sup Ln Drn HV-10768 CLOSED.	Observes HV-10768 amber light on, red light off (Panel 1C668).		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 84.ON.003.101 Student Name: ______

Step	Action	Standard	Eval	Comments
*14.	Close SSE Press Ctlr Iso HV-10704, AND	Closes HV-10704 by depressing CLOSE pushbutton (Panel 1C668).		
15.	Throttle OPEN SSE Press Ctlr Byps HV-10705 to establish 0.25 to 0.50 psig on SSE Pressure PI-10723. **EVALUATOR NOTE** Pressure will not rise in this step because the Main Steam Line is depressurized. If the candidate anticipates this response, they may N/A this step. **EVALUATOR CUE** If asked how to proceed based on pressure not rising, direct candidate to respond in accordance with the procedure.	Throttles open HV-10705 by depressing OPEN pushbutton (Panel 1C668). Observes PI-10723 does NOT rise (Panel 1C668).		
16.	IF pressure was not established in the preceding step, Close HV-10705 SSE Press Ctlr Byps vlv.	Closes HV-10705 by depressing CLOSE pushbutton (Panel 1C668).		
*17.	Close Mn Stm SJAE Iso HV-10107.	Closes HV-10107 by depressing CLOSE pushbutton (Panel 1C668).		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 84.ON.003.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
*18.	WHEN directed by Shift Supervision AND initiating event is determined and cleared, Reset NSSSS Main Steam Line Isolation by Depressing: • Mn Stm Line Div 1 Iso Reset HS-B21-1S32 Reset pushbutton. • Mn Stm Line Div 2 Iso Reset HS-B21-1S33 Reset pushbutton. **EVALUATOR CUE** If asked, direct candidate to continue with procedure.	Depresses HS-B21-1S32 Reset pushbutton (Panel 1C601). Depresses HS-B21-1S33 Reset pushbutton (Panel 1C601).		
*19.	To Open IB MSIVs Place following control switches to AUTO: • Mn Stm Line A IB Iso HV-141-F022A. • Mn Stm Line B IB Iso HV-141-F022B. • Mn Stm Line C IB Iso HV-141-F022C. • Mn Stm Line D IB Iso HV-141-F022D.	Opens inboard MSIVs by rotating the following control switches clockwise to AUTO (Panel 1C601): • Mn Stm Line A IB Iso HV-141-F022A. • Mn Stm Line B IB Iso HV-141-F022B. • Mn Stm Line C IB Iso HV-141-F022C. • Mn Stm Line D IB Iso HV-141-F022D.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 84.ON.003.101 Student Name: ______

Step	Action	Standard	Eval	Comments
20.	Align for steam line pressurization as follows: Enter TRO 3.8.2.1 **EVALUATOR ROLE PLAY** Acknowledge report and inform candidate that you have entered TRO 3.8.2.1.	Informs evaluator to enter TRO 3.8.2.1.		
21.	Place AC MOV OL Byps HS-B21-1S37A to TEST.	Rotates HS-B21-1S37A clockwise to TEST (Panel 1C601).		
22.	Place DC MOV OL Byps HS-B21-1S37B to TEST.	Rotates HS-B21-1S37B clockwise to TEST (Panel 1C601).		
*23.	Open Mn Stm Line IB Drain HV-141-F016.	Opens HV-141-F016 by rotating control switch clockwise to OPEN (Panel 1C601).		
*24.	Open Mn Stm Line OB Drain HV-141-F019.	Opens HV-141-F019 by rotating control switch clockwise to OPEN (Panel 1C601).		
25.	Ensure Mn Steam Line Warm Up HV-141-F020 OPEN.	Observes HV-141-F020 red light on, amber light off (Panel 1C601).		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 84.ON.003.101 Student Name:

Step	Action	Standard	Eval	Comments
26.	AFTER 2 minutes: **EVALUATOR CUE** 2 minutes have passed.	Waits before proceeding to next step.		
27.	Place AC MOV OL Byps HS-B21-1S37A to NORM.	Rotates HS-B21-1S37A counterclockwise to NORM (Panel 1C601).		
28.	Place DC MOV OL Byps HS-B21-1S37B to NORM.	Rotates HS-B21-1S37B counterclockwise to NORM (Panel 1C601).		
29.	Exit TRO 3.8.2.1 **EVALUATOR ROLE PLAY** Acknowledge report and inform candidate that you have exited TRO 3.8.2.1.	Informs evaluator to exit TRO 3.8.2.1.		
30.	Observe main steam line pressure RISING on Main Turbine Generator Recorder XR-19201.	Observes main steam line pressure RISING on Main Turbine Generator Recorder XR-19201 (Panel 1C668).		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 84.ON.003.101 Student Name:

Step	Action	Standard	Eval	Comments
31.	WHEN differential pressure across MSIVs is between 50 psid and 200 psid, **EVALUATOR CUE** Once candidate displays ability to determine differential pressure across MSIVs and D/P is less than 400 psig, inform the candidate that the dP requirements have been met and the MSIVs may be opened.	Compares difference between main steam line pressure and Reactor pressure.		
*32.	Open OB MSIVs by Placing following control switches to AUTO: • Mn Stm Line A OB Iso HV-141-F028A • Mn Stm Line B OB Iso HV-141-F028B • Mn Stm Line C OB Iso HV-141-F028C • Mn Stm Line D OB Iso HV-141-F028D **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	Opens outboard MSIVs by rotating the following control switches clockwise to AUTO (Panel 1C601). • Mn Stm Line A OB Iso HV-141-F028A • Mn Stm Line B OB Iso HV-141-F028B • Mn Stm Line C OB Iso HV-141-F028C • Mn Stm Line D OB Iso HV-141-F028D		

* = Critical Step
\# = Critical Sequence

SIMULATOR SETUP INSTRUCTIONS
JOB PERFORMANCE MEASURE
S/RO 84.ON.003.101

- From a power operating IC, insert the following to cause a spurious MSIV isolation on high steam line flow (n13jpmE.scn may be used to accomplish this):

  IMF cmfRL01_B211K3A
  IMF cmfRL01_B211K3D

- Place the Mode Switch in SHUTDOWN.
- Place the simulator in RUN.
- Take action to stabilize Reactor water level and pressure. Establish level control with RCIC and pressure control with SRVs.
- Allow plant conditions to stabilize.
- Delete the malfunctions listed above to allow re-opening MSIVs.
- Place the simulator in Freeze.
- Consider snapping an IC for multiple performances of this JPM.
- When student is ready to begin **JPM**, place the simulator in **RUN**.

TASK CONDITIONS

A. An MSIV isolation and Reactor scram occurred from 100% reactor power.
B. The cause of the MSIV isolation was a faulty isolation logic surveillance test procedure.
C. RCIC injection is controlling Reactor water level.
D. Reactor pressure is controlled by manual SRV actuation.
E. Restoration of normal steam loads and turbine bypass system is required for a reactor cooldown.

INITIATING CUE

Perform a quick recovery from a Main Steam Line Isolation and reopen the MSIVs per ON-184-001.

TASK CONDITIONS

A. An MSIV isolation and Reactor scram occurred from 100% reactor power.
B. The cause of the MSIV isolation was a faulty isolation logic surveillance test procedure.
C. RCIC injection is controlling Reactor water level.
D. Reactor pressure is controlled by manual SRV actuation.
E. Restoration of normal steam loads and turbine bypass system is required for a reactor cooldown.

INITIATING CUE

Perform a quick recovery from a Main Steam Line Isolation and reopen the MSIVs per ON-184-001.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Start HPCI in Pressure Control Mode; Steam Leak Develops

S/RO	52.OP.005.152	0	01/28/2013	Simulator
Appl To	JPM Number	Revision	Date	Setting

206000	A4.13	4.1/4.0	Y	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/28/2013	20
Author	Date	Validation Time (min)

Validated

[signature]	1/20/2013	[signature]	2/26/13
Operations Instructor	Date	Nuclear Trng Supv R. Simmons	Date

Approval

Examinee Name: ______________________ ______________________

Last, First MI   Employee Number

Exam Date: ______________   Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________

Name   Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 52.OP.005.152

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. OP-152-001, HPCI SYSTEM, REV 49

B. AR-114-001 (F04) HPCI LEAK DETECT LOGIC A HI TEMP, REV 28

C. AR-114-001 (F05) HPCI LEAK DETECT LOGIC B HI TEMP, REV 28

III. OPERATIONAL ACTIVITIES

44 HPCI Recovery From Isolation

IV. TASK CONDITIONS

A. Reactor scram occurred from an MSIV isolation.
B. Reactor water level and pressure are currently being controlled with RCIC and SRVs.
C. It is desired to place HPCI in pressure control mode.
D. ESW, Suppression Pool Cooling, and Standby Gas Treatment have been placed in service in preparation for starting HPCI.
E. SO-159-010 is in progress and being controlled by another operator.
F. Suppression Pool level will be controlled per OP-159-001 by another operator.

V. INITIATING CUE

Place HPCI in pressure control mode per OP-152-001 and maximize pressure reduction with HPCI.

VI. TASK STANDARD

HPCI is started in pressure control mode. Then the steam leak is isolated.

VII. TASK SAFETY SIGNIFICANCE

Secondary containment steam leak is isolated.

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 52.OP.005.152 Student Name: ____________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE • This JPM must be performed in the simulator. • Reset the simulator to IC–384. • Setup the simulator in accordance with the attached Simulator Setup Instructions. • Prior to performing this JPM, obtain a copy of the latest revision of OP-152-001 section 2.6 and provide to candidate.			
1.	Obtain a controlled copy of OP-152-001, HPCI System section 2.6.	Obtains Controlled copy from evaluator.		
2.	Determines steps 2.6.1 through 2.6.3 are met or have been completed.	Continues at step 2.6.4.		
3.	IF time permits, Evacuate personnel from HPCI Pump Room and HPCI Pipe Area 670' Reactor Building. (Once HPCI is operating, pump room and pipe area may be accessed again.) **EVALUATOR NOTE** If desired, tell candidate to NOT broadcast announcement over PA system.	Makes plant announcement to evacuate HPCI Pump Room.		
4.	Ensure HPCI TEST LINE TO CST ISO HV-155-F008 CLOSED.	Observes HV-155-F008 amber light on, red light off.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 52.OP.005.152 Student Name: ______________

Step	Action	Standard	Eval	Comments
5.	Ensure HPCI PUMP DSCH HV-155-F007 OPEN.	Observes HV-155-F007 amber light off, red light on.		
6.	Ensure HPCI PUMP SUCT FROM SUPP POOL HV-155-F042 CLOSED.	Observes HV-155-F042 amber light on, red light off.		
7.	Ensure HPCI PUMP SUCT FROM CST HV-155-F004 OPEN.	Observes HV-155-F004 amber light off, red light on.		
*8.	Open HPCI TEST LINE TO CST HV-155-F011.	Opens HV-155-F011 by rotating control switch clockwise to OPEN.		
*9.	Place HPCI TURBINE FLOW CONTROL FC-E41-1R600 in MANUAL set at minimum.	Places FC-E41-1R600 in manual by flipping selector to the left to M. Sets FC-E41-1R600 to minimum by depressing CLOSE pushbutton until needle indicates 0.		
10.	Open HPCI L O CLG WTR HV-156-F059.	Opens HV-156-F059 by rotating control switch clockwise to OPEN.		
11.	Start HPCI BARO CDSR VACUUM PP 1P216.	Starts 1P216 by rotating control switch clockwise to START.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 52.OP.005.152 Student Name: ____________

Step	Action	Standard	Eval	Comments
12.	Initiate TRA. **EVALUATOR CUE** Another operator has initiated TRA.	Acknowledges cue.		
*13.	Simultaneously Start HPCI AUXILIARY OIL PUMP 1P213, AND Open HPCI TURBINE STEAM SUPPLY HV-155-F001.	Starts 1P213 by rotating control switch clockwise to START. Opens HV-155-F001 by rotating control switch clockwise to OPEN.		
*14.	Simultaneously Accelerate HPCI Turbine with HPCI TURBINE FLOW CONTROL FC-E41-1R600 until HPCI Pump flow can be maintained 2500 5000 gpm, AND Throttle HPCI TEST LINE TO CST ISO HV-155-F008 to achieve either of following as required by Emergency Operating Procedures: • Reactor pressure < 1087 psig, OR • Cooldown rate <100 °F/hr.	Accelerates HPCI by depressing FC-E41-1R600 OPEN pushbutton. Throttles open HV-155-F008 by rotating control switch clockwise to OPEN.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 52.OP.005.152 Student Name: ____________

Step	Action	Standard	Eval	Comments
	FAULT STATEMENT When HPCI flow exceeds 2000 gpm, a steam leak will develop in the HPCI Pump Room. The automatic high temperature isolation will fail. This will required the candidate to manually isolate HPCI steam supply.			
15.	Recognize / report annunciators AR-114-001 (F04(05)), HPCI LEAK DETECT LOGIC A(B) HI TEMP. **EVALUATOR NOTE** Both HPCI steam isolation valves fail to automatically close, but can be manually closed. Guidance for this action can be found in AR-114-001 (F04(05)) or the candidate may close the valves as manual backup of a failed automatic action. **EVALUATOR CUE** If candidate asks for further direction, ask them to make a recommendation, and then direct them to carry out their recommendation.	Recognizes / reports annunciators AR-114-001 (F04(05)), HPCI LEAK DETECT LOGIC A(B) HI TEMP.		

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 52.OP.005.152 Student Name: ______

Step	Action	Standard	Eval	Comments
*16.	Isolates HPCI steam leak. **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	Isolates the HPCI steam leak by at least one of the following: • Closes STM SUPPLY IB ISO HV-155-F002 by rotating keyswitch counterclockwise to CLOSE. AND/OR • Closes STM SUPPLY OB ISO HV-155-F003 by rotating keyswitch counterclockwise to CLOSE.		

* = Critical Step
\# = Critical Sequence

SIMULATOR SETUP INSTRUCTIONS
JOB PERFORMANCE MEASURE
S/RO 52.OP.005.152

- From a power operating IC, insert the following to cause HPCI auto isolation logic failure (may use n13jpmF.scn):

  IMF cmfMV06_HV155F002
  IMF cmfMV06_HV155F003

- Insert the following to setup the HPCI steam leak:

  aet n13jpmFet1

  With **n13jpmFet1.et** having the following conditions:

  ;METER:HPCI PUMP DISCHARGE
  aoFIE411R6001.CurrValue >= 2000

  And **n13jpmFet1.scn** having the following commands:

  IMF mfHP152009 f:5

- Place the simulator in RUN.
- Place the Mode Switch in SHUTDOWN.
- Close the MSIVs.
- Take action to stabilize Reactor water level and pressure. Establish level control with RCIC and pressure control with SRVs. Start ESW, Suppression Pool cooling, and Standby Gas Treatment to setup for HPCI start.
- Allow plant conditions to stabilize.
- Place the simulator in Freeze.
- Consider snapping an IC for multiple performances of this JPM.
- When student is ready to begin **JPM**, place the simulator in **RUN**.

TASK CONDITIONS

A. Reactor scram occurred from an MSIV isolation.
B. Reactor water level and pressure are currently being controlled with RCIC and SRVs.
C. It is desired to place HPCI in pressure control mode.
D. ESW, Suppression Pool Cooling, and Standby Gas Treatment have been placed in service in preparation for starting HPCI.
E. SO-159-010 is in progress and being controlled by another operator.
F. Suppression Pool level will be controlled per OP-159-001 by another operator.

INITIATING CUE

Place HPCI in pressure control mode per OP-152-001 and maximize pressure reduction with HPCI.

TASK CONDITIONS

A. Reactor scram occurred from an MSIV isolation.
B. Reactor water level and pressure are currently being controlled with RCIC and SRVs.
C. It is desired to place HPCI in pressure control mode.
D. ESW, Suppression Pool Cooling, and Standby Gas Treatment have been placed in service in preparation for starting HPCI.
E. SO-159-010 is in progress and being controlled by another operator.
F. Suppression Pool level will be controlled per OP-159-001 by another operator.

INITIATING CUE

Place HPCI in pressure control mode per OP-152-001 and maximize pressure reduction with HPCI.

2.6 MANUAL COMPONENT BY COMPONENT STARTUP FOR PRESSURE CONTROL

2.6.1 Prerequisites

☐ a. HPCI System lined up for automatic response in accordance with "Setup for Automatic Response" section.

☐ b. Operation of HPCI for pressure control or cooldown required.

☐ c. HPCI Initiation Signal **NOT** present.

2.6.2 Precautions

a. Operating HPCI < 2200 rpm requires frequent monitoring of both turbine speed for oscillations and auxiliary oil pump for cycling. Continued operation with turbine speed oscillations or cycling of auxiliary oil pump may result in unstable system operation and equipment damage.

b. Failure of ramp generator (RGSC) on startup or system operation is indicated by inability of HPCI turbine to raise or maintain speed above ~ 0 rpm.

c. HPCI should only be placed in CST to CST operation if adequate core cooling is assured.

2.6.3 **Perform** Manual Startup component by component as follows:

☐

CAUTION
Running HPCI CST to CST with fuel failure will contaminate CST from steam seals via Barometric Condenser Condensate Pump Discharge.

☐ a. **Place** Standby Gas Treatment in service in accordance with OP-070-001.

b. **WHEN** time permits:

☐ (1) **Place** ESW System in service supplying HPCI Room Coolers in accordance with OP-054-001.

☐ (2) **Perform** SO-159-010, Suppression Chamber Average Water Temperature Verification.

☐

NOTE:	RHR Loop B preferred for Suppression Pool Cooling as HPCI exhausts near RHR Loop B suction.

☐ (3) **Place** Suppression Pool Cooling in service in accordance with OP-149-005.

☐ (4) **Maintain** Suppression Pool level < 23' 9" using SUPP POOL WATER FILTER PUMP 1P229 in accordance with OP-159-001.

☐ c. <u>IF</u> time permits, **Evacuate** personnel from HPCI Pump Room and HPCI Pipe Area 670' Reactor Building. (Once HPCI is operating, pump room and pipe area may be accessed again.)

☐ d. **Ensure** HPCI TEST LINE TO CST ISO HV-155-F008 **CLOSED**.

☐ e. **Ensure** HPCI PUMP DSCH HV-155-F007 **OPEN**.

☐

NOTE:	HPCI PUMP SUCT FROM CST HV-155-F004 will automatically CLOSE and will not OPEN if HPCI PUMP SUCT FROM SUPP POOL HV-155-F042 FULL OPEN.

☐ f. **Ensure** HPCI PUMP SUCT FROM SUPP POOL HV-155-F042 **CLOSED**.

☐ g. **Ensure** HPCI PUMP SUCT FROM CST HV-155-F004 **OPEN**.

☐

NOTE:	HPCI TEST LINE TO CST HV-155-F011 will not OPEN if HPCI system initiation signal present or HPCI PUMP SUCT FROM SUPP POOL HV-155-F042 FULL OPEN.

☐ h. **Open** HPCI TEST LINE TO CST HV-155-F011.

☐ i. **Place** HPCI TURBINE FLOW CONTROL FC-E41-1R600 in **MANUAL** set at minimum.

☐ j. **Open** HPCI L-O CLG WTR HV-156-F059.

☐ k. **Start** HPCI BARO CDSR VACUUM PP 1P216.

☐ l. **Initiate** TRA.

☐ m. **Simultaneously Start** HPCI AUXILIARY OIL PUMP 1P213,

AND

☐ n. **Open** HPCI TURBINE STEAM SUPPLY HV-155-F001.

☐ o. **Simultaneously Accelerate** HPCI Turbine with HPCI TURBINE FLOW CONTROL FC-E41-1R600 until HPCI Pump flow can be maintained 2500-5000 gpm,

AND

☐ p. **Throttle** HPCI TEST LINE TO CST ISO HV-155-F008 to achieve either of following as required by Emergency Operating Procedures:

(1) Reactor pressure < 1087 psig,

OR

(2) Cooldown rate <100 °F/hr.

q. **Ensure**:

☐ (1) HPCI STM LINE DRN TO CDSR IB ISO HV-155-F028 **CLOSES**.

☐ (2) HPCI STM LINE DRN TO CDSR OB ISO HV-155-F029 **CLOSES**.

☐ (3) HPCI BARO CDSR COND PP DSCH DRN HV-156-F025 **CLOSES** if open.

☐ (4) HPCI BARO CDSR COND PP DSCH DRN HV-156-F026 **CLOSES**.

☐ (5) HPCI PUMP ROOM UNIT COOLER 1V209A(B) **STARTS**.

☐ (6) HPCI MIN FLOW TO SUPP POOL HV-155-F012 **OPENS WHEN** HPCI Pump discharge pressure > 125 psig with flow < 500 gpm, **AND CLOSES WHEN** flow > 600 gpm.

r. **WHEN** desired flow established:

☐ (1) **Null** HPCI TURBINE FLOW CONTROL FC-E41-1R600.

☐ (2) **Place** HPCI TURBINE FLOW CONTROL FC-E41-1R600 in **AUTO**.

☐ s. **Observe** HPCI BARO CDSR COND PP 1P215 **AUTOMATICALLY STARTS** to control Vacuum Tank level.

☐ t. **Notify** STA to plot TRA STDP63 at a resolution of 1 second/inch and **Forward** TRA plot to HPCI System Engineer.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title: Immediate Operator Action For Control Room Evacuation

S/RO	00.ON.015.154	0	01/28/2013	Simulator
Appl To	JPM Number	Revision	Date	Setting

212000	A4.01	4.6/4.6	Y	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/28/2013	10
Author	Date	Validation Time (min)

Validated / Approval

	1/25/2013		2/26/13
Operations Instructor	Date	Nuclear Trng Supv D. Simpson	Date

Examinee Name: ______________________ ______________
Last, First MI — Employee Number

Exam Date: __________ Exam Duration (Min) __________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________

Name — Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 00.ON.015.154

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. ON-100-109, CONTROL ROOM EVACUATION, REV 27

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. A condition has occurred requiring evacuation of the Control Room.
B. You are the only PCO in the Control Room.
C. Conditions in the Control Room are degrading, but remain habitable for the moment.
D. Security has been notified to provide access to both Units' Remote Shutdown Panels.
E. The Control Room evacuation has already been announced over the plant PA system.
F. NERO has already been activated.

V. INITIATING CUE

Perform the Immediate Operator Actions of Control Room evacuation.

VI. TASK STANDARD

Performs immediate actions for Control Room evacuation per ON–100–009. Following failure of Mode Switch, manually scrams the Reactor using the manual scram pushbuttons.

VII. TASK SAFETY SIGNIFICANCE

Failure to perform the immediate actions of ON–100–009 when necessary places the plant in the undesirable condition of not being able to control the reactor from outside the Control Room when necessary.

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 00.ON.015.154 Student Name: ____________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE • This JPM must be performed in the simulator. • Reset the simulator to IC–385. • Ensure the simulator is setup in accordance with the attached Simulator Setup Instructions. • Prior to performing this JPM, obtain a copy of the latest revision of ON-100-109 and provide to candidate.			
1.	Obtain a controlled copy of ON-100-109, Control Room Evacuation.	Obtains Controlled copy from evaluator or Hard Card from rack near Unit 1 Unit Supervisor's desk.		
*2.	Place MODE SWITCH HS-C72A-1S01 to SHUTDOWN.	Rotates the Mode Switch counterclockwise to SHUTDOWN (Panel 1C651).		

FAULT STATEMENT

When the Mode Switch is placed in SHUTDOWN, the Reactor will fail to scram. The candidate must arm and depress either the manual scram pushbuttons or manual ARI pushbuttons to initiate a scram.

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 00.ON.015.154 Student Name:

Step	Action	Standard	Eval	Comments
*3.	Scrams the Reactor.	Determines there is a failure to scram Arms AND depresses manual scram pushbuttons (Panel 1C651): • RPS MAN SCRAM CHAN A1 HS-C72A-1S03A • RPS MAN SCRAM CHAN B1 HS-C72A-1S03B • RPS MAN SCRAM CHAN A2 HS-C72A-1S03C • RPS MAN SCRAM CHAN B2 HS-C72A-1S03D OR Arms and depresses manual ARI pushbuttons (Panel 1C601) • RI DIV 1 MAN TRIP HS-147103A1 • RI DIV 2 MAN TRIP HS-147103B1		
4.	Ensure all control rods INSERTED.	Observes all control rods are inserted (Panel 1C651).		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 00.ON.015.154 Student Name:

Step	Action	Standard	Eval	Comments
5.	Insert SRMs and IRMs.	Inserts SRMs and IRMs by depressing all SRM and IRM SELECT (12) pushbuttons and then depressing DRIVE IN and Power On pushbuttons (Panel 1C601).		
*6.	Close HV-141-F022A,B,C, & D, HV-141-F028A,B,C & D, HV-141-F016 and HV-141-F019 MSIVs and MSL drains using control switches.	*Closes the following valves by rotating the following control switches counterclockwise to CLOSE (Panel 1C601): • HV-141-F022A • HV-141-F022B • HV-141-F022C • HV-141-F022D • HV-141-F028A • HV-141-F028B • HV-141-F028C • HV-141-F028D Observes the following valves amber lights are on, red lights are off **(not critical)**(Panel 1C601): • HV-141-F016 • HV-141-F019		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 00.ON.015.154 Student Name:

Step	Action	Standard	Eval	Comments
7.	Trip RFPT A, B & C using RFP A(B)(C) TRIP pushbuttons HS-12745A, B and C.	Trips RFPTs by depressing the following TRIP pushbuttons (Panel 1C651): • HS-12745A • HS-12745B • HS-12745C		
8.	Shutdown Condensate Pumps in order to leave 2 pumps in service.	Secures Condensate pumps by depressing STOP pushbuttons to leave two pumps in service (Panel 1C651).		
*9.	Close RWCU Inlet IB Iso HV-144-F001.	Closes HV-144-F001 by rotating control switch counterclockwise to CLOSE (Panel 1C651).		
*10.	Close RWCU Inlet OB Iso Vlv HV-144-F004.	Closes HV-144-F004 by rotating control switch counterclockwise to CLOSE (Panel 1C651).		
11.	WHEN RPV level is > 15", Reset FW setpoint setdown.	Resets FW setpoint setdown by touching HMI button HS-C32-1S08 RESET SETPT SETDOWN (Panel 1C651).		
12.	Ensure FW LOW LOAD DEMAND SIGNAL TO LV-10641, LIC-C32-1R602 in AUTO with a Level Setpoint of 35".	Touches HMI button 641(Panel 1C651). Observes LIC-C32-1R602 AUTO button has yellow backlight. Depresses LIC-C32-1R602 INC(DEC) LVL SETPT buttons as necessary to adjust setpoint to 35".		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 00.ON.015.154 Student Name: ____________

Step	Action	Standard	Eval	Comments
13.	Ensure HV-10603A, B & C RFP A, B & C DSCH ISO Vlvs CLOSED.	Observes HMI indications for 603A, 603B, and 603C indicate yellow (Panel 1C651).		
14.	Open HV-155-F011 HPCI TEST LINE TO CST ISO.	Opens HV-155-F011 by rotating control switch clockwise to OPEN (Panel 1C601).		
15.	Ensure HPCI in AUTO set for 5100 gpm.	Observes HPCI controller selector in A position (Panel 1C601). Observes HPCI controller thumbwheel setpoint indicates ~5100 gpm.		
16.	Ensure RCIC in AUTO set for 625 gpm. **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	Observes RCIC controller selector in A position (Panel 1C601). Observes RCIC controller thumbwheel setpoint indicates ~625 gpm.		

* = Critical Step
\# = Critical Sequence

SIMULATOR SETUP INSTRUCTIONS
JOB PERFORMANCE MEASURE
S/RO 00.ON.015.154

- From a power operating IC, insert the following to cause the Mode Switch to fail to scram the Reactor:

  IOR diHSC72A1S01 f:RUN

- Place the simulator in RUN.
- Allow plant conditions to stabilize.
- Place the simulator in Freeze.
- Consider snapping an IC for multiple performances of this JPM.
- When student is ready to begin **JPM**, place the simulator in **RUN**.

TASK CONDITIONS

A. A condition has occurred requiring evacuation of the Control Room.
B. You are the only PCO in the Control Room.
C. Conditions in the Control Room are degrading, but remain habitable for the moment.
D. Security has been notified to provide access to both Units' Remote Shutdown Panels.
E. The Control Room evacuation has already been announced over the plant PA system.
F. NERO has already been activated.

INITIATING CUE

Perform the Immediate Operator Actions of Control Room evacuation.

TASK CONDITIONS

A. A condition has occurred requiring evacuation of the Control Room.
B. You are the only PCO in the Control Room.
C. Conditions in the Control Room are degrading, but remain habitable for the moment.
D. Security has been notified to provide access to both Units' Remote Shutdown Panels.
E. The Control Room evacuation has already been announced over the plant PA system.
F. NERO has already been activated.

INITIATING CUE

Perform the Immediate Operator Actions of Control Room evacuation.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Vent the Drywell

S/RO	73.OP.001.101	2	01/28/2013	Simulator
Appl To	JPM Number	Revision	Date	Setting

223001	A2.07	4.2/4.3	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/28/2013	15
Author	Date	Validation Time (min)

Validated

[signature]	1/25/2013
Operations Instructor	Date

Approval

[signature]	2/26/13
Nuclear Trng Supv R. Sroson	Date

Examinee Name: ______________________ ______________________

Last, First MI Employee Number

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________

Name Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 73.OP.001.101

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. OP-173-003, PRIMARY CONTAINMENT NITROGEN MAKEUP AND VENTING, REV 11

B. OP-070-001, STANDBY GAS TREATMENT SYSTEM, REV 23

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. Unit 1 is in Mode 1.
B. Drywell pressure is 0.4 psig and steady.

V. INITIATING CUE

Reduce Drywell pressure to 0.2 psig per OP-173-003, Primary Containment Nitrogen Makeup and Venting section 2.3. All prerequisites have been met. All TR/TS requirements are satisfied.

VI. TASK STANDARD

SGTS in operation, Drywell venting lineup up with Drywell pressure being reduced.

VII. TASK SAFETY SIGNIFICANCE

Avoid an unnecessary high Drywell pressure scram.

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 73.OP.001.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE • This JPM must be performed in the simulator. • Reset the simulator to IC–383. • Setup the simulator in accordance with the attached Simulator Setup Instructions. • Prior to performing this JPM, obtain a copy of the latest revision of OP-173-103 section 2.3 and OP-070-001 section 2.2. Provide these procedures to the candidate at the appropriate times.			
1.	Obtain a controlled copy of OP-173-003, Primary Containment Nitrogen Makeup and Venting.	Obtains Controlled copy of OP-173-003 from evaluator.		
2.	Manually Start SGTS in accordance with OP-070-001.	Obtains Controlled copy of OP-070-001 from evaluator.		
	EVALUATOR CUE If necessary inform the student all prerequisites and precautions have been met and that an NPO has checked both SGTS trains SAT.	Selects section 2.2.		
	EVALUATOR CUE Role-play the Unit Supervisor and instruct candidate to start the "A" train of SGTS.			

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 73.OP.001.101 Student Name:

Step	Action	Standard	Eval	Comments
*3.	At Panel 0C681, Depress SGTS Clg 0A Dmp HD07555A OPEN pushbutton. **EVALUATOR NOTE** HD07555A remains open for approximately 120 seconds after its respective pushbutton is released. JPM steps 3 through 5 must be performed expeditiously to establish a flow path and allow SGTS to start.	Opens HD07555A by depressing OPEN pushbutton.		
4.	Observe SGTS Clg 0A Dmp HD07555A OPENS to allow suction flow path for start of SGTS Fan A.	Observe HD07555A red light on, amber light off.		
*5.	At Panel 0C681, Start Standby Gas Treatment System A by placing selector switch for SGTS Fan 0V109A to START.	Starts Standby Gas Treatment System A by rotating selector switch clockwise to START.		
6.	When Fan starts, Observe flow increases >3000 cfm on SGTS Air Flow FR07553A.	Observes flow >3000 cfm on FR07553A.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 73.OP.001.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
7.	Check following positioned as indicated:			
	• SGTS Makeup 0A Dmp FD07551A2 MODULATED/OPEN approximately 120 seconds after SGTS Fan 0V109A started.	Observes FD07551A2 red light on after approximately 120 seconds (amber light may be on or off).		
	• SGTS Fan Inlet Dmp HD07552A FULL OPEN.	Observes HD07552A red light on, amber light off.		
	• SGTS A Inlet Dmp HD07553A FULL OPEN.	Observes HD07553A red light on, amber light off.		
8.	Vent desired system to SGTS Inlet Header as follows: • For inerting, purging or primary containment pressure control for Unit 1, Perform actions for desired evolution in accordance with OP-173-001 and OP-173-003.	Returns to OP-173-003 section 2.3.		
9.	Ensure Drywell pressure does not become >0.5 psig below suppression chamber pressure, to prevent opening vacuum breakers.	Acknowledges step.		
10.	Log vent start time in Unit 1 Log. **EVALUATOR CUE** Start time has been logged by another operator.	Informs evaluator of need to log vent start time.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 73.OP.001.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
*11.	Open following: • HD17508A DRWL/WETWELL BURP DMP	Opens HD17508A by rotating control switch clockwise to OPEN (Panel 1C681).		
*12.	• HD17508B DRWL/WETWELL BURP DMP	Opens HD17508B by rotating control switch clockwise to OPEN (Panel 1C681).		
*13.	• HV-15713 DRWL VENT IB ISO	Opens HV-15713 by depressing OPEN pushbutton.		
*14.	• HV-15711 DRWL VENT BYPS OB ISO	Opens HV-15711 by depressing OPEN pushbutton.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 73.OP.001.101 Student Name: ____________

Step	Action	Standard	Eval	Comments
15.	Monitor Drywell Pressure using any of the following: • Computer point MAP01 or MAP001Z • PPC screen CONTN • PI-15702 CONTN OR SUPP CHMBR PRESS with selector switch HSS-15702 selected to CONTN **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	Monitors Drywell pressure and determines it is lowering.		

SIMULATOR SETUP INSTRUCTIONS
JOB PERFORMANCE MEASURE
S/RO 73.OP.001.101

- From a power operating IC, open N2 makeup valves SV-15767 and SV-15789 (found on P&ID PC5) until Drywell pressure rises to 0.4 psig. Then close these valves.
- Allow plant conditions to stabilize.
- Place the simulator in Freeze.
- Consider snapping an IC for multiple performances of this JPM.
- When student is ready to begin **JPM**, place the simulator in **RUN**.

TASK CONDITIONS

A. Unit 1 is in Mode 1.
B. Drywell pressure is 0.4 psig and steady.

INITIATING CUE

Reduce Drywell pressure to 0.2 psig per OP-173-003, Primary Containment Nitrogen Makeup and Venting section 2.3. All prerequisites have been met. All TR/TS requirements are satisfied.

TASK CONDITIONS

A. Unit 1 is in Mode 1.
B. Drywell pressure is 0.4 psig and steady.

INITIATING CUE

Reduce Drywell pressure to 0.2 psig per OP-173-003, Primary Containment Nitrogen Makeup and Venting section 2.3. All prerequisites have been met. All TR/TS requirements are satisfied.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Pull Scram Fuses; Vent Scram Air Header

S/RO	58.EO.001.151	0	01/29/2013	Plant
Appl To	JPM Number	Revision	Date	Setting

295037	EA1.01	4.6/4.6	Y	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/29/2013	20
Author	Date	Validation Time (min)

Validated | | Approval |

	1/29/2013		2/6/13
Operations Instructor	Date	Nuclear Trng Supv R. Simon	Date

Examinee Name: ______________________ ______________

Last, First MI Employee Number

Exam Date: ____________ Exam Duration (Min) ____________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator

______________________ ______________________

Name Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 58.EO.001.151

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. ES-158-001, DE-ENERGIZING SCRAM PILOT SOLENOIDS, REV 12

B. EO-100-113 Sheet 2, CONTROL ROD INSERTION, REV 10

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. Unit 1 has received a valid scram signal.

B. All control rods are not full in and all scram channel lights remain lit.

C. EO-100-113, Level/Power Control, has been entered.

D. ARI has been manually initiated.

E. The scram air header is still pressurized.

V. INITIATING CUE

Insert control rods by removing RPS fuses IAW ES-158-001, DE-ENERGIZING SCRAM PILOT SOLENOIDS.

VI. TASK STANDARD

Provide an alternate means of Control Rod Insertion. This will initially be attempted by de-energizing RPS circuitry through fuse removal. The fuse removal cannot be accomplished due to cabinet doors being stuck. The alternate path is to vent the scram air header locally.

VII. TASK SAFETY SIGNIFICANCE

Alternate methods to insert control rods are designed to limit threat to core and containment by minimizing the duration of the ATWS event.

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 58.EO.001.151 Student Name:

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE Prior to performing this JPM, obtain a copy of the latest revision of ES-158-001, mark it up as if it were actually to be performed, and provide it to the student along with the Task Conditions/Initiating Cue Sheet. Also obtain a copy of Hard Card for venting the scram air header, but do NOT initially provide to student.			
1.	Review Sections 1.0 through 3.0.	Review all sections. Follows all precautions as applicable.		
2.	Notes Shift Supervision permission to perform this ES procedure.	Verifies Shift Supervision signature, date, and time in the appropriate location in Section 4.1 of the procedure.		
	EVALUATOR NOTE With Shift Supervision permission, have the student show you the required equipment, but do not remove it from the Shift Manager's office. The equipment can also be located in the OSC ES Box.			
3.	Obtain the required equipment.	Obtains the required equipment from the ES Box in the Shift Manager's office or OSC (fuse pullers and low voltage rubber gloves).		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 58.EO.001.151 Student Name: ____________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE RPS logic Channel A indications are located on the front of Panel 1C609 in the Upper Relay Room.			
4.	Ensure RPS logic Channel A de-energized by performing one of following at 1C609 RPS Trip Sys A1/A2 NSS Shutoff Sys Panel (Upper Relay Room): Observe NO Rod Group Scram Indicators Division 1, ILLUMINATED: a. C72A-DS2C, Rod Group 1 b. C72A-DS2G, Rod Group 2 c. C72A-DS2E, Rod Group 3 d. C72A-DS2A, Rod Group 4 **EVALUATOR CUE** When candidate locates above lights, say that all Division 1 Rod Group Scram Indicator lights are LIT.	Observes the following Division 1 Rod Group Scram Indicators NOT LIT: • C72A-DS2C, Rod Group 1 • C72A-DS2G, Rod Group 2 • C72A-DS2E, Rod Group 3 • C72A-DS2A, Rod Group 4		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 58.EO.001.151 Student Name:

Step	Action	Standard	Eval	Comments
5.	Perform following: Notify the Control Room to expect BACKUP/GROUP SYSTEM A POWER FAILURE alarms on 1C651. **EVALUATOR CUE** Role play the Control Room and acknowledge the report. **EVALUATOR NOTE** The following two fuses are located in the RPS A2 (left side) right door, lower right side.	Contacts the Control Room and informs the Control Room to expect BACKUP/GROUP SYSTEM A POWER FAILURE alarms on 1C651.		
*6.	Remove following fuses: (1) F46-C72A-F18C (2) F47-C72A-F18G **EVALUATOR NOTE** Candidate may ask Control Room BACKUP/GROUP SYSTEM A POWER FAILURE alarms on 1C651. If so, inform candidate that alarm came in.	Using the fuse puller and low voltage gloves, simulates removing the following fuses from the fuse holder: • F46-C72A-F18C • F47-C72A-F18G		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 58.EO.001.151 Student Name:

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE The following two fuses are located in the RPS A1 (right side) right door, lower left side.			
*7.	Remove following fuses: (1) F52-C72A-F18A (2) F53-C72A-F18E	Using the fuse puller and low voltage gloves, removes the following fuses from the fuse holder: • F52-C72A-F18A • F53-C72A-F18E		
8.	Observe BACKUP/GROUP PILOT SCRAM SYSTEM A POWER FAILURE annunciator clears at 1C651. **EVALUATOR CUE** Role play the Control Room PCO and inform the student that BACKUP/GROUP SYSTEM A POWER FAILURE alarm has cleared.	Contacts the Control Room and requests the PCO to verify the BACKUP/GROUP SYSTEM A POWER FAILURE alarm has cleared on 1C651.		

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 58.EO.001.151 Student Name: ____________

Step	Action	Standard	Eval	Comments
9.	Ensure RPS logic Channel B de-energized by performing one of following at 1C611 RPS Trip Sys B1/B2 NSS Shutoff Sys Panel (Lower Relay Room): Observe NO Rod Group Scram Indicators Division 2, ILLUMINATED: a. C72A-DS2D, Rod Group 1 b. C72A-DS2H, Rod Group 2 c. C72A-DS2F, Rod Group 3 d. C72A-DS2B, Rod Group 4 **EVALUATOR CUE** When candidate locates above lights, say that all Division 2 Rod Group Scram Indicator lights are LIT. **CAUTION** **The Following Step Results In The Inability To Close The SDV Vent And Drain Valves If Fuses Were Also Pulled For Channel A. Prompt Restoration Of Fuses Is Necessary To Minimize The Time The Valves Remain Open.**	Verifies the following Division 2 Rod Group Scram Indicators NOT LIT: • C72A-DS2D, Rod Group 1 • C72A-DS2H, Rod Group 2 • C72A-DS2F, Rod Group 3 • C72A-DS2B, Rod Group 4		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 58.EO.001.151 Student Name:

Step	Action	Standard	Eval	Comments
10.	Perform following: Notify the Control Room to expect BACKUP/GROUP SYSTEM B POWER FAILURE alarms on 1C651. **EVALUATOR CUE** Role play the Control Room and acknowledge the report.	Contacts the Control Room and informs the Control Room to expect BACKUP/GROUP SYSTEM B POWER FAILURE alarms on 1C651.		
FAULT STATEMENT When the student attempts to open the RPS B1 and B2 doors, they will be informed that the doors are stuck shut and CANNOT be opened. They will be cued to take alternate actions IAW EO-100-113 Sheet 2 to insert control rods as rapidly as possible from outside the Control Room. The student shall proceed to vent the scram air header.				
	NOTE The following two fuses are located in the RPS B2 (left side) right door, lower right side.			

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 58.EO.001.151 Student Name:

Step	Action	Standard	Eval	Comments
11.	Attempts to remove following fuses: (1) F51-C72A-F18D (2) F52-C72A-F18H **EVALUATOR CUE** As the student moves to open either door for RPS B1 and B2 fuses, inform them that the doors are stuck shut and CANNOT be opened by any means. When the student reports inability to insert control rods by pulling RPS fuses, direct them to take alternate actions IAW EO-100-113 Sheet 2 to insert control rods as rapidly as possible from outside the Control Room.	Acknowledges evaluator cue and reports that control rods CANNOT be inserted by pulling RPS fuses.		
12.	Determines alternate method for inserting control rods as rapidly as possible from outside the Control Room IAW EO-100-113 Sheet 2. **EVALUATOR NOTE** When the student determines venting the scram air header is required, provide copy of associated Hard Card.	Determines venting the scram air header is required.		
13.	Open ARI Sys Solenoid Valves Bypass 147021	ARI Solenoid Valve Bypass Valve 147021 is simulated being opened by rotating the valve handle to the parallel position.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 58.EO.001.151 Student Name:

Step	Action	Standard	Eval	Comments
	EVALUATOR CUE When the candidate indicates they will rotate the handle in the correct direction, state that the handle rotates until it reaches a hard stop parallel to the pipe. • Valve handle 147021 simulated being rotated to the parallel position			
*14.	Close Scram Air Supply 1470002A and 147002B **EVALUATOR NOTE** Since only one valve is normally open, the other valve should be checked closed. **EVALUATOR CUE** When the candidate indicates they will rotate the handwheel of the open valve in the CW direction, state that the handwheel rotates until it reaches a hard stop. The closed valve will not turn in the CW direction.	Simulates closing or checking closed SCRAM AIR SUPPLY Valves 147002A and 147002B by rotating the valve handle in the clockwise direction until seated.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 58.EO.001.151 Student Name:

Step	Action	Standard	Eval	Comments
*15.	Uncap Scram Air Header Vent 147007 **EVALUATOR NOTE** The pipe cap is normally installed finger tight and can be removed by hand with proper PPE. The candidate may desire to use a pipe wrench to remove the pipe cap. **EVALUATOR CUE** When the candidate describes the proper method of removing the cap, state that the cap unscrews smoothly until fully removed.	Simulates uncapping SCRAM AIR HDR VENT Valve 147007 by rotating it CCW.		
*16.	Open Scram Air Header Vent 147007 **EVALUATOR CUE** The valve handle rotates smoothly and stops at the parallel position. The sound of air flow is heard.	Simulates opening 147007 by slowly rotating the handle to the parallel position.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 58.EO.001.151 Student Name: ______________________

Step	Action	Standard	Eval	Comments
17.	Notify Control Room that the Scram Air Header is vented. **EVALUATOR CUE** Inform candidate Control Room has been notified and all control rods have inserted, no further system manipulation required. **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	Simulates reporting to the Control Room, by Radio or Page, that air is venting from the 147007 valve.		

* = Critical Step
\# = Critical Sequence

TASK CONDITIONS

A. Unit 1 has received a valid scram signal.

B. All control rods are not full in and all scram channel lights remain lit.

C. EO-100-113, Level/Power Control, has been entered.

D. ARI has been manually initiated.

E. The scram air header is still pressurized.

INITIATING CUE

Insert control rods by removing RPS fuses IAW ES-158-001, DE-ENERGIZING SCRAM PILOT SOLENOIDS.

TASK CONDITIONS

A. Unit 1 has received a valid scram signal.

B. All control rods are not full in and all scram channel lights remain lit.

C. EO-100-113, Level/Power Control, has been entered.

D. ARI has been manually initiated.

E. The scram air header is still pressurized.

INITIATING CUE

Insert control rods by removing RPS fuses IAW ES-158-001, DE-ENERGIZING SCRAM PILOT SOLENOIDS.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title: Start Containment Hydrogen Recombiner

S/RO	73.OP.011.102	5	01/29/2013	Plant
Appl To	JPM Number	Revision	Date	Setting

223001	A2.01	4.3/4.4	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/29/2013	20
Author	Date	Validation Time (min)

Validated / Approval

[signature]	1/25/2013	[signature]	2/21/13
Operations Instructor	Date	Nuclear Trng Supv R. Simons	Date

Examinee Name: ______________________ ______________________
Last, First MI Employee Number

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator ______________________ ______________________
Name Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 73.OP.011.102

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. OP-173-001, CONTAINMENT ATMOSPHERE CONTROL SYSTEM (Rev. 40)

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. The plant is in a post-LOCA condition approximately 24 hours after the event.

B. Containment H_2 and O_2 concentrations are below combustible limits.

V. INITIATING CUE

Start Containment Hydrogen Recombiner 1E440A(B)(C)(D) in Automatic.

VI. TASK STANDARD

Selected Recombiner operating automatically IAW OP-173-001.

VII. TASK SAFETY SIGNIFICANCE

Recombiners are the primary means or hydrogen reduction in Containment post-LOCA. Failure to place the Recombiner(s) in service post-LOCA may result in excessive hydrogen concentrations in Containment and raise the risk of Containment damage due to hydrogen detonation/deflagration.

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 73.OP.011.102 Student Name: ____________

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE Select which Recombiner is to be operated. A and C are in the Upper Relay Room; B and D are in the Lower Relay Room. Circle the selected Recombiner in the Initiating Cue. Prior to performing this JPM, obtain a copy of the latest revision of OP-173-001, mark it up as if it were actually to be performed, and provide it to the student along with the Task Conditions/Initiating Cue Sheet.			
1.	Obtain a controlled copy of OP-173-001, select correct section, and review procedure. **EVALUATOR CUE** If asked, inform the candidate that all prerequisites have been met.	Obtains a controlled copy of OP-173-001 from evaluator. Selects Section 2.10. Reviews prerequisites and precautions.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 73.OP.011.102 Student Name: ______

Step	Action	Standard	Eval	Comments
2.	Ensure H_2 Recombiner aligned as follows prior to startup: Turn H_2 Rcb A(B)(C)(D) Heater Power Adj Control HC-15796A(B)(C)(D) in counter clockwise direction until potentiometer STOPS. **EVALUATOR CUE** Indicate H_2 Rcb A(B)(C)(D) Heater Power Adj Control HC-15796A(B)(C)(D) is rotated fully counterclockwise.	Simulates rotating H_2 Rcb A(B)(C)(D) Heater Power Adj Control HC-15796A(B)(C)(D) counterclockwise until potentiometer STOPS.		
3.	Set H_2 Rcb A(B)(C)(D) Heater Power Adj Control HC-15796A(B)(C)(D) to ZERO (000). **EVALUATOR CUE** Indicate H_2 Rcb A(B)(C)(D) Heater Power Adj Control HC-15796A(B)(C)(D) is at ZERO (000).	Simulates rotating H_2 Rcb A(B)(C)(D) Heater Power Adj Control HC-15796A(B)(C)(D) potentiometer to ZERO (000).		
4.	Observe H_2 RCB A(B)(C)(D) Power In Available White light ILLUMINATED indicating MCC feeder closed. **EVALUATOR CUE** Indicate H_2 RCB A(B)(C)(D) Power In Available White light is ILLUMINATED.	Observes H_2 RCB A(B)(C)(D) Power In Available White light.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 73.OP.011.102 Student Name: ____________

Step	Action	Standard	Eval	Comments
5.*	To start H_2 Recombiner in Automatic: Place H_2 Rcb A(B)(C)(D) Temp Ctl Select HSS-15796A(B)(C)(D) to AUTO. **EVALUATOR CUE** Indicate H_2 Rcb A(B)(C)(D) Temp Ctl Select HSS-15796A(B)(C)(D) is in AUTO.	Simulates placing H_2 Rcb A(B)(C)(D) Temp Ctl Select HSS-15796A(B)(C)(D) to AUTO.		
6.*	Place H_2 Rcb A(B)(C)(D) Power Out Switch HS-15796A(B)(C)(D) to ON. **EVALUATOR CUE** Indicate H_2 Rcb A(B)(C)(D) Power Out Switch HS-15796A(B)(C)(D) is in ON.	Simulates placing H_2 Rcb A(B)(C)(D) Power Out Switch HS-15796A(B)(C)(D) to ON.		
7.	Verify Red light above HS-15796A(B)(C)(D) ILLUMINATES. **EVALUATOR CUE** Indicate Red light above HS-15796A(B)(C)(D) is ILLUMINATED.	Observes Red light above HS-15796A(B)(C)(D).		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 73.OP.011.102 Student Name:

Step	Action	Standard	Eval	Comments
8.*	Adjust H_2 Rcb A(B)(C)(D) Temp Out Indicating Controller TIC-15796A(B)(C)(D) to 1250°F. **EVALUATOR CUE** H_2 Rcb A(B)(C)(D) Temp Out Indicating Controller TIC-15796A(B)(C)(D) is at 1250°F.	Simulates adjusting H_2 Rcb A(B)(C)(D) Temp Out Indicating Controller TIC-15796A(B)(C)(D) to 1250°F.		
9.	Monitor temperature periodically placing H_2 Rcb A(B)(C)(D) Temp Chan Select TSS-15796A(B)(C)(D) in Position #1, #2, and/or #3. **EVALUATOR CUE** Indicate temperature is rising towards 1250°F. Inform candidate that four hours have now elapsed.	Simulates placing H_2 Rcb A(B)(C)(D) Temp Chan Select TSS-15796A(B)(C)(D) in Position #1, #2, and/or #3. Observes temperature.		

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 73.OP.011.102 Student Name:

Step	Action	Standard	Eval	Comments
10.	Observe temperature stabilizes at ~ 1250°F on TIC-15796A(B)(C)(D) after H_2 Recombiner has been running ~ 4 hours. **EVALUATOR CUE** Indicate temperature is 1250°F and stable. **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	Observe temperature on TIC-15796A(B)(C)(D).		

* = Critical Step
\# = Critical Sequence

TASK CONDITIONS

A. The plant is in a post-LOCA condition approximately 24 hours after the event.

B. Containment H_2 and O_2 concentrations are below combustible limits.

INITIATING CUE

Start Containment Hydrogen Recombiner 1E440A(B)(C)(D) in Automatic.

TASK CONDITIONS

A. The plant is in a post-LOCA condition approximately 24 hours after the event.

B. Containment H_2 and O_2 concentrations are below combustible limits.

INITIATING CUE

Start Containment Hydrogen Recombiner 1E440A(B)(C)(D) in Automatic.

PPL SUSQUEHANNA, LLC

JOB PERFORMANCE MEASURE

APPROVAL AND ADMINISTRATIVE DATA SHEET

Task Title Lineup Fire Protection System to RHRSW to Inject Into the RPV

S/RO	13.EO.001.101	2	01/30/2013	Plant
Appl To	JPM Number	Revision	Date	Setting

295031	EA1.08	3.8/3.9	N	N
NUREG–1123 E/APE / Sys	K/A Number	K/A Importance	Faulted	Time Critical

Prepared

Tom Hooper	01/30/2013	30
Author	Date	Validation Time (min)

Validated / Approval

RC/Th	1/25/2013	[signature]	2/26/13
Operations Instructor	Date	Nuclear Trng Supv R. Simeon	Date

Examinee Name: ______________________ ______________________

Last, First MI — Employee Number

Exam Date: ______________ Exam Duration (Min) ______________

Evaluation Result: ☐ Satisfactory ☐ Unsatisfactory

Evaluator

______________________ ______________________

Name — Signature

Comments

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
S/RO 13.EO.001.101

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP–AD–002, Standards for Shift Operations.

B. All applicable safety precautions shall be taken in accordance with established PPL safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment such as hearing or eye protection, safety shoes, hardhats, etc., is required and/or posted as being necessary.

C. If, in the judgment of the Evaluator any safety issue occurs during the performance of a JPM, the JPM will be terminated until the issue is resolved.

D. Peer checking is the expectation for all evolutions; however, since a JPM is an individual effort, no peer check will be provided and Self Checking is required.

II. REFERENCES

A. ES-013-001, Fire Protection System Crosstie to RHRSW

III. OPERATIONAL ACTIVITIES

None

IV. TASK CONDITIONS

A. A LOCA and Station Blackout have occurred.

B. All control rods are full-in.

C. A Rapid Depressurization has been manually performed IAW EO-100-112.

D. Reactor pressure is approximately 30 psig and stable.

E. The EOPs direct implementing ES-013-001, Fire Protection System Crosstie to RHRSW.

F. The Diesel Engine-Driven Fire Pump, OP511, is operating IAW OP-013-001.

G. An NPO is on station to perform any required actions in the screen house.

V. INITIATING CUE

Crosstie the Fire Protection System to supply Unit 1 Loop A RHRSW Pump Discharge IAW ES-013-001, Fire Protection System Crosstie to RHRSW and inject into the RPV.

VI. TASK STANDARD

Provide an alternate means of RPV injection using the Diesel Engine-Driven Fire Pump through the RHRSW system.

VII. TASK SAFETY SIGNIFICANCE

RPV injection is required during a Station Blackout to provide adequate core cooling to minimize fuel cladding damage.

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 13.EO.001.101 Student Name:

Step	Action	Standard	Eval	Comments
	EVALUATOR NOTE Prior to performing this JPM, obtain a copy of the latest revision of ES-013-001, mark it up as if it were actually to be performed, and provide it to the student along with the Task Conditions/Initiating Cue Sheet.			
1.	Review Sections 1.0 through 3.0.	Review all sections. Follows all precautions as applicable.		
2.	Notes Shift Manager permission to perform Section 4.10.	Verifies Shift Manager signature, date, and time in Step 4.9.1.		
*3.	Direct a Plant Operator to line up the RHRSW and Fire Protection Systems for cross-connection using the RHRSW Loop 'A'. **EVALUATOR CUE** Role play as Plant Operator and inform the candidate Steps 4.3, 4.4, and 4.6 have been complete.	Directs a Plant Operator to perform ES-013-001 Steps 4.3, 4.4, and 4.6.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 13.EO.001.101 Student Name: ______

Step	Action	Standard	Eval	Comments
*4.	OPEN the RHRSW Crosstie Valves. **EVALUATOR CUE** Indicate HV-112-073A and HV-112-073A handwheels are rotated fully counterclockwise. Indicate HV-112-F074A handwheel will not rotate any further clockwise.	At 29-670' RHR Pump Room Overhead: • Simulates opening RHRSW XTIE HV-112-073A by rotating handwheel counterclockwise. • Simulates opening RHRSW XTIE HV-112-75A by rotating handwheel counterclockwise. • Simulates ensuring RHRSW/RHR LOOP 'A' XTIE DRAIN VALVE HV-112-F074A closed by checking handwheel fully rotated clockwise.		
5.	Ensure RHRSW Inlet Valve closed. **EVALUATOR CUE** Indicate HV-112-F010A handwheel is rotated fully clockwise.	At 29-645', ensure RHRSW HX 'A' INLET HV-112-F010A closed by simulating rotating handwheel fully clockwise.		
6.	Ensure Unit 2 RHRSW HX 'A' Inlet Valve closed. **EVALUATOR CUE** Indicate HV-212-F010A handwheel is rotated fully clockwise.	At 34-645' (Unit 2), ensure RHRSW HX 'A' INLET HV-212-F010A closed by simulating rotating handwheel fully clockwise.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 13.EO.001.101 Student Name:

Step	Action	Standard	Eval	Comments
*7.	Open RHRSW Loop 'A' Hose Connection Valve 012062. **EVALUATOR CUE** Role play as Plant Operator and inform the candidate that 012062 is open.	Directs Plant Operator to open RHRSW LOOP 'A" Hose Conn Iso Valve 012062.		
8.	Ensure SUPP CHMBR SPR TEST SHUTOFF HV-151-F028A closed. **EVALUATOR CUE** Indicate HV-212-F028A handwheel is rotated fully clockwise.	At 27-704', ensure SUPP CHMBR SPR TEST SHUTOFF HV-151-F028A closed by simulating rotating handwheel fully clockwise.		
9.	Ensure RHR INJ Flow Control Valve F017A open. **EVALUATOR CUE** Indicate HV-151-F017A handwheel is rotated fully counterclockwise.	At 29-704', ensure RHR INJ FLOW CTL HV-151-F017A open by simulating rotating handwheel fully counterclockwise.		

* = Critical Step
\# = Critical Sequence

PERFORMANCE CHECKLIST

Appl. To: S/RO JPM No.: 13.EO.001.101 Student Name:

Step	Action	Standard	Eval	Comments
*10.	Open RHR INJ OB Isolation Valve HV-151-F015A. **EVALUATOR CUE** Indicate HV-151-F015A handwheel is rotated fully counterclockwise.	At 29-704', simulates opening RHR INJ OB ISO HV-151-F015A by rotating handwheel fully counterclockwise.		
11.	Ensure DW Spray Isolation OB HV-151-F016A closed. **EVALUATOR CUE** Indicate HV-151-F016A handwheel is rotated fully clockwise. **EVALUATOR CUE** This completes the JPM. **EVALUATOR** Do you have ALL your JPM exam materials? Task Cue Sheets? Procedures?	At 29-749', ensure DRYWELL SPRAY ISO OB HV-151-F016A closed by simulating rotating handwheel fully clockwise.		

* = Critical Step
# = Critical Sequence

TASK CONDITIONS

A. A LOCA and Station Blackout have occurred.

B. All control rods are full-in.

C. A Rapid Depressurization has been manually performed IAW EO-100-112.

D. Reactor pressure is approximately 30 psig and stable.

E. The EOPs direct implementing ES-013-001, Fire Protection System Crosstie to RHRSW.

F. The Diesel Engine-Driven Fire Pump, OP511, is operating IAW OP-013-001.

G. An NPO is on station to perform any required actions in the screen house.

INITIATING CUE

Crosstie the Fire Protection System to supply Unit 1 Loop A RHRSW Pump Discharge IAW ES-013-001, Fire Protection System Crosstie to RHRSW and inject into the RPV.

TASK CONDITIONS

A. A LOCA and Station Blackout have occurred.

B. All control rods are full-in.

C. A Rapid Depressurization has been manually performed IAW EO-100-112.

D. Reactor pressure is approximately 30 psig and stable.

E. The EOPs direct implementing ES-013-001, Fire Protection System Crosstie to RHRSW.

F. The Diesel Engine-Driven Fire Pump, OP511, is operating IAW OP-013-001.

G. An NPO is on station to perform any required actions in the screen house.

INITIATING CUE

Crosstie the Fire Protection System to supply Unit 1 Loop A RHRSW Pump Discharge IAW ES-013-001, Fire Protection System Crosstie to RHRSW and inject into the RPV.

Facility: Susquehanna Scenario No.: NRC-1 Op-Test No.: 2013

Examiners: ______________________ Operators: ______________________

Initial Conditions: The plant is operating at approximately 100% power. EHC pump A is out of service for maintenance. RCIC is out of service for maintenance.

Turnover: Transfer Bus 1A202 to the alternate supply per OP-104-001 section 2.1.4. Then lower Reactor power with Recirculation flow to approximately 92% per GO-100-012 section 5.3 and Reactivity Manipulation Package.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP, SRO	Transfer Bus 1A202 to the Alternate Supply OP-104-001
2	N/A	R – ATC, SRO	Lower Reactor Power with Recirculation Flow to 92% GO-100-012
3	cmfTR02_LT0 0812A	I – SRO	Condensate Storage Tank A Level Instrument Fails High AR-016-001 (D07), Technical Specifications
4	mfFW145007A	C – All	Feedwater Pump A High Vibrations with Delayed Pump Trip AR-101-001 (A16), OP-145-001, ON-164-002
5	cmfRL02_E11 1K11A mfRH149004B	C – BOP, SRO	RHR Pump B Spurious Start and Suction Flange Leak into Reactor Building ON-169-002, EO-000-104, Technical Specifications
6	mfHP152009 mfHP152003	M – All	HPCI Steam Leak into Reactor Building EO-000-104, ON-100-101, EO-000-102
7	cmfMV06_HV 155F002 cmfMV06_HV 155F003 cmfMV09_HV 155F002 cmfMV09_HV 155F003	I – BOP, SRO	HPCI Fails to Automatically Isolate, HPCI Isolation Valves Stick Mid-Position When Manually Closed EO-000-104, EO-000-112
8	mfRD155006 cmfSC04	C – All	Multiple Control Rods Fail to Insert EO-000-102, EO-000-113

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: **Susquehanna**	Scenario No.: **NRC-1**	Op-Test No.: **2013**
1. Total malfunctions (5-8) **Events 3, 4, 5, 6, 7, 8**	6	
2. Malfunctions after EOP entry (1-2) **Events 7 & 8**	2	
3. Abnormal events (2-4) **Events 3, 4, 5**	3	
4. Major transients (1-2) **Event 6**	1	
5. EOPs entered/requiring substantive actions (1-2) **EO-000-102, EO-000-104**	2	
6. EOP contingencies requiring substantive actions (0-2) **EO-000-112, EO-000-113**	2	
7. Critical tasks (2-3)	4	
CRITICAL TASK DESCRIPTIONS: **CT-1 – Manually scram the reactor when any Secondary Containment Area temperature approaches or exceeds Max Safe temperature.** **CT-2 – Rapidly depressurize the reactor when two Secondary Containment Areas exceed Max Safe Temperature levels.** **CT-3 – Insert control rods IAW EO-000-113, Sheet 2, Control Rod Insertion.** **CT-4 – Stop and prevent injection except from CRD and SLC.**		

TEAM SUSQUEHANNA Generating Excellence	**PPL–SUSQUEHANNA, LLC** **LEARNING CENTER** **SIMULATOR SCENARIO**
Scenario Title:	**NRC 2013 Scenario #1**
Scenario Duration:	**1.5 hours**
Scenario Number:	**NRC 2013 Scenario #1**
Revision / Date:	**0 / February 25, 2013**
Course:	**Licensed Operator Initial**
Operational Activities:	

Prepared By:	Tom Hooper Instructor	02/25/2013 Date
Reviewed By:	R. Simpson Operations Training Supervisor	2/26/2013 Date
Approved By:	Lonnie Crawford Supervising Manager/Shift Manager	3/1/2013 Date

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SCENARIO SUMMARY

The crew assumes the shift with the plant operating at approximately 100% power. EHC pump A is out of service for maintenance. RCIC is out of service for maintenance.

The crew will begin by transferring Bus 1A202 to the alternate supply per OP-104-001 section 2.1.4. Then, the crew will lower Reactor power with Recirculation flow to approximately 92% per GO-100-012 section 5.3 and Reactivity Manipulation Package.

Once the Reactor power reduction is in progress or completed, the level instrument for Condensate Storage Tank A will fail high. This instrument impacts RCIC and HPCI operability. With RCIC already inoperable, there will be no further impact on that system. The SRO will review Technical Specifications and determine the required actions for HPCI.

Next, Feedwater pump turbine A will develop high vibrations. The crew will respond per AR-016-001 (D07) and lower load on the Feedwater pump either manually or by lowering Reactor power. The crew may trip the Feedwater pump as vibration levels approach the 5 mil automatic trip setpoint. Eventually, the Feedwater pump will automatically trip if the crew does not remove the pump from service. An automatic Recirc run back to the 48% limiter will be received. The crew will execute ON-162-001 due to lowering Recirculation flow. Reactor power will be approximately 65% following this transient.

Once the crew stabilizes the plant, RHR pump B will spuriously start. After a short delay, a leak will develop on the pump suction flange. RHR pump room water level will rise and Suppression Pool level will lower. The crew will secure the pump and isolate the leak by closing the suction valve. The crew will enter ON-169-002 due to flooding in the Reactor Building, EO-000-104 due to high Reactor Building area water level, and possibly EO-000-103 due to low Suppression Pool level. The SRO will review Technical Specifications and determine the impact.

Next, a steam leak will develop in the HPCI equipment room. HPCI will fail to automatically isolate. When the crew attempts to manually isolate the leak, both HPCI steam isolation valves will fail mid-position. The crew will enter re-EO-000-104, Secondary Containment Control. With an un-isolable primary system discharging into the Reactor Building and one area temperature approaching or exceeding the maximum safe value, the crew will insert a manual Reactor scram. Ten control rods will fail to insert on the scram. Five of these control rods will be able to be inserted using RMCS and five of these control rods will remain stuck for the rest of the scenario. The crew will enter EO-000-113, Level/Power Control, and take actions for the failure to scram. A second steam leak will develop from the HPCI steam isolation valves in the HPCI pipe routing area. This will lead to a second area temperature exceeding the maximum safe value. The crew will perform a rapid depressurization of the Reactor per EO-000-112.

The scenario will be terminated when the ADS valves are open, control rod insertion is in progress or completed for all rods that can be inserted, and Reactor water level is being controlled in the assigned band above -161".

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SCENARIO OBJECTIVES

The objective of this scenario is to evaluate the Licensed Operator Candidate's ability to respond to the scenario events. These events will require each candidate to demonstrate the following:

- Knowledge of integrated plant operations
- Ability to diagnose abnormal plant conditions
- Ability to work together as a team
- Ability to mitigate plant transients that exercise their knowledge and use of ONs and EOPs
- Ability to utilize Technical Specifications (SRO Only)

To meet this objective, the Licensed Operator Candidates must demonstrate proficiency in the following competencies:

Reactor Operator Candidates:

1. Interpret/diagnose events and conditions based on alarms, signals, and readings.
2. Comply with and use procedures, references, and Technical Specifications.
3. Operate the control boards.
4. Communicate and interact with other crew members.

Senior Reactor Operator Candidates:

1. Interpret/diagnose events and conditions based on alarms, signals, and readings.
2. Comply with and use procedures and references.
3. Operate the control boards (N/A to upgrade candidates).
4. Communicate and interact with the crew and other personnel.
5. Direct shift operations.
6. Comply with and use Technical Specifications.

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CRITICAL TASKS

1. Critical Task 1

Manually scram the reactor when any *Secondary Containment Area* temperature / radiation approaches or exceeds Max Safe Temperature.

Safety Significance

High-energy leakage into the Secondary Containment Area impacts the integrity of Secondary Containment. Failure of the Secondary Containment directly relates to the 10CFR50.67 design criteria of dose to the General Public.

Action is taken to isolate systems that are discharging into secondary containment to terminate possible sources of radioactivity release. If these efforts are unsuccessful, for whatever reason, or conditions are approaching or exceeding max safe thresholds, the reactor (source term) is placed in a low energy state, or shutdown.

Consequences for Failure to Perform Task

Failure to take actions to mitigate the energy released to the secondary containment directly affects the radiation dose to the General Public.

SSES EOP Basis for:

SC/T-8 **BEFORE** ANY RB AREA TEMP REACHES MAX SAFE

GO TO RPV CONTROL

Areas monitored by steam leak detection (RWCU equipment, main steam line tunnel, HPCI and RCIC pipe routing, HPCI equipment, and RCIC equipment) are assigned a Max Safe temperature equal to the steam leak detection isolation setpoint. "The setpoints are designed to detect a leakage rate below the leak rate corresponding to critical crack size for the smallest high energy line in the room which is part of the respective system." (FSAR 5.2.5.1.3). Instrumentation and components required for isolation are qualified up to the isolation temperature setpoints.

(Reference: SSES-EPG SC/T-4.1)

SC/R-5 **BEFORE** ANY RB AREA RAD REACHES MAX SAFE

GO TO RPV CONTROL

The Max Safe operating radiation level is the most limiting area radiation level which will ensure personnel exposure is kept below the emergency exposure limit (25 Rem) while performing EOP actions in the secondary containment for a period no longer than 2.5 hours (i.e., 25 Rem/2.5 hr = 10 Rem/hr).

A reactor scram through entry to EO-000-102, RPV Control, promptly reduces to decay heat levels the energy that the RPV may be discharging to the secondary containment. The instruction to take this action at any time between the Max Normal and the Max Safe operating value may help avoid reaching the more severe action of rapidly depressurizing the RPV.

(Reference: SSES-EPG SC/R-2.1)

Indications/Cues for Event Requiring Critical Task

Simplex Fire Detection alarms indicating High temperatures in RB Areas
Increasing area radiation and alarms for RB Areas
Increasing Steam Leak Detection System temperatures and alarms

Performance Criteria

Manually Scram the Reactor when approaching or exceeding any Max Safe Temperature/Radiation as indicated by associated control room alarms and PICSY radiation indications.

Performance Feedback

Initiating a reactor scram reduces the heat load that will be absorbed and released by the Secondary Containment as well as the radioactive source term.

Rods inserted

Power lowering

2. Critical Task 2

Rapidly depressurize the reactor when two Secondary Containment Areas exceed Max Safe Rad / Temperature / Water levels.

Safety Significance

High-energy leak in the Secondary Containment Area impacts the integrity of Secondary Containment. Failure of the Secondary Containment directly relates to the 10CFR50.67 design criteria of dose to the General Public.

Action is taken to isolate systems that are discharging into secondary containment to terminate possible sources of radioactivity release. Minimizing radioactive release to secondary containment also helps accomplish the objective of precluding a radioactive release outside secondary containment under conditions where secondary containment integrity cannot be maintained. Previous containment control actions have not, for whatever reason, mitigated the event and now potentially large areas of the secondary containment have been challenged.

Consequences for Failure to Perform Task

Failure to take actions to mitigate the energy released to the secondary containment directly affects the radiation dose to the General Public.

SSES EOP Basis for:

SC/T-9 **WHEN** RB AREA TEMP EXCEEDS MAX SAFE IN **2** OR MORE AREAS

RAPID DEPRESS IS REQ'D

SC/R-6 **WHEN** RB AREA RAD EXCEEDS MAX SAFE IN **2** OR MORE AREAS

RAPID DEPRESS IS REQ'D

SC/L-7 **WHEN** RB AREA WATER LEVEL EXCEEDS MAX SAFE IN **2** OR MORE AREAS

RAPID DEPRESS IS REQ'D

Should secondary containment area temperatures/radiation/water levels continue to increase to their Max Safe values in more than one area with a primary system discharging into secondary containment, the RPV must be rapidly depressurized. Depressurizing the RPV promptly places the primary system in its lowest possible energy state, rejects heat to the suppression pool in preference to outside the containment, and reduces the driving head and flow of primary systems that are un-isolated and discharging into the secondary containment.

The criteria of "2 or more areas" identifies the increase in temperature (radiation or water level) trend as a wide spread problem which may pose a direct and immediate threat to secondary containment integrity, equipment located in the secondary containment, or continued safe operation of the plant.

Indications/Cues for Event Requiring Critical Task

Increasing Steam Leak Detection System temperatures and alarms indicating levels at Max Safe values.
Increasing area radiation and alarms for RB Areas indicating levels at Max Safe values.
PICSY formats indicating radiation values greater than Max Safer values.
Reactor Building room levels above high level annunciation or as confirmed by local evaluation.

Performance Criteria

Perform a Rapid Depressurization per EO-100-112 when two or more RB areas exceed max safe temperatures per EO-100-104 Table 8
Perform a Rapid Depressurization per EO-100-112 when two or more RB areas exceed max safe radiation per EO-100-104 Table 9 (10 R/hr for all areas)
Perform a Rapid Depressurization per EO-100-112 when two or more RB areas exceed max safe water level per EO-100-104 Table 10

Initiate ADS / Manually open all 6 ADS valves

Performance Feedback

Initiating a rapid depressurization causes Reactor pressure to lower which lowers the driving force of any primary system breach.

Verify ADS valves are open using red light indication, acoustic monitoring and lowering Reactor pressure and rising reactor water level.

3. Critical Task 3

Insert control rods IAW EO-100-113 Sht. 2.

Safety Significance

Control rod insertion initiates power reduction immediately

Consequences for Failure to Perform Task

Failure to insert control rods allows power to remain elevated with resultant power oscillations and potential core damage.

Indications/Cues for Event Requiring Critical Task

Exceeding a RPS scram setting with NO reactor scram signal, or RPS/ARI fail to fully insert all control rods.

Performance Criteria

Insert Control Rods by one or more of the following methods:
Maximize CRD to drift control rods.
Drive control rods after bypassing RWM.
Reset and Scram again by performing ES-158-002 Bypass RPS logic trips.
De-energizing RPS solenoids by performing ES-158-001.
Local venting of Scram Air Header.

Performance Feedback

Successful insertion of control rods will be indicated by:

Rod position full in indication for manual insertion of control rods, venting scram air header or de-energizing RPS solenoids.

Rod position full in after resetting scram, draining scram discharge volume and re-scram.

4. Critical Task 4

<u>Stops and prevents injection except from SLC and CRD.</u>

<u>Safety Significance</u>

Uncontrolled injection of relatively cold, unborated water into the RPV with the core not shutdown will cause a power spike. Uncontrolled criticality and possible significant fuel damage may result from the injection.

<u>Consequences of Failure to Perform the Task</u>

Uncontrolled re-criticality and fuel damage.

SSES EOP Basis for:

LQ/L-18 STOP INJECTION
<u>AND</u>
PREVENT INJECTION

EXCEPT FROM:

- SLC
- CRD
- RCIC
- HPCI

Injection into the RPV is stopped and prevented, while rapid RPV depressurization proceeds, in order to prevent uncontrolled injection of cold water as RPV pressure decreases below the shutoff head of operating system pumps. Injection from boron injection systems and CRD is not terminated because operation of these systems may be needed to establish and maintain reactor shutdown. Further, the injection flowrates from these systems are small compared to those of the other Table 15 systems. Injection from RCIC is not stopped because the injection flowrate from this system is small. Injection from HPCI is permitted to avoid potential isolation and minimize the transient that may occur when RPV injection is restored. It also helps reduce RPV pressure by spraying cold water into the steam space.

<u>Indications/Cues for the Event Requiring Critical Task</u>

Any condition requiring rapid depressurization of the RPV with an ATWS in progress will lead the Crew to the EOP step addressing the need to stop injection.

<u>Performance Criteria</u>

If any system is injecting, other than the exceptions listed, this step requires that these systems <u>stop</u> injection.

All injection systems other than the exceptions listed must be <u>prevented</u> from injection. For feedwater, this would mean tripping feedwater pumps or closing their discharge valves.

For condensate, this would mean <u>preventing</u> injection below RPV pressure of 600 psig using valves or if needed, tripping condensate pumps.

For RHR and Core Spray this would require <u>preventing</u> injection in accordance with overriding section of their respective operating procedures.

<u>Performance Feedback</u>

RPV injection from systems not listed as exceptions is either stopped or prevented.

SCENARIO MALFUNCTIONS

Malfunction	Description	Crew Response
1	Condensate Storage Tank A Level Instrument Fails High	Determine Technical Specification impact
2	Feedwater Pump A High Vibrations with Delayed Pump Trip	Lower Feedwater pump load, lower Reactor power, secure Feedwater pump or respond to pump trip, respond to Recirc pump runback
3	RHR Pump B Spurious Start and Suction Flange Leak into Reactor Building	Secure RHR pump, close RHR pump suction valve, declare RHR pump inoperable
4	HPCI Steam Leak into Reactor Building	Scram the Reactor, rapidly depressurize the Reactor
5	HPCI Fails to Automatically Isolate, HPCI Isolation Valves Stick Mid-Position When Manually Closed	Attempt to manually close HPCI isolation valves, recognize HPCI isolation valves stuck mid-position, rapidly depressurize the Reactor
6	Multiple Control Rods Fail to Insert	Insert some control rods with RMCS, recognize some control rods will not insert, terminate and prevent injection prior to rapid depressurization

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SCENARIO REFERENCES

1.	OP-104-001	4 KV ELECTRICAL SYSTEM
2.	GO-100-012	POWER MANEUVERS
3.	OP-164-002	REACTOR RECIRCULATION SYSTEM HMI OPERATIONS
4.	AR-016-001 (D07)	CONDENSATE TANK A HI-LO LEVEL
5.	TS 3.3.5.1	EMERGENCY CORE COOLING SYSTEM (ECCS) INSTRUMENTATION
6.	AR-101-001 (A16)	RFPT – RFP A / B / C HI VIBRATION
7.	OP-145-006	FEEDWATER SYSTEM HMI OPERATIONS
8.	OP-145-001	RFP AND RFP LUBE OIL SYSTEM
9.	ON-164-002	LOSS OF REACTOR RECIRCULATION FLOW
10.	AR-110-001 (C03)	RHR/CORE SPRAY LOOP B OPERATING ADS PERMISSIVE
11.	AR-113-001 (H08)	RHR LOOP B PUMP ROOM FLOODED
12.	TS 3.5.1	ECCS - OPERATING
13.	ON-169-002	FLOODING IN REACTOR BUILDING
14.	EO-000-103	PRIMARY CONTAINMENT CONTROL
15.	EO-100-104	SECONDARY CONTAINMENT CONTROL
16.	AR-114-001 (E05)	HPCI LEAK DETECTION HI TEMP/HI DIFF TEMP
17.	EO-100-102	RPV CONTROL
18.	EO-100-113	LEVEL/POWER CONTROL
19.	EO-100-112	RAPID DEPRESSURIZATION
20.	OP-155-001	CONTROL ROD DRIVE HYDRAULIC SYSTEM
21.	OP-149-001	RHR SYSTEM
22.	OP-151-001	CORE SPRAY SYSTEM

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SCENARIO SPECIAL INSTRUCTIONS

1. Simulator setup
   a. **Initialize** to IC–376
   b. **Run** SCN file **n13scen1.scn**
2. **Place** the simulator in RUN
3. **Verify** the following malfunctions/overrides, event triggers and key assignments:

MF	RF	OR	SCN	ET	CONDITIONS	KEYS
16:16	**1:1**	**0:0**	**0**	**1:0**	**11**	**9**

4. **Prepare** the simulator for evaluation
   a. **Complete** a simulator exam checklist, NTP–QA–31.10 Attachment B
   b. **Place** a tag on EHC pump 1A HS.
   c. **Place** tags on RCIC.
   d. **Prepare** a Reactivity Manipulation Package for lowering Reactor power from 100% to 92% with recirculation flow.
5. **Prepare** a Turnover Sheet including the following:
   a. Transfer Bus 1A202 to the alternate supply per OP-104-001 section 2.1.4.
   b. Then lower Reactor power with Recirculation flow to approximately 92% per GO-100-012 section 5.3 and Reactivity Manipulation Package.

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SCENARIO FILES

n13scen1.scn

```
; Monitored parameters
SCN rat_mp
SCN n13scen1mp

; EHC Pump A OOS
IRF crfPM10_1P113A f:OUT

; RCIC OOS
IMF mfRC150011

; Crew swaps Bus 1A202 from normal to alternate supply

; Crew lowers power to 95% with recirc flow

; CST A level instrument fails high
{Key[1]} IMF cmfTR02_LT00812A f:100
{Key[1]} IMF annAR016D07 f:ALARM_ON

; Feedwater pump A high vibrations
{Key[2]} IMF mfFW145007A i:2.5 r:25:00 f:8

; May make FW pump vibes worse if needed/when directed
{Key[12]} IMF mfFW145007A r:1:00 f:10

; RHR pump B spurious start and suction leak
{Key[3]} IMF cmfRL02_E111K11A
{Key[3]} IMF mfRH149004B d:1:00 r:2:00 f:40

; May open room drain valve
{Key[13]} IRF rfLD120005 f:OPEN

; HPCI leak into RB (HPCI equipment room)
{Key[4]} IMF mfHP152009 f:0.5

; Ramps up HPCI leak into equipment room
{Key[14]} MMF mfHP152009 f:4 r:1:00

; HPCI leak into RB (pipe tunnel)
; activates when either HPCI steam inlet valve HS is taken to close
; and mode switch is in shutdown
aet n13scen1et1

; HPCI fails to isolate automatically and steam inlet valves fail mid-position
; when manually closed
IMF cmfMV06_HV155F003
IMF cmfMV09_HV155F003 f:50
IMF cmfMV06_HV155F002
IMF cmfMV09_HV155F002 f:50

; Multiple control rods fail to insert on scram but may be manually driven
IMF cmfSC04_HCU1823 f:0
IMF cmfSC04_HCU3415 f:0
IMF cmfSC04_HCU3427 f:0
IMF cmfSC04_HCU4223 f:0
IMF cmfSC04_HCU5031 f:0

; Multiple control rods fail to insert on scram and will not drive manually
IMF mfRD1550061027 f:AsIs
IMF mfRD1550061443 f:AsIs
IMF mfRD1550062207 f:AsIs
IMF mfRD1550062635 f:AsIs
IMF mfRD1550063443 f:AsIs

; Operator may close CRD charging water isolation valve
{Key[5]} IRF rfRD155017 f:0

; open ADS SRVs from lower relay room
```

```
{Key[6]} SCN n13scen1_1
```

n13scen1_1.scn

```
;# FILE: ADB.ADSKEYS
;# NAME: GREGG LUDLAM
;# SCENARIO: ANY REQUIRING ADS KEY-LOCKED OPEN IN RELAY ROOM
;# REVISION/DATE: 0, 9/21/93
;# DESCRIPTION: PERFORMS OVERRIDES FOR 6 ADS VLVS IN LRR (DIV 2) TO
;# KEYLOCK THEM OPEN.
;# END
IOR diHS14113G2 f:OPEN
IOR diHS14113J2 d:6 f:OPEN
IOR diHS14113K2 d:12 f:OPEN
IOR diHS14113L2 d:18 f:OPEN
IOR diHS14113M2 d:24 f:OPEN
IOR diHS14113N2 d:30 f:OPEN
```

n13scen1mp.scn

```
insmp ldtee41n24b
changemp ldtee41n24b ,,,HPCI Equip Room Temp

insmp ldtee51n25c
changemp ldtee51n25c ,,,HPCI Pipe Tunnel Temp
```

n13scen1et1.et

```
; SWITCH: HPCI STEAM SUPPLY OB ISO
diHS15503.CurrValue = #OR.diHS15503.CLS |
diHS15502.CurrValue = #OR.diHS15502.CLS
```

n13scen1et1.scn

```
IMF mfHP152003 d:10:00 r:2:00 f:1
```

SCENARIO EVENT DESCRIPTION FORM

Initial Conditions: Ensure shift positions are assigned, have the Crew conduct the turnover and perform a panel walk down before the start of the scenario.

EVENT	OP EVENT / TASK	TIME	DESCRIPTION
N/A	N/A	0	Crew assumes shift
1	N/A	5	Transfer Bus 1A202 to the Alternate Supply
2	N/A	15	Lower Reactor Power with Recirculation Flow to 92%
3	N/A	25	Condensate Storage Tank A Level Instrument Fails High
4	N/A	35	Feedwater Pump A High Vibrations with Delayed Pump Trip
5	N/A	50	RHR Pump B Spurious Start and Suction Flange Leak into Reactor Building
6	N/A	60	HPCI Steam Leak into Reactor Building
7	N/A	60	HPCI Fails to Automatically Isolate, HPCI Isolation Valves Stick Mid-Position When Manually Closed
8	N/A	65	Multiple Control Rods Fail to Insert
N/A	N/A	90	Termination

SCENARIO EVENT FORM

EVENT	1
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Transfer Bus 1A202 to the Alternate Supply

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs BOP to transfer Bus 1A202 from the normal supply to the alternate supply per OP-104-001 section 2.1.4.
ATC		Monitors plant parameters.
BOP		Transfers Bus 1A202 from the normal supply to the alternate supply per OP-104-001 section 2.1.4: • Ensure SU Bus 10 Xfmr 111 bkr 0A10312 CLOSED. • Observe ESS Transformer 111(0X211) secondary supply line voltage on Voltmeter XI 00040 is nominally 4200V. • Ensure loads to be picked up by ESS Transformer 111(0X211) will not overload Transformer 111(0X211). • Insert key and Place Xfmr 111 Bus 1B Sync Sel keyswitch to ON. • Check two voltages MATCHED by Observing Diff AC Volts XI 00036 on red scale reads less than 297 volts. • Check two sources IN PHASE by Observing Synchroscope XI 00037 is at 12 o'clock position. • Close Xfmr 111 to Bus 1B Bkr 1A20201 by Placing switch to CLOSE. • Observe Xfmr 111 to Bus 1B Bkr 1A20201 CLOSES. • When Xfmr 111 to Bus 1B Bkr 1A20201 CLOSES, Observe Xfmr 211 to Bus 1B Bkr 1A20209 AUTOMATICALLY OPENS. • Observe voltage indication on ESS BUS 1B (1A202). (PICSY Display 4KV) • Dispatch operator to check all 3 phase voltages at 1A20204. • Ensure ESS Transformer 111(0X211) not overloaded by monitoring ESS Xfmr 111(0X211) current indication. • Return Xfmr 111 Bus 1B Sync Sel keyswitch to OFF and Remove key. • Align all control switch flags to actual breaker positions.

NOTES	

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	1
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Transfer Bus 1A202 to the Alternate Supply

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

If asked as **NPO** before the breaker swap, immediately report that the area is clear of unnecessary personnel and you are ready for the swap.

If asked as **NPO** after the breaker swap to check Bus 1A202, immediately report that everything looks good at Bus 1A202.

If asked as **NPO** after the breaker swap to check phase voltages, immediately report that all three phase voltages indicate normal at 1A20204 (OP-104-001 step 2.1.4.k).

Role play any other directed actions as required.

EVALUATOR NOTES

1. None

SCENARIO EVENT FORM

EVENT	2
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Lower Reactor Power with Recirculation Flow to 92%

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs ATC to lower Reactor power to 92% with recirculation flow per GO-100-012 and the Reactivity Manipulation Package. Provides oversight for reactivity manipulation.
ATC		Lowers recirculation flow by controlling both Reactor Recirc Pumps in MANUAL mode : <u>MANUAL mode:</u> • Touch any of the following buttons on the vertical selection menu: 　o RRP_A 　o RRP_B 　o RRP DUAL SCRN • IF required on the RRP DUAL SCRN, Touch the Screen Select MANUAL button on the desired Rx Recirc Pump controller to open the Manual Mode HMI half screen. • Touch the MANUAL MODE SELECT button. • Touch the MANUAL MODE SELECT button on the confirmation overlay screen. • Ensure the MANUAL Screen Select button and MANUAL MODE SELECT buttons change color from blue to yellow. • Ensure the MANUAL MODE SELECT button text now reads MANUAL MODE SELECTED. • Slowly Adjust REACTOR RECIRC PUMP A(B) SPEED SY B31 1R621A(B) Controller Demand with the applicable DEC pushbuttons as required. Monitors diverse indications: • APRMs, Core thermal power • Main Generator output • Reactor water level, Reactor pressure, • Recirc pump speeds, Recirc pump flows, Total core flow Plots all Reactor power changes on Power/Flow Map.
BOP		May contact GCC prior to start of power reduction. Peer checks reactivity manipulations. Monitors plant parameters.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	2
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Lower Reactor Power with Recirculation Flow to 92%

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

When contacted as **GCC** (Lou Spinelli) concerning power reduction, acknowledge communication.

Role play any directed actions as required.

EVALUATOR NOTES

1. Recirculation Loop Jet Pump mismatch shall be maintained ≤ 5 million lbm/hr when operating at ≥ 75 million lbm/hr total core flow.
2. It is permissible for the crew to control one Recirc Pump in POWER MANEUVERING MODE, however it is most likely that they will control both in MANUAL MODE.
3. Once a sufficient power change has been observed, proceed to the next event.

SCENARIO EVENT FORM

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Condensate Storage Tank A Level Instrument Fails High

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports: • Annunciator AR-016-001 (D07), CONDENSATE TANK A HI-LO LEVEL • Condensate Tank A level indicator upscale
SRO		Ensures execution of AR-016-001 (D07). Refers to Technical Specification Table 3.3.5.1-1 Determines Technical Specification 3.3.5.1 Condition D applies due to loss of CST low level channel. Determines Technical Specification 3.5.1 Required Action D.2.1 requires placing the channel in the tripped condition within 24 hours or D.2.2 requires aligning HPCI suction to the Suppression Pool within 12 hours.
ATC		Monitors plant parameters.
BOP		Executes AR-016-001 (D07).

NOTES	

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Condensate Storage Tank A Level Instrument Fails High

INSTRUCTOR ACTIVITY

1. When crew completes power reduction to 92% or when directed by lead examiner, **depress KEY 1** to initiate event:

   {Key[1]} IMF cmfTR02_LT00812A f:100
   {Key[1]} IMF annAR016D07 f:ALARM_ON

ROLE PLAY

As **NPO** dispatched to investigate CST A level instrument, wait 2 minutes and report:

> **"There are no abnormal indications at CST A."**

If directed as **NPO** to check Condensate makeup and reject valve positions, wait 2 minutes and report valve positions based on simulator status.

As **WWM** (or equivalent) contacted for assistance with troubleshooting/repairing CST A level instrument, acknowledge request and report that you will contact FIN and inform Operations Management.

Role play any other directed actions as required.

EVALUATOR NOTES

1. None

SCENARIO EVENT FORM

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Feedwater Pump A High Vibrations with Delayed Pump Trip

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports: • Annunciator AR-101-001 (A16), RFPT – RFP A / B / C HI VIBRATION • RFPT A vibrations rising
SRO		Ensures execution of AR-101-001 (A16). May direct rapidly lowering Reactor power with recirculation flow and/or rods. May direct trip of RFPT A. Enters ON-164-002 due to Recirc runback. May enter ON-145-001, RPV Level Control System Malfunction.
ATC		Executes AR-101-001 (A16): • Check alarm condition and trend on RFPT VIBRATION XRSH 12728. • May reduce load (Turbine speed) on RFPT 1A to determine if Turbine vibration condition is load related. • IF turbine vibration increases to 5 mils, THEN Ensure RFPT trips. May reduce load on RFPT 1A per OP-145-005 section 2.6.3: • Place RFP A SPD CTL/DEMAND SIGNAL SIC-C32-1R601A controller in MANUAL. • Adjust RFP A SPD CTL/DEMAND SIGNAL SIC-C32-1R601A using INC/DEC buttons as necessary to control RPV Water as desired. May rapidly lower Reactor power with Recirculation flow and/or rods. May trip RFPT A per OP-145-001 section 2.24: ▪ IF desired Trip RFPT A from 1C651 panel, Depress RFPT A TRIP HS 12745A pushbutton. ▪ IF desired to Trip RFPT A from an ICS HMI screen, Perform following on RFP A HMI screen: o Touch A RFPT RESET Button. o Touch TRIP button on RFPT A TRIP RESET HS 12745A2. o Touch ENABLE TRIP A RFPT button on confirmation overlay screen. o Touch TRIP A RFPT button on confirmation overlay screen within 15 seconds.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Feedwater Pump A High Vibrations with Delayed Pump Trip

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 2** to initiate event.

   {Key[2]} IMF mfFW145007A i:2.5 r:25:00 f:8

2. If candidates place RFPT A in idle mode or directed by lead examiner, **depress KEY 12** to cause vibrations to exceed trip level.

   {Key[12]} IMF mfFW145007A r:1:00 f:10

ROLE PLAY

If contacted as **GCC** (Lou Spinelli) regarding power reduction, ask what the expected final power level will be.

As **NPO** dispatched to RFPT A, wait 2 minutes and **report,**

> **"Noise levels from RFPT A are much higher than normal and the whole area is vibrating. It appears that the vibrations have caused a small lube oil leak."**

As **WWM** (or equivalent) contacted for assistance with RFPT A, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. The crew may reduce load on RFPT 1A either by taking manual control or by reducing overall Reactor power.
2. RFPT A will trip on a high turbine vibration of 5 mils a number of minutes after event initiation if the crew does not remove it from service earlier.
3. Recirculation pumps will runback to the 48% limiter due to trip of RFPT A.
4. Recommend proceeding to the next event once Reactor power has stabilized and the crew has performed initial actions in ON-164-002 for Recirculation runback.

SCENARIO EVENT FORM

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Feedwater Pump A High Vibrations with Delayed Pump Trip

POSITION	TIME	STUDENT ACTIVITIES

ATC (cont)		Executes ON-164-002 actions for Recirc runback:
		▪ Plot position on Power/Flow Map.
		▪ Ensure a Non Peripheral Control Rod selected.
		▪ Monitor LPRMs for Limit Cycle Oscillations.
		▪ Perform appropriate action specified in ON-178-002.
		▪ Perform appropriate actions specified in ON-156-001.
		▪ Determine which Limiter initiated runback on any Rx Recirc HMI screen by observing:
		  o Speed Limiter #1 (30%) Initiated status block blinks red.
		  o Speed Limiter #2 (48%) Initiated status block blinks red.
		▪ Ensure the Rx Recirc Pumps run back to value associated with controlling limiter.
		▪ Ensure the associated SY-B31-1R621A(B) controller(s) have transferred to Manual as appropriate.

BOP		Monitors plant parameters.

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SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	RHR Pump B Spurious Start and Suction Flange Leak into Reactor Building

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports: • Annunciator AR-110-001 (C03), RHR/CORE SPRAY LOOP B OPERATING ADS PERMISSIVE • RHR pump B is running • Annunciator AR-113-001 (H08), RHR LOOP B PUMP ROOM FLOODED • Suppression Pool level is lowering
SRO		Ensures execution of AR-110-001 (C03) and AR-113-001 (H08). Determines RHR pump B operation is not required. Directs BOP to stop RHR pump B. Enters EO-000-104, Secondary Containment Control, on high RB area water level. Enters ON-169-002, Flooding in Reactor Building. Directs BOP to close RHR pump B suction valve. Directs start of ESW and Unit Coolers. If Suppression Pool level lowers to 22', enters EO-000-103, Primary Containment Control. May direct makeup to the Suppression Pool using Suppression Pool Cleanup per OP-159-001 section 2.4. Declares RHR pump B inoperable. Determines Technical Specification 3.5.1 Condition B applies which requires restoration of RHR pump B within 7 days.
ATC		Monitors plant parameters.
BOP		Dispatches NPO to investigate / assist. Stops RHR pump B by placing 1P202B to STOP. Closes RHR pump B suction valve by placing HV-151-F004B to CLOSE. Starts ESW and Unit Coolers.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	RHR Pump B Spurious Start and Suction Flange Leak into Reactor Building

INSTRUCTOR ACTIVITY

1. When directed by the lead examiner, **depress KEY 3** to initiate event.

   {Key[3]} IMF cmfRL02_E111K11A
   {Key[3]} IMF mfRH149004B d:1:00 r:2:00 f:40

2. If directed to open RHR pump room B drain valve, wait 2 minutes and **depress KEY 13** and report completion.

   {Key[13]} IRF rfLD120005 f:OPEN

ROLE PLAY

As **NPO** dispatched to RHR pump B, wait 2 minutes and **report** the pump and leak status based on current plant condition. If the leak is still un-isolated, **report** at a minimum,

> **"There is a lot of water coming out of a leak between the suction valve and RHR pump B."**
>
> If asked about water level in the room, report that there are several inches of water on the floor, but it is not over the berm at the door.

As **NPO** dispatched to investigate if RHR leak has been isolated, **report** that the leak has stopped and RHR pump room B water level is stable.

If dispatched as **NPO** ensure closed water tight doors, wait 2 minutes and **report** that all water tight doors on elevation 645' are closed.

If asked as **Radwaste** about capacity to take on water, **report** that you have room for water and will closely monitor tank levels.

If dispatched as **NPO** open RHR pump room B drain valve (161121), wait 2 minutes and **depress KEY 13,** as described above, and **report** the valve is open.

As **WWM** (or equivalent) contacted for assistance with RHR pump B, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. None

SCENARIO EVENT FORM

EVENTS	6, 7, & 8
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	HPCI Steam Leak into Reactor Building, HPCI Fails to Automatically Isolate, HPCI Isolation Valves Stick Mid-Position When Manually Closed, Multiple Control Rods Fail to Insert

POSITION	TIME	STUDENT ACTIVITIES
★		**Manually scram the reactor when any Secondary Containment Area temperature / radiation approaches or exceeds Max Safe Temperature.** **Rapidly depressurize the reactor when two Secondary Containment Areas exceed Max Safe Rad / Temperature / Water levels.** **Insert control rods IAW EO-100-113 Sheet 2.** **Stops and prevents injection except from SLC and CRD.**
TEAM		Recognizes / reports: • Annunciator AR-114-001 (E05), HPCI LEAK DETECTION HI TEMP/HI DIFF TEMP • Annunciator AR-016-001 (G15), FIRE PROTECTION PANEL 0C650 SYSTEM TROUBLE • Elevated temperatures in the HPCI equipment area on recorder 1R604 and Riley Tempmatic readings at 1C614.
SRO		Re-enters EO-100-104, SECONDARY CONTAINMENT CONTROL, based on HPCI equipment area temperature: • Directs starting ESW, all individual Room Coolers. • Directs manual isolation of HPCI. May direct scram-imminent actions, if time permits. Enters EO-000-102, RPV CONTROL, after determining that a primary system is discharging into an area and cannot be isolated: • **Directs Mode Switch to SHUTDOWN when Pipe Routing Area approaches or exceeds Maximum Safe temperature.** • Acknowledges multiple control rods fail to insert. • Answers, “Is more than 1 control rod >00?” Yes.

★ Denotes Critical Task

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENTS	6, 7, & 8
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	HPCI Steam Leak into Reactor Building, HPCI Fails to Automatically Isolate, HPCI Isolation Valves Stick Mid-Position When Manually Closed, Multiple Control Rods Fail to Insert

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 4** to initiate event:
   {Key[4]} IMF mfHP152009 f:0.5

2. Once the crew has diagnosed HPCI steam leak and directed by lead examiner, **depress KEY 14** to ramp up leak:
   {Key[14]} MMF mfHP152009 f:4 r:1:00

3. When either HPCI steam isolation valve HS is taken to close and the mode switch is in shutdown, **ensure mfHP152003 initiates** to start a delayed steam leak in the HPCI pipe routing area **(aet n13scen1et1)**.

4. If dispatched to close CRD charging water header isolation valve (HV-146-F034), wait 2 minutes, then **depress KEY 5** and report completion:
   {Key[5]} IRF rfRD155017 f:0

5. If dispatched to open ADS valves from lower relay room, wait 2 minutes, then **depress KEY 6** and report completion:
   {Key[6]} SCN n13scen1_1

ROLE PLAY

As **NPO** dispatched to investigate HPCI, wait 2 minutes and report:
"There is some steam coming from the HPCI equipment room. I can hear a hissing noise from the HPCI equipment room. The door to the room is very warm."

If dispatched to close HPCI outboard steam isolation valve (HV-155-F003), wait 5 minutes and then report you cannot access the valve due to steam in the area.

Role play any other directed actions as required.

EVALUATOR NOTES

1. When the crew attempts to manually isolate HPCI, a second steam leak will occur in the HPCI pipe routing area where the isolation valves are located. This will drive a second area temperature to exceed maximum safe and require a rapid depressurization.
2. Due to the quick rise in HPCI equipment room temperature, the crew may not scram the Reactor prior to exceeding the maximum safe temperature of 167°F. In this case, the crew should take prompt action to scram the Reactor once the HPCI equipment room temperature exceeds 167°F.
3. Five of the ten control rods that failed to scram may be inserted with RMCS.
4. Recommended termination criteria:
   - ADS valves open.
   - Control rod insertion in progress or completed (5 of 10 rods).
   - Reactor water level controlled in assigned band above -161".

SCENARIO EVENT FORM

EVENTS	6, 7, & 8
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	HPCI Steam Leak into Reactor Building, HPCI Fails to Automatically Isolate, HPCI Isolation Valves Stick Mid-Position When Manually Closed, Multiple Control Rods Fail to Insert

POSITION	TIME	STUDENT ACTIVITIES
SRO (cont)		Exits EO-000-102 and enters EO-000-113, Level/Power Control: • Executes Power Leg: o Ensures ARI initiated. o Records initial ATWS power level. o Answers, "Is initial ATWS pwr >5% or cannot be determined?" No. o Ensures SRMs/IRMs inserted. o Directs Recirc run back to minimum, if Turbine still online. o **Direct CRD maximized.** o Enters EO-000-113 sheet 2 for control rod insertion: ▪ Answers, "Is more than 1 control rod >00?" Yes. ▪ **Directs control rod insertion per EO-100-113 Sheet 2.** • Executes Level Leg: o Directs verification of isolations and initiations o Answers, "Is initial ATWS pwr >5% or cannot be determined?" No. o Directs Reactor water level controlled -129" to +54" using Table 15 systems (SLC, FW, Cond, CRD, LPCI). • Executes Pressure Leg: o Directs Reactor pressure controlled 800-1050 psig using Turbine Bypass Valves. Acknowledges report of HPCI pipe routing area temperature high and failure to isolate. When HPCI pipe routing area and equipment area temperatures exceed 167°F (2 > max safe): • Exits Pressure Leg of EO-000-113. • **Directs stopping and preventing RPV injection from FW, Cond, LPCI, and Core Spray per EO-100-113 LQ/L-18.** • **Enters EO-000-112, Rapid Depressurization** • **Ensures RPV Injection is stopped and prevented iaw EO-100-113 LQ/L-18** • Answers, "Is Supp Pool Lvl > 5'?" Yes. • **Directs opening all ADS valves.** • Answers, "Are all ADS valves open?" Yes. • Directs slowly raising injection to restore and maintain Reactor water level -60" to -161" using Table 15 systems (SLC, FW, Cond, CRD, LPCI).

SCENARIO EVENT FORM

EVENTS	6, 7, & 8
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	HPCI Steam Leak into Reactor Building, HPCI Fails to Automatically Isolate, HPCI Isolation Valves Stick Mid-Position When Manually Closed, Multiple Control Rods Fail to Insert

POSITION	TIME	STUDENT ACTIVITIES

ATC		**Rotates Mode Switch to SHUTDOWN.**
		
		Recognizes/reports failure of multiple control rods to insert and APRMs are downscale.
		
		Arms and depresses manual scram pushbuttons (4).
		
		Inserts SRMs/IRMs.
		
		If directed, runs Recirc to minimum From any RRP HMI screen by:
		• Selects MANUAL FLOW REDUCTION INITIATION.
		• Selects RRP SPEED TO MINIMUM.
		• Selects INITIATE RRP FLOW REDUCTION.
		
		Maximizes CRD per OP-155-001:
		• Place control switch CRD Pump 1P132B(A) to RUN, to start 1P132B(A), Ctl Rod Drive Water Pump B(A).
		• Using FC C12 1R600, CRD Flow Controller, in MANUAL, Fully Open FV 146 F002A(B), CRD Flo Ctl.
		• Fully Open THTLG PV 146 F003, DRIVE WTR PRESS THTLG valve.
		
		Inserts control rods using RMCS per EO-000-113 Sheet 2 hard card:
		• Bypass RWM.
		• Establish approximately (if obtainable) (closing Charging Water Iso 146F034 as necessary):
		  o 63 gpm cooling water flow.
		  o 350 psid drive water pressure.
		• Select rod.
		• Depress continuous insert pushbutton.
		
		Controls Reactor water level -129" to +54" using Table 15 systems (SLC, FW, Cond, CRD, LPCI).

SCENARIO EVENT FORM

EVENTS	6, 7, & 8
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	HPCI Steam Leak into Reactor Building, HPCI Fails to Automatically Isolate, HPCI Isolation Valves Stick Mid-Position When Manually Closed, Multiple Control Rods Fail to Insert

POSITION	TIME	STUDENT ACTIVITIES
ATC (cont)		**Before rapid depressurization is performed, stops and prevents RPV injection from FW and Cond per OP-145-001 hard card:** • IF RFP A(B)(C) is in DPM, or transfer to DPM is in progress: o Control level in MANUAL via LV-10641 FW Startup Control Vlv controller LIC-C32-1R602. o As required, Adjust INC/DEC button on feeding RFP A(B)(C) SPD CTL/DEMAND SIGNAL controller SIC C32 1R601A(B)(C) in MANUAL to establish and maintain assigned level band. (2.19.9b) Slowly raises injection to restore and maintain Reactor water level -129" to 54" using Table 15 systems (SLC, FW, Cond, CRD, LPCI).

SCENARIO EVENT FORM

EVENTS	6, 7, & 8
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	HPCI Steam Leak into Reactor Building, HPCI Fails to Automatically Isolate, HPCI Isolation Valves Stick Mid-Position When Manually Closed, Multiple Control Rods Fail to Insert

POSITION	TIME	STUDENT ACTIVITIES

BOP		Starts ESW and all individual Room Coolers.
		
		Attempts to manually isolate HPCI by closing:
		• HV-155-F002
		• HV-155-F003
		
		Recognizes/reports HPCI isolation valves failed mid-position and HPCI is NOT isolated.
		
		Initiates ARI by arming and depressing ARI DIV 1 MAN TRIP HS-147103A1 TRIP and ARI DIV 2 MAN TRIP HS-147103B1 TRIP.
		
		Controls Reactor pressure 800-1000 psig using Turbine Bypass Valves.
		
		Stops and prevents RPV injection from LPCI per OP-149-001 hard card:
		• Checks RHR loop pressures and ensures lopos are not voided.
		• Arm AND Depress initiation buttons HS-E11-1S20A and HS-E11-1S20B.
		• Place pump control switches 1P202A(B)(C)(D) to STOP, then Release.
		• Observe white pump override lights ILLUMINATED, and NO RHR Pumps running.
		
		Stops and prevents RPV injection from Core Spray per OP-151-001 hard card:
		• IF Core Spray NOT initiated, Arm AND Depress initiation button HS-E21-1S16A and B.
		• Shutdown pumps:
		  o Place pump control switches 1P206A(B)(C)(D) to STOP AND Release.
		  o Observe white pump override lights ILLUMINATED.
		  o Observe no Core Spray pump running.
		
		Recognizes/reports high temperature in HPCI pipe routing area.
		
		Opens ADS valves.

UNIT SUPERVISOR TURNOVER SHEET

UNIT 1 TO/DA/Y
Date

SHIFT	1900 Start	to	0700 End	SHIFT	0700 Start	to	1900 End

MODE	1	MODE	
POWER LEVEL	99.0 %	POWER LEVEL	%
GENERATOR OUTPUT	1340 MWe	GENERATOR OUTPUT	MWe
CASK STORAGE GATE INSTALLED:	YES/NO	CASK STORAGE GATE INSTALLED:	YES/NO

NRC CODE PRIOR TO 0800	Tango	Golf	Indigo	Foxtrot
NRC CODE AFTER 0800	Oscar	November	Indigo	Mike

REMARKS:

1) EHC pump A is out of service for maintenance.
2) RCIC is out of service for maintenance.
3)
4)
5)
6)
7) Shift activities are to:
   1. Swap Bus 1A202 from normal to alternate supply per OP-104-001 section 2.1.4.
   2. Lower Reactor power with Recirculation flow to approximately 92% per GO-100-012 section 5.3 and Reactivity Manipulation Package.
8)
9)
10) Unit 2 is at 100% power.
11)
12)

COMMON:

1) None
2)
3)
4)
5)
6)
8)
9)
10)
11)
12) (NRC SCN 1)

OFFGOING UNIT SUPERVISOR CHECKLIST:

1900-0700	0700-1900
MJ	
MJ	
MJ	
MJ	

1. Evolutions in progress and items to be completed during next shift, as noted in remarks, have been discussed with oncoming Unit Supervisor.
2. Problems encountered during past shift and abnormal plant conditions, as noted in remarks, have been discussed with oncoming Unit Supervisor.
3. Information in SOMS Log is complete and discussed with oncoming Unit Supervisor.
4. As applicable turnover plastic Security Badge cover and CRS Monitor function to oncoming Unit Supervisor.

1900 - 0700 M. Jacopetti

0700 - 1900 ____________________

Offgoing Unit Supervisor

ONCOMING UNIT SUPERVISOR CHECKLIST:

	0700-1900	1900-0700
(14)		

1. LCO/TRO Log reviewed.
2. SOMS Log reviewed for entries made in past 24 hours.

0700 - 1900 ____________________

1900 - 0700 ____________________

Oncoming Qualified
Unit Supervisor

POST RELIEF

0700-1900	1900-0700

1. Walk down Control Room panels with Unit Responsible PCO.
2. CRC Book reviewed and Reactivity Brief performed with PCO.
3. Completed System Status Operable audit for open PMT this shift.

0700 - 1900 ____________________

1900 - 0700 ____________________

Oncoming Unit Supervisor

RFPT-RFP A,B,C
HI VIBRATION
(A16)

SETPOINT: 3 mils

ORIGIN:
Turbine - VE10671A1,A2,B1,B2,C1,C2
Turbine - VE10672A1,A2,B1,B2,C1,C2
Pump - VE10673A1,A2,B1,B2,C1,C2
Pump - VE10674A1,A2,B1,B2,C1,C2

1. PROBABLE CAUSE:

1.1 Improper cooldown or warmup causing a warped rotor condition.
1.2 Improper lube oil temperature.
1.3 Improper lube oil supply flow to bearings.
1.4 Wiped bearing.
1.5 Turbine packing rubbing.

2. OPERATOR ACTION:

☐ 2.1 **Check** alarm condition and trend on RFPT VIBRATION XRSH-12728.
☐ 2.2 **Reduce** load (Turbine speed) on 1A or 1B RFP to determine if Pump or Turbine vibration condition is load related. Control 1C RFPT speed per EWR 1261258 recommendation.

☐ NOTE: Associated RFPT trips if high Turbine vibration conditions reaches 5 mils. Pump vibration is alarm only.

☐ 2.3 **IF** turbine vibration increases to 5 mils, **THEN Ensure** RFPT trips.

☐ NOTE: 1C RFP "pump" vibration may exceed the 3 mil alarm setpoint. The 1C RFP speed will be controlled per EWR 1261258 recommendation.

☐ 2.4 **IF** 1A or 1B RFP "Pump" vibration increases to 5 mils, **Trip** RFPT.
2.5 **IF** 1C RFP "Pump" vibration exceeds the predetermined EWR 1261258 criteria, **Reduce** speed to lower the RFP vibration or trip the turbine if vibration levels cannot be restored below maximum allowed levels.
☐ 2.6 **IF** alarm occurs during startup, **THEN Reduce** warmup rate of Turbine.
☐ 2.7 **Check** bearing oil temperatures prior to trip to determine if oil temperature induced vibration.
☐ 2.8 **Notify** Predictive Maintenance to increase monitoring vibration data.

3. AUTOMATIC ACTION:

☐ Associated RFPT trips if high turbine vibration conditions reaches 5 mils. Pump vibration is alarm only.

4. REFERENCE:

4.1 P&ID M-127
4.2 M2-J-34(2)
4.3 E-323
4.4 E-126
4.5 IOM 42
4.6 P&ID M-106 sh 2, 3, & 4
4.7 EWR 1261258

PROCEDURE COVER SHEET

PPL SUSQUEHANNA, LLC PROCEDURE	
FLOODING IN REACTOR BUILDING ADHERENCE LEVEL: STEP-BY-STEP	4/28/2011 ON-169-002 Revision 6 Page 1 of 8

QUALITY CLASSIFICATION:	APPROVAL CLASSIFICATION:
(X) QA Program ( ) Non-QA Program	(X) Plant ( ) Non-Plant ( ) Instruction

EFFECTIVE DATE: ______________

PERIODIC REVIEW FREQUENCY: 2 Years

PERIODIC REVIEW DUE DATE: ______________

RECOMMENDED REVIEWS:

Emergency Planning

Procedure Owner: B Shift

Responsible Supervisor: Shift Manager-B Shift

Responsible FUM: Manager-Nuclear Operations

Responsible Approver: Manager-Nuclear Operations

1. SYMPTOMS AND OBSERVATIONS

1.1 Any following alarm at Panel 1C601:

1.1.1 Core Spray Loop A Pump Room Flooded (AR109-H1)

1.1.2 Core Spray Loop B Pump Room Flooded (AR113-H1)

1.1.3 HPCI Pump Room Flooded (AR114-H3)

1.1.4 RCIC Pump Room Flooded (AR108-H3)

1.1.5 RHR Loop A Pump Room Flooded (AR109-H8)

1.1.6 RHR Loop B Pump Room Flooded (AR113-H8)

1.2 Reactor Bldg Sump Level Hi-Hi alarm at Panel 1C692. (AR125-B1)

1.3 RBCCW Loop A(B) Hx Room Flooded alarm at Panel 1C668. (AR123-F1(2))

1.4 Any following alarm at Panel OC211: (LA-0211-001)

1.4.1 Reactor Well Seal Leak (A01)

1.4.2 Refueling Gates Leak (A03)

1.4.3 Fuel Pool Water Lo Level (B04)

1.5 Visual observation of flooding.

1.6 Unexpected/unexplained high influent to LRW Collection Tank System.

2. AUTOMATIC ACTIONS

Reactor Building Sump Pumps 1P225A(B) start/stop on high/low levels.

NOTE:	Subsections within Section 3 may be performed in any order as determined by Shift Supervision based on the nature of the event and the priority of required operator actions. Steps within each subsection must be performed in the order written.

3. <u>OPERATOR ACTIONS</u>

3.1 **Record** date and time of event.

_______________ / __________ / __________
Shift Supervisor / Date / Time

☐ 3.2 **Evaluate** entry into EO-100-104, SECONDARY CONTAINMENT CONTROL.

☐ 3.3 **Evaluate** entry into Emergency Plan, refer to EAL (Emergency Action Levels) Section 5, Table O, Natural or Man Made Events, OA5 and OU5.

☐ 3.4 **Evaluate** Operability of ECCS and **Comply** with TS 3.5.1.

☐ 3.5 **Monitor** PICSY PMS Format Liquid Radwaste Collection (LRW).

☐ 3.6 **Dispatch** Operator to assess extent and source of flooding.

☐ 3.7 **Isolate** source of flooding as rapidly as possible, **<u>UNLESS</u>** source required to:

3.7.1 Shut down reactor,

<u>OR</u>

3.7.2 Assure adequate core cooling,

<u>OR</u>

3.7.3 Suppress fire,

<u>OR</u>

3.7.4 Prevent primary containment failure.

☐ 3.8 **Notify** Radwaste Control Room to prepare for high influent rate of water due to flooding.

3.8.1 **<u>Before</u>** overflowing the LRW Collection System, **Perform** the following:

☐ a. **Place** 0P338A LRW Sump Pump to **OFF**.

☐ b. **Place** 0P338B LRW Sump Pump to **OFF**.

☐ c. **Place** 0P337A CRW Sump Pump to **OFF**.

☐ d. **Place** 0P337B CRW Sump Pump to **OFF**.

☐ e. **Ensure** RW BLDG elevator doors are **CLOSED** on Ele 646'.

☐ f. **Open** 0B342041 Radwaste Bldg Freight Elevator Disconnect Switch 0DS309A Bkr.

☐ 3.9 IF the source of flooding is fire protection water, **Dedicate** a set of LRW collection tanks to hold the water until future processing can be accomplished.

☐ 3.10 **Ensure** all eight water tight doors on elevation 645' **CLOSED**.

3.11 IF Reactor Building Sump Hi-Hi Level **ANNUNCIATED**

CAUTION

If the Core Spray Room A flooded alarm was received, sump pump box 1CB238 may only be accessible by wading through water. Electrical and/or radiological safety measures should be implemented, as necessary.

☐ 3.11.1 At Reactor Building Sump Pump Box 1CB238, **Ensure** Reactor Building Sump Pump 1P225A(B) **RUNNING**.

☐ 3.11.2 IF NOT running, **Start** Reactor Building Sump Pump 1P225B(A).

☐ 3.11.3 IF one or both reactor building sump pump(s) running with **NO** apparent flow:

a. **Ensure** the following valves **OPEN**:

☐ (1) 161201 RB Liquid Radwaste Dsch Header Iso Vlv.

☐ (2) 161123 RB Sump Pump A Discharge Iso Vlv.

☐ (3) 161125 RB Sump Pump B Discharge Iso Vlv.

☐ b. **Check** LRW Collection Tank in service in accordance with OP-069-020 Liquid Radwaste Collection/Surge Tank Operation.

c. **IF** only one Reactor Building Sump Pump is running, **Check** for reverse flow through shutdown pump indicating a stuck open discharge check valve (161124 or 161126) by:

☐ (1) **Observing** shutdown pump's motor/pump shaft for rotation.

☐ (2) **Elevated** discharge pressure on shutdown pump.

☐ (3) **Sound** of flow through the shutdown pump.

3.12 **IF** ECCS Room flooded and radwaste has room for water:

☐ 3.12.1 **Isolate** source of flooding, unless source required to:

a. Shut down reactor,

OR

b. Assure adequate core cooling,

OR

c. Suppress fire,

OR

d. Prevent primary containment failure.

Caution

Opening more than one ECCS room drain valve at a time may result in flooding of other vital equipment.

If leakage can NOT be isolated, do NOT drain room to LRW to maintain Supp Pool inventory.

3.12.2 **Open** following Room Drain Valve for affected room:

CAUTION

If the Core Spray Room A flooded alarm was received, room drain valves may only be accessible by wading through water. Electrical and/or Radiological Safety measures should be implemented as necessary.

☐ a. 161117 CSPRY Pump A & C Room Drain Iso Vlv.

☐ b. 161118 CSPRY Pump B & D Room Drain Iso Vlv.

☐ c. 161119 HPCI Pump Room Drain Iso Vlv.

☐ d. 161122 RCIC Pump Room Drain Iso Vlv.

☐ e. 161120 RHR Pump A & C Room Drain Iso Vlv.

☐ f. 161121 RHR Pump B & D Room Drain Iso Vlv.

☐ 3.12.3 **WHEN** room drained, **Close** drain valve.

☐ 3.13 **Notify** Health Physics that radiological conditions in the affected areas may have changed.

☐ 3.14 Upon problem resolution, **Ensure** affected system(s) is/are restored to required lineup for desired operating condition in accordance with appropriate operating procedure.

3.15 Unit Supervisor's Comments:

____

____

3.16 **Forward** completed copy of this procedure to following for review:

3.16.1 Unit Supervisor ________________ / _________
Signature Date

3.16.2 Shift Manager ________________ / _________
Signature Date

3.16.3 Assistant Operations Manager-Shift Operations

3.16.4 DCS

3.17 **Forward** copy of this reviewed procedure to:

3.17.1 None

4. REFERENCES

4.1 P&ID M-149

4.2 P&ID M-151

4.3 P&ID M-152

4.4 P&ID M-156

4.5 P&ID M-161

4.6 TS 3.5.1

4.7 NDAP-QA-0310 Liquid Effluent Release

4.8 EO-000-104 Secondary Containment Control

4.9 OP-069-020 Liquid Radwaste Collection/Surge Tank Operation

5. DISCUSSIONS

Flooding in the Reactor Building may affect the operability of ECCS equipment located in 645' elevation. If submerged, equipment and instruments are subject to damage which could create an unsafe condition. Any report or indication of flooding should be investigated immediately to prevent and minimize loss of equipment and allow continued Unit operation.

A leak from a primary system to the secondary containment could produce airborne radioactivity and elevated ambient temperatures requiring precautions when entering the area.

NDAP-QA-1218, Temporary Changes, addresses plant internal flooding and requirements for covering floor drains. Internal flooding of rooms containing Engineered Safety Features is minimized by one or more of the following:

- At least one open floor drain
- Door to floor clearance between rooms
- Sufficient physical separation
- Individual water tight compartments

Additionally, efforts need to be directed at limiting the amount of non-radioactive water to be processed by isolating the leak as soon as possible.

PROCEDURE COVER SHEET

PPL SUSQUEHANNA, LLC PROCEDURE	
SCRAM, SCRAM IMMINENT ADHERENCE LEVEL: CONTINUOUS USE	12/28/2012 ON-100-101 Revision 28 Page 1 of 17

QUALITY CLASSIFICATION:	APPROVAL CLASSIFICATION:
(X) QA Program ( ) Non-QA Program	(X) Plant ( ) Non-Plant ( ) Instruction

EFFECTIVE DATE:	
PERIODIC REVIEW FREQUENCY:	2 Years
PERIODIC REVIEW DUE DATE:	

RECOMMENDED REVIEWS:

Procedure Owner:	E Shift
Responsible Supervisor:	Shift Manager-E Shift
Responsible FUM:	Manager-Nuclear Operations
Responsible Approver:	Manager-Nuclear Operations

1. SYMPTOMS AND OBSERVATIONS

1.1 FOR SCRAM IMMINENT

1.1.1 Conditions exist as determined by the Unit Supervisor that may require a reactor SCRAM to be initiated **OR**

1.1.2 SCRAM IMMINENT Actions directed to be performed by another procedure.

1.2 For Reactor SCRAM, both of the following annunciators:

RPS CHANNEL A1/A2 AUTO SCRAM (AR-103-001,A01)

RPS CHANNEL B1/B2 AUTO SCRAM (AR-104-001,AO1)

2. AUTOMATIC ACTIONS

2.1 For SCRAM IMMINENT

None

2.2 For SCRAM

2.2.1 Full core display changes to RODS FULL-IN/FULL-OUT mode, and all control rods indicating full-in. Control rod locations on the full core display will be green for each fully inserted rod.

2.2.2 **IF** RPV water level goes down to +13", feedwater system initiates level setdown to control level at approximately +18" on the FW Lo Load Valve LV-10641.

2.2.3 When main generator lockout is received, auxiliary busses transfer to tie bus.

3. <u>OPERATOR ACTIONS FOR SCRAM IMMINENT</u>

<u>AS TIME PERMITS</u>, **Perform** following prior to scram to mitigate plant transient:

☐ 3.1 **Reduce** Reactor Power in accordance with RE Instructions in CRC Book.

3.1.1 **When** required, **Reduce** Rx Core Flow as follows:

☐ a. **<u>IF</u>** not in the Manual Mode, on the RRP DUAL SCRN HMI screen, **Touch** the Rx Recirc Pump A & B <u>EXIT TO MANUAL</u> buttons.

☐ b. **<u>IF</u>** required, **Insert** Control Rods, as necessary, to obtain a Rod Line which is less than the value stated in the CRC Book.

c. **Initiate** the required flow/power reduction by performing <u>either</u> of the following:

☐ (1) **Initiate** a Manual Rx Recirc Limiter #2 Runback in accordance with OP-164-001.

<u>OR</u>

☐ (2) **Adjust** the double chevron DEC buttons on the REACTOR RECIRC PUMP A(B) SPEED controllers SY-B31-1R621A & B as required to establish the final Core Flow value stated in the CRC Book.

☐ 3.2 **Notify** GCC.

3.3 **<u>IF</u>** Auto Scram has <u>not</u> occurred, **<u>AND</u>** Manual Scram is <u>not</u> required at this time, **Enter**:

☐ 3.3.1 GO-100-012, Power Maneuvers, **<u>OR</u>**

☐ 3.3.2 GO-100-004, Plant Shut Down to Minimum Power.

4. IMMEDIATE OPERATOR ACTIONS **(For Rx SCRAM ONLY)**

☐ | NOTE: A Hard Card is available to cover key steps of this procedure in an expeditious manner.

☐ 4.1 **Place** Mode Switch HS-C72A-1S01 to **SHUTDOWN** (HC)

CS ☐ 4.2 **Observe** all Control Rods indicate fully inserted (using two indications, OD-7 completed as soon as possible). (HC)

4.3 IF more than 1 control rod > 00:

4.3.1 **Arm AND Depress** manual scram pushbuttons.

☐ a. RPS MAN SCRAM CHAN A1 HS-C72A-1S03A

☐ b. RPS MAN SCRAM CHAN B1 HS-C72A-1S03B

☐ c. RPS MAN SCRAM CHAN A2 HS-C72A-1S03C

☐ d. RPS MAN SCRAM CHAN B2 HS-C72A-1S03D

4.3.2 **Initiate** ARI by arming and depressing:

☐ a. ARI DIV 1 MAN TRIP HS-147103A1 TRIP

☐ b. ARI DIV 2 MAN TRIP HS-147103B1 TRIP

☐ 4.3.3 IF more than 1 control rod remains > 00, **Enter** EO-100-113 at step LQ/Q-2.

☐ 4.4 **Insert** IRMs and SRMs. (HC)

5. SUBSEQUENT OPERATOR ACTIONS

☐ NOTE: Subsections within Section 5 may be performed in any order as determined by Shift Supervision based on the nature of the event and priority of the operator actions. Steps within each subsection must be completed in the order written.

☐ 5.1 **Record** date and time of event.

_______________ / _______________
Date Time

☐ 5.2 **Observe** Scram Discharge Volume Vent and Drain valves **CLOSED**. (HC)

☐ 5.3 **WHEN** main generator load < 150 MWe, at 1C651, **Depress** Trip Pushbutton for Main Turbine. (HC)

☐ 5.4 **Record** date and time IRM's are placed in Range 2 or below.

_______________ / _______________
Date Time

☐ 5.4.1 **Ensure** SRM functional and signal to noise determination surveillances are performed within 12 hours of placing IRM's on Range 2 or below (SR 3.3.1.2.6).

☐ 5.5 **Stop** Condensate Pumps 1P102A(B)(C)(D) as necessary to leave 2 pumps in operation. (HC)

☐ 5.6 **Perform** ON-193-002, Main Turbine Trip, to ensure main trubine trip and main generator lockout.

☐ 5.7 **Ensure** feedwater is in a Startup Level Control alignment in accordance with OP-145-001, Reactor Feed Pump and Reactor Feed Pump Lube Oil System. (HC)

☐ 5.8 **Maintain** Reactor Pressure: (HC)

5.8.1 ~ 934 psig **IF** Turbine Bypass Valves available,

OR

5.8.2 Between 800-1087 psig until directed otherwise.

☐ NOTE: Stator Cooling Lockout relays (86GI and 86 GJ) may only be reset in accordance with ON-193-002.

☐ 5.9 **Reset** Main Generator Lockouts in accordance with ON-193-002.

☐ NOTE: Resetting the Scram will result in a change in RPV makeup. Level control above Setpoint Setdown is recommended prior to Scram reset to avoid a second Scram on low RPL level. (4)

☐ 5.10 **IF** no fuel failure and conditions permit, **Reset** Scram and ARI in accordance with OP-158-001.

☐ 5.11 **Perform** ON-159-002, Containment Isolation, as required.

☐ 5.12 **IF** at least one Recirc Pump running, **Maintain** RPV level between +13" and +54". (HC)

5.13 **IF NO** Reactor Recirc Pumps running: (1)(2)

☐ NOTE: RPV bottom head drain temperature is valid even if RWCU isolated.

☐ 5.13.1 **IF** ΔT between RPV bottom head drain and RPV steam dome > 145°F indicating thermal stratification, **Maintain** RPV level between +13" and +30". **DO NOT START RECIRC PUMPS**.

☐ NOTE: The remainder of the substeps in this step are performed to prevent/reduce stratification. The methods are presented in the preferred order of performance. As many steps as required to prevent stratification should be performed.

☐ 5.13.2 **IF** ΔT between RPV bottom head drain and RPV steam dome ≤ 145°F **Restore AND Maintain** RPV water level between +45" and +54".

5.13.3 **IF** RWCU is in service **OR** is aligned for operation:

☐

NOTE:	IF RWCU can not be placed in service but is aligned, it should be aligned for letdown to establish bottom head drain flow.

☐ a. **IF** available, **Place** RWCU in service in accordance with OP-161-001.

OR

☐ b. **IF** RWCU cannot be placed in service, **Align** the RWCU system for letdown IAW OP-161-001.

THEN

☐ (1) **Establish** RPV bottom head flow through RWCU to Main Condenser **OR** Radwaste in accordance with OP-161-001.

AND

☐

NOTE:	If both Recirc loop suction paths are isolated, RWCU pumps will trip on low flow.

(2) **Perform** following to raise bottom head flow:

(a) **Close** EITHER:

☐ 1) HV-144-F100, RWCU SUCT FROM RECIRC LOOP A

OR

☐ 2) HV-144-F106, RWCU SUCT FROM RECIRC LOOP B

☐ (3) **Restore** RWCU System flow to its original flow in accordance with OP-161-001.

☐	NOTE:	Resetting the Scram will result in a change in RPV makeup. Level control above Setpoint Setdown is recommended prior to Scram reset to avoid a second Scram on low RPL level. (4)

☐ 5.13.4 IF no fuel failure and conditions permit and not previously performed, **Reset** Scram and ARI in accordance with OP-158-001.

☐ 5.13.5 **Reduce** FC-C12-1R600 CRD Flow Controller setpoint to 38 gpm.

☐ 5.13.6 IF SCRAM and ARI cannot be reset, **AND** all rods in, **Consider** closing CRD Charging Wtr Hdr Iso Vlv 146F034 (Area 29, El. 719', R722) to stop charging flow.

☐ 5.13.7 **Start** at least one Recirc Pump in accordance with OP-164-001.

☐ a. **WHEN** at least one Recirc pump has been placed in service, **Restore** RC-C12-1R600 CRD Flow Controller setpoint to 63 gpm.

☐ 5.13.8 IF none of the above methods could be performed or stratification is still a concern, **Trip** CRD pump(s).

☐ 5.14 **Ensure** RWCU in service in accordance with OP-161-001.

☐ 5.15 **Remove** Condensate Demineralizers from service, in accordance with OP-139-001.

☐ 5.16 **Shut Down** Condensate Iron Injection in accordance with OP-144-002.

☐ 5.17 **Ensure** Hydrogen Water Chemistry System shutdown in accordance with OP-145-002.

☐ 5.18 **Ensure** Condensate Filtration Bypass valve is restored to **CLOSED** in accordance with Condensate Filtration System Bypass Valve Operation section of OP-144-002. (3)

5.19 **Notify** following about scram:

☐ 5.19.1 Manager-Nuclear Operations

☐ 5.19.2 Assistant Operations Manager-Shift Operations

☐ 5.19.3 Chemistry

☐ 5.19.4 Health Physics

5.20 **Notify** I&C Supervision to:

☐ 5.20.1 **Perform** Nuclear Instrumentation (NI) surveillances.

☐ 5.20.2 **Confirm** feedwater heater isolation logic not tripped due to the transient. (Per activity C4598-01)

☐ 5.21 **Perform** SO-159-002 within 2 hours after any discharge of steam from SRVs.

5.22 **Place** plant in desired condition:

☐ 5.22.1 GO-100-002, Plant Startup and Heatup

☐ 5.22.2 GO-100-004, Plant Shutdown to Minimum Power

☐ 5.22.3 GO-100-005, Plant Shutdown from Minimum Power Operation or Scram to Cold Shutdown

☐ 5.22.4 GO-100-012, Power Maneuvers

☐ 5.23 **Implement** OP-AD-327, Post Reactor Transient/Scram/Shutdown evaluation.

☐ 5.24 IF Scram has been reset, **Notify** HP to perform followup survey.

5.25 Unit Supervisor comments:

____

____

____

____________________ / __________
Unit Supervisor Date

5.26 **Forward** completed copy of this procedure to following for review:

5.26.1	Unit Supervisor	______________ Signature	/ __________ Date
5.26.2	Shift Manager	______________ Signature	/ __________ Date
5.26.3	Assistant Operations Manager-Shift Operations		

5.27 **Forward** copy of this reviewed procedure to:

5.27.1 None

6. REFERENCES

6.1 FSAR Table 15E.1.1-1 Operator Actions when Reactor Scram is Incurred

([1]) 6.2 PLI-70494, G. T. Jones to H. G. Stanley "Reactor Coolant Pressure Boundary Thermal Limits", February 28, 1992

([2]) 6.3 CRA 432219

([3]) 6.4 CRA 509233

([4]) 6.5 CRA 1653667

7. DISCUSSION

SCRAM Imminent actions are performed, as time permits, for two reasons. First, to mitigate the consequences of the SCRAM transient on the plant. Second, to buy time for the Operators to carry out alarm response and off normal procedure steps that may preclude the need for a SCRAM. If the plant is stabilized and a SCRAM is not required, conditions would be appropriate for entry into GO-100-012, Power Maneuvers, or GO-100-004, Plant Shutdown to Minimum Power.

The SCRAM ON is entered on every scram. If a symptom-based EOP entry condition exists, the SCRAM ON is performed concurrently with symptom-based EOPs, however, only SCRAM immediate operator actions must be performed. Since immediate operator actions must be committed to memory, the SCRAM ON is entered by performing the scram immediate operator actions. There is no need to immediately take the procedure off the shelf. A limited number of subsequent operator actions may be performed concurrently with the symptom-based procedures, however, there is no urgency, especially if continued performance of the ON conflicts with or slows implementation of symptom-based procedures. If a conflict of guidance exists, the symptom-based EOP actions always take precedence over ONs.

Placing Mode Switch to shutdown accomplishes two major goals. It seals in scram signal by inserting an additional scram signal for ten seconds. It also changes plant mode such that if main steam line pressure lowers to 866.5 psig, MSIVs will not close.

The full core display is the first and quickest method of observing control rods full-in. The computer can be used to indicate control positions by demanding an OD-7. Note that OD-7 will indicate 'FI' for control rods fully inserted beyond the '00' position. OD-7 will indicate '00' when each control rod is settled in the 00 position. Verification of Rod Full In position using the computer OD-7 is expected to be completed as soon as possible after the scram.

Other key plant parameters (power, period, turbine load, BPV position, steam flow and RPV pressure) can also be used to observe reactor is shutdown.

If more than 1 control rod is not inserted to position 00, cold shutdown margin is not assured and alternate means are attempted to insert the rods.

The action to arm and depress the manual scram pushbuttons on control room Panel 1C651 specifically addresses multiple sensor or relay failures in the RPS logic for plant conditions where an automatic reactor scram should have been initiated but did not.

Initiating ARI (alternate rod insert) vents the scram air header using redundant ARI valves and independent logic to attempt inserting control rods. ARI is independent of RPS and has three inputs that can cause it to trip (initiate). It has two automatic trips: RPV level -38 inches or pressure 1135 psig which are the same as ATWS setpoints for recirc pump RPT breakers. ARI can also be initiated manually from Panel 1C601 by arming and depressing ARI DIV 1/DIV 2 MAN TRIP HS-147103A1/B1 pushbuttons. It takes longer for ARI to insert control rods than RPS because ARI does not vent scram air from each scram valve individually but vents the scram air header. For this reason ARI cannot be reset for 25 seconds once it is initiated.

Scram discharge volume drain valves close in a scram to prevent reactor coolant release into the secondary containment at the RB sump.

Scram discharge volume vent valves close in a scram to prevent reactor coolant release into the secondary containment ventilation system.

The SDV has two series vent valves and two series drain valves. When one vent valve is closed the indication for SDV vent will indicate amber. When one drain valve is closed the indication for SDV drain will indicate amber. The position indication for these valves is actually a "Flow Path" indication.

SPDS may be used to determine Containment Isolations.

A running diesel generator must be supplied with adequate ESW flow. Adequate ESW Flow is described in OP-054-001.

Rather than relying on automatic actuation of reverse power relay trips of main generator, main turbine is tripped at less than 150 MWe. 150 MWe is specified because the EOC-RPT breaker trip of the Reactor Recirculation pumps is automatically bypassed at less than 26% reactor power. This corresponds to 130.1 psig Turbine first stage pressure.

When main turbine is tripped or if turbine trips automatically, turbine and generator are protected by ensuring automatic actions take place in accordance with ON-193-002.

Placing Feedwater System in startup level control maintains normal water level and prevents inadvertent flooding of vessel through Reactor Feed Pump discharge valves in event of vessel depressurization. It also assures minimum flow requirements of Reactor Feed Pumps are being met.

If there are <u>no</u> entry conditions, symptom-based EOPs do not require entry for ATWS when reactor power is less than APRM downscale setpoint (5%); therefore, it is possible to be in the scram procedure alone. In this event, direction is given to enter EO-100-113, Level/Power Control, to obtain directions for inserting those control rods which did not insert automatically. Entry to EO-100-113 is specified to the Power Control flowpath only.

As soon as all scram signals clear and plant is stabilized, ARI and SCRAM are reset to allow accumulators to recharge, reduce wear across CRD mechanism seals, permit draining of scram discharge volume, and minimize cold water injection into lower head region of vessel. This step is especially important if reactor recirc pumps are not running to prevent the buildup of stratified thermal layer.

When no reactor recirc pumps are running, it is possible for relatively cold water to stratify in the RPV bottom head. Stratification is indicated by a differential temperature > 145°F between RPV bottom head drain and steam dome. RPV bottom head drain can be used regardless of RWCU status because the bottom head drain indicated temperature will be conservatively low when RWCU is not in service. It is important to take steps to prevent the buildup of a stratified thermal layer because it is difficult to remove the thermal layer (once developed) without exceeding the heatup rate on the CRD stub tube welds.

The methods and order of preference for performing actions to prevent stratifications are:

1. Raise RPV level to +45" to +54" upon recovery of level transient from scram.

2. Establish bottom head flow through RWCU.

3. Reset the SCRAM.

4. Minimize CRD Flow.

5. Restart a Recirc pump.

6. Trip CRD pump (last resort).

Rationale on the order of preference:

Raise RPV level:	The actions to control RPV level are normally performed as a normal recovery after a scram. Core flow must be evaluated as soon as possible and level raised to the +45" to +54" band as part of the recovery.
Bottom head flow:	The FSAR and DBD for RWCU system has numerous references that one of the system design functions is to prevent stratification. To commence letting down through RWCU to the Condenser or Radwaste is a relatively simple evolution. This is listed as #2 because there is a possibility we will be unable to reset the SCRAM and minimize CRD flow.
Reset SCRAM/min CRD:	These go hand in hand. Adjusting the CRD flow controller will have no effect on CRD flow into the vessel until scram is reset due to leakage through the seals from the charging water header. This is #3 because bottom head flow may be able to prevent Stratification by removing the cold CRD water and this action may not be able to be performed.
Isolate Charging Water:	If SCRAM and ARI cannot be reset, and all rods in, an alternate action to minimize CRD flow is to isolate charging water to reduce cold water flow to the vessel.
Restart Recirc Pump:	This is the next logical step. Stratification will not occur with a recirc pump running. This evolution will take several minutes and requires coordination. The limits to start a pump requires differential temperatures across recirc loops and Tsat and bottom head. Therefore any delays in getting the pump started, without taking the above actions, will prevent starting a recirc pump until our differential temperature limits are within their required limits.
Trip CRD:	This is the last resort because of the other systems that require CRD to be in operation. If CRD is secured we must perform the CRD startup OP and gradually restore seal purge to the RWCU and Recirc pumps. The concern is the potential pressure transient on the Pressure relief valve for the recirc seal purge system. Tripping CRD will further delay operators ability to timely restart a recirc pump.

If thermal stratification occurs, direction is given to reduce CRD flow and establish a water level band (+13" to +30") that hinders natural circulation in the RPV by keeping water level below the level where steam separators are covered. Maintaining water level above +13" provides ample margin for adequate core cooling and allows the scram to be reset.

Ability to reduce CRD flow depends on scram and ARI being reset. Charging water will enter the CRD's through the scram valves irrespective of CRD Flow Control Valve position until the scram valves can be closed by resetting scram and ARI.

When thermal stratification has not proceeded to the point of causing greater than 145°F differential temperature between the steam dome and the bottom head, the RPV water level is raised above 45 inches to promote sufficient natural circulation due to the steam separators being flooded. Maintaining water level below 54" prevents tripping of steam driven pumps.

1C651 PCO ACTIONS FOLLOWING A SCRAM
Reference Sect. 4.1, 4.2, 4.4, 5.2, 5.3, 5.5, 5.7, 5.8, 5.12

☐ 1. **Place** Mode Switch in Shutdown

☐ 2. **Verify** all rods in (using two indications, OD-7 completed as soon as possible)

☐ 3. **Insert** SRMs and IRMs

☐ 4. **Stop** Condensate Pumps 1P102A(B)(C)(D) as necessary to leave 2 pumps in operation.

☐ 5. **Check** SDV Vent and Drain valves closed

☐ 6. **Check** RPV level between 13" and 54"

☐ 7. **Check** RPV pressure < 1087 psig

☐ 8. **Trip** Turbine when < 150 MWe

☐ 9. **Check** Turbine speed is lowering

☐ 10. **Check** Status of MSIV's

☐ 11. **Report** anything abnormal to Unit Supervisor

☐ 12. **Ensure** FW is aligned for Start Up Level Control

RPV LEVEL NORMAL OPERATING BAND
+20 inches to +45 inches
RPV PRESSURE NORMAL OPERATING BAND
800 psig to 1050 psig

1C601 PCO ACTIONS FOLLOWING A SCRAM
<u>REFERENCE SECT. 4.1, 4.2, 4.4, 5.2, 5.3, 5.7, 5.8, 5.12</u>

☐ 1. 1.72 psig Drywell pressure:
   a. ☐ HPCI initiation
   b. ☐ Diesel Generators A - D start with ESW cooling
   c. ☐ Isolations

☐ 2. 13" RPV water level isolations

☐ 3. -30" RPV water level RCIC initiation

☐ 4. -38" RPV water level:
   a. ☐ HPCI initiation
   b. ☐ Isolations

☐ 5. -129" RPV water level:
   a. ☐ Low Pressure ECCS initiations
   b. ☐ Diesel Generators A - D start with ESW cooling
   c. ☐ Isolations

☐ 6. Electrical Plant Status
   a. ☐ 4.16 kV buses
   b. ☐ Aux Buses
   c. ☐ Startup Buses

☐ 7. **Report** anything abnormal to Unit Supervisor

RPV LEVEL NORMAL OPERATING BAND
+20 inches to +45 inches
RPV PRESSURE NORMAL OPERATING BAND
800 psig to 1050 psig

Facility: Susquehanna Scenario No.: NRC-2 Op-Test No.: 2013

Examiners: ____________ Operators: ____________

Initial Conditions: The plant is operating at approximately 100% power. EHC pump A is out of service for maintenance. RCIC is out of service for maintenance.

Turnover: Perform half scram testing for RPS scram channel A1 per SO-158-001.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP, SRO	Perform Half Scram Testing SO-158-001
2	rfDB105 101	C - All	MCC 1B217 De-Energizes, Loss of Power to Drywell Spray Valves, Loss of RPS Bus A ON-158-001, Technical Specifications
3	Report	R – ATC, SRO	Power Reduction Due to Minimum Generation Emergency Notification OI-AD-029, GO-100-012
4	mfHP1520 04	I – BOP, SRO	HPCI Inadvertent Initiation ON-156-001, Technical Specifications
5	cmfTH02_ TE14357A 1A2	C – All	Recirculation Pump A High Temperature AR-102-001 (G03), ON-164-002, Technical Specifications
6	cmfBR03_ 1A10201 cmfBR03_ 1A10204	C – All	Electrical Fault on Bus 11B ON-103-003, ON-100-101, EO-000-102
7	mfRR1640 11A	M – All	Reactor Coolant Leak in Drywell EO-000-102, EO-000-103
8	mfFW1440 03A(C)	C – All	Trip of Condensate Pumps 1A and 1C EO-000-102
9	mfHP1520 15	C – All	HPCI Trip EO-000-102, EO-000-112
10	mfAD1830 01	C – BOP, SRO	ADS Fails to Automatically Initiate EO-000-102, EO-000-112

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: **Susquehanna**	Scenario No.: **NRC-2**	Op-Test No.: **2013**
1. Total malfunctions (5-8) **Events 2, ~~3~~, 4, 5, 6, 7, 8, 9, 10**	9	
2. Malfunctions after EOP entry (1-2) **Events 8, 9, 10**	3	
3. Abnormal events (2-4) **Events 2, 3, 4, 5, 6**	5	
4. Major transients (1-2) **Event 7**	1	
5. EOPs entered/requiring substantive actions (1-2) **EO-000-102, EO-000-103**	2	
6. EOP contingencies requiring substantive actions (0-2) **EO-000-102 Alt Level Leg, EO-000-112**	2	
7. Critical tasks (2-3)	2	
CRITICAL TASK DESCRIPTIONS: **CT-1 – Spray the Drywell when Suppression Chamber exceeds 13 psig.** **CT-2 – Perform Rapid Depressurization when RPV level drops to -161".**		

TEAM SUSQUEHANNA Generating Excellence	**PPL–SUSQUEHANNA, LLC LEARNING CENTER** **SIMULATOR SCENARIO**
Scenario Title:	**NRC 2013 Scenario #2**
Scenario Duration:	**1.5 hours**
Scenario Number:	**NRC 2013 Scenario #2**
Revision / Date:	**0 / January 28, 2013**
Course:	**Licensed Operator Initial**
Operational Activities:	

Prepared By:	Tom Hooper Instructor	01/28/2013 Date
Reviewed By:	R.J. TRESSLER Operations Training Supervisor	2/26/2013 Date
Approved By:	Lonnie Crawford Supervising Manager/Shift Manager	3/1/2013 Date

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SCENARIO SUMMARY

The crew assumes the shift with the plant operating at approximately 100% power. EHC pump A is out of service for maintenance. RCIC is out of service for maintenance.

The crew will begin by performing half scram surveillance testing for Reactor Scram Instrument Channel A1 SO-158-001. When the crew resets the half scram, MCC 1B217 will de-energize. This results in a loss of RPS bus A, as well as power to Drywell spray valves on RHR A. The crew will execute ON-158-001, Loss of RPS, to restore power to RPS bus A. The crew will reset the half scram, reset NSSSS logic, and recover the RBCW isolation.

Next, the crew will be notified that a Minimum Generation Emergency has been declared and that a 50 MWe reduction on Unit 1 is requested ASAP. The crew will reduce power in accordance with OI-AD-029, Emergency Load Control, and GO-100-012, Power Maneuvers.

Next, HPCI will spuriously start. HPCI will inject into the Reactor and Reactor power will rise. The crew will take action to override HPCI injection per OP-152-001. The crew will also execute ON-156-001, Unanticipated Reactivity Change. HPCI will be inoperable but available for the remainder of the scenario. The SRO will determine that with RCIC already out of service, this requires the plant to be taken to Mode 3 within 12 hours.

A high temperature condition will develop on Recirculation pump A lower guide bearing. The crew will respond per AR-102-001 (G03) and trip the pump once limits are exceeded. The crew will also execute ON-164-002, Loss of Recirculation Flow, and the SRO will determine the impact of single loop operations in Technical Specifications.

Next, a fault will occur on Auxiliary Bus 11B. This will lead to loss of two Condensate pumps, two Service Water pumps, two Circulating Water pumps, and the only operating Recirculation pump. The crew will scram the Reactor due to the loss of all Recirculation pumps. The crew will execute ON-100-101, Scram, Scram Imminent, ON-103-003, 13.8 KV Bus 11A Loss, and EO-000-102, RPV Control.

Next, the two remaining Condensate pumps will trip and a Reactor coolant leak will develop inside the Drywell. The crew will enter EO-000-103, Primary Containment Control. The crew will transition to HPCI to maintain Reactor water level, spray the Suppression Chamber, and then spray the Drywell. Sprays will be successful in lowering Containment pressures.

HPCI will trip and the Reactor coolant leak will worsen. ADS will fail to automatically initiate. Reactor water level will lower below the top of active fuel and the crew will execute EO-000-112, Rapid Depressurization. The crew will open the ADS valves to lower Reactor pressure and then restore and maintain Reactor water level with low pressure injection systems.

The scenario will be terminated when the ADS valves are open, Reactor water level is being controlled in the assigned band above -161", and Containment parameters are being controlled per EO-000-103.

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SCENARIO OBJECTIVES

The objective of this scenario is to evaluate the Licensed Operator Candidate's ability to respond to the scenario events. These events will require each candidate to demonstrate the following:

- Knowledge of integrated plant operations
- Ability to diagnose abnormal plant conditions
- Ability to work together as a team
- Ability to mitigate plant transients that exercise their knowledge and use of ONs and EOPs
- Ability to utilize Technical Specifications (SRO Only)

To meet this objective, the Licensed Operator Candidates must demonstrate proficiency in the following competencies:

Reactor Operator Candidates:

1. Interpret/diagnose events and conditions based on alarms, signals, and readings.
2. Comply with and use procedures, references, and Technical Specifications.
3. Operate the control boards.
4. Communicate and interact with other crew members.

Senior Reactor Operator Candidates:

1. Interpret/diagnose events and conditions based on alarms, signals, and readings.
2. Comply with and use procedures and references.
3. Operate the control boards (N/A to upgrade candidates).
4. Communicate and interact with the crew and other personnel.
5. Direct shift operations.
6. Comply with and use Technical Specifications.

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CRITICAL TASKS

1. Critical Task 1

   Spray the Drywell when Suppression Chamber pressure exceeds 13 psig.

Safety Significance

Maintenance of primary containment integrity.

Actions are taken to spray the Drywell during a LOCA when the Suppression Chamber pressure exceeds 13 psig. From the Susquehanna Emergency Operating Procedures basis document, EO-000-103, "The value of 13 psig is the lowest suppression chamber pressure which can occur when 95% of the non-condensables (Nitrogen) in the drywell have been transferred to the suppression chamber." At 13 psig suppression chamber pressure, 5% of the non-condensables remain in the drywell. This 5% value is the limit established to preclude "chugging" – the cyclic condensation of steam at the downcomer openings of the drywell vents. Values in excess of 13 psig are indicative of more non-condensables in the drywell, meaning chugging is more probable.

Chugging (steam bubble collapse at the downcomer exit resulting in a water in-rush to fill the voided areas) induces stresses at the junction of the downcomers and the drywell floor. Repeated such stresses may result in failure of these joints, creating a direct bypass from drywell to suppression chamber. Bypassing the suppression pool will directly pressurize the primary containment during a LOCA may result in failure.

By requiring drywell sprays at 13 psig in the suppression chamber (5% non-condensables in the drywell), a drywell non-condensable value of >1% will be maintained and chugging should not occur.

From Appendix D of NUREG-1021, Draft Revision 9, the critical task listed above has essential safety action that correctly completed, will prevent "degradation of any barrier to fission product release" and the crew will take action to "effectively direct or manipulate engineered safety feature (ESF) controls that would prevent any condition describe in the previous paragraph."

Consequences of Failure to Perform the Task

Potential failure of primary containment.

SSES EOP Basis for:

PC/P-5 **WHEN** SUPP CHMBR PRESS > **13 PSIG**
CONTINUE
[Directions to initiate drywell sprays]

Drywell spray operation may affect the availability of electrical equipment located in the drywell. Therefore, suppression chamber sprays are given the maximum time allowable to reduce primary containment pressure before operation of drywell sprays is required.

The allowable time is determined by the suppression chamber pressure which is equated to the amount of non-condensables remaining in the drywell.

The value of 13 psig is the lowest suppression chamber pressure which can occur when 95% of the non-condensables (N2) in the drywell have been transferred to the suppression chamber. That is, at least 5% non-condensables remain in the drywell when suppression chamber pressure reaches 13 psig. This non-condensable concentration limit is established to preclude chugging - the cyclic condensation of steam at the downcomer openings of the drywell vents. A suppression chamber pressure greater than 13 psig could be indicative of a lower concentration of non-condensables in the drywell, thereby meaning that chugging is more probable.

Chugging occurs when a steam bubble collapses at the exit of the downcomers, the rush of water drawn into the downcomers to fill the void induces stresses at the junction of the downcomers

and the drywell floor. Repeated occurrence of such stresses could cause fatigue failure of these joints, thereby creating a direct path between the drywell and suppression chamber. Steam discharged through the downcomers could then bypass the suppression pool and directly pressurize the primary containment. Scale model tests have demonstrated that chugging will not occur so long as the drywell contains at least 1% non-condensables. To preclude conditions under which chugging may occur, drywell sprays are conservatively required when at least 5% non-condensables remain in the drywell, i.e., suppression chamber pressure reaches 13 psig.

Both wide range and narrow range suppression chamber pressure indication is available in the control room. Wide range suppression chamber pressure indication is available locally on Containment H2/O2 Analyzer Panel if analyzer is selected to suppression chamber.

Indications/Cues for the Event Requiring Critical Task

Multiple control board and control room indications of suppression chamber and drywell pressures.

Performance Criteria

Start an RHR loop
Perform a valve alignment to provide a flowpath for spray.

Performance Feedback

RHR pump, valve and system flow indications are available.
Multiple indications of Drywell pressure dropping

2. Critical Task 2

Perform Rapid Depressurization when RPV level drops to -161"

Safety Significance
RPV leakage or loss of injection systems impacts the ability to provide continued adequate core cooling through core submergence based on inventory loss.

Consequences for Failure to Perform Task
Failure to take the EOP actions will result in uncovering the core and breach of the fuel clad due to over heating.
SSES EOP Basis for:
The following steps provide the operating crew guidance to line up injection systems as available to maintain level >-129". If these actions are unsuccessful, the crew receives additional direction when it is determined that level can not be maintained above TAF.
RC/L- 4 RESTORE AND MAINTAIN LVL BETWEEN
+13" AND **+54"**
USING TABLE **3** SYSTEMS
RC/L-5 **IF** LVL CANNOT BE RESTORED AND MAINTAINED **> +13"**
MAINTAIN LVL **> -129"** USING TABLE **3** SYSTEMS
AUGMENTING AS DESIRED WITH
TABLE **5** ALTERNATE SUBSYSTEMS
RC/L-10 IRRESPECTIVE OF VORTEX LIMITS
WITH TABLE **3** SYSTEMS
PERFORM ALL
1 LINE UP FOR INJECTION
2 START PUMPS
3 INCREASE INJECTION TO MAX
RC/L-11 **IF** LESS THAN 2 TABLE **4** SUBSYSTEMS CAN BE LINED UP
COMMENCE LINING UP AS MANY AS POSSIBLE
TABLE **5** ALTERNATE SUBSYSTEMS
RC/L-13 WITH TABLE **5** ALTERNATE SUBSYSTEMS PERFORM ALL:
1 LINE UP FOR INJECTION
2 START PUMPS
3 INCREASE INJECTION TO MAX
RC/L-16 **WHEN** LVL CANNOT BE RESTORED AND MAINTAINED **> -161"** GO TO RAPID DEPRESS
Rapid Depressurization is not initiated until RPV water level has dropped to -161" (TAF) because:

- Adequate core cooling exists so long as RPV water level remains above -161" (TAF).
- The time required for RPV water level to decrease to -161" (TAF) can best be used to line up and start pumps, attempting to reverse the decreasing RPV water level trend before Rapid Depressurization is required to assure continued adequate core cooling.

(Reference: SSES-EPG C1-4 and second override before C3-1)

Indications/Cues for Event Requiring Critical Task
Reactor water level trending downward, eventually indicating less than the top of active fuel height on the Fuel Zone Level Indicator.

Performance Criteria
Perform a Rapid Depressurization per EO-100-112 when water level reaches the TAF –161" as read on the Fuel Zone Instrument.
Initiate ADS / Manually open all 6 ADS valves

Performance Feedback
Initiating a rapid depressurization causes Reactor pressure to lower to the shutoff head of the low pressure injection systems allowing water level to rise on the Fuel Zone and Wide Range level instruments.
Verify ADS valves are open using light red light indication, acoustic monitoring and lowering Reactor pressure and rising reactor water level.

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SCENARIO MALFUNCTIONS

Malfunction	Description	Crew Response
1	MCC 1B217 De-Energizes, Loss of Power to Drywell Spray Valves, Loss of RPS Bus A	Places RPS bus A on alternate supply, resets half scram, resets NSSSS logic, restores from RBCW isolation
2	Power Reduction Due to Minimum Generation Emergency Notification	Lower Reactor power
3	HPCI Inadvertent Initiation	Secure HPCI, determine Technical Specification impact
4	Recirculation Pump A High Temperature	Secure Recirculation pump A
5	Electrical Fault on Bus 11B	Scram the Reactor
6	Reactor Coolant Leak in Drywell	Spray the Suppression Pool and Drywell
7	Trip of Condensate Pumps 1A and 1C	Control Reactor water level with HPCI
8	HPCI Trip	Rapidly depressurize the Reactor and control Reactor water level with low pressure systems
9	ADS Fails to Automatically Initiate	Manually open ADS valves

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SCENARIO REFERENCES

1.	SO-158-001	WEEKLY MANUAL SCRAM CONTROL SWITCH FUNCTIONAL CHECK
2.	ON-156-001	UNANTICIPATED REACTIVITY CHANGE
3.	OP-152-001	HPCI SYSTEM
4.	TS 3.5.1	ECCS – OPERATING
5.	ON-158-001	LOSS OF RPS
6.	AR-102-001 (G03)	RECIRC PUMP MOTOR HI TEMP
7.	ON-164-002	LOSS OF REACTOR RECIRCULATION FLOW
8.	TS 3.4.1	RECIRCULATION LOOPS OPERATING
9.	ON-100-101	SCRAM, SCRAM IMMINENT
10.	EO-000-102	RPV CONTROL
11.	ON-103-003	13.8 KV BUS 11A AND 11B LOSS OF BUS LOAD SHEDDING ON BUS UNDERVOLTAGE
12.	EO-000-103	PRIMARY CONTAINMENT CONTROL
13.	EO-000-112	RAPID DEPRESSURIZATION
14.	OP-149-004	RHR CONTAINMENT COOLING
15.	OP-160-001	DRYWELL VENTILATION SYSTEM
16.	OP-155-001	CONTROL ROD DRIVE HYDRAULIC SYSTEM
17.	OP-153-001	STANDBY LIQUID CONTROL SYSTEM
18.	OP-149-001	RHR SYSTEM
19.	OP-151-001	CORE SPRAY SYSTEM

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SCENARIO SPECIAL INSTRUCTIONS

1. Simulator setup
   a. **Initialize** to IC–377
   b. **Run** SCN file **n13scen2.scn**
2. **Place** the simulator in RUN
3. **Verify** the following malfunctions/overrides, event triggers and key assignments:

MF	RF	OR	SCN	ET	CONDITIONS	KEYS
3:3	1:1	0:0	0	2:0	10	6

4. **Prepare** the simulator for evaluation
   a. **Complete** a simulator exam checklist, NTP–QA–31.10 Attachment B
   b. **Place** a tag on EHC pump 1A handswitch.
   c. **Place** tags on RCIC.
5. **Prepare** a Turnover Sheet including the following:
   a. Perform half scram testing for Reactor Scram Instrument Channel A1 per SO-158-001.
6. **Prepare** a Surveillance Authorization Coversheet NDAP-QA-0722 -1 (available on X drive X:\FORMS\Nuclear\NDAP) and staple to copy of SO-158-001.

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SCENARIO FILES

n13scen2.scn

```
; Monitored parameters
SCN rat_mp
SCN n13scen2mp

; EHC Pump A OOS
IRF crfPM10_1P113A f:OUT

; RCIC OOS
IMF mfRC150011

; Crew performs half scram testing on RPS channel A1

; When crew resets half scram, MCC 1B217 deenergizes,
; causing loss of RPS A and power to DW spray valves
aet n13scen2et3

; Crew lowers power by 50 MWe due to min generation emergency

; HPCI spuriously initiates
{Key[1]} IMF mfHP152004 c:10

; NPO opens HPCI room drain valve
{Key[11]} IRF rfLD120003 f:OPEN

; Recirc pump A high temperature
{Key[2]} IMF cmfTH02_TE14357A1A2 r:10:00 f:300

; Electrical fault on Bus 11B
{Key[4]} IMF cmfBR03_1A10201
{Key[4]} IMF cmfBR03_1A10204

; Reactor coolant leak in Drywell
{Key[5]} IMF mfRR164011A r:3:00 f:0.2

; Trip of Condensate pumps 1A and 1C
{Key[5]} IMF mfFW144003A
{Key[5]} IMF mfFW144003C

; HPCI trip and coolant leak gets worse
{Key[5]} IMF mfHP152015 d:12:00
aet n13scen2et1

; Coolant leak gets worse once Drywell sprays are in service
{Key[6]} MMF mfRR164011A r:30 f:1.5

; ADS fails to initiate automatically
IMF mfAD183001
```

n13scen2mp.scn

insmp zaoti11305
changemp zaoti11305 ,,,RBCCW Supply Temp

n13scen2et1.et

```
;HPCI trip malfunction inserted
mfHP152015.Status=1
```

n13scen2et1.scn

```
IMF mfRR164011A r:3:00 i:0.2 f:1
```

n13scen2et3.scn

```
;SWITCH:RPS SCRAM RESET
diHSC72A1S05.CurrValue != #OR.diHSC72A1S05.NORM
```

n13scen2et3.scn

```
IRF rfDB105101 f:OPEN d:3
```

SCENARIO EVENT DESCRIPTION FORM

Initial Conditions: Ensure shift positions are assigned, have the Crew conduct the turnover and perform a panel walk down before the start of the scenario.

EVENT	OP EVENT / TASK	TIME	DESCRIPTION
N/A	N/A	0	Crew assumes shift
1	N/A	5	Perform Half Scram Testing
2	N/A	10	MCC 1B217 De-Energizes, Loss of Power to Drywell Spray Valves, Loss of RPS Bus A
3	N/A	20	Power Reduction Due to Minimum Generation Emergency Notification
4	N/A	30	HPCI Inadvertent Initiation
5	N/A	40	Recirculation Pump A High Temperature
6	N/A	55	Electrical Fault on Bus 11B
7	N/A	60	Reactor Coolant Leak in Drywell
8	N/A	60	Trip of Condensate Pumps 1A and 1C
9	N/A	70	HPCI Trip
10	N/A	85	ADS Fails to Automatically Initiate

SCENARIO EVENT FORM

EVENT	1
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Perform Half Scram Testing

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs ATC to perform half scram testing for Reactor Scram Instrument Channel A1 per SO-158-001.
ATC		Performs half scram testing for Reactor Scram Instrument Channel A1 per SO-158-001: • Place RPS MAN SCRAM CHAN A1 HS-C72A-1S03A control switch to ARMED. • Verify annunciator AR-103-A03, RPS MAN SCRAM CHANNEL A1/A2 SWITCH ARMED is ILLUMINATED. • Depress RPS MAN SCRAM CHAN A1 HS-C72A-1S03A control switch. • Verify the following annunciator alarms ILLUMINATED: o AR-103-A01, RPS CHANNEL A1/A2 AUTO SCRAM o AR-103-F01, RPS CHANNEL A1/A2 MAN SCRAM • Place RPS MAN SCRAM CHAN A1 HS-C72A-1S03A control switch to DISARMED. Reset A RPS half scram by momentarily positioning REACTOR SCRAM RESET HS-C72A-1S05 to GROUP 1/4 position AND THEN to GROUP 2/3 position.
BOP		Monitors plant parameters. Provides peer checks.

NOTES	

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	1
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Perform Half Scram Testing

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

Role play any directed actions as required.

EVALUATOR NOTES

1. When the crew resets the half scram, the next event will be automatically inserted (loss of MCC 1B217).

SCENARIO EVENT FORM

EVENT	2
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	MCC 1B217 De-Energizes, Loss of Power to Drywell Spray Valves, Loss of RPS Bus A

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes/reports: • AR-103-001 (A01), RPS CHANNEL A1/A2 AUTO SCRAM • AR-016-001 (A04), ESS 480V LC 1B210 TROUBLE • Loss of RPS bus A • Loss of power to RHR A Drywell spray valves
SRO		May refer to ON-104-201, Loss of 4KV ESS Bus 1A, Attachment E for MCC 1B217 load list and impact. Enters ON-158-001, Loss of RPS. Determines Technical Specification 3.8.7 Required Action A.1 requires restoring 1B217 to operable within 8 hours. Determines Technical Specification 3.5.1 Condition A applies for loss of Core Spray A (7 day LCO). Determines Technical Specification 3.1.7 Condition B applies for loss of SLC B (7 day LCO).
ATC		Reset A RPS half scram by momentarily positioning REACTOR SCRAM RESET HS-C72A-1S05 to GROUP 1/4 position AND THEN to GROUP 2/3 position.
BOP		Executes ON-158-001, Loss of RPS: • Determines Attachment A is applicable. • Transfer A RPS bus to alternate power supply as follows: o Ensure ALTERNATE A FEED White indicating light ILLUMINATED. o Ensure RPS M G SET TRANSFER SWITCH HS-C72B-S1 in NORM position. o Place RPS M G SET TRANSFER SWITCH HS-C72B-S1 in ALT A position. • Coordinates with ATC to reset half scram. • Reset NSSSS isolation logic as follows: o Depress MN STM LINE DIV 1 ISO RESET HS-B21-1S32. o Depress MN STM LINE DIV 2 ISO RESET HS-B21-1S33. • Recover from RBCW isolation as follows: o Ensure RRP A CLG WTR OB ISO VALVES HV-18791A1&A2 CLOSED. o Ensure RRP B CLG WTR IB ISO VALVES HV-18792A1&A2 CLOSED. o Depress HV-18791A1&A2 ISOLATION RESET. o Depress HV-18792A1&A2 ISOLATION RESET. o Ensure RRP A CLG WTR OB ISO VALVES HV-18791A1&A2 OPEN. o Ensure RRP B CLG WTR IB ISO VALVES HV-18792A1&A2 OPEN.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	2
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	MCC 1B217 De-Energizes, Loss of Power to Drywell Spray Valves, Loss of RPS Bus A

INSTRUCTOR ACTIVITY

1. When the crew resets the half scram in the previous event, verify **automatic event trigger n13scen2et3 inserts** the following remote function:

   IRF rfDB105101 f:OPEN d:3

ROLE PLAY

If directed to investigate MCC 1B217, wait 2 minutes, then report:

> **"The feeder breaker to 1B217, 1B210-013, is tripped. I don't see anything specifically wrong at 1B217."**

If asked as Electrical Maintenance about reclosing 1B210-013, wait 2 minutes, then report:

> **"We do NOT recommend attempting reclosure of 1B210-013 until we investigate further."**

As **WWM** (or equivalent) contacted for assistance, acknowledge request.

Role play any directed actions as required.

EVALUATOR NOTES

1. Once the crew has reset the half scram, reset NSSSS logic, recovered RBCW, and determined extent of Core Spray / RHR loss, recommend moving on to the next event.

SCENARIO EVENT FORM

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Power Reduction Due to Grid Emergency Notification

POSITION	TIME	STUDENT ACTIVITIES
Team		Acknowledge Minimum Generation Emergency notification from GCC.
SRO		May refer to OI-AD-029 attachment D and CRC Book. Directs ATC to reduce power by 50 MWe with Recirculation flow. Provides oversight of reactivity maneuver.
ATC		Reduces power by approximately 50 MWe: • Using the RRP Dual Screen HMI, lowers A and B Recirc speeds by depressing the double chevron DEC buttons, as necessary. • Observes diverse plant indications: o APRMs o Core Thermal Power o MWe o RRP parameters o Core flow (Recirc loop mismatch <5%) o Reactor water level • Plots power reduction on Power to Flow Map.
BOP		Monitors plant parameters. Provides peer checks for reactivity manipulations.

NOTES	

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Power Reduction Due to Grid Emergency Notification

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **make the following report** to initiate event:

   "This is Lou Spinelli at GCC. A Minimum Generation Emergency is required and we need Susquehanna Unit 1 to reduce output by 50 MWe as quickly as possible."

ROLE PLAY

Role play any directed actions as required.

EVALUATOR NOTES

1. None

SCENARIO EVENT FORM

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	HPCI Inadvertent Initiation

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes/reports HPCI initiation. Recognizes/reports AR-114-001 (E02), HPCI PUMP DSCH LO FLOW. Recognizes/reports Reactor power change. Observes Drywell pressure and Reactor water level and determines HPCI injection is not required.
SRO		Directs overriding HPCI injection. Directs action to restore Reactor power less than license limit, if necessary. Enters ON-156-001. Declares HPCI inoperable. Determines Technical Specification Required Action 3.5.1 Condition D.1 cannot be met, therefore Condition H requires the plant to be in Mode 3 within 12 hours.
ATC		Monitors Reactor power and water level. May reduce Recirculation flow to restore Reactor power. Performs ON-156-001 actions as directed.

NOTES	

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	HPCI Inadvertent Initiation

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 1** to initiate event:

   {Key[1]} IMF mfHP152004 c:10

2. If dispatched as **NPO** to open HPCI room drain valve, wait two minutes, **depress KEY 11**, then report completion.

   {Key[11]} IRF rfLD120003 f:OPEN

ROLE PLAY

As **NPO** dispatched to investigate HPCI, wait 2 minutes and report:

"There are no abnormal indications in the HPCI room."

If dispatched as **NPO** to open HPCI room drain valve, wait two minutes, depress KEY 11 as described above, then report completion.

If asked as I&C to check HPCI before shutdown, wait 3 minutes, then report:

"We do NOT see anything immediately wrong with HPCI. You can go ahead and shut it down and we will continue troubleshooting afterwards."

As **WWM** (or equivalent) contacted for assistance with troubleshooting/repairing HPCI, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. Recirc pump rundown may occur due to low Feedwater pump suction pressure as HPCI is secured.

SCENARIO EVENT FORM

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	HPCI Inadvertent Initiation

POSITION	TIME	STUDENT ACTIVITIES
BOP		Overrides HPCI injection: • Ensure HPCI AUXILIARY PUMP 1P213 switch placed to START. • Place HPCI TURBINE FLOW CONTROL FC-E41-1R600 in MANUAL. • Reduce demand to stop HPCI flow. May shutdown HPCI per OP-152-001 section 2.10: ▪ IF initiation signal sealed in indicated by Green light ILLUMINATED above HPCI INIT SIG RESET HS-E41-1S17 RESET: o Depress HS-E41-1S17 to RESET Initiation Signal. o Observe Green light EXTINGUISHED. ▪ Ensure HPCI AUXILIARY OIL PUMP 1P213 switch placed to START. ▪ Ensure following overload bypass switches placed to TEST: o HPCI DIV 1 MOV OL BYPS HS-E41-1S42. o HPCI DIV 2 MOV OL BYPS HS-E41-1S41. ▪ Place HPCI TURBINE FLOW CONTROLLER FC-E41-1R600 in MANUAL. ▪ Manually Reduce HPCI Pump flow (speed) with HPCI TURBINE FLOW CONTROL FC-E41-1R600 to reduce Turbine speed to ~ 2200 rpm. ▪ Open HPCI Room Floor Drain Valve 161119. (Only one ECCS room drain is to be opened at a time.) ▪ Check Close or CLOSE: o HPCI TEST LINE TO CST ISO HV-155-F011. o HPCI TEST LINE TO CST ISO HV-155-F008. ▪ Depress and Maintain HPCI TURB TRIP HS-E41-1S19 pushbutton DEPRESSED. ▪ WHILE holding HPCI TURB TRIP pushbutton depressed, Close HPCI TURBINE STEAM SUPPLY HV-155-F001. ▪ Ensure HPCI INJECTION HV-155-F006 CLOSES. ▪ Ensure HPCI MIN FLOW TO SUPP POOL HV-155-F012 CLOSES, if previously open. ▪ Observe HPCI AUXILIARY OIL PUMP 1P213 STARTS as HPCI Turbine coasts down. ▪ WHEN HPCI TURBINE STEAM SUPPLY HV-155-F001 indicates Fully Closed Release HPCI TURB TRIP pushbutton. ▪ Ensure HPCI STM LINE DRN TO CDSR IB ISO HV-155-F028 OPENS. ▪ Ensure HPCI STM LINE DRN TO CDSR OB ISO HV-155-F029 OPENS. ▪ Ensure HPCI BARO CDSR COND PP DSCH DRN HV-156-F026 OPENS. ▪ Ensure HPCI ROOM UNIT COOLER 1V209A(B) STOPS. ▪ Ensure HPCI L O CLG WTR HV-156-F059 CLOSED.

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SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Recirculation Pump A High Temperature

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports: • AR-102-001 (G03), RECIRC PUMP MOTOR HI TEMP, alarms. • Recirc pump A lower guide bearing temperature is rising.
SRO		Ensures execution of AR-102-001 (G03). Directs trip of Recirculation pump A. Enters ON-164-002, Loss of Reactor Recirculation Flow. Determines single loop limits must be met per COLR Section 8.0 Limits in TRM Section 3.2. Determines Tech Spec LCO 3.4.1 applies for single loop operation. Determines TR 3.8.2.1, Motor Operated Valves (MOV) Thermal Overload Protection Continuous, applies while overload bypass is in TEST.
ATC		Executes AR-102-001 (G03): • IF shutdown of recirc pump imminent: o Reduce Reactor Power IAW RE Instructions in CRC Book. • WHEN any of following temperatures reached: ▪ Motor bearing: 195°F ▪ Motor winding: 248°F ▪ Seal Cavity: 200°F o Perform the following: ▪ Trip Reactor Recirc Pump A(B). ▪ Perform ON-164-002, Loss of Reactor Recirculation Flow.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Recirculation Pump A High Temperature

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 2** to initiate event:

   {Key[2]} IMF cmfTH02_TE14357A1A2 r:10:00 f:300

ROLE PLAY

As **WWM** (or equivalent) contacted for assistance with Recirc pump A, acknowledge request.

As **Reactor Engineer** being informed of Recirc pump A out of service, acknowledge report and inform that you will review thermal limits.

Role play any other directed actions as required.

EVALUATOR NOTES

1. It is possible for a Reactor scram to occur during this event on OPRMs due to power/flow conditions after RRP A is tripped. This is likely to occur if the crew initiates a Lim #2 runback prior to tripping RRP A. If this occurs, insert the next event (fault on bus 11B) once the crew has stabilized the plant after the scram.
2. Recommend initiating the next event once the crew has tripped Recirculation pump A and is inserting control rods to get below the 60% rod line.

SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Recirculation Pump A High Temperature

POSITION	TIME	STUDENT ACTIVITIES

ATC (cont)		Executes ON-164-002, Loss of Reactor Recirculation Flow:
		• IF one Reactor Recirculation Pump trips:
		  o Comply with TRO 3.4.6.
		  AND
		  o Perform SO-164-004, Unit 1 Reactor Recirculation Single Loop Flow Recording.
		• IF operating recirculation pump speed is <75% rated speed (1260 rpm), Determine actual core flow by (else N/A):
		  o Display Core Pressure Drop via PICSY computer point NJP51 Core PL Press OR if PICSY unavailable via XR 14301: Point #5 – Recirc Core Plate DP.
		  o Determine actual core flow using Form GO 100 009 2 "Core Flow vs. Core Pressure Drop" curve.
		• Plot position on Power/Flow Map.
		• Perform appropriate action as specified on the Power/Flow map.
		• Perform appropriate action as specified in ON-178-002.
		• Request STA or other qualified individual to verify PICSY point NJZ51(NJZ52) RECIRC LOOP A NO FLOW Current Value is YES.
		• IF time permits, Disable all RFP A, B and C IND FLOW < 16.4% Inputs to Rx RECIRC RUNBK CKT in accordance with OP-164-001, prior to reducing power < 65% RTP.
		• Ensure thermal power REDUCED to < 60% rod line.
		• Reduce operating pump speed to maintain ≤ 80% rated pump speed (80% = 1344 rpm) AND operating loop flow to ≤ 53 Mlbm/hr in accordance with OP-164-001.
		• Comply with COLR Section 8.0 Limits in TRM.
		• Comply with Tech Spec LCOs 3.4.1.
		• Comply with TR 3.8.2.1, Motor Operated Valves (MOV) Thermal Overload Protection – Continuous.
		• For stopped pump, Place RECIRC A MOV OL BYPS HV-143-F031A/F032A key switch to TEST position.
		• Ensure RECIRC PUMP A DSCH BYPS HV-143-F032A OPEN.
		• Close RECIRC PUMP A DSCH HV-143-F031A.
		• Within 5 minutes, Re-Open RECIRC PUMP A DSCH HV-143-F031A.
		• AFTER 2 minutes, Place RECIRC A MOV OL BYPS HV-143-F031A/F032A key switch to NORM position.
		• Notify Shift Supervision to clear TR 3.8.2.1.
		• Perform the applicable sections of GO-100-012, Power Maneuvers.

BOP		Monitors plant parameters.

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SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Electrical Fault on Bus 11B

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports loss of Bus 11B. Recognizes / reports no running Recirculation pumps. Recognizes / reports loss of: • Circulating Water pumps B and D • Service Water pump B and D • Condensate pumps B and D
SRO		Directs Reactor scram due to no running Recirculation pumps. Enters ON-100-101, Scram, Scram Imminent. Enters EO-000-102, RPV Control: • Directs verification of isolations and initiations. • Directs Reactor water level controlled +13" to +54" using Condensate, Feedwater, and CRD. • Directs Reactor pressure controlled 800-1050 psig using Turbine Bypass Valves. Enters ON-103-003, 13.8 KV Bus 11A and 11B Loss of Bus Load Shedding on Bus Undervoltage.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Electrical Fault on Bus 11B

INSTRUCTOR ACTIVITY

1. When directed by the lead examiner, **depress KEY 4** to initiate event.

   {Key[4]} IMF cmfBR03_1A10201
   {Key[4]} IMF cmfBR03_1A10204

ROLE PLAY

As **NPO** dispatched check protective relays, wait 2 minutes and **report**,

> **"Breaker 1A10201 has an overcurrent flag tripped. There are no other abnormal indications at the breaker."**

As **NPO** dispatched to perform other restoration actions from ON-103-003, acknowledge requests, but delay any action.

As **WWM** (or equivalent) contacted for assistance with Bus 11B, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. The initial post-scram level control band is likely to be +20" to +45".
2. Recommend initiating the next event once the crew has stabilized the plant post-scram.

SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Electrical Fault on Bus 11B

POSITION	TIME	STUDENT ACTIVITIES
ATC		Places the Mode Switch in SHUTDOWN. Executes ON-100-101, Scram, Scram Imminent: • Observe all Control Rods indicate fully inserted (using two indications, OD 7 completed as soon as possible). • Insert IRMs and SRMs. • Observe Scram Discharge Volume Vent and Drain valves CLOSED. • Check Reactor water level between 13" and 54". • Check Reactor pressure <1087 psig. • WHEN main generator load < 150 MWe, at 1C651, Depress Trip Pushbutton for Main Turbine. • Check Turbine speed is lowering. • Check status of MSIVs. • Ensure Feedwater is aligned for Start Up Level Control per OP-145-001.

BOP		Executes ON-100-101, Scram, Scram Imminent:
		• Verifies isolations and initiations:
		    o 13" Reactor water level isolations (ON-159-002 Attachment A).
		
		Executes ON-103-003, 13.8 KV Bus 11A and 11B Loss of Bus Load Shedding on Bus Undervoltage:
		• Selects attachment A.
		• Dispatches NPO to check bus protective relays.
		• Acknowledges overcurrent relay trip on Breaker 1A10101.
		• If desired / as time permits:
		    o Dispatches NPO to cross-tie load centers 1B120, 1B140, 1B100, 1B260, and 1B 270 per OP-105-001.
		    o Ensures Condensate, Feedwater, Service Water and Circulating Water system parameters are within limits.
		    o Confirms status of RFP HPU & Kidney Pumps at ICS HMI monitor.
		    o Dispatches NPO to perform local checks at RFP HPU skid.
		    o Monitors Condenser vacuum.
		    o Performs ON-134-001, Loss of RBCCW.

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SCENARIO EVENT FORM

EVENTS	7, 8, 9 & 10
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Reactor Coolant Leak in Drywell, Trip of Condensate Pumps 1A and 1C, HPCI Trip, ADS Fails to Automatically Initiate

POSITION	TIME	STUDENT ACTIVITIES
★		**Spray the Drywell when Suppression Chamber exceeds 13 psig.** **Perform Rapid Depressurization when RPV level drops to -161".**
TEAM		Recognizes / reports rising: • Drywell leakage • Drywell temperature • Drywell pressure • Loss of all Condensate and Feedwater
SRO		Enters EO-100-103, Primary Containment Control, due to high Drywell temperature and pressure. Re-enters EO-100-102, RPV Control, due to low Reactor water level and high Drywell pressure. Directs initiation of Suppression Chamber spray. Directs Reactor water level controlled between -129" and 54" using HPCI, CRD, and/or SBLC. When Suppression Chamber pressure exceeds 13 psig or Drywell temperature approaches 340°F: • Ensures shutdown of Drywell coolers and fans. • **Directs initiation of Drywell sprays with flow limited to between 1000 and 2800 gpm for first 30 seconds.** Determines Containment parameters are within the Pressure Suppression Limit. Determines Reactor water level cannot be maintained above -129". Directs lineup for injection and starting of pumps for all Table 3 injections systems. Determines more than 1 injection subsystem is lined up with a pump running.

★ Denotes Critical Task

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENTS	7, 8, 9 & 10
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Reactor Coolant Leak in Drywell, Trip of Condensate Pumps 1A and 1C, HPCI Trip, ADS Fails to Automatically Initiate

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, depress KEY 5 to initiate coolant leak, trip of Condensate pumps, and delayed HPCI trip.

   {Key[5]} IMF mfRR164011A r:3:00 f:0.2
   {Key[5]} IMF mfFW144003A
   {Key[5]} IMF mfFW144003C
   {Key[5]} IMF mfHP152015 d:12:00

2. Twelve (12) minutes after Key 5 was initially inserted, ensure **mfHP152105** trips HPCI and **mfRR164011A** ramps up from 0.2 to 1 over 3:00 (caused by automatic event trigger n13scen2et1).

3. Once Drywell sprays are in service and directed by lead examiner, depress KEY 6 to raise severity of leak:

   {Key[6]} MMF mfRR164011A r:30 f:1.5

ROLE PLAY

As **NPO** dispatched to investigate Condensate pumps A and C, wait 2 minutes and report:

"Condensate pump A and C tripped on overcurrent."

As **NPO** dispatched to investigate HPCI after it trips, wait 2 minutes and report:

"It looks like the HPCI turbine is damaged."

Role play any other directed actions as required.

EVALUATOR NOTES

1. HPCI was secured earlier in the scenario due to a spurious start, but it remains available for injection. The actions to restore HPCI will vary depending on the exact method used to initially secure it.
2. Once Drywell spray is in service, if desired to lower Reactor water level at a faster rate, direct insertion of KEY 6.
3. The final Reactor water level control band is likely to be +20" to +45".
4. Recommended termination criteria:
    - ADS valves open.
    - Reactor water level controlled in assigned band above -161".
    - Containment pressure controlled per EO-000-103.

SCENARIO EVENT FORM

EVENTS	7, 8, 9 & 10
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Reactor Coolant Leak in Drywell, Trip of Condensate Pumps 1A and 1C, HPCI Trip, ADS Fails to Automatically Initiate

POSITION	TIME	STUDENT ACTIVITIES
SRO (cont)		When Reactor water level drops to -161", enters EO-000-112, Rapid Depressurization: • Exits EO-000-102 pressure leg. • Determines Suppression Pool level is >5'. • **Directs opening all ADS valves.** • Determines all ADS valves are open. Directs Reactor water level restored and maintained between +13" and +54" using LPCI, Core Spray, CRD, and/or SBLC.

ATC / BOP		Initiates Suppression Chamber spray per OP-149-004:
		• IF available, Place Emergency Service Water System in operation supplying RHR Room Cooler and RHR Pump to be placed in service.
		• IF LOCA signal present, Place HS-E11-1S17A(B) LOCA ISOLATION MANUAL OVERRIDE Switch to OVERRIDE.
		  ○ Observe White Indicating Light ILLUMINATED above HS-E11-1S17A(B) LOCA ISOLATION MANUAL OVERRIDE.
		  ○ Observe LOCA ISO SWITCH LOOP (A)B MANUAL OVERRIDE (AR-109(113)-C5) Annunciator alarms.
		• Open HV-151-F028A(B) SUPP CHMBR SPR TEST SHUTOFF.
		• Close HV-151-F017A(B)RHR INJ FLOW CTL.
		• IF a RHR Pump not in service, Start 1P202A(B)(C)(D)RHR PUMP.
		• Throttle Open HV-151-F027A(B) SUPP POOL SPRAY CTL, as necessary, to maintain ≤ 500 GPM as indicated on FI-15120A(B) CONTN SPRAY DIV 1(2) AND maintain total loop flowrate ≤ 10,000 gpm.
		• Monitor Suppression Chamber pressure.
		• IF Suppression Chamber pressure drops to 0 psig, THEN Stop Suppression Chamber Sprays.

SCENARIO EVENT FORM

EVENTS	7, 8, 9 & 10
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Reactor Coolant Leak in Drywell, Trip of Condensate Pumps 1A and 1C, HPCI Trip, ADS Fails to Automatically Initiate

POSITION	TIME	STUDENT ACTIVITIES

ATC / BOP (cont)		• IF required, Place RHRSW in service to RHR HX per section 4.0:
		  o Place RHR Service Water in service to the RHR Heat Exchanger per OP-116-001 OR as follows:
		    ▪ Ensure Closed Unit 2 HV-21210A(B) RHRSW Hx A(B) INLET.
		    ▪ Open HV-11210A(B) Unit 1 RHRSW Hx A(B) INLET to 10% Open.
		    ▪ OPEN HV-11215A(B) Unit 1 RHRSW Hx A(B) OUTLET.
		    ▪ IF required, Place HS-11202A3(B3) RHRSW PUMP A(B) LOCA TRIP switch to RESET.
		    ▪ Start 1P506A(B) RHRSW Pump A(B).
		    ▪ Throttle HV-11210A(B) Unit 1 RHRSW Hx A(B) INLET to establish 8000 to 9000 gpm on FI-E11-1R602A(B) RHRSW HX A(B) INLET FLOW.
		  o Place HV-151-F048A(B) HX A(B) SHELL SIDE BYPS Control Switch to OFF/LOCA RESET position.
		  o Observe White Indicating Light ILLUMINATED above HV-151-F048A(B) Control Switch.
		  o Close HV-151-F048A(B) HX A(B) SHELL SIDE BYPS.

SCENARIO EVENT FORM

EVENTS	7, 8, 9 & 10
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Reactor Coolant Leak in Drywell, Trip of Condensate Pumps 1A and 1C, HPCI Trip

POSITION	TIME	STUDENT ACTIVITIES
ATC / BOP (cont)		Attempts to control Reactor water level between -129" and 54" using HPCI, CRD, and/or SBLC. • May inject with HPCI per OP-152-001: o If HPCI running on min flow with controller in MANUAL, Raise demand on HPCI TURBINE FLOW CONTROL FC-E41-1R600 OR return controller to AUTO. o If HPCI isolated earlier in scenario, may need to perform step by step startup per OP-152-001. • May maximize CRD flow per OP-155-001: o Place control switch CRD Pump 1P132B(A) to RUN, to start 1P132B(A), Ctl Rod Drive Water Pump B(A). o Using FC-C12-1R600, CRD Flow Controller, in MANUAL, Fully Open FV-146-F002A(B), CRD Flo Ctl. o Fully Open THTLG PV-146-F003, DRIVE WTR PRESS THTLG valve. • May inject with SBLC per OP-153-001: o Place HS-14804 SBLC MANUAL INITIATION keylock control switch to A(B) START. o Observe SBLC PUMPS 1P208A(B) STARTS. o Once initiated, Observe the following: ▪ HV-144-F004 RWCU INLET OB ISO CLOSES ▪ SBLC SQUIB READY A B white indicating lights EXTINGUISHED ▪ SBLC SQUIB VALVES LOSS OF CKT CONTINUITY annunciator ALARMS ▪ Pump 1P208A(B) Red indicating light ILLUMINATED ▪ SBLC PUMP discharge header pressure ~ 200 psig greater than reactor pressure ▪ SBLC FLOW Indicates ≥ 40 GPM ▪ SBLC Storage Tank level decreasing

SCENARIO EVENT FORM

EVENTS	7, 8, 9 & 10
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Reactor Coolant Leak in Drywell, Trip of Condensate Pumps 1A and 1C, HPCI Trip

POSITION	TIME	STUDENT ACTIVITIES
ATC / BOP (cont)		When Suppression Chamber pressure exceeds 13 psig or Drywell temperature approaches 340°F: • Secures Drywell coolers and fans. • **Initiates Drywell sprays with flow limited to between 1000 and 2800 gpm for first 30 seconds:** o Open HV-151-F021A(B) DRYWELL SPRAY IB ISO. o Ensure both RX Recirc Pumps, all DW Coolers and Fans are Shutdown. o Throttle HV-151-F016A(B) DRYWELL SPRAY OB ISO, as necessary, to establish a flowrate BETWEEN 1000 AND 2800 GPM for the first 30 seconds as indicated on FI-15120A(B) CONTN SPRAY DIV 1(2) AND maintain total loop flowrate ≤ 10,000 gpm. o AFTER 30 seconds, Throttle Open HV-151-F016A(B) to establish a total loop flowrate 9,500 to 10,000 GPM as indicated on FI-E11-1R603A(B) RHR A/C(B/D) FLOW. o Monitor Drywell pressure. o IF Suppression Chamber pressure drops to 0 psig, THEN Stop Suppression Chamber Sprays. o IF required, Place RHRSW in service to RHR HX per section 4.0. o AFTER Primary Containment parameters show a decreasing trend, IF DESIRED, Throttle HV-151-F016A(B) DRYWELL SPRAY OB ISO to establish a reduced flowrate. Recognizes / reports trip of HPCI. **Opens all ADS valves.** Restores and maintains Reactor water level between +13" and +54" using LPCI, Core Spray, CRD, and/or SBLC.

SCENARIO EVENT FORM

EVENTS	7, 8, 9 & 10
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Reactor Coolant Leak in Drywell, Trip of Condensate Pumps 1A and 1C, HPCI Trip

POSITION	TIME	STUDENT ACTIVITIES
ATC / BOP (cont)		<u>Possible actions to control LPCI (OP-149-001):</u> IF RHR Injection initiated and RPV pressure < 420 psig, Perform either of the following: • Throttle injection flow (45 second time delay): o Throttle RHR INJ FLOW CTL HV-151-F017A(B) to achieve desired injection flow. o Stop one RHR PUMP A or C (B or D) when loop flow is between 12000 gpm and 3000 gpm. o Ensure RHR PP A/C (B/D) MIN FLOW HV-151-F007A(B) OPENS ≤ 30 seconds after system flow decreases below 3000 gpm. • Stop injection: o Close RHR INJ FLOW CTL HV-151-F017A(B) (45 second time delay), OR o Place pump control switches to STOP and then release. o Observe white pump override lights ILLUMINATED, and NO RHR Pumps running. <u>Possible actions to control Core Spray (OP-151-001):</u> IF Core Spray initiated and injection with reactor pressure below 420 psig, Throttle OR Stop injection: • Throttle injection: o To establish desired injection flow, Throttle CORE SPRAY LOOP A(B) IB INJ SHUTOFF HV-152F005A(B). o AFTER system flow decreases below 635 gpm, Ensure CORE SPRAY LOOP A(B) MIN FLOW HV-152F031A(B) OPENS. • Stop injection: o Close CORE SPRAY LOOP A(B) INJ SHUTOFF HV-152F005A(B), OR o Shutdown pumps: ▪ Place pump control switches to STOP AND Release. ▪ Observe white pump override lights ILLUMINATED. ▪ Observe no core spray pump running.

UNIT SUPERVISOR TURNOVER SHEET

UNIT 1 TO/DA/Y
Date

SHIFT 1900 to 0700
Start End

SHIFT 0700 to 1900
Start End

MODE 1
POWER LEVEL 99.0 %
GENERATOR OUTPUT 1340 MWe
CASK STORAGE GATE INSTALLED: YES/NO

MODE
POWER LEVEL %
GENERATOR OUTPUT MWe
CASK STORAGE GATE INSTALLED: YES/NO

NRC CODE PRIOR TO 0800	Tango	Golf	Indigo	Foxtrot
NRC CODE AFTER 0800	Oscar	November	Indigo	Mike

REMARKS:

1) EHC pump A is out of service for maintenance.
2) RCIC is out of service for maintenance.
3)
4)
5)
6)
7) Shift activity is to perform half scram testing for RPS Scram Channel A1 only per SO-158-001 section 5.1.
8)
9)
10) Unit 2 is at 100% power.
11)
12)

COMMON:

1) None
2)
3)
4)
5)
6)
8)
9)
10)
11)
12) (NRC SCN 2)

OFFGOING UNIT SUPERVISOR CHECKLIST:

1900-0700	0700-1900	
MJ		1. Evolutions in progress and items to be completed during next shift, as noted in remarks, have been discussed with oncoming Unit Supervisor.
MJ		2. Problems encountered during past shift and abnormal plant conditions, as noted in remarks, have been discussed with oncoming Unit Supervisor.
MJ		3. Information in SOMS Log is complete and discussed with oncoming Unit Supervisor.
MJ		4. As applicable turnover plastic Security Badge cover and CRS Monitor function to oncoming Unit Supervisor.

1900 - 0700 *M. Jacopetti*

0700 - 1900 ____________________

Offgoing Unit Supervisor

ONCOMING UNIT SUPERVISOR CHECKLIST:

0700-1900	1900-0700	
		1. LCO/TRO Log reviewed.
		(14) 2. SOMS Log reviewed for entries made in past 24 hours.

0700 - 1900 ____________________

1900 - 0700 ____________________

Oncoming Qualified Unit Supervisor

POST RELIEF

0700-1900	1900-0700	
		1. Walk down Control Room panels with Unit Responsible PCO.
		2. CRC Book reviewed and Reactivity Brief performed with PCO.
		3. Completed System Status Operable audit for open PMT this shift.

0700 - 1900 ____________________

1900 - 0700 ____________________

Oncoming Unit Supervisor

Facility: Susquehanna   Scenario No.: NRC-3   Op-Test No.: 2013

Examiners: ____________________   Operators: ____________________

Initial Conditions: The plant is operating at approximately 90% power. Core Spray pump A is out of service for maintenance.

Turnover: Swap EHC pumps per OP-193-003 section 2.9. Then raise Reactor power with Recirculation flow per GO-100-012 section 5.4 and Reactivity Manipulation Package.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP, SRO	Swap EHC Pumps OP-193-003
2	N/A	R – ATC, SRO	Raise Reactor Power with Recirculation Flow GO-100-012
3	mfTC1930 03	C – ATC, SRO	EHC Oscillations ON-193-001
4	cmfRV04_ PSV141F1 3K	C – BOP, SRO	SRV Inadvertently Opens ON-183-001, Technical Specifications
5	cmfMV01_ HV151F02 4A(B)	C – BOP, SRO	Suppression Pool Cooling Valve Breaker Trip OP-149-005, Technical Specifications
6	mfMS1830 10K mfMS1830 13K	C – All	SRV Leaks with Cracked Tailpipe ON-100-101, EO-000-102, EO-000-103
7	mfRP1580 04A(B)(C)(D)	M – All	Electrical ATWS EO-000-102, EO-000-113
8	cmfAV04_ FV146F00 2A cmfPM03_ 1P132A(B)	C – BOP, SRO	In-Service CRD Flow Control Valve Fails Closed, Then CRD Pumps Trip EO-000-113
9	mfSL1530 01A(B) cmfPM03_ 1P208A(B)	C – BOP, SRO	SLC Squib Valves Fail to Open on Start of First Pump, Subsequent SLC Pump Starts Fail EO-000-113

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: **Susquehanna**	Scenario No.: **NRC-3**	Op-Test No.: **2013**
1. Total malfunctions (5-8) **Events 3, 4, 5, 6, 7, 8, 9**	7	
2. Malfunctions after EOP entry (1-2) **Events 8 & 9**	2	
3. Abnormal events (2-4) **Events 3, 4, 5, 6**	4	
4. Major transients (1-2) **Event 7**	1	
5. EOPs entered/requiring substantive actions (1-2) **EO-000-102**	1	
6. EOP contingencies requiring substantive actions (0-2) **EO-000-113**	1	
7. Critical tasks (2-3)	3	
CRITICAL TASK DESCRIPTIONS: **CT-1 – Closes the spuriously open SRV or initiates a manual Reactor scram before Suppression Pool water temperature reaches 110°F.** **CT-2 – Lowers RPV level less than -60" but greater than -161".** **CT-3 – Inserts control rods IAW EO-100-113, Sheet 2, Control Rod Insertion.**		

PPL–SUSQUEHANNA, LLC
LEARNING CENTER

SIMULATOR SCENARIO

Scenario Title:	**NRC 2013 Scenario #3**
Scenario Duration:	**1.5 hours**
Scenario Number:	**NRC 2013 Scenario #3**
Revision / Date:	**0 / February 25, 2013**
Course:	**Licensed Operator Initial**
Operational Activities:	

Prepared By:	Tom Hooper Instructor	02/25/2013 Date
Reviewed By:	R. Stroupe Operations Training Supervisor	2/26/2013 Date
Approved By:	Lonnie Crawford Supervising Manager/Shift Manager	3/1/2013 Date

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SCENARIO SUMMARY

The crew assumes the shift with the plant operating at approximately 90% power. Core Spray pump A is out of service.

The crew will begin by starting EHC pump B and placing EHC pump A in standby per OP-193-003. Then the crew will begin raising Reactor power with Recirculation flow.

During the power ascension, the Reactor pressure regulator will begin to oscillate. Reactor power and pressure will oscillate. The crew will execute ON-156-001, Unanticipated Reactivity Change, ON-178-002, Core Flux Oscillations, and ON-193-001, Turbine EHC System Malfunction. The crew will lower Reactor power. This will suppress the oscillations some. The crew will then lower the load limit and swap pressure regulators to eliminate the oscillations.

Next, SRV K will spuriously open. The crew will execute ON-183-001, Stuck Open Safety Relief Valve. The SRV control switch will not close the valve, however pulling fuses will. Once the valve is closed, the crew will attempt to place Suppression Pool cooling in service. The Suppression Pool cooling valve breaker will trip immediately upon trying to open the valve on the first RHR loop attempted. The SRO will determine the Technical Specification impact. The crew will be able to place Suppression Pool cooling in service with the second loop of RHR.

SRV K will continue to have significant leak-by even once the fuses are pulled. Additionally, the SRV tailpipe is cracked and will continue to degrade. This results in rising Suppression Pool water temperature, air temperature, and pressure. Eventually, vacuum breakers will cycle, causing Drywell temperature and pressure to rise. The crew will execute ON-100-101, Scram, Scram Imminent, to lower Reactor power and attempt a manual scram prior to Drywell pressure exceeding 1.72 psig. Later in the scenario, the crew will mitigate degraded Containment parameters with Suppression Chamber sprays per EO-000-103, Primary Containment Control.

When the crew attempts to scram the Reactor, RPS will fail to de-energize and ARI will fail to function. The crew will enter EO-000-102, RPV Control, and transition to EO-000-113, Level/ Power Control. The crew will lower Reactor power by lowering Recirculation flow, tripping Recirculation pumps, lowering Reactor water level, attempting SLC injection, and inserting control rods. The response will be complicated by failures of SLC and CRD. Upon start of the first SLC pump, the squib valves will fail to fire. If the crew attempts another SLC pump start, the squib valves will fire, but the SLC pump will trip after a short time delay. During the scram, the in-service CRD flow control valve will fail closed. This will prevent the crew from raising drive water or cooling water differential pressure to insert control rods. The crew will be able to swap to the alternate CRD flow control valve, however as they raise CRD pressure, the CRD pumps will then trip.

The crew will be able to insert all control rods by either venting the scram air header or pulling RPS fuses. If the Main Generator is tripped with Drywell pressure above 1.72 psig, load shedding will cause a loss of all Condensate pumps unless the crew has taken action to reset the Main Generator lock-outs. The crew will take action to establish Reactor water level control with RCIC and/or HPCI.

The scenario will be terminated when all control rods are inserted and Reactor water level is being controlled in the assigned band above -161".

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SCENARIO OBJECTIVES

The objective of this scenario is to evaluate the Licensed Operator Candidate's ability to respond to the scenario events. These events will require each candidate to demonstrate the following:

- Knowledge of integrated plant operations
- Ability to diagnose abnormal plant conditions
- Ability to work together as a team
- Ability to mitigate plant transients that exercise their knowledge and use of ONs and EOPs
- Ability to utilize Technical Specifications (SRO Only)

To meet this objective, the Licensed Operator Candidates must demonstrate proficiency in the following competencies:

Reactor Operator Candidates:

1. Interpret/diagnose events and conditions based on alarms, signals, and readings.
2. Comply with and use procedures, references, and Technical Specifications.
3. Operate the control boards.
4. Communicate and interact with other crew members.

Senior Reactor Operator Candidates:

1. Interpret/diagnose events and conditions based on alarms, signals, and readings.
2. Comply with and use procedures and references.
3. Operate the control boards (N/A to upgrade candidates).
4. Communicate and interact with the crew and other personnel.
5. Direct shift operations.
6. Comply with and use Technical Specifications.

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CRITICAL TASKS

1. Critical Task 1

Closes the spuriously open SRV or initiates a manual Reactor scram before Suppression Pool water temperature reaches 110°F.

NOTE: In this scenario the SRV will remain slightly open after fuses are pulled. Getting the SRV mostly closed by pulling fuses will satisfy the critical task in this scenario, since this action significantly mitigates the malfunction.

Safety Significance

Suppression Pool water temperature must be maintained below 110°F (Boron Injection Initiation Temperature) during Reactor operation to ensure adequate margin is available in an ATWS to shutdown the Reactor before exceeding the Heat Capacity Temperature Limit.

Consequences for Failure to Perform Task

Failure to either close the SRV or initiate a manual Reactor scram before Suppression Pool water temperature reaches 110°F could result in a significant challenge to Primary Containment integrity during an ATWS.

Indications/Cues for Event Requiring Critical Task

SRV open with no valid initiation signal. Suppression Pool water temperature rising.

Performance Criteria

Close the spuriously open SRV by one of the following methods:

- Placing control switch to OFF.
- Cycling control switch to OPEN and then OFF.
- Dispatching a field operator to pull SRV fuses.

OR

Attempt to initiate a manual Reactor scram by one of the following methods:

- Placing the Mode Switch to SHUTDOWN.
- Arming and depressing the RPS manual scram pushbuttons.

Performance Feedback

SRV closure indicated by:

- Acoustic monitor noise lowering.
- Tailpipe temperature lowering.
- Reactor pressure rising.

Manual Reactor scram attempt indicated by:

- Mode Switch position.
- RPS status lights and alarms.
- Lowering Reactor power.

2. Critical Task 2

Lowers RPV level to <-60" but >-161".

Safety Significance

Core damage due to unstable operation can be prevented or at least mitigated by promptly reducing feedwater flow so that level is lowered below the feedwater spargers.

Consequences for Failure to Perform Task

A General Electric Company study (NEDO-32047) indicates that the major threat to fuel integrity from ATWS is caused by large-amplitude power/flow instabilities. The power oscillations can become large enough to cause melting of fuel in high-power bundles.

SSES EOP Basis for:

LQ/L-13 MAINTAIN LVL BETWEEN **-60"** AND **-161"**
USING TABLE 15 SYSTEMS
BYPASSING INTERLOCKS AS NECESSARY IAW ANY:

This step identifies the widest, acceptable water level control band. Although level fluctuations within this band are safe, it is very desirable to maintain level within the more restrictive target area of -110" to -60". The target area and expanded band are shown in Figure 8, Water Level Operation Guidance. The intent of this step is to remain within the target band at all times unless prohibited by system perturbations, and remain within the expanded band at all times.

Operation outside the target area has the following disadvantages:

The basis for an upper level of -60" is given in LQ/L-6.

A lower level of -110" is specified for the following reasons:

1. *Provides a margin for core coverage.*
2. *Avoids operation near TAF where core power is more responsive to RPV pressure fluctuations.*
3. *Makes level control easier by maintaining level above the narrow region of the downcomer.*

   Below -110" the downcomer free area reduces from 300 ft^2 to 88 ft^2 resulting in increased magnitude of indicated level oscillations.
4. *Maintains sufficient core flow to carry liquid boron from lower plenum upward into the core.*

   As level is decreased below -110", boron mixing efficiency is reduced because the natural circulation flow rate through the jet pumps is reduced and not as efficient at carrying the injected boron from the lower plenum upward into the core.

   At very low downcomer water levels near or below top of active fuel, there is little water available in the region above the jet pump throat for mixing with boron injected via RCIC. In this situation, there is concern that boron may accumulate in the stagnant region of the downcomer which is below the jet pump throat.
5. *Water level can be determined from wide range level instrumentation.*
6. *Avoids MSIV isolation setpoint of -129".*

RPV level below TAF is not, by itself, a determination of whether or not level can be maintained > -161". The determination that level cannot be maintained > -161" must be made based upon:

- *availability of high pressure injection systems, and,*
- *present level trend*

This decision must not be made prematurely since depressurization of a critical core results in destabilizing affects and has a potential to cause core damage.

Controlling reactor pressure, power and level with condensate and SRVs at 500 psig is difficult because all 3 parameters affect each other. Therefore, rapid depressurization is recommended when high pressure injection cannot be obtained.

The initial influence of reactor depressurization is stabilizing since the additional flashing of liquid phase required for depressurization introduces excess voids in the reactor core which can essentially terminate the fission process if the rate of depressurization is high enough. Once the depressurization is complete, however, the result is the immediate initiation of power excursions. Core damage is expected to occur from high clad stresses induced by: temperature excursions above the rewet temperature, PCI, cyclic fatigue, burnout or having the fuel enthalpy exceed the cladding failure threshold.

Indications/Cues for Event Requiring Critical Task

ATWS with initial reactor power level greater than 5% APRM power.

Performance Criteria

Lower reactor water level by manually controlling injection rate from Feedwater, HPCI and/or RCIC.

Performance Feedback

Lowering water level to –60 to –110 inches will result in power level lowering as indicated on the Average Power Range Monitors.

3. Critical Task 3

Inserts control rods IAW EO-100-113 Sheet 2.

Safety Significance

Control rod insertion initiates power reduction immediately

Consequences for Failure to Perform Task

Failure to insert control rods allows power to remain elevated with resultant power oscillations and potential core damage.

Indications/Cues for Event Requiring Critical Task

Exceeding a RPS scram setting with NO reactor scram signal, or RPS/ARI fail to fully insert all control rods.

Performance Criteria

Insert Control Rods by one or more of the following methods:
Maximize CRD to drift control rods.
Drive control rods after bypassing RWM and RSCS.
Reset and Scram again by performing ES-158-002 Bypass RPS logic trips.
De-energizing RPS solenoids by performing ES-158-001.
Local venting of Scram Air Header.

Performance Feedback

Successful insertion of control rods will be indicated by:

Rod position full in indication for manual insertion of control rods, venting scram air header or de-energizing RPS solenoids.

Rod position full in after resetting scram, draining scram discharge volume and re-scram.

SCENARIO MALFUNCTIONS

Malfunction	Description	Crew Response
1	EHC Oscillations	Lower Reactor power, lower load limit, place alternate pressure regulator in service
2	SRV Inadvertently Opens	Pull SRV fuses, attempt to place Suppression Pool cooling in service, determine Tech Spec impact
3	Suppression Pool Cooling Valve Breaker Trip	Place alternate loop of Suppression Pool cooling in service, determine Tech Spec impact
4	SRV Leaks with Cracked Tailpipe	Lower Reactor power, scram the Reactor , initiate Suppression Chamber spray
5	Electrical ATWS	Lower Recirculation flow, trip Recirculation pumps, lower Reactor water level, insert control rods
6	In-Service CRD Flow Control Valve Fails Closed, Then CRD Pumps Trip	Swap CRD flow control valves, pull RPS fuses, or vent the scram air header
7	SLC Squib Valves Fail to Open on Start of First Pump, Subsequent SLC Pump Starts Fail	Attempt to start alternate SLC pump, lineup alternate boron injection, control Reactor power with alternate means

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SCENARIO REFERENCES

1.	OP-193-003	MAIN TURBINE EHC OIL SYSTEM
2.	GO-100-012	POWER MANEUVERS
3.	ON-156-001	UNANTICIPATED REACTIVITY CHANGE
4.	ON-178-002	CORE FLUX OSCILLATIONS
5.	ON-193-001	TURBINE EHC SYSTEM MALFUNCTION
6.	TS 3.7.8	MAIN TURBINE PRESSURE REGULATION SYSTEM
7.	ON-183-001	STUCK OPEN SAFETY RELIEF VALVE
8.	TS 3.4.3	SAFETY/RELIEF VALVES (S/RVs)
9.	EO-000-103	PRIMARY CONTAINMENT CONTROL
10.	OP-149-005	RHR SUPPRESSION POOL COOLING
11.	OP-054-001	EMERGENCY SERVICE WATER SYSTEM
12.	OP-116-001	RHR SERVICE WATER
13.	ON-100-101	SCRAM, SCRAM IMMINENT
14.	EO-000-102	RPV CONTROL
15.	EO-000-113	LEVEL/POWER CONTROL
16.	OP-145-001	RFP AND RFP LUBE OIL SYSTEM
17.	OP-153-001	STANDBY LIQUID CONTROL SYSTEM
18.	OP-155-001	CONTROL ROD DRIVE HYDRAULIC SYSTEM
19.	OP-150-001	RCIC SYSTEM
20.	OP-152-001	HPCI SYSTEM
21.	OP-184-001	MAIN STEAM SYSTEM
22.	OP-160-001	DRYWELL VENTILATION SYSTEM
23.	OP-149-004	RHR CONTAINMENT COOLING

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SCENARIO SPECIAL INSTRUCTIONS

1. Simulator setup
   a. **Initialize** to IC–378
   b. **Run** SCN file **n13scen3.scn**
2. **Place** the simulator in RUN
3. **Verify** the following malfunctions/overrides, event triggers and key assignments:

MF	RF	OR	SCN	ET	CONDITIONS	KEYS
10:10	**1:1**	**0:0**	**0**	**6:0**	**26**	**10**

4. **Prepare** the simulator for evaluation
   a. **Complete** a simulator exam checklist, NTP–QA–31.10 Attachment B
   b. **Place** a tag on Core Spray pump A.
   c. **Prepare** a Reactivity Manipulation Package for raising Reactor power from 90% to 100% with recirculation flow.
5. **Prepare** a Turnover Sheet including the following:
   a. Swap EHC pumps per OP-193-003.
   b. Then raise Reactor power with Recirculation flow to 100% per GO-100-012 section and Reactivity Manipulation Package.

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SCENARIO FILES

n13scen3.scn

```
; Monitored parameters
SCN rat_mp
SCN n13scen3mp

; Core Spray Pump A OOS
IRF crfPM13_1P206A

; Reactor power ~90%

; Crew swaps EHC pumps from A to B

; Crew begins raising power from 90% to 100%

; EHC oscillations
{Key[1]} SCN n13scen3_1

; Dampen oscillation when crew takes action to open TBV
{Key[11]} SCN n13scen3_1C

; Place EHC regulator B in service and delete oscillation
{Key[21]} IOR aiM2HHD702 r:30 f:.6

; SRV K inadvertently opens and control switch will not close it
{Key[2]} IMF cmfRV04_PSV141F13K f:100

; NPO pulls SRV K fuses in relay room, SRV K closes but leaks by
; SRV K tailpipe cracks in Supp Chamber
{Key[12]} IMF cmfRV08_PSV141F13K
{Key[12]} DMF cmfRV04_PSV141F13K
{Key[12]} IMF mfMS183010K f:10
{Key[12]} IMF mfMS183013K r:17:00 f:6

; Suppression Pool cooling valve breaker trips on first loop attempted
aet n13scen3et3
aet n13scen3et13

; Electrical ATWS
IMF mfRP158004A
IMF mfRP158004B
IMF mfRP158004C
IMF mfRP158004D
IMF mfRP158003
IMF cmfRL01_63X114725D1
IMF cmfRL01_63X214725D1

; In-service CRD FCV fails closed on scram; CRD pumps trip when
; backup CRD FCV is in service and cooling water D/P is > 10 psig
aet n13scen3et1

; NPO assists placing CRD FCV B in service
{Key[40]} IRF rfRD155003 f:MANUAL
{Key[40]} IRF rfRD155001 f:0
{Key[40]} IRF rfRD155021 f:100
{Key[40]} IRF rfRD155020 f:0
{Key[40]} IRF rfRD155004 f:AUTO
{Key[40]} aet n13scen3et11

; SLC squibs fail to fire with first pump started; second pump started allows
; squibs to fire, but pump has shaft shear; first pump will not restart
IMF mfSL153001A
```

```
IMF mfSL153001B
aet n13scen3et9
aet n13scen3et19

; NPO pulls RPS A fuses in upper relay room
{Key[10]} IMF cmfFU01_1C609F18C
{Key[10]} IMF cmfFU01_1C609F18G d:5
{Key[10]} IMF cmfFU01_1C609F18A d:15
{Key[10]} IMF cmfFU01_1C609F18E d:20

; NPO pulls RPS B fuses in lower relay room
{Key[20]} IMF cmfFU01_1C611F18D
{Key[20]} IMF cmfFU01_1C611F18H d:5
{Key[20]} IMF cmfFU01_1C611F18B d:15
{Key[20]} IMF cmfFU01_1C611F18F d:20

; NPO vents scram air header
{Key[30]} IRF rfRD155018 f:100
{Key[30]} IRF rfRD155025 d:5 f:0
{Key[30]} IRF rfRD155016 d:10 f:100

; NPO closes charging water header isolation
{Key[7]} IRF rfRD155017 f:0

; SRV tailpipe break gets worse once Supp Chamber sprays are in service
aet n13scen3et25
```

n13scen3_1.scn

```
IMF cmfTR03_PT10101A f:20
+10 MMF cmfTR03_PT10101A f:10
+10 MMF cmfTR03_PT10101A r:10 f:0
scn n13scen3_1A
```

n13scen3_1A.scn

```
+10 MMF cmfTR03_PT10101A r:10 f:10
+10 MMF cmfTR03_PT10101A r:10 f:0
scn n13scen3_1B
```

n13scen3_1B.scn

```
+10 MMF cmfTR03_PT10101A r:10 f:10
+10 MMF cmfTR03_PT10101A r:10 f:0
scn n13scen3_1A
```

n13scen3_1C.scn

```
MMF cmfTR03_PT10101A r:10 f:6
+10 MMF cmfTR03_PT10101A r:10 f:0
scn n13scen3_1D
```

n13scen3_1D.scn

```
+10 MMF cmfTR03_PT10101A r:10 f:6
+10 MMF cmfTR03_PT10101A r:10 f:0
+10 scn n13scen3_1C
```

n13scen3et1.et

```
;SWITCH:MODE SWITCH
diHSC72A1S01.CurrValue = #OR.diHSC72A1S01.SHUTDN
```

n13scen3et1.scn

```
IMF cmfAV04_FV146F002A f:0
```

n13scen3et3.et

```
;SWITCH:SUPP POOL CLG/TEST CTL HV-1F024A (E11A-S12A)
diHS15124A.CurrValue = #OR.diHS15124A.OPEN
```

n13scen3et3.scn

```
IMF cmfMV01_HV151F024A
cet n13scen3et13
```

n13scen3et9.et

```
;SWITCH:SBLC MANUAL INITIATION
diHSS14804.CurrValue = #OR.diHSS14804.START_A
```

n13scen3et9.scn

```
aet n13scen3et29
```

n13scen3et11.et

```
;METER:COOLING WATER DIFF PRESSURE
aoPDIC121R603.CurrValue > 10
```

n13scen3et11.scn

```
IMF cmfPM03_1P132A
IMF cmfPM03_1P132B
```

n13scen3et13.et

```
;SWITCH:SUPP POOL CLG/TEST CTL HV-1F024B (E11A-S12B)
diHS15124B1.CurrValue = #OR.diHS15124B1.OPEN
```

n13scen3et13.scn

```
IMF cmfMV01_HV151F024B
cet n13scen3et3
```

n13scen3et19.et

```
;SWITCH:SBLC MANUAL INITIATION
diHSS14804.CurrValue = #OR.diHSS14804.START_B
```

n13scen3et19.scn

```
aet n13scen3et29
```

n13scen3et25.et

```
;METER:DRYWELL SUPP CHMB FLOW
aoFI15120AB.CurrValue >= 200 | aoFI15120BB.CurrValue >= 200
```

n13scen3et25.scn

```
IMF mfMS183013K r:60 f:20
```

n13scen3et29.et

```
;SWITCH:SBLC MANUAL INITIATION
diHSS14804.CurrValue = #OR.diHSS14804.STOP
```

n13scen3et29.scn

```
DMF mfSL153001A
DMF mfSL153001B
imf cmfPM03_1P208A d:5
imf cmfPM03_1P208B d:5
```

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SCENARIO EVENT DESCRIPTION FORM

Initial Conditions: Ensure shift positions are assigned, have the Crew conduct the turnover and perform a panel walk down before the start of the scenario.

EVENT	OP EVENT / TASK	TIME	DESCRIPTION
N/A	N/A	0	Crew assumes shift
1	N/A	5	Swap EHC Pumps
2	N/A	10	Raise Reactor Power with Recirculation Flow
3	N/A	20	EHC Oscillations
4	N/A	30	SRV Inadvertently Opens
5	N/A	40	Suppression Pool Cooling Valve Breaker Trip
6	N/A	50	SRV Leaks with Cracked Tailpipe
7	N/A	60	Electrical ATWS
8	N/A	70	In-Service CRD Flow Control Valve Fails Closed, Then CRD Pumps Trip
9	N/A	70	SLC Squib Valves Fail to Open on Start of First Pump, Subsequent SLC Pump Starts Fail
N/A	N/A	90	Termination

SCENARIO EVENT FORM

EVENT	1
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Swap EHC Pumps

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs BOP to start EHC pump B and secure EHC pump A per OP-193-003 section 2.9.
ATC		Monitors plant parameters.
BOP		Starts EHC pump B and secures EHC pump A per OP-193-003 section 2.9: • Station an Operator locally to observe EHC Pump Discharge pressure at PI10180B. • Start 1P113B EHC HYD FLUID PUMP by Depressing RUN pushbutton. • Observe EHC Pump 1P113B discharge pressure on local gage PI10180B rises to ~ 1500-1700 psig. • WHEN EHC System pressure stabilizes, Stop EHC HYD FLUID PUMP 1P113A by Depressing AUTO pushbutton, AND then STOP pushbutton. • Place EHC HYD FLUID PUMP 1P113A in standby by Depressing AUTO pushbutton. • Verify discharge pressure using Computer Point TLP03 ≈ 1625 psig. • IF necessary, Adjust EHC Pump discharge pressure using procedure section titled "Adjusting EHC Pump Discharge Pressure."

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	1
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Swap EHC Pumps

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

If asked as **NPO** before the pump swap, immediately report that the area is clear of unnecessary personnel and you are ready for the swap.

If asked as **NPO** after the breaker swap, immediately report that you have a good start on EHC pump B and a good stop on EHC pump A. If asked, immediately report local discharge pressure reads approximately 1625 psig.

Role play any other directed actions as required.

EVALUATOR NOTES

1. None

SCENARIO EVENT FORM

EVENT	2
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Raise Reactor Power with Recirculation Flow

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs ATC to raise Reactor power to 100% with recirculation flow per GO-100-012 and the Reactivity Manipulation Package. Provides oversight for reactivity manipulation.

ATC		Raises recirculation flow by controlling two Reactor Recirc Pumps in MANUAL mode:
		
		<u>MANUAL mode:</u>
		• Touch any of the following buttons on the vertical selection menu:
		  o RRP_A
		  o RRP_B
		  o RRP DUAL SCRN
		• IF required on the RRP DUAL SCRN, Touch the Screen Select MANUAL button on the desired Rx Recirc Pump controller to open the Manual Mode HMI half screen.
		• Touch the MANUAL MODE SELECT button.
		• Touch the MANUAL MODE SELECT button on the confirmation overlay screen.
		• Ensure the MANUAL Screen Select button and MANUAL MODE SELECT buttons change color from blue to yellow.
		• Ensure the MANUAL MODE SELECT button text now reads MANUAL MODE SELECTED.
		• Slowly Adjust REACTOR RECIRC PUMP A(B) SPEED SY B31 1R621A(B) Controller Demand with the applicable DEC pushbuttons as required.
		
		Monitors diverse indications:
		• APRMs
		• Core thermal power
		• Main Generator output
		• Reactor water level
		• Reactor pressure
		• Recirc pump speeds
		• Recirc pump flows
		• Total core flow
		
		Plots all Reactor power changes on Power/Flow Map.

BOP		Monitors plant parameters. Provides peer checks for reactivity manipulation.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	2
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Raise Reactor Power with Recirculation Flow

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

Role play any directed actions as required.

EVALUATOR NOTES

1. Recirculation Loop Jet Pump mismatch shall be maintained ≤ 5 million lbm/hr when operating at ≥ 75 million lbm/hr total core flow.
2. OP-164-002 Attachment A provides the expectation that power ascensions above 60% power will be performed with two Recirculation pump in the MANUAL mode until Power Ramp is reached (per this scenario's reactivity instructions – 98%).
3. Once a sufficient power change has been observed, proceed to the next event (recommended by 95%).

SCENARIO EVENT FORM

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	EHC Oscillations

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports: • Reactor power and pressure oscillating • Turbine Control Valves oscillating • Annunciator AR-105-001 (I06), Main Turbine Bypass Valves Open
SRO		May enter ON-156-001, Unanticipated Reactivity Change. May enter ON-178-002, Core Flux Oscillations. Enters ON-193-001, Turbine EHC System Malfunction. Provides oversight for power reduction.
ATC		Executes ON-193-001, Turbine EHC System Malfunction: • Determine Turbine Control Valves are oscillating > 2% and proceed to section 3.4. • Reduce reactor power with recirculation flow until EITHER of following reached: o Reactor power reduction of 5% (65 MWe) OR o Core flow reduced to value specified IAW RE Instructions in CRC Book. • Perform following to stop Control Valve oscillations: o Note the Setpoint of the LOAD LIMIT SET potentiometer. o Using LOAD LIMIT SET potentiometer, Unlock and Lower setting until LOAD LIMIT LIGHT ILLUMINATES. o Continue to Slowly Lower LOAD LIMIT SET potentiometer setting until sufficient bypass valves are open to stop Control Valve oscillations. o Check Control Valve oscillations STOP. o Lock the LOAD LIMIT SET potentiometer. • Observe any of the following Main Turbine PRESSURE SET PT/MAIN STEAM PRESSURE A or B indications for evidence of oscillations. o Main Turbine PRESSURE SET PT/MAIN STEAM PRESSURE A or B Meter(s) on 1C651. o TRA Points 190(191) Pressure Regulator A(B) Setpoint. o TRA Points 192(193) Pressure Regulator A(B) Sensed Pressure.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	EHC Oscillations

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 1** to initiate event:

   {Key[1]} SCN n13scen3_1

2. When the crew initiates a power reduction, **ABORT n13scen3_1A or n13scen3_1B (whichever is currently active), then depress Key 11** to reduce the severity of the oscillations.

   {Key[11]} SCN n13scen3_1C

3. When the crew requests swapping pressure regulators, wait 2 minutes, **then depress KEY 21** to place pressure regulator B in service.

   {Key[21]} IOR aiM2HHD702 r:30 f:.6

ROLE PLAY

If dispatched as I&C to check EHC, wait 3 minutes, then report:

"It appears that the in-service pressure regulator is causing oscillations."

As **NPO/I&C** dispatched to swap pressure regulators, wait 2 minutes, then depress KEY 21 as stated above, and report:

"Pressure regulator B is now in service."

As **WWM** (or equivalent) contacted for assistance with troubleshooting/repairing pressure regulator A, acknowledge request and report that you will engage the organization.

Role play any other directed actions as required.

EVALUATOR NOTES

1. None

SCENARIO EVENT FORM

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	EHC Oscillations

POSITION	TIME	STUDENT ACTIVITIES
ATC (cont)		• IF oscillations observed AND I&C NOT available, at Turbine EHC Cabinet 1C663, Place Pressure Regulator B or A in control performing Steps 3.4.5 or 3.4.6, as applicable. • Dispatches operator/I&C to place Pressure Regulator B in control. • Using LOAD LIMIT SET potentiometer, Raise setting until #1 BYPASS VALVE CLOSES. • Return LOAD LIMIT SET potentiometer to setting recorded previously.
BOP		Monitors plant parameters.

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SCENARIO EVENT FORM

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	SRV Inadvertently Opens

POSITION	TIME	STUDENT ACTIVITIES
★		**Closes the spuriously open SRV or initiates a manual Reactor scram before Suppression Pool water temperature reaches 110°F.**
Team		Recognizes / reports: • Annunciator AR-110-001 (E02), Main Steam Div 1 SRV Open • SRV K acoustic monitor in alarm • Reactor pressure lowers • Suppression Pool temperature rising
SRO		Enters ON-183-001, Stuck Open Safety Relief Valve. May enter EO-000-103, Primary Containment Control, on high Suppression Pool temperature. Declares SRV K inoperable for the relief function. Reviews TS 3.6.1.6 and determines that SO-159-002 must be completed within 1 hour of the SRV opening. Determines Technical Specification 3.4.3 is still met with only one SRV inop. Determines Technical Specification 3.5.1 is still met since ADS function of SRV K is still operable.
ATC		Monitors plant parameters.

BOP		Executes ON-183-001, Stuck Open Safety Relief Valve:
		• Immediately Scram Reactor for ANY of the following:
		    o It is evident SRV WILL NOT close.
		    o SRV is open AND BEFORE suppression pool temperature reaches 110°F. (TS 3.6.2.1)
		• Determine SRV K is NOT open due to high pressure
		• Place SRV K control switch to OFF.

★ Denotes Critical Task

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	SRV Inadvertently Opens

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 2** to initiate event.

   {Key[2]} IMF cmfRV04_PSV141F13K f:100

2. When requested to pull SRV K fuses, wait 2 minutes, then **depress KEY 12 (also sticks SRV K 10% open and starts SRV K tailpipe crack)**.

   {Key[12]} IMF cmfRV08_PSV141F13K
   {Key[12]} DMF cmfRV04_PSV141F13K
   {Key[12]} IMF mfMS183010K f:10
   {Key[12]} IMF mfMS183013K r:17:00 f:6

ROLE PLAY

As **NPO** dispatched to pull fuses for SRV K, wait 2 minutes, then **depress KEY 12** as described above, and **report,**

"SRV K fuses have been pulled."

As **WWM** (or equivalent) contacted for assistance with SRV K, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. Placing the control switch in OFF and cycling it will not close SRV K. This drives the crew to pull fuses.
2. The crew will discover the next event when they attempt to place Suppression Pool cooling in service.
3. While it satisfies the critical task, it is not expected that the crew will attempt a manual Reactor scram on this event prior to partially closing SRV K by pulling fuses.
4. When the SRV fuses are pulled, the SRV will partially close (to approximately 10% open) and the SRV tailpipe will begin to crack. These effects of these malfunctions will build over time and most likely be seen during or after activities to place Suppression Pool cooling in service. If the crew quickly diagnoses failure of SRV K to fully close, they may scram prior to placing Suppression Pool cooling in service. Further Primary Containment control actions will then likely be performed following the ATWS response.

SCENARIO EVENT FORM

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	SRV Inadvertently Opens

POSITION	TIME	STUDENT ACTIVITIES
BOP (cont)		• Determine SRV K did NOT close by evaluating following: o On Panel 1C601 vertical board, Check Acoustic Monitor red light EXTINGUISHED. o On Panel 1C690A(B), Check MSRVs Acoustic Monitor VISH-14180A1(B1) through VISH-14180A8(B8) green lights EXTINGUISHED. o On Panel 1C614, Check SRV/ADS Temp Recorder TRS-B21-1R614 for temperature decrease. o Check RPV pressure and pressure trend o Check generator MWE and reactor MWTH. o Check RPV level trend recorder, Panel 1C652, Recorder XR-10602, for indication of level shrink that shows SRV closing. • Perform the following: o Obtain concurrence from Shift Supervision, THEN Place the affected SRV control switch to OPEN. o Return SRV control switch to OFF. o Determine SRV K did NOT close. o As directed by Shift Supervision, Repeat steps 3.5.1 through 3.5.3 until evident SRV will not close, AND/OR Continue with next step. • IF SRV did NOT close when control switch was placed in OFF, attempt to Close SRV by removal of fuses per Attachment A for affected SRV as follows: o **Directs NPO to pull fuses at 1C628 (12/754') and Verify:** ▪ Check for SRV CLOSURE IAW Section 3.4 of this procedure. ▪ IF SRV closure successful, Leave fuses removed and Apply SCT. • Determines / reports SRV K closed by fuse removal. • IF NOT required for adequate core cooling, Place at least one loop of RHR in Suppression Pool Cooling Mode in accordance with OP-149-005. • WHEN all SRVs are closed, Comply with TS 3.6.1.6 by performing SO-159-002.

NOTES	

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SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Suppression Pool Cooling Valve Breaker Trip

POSITION	TIME	STUDENT ACTIVITIES
SRO		Acknowledges failure of Suppression Pool cooling valve(s) HV-151-F024A(B). Determines one or both subsystems of Suppression Pool cooling is inoperable. When informed of one subsystem of Suppression Pooling cooling inoperable, determines Technical Specification 3.6.2.3 Condition A requires restoring operability within 7 days. If informed of both subsystems of Suppression Pooling cooling inoperable, determines Technical Specification 3.6.2.3 Condition B requires restoring operability of one subsystem within 8 hours.
ATC		Monitors plant parameters.

BOP		Attempts to place Suppression Pool cooling in service per OP-149-005:
		• May contact Radwaste regarding ability to take water.
		• Place Emergency Service Water System in operation in accordance with OP-054-001 supplying RHR Room Cooler and RHR Pump to be placed in service:
		  o Place ESW Loop A(B) in service by depressing ESW Pump 0P504A(C)(0P504B(D)) RUN pushbutton.
		  o Ensure OPEN:
		    ▪ HV-01222A(B) ESW Pond Spr Bpv A(B).
		    OR
		    ▪ HV-01224A1(B1) ESW Pond Spr In A1(B1).
		    AND/OR
		    ▪ HV-01224A2(B2) ESW Pond Spr In A2(B2).
		  o On Panel 0C681, Ensure ESW Pp Supply Fan 0V521A(C)(0V521B(D)) STARTS.
		  o Ensure ventilation damper alignment in accordance with OP-128-001.
		  o May start additional pumps as required.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Suppression Pool Cooling Valve Breaker Trip

INSTRUCTOR ACTIVITY

1. If RHR loop A is attempted first, verify automatic event trigger n13scen3et3 initiates to trip breaker for RHR A Suppression Pool cooling breaker and clear the automatic event trigger for RHR loop B.

2. If RHR loop B is attempted first, verify automatic event trigger n13scen3et13 initiates to trip breaker for RHR B Suppression Pool cooling breaker and clear the automatic event trigger for RHR loop A.

ROLE PLAY

As **NPO** dispatched to investigate valve failure, wait 2 minutes and **report**,

"The valve breaker is tripped and the valve appears to be closed."

As **NPO** dispatched manually open valve, wait 2 minutes and **report**,

"The valve is stuck closed."

If asked as **Radwaste** about capacity to take on water, **report**,

"There is not enough capacity in Radwaste tanks right now."

As **WWM** (or equivalent) contacted for assistance with valve failure(s), acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. Only the first RHR loop attempted will have the Suppression Pool cooling valve breaker trip. The second loop can be successfully placed in Suppression Pool cooling.
2. The next event is ramping in during this event. The next event may eventually take priority for the crew over further action to place Suppression Pool cooling in service.

SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Suppression Pool Cooling Valve Breaker Trip

POSITION	TIME	STUDENT ACTIVITIES
BOP (cont)		• Place RHR Service Water System in service to RHR Heat Exchanger A(B) in accordance with OP-116-001: o Inform SRO to comply with TRO 3.8.2.1. o At 0C697 Motor Overload Bypass Control Panel, Place HS-11210A1 (HS-11210B3) RHRSW Sys Unit 1 Div 1(2) to TEST. o Ensure HV-21210A(B) Unit 2 RHRSW Hx A(B) Inlet CLOSED. o Open HV-11210A(B) Unit 1 RHRSW Hx A(B) Inlet to 10% OPEN. o Open HV-11215A(B) Unit 1 RHRSW Hx A(B) Outlet. o Ensure OPEN ▪ HV-01222A(B) ESW Pond Spr Bpv A(B) OR ▪ HV-01224A1(B1) ESW Pond Spr In A1(B1) AND/OR ▪ HV-01224A2(B2) ESW Pond Spr In A2(B2). o Start 1P506A(B) RHRSW Pump A(B). o Throttle HV-11210A(B) Unit 1 RHRSW Hx A(B) Inlet to establish 6000 to 9000 gpm on FI-1R602A(B) RHRSW Hx A(B) Inlet Flow. o Ensure proper operation of the A(B) RHRSW Rad Monitor by observing the following alarms not ANNUNCIATED: ▪ AR109(F01) (AR113(F01)) ▪ AR109(F02) (AR113(F02)) o IF Unit 1 LOCA signal not present: ▪ Place HS-11202A3(B3) RHRSW Pump A(B) Loca Trip to ENABLE. ▪ Observe White Indicating Light ILLUMINATED. • Ensure TRO 3.8.2.1 entered before placing MOV OL BYPS keyswitch to test in the next step. • Place HS-E11-1S62A(B) RHR LOOP A(B) MOV OL BYPS keyswitch to TEST. o Confirm BIS Status Light RHR LOOP A(B) MOVS IN TEST ILLUMINATES. o Confirm RHR LOOP A(B) OUT OF SERVICE ANNUNCIATOR ALARMS. • Open HV-151-F028A(B) SUPP CHMBR SPR TEST SHUTOFF. • Check RHR System filled and vented in accordance with OP-149-001. • Start RHR PUMP 1P202A(B)(C)(D). • To adjust RHR flow, Throttle As Necessary HV-151-F024A(B) TEST LINE CTL to maintain < 10,000 gpm as indicated on RHR A/C(B/D)FLOW FI-E11-1R603A(B).

SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Suppression Pool Cooling Valve Breaker Trip

POSITION	TIME	STUDENT ACTIVITIES
BOP (cont)		Recognizes / reports Suppression Pool cooling valve(s) HV-151-F024A(B) failed to open and lights de-energized. Dispatches NPO to investigate HV-151-F024A(B) failure and check breaker 1B237-034 (1B247-05).. May attempt to place other loop of Suppression Pool cooling in service, as time allows.

SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	SRV Leaks with Cracked Tailpipe

POSITION	TIME	STUDENT ACTIVITIES
TEAM		Recognizes / reports: • Suppression Chamber water temperature rises. • Suppression Chamber pressure rises. • Suppression Chamber to Drywell vacuum breakers cycle. • Drywell temperature and pressure rise.
SRO		Enters ON-100-101, Scram, Scram Imminent. Directs Scram Imminent actions. Provides oversight for reactivity manipulation. May enter / re-enter EO-000-103, Primary Containment Control, on high Drywell temperature and/or pressure. Directs manual Reactor scram. Acknowledges failure to scram.
ATC		Executes Scram Imminent actions of ON-100-101, Scram, Scram Imminent: • Reduce Reactor Power in accordance with RE Instructions in CRC Book. o When required, Reduce Rx Core Flow as follows: ▪ IF not in the Manual Mode, on the RRP DUAL SCRN HMI screen, Touch the Rx Recirc Pump A & B EXIT TO MANUAL buttons. ▪ Initiate the required flow/power reduction by performing either of the following: • Initiate a Manual Rx Recirc Limiter #2 Runback in accordance with OP-164-001. OR • Adjust the double chevron DEC buttons on the REACTOR RECIRC PUMP A(B) SPEED controllers SY-B31-1R621A & B as required to establish the final Core Flow value stated in the CRC Book.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	SRV Leaks with Cracked Tailpipe

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

As **WWM** (or equivalent) contacted for assistance, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. This event is inserted as soon as the SRV fuses are pulled in event 4. The severity and ramp time is set to allow sufficient time for event 4 follow-up and event 5.
2. Additional BOP actions for this event are scripted in the following events, as the failure to scram will divert crew resources for a period of time.

SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	SRV Leaks with Cracked Tailpipe

POSITION	TIME	STUDENT ACTIVITIES
ATC (cont)		Executes scram actions of ON-100-101, Scram, Scram Imminent: • Place Mode Switch in SHUTDOWN. • Arm and depress manual scram pushbuttons (4). Recognize / report failure to scram.
BOP		Monitors plant parameters. Initiate ARI by arming and depressing: • ARI DIV 1 MAN TRIP HS-147103A1 TRIP • ARI DIV 2 MAN TRIP HS-147103B1 TRIP

NOTES	

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SCENARIO EVENT FORM

EVENTS	7, 8, & 9
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Electrical ATWS, CRD FCV/Pumps Trip, SLC Squibs/Pumps Fail

POSITION	TIME	STUDENT ACTIVITIES
★		**Lowers RPV level less than -60" but greater than -161".** **Insert control rods IAW EO-100-113 Sheet 2.**
Team		Recognizes / reports failure to scram.
SRO		Enters EO-000-102, RPV Control, on high power and/or high Drywell pressure. Exits EO-000-102 and enters EO-000-113, Level/Power Control: • Directs ARI initiated. • Records initial ATWS power level. • Executes Power Leg: o Answers, "Is initial ATWS pwr >5% or cannot be determined?" Yes o Directs SLC injection. o Directs ADS inhibited. o Ensures RWCU isolated. o Ensures SRMs and IRMs inserted. o Directs Recirc run back to minimum. o Directs Recirc pumps tripped. o Direct CRD maximized. o Enters EO-000-113 sheet 2 for control rod insertion: ▪ Answers, "Is more than 1 control rod >00?" Yes. ▪ Determines ATWS is electrical. ▪ **Directs control rod insertion by pulling RPS fuses and/or venting scram air header.** • Executes Level Leg: o Directs verification of isolations and initiations. o Answers, "Is initial ATWS pwr >5% or cannot be determined?" Yes o Directs overriding RCIC and HPCI injection o **Directs injection throttled and prevented until level between -60" and -110".** o Directs bypassing of MSIV and CIG interlocks. o **Directs Reactor water level controlled -60" to -161" using Table 15 systems (SLC, FW, Cond, CRD, HPCI, RCIC, LPCI).** • Executes Pressure Leg: o Directs Reactor pressure controlled 800-1050 psig using Turbine Bypass Valves.

★ Denotes Critical Task

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENTS	7, 8, & 9
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Electrical ATWS, CRD FCV/Pumps Trip, SLC Squibs/Pumps Fail

INSTRUCTOR ACTIVITY

1. When Suppression Chamber spray is placed in service, verify automatic event trigger n13scen3et25 initiates and ramps up the SRV tailpipe crack severity to 20% over 1 minute.

2. When requested to pull RPS fuses, wait until given permission from lead examiner, then **depress Keys 10 and 20** as described in role play below (and when directed to re-install fuses, immediately delete these malfunctions):
   {Key[10]} IMF cmfFU01_1C609F18C / {Key[10]} IMF cmfFU01_1C609F18G d:5
   {Key[10]} IMF cmfFU01_1C609F18A d:15 / {Key[10]} IMF cmfFU01_1C609F18E e:20
   {Key[20]} IMF cmfFU01_1C611F18D / {Key[20]} IMF cmfFU01_1C611F18H d:5
   {Key[20]} IMF cmfFU01_1C611F18B d:15 / {Key[20]} IMF cmfFU01_1C611F18F d:20

3. When requested to vent scram air header, wait until given permission from lead examiner, then **depress Key 30**:
   {Key[30]} IRF rfRD155018 f:100 / {Key[30]} IRF rfRD155025 d:5 f:0
   {Key[30]} IRF rfRD155016 d:10 f:100

4. If requested to swap CRD FCV, wait 3 minutes, then **depress Key 40**. Verify this inserts malfunctions to trip CRD pumps.

5. If requested to close CRD charging water header isolation valve, wait 2 minutes, depress Key 7, then report task completion:
   {Key[7]} IRF rfRD155017 f:0

ROLE PLAY

As **NPO** dispatched to pull RPS fuses, wait at least 2 minutes and obtain lead examiner permission, then report,
"I am about to pull RPS Channel A fuses, expect BACKUP/GROUP SYSTEM A POWER FAILURE alarms on 1C651."
Then **depress Key 10** as described above. Wait one minute, then report,
"I am about to pull RPS Channel B fuses, expect BACKUP/GROUP SYSTEM B POWER FAILURE alarms on 1C651."
Then **depress Key 20** as described above and report,
"The RPS fuses have been pulled per ES-158-001."

As **NPO** dispatched vent scram air header, wait at least 3 minutes and obtain lead examiner permission. Contact the crew and report you are ready to vent the scram air header. When given permission **depress Key 30** as described above and report,
"The scram air header has been depressurized."

If directed to swap CRD FCVs, wait 3 minutes, then **depress Key 40** as described above and report completion.

Role play any other directed actions as required.

EVALUATOR NOTES

1. It is recommended to delay pulling RPS fuses and venting the scram air header for a short amount of time only if necessary to see the crew lower Reactor water level.
2. The final Reactor water level control band is likely to be +20" to +45".
3. Recommended termination criteria: (1) All control rods inserted, and (2) Reactor water level controlled in assigned band above -161".

SCENARIO EVENT FORM

EVENTS	7, 8, & 9
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Electrical ATWS, CRD FCV/Pumps Trip, SLC Squibs/Pumps Fail

POSITION	TIME	STUDENT ACTIVITIES
SRO (cont)		Acknowledges failure of CRD FCV / pumps. Acknowledges failure of SLC to inject. Directs boron injection using RCIC per ES-150-002. Acknowledges all control rods are inserted. Directs stopping boron injection. Exits EO-000-103 and enters EO-000-102, RPV Control. Directs Reactor water level restored and maintained +13" to +54". May direct reset of Main Generator lockouts. Directs initiation of Suppression Chamber spray.

ATC		Inserts SRMs/IRMs.
		
		Runs Recirc to minimum From any RRP HMI screen by:
		• Selects MANUAL FLOW REDUCTION INITIATION.
		• Selects RRP SPEED TO MINIMUM.
		• Selects INITIATE RRP FLOW REDUCTION.
		
		Trips Recirculation pumps A and B one at a time.
		
		Throttles and prevents RPV injection from FW and Cond until level is between -60" and -110" per OP-145-001 hard card:
		• IF RFP A(B)(C) is in DPM, or transfer to DPM is in progress:
		  o Control level in MANUAL via LV-10641 FW Startup Control Vlv controller LIC-C32-1R602.
		  o As required, Adjust INC/DEC button on feeding RFP A(B)(C) SPD CTL/DEMAND SIGNAL controller SIC C32 1R601A(B)(C) in MANUAL to establish and maintain assigned level band. (2.19.9b)
		• Stop Condensate pumps as necessary to leave 2 pumps in operation.

SCENARIO EVENT FORM

EVENTS	7, 8, & 9
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Electrical ATWS, CRD FCV/Pumps Trip, SLC Squibs/Pumps Fail

POSITION	TIME	STUDENT ACTIVITIES

ATC (cont)		**Maintains Reactor water level between -60" and -161" using Table 15 systems (SLC, FW, Cond, CRD, RCIC, HPCI, LPCI).**
		
		May insert control rods using RMCS per EO-000-113 Sheet 2 hard card:
		• Bypass RWM.
		• Establish approximately (if obtainable) (closing Charging Water Iso 146F034 as necessary):
		  o 63 gpm cooling water flow.
		  o 350 psid drive water pressure.
		• Select rod.
		• Depress continuous insert pushbutton.
		
		Dispatch NPO to pull RPS fuses.
		
		Dispatch NPO to vent scram air header.
		
		Once all control rods are inserted, slowly raises injection to restore and maintain Reactor water level -60" to -161" using Table 15 systems (SLC, FW, Cond, CRD, HPCI, LPCI).
		
		Recognizes / reports all control rods inserted.
		
		May reset Main Generator lockouts.
		
		May recognize / report loss of Condensate pumps due to Main Generator lockout with Drywell pressure > 1.72 psig.
		
		Restores and maintains Reactor water level +13" to +54" using Condensate (if available), HPCI and/or RCIC.

BOP		Injects SLC per OP-153-001: • Place HS-14804 SBLC MANUAL INITIATION keylock control switch to A(B) START. • Observe SBLC PUMPS 1P208A(B) STARTS Recognizes / reports SLC not injecting. • May attempt to start/re-start SLC pump. • Recognizes / reports trip of SLC pump(s). Dispatches operator to inject boron using RCIC. Inhibits ADS by placing ADS A and ADS B LOGIC CONTROL switches in INHIBIT.

SCENARIO EVENT FORM

EVENTS	7, 8, & 9
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Electrical ATWS, CRD FCV/Pumps Trip, SLC Squibs/Pumps Fail

POSITION	TIME	STUDENT ACTIVITIES
BOP (cont)		Maximizes CRD per OP-155-001: • Place control switch CRD Pump 1P132B(A) to RUN, to start 1P132B(A), Ctl Rod Drive Water Pump B(A). • Using FC-C12-1R600, CRD Flow Controller, in MANUAL, attempts to fully Open FV-146-F002A(B), CRD Flo Ctl. • Fully Open THTLG PV-146-F003, DRIVE WTR PRESS THTLG valve. Recognize / report CRD Flow Control Valve does not respond properly to open signal. • May enter ON-155-007, Loss of CRD System Flow. o Dispatches NPO to swap CRD Flow Control Valve. o Opens CRD Flow Control Valve. o Recognizes / reports trip of CRD pumps. Overrides RCIC per OP-150-001: • To prevent Auto Injection if RCIC NOT initiated, Close RCIC TURBINE TRIP AND THROTTLING HV-15012. Overrides HPCI per OP-152-001: • To prevent auto injection if HPCI not initiated, Place HPCI TURBINE FLOW CONTROL FC-E41-1R600 in MANUAL AND Reduce demand to zero (0). Bypasses MSIV and CIG interlocks per OP-184-001: • Bypass MSIV Low Water Level 1 Isolation at 1C645 by Placing the following to BYPASS: o HS-B21-S38A Rx Wtr Lvl 1 MSIV Bypass Logic A. o HS-B21-S38C Rx Wtr Lvl 1 MSIV Bypass Logic C. • Bypass CIG Low Water Level 1 and High Drywell Pressure Isolation by Placing the following to BYPASS: o At 1C645, HS-12694 Low Lvl 1/Hi Drywell Press CIG Bypass (HV-12603) o At 1C645, HS-12695 Low Lvl 1/Hi Drywell Press CIG Bypass (SV-12651) o At 1C644, HS-12696 Low Lvl 1/Hi Drywell Press CIG Bypass (SV-12605) • IF 1.72# High Drywell Pressure isolation has occurred, Restore CIG as follows: o Open Instr Gas Cmp Suct Iso HV-12603. o Open Instr Gas To Contn Iso SV-12651. o Open Instr Gas Cmp OB Suct ISO SV-12605.

SCENARIO EVENT FORM

EVENTS	7, 8, & 9
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Electrical ATWS, CRD FCV/Pumps Trip, SLC Squibs/Pumps Fail

POSITION	TIME	STUDENT ACTIVITIES
BOP (cont)		May initiate Suppression Chamber spray per OP-149-004: • IF available, Place Emergency Service Water System in operation supplying RHR Room Cooler and RHR Pump to be placed in service. • IF LOCA signal present, Place HS-E11-1S17A(B) LOCA ISOLATION MANUAL OVERRIDE Switch to OVERRIDE. • Observe White Indicating Light ILLUMINATED above HS-E11-1S17A(B) LOCA ISOLATION MANUAL OVERRIDE. • Observe LOCA ISO SWITCH LOOP (A)B MANUAL OVERRIDE (AR-109(113)-C5) Annunciator alarms. • Open HV-151-F028A(B) SUPP CHMBR SPR TEST SHUTOFF. • Close HV-151-F017A(B)RHR INJ FLOW CTL. • IF a RHR Pump not in service, Start 1P202A(B)(C)(D)RHR PUMP. • Throttle Open HV-151-F027A(B) SUPP POOL SPRAY CTL, as necessary, to maintain ≤ 500 GPM as indicated on FI-15120A(B) CONTN SPRAY DIV 1(2) AND maintain total loop flowrate ≤ 10,000 gpm. • Monitor Suppression Chamber pressure. • IF Suppression Chamber pressure drops to 0 psig, THEN Stop Suppression Chamber Sprays. • IF required, Place RHRSW in service to RHR HX per section 4.0: o Place RHR Service Water in service to the RHR Heat Exchanger per OP-116-001 OR as follows: ▪ Ensure Closed Unit 2 HV-21210A(B) RHRSW Hx A(B) INLET. ▪ Open HV-11210A(B) Unit 1 RHRSW Hx A(B) INLET to 10% Open. ▪ OPEN HV-11215A(B) Unit 1 RHRSW Hx A(B) OUTLET. ▪ IF required, Place HS-11202A3(B3) RHRSW PUMP A(B) LOCA TRIP switch to RESET. ▪ Start 1P506A(B) RHRSW Pump A(B). ▪ Throttle HV-11210A(B) Unit 1 RHRSW Hx A(B) INLET to establish 8000 to 9000 gpm on FI-E11-1R602A(B) RHRSW HX A(B) INLET FLOW. o Place HV-151-F048A(B) HX A(B) SHELL SIDE BYPS Control Switch to OFF/LOCA RESET position. o Observe White Indicating Light ILLUMINATED above HV-151-F048A(B) Control Switch. o Close HV-151-F048A(B) HX A(B) SHELL SIDE BYPS.

UNIT SUPERVISOR TURNOVER SHEET

UNIT 1 TO/DA/Y
Date

SHIFT 1900 to 0700	SHIFT 0700 to 1900
Start End	Start End
MODE 1	MODE
POWER LEVEL 90.0 %	POWER LEVEL %
GENERATOR OUTPUT 1211 MWe	GENERATOR OUTPUT MWe
CASK STORAGE GATE INSTALLED: YES/NO	CASK STORAGE GATE INSTALLED: YES/NO

NRC CODE PRIOR TO 0800	Tango	Golf	Indigo	Foxtrot
NRC CODE AFTER 0800	Oscar	November	Indigo	Mike

REMARKS:

1) Core Spray pump A is out of service for maintenance.
2)
3)
4)
5)
6)
7) Shift activities are to:
   1. Start EHC pump B and secure EHC pump A per OP-193-003 section 2.9.
   2. Raise Reactor power to 100% with recirculation flow per GO-100-012 and the Reactivity Manipulation Package.
8)
9)
10) Unit 2 is at 100% power.
11)
12)

COMMON:

1) None
2)
3)
4)
5)
6)
8)
9)
10)
11)
12) (NRC SCN 3)

OFFGOING UNIT SUPERVISOR CHECKLIST:

1900-0700	0700-1900
MJ	
MJ	
MJ	
MJ	

1. Evolutions in progress and items to be completed during next shift, as noted in remarks, have been discussed with oncoming Unit Supervisor.
2. Problems encountered during past shift and abnormal plant conditions, as noted in remarks, have been discussed with oncoming Unit Supervisor.
3. Information in SOMS Log is complete and discussed with oncoming Unit Supervisor.
4. As applicable turnover plastic Security Badge cover and CRS Monitor function to oncoming Unit Supervisor.

1900 - 0700 M. Jacopetti

0700 - 1900 ____________

Offgoing Unit Supervisor

ONCOMING UNIT SUPERVISOR CHECKLIST:

	0700-1900	1900-0700
(14)		

1. LCO/TRO Log reviewed.
2. SOMS Log reviewed for entries made in past 24 hours.

0700 - 1900 ____________

1900 - 0700 ____________

Oncoming Qualified Unit Supervisor

POST RELIEF

0700-1900	1900-0700

1. Walk down Control Room panels with Unit Responsible PCO.
2. CRC Book reviewed and Reactivity Brief performed with PCO.
3. Completed System Status Operable audit for open PMT this shift.

0700 - 1900 ____________

1900 - 0700 ____________

Oncoming Unit Supervisor

Facility: Susquehanna Scenario No.: NRC-4 Op-Test No.: 2013

Examiners: ______________ Operators: ______________

Initial Conditions: The plant is operating at approximately 70% power. Core Spray pump A is out of service for maintenance. Circulating Water pump A is out of service and ready to be returned to service.

Turnover: Start Circulating Water pump A per OP-142-001 section 2.13 starting at step 2.13.5.d. Then perform a control rod pattern adjustment per the Reactivity Manipulation Package, OP-156-001, and GO-100-012.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP, SRO	Start Circulating Water pump A OP-142-001
2	cmfRD02_RED121N015A	I – SRO	Refuel Floor High Exhaust Radiation Monitor Fails Downscale AR-112-G02, Technical Specifications
3	N/A	R – ATC, SRO	Perform Control Rod Pattern Adjustment OP-156-001, GO-100-012
4	cmfPM03_1P132A mfRD1550193431	C – BOP, SRO	CRD Pump A Trip with One Inoperable CRD Accumulator ON-155-007, Technical Specifications
5	Override aiHS10001	C – ATC, SRO	Main Generator Auto Voltage Regulator Failure ON-198-001
6	mfDB117004 cmfPM04_0P162A	C – BOP, SRO	Loss of Instrument Bus 1Y226, Control Structure Chiller Fails to Auto-Start ON-117-001, Technical Specifications
7	mfMS183008	M – All	Main Steam Leak into Turbine Building ON-100-101, EO-000-102
8	mfRP158007B	I – ATC, SRO	RPS B Fails to Scram ON-100-101, EO-000-102
9	cmfAV06_HV141F028D cmfAV06_HV141F022D	C – BOP, SRO	MSIVs Fail to Automatically Close EO-000-102

10	mfHP152015 mfRC150001 diHS15012CB	C – All	HPCI Trips, RCIC Fails to Auto-Initiate, RCIC Initiation Pushbutton Fails to ARM EO-000-102
11	mfRC150011	C - All	RCIC Trips EO-000-102
*	(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor		

Facility: **Susquehanna** Scenario No.: **NRC-4**		Op-Test No.: **2013**
1. Total malfunctions (5-8) **Events ~~3~~, 4, 5, 6, 7, 8, 9, 10, 11**	~~9~~ 8	
2. Malfunctions after EOP entry (1-2) **Events 8, 9, 10, 11**	4	
3. Abnormal events (2-4) **Events 4, 5 & 6**	3	
4. Major transients (1-2) **Event 7**	1	
5. EOPs entered/requiring substantive actions (1-2) **EO-000-102**	1	
6. EOP contingencies requiring substantive actions (0-2)	0	
7. Critical tasks (2-3)	2	
CRITICAL TASK DESCRIPTIONS: **CT-1 – Manually initiate ARI.** **CT-2 – Manually isolate a Steam Line break.**		

TEAM SUSQUEHANNA Generating Excellence	# PPL–SUSQUEHANNA, LLC LEARNING CENTER
	# SIMULATOR SCENARIO
Scenario Title:	**NRC 2013 Scenario #4**
Scenario Duration:	**1.5 hours**
Scenario Number:	**NRC 2013 Scenario #4**
Revision / Date:	**0 / January 28, 2013**
Course:	**Licensed Operator Initial**
Operational Activities:	

Prepared By:	Tom Hooper Instructor	01/28/2013 Date
Reviewed By:	R. Strozzi Operations Training Supervisor	2/26/2013 Date
Approved By:	Lonnie Crawford Supervising Manager/Shift Manager	3/1/2013 Date

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SCENARIO SUMMARY

The crew assumes the shift with the plant operating at approximately 70% power. Core Spray pump A is out of service. Circulating Water pump A is out of service and ready to be started.

The crew will begin by starting Circulating Water pump A per OP-142-001. At the end of this evolution, Refuel Floor High exhaust radiation monitor A will fail downscale. The SRO will determine the Technical Specification impact. Then the crew will perform a control rod pattern adjustment.

During the control rod pattern adjustment, CRD pump A will trip. The crew will respond per ON-155-007 by placing the CRD flow control valve in manual and fully closing it. Then the crew will start CRD pump B, open the CRD flow control valve, and place the valve back in automatic. One CRD accumulator will alarm with low nitrogen pressure. The low nitrogen pressure condition will continue even after other CRD parameters are restored. The SRO will determine the Technical Specification impact of the inoperable accumulator.

The Main Generator voltage regulator will fail to maximum demand while in automatic. The crew will respond per ON-198-001. The crew may attempt to fix the automatic voltage regulator demand signal, but will eventually place the manual voltage regulator in service and lower reactive load.

Next, Instrument Bus 1Y226 will de-energize. This will cause a loss of multiple control room indications, Instrument Air compressors, and the running Control Structure Chiller. The standby Control Structure Chiller will fail to auto-start. The crew will take action to start the standby Control Structure Chiller. The SRO will determine the Technical Specification impact.

Next, a leak will develop from the Main Steam lines into the Turbine Building. The crew will lower Reactor power as time allows and attempt a manual Reactor scram. RPS channel B will fail to scram. The crew will insert control rods by manually initiating ARI. An MSIV isolation will be received on high temperature, however Main Steam Line D will fail to isolate. The crew will manually isolate Main Steam Line D by closing at least one of the two MSIVs.

Once the MSIVs are closed, the crew will lose the normal post-scram level and pressure control systems, Feedwater and Turbine Bypass Valves, respectively. HPCI may be started for level control, but will immediately trip. RCIC will fail to start on an automatic start signal. The crew will be able to manually start RCIC to restore and maintain Reactor water level and assist in controlling Reactor pressure. The RCIC initiation pushbutton will fail to arm, requiring manual component by component startup of RCIC. SRVs will also initially be required to control Reactor pressure. Steam flow through the SRVs will exceed RCIC makeup capability for a period of time following the scram. The crew will maximize other injection sources. After a period of time, lowering decay heat will allow RCIC to turn Reactor water level, avoiding the need for more drastic Reactor water level control actions. RCIC will eventually trip, requiring the crew to lower Reactor pressure and utilize Condensate pumps for Reactor injection.

The scenario will be terminated when all control rods are inserted, the Main Steam lines are isolated, Reactor water level is being restored to or controlled in the assigned band above -161", and Reactor pressure is being controlled in the assigned band below 1087 psig.

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SCENARIO OBJECTIVES

The objective of this scenario is to evaluate the Licensed Operator Candidate's ability to respond to the scenario events. These events will require each candidate to demonstrate the following:

- Knowledge of integrated plant operations
- Ability to diagnose abnormal plant conditions
- Ability to work together as a team
- Ability to mitigate plant transients that exercise their knowledge and use of ONs and EOPs
- Ability to utilize Technical Specifications (SRO Only)

To meet this objective, the Licensed Operator Candidates must demonstrate proficiency in the following competencies:

Reactor Operator Candidates:

1. Interpret/diagnose events and conditions based on alarms, signals, and readings.
2. Comply with and use procedures, references, and Technical Specifications.
3. Operate the control boards.
4. Communicate and interact with other crew members.

Senior Reactor Operator Candidates:

1. Interpret/diagnose events and conditions based on alarms, signals, and readings.
2. Comply with and use procedures and references.
3. Operate the control boards (N/A to upgrade candidates).
4. Communicate and interact with the crew and other personnel.
5. Direct shift operations.
6. Comply with and use Technical Specifications.

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CRITICAL TASKS

1. Critical Task 1

   Manually initiate ARI.

Safety Significance

Control rod insertion initiates power reduction immediately.

Consequences for Failure to Perform Task

Failure to insert control rods allows power to remain elevated with resultant power oscillations and potential core damage.

Indications/Cues for Event Requiring Critical Task

Exceeding a RPS scram setting with NO reactor scram signal, or RPS fails to fully insert all control rods.

Performance Criteria

Depressurize scram air header by arming and depressing manual ARI pushbuttons.

Performance Feedback

Successful insertion of control rods will be indicated by:

Rod position full in indication for manual insertion of control rods, venting scram air header or de-energizing RPS solenoids.

Rod position full in after resetting scram, draining scram discharge volume and re-scram.

2. Critical Task 2

Manually isolate a Steam Line break.

Safety Significance

High-energy leakage into the Turbine Building impacts the ability to safely operate the plant. Action is taken to isolate systems that are discharging into the Turbine Building to terminate possible sources of radioactivity release. Minimizing radioactive release to the Turbine Building also helps accomplish the objective of precluding a radioactive release outside Turbine Building under conditions where Turbine Building integrity cannot be maintained.

Consequences for Failure to Perform Task

Failure to take actions to mitigate the energy released to the Turbine Building directly affects the radiation dose to the General Public.

Indications/Cues for Event Requiring Critical Task

Simplex Fire Detection alarms; room area temperature annunciation; feedback from plant personnel.
High radiation annunciation for affected areas/rooms.
Other indication of steam line break: lowering steam supply pressure, depressurization of the RPV; level transient on RPV.

Performance Criteria

Manually close at least one MSIV in each Main Steam line.

Performance Feedback

Initiating an isolation of the affected system results in Control Room/PICSY indications of lowering area temperatures and radiation levels. Successful isolation is indicated on Control Room panel by full closed light indication for operated valves.

SCENARIO MALFUNCTIONS

Malfunction	Description	Crew Response
1	Refuel Floor High Exhaust Radiation Monitor Fails Downscale	Determine Technical Specification impact
2	CRD Pump A Trip with One Inoperable CRD Accumulator	Take manual control of CRD FCV, start alternate pump, place CRD FCV back in automatic, determine Technical Specification impact
3	Main Generator Auto Voltage Regulator Failure	Swap to manual voltage regulation, lower MVARs
4	Loss of Instrument Bus 1Y226, Control Structure Chiller Fails to Auto-Start	Start standby Control Structure Chiller, determine Technical Specification impact
5	Main Steam Leak into Turbine Building	Reduce Reactor power, attempt Reactor scram, control Reactor pressure and level with alternate systems
6	RPS B Fails to Scram	Manually initiate ARI
7	MSIVs Fail to Automatically Close	Manually isolate Main Steam line
8	HPCI Trips, RCIC Fails to Auto-Initiate, RCIC Initiation Pushbutton Fails to ARM	Manually start RCIC
9	RCIC Trips	Lower Reactor pressure and inject with Condensate

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SCENARIO REFERENCES

1. OP-142-001 — CIRCULATING WATER SYSTEM AND COOLING TOWER OPERATION
2. OP-164-001 — REACTOR RECIRCULATION SYSTEM
3. AR-112-001 (G02) — REFUEL FLOOR HI EXH MON DNSCALE
4. TS 3.3.6.2 — SECONDARY CONTAINMENT ISOLATION INSTRUMENTATION
5. TS 3.3.7.1 — CREOAS SYSTEM INSTRUMENTATION
6. OP-156-001 — REACTOR MANUAL CONTROL SYSTEM (RMCS)
7. ON-155-007 — LOSS OF CRD SYSTEM FLOW
8. AR-106-001 (C09) — GEN VOLT REG AUTO TO MAN SET POINT UNBALANCE
9. ON-198-001 — UNIT 1 MAIN GENERATOR MVAR CONTROL FOR AUTO VOLTAGE REGULATOR OPERATION WHEN SYNCHED TO GRID
10. OP-198-001 — MAIN GENERATOR SYSTEM
11. ON-117-001 — LOSS OF INSTRUMENT BUS
12. ON-100-101 — SCRAM, SCRAM IMMINENT
13. EO-000-102 — RPV CONTROL
14. ON-193-002 — MAIN TURBINE TRIP
15. ON-159-002 — CONTAINMENT ISOLATION
16. OP-150-001 — RCIC SYSTEM
17. OP-153-001 — STANDBY LIQUID CONTROL SYSTEM
18. OP-155-001 — CONTROL ROD DRIVE HYDRAULIC SYSTEM

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SCENARIO SPECIAL INSTRUCTIONS

1. Simulator setup
   a. **Initialize** to IC–379
   b. **Run** SCN file **n13scen4.scn**
2. **Place** the simulator in RUN
3. **Verify** the following malfunctions/overrides, event triggers and key assignments:

MF	RF	OR	SCN	ET	CONDITIONS	KEYS
10:10	**1:1**	**1:1**	**0**	**4:0**	**8**	**6**

4. **Prepare** the simulator for evaluation
   a. **Complete** a simulator exam checklist, NTP–QA–31.10 Attachment B
   b. **Place** a tag on Core Spray pump A.
   c. **Ensure** Circulating Water pump A is secured and ready for start.
   d. **Prepare** a Reactivity Manipulation Package for a control rod pattern adjustment.
5. **Prepare** a Turnover Sheet including the following:
   a. Start Circulating Water pump A per OP-142-001 section 2.13 starting at step 2.13.5.d. It is not desired to swap the Corrosion and Fouling Monitoring System from Circulating Water pump B to A. It is not desired to return the AMERTAP system to service at this time.
   b. Then perform a control rod pattern adjustment per the Reactivity Manipulation Package, OP-156-001, and GO-100-012.

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SCENARIO FILES

n13scen4.scn

```
; Monitored parameters
SCN rat_mp
SCN n13scen4mp

; Core Spray Pump A OOS
IRF crfPM13_1P206A

; Reactor power ~70%

; Circ water pump A OOS and ready for start

; Crew starts Circ water pump A

; Refuel Floor High Exhaust rad monitor fails downscale
{Key[1]} IMF cmfRD02_RED121N015A f:0.01

; Crew performs control rod pattern adjustment

; CRD pump A trips with one accumulator inoperable
{Key[3]} IMF cmfPM03_1P132A
{Key[3]} IMF mfRD1550193431 d:10

; Main Generator auto voltage regulator fails high
{Key[4]} IOR aiHS10001 r:8:00 f:1

; Loss of Instrument Bus 1Y226
{Key[5]} IMF mfDB117004

; CS Chiller fails to auto start, but will manually start
IMF cmfPM04_0P162A
aet n13scen4et35

; NPO cross ties CIG to IA
{Key[14]} IRF rfPC125001 f:OPEN

; Main steam leak into Turbine Building
{Key[6]} IMF mfMS183008 r:10:00 f:.25

; RPS B fails to scram
IMF mfRP158007B

; Auto ARI fails
IMF cmfRL03_B31K59AX
IMF cmfRL03_LISXB211N025A
IMF cmfRL03_B31K59CX
IMF cmfRL03_LISXB211N025C

; D MSIVs fail to automatically close but close manually
IMF cmfAV06_HV141F028D f:AsIs
IMF cmfAV06_HV141F022D f:AsIs
aet n13scen4et15
aet n13scen4et25

; HPCI trips
aet n13scen4et6

; RCIC fails to auto-initiate
IMF mfRC150001
```

```
; RCIC fails to arm
IOR diHS15012CB f:NORM

; RCIC trips, requiring depressurization and Condensate injection
{Key[7]} IMF mfRC150011
```

n13scen4et6.et

```
;METER:HPCI PUMP DISCHARGE
hpfinjfw >100
```

n13scen4et6.scn

```
imf mfHP152015
```

n13scen4et15.et

```
;SWITCH:MAIN STEAM LINE D ISOLATION
diHS14123D.CurrValue = #OR.diHS14123D.CLS
```

n13scen4et15.scn

```
dmf cmfAV06_HV141F022D
```

n13scen4et25.et

```
;SWITCH:MAIN STEAM LINE D ISOLATION
diHS14129D.CurrValue = #OR.diHS14129D.CLS
```

n13scen4et25.scn

```
dmf cmfAV06_HV141F028D
```

n13scen4et35.et

```
;SWITCH:CS CHLD WTR PMP 0P162A
diHS08622A.CurrValue != #OR.diHS08622A.AUTO
```

n13scen4et35.scn

```
DMF cmfPM04_0P162A
```

SCENARIO EVENT DESCRIPTION FORM

Initial Conditions: Ensure shift positions are assigned, have the Crew conduct the turnover and perform a panel walk down before the start of the scenario.

EVENT	OP EVENT / TASK	TIME	DESCRIPTION
N/A	N/A	0	Crew assumes shift
1	N/A	5	Start Circulating Water pump A
2	N/A	15	Refuel Floor High Exhaust Radiation Monitor Fails Downscale
3	N/A	25	Perform Control Rod Pattern Adjustment
4	N/A	35	CRD Pump A Trip with One Inoperable CRD Accumulator
5	N/A	45	Main Generator Auto Voltage Regulator Failure
6	N/A	55	Loss of Instrument Bus 1Y226, Control Structure Chiller Fails to Auto-Start
7	N/A	65	Main Steam Leak into Turbine Building
8	N/A	70	RPS B Fails to Scram
9	N/A	70	MSIVs Fail to Automatically Close
10	N/A	70	HPCI Trips, RCIC Fails to Auto-Initiate, RCIC Initiation Pushbutton Fails to ARM
11	N/A	80	RCIC Trips
N/A	N/A	90	Termination

SCENARIO EVENT FORM

EVENT	1
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Start Circulating Water pump A

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs BOP to start Circulating Water pump A per OP-142-001 section 2.13 starting at step 2.13.5.d.
ATC		Monitors plant parameters. Once Circulating Water pump A is running, enables the Rx Recirc CWP Trip Limiter #2 input for both the A & B Rx Recirc Pumps in accordance with OP-164-001: • Touch either the RRP A or RRP B button on the vertical selection menu to open the desired RRP controller. • Touch the ENABLE ALL button next to the Limiter #2 – CWP TRIP on the RRP_A(B) HMI screen. • Touch the ENABLE #2 LIMITER INPUT button on the confirmation overlay screen. • Ensure that the CWP TRIPS status block changes from an orange background to the normal gray background color. • Touch LIM 2 STATUS button to open the Limiter #2 Status overlay and ensure the CWP TRIPS input has been Enabled for both the A and the B Rx Recirc Pumps. • IF no other Limiter #2 Inputs are Disabled, Ensure that the Rx Recirc Pump A(B) INPUT ANOMALY status block under SPEED LIMITER #2 (48%) changes background color from orange to gray.

BOP		Starts Circulating Water pump A per OP-142-001 section 2.13 starting at step 2.13.5.d:
		• Depress CWP A 1P501A RUN FULL pushbutton.
		• Observe CWP A SUCTION HV 11513A OPENS ~ 90 seconds after start pushbutton depressed.
		• Observe CWP A STARTS.
		• Observe following occur for CWP A DISCHARGE HV-11511A:
		  o Red light ILLUMINATES when valve starts OPEN.
		  o White light ILLUMINATES when valve ~ 27% OPEN.
		  o Amber light EXTINGUISHES when valve 100% OPEN.
		• Monitor following CWP parameters:
		  o Motor Current on Computer point WCI10, PPC Display Format "CIRWT" or locally at 13.8KV switchgear.
		  o CWP differential pressure to ensure pump not in runout condition.
		  o Condenser water box differential pressure for indication of condenser water box performance.
		  o Cooling Tower Screens differential level.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	1
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Start Circulating Water pump A

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

If asked as **NPO** before the pump start, immediately report that the area is clear of unnecessary personnel and Circulating Water pump 1A is ready for start.

If asked as **NPO** after the pump start, immediately report that you have a good start on Circulating water pump 1A. If asked, wait one minute and report local motor current reads approximately 150 amps.

EVALUATOR NOTES

1. None

SCENARIO EVENT FORM

EVENT	2
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Refuel Floor High Exhaust Radiation Monitor Fails Downscale

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports: • Annunciator AR-112-001 (G02), REFUEL FLOOR HI EXH MON DNSCALE. • Refuel Floor High Exhaust Rad Monitor A reads downscale on RR-D12-1R607 on panel 1C600.
SRO		Ensures execution of AR-112-001 (G02). Determines Refuel Floor Exhaust Rad Monitor A is inoperable for Secondary Containment isolation function and CREOAS instrumentation function. Determines Technical Specification 3.3.6.2 Condition A requires placing the channel in trip within 24 hours. Determines Technical Specification 3.3.7.1 Condition B required action B.2.1 requires placing channel in trip within 24 hours.
ATC		Monitors plant parameters.
BOP		Executes AR-112-001 (G02): • Dispatches NPO to check indicator and trip units in the relay rooms. • May dispatch Radiation Protection to perform local survey. • Notifies SRO to comply with Technical Specifications 3.3.6.2 and 3.3.7.1.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	2
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Refuel Floor High Exhaust Radiation Monitor Fails Downscale

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 1** to initiate event:

   {Key[1]} IMF cmfRD02_RED121N015A f:0.01

ROLE PLAY

If asked as **NPO** to check Refuel Floor exhaust rad monitor indicators and trip units in the relay rooms, wait 2 minutes, then report,

> **"In the upper relay room, RISHH-D12-1K615A indicates downscale with a downscale trip. In the lower relay room, RISHH-D12-1K615B indicates normal."**

If asked as **Radiation Protection** to perform local surveys, wait 5 minutes, then report,

> **"All radiation levels in the Reactor Building and on the Refuel Floor are normal."**

As **WWM** (or equivalent) contacted for assistance with troubleshooting/repairing Refuel Floor exhaust rad monitor, acknowledge request and report that you will engage the organization.

If needed and directed by lead examiner, once the crew has responded to this event, call as Operations Management and prompt the crew to continue on with the control rod pattern adjustment.

Role play any other directed actions as required.

EVALUATOR NOTES

1. None

SCENARIO EVENT FORM

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Perform Control Rod Pattern Adjustment

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs ATC to perform control rod pattern adjustment per the Reactivity Manipulation Package, OP-156-001, and GO-100-012. Provides oversight for reactivity manipulation.
ATC		Performs control rod pattern adjustment per the Reactivity Manipulation Package, OP-156-001, and GO-100-012. Withdraws control rods 22-23, 38-39, 38-23, and 22-39 from position 04 to 08 one notch at a time: • Select control rod to be withdrawn one notch by Depressing corresponding CONTROL ROD SELECTION pushbuttons. • Observe: o CONTROL ROD SELECTION pushbuttons ILLUMINATED. o FULL CORE DISPLAY ILLUMINATED Green at selected location. o Present position of selected rod INDICATED on FOUR ROD DISPLAY on CRT and Standby Information Panel 1C652. • Momentarily Depress W/DRAW ROD pushbutton until the rod insert light illuminates. • During withdraw cycle, Observe following occur in sequence within ~ 10 seconds: o ROD INSERT light MOMENTARILY ILLUMINATED. o ROD W/DRAWG light ILLUMINATED THEN EXTINGUISHED. o Withdrawal drive flow of approx. 2-3 gpm during control rod withdrawal on CRT FOUR ROD DISPLAY. o ROD SETLG light ILLUMINATED THEN EXTINGUISHED at end of cycle. • Observe at FOUR ROD DISPLAY control rod withdraws one notch from previous position AND position indicated is an even number. Withdraws control rods 30-15, 30-47, 14-31, and 46-31 from position 12 to 16, as time permits.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Perform Control Rod Pattern Adjustment

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

Role play any directed actions as required.

EVALUATOR NOTES

1. The next event presents a challenge to control rod movements. It is recommended event 4 (CRD pump trip) be inserted after the fourth control rod is withdrawn.

SCENARIO EVENT FORM

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Perform Control Rod Pattern Adjustment

POSITION	TIME	STUDENT ACTIVITIES
ATC (cont)		Monitors diverse indications: • RPIS • APRMs • Core thermal power • Main Generator output • Reactor water level • Reactor pressure • Recirc pump speeds • Recirc pump flows • Total core flow Plots all Reactor power changes on Power/Flow Map.
BOP		Monitors plant parameters, including CRD parameters.

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SCENARIO EVENT FORM

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	CRD Pump A Trip with One Inoperable CRD Accumulator

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports: • Annunciator AR-107-001 (A01), CRD CHARGING WATER LO PRESS • Annunciator AR-107-001 (D01), CRD PUMP A TRIP • Annunciator AR-103-001 (H06), CRD ACCUMULATOR TROUBLE • CRD pump A tripped.
SRO		Enters ON-155-007, Loss of CRD System Flow. Declares CRD accumulator 34-31 inoperable due to low pressure (≤940 psig). Determines Technical Specification 3.1.5 Condition A required declaring the control rod slow within 8 hours as long as the control rod scram time was within the limits of Table 3.1.4-1 during the last scram time surveillance. Determines control rod 34-31 scram times are normal by checking the CRC book or contacting Reactor Engineering.
ATC		Monitors plant parameters.

BOP		Executes ON-155-007, Loss of CRD System Flow:
		• Determines accumulator trouble alarm has been received for control rod 34-31:
		  o Determines control rod 34-31 is withdrawn.
		  o Dispatches NPO to check HCU.
		  o Acknowledges HCU pressure is 900 psig.
		  o Informs SRO that accumulator 34-31 must be declared inoperable per Technical Specification 3.1.5.
		  o Determines Reactor pressure is > 900 psig and a Reactor scram is NOT required.
		  o Directs NPO to charge accumulator.
		• Determines CRD pump A tripped and trip not caused by low suction pressure and performs section 3.4.
		• Close CRD Flow Control Valve FV-146-F002A(B) as follows:
		  o Place CRD Flow Controller FC-C12-1R600 in MANUAL.
		  o Set CRD Flow Controller FC-C12-1R600 to 0% DEMAND SIGNAL.
		  o Verify CRD Flow Control Valve FV-146-F002A(B) CLOSED.
		• Start standby CRD Pump 1P132B by placing control switch to RUN position.
		• With CRD Pump 1P132B in operation, Establish system flow ~ 63 gpm using CRD Flow Controller FC-C12-1R600.
		• Place CRD Flow Controller FC-C12-1R600 in AUTO.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	CRD Pump A Trip with One Inoperable CRD Accumulator

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 3** to initiate event.

   {Key[3]} IMF cmfPM03_1P132A
   {Key[3]} IMF mfRD1550193431 d:10

ROLE PLAY

As **NPO** dispatched to investigate CRD accumulator 34-31, wait 2 minutes and **report**,

"CRD accumulator 34-31 pressure is 900 psig and stable."

As **NPO** dispatched to investigate CRD pump A, wait 2 minutes and **report**,

"There are no abnormal indications at CRD pump 1A."

As **NPO** dispatched to check the breaker for 1A CRD Pump, wait two minutes and **report**,

"1A207-01 for 1A CRD Pump is tripped and there is an acrid odor in the area."

As **NPO** dispatched to check CRD pump B start, wait 2 minutes and **report**,

"CRD pump B post-start checks are SAT."

As **Reactor Engineer** (or equivalent) contacted for assistance with determining accumulator 34-31 scram time data, acknowledge request (no data will be given during time frame of scenario).

As **WWM** (or equivalent) contacted for assistance with CRD pump A and/or CRD accumulator 34-31, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. It is recommended this event (CRD pump trip) be inserted after the fourth control rod is withdrawn.

SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Generator Auto Voltage Regulator Failure

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports: • Annunciator AR-106-001 (C09), GEN VOLT REG AUTO TO MAN SETPOINT UNBALANCED • Main Generator reactive load high.
SRO		Ensures execution of AR-106-C09. Enters ON-198-001, Unit 1 Main Generator MVAR Control for AUTO Voltage Regulator Operation when Synched to Grid Directs placing Main Generator voltage regulator in MANUAL. Directs lowering Main Generator reactive load.
ATC		Executes AR-106-001 (C09): • Determines Generator field overvoltage alarm is NOT in. • Determines grid is stable. • Ensures AC MVARS, XI-10004, within limits of OP-198-001 Attachment A, Main Generator Reactive Capability curve. • Determines Main Generator is in Auto Voltage Regulator control. • Monitors Main Generator parameters (MVars, MWe, Stator Cooling Temps Gen H2 Press. and Temp). • May attempt to null Manual and Automatic regulators using MAN VOLT REG ADJUST HC-10002 potentiometer. Executes ON-198-001, Unit 1 Main Generator MVAR Control for AUTO Voltage Regulator Operation when Synched to Grid: • Bring Up Group Display ON198 or PICSY PID menu (GENB) and Record parameters. • If MVAR is approaching or exceeding Generator Capability Curve OR Generator Field Current exceeding 6000 Amps as viewed on Unit 1 Computer Point GNI01, Perform Section 3.5: o May attempt to slowly Lower generator output voltage by using AUTO VOLT REG ADJUST HC-10001 potentiometer in order to control the Generator MVAR output

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Generator Auto Voltage Regulator Failure

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 4** to initiate event.

   {Key[4]} IOR aiHS10001 r:8:00 f:1

ROLE PLAY

Provide the following role plays either when called or 4 minutes after event initiation (call as GCC):

> **"We have noticed a slight rise in grid voltage, but other than that, the grid appears stable."**
>
> **"We need SSES Unit 1 to supply approximately 150 MVAR to the grid."**

If asked as **GCC/TCC**, give permission to make any changes to the voltage regulator that SSES requests (Auto to Manual, Manual to Auto, wiping potentiometers).

As **WWM** (or equivalent) contacted for assistance, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. The procedural path taken in this event may vary depending on how the crew diagnoses failure of the auto voltage regulator. Multiple procedure sections are described, however the crew may not perform all sections.

SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Generator Auto Voltage Regulator Failure

POSITION	TIME	STUDENT ACTIVITIES
ATC (cont)		• If a problem is suspected of the Voltage Regulator, Perform either of the following as required: o To wipe the auto and manual voltage regulator potentiometers, Perform Section 3.9.1: ▪ Ensure both Rx Recirc Pump controllers are operating in the Manual Mode in accordance with OP-164-002. ▪ Contact TCC to request permission to wipe the manual and auto voltage regulator potentiometers. ▪ IF generator voltage becomes unstable at any time during or after transfers between regulators, Promptly Transfer to the regulator that provides stable operation. ▪ Ensure HS-10006, VOLT REG XFER SELECT, switch is in the AUTO position. ▪ Rotate Slightly HC-10002, MAN VOLT REG ADJUST, and Ensure Auto Voltage Reg in control. ▪ Rapidly Rotate HC-10002, MAN VOLT REG ADJUST, from end to end a few times to clean its brush surface. ▪ Return HC-10002, MAN VOLT REG ADJUST, to null volts at XI-10012, VR XFER. ▪ Transfer HS-10006, VOLT REG XFER SELECT, switch to MAN position. ▪ Ensure HS-10006, VOLT REG XFER SELECT, switch is in the MAN position. ▪ Rotate Slightly HC-10001, AUTO VOLT REG ADJUST and Ensure Manual Voltage Reg in control. ▪ Rapidly Rotate HC-10001, AUTO VOLT REG ADJUST, from end to end a few times to clean its brush surface. ▪ Return HC-10001, AUTO VOLT REG ADJUST, to null volts at XI-10012, VR XFER. ▪ Transfer HS-10006, VOLT REG XFER SELECT, switch back to AUTO position. ▪ Ensure HS-10006, VOLT REG XFER SELECT, switch is in the AUTO position. ▪ Observe operation of the auto voltage regulator voltage adjust controls to verify proper operation and response. ▪ Select the desired modes of operation for the Rx Recirc Pump controllers in accordance with OP-164-002.

SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Generator Auto Voltage Regulator Failure

POSITION	TIME	STUDENT ACTIVITIES
ATC (cont)		o To transfer the voltage regulator from auto to manual and back to auto without performing a wiping action, Perform Section 3.9.2: ▪ Contact TCC to request permission to transfer to the manual regulator for a period of time to ride out MVAR oscillations. ▪ Ensure both Rx Recirc Pump controllers are operating in the Manual Mode in accordance with OP-164-002. ▪ IF generator voltage becomes unstable at any time during or after transfers between regulators, Promptly Transfer to the regulator that provides stable operation. ▪ Ensure HS-10006, VOLT REG XFER SELECT, switch is in the AUTO position. ▪ Adjust HC-10002, MAN VOLT REG ADJUST, to null volts at XI-10012, VR XFER if required. ▪ Transfer HS-10006, VOLT REG XFER SELECT, switch to MAN position. ▪ Adjust HC-10001, AUTO VOLT REG ADJUST, to null volts at XI-10012, VR XFER if required. ▪ Transfer HS-10006, VOLT REG XFER SELECT, switch back to AUTO position. ▪ Observe operation of the auto voltage regulator voltage adjust controls to verify proper operation and response. ▪ Select the desired modes of operation for the Rx Recirc Pump controllers in accordance with OP-164-002.

SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Generator Auto Voltage Regulator Failure

POSITION	TIME	STUDENT ACTIVITIES
ATC (cont)		May use OP-198-001 section 2.7 to transfer to manual voltage regulator: • Obtain Unit Supervisor Permission to Transfer. • Contact GCC and TCC to Request permission to transfer to the MANUAL regulator. • IF generator voltage becomes UNSTABLE at any time during OR after transfers between regulators, Promptly Transfer to the regulator that provides STABLE operation. • Ensure HS-10006, VOLT REG XFER SELECT, switch is in the AUTO position. • Adjust HC-10002, MAN VOLT REG ADJUST, to Null volts at XI-10012, VR XFER IF Required. • Transfer HS-10006, VOLT REG XFER SELECT, switch to MAN position. • Check operation of the Manual voltage regulator voltage adjust controls AND Observe proper Response. Adjusts HC-10002, MAN VOLT REG ADJUST, as necessary to obtain desired Main Generator reactive load.
BOP		Monitors plant parameters. As time permits, Contact GCC and TCC and advise MVAR output greater than desired on Generator Capability Curve.

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SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Loss of Instrument Bus 1Y226, Control Structure Chiller Fails to Auto-Start

POSITION	TIME	STUDENT ACTIVITIES
TEAM		Recognizes / reports: • AR-106-001 (G12), INSTRUMENT AC 1Y226 POWER FAILURE • Loss of Instrument Bus 1Y226 • Control Structure Chiller B tripped and A failed to auto-start
SRO		Enters ON-117-001, Loss of Instrument Bus. Reviews ON-117-001 Attachments F and G for functions lost and recommended actions. Determines Technical Specification 3.8.7 Condition A requires restoring 1Y226 within 8 hours.
ATC		Monitors plant parameters.
BOP		Executes ON-117-001, Loss of Instrument Bus: • Determines section 3.5 applies. • Refers to Attachments F and G for functions lost and recommended actions. • Dispatches operator to check 1B226024. • Determines 1Y226 cannot be re-energized. Starts Control Structure Chiller A per OP-030-001: • At Heat and Ventilation Control Panel 0C681, Place CS Chld Wtr Pp 0P162A control switch to START. • Observe: o CS Chld Wtr Pp 0P162A STARTS. o CS CWS SW Cdsr Pp 0P170A STARTS. o After 30 to 60 seconds, CS Chlr 0K112A Compressor Motor STARTS. • Monitor current on CS Chiller 0K112A. • Verify Chiller 0K112A picking up load by observing current ≥ 30 amps.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Loss of Instrument Bus 1Y226, Control Structure Chiller Fails to Auto-Start

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 5** to initiate event.

   {Key[5]} IMF mfDB117004

2. When a candidate attempts to start Control Structure Chiller A, verify automatic event trigger n13scen4et35 initiates and the chiller starts.

ROLE PLAY

If dispatched as operator to check 1Y226 or breaker 1B226024, wait 2 minutes, then report:

"1Y226 supply breaker 1B226024 is tripped and appears damaged."

As **WWM** (or equivalent) contacted for assistance, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. Recommend initiating the next event once the crew has reviewed the plant impact and started the alternate Control Structure Chiller.

SCENARIO EVENT FORM

EVENTS	7, 8, 9, 10, & 11
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Steam Leak into Turbine Building, RPS B Fails to Scram, MSIVs Fail to Automatically Close, HPCI Trips, RCIC Fails to Auto-Initiate, RCIC Initiation Pushbutton Fails to ARM, RCIC Trips

POSITION	TIME	STUDENT ACTIVITIES
★		**Manually initiate ARI.** **Manually isolate a Steam Line break.**
Team		Recognizes / reports: • Notification of steam in Turbine Building • Rising temperature in Main Steam Tunnel in Turbine Building • Annunciator AR-111-001 (F02), STEAM TUNNEL TURBINE AREA HI TEMP • Annunciators AR-111(112)-001 (B02), STEAM TUNNEL LOGIC A/C (B/D) HI TEMP • Annunciators AR-111(112)-001 (B03), MS STM LINE LEAK DETECTION HI TEMP • Annunciators AR-111-001 (D01(E01)), MSIV LOGIC A/C (B/D) ISO INITIATED • Annunciators AR-103(104)-001 (D02), MSIV CHAN A/C (B/D) NOT FULLY OPEN TRIP • Annunciator AR-103-001 (A01), RPS CHANNEL A1/A2 AUTO SCRAM • Failure of RPS B to scram. • Failure of Inboard and Outboard MSIVs on Main Steam Line D to close. • Failure of RCIC to auto-initiate. • Trip of HPCI turbine.
SRO		Enters ON-100-101, Scram, Scram Imminent. As time/power level allows, directs power reduction for Scram Imminent. As time allows, directs manual Reactor scram. Enters EO-000-102, RPV Control, on high power, high Reactor pressure, and/or low Reactor water level. May exit EO-000-102 and enter EO-000-113, Level/Power Control: • **Ensures ARI initiated.** • Acknowledges all control rods inserted. • Exits EO-000-113 and enters EO-000-102. **Directs closure of MSIVs on Main Steam Line D.**

★ Denotes Critical Task

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENTS	7, 8, 9, 10, & 11
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Steam Leak into Turbine Building, RPS B Fails to Scram, MSIVs Fail to Automatically Close, HPCI Trips, RCIC Fails to Auto-Initiate, RCIC Initiation Pushbutton Fails to ARM, RCIC Trips

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, initiate the Main Steam leak by **depressing Key 6, then make first Role Play below**:
   {Key[6]} IMF mfMS183008 r:10:00 f:.25

2. When candidate attempts to close MSIVs on D MSL, verify automatic event triggers n13scen4et15 and n13scen4et25 initiate and the MSIVs close.

3. If HPCI starts, verify automatic event trigger n13scen4et6 initiates and trips HPCI.

4. When directed by lead examiner (recommended once level is under control with RCIC), **depress Key 7** to trip RCIC.
   {Key[7]} IMF mfRC150011

ROLE PLAY

Upon event initiation, call the crew as an **NPO** in the Turbine Building and report:
"There is a lot of steam in the Turbine Building. It appears to be coming from the vicinity of the Main Steam Tunnel."

If dispatched as **NPO** to investigate abnormal conditions in the Turbine Building, wait 2 minutes, then report:
"There was elevated temperature and a lot of steam as soon as I got into the Turbine Building. I have exited the building." (if after MSIVs closed, instead report steam seems to be clearing)

If dispatched as **NPO/Security** to check TB blowout panels, wait 2 minutes, then report:
"No Turbine Building blowout panels have ruptured."

If dispatched as **NPO** to investigate HPCI, wait 2 minutes, then report,
"HPCI appears to have some damage to the Turbine."

If dispatched as **NPO** to investigate RCIC before it is started, wait 2 minutes, then report:
"RCIC appears to be in standby. There is nothing abnormal in the RCIC room."

Role play any other directed actions as required.

EVALUATOR NOTES

1. ARI may be manually initiated before entry into EO-000-113, Level/Power Control, based on direction in ON-100-101, Scram, Scram Imminent. In this case, entry into EO-000-113 will not be made.
2. MSIVs may be closed based on Operator standards to backup automatic actions that fail or on guidance in EO-000-102, RPV Control, step RC/L-1.
3. The initial post-scram level control band is likely to be +20" to +45".
4. In order to inject with Condensate pumps, Reactor pressure will need to be reduced below 700 psig.
5. Recommended termination criteria:
   a. All control rods inserted.
   b. Main Steam lines isolated.
   c. Reactor water level being restored to or controlled in assigned band above -161".
   d. Reactor pressure controlled in assigned band below 1087 psig.

SCENARIO EVENT FORM

EVENTS	7, 8, 9, 10, & 11
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Steam Leak into Turbine Building, RPS B Fails to Scram, MSIVs Fail to Automatically Close, HPCI Trips, RCIC Fails to Auto-Initiate, RCIC Initiation Pushbutton Fails to ARM, RCIC Trips

POSITION	TIME	STUDENT ACTIVITIES
SRO (cont)		Directs Reactor water level controlled +13" to +54" using HPCI, RCIC, CRD, SLC, and/or Condensate. Directs Reactor pressure controlled 800-1050 psig using RCIC and SRVs. May direct Reactor cooldown <100°F/hr using RCIC and SRVs. Directs evacuation of the Turbine Building. Once RCIC trips: • Directs Reactor pressure lowered. • Directs Reactor water level controlled with Condensate, CRD, and/or SLC. Enters EO-000-103 on high Suppression Pool temperature. Directs initiation of Suppression Pool cooling.
ATC		As time / power level permits, performs ON-100-101, Scram Imminent actions: • When required, Reduce Rx Core Flow as follows: o IF not in the Manual Mode, on the RRP DUAL SCRN HMI screen, Touch the Rx Recirc Pump A & B EXIT TO MANUAL buttons. o IF required, Insert Control Rods, as necessary, to obtain a Rod Line which is less than the value stated in the CRC Book. o Initiate the required flow/power reduction by performing either of the following: ▪ Initiate a Manual Rx Recirc Limiter #2 Runback in accordance with OP-164-001. OR ▪ Adjust the double chevron DEC buttons on the REACTOR RECIRC PUMP A(B) SPEED controllers SY-B31-1R621A & B as required to establish the final Core Flow value stated in the CRC Book. Places the Mode Switch in SHUTDOWN. Arms and depresses the RPS manual scram pushbuttons (4). Recognizes/reports all control rods inserted.

SCENARIO EVENT FORM

EVENTS	7, 8, 9, 10, & 11
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Steam Leak into Turbine Building, RPS B Fails to Scram, MSIVs Fail to Automatically Close, HPCI Trips, RCIC Fails to Auto-Initiate, RCIC Initiation Pushbutton Fails to ARM, RCIC Trips

POSITION	TIME	STUDENT ACTIVITIES

ATC (cont)		Inserts SRMs/IRMs.
		
		Observes Scram Discharge Volume Vent and Drain valves CLOSED.
		
		WHEN main generator load < 150 MWe, at 1C651, Depresses Trip Pushbutton for Main Turbine.
		
		Stops Condensate Pumps 1P102A(B)(C)(D) as necessary to leave 2 pumps in operation.
		
		Performs ON-193-002, Main Turbine Trip, to ensure main turbine trip and main generator lockout. Ensures:
		• Main Generator Output Breaker TRIPS.
		• IF Main Generator is unable to disconnect from grid after a turbine trip, Perform ON-198-004.
		• Main Generator Exciter Field Breaker TRIPS.
		• Auxiliary Bus "11A" 1A101 TRANSFERS to Startup Bus 0A103.
		• Auxiliary Bus "11B" 1A102 TRANSFERS to Startup Bus 0A103.
		• Motor Suction Pump 1P108 STARTS.
		• Turning Gear Oil Pump 1P111 STARTS.
		• Turbine Lift Pumps 1P109A,B,C,D,E,F,G, H & J START.
		• Reactor Recirc Pumps 1P401A and B TRIP caused by EOC RPT if thermal power > 26%.
		
		Resets Main Generator Lockouts in accordance with ON-193-002:
		• At Generator and Transformers Protection Relays Vertical Board 1C654, Circle as found position AND Reset the following Primary and Backup Lockout Relays if tripped:
		  o 86GA TRIPPED/RESET
		  o 86GC TRIPPED/RESET
		  o 86GE TRIPPED/RESET
		  o Reset/Ensure Reset Breaker Failure Lockout Relay 86BF–190B1 at Panel 0C190B.
		  o 86GB TRIPPED/RESET
		  o 86GD TRIPPED/RESET
		
		Performs ON-159-002, Containment Isolation.

SCENARIO EVENT FORM

EVENTS	7, 8, 9, 10, & 11
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Steam Leak into Turbine Building, RPS B Fails to Scram, MSIVs Fail to Automatically Close, HPCI Trips, RCIC Fails to Auto-Initiate, RCIC Initiation Pushbutton Fails to ARM, RCIC Trips

POSITION	TIME	STUDENT ACTIVITIES

BOP		**Arms and depresses the ARI manual pushbuttons (2).**
		
		May attempt to manually start HPCI.
		
		Recognizes / report HPCI trip.
		
		Recognizes / reports D MSIVs fail to close.
		
		Manually closes D MSIVs (HV-141-F022D and F028D).
		
		Manually initiates RCIC per OP-150-001 using either manual pushbutton method or component-by-component startup:
		
		If attempts RCIC start using manual pushbutton, recognizes / report RCIC initiation pushbutton fails.
		
		<u>Starting RCIC Component-by-Component</u>
		• Place RCIC TURBINE FLOW CONTROL FC-E51-1R600 in MANUAL and set for MINIMUM SPEED.
		• Start RCIC BARO CDSR VACUUM PP 1P219.
		• Open RCIC L O COOLER WTR SUPPLY HV-150-F046.
		• Open STEAM TO RCIC TURBINE HV-150-F045.
		• Observe RCIC Turbine accelerate.
		• When RCIC Pump discharge pressure > 190 psig with flow < 75 gpm, Observe MIN FLOW TO SUPP POOL FV-149-F019 OPENS.
		• Using RCIC TURBINE FLOW CONTROL FC-E51-1R600, Raise RCIC pump discharge pressure within 50 psig of reactor pressure.
		• Open RCIC INJECTION HV-149-F013.
		• Using RCIC TURBINE FLOW CONTROL FC-E51-1R600, Establish desired flow.
		• Ensure MIN FLOW TO SUPP POOL FV-149-F019 CLOSES.
		• When desired flow established:
		  o Null RCIC TURBINE FLOW CONTROL FC-E51-1R600.
		  o Place RCIC TURBINE FLOW CONTROL FC-E51-1R600 in AUTO.

SCENARIO EVENT FORM

EVENTS	7, 8, 9, 10, & 11
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Main Steam Leak into Turbine Building, RPS B Fails to Scram, MSIVs Fail to Automatically Close, HPCI Trips, RCIC Fails to Auto-Initiate, RCIC Initiation Pushbutton Fails to ARM, RCIC Trips

POSITION	TIME	STUDENT ACTIVITIES

ATC / BOP (cont)		May maximize CRD per OP-155-001:
		• Using FC-C12-1R600, CRD Flow Controller, in MANUAL, Fully Open FV-146-F002A(B), CRD Flo Ctl.
		• Fully Open THTLG PV-146-F003, DRIVE WTR PRESS THTLG valve.
		
		May inject SLC per OP-153-001:
		• Place HS-14804 SBLC MANUAL INITIATION keylock control switch to A(B) START.
		• Observe SBLC PUMPS 1P208A(B) STARTS
		• Once initiated, Observe the following:
		  o HV-144-F004 RWCU INLET OB ISO CLOSES.
		  o SBLC SQUIB READY A B white indicating lights EXTINGUISHED.
		  o SBLC SQUIB VALVES LOSS OF CKT CONTINUITY annunciator ALARMS.
		  o Pump 1P208A(B) Red indicating light ILLUMINATED.
		  o SBLC PUMP discharge header pressure > 200 psig greater than reactor pressure.
		  o SBLC FLOW Indicates ~ 40 GPM.
		  o SBLC Storage Tank level decreasing.
		
		Restores and maintains Reactor water level +13” to +54”.
		
		Maintains Reactor pressure 800-1050 psig using RCIC and SRVs.
		
		May perform a Reactor cooldown <100°F/hr using RCIC and SRVs, if directed.
		
		Once RCIC trips:
		• Lowers Reactor pressure using SRVs.
		• Controls Reactor water level with Condensate, CRD, and/or SLC.
		
		May initiate Suppression Pool cooling, as time permits.

UNIT SUPERVISOR TURNOVER SHEET

UNIT 1 TO/DA/Y
Date

SHIFT	1900	to	0700	SHIFT	0700	to	1900
	Start		End		Start		End

MODE 1
POWER LEVEL 70.0 %
GENERATOR OUTPUT 892 MWe
CASK STORAGE GATE INSTALLED: YES/NO

MODE
POWER LEVEL %
GENERATOR OUTPUT MWe
CASK STORAGE GATE INSTALLED: YES/NO

NRC CODE PRIOR TO 0800	Tango	Golf	Indigo	Foxtrot
NRC CODE AFTER 0800	Oscar	November	Indigo	Mike

REMARKS:

1) Core Spray pump A is out of service for maintenance.
2) Irradiated fuel moves are being made in the Unit 1 Spent Fuel Pool for pool optimization.
3) Circulating Water pump A is out of service following maintenance and ready to be re-started.
4)
5)
6)
7) Shift activities are to:
   1. Start Circulating Water pump A per OP-142-001 section 2.13, starting at step 2.13.5.d.
   2. Perform a control rod pattern adjustment per the given Reactivity Manipulation Package, OP-156-001, and GO-100-012.
8)
9)
10) Unit 2 is at 100% power.
11)
12)

COMMON:

1) None
2)
3)
4)
5)
6)
8)
9)
10)
11)
12) (NRC SCN 4)

OFFGOING UNIT SUPERVISOR CHECKLIST:

1900-0700	0700-1900
MJ	
MJ	
MJ	
MJ	

1. Evolutions in progress and items to be completed during next shift, as noted in remarks, have been discussed with oncoming Unit Supervisor.
2. Problems encountered during past shift and abnormal plant conditions, as noted in remarks, have been discussed with oncoming Unit Supervisor.
3. Information in SOMS Log is complete and discussed with oncoming Unit Supervisor.
4. As applicable turnover plastic Security Badge cover and CRS Monitor function to oncoming Unit Supervisor.

1900 - 0700 M. Jacopetti

0700 - 1900 ____________________

Offgoing Unit Supervisor

ONCOMING UNIT SUPERVISOR CHECKLIST:

	0700-1900	1900-0700
(14)		

1. LCO/TRO Log reviewed.
2. SOMS Log reviewed for entries made in past 24 hours.

0700 - 1900 ____________________

1900 - 0700 ____________________

Oncoming Qualified
Unit Supervisor

POST RELIEF

0700-1900	1900-0700

1. Walk down Control Room panels with Unit Responsible PCO.
2. CRC Book reviewed and Reactivity Brief performed with PCO.
3. Completed System Status Operable audit for open PMT this shift.

0700 - 1900 ____________________

1900 - 0700 ____________________

Oncoming Unit Supervisor

TEAM SUSQUEHANNA
Generating Excellence

PPL–SUSQUEHANNA, LLC
LEARNING CENTER

SIMULATOR SCENARIO

Scenario Title:	**NRC 2013 Scenario #5**
Scenario Duration:	**1.5 hours**
Scenario Number:	**NRC 2013 Scenario #5**
Revision / Date:	**0 / January 28, 2013**
Course:	**Licensed Operator Initial**
Operational Activities:	

Prepared By:	Tom Hooper Instructor	01/28/2013 Date
Reviewed By:	R. Sorensen Operations Training Supervisor	2/26/2013 Date
Approved By:	Lonnie Crawford Supervising Manager/Shift Manager	3/1/2013 Date

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SCENARIO SUMMARY

The crew assumes the shift with the plant operating at approximately 8-9% power during a plant startup. APRM 1 is bypassed due to spiking.

The crew will begin by raising Reactor power by withdrawing control rods. The crew will complete the current rod group. Then the crew will place the Mode Switch in RUN per GO-100-002, Plant Startup, Heatup, and Power Operation. When the Mode Switch is placed in RUN, Annunciator AR-104-001 (D03), MSIV CLOSURE BYPASS, will not clear as required. The SRO will place the startup on hold and determine the Technical Specification impact.

Next, EDG C will spuriously start. ESW pump C will start and then trip after a short time delay. The crew will enter ON-054-001, Loss of Emergency Service Water, and restore ESW flow. EDG C will experience high jacket water and lube oil temperatures due to failure of the jacket water temperature control valve. The crew will secure EDG C due to the high temperatures. The SRO will determine the Technical Specification impact of ESW pump C and EDG C inoperability.

Service Water pump A will develop a high bearing temperature. After a short period of time, discharge pressure from Service Water pump A will begin to degrade. The crew may enter ON-111-001, Loss of Service Water. The crew will take action to start an alternate Service Water pump and secure Service Water pump A.

Next, a seismic event will occur and cause a rupture in Instrument Air piping. The crew will enter ON-118-001, Loss of Instrument Air. The crew will insert a manual Reactor scram and execute ON-100-101, Scram, Scram Imminent. The MSIVs will close due to low Instrument Air pressure, resulting is loss of Feedwater pumps and Turbine Bypass Valves for Reactor water level and pressure control, respectively. The crew will use alternate systems for Reactor water level and pressure control, and stabilize the plant as Instrument Air pressure continues to degrade.

A second seismic event will occur and cause a break between the Suppression Pool and both the Core Spray A and RHR A rooms. Additionally, a small steam leak will develop in the Drywell. Suppression Pool level will lower and the crew will enter EO-000-103, Primary Containment Control. The crew may attempt to isolate Core Spray A and RHR A suction lines, but the respective suction valves will fail to close. The crew will lineup Suppression Pool makeup from Condensate Transfer, the Condensate Storage Tanks, HPCI, and/or RCIC. The running Condensate Transfer pump will trip upon initiation of makeup. The crew will be able to start the alternate Condensate Transfer pump, but it will fail to produce normal discharge pressure due to a shaft shear. HPCI and RCIC minimum flow valves will also fail to open. These failures will limit the sources of Suppression Pool makeup.

As Suppression Pool level continues to lower, the crew will isolate HPCI and then enter EO-000-112, Rapid Depressurization. The crew will attempt to open all 6 ADS valves, however only 3 will open. The crew will open 3 other SRVs. The crew will control Reactor injection to restore / maintain Reactor water level during and after the rapid depressurization.

The scenario will be terminated when 6 SRVs are open and Reactor water level is being restored to or controlled in the assigned band above -161".

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SCENARIO OBJECTIVES

The objective of this scenario is to evaluate the Licensed Operator Candidate's ability to respond to the scenario events. These events will require each candidate to demonstrate the following:

- Knowledge of integrated plant operations
- Ability to diagnose abnormal plant conditions
- Ability to work together as a team
- Ability to mitigate plant transients that exercise their knowledge and use of ONs and EOPs
- Ability to utilize Technical Specifications (SRO Only)

To meet this objective, the Licensed Operator Candidates must demonstrate proficiency in the following competencies:

Reactor Operator Candidates:

1. Interpret/diagnose events and conditions based on alarms, signals, and readings.
2. Comply with and use procedures, references, and Technical Specifications.
3. Operate the control boards.
4. Communicate and interact with other crew members.

Senior Reactor Operator Candidates:

1. Interpret/diagnose events and conditions based on alarms, signals, and readings.
2. Comply with and use procedures and references.
3. Operate the control boards (N/A to upgrade candidates).
4. Communicate and interact with the crew and other personnel.
5. Direct shift operations.
6. Comply with and use Technical Specifications.

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CRITICAL TASKS

1. Critical Task 1

Isolate HPCI when Suppression Pool level cannot be maintained above 17 feet.

Safety Significance

Maintenance of primary containment by preventing direct deposition of HPCI exhaust steam to the Suppression Chamber air space (bypassing the suppression capability).

Consequences of Failure to Perform the Task
Potential failure of primary containment.

SSES EOP Basis for:

SP/L-6 **WHEN** SUPP POOL LVL CANNOT BE MAINTAINED **> 17'**

IRRESPECTIVE OF ADEQUATE CORE COOLING
ISOLATE HPCI

Operation of HPCI with its exhaust sparger uncovered (17 ft) will cause the suppression chamber pressure to increase and possibly cause the primary containment to fail. Therefore, HPCI must be secured irrespective of adequate core cooling.

Indications/Cues for the Event Requiring Critical Task

Multiple Control Room and PICSY indications of Suppression Pool water level. Determination by Unit Supervisor that attempts to maintain pool level will not be successful maintaining level above 17 feet.

Performance Criteria

Regardless of HPCI use for adequate core cooling, close steam isolation valves when Suppression Pool level cannot be maintained above 17 feet.

Performance Feedback
Full closed indication of HPCI steam isolation valves; HPCI trip.

2. Critical Task 2

Rapidly depressurize the reactor when Suppression Pool level cannot be maintained above 12 feet.

Safety Significance

Maintenance of primary containment by ensuring RPV depressurization is accomplished prior to additional Suppression Pool inventory loss.

Consequences of Failure to Perform the Task

Potential failure of primary containment.

SSES EOP Basis for:

SP/L-7 **WHEN** SUPP POOL LVL CANNOT BE MAINTAINED **> 12'**

CONTINUE

SP/L-8 **IF** INITIAL ATWS PWR ≤ **5%**

OR

RX SHUTDOWN WITH CONTROL RODS

RAPID DEPRESS IS REQ'D

When pool level drops to 12', its ability to quench a LOCA is threatened because the downcomers uncover at 12'; any steam discharged from the RPV into the drywell may not condense in the suppression pool before suppression chamber pressure reaches unacceptable levels.

Depressurizing via SRVs is safe because T-quenchers do not uncover until pool level is < 5'.

Indications/Cues for the Event Requiring Critical Task

Multiple Control Room and PICSY indications of Suppression Pool water level. Determination by Unit Supervisor that attempts to maintain pool level will not be successful maintaining level above 12 feet.

Performance Criteria

Recognize that efforts to maintain Suppression Pool level above 12' are unsuccessful perform rapid depressurization per EO-112.
Initiate ADS / Manually open all 6 ADS valves

Performance Feedback

Verify ADS valves are open using red light indication, acoustic monitoring and lowering Reactor pressure and rising reactor water level.

SCENARIO MALFUNCTIONS

Malfunction	Description	Crew Response
1	MSIV Closure Bypass Annunciator Does Not Clear	Stop startup, SRO determines Technical Specification impact
2	Spurious EDG C Start, ESW Pump C Trip, EDG C Jacket Water TCV Fails Closed	Start alternate ESW pump, shutdown EDG C, SRO determines Technical Specification impact
3	Service Water Pump A High Temperature and Degraded Performance	Start alternate Service Water pump, secure Service Water pump A
4	Seismic Event and Instrument Air Leak	Scram, stabilize plant with MSIVs closed
5	Seismic Event, Un-isolable Suppression Pool Break, and Small Steam Leak in Drywell	Initiate Suppression Pool makeup, isolate HPCI, rapidly depressurize the Reactor
6	Condensate Transfer Pump A Trips Upon Makeup to Suppression Pool, Condensate Transfer Pump B Shaft Shear, HPCI and RCIC Minimum Flow Valves Fail to Open	Start Condensate Transfer pump B, utilize alternate means of Suppression Pool makeup, rapidly depressurize the Reactor
7	Three ADS Valves Fail to Open	Open alternate SRVs

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SCENARIO REFERENCES

1.	OP-156-001	REACTOR MANUAL CONTROL SYSTEM (RMCS)
2.	GO-100-002	PLANT STARTUP, HEATUP AND POWER OPERATION
3.	ON-024-001	DIESEL GENERATOR TRIP
4.	LCO 3.8.1	AC SOURCES - OPERATING
5.	ON-054-001	LOSS OF EMERGENCY SERVICE WATER (ESW)
6.	LCO 3.7.2	EMERGENCY SERVICE WATER (ESW) SYSTEM
7.	OP-024-001	DIESEL GENERATORS
8.	ON-111-001	LOSS OF SERVICE WATER
9.	OP-111-001	SERVICE WATER SYSTEM
10.	ON-000-002	NATURAL PHENOMENA
11.	ON-118-001	LOSS OF INSTRUMENT AIR
12.	ON-100-101	SCRAM, SCRAM IMMINENT
13.	ON-193-002	MAIN TURBINE TRIP
14.	OP-152-001	HPCI SYSTEM
15.	OP-150-001	RCIC SYSTEM
16.	OP-153-001	STANDBY LIQUID CONTROL SYSTEM
17.	OP-155-001	CONTROL ROD DRIVE HYDRAULIC SYSTEM
18.	EO-000-103	PRIMARY CONTAINMENT CONTROL
19.	OP-159-001	SUPPRESSION POOL CLEANUP SYSTEM
20.	ON-037-001	LOSS OF CONDENSATE TRANSFER
21.	EO-000-102	RPV CONTROL
22.	EO-000-112	RAPID DEPRESSURIZATION

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SCENARIO SPECIAL INSTRUCTIONS

1. Simulator setup
   a. **Initialize** to IC–380
   b. **Run** SCN file **n13scen5.scn**
2. **Place** the simulator in RUN
3. **Verify** the following malfunctions/overrides, event triggers and key assignments:

MF	RF	OR	SCN	ET	CONDITIONS	KEYS
9:9	2:2	9:9	0	2:0	23	10

4. **Prepare** the simulator for evaluation
   a. **Complete** a simulator exam checklist, NTP–QA–31.10 Attachment B
   b. **Place** a tag on the APRM bypass joystick (APRM 1 bypassed).
   c. **Prepare** the startup control rod sequence for the current place in the Reactor startup.
   d. **Markup** GO-100-002 to step 5.63.
5. **Prepare** a Turnover Sheet including the following:
   a. Continue to raise Reactor power by withdrawing control rods. Complete the next four control rod withdrawal steps in the startup sequence.
   b. Then place the Mode Switch in RUN and withdraw IRMs per GO-100-002 step 5.63.

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SCENARIO FILES

n13scen5.scn

```
; Monitored parameters
SCN rat_mp
SCN n13scen5mp

; Closes SW B and C discharge valves
IRF rfSW111005 f:0
IRF rfSW111006 f:0

; APRM A bypassed due to spiking

; Reactor power ~7% during startup, ready to go to RUN

; Crew raises Reactor power with control rods

; Crew places mode switch in RUN and withdraws IRMs

; MSIV closure bypass annunciator does not clear
IMF cmfRL02_C721K11A
IMF cmfRL02_C721K11B

; Inadvertent EDG C start; ESW pump C trips after
; 60 seconds; high jacket water and lube oil temps
{Key[1]} IOR diHS00051C c:15 f:RESET
{Key[1]} IMF cmfPM03_0P504C d:60
{Key[1]} IMF mfDG024010C f:0.0
{Key[1]} IMF cmfTH02_TE03421C r:5:00 f:205
{Key[1]} IMF cmfTH02_TE03458C r:5:00 f:185
{Key[1]} IMF annLA521CC07 f:ALARM_ON d:1:00
{Key[1]} IMF annLA521CA06 f:ALARM_ON d:4:30

; Actions for emergency stop of EDG C from engine
; control panel
{Key[11]} IOR di43CMC_Q f:LOCAL
{Key[11]} IOR di5ESC_Q c:3 f:STOP d:2

; Service water pump A high bearing temperature and
; subsequent low discharge pressure
{Key[2]} IMF cmfTH02_TE10901A i:160 r:3:00 f:200
{Key[2]} IRF rfSW111004 d:3:00 r:3:00 f:40

; NPO opens Service Water pump discharge valve in field
{Key[30]} IRF rfSW111005 f:100
{Key[40]} IRF rfSW111006 f:100

; Seismic event with instrument air leak
{Key[3]} IMF mfEN099001D
{Key[3]} IMF mfIA118002 i:5 r:10:00 f:7

; Seismic event with suppression pool break and small steam
; leak in Drywell
{Key[4]} IMF mfMS183007 r:1:00 f:0.1
{Key[4]} IMF mfEN099001D
{Key[4]} IMF mfCS151002 r:1:00 f:100
{Key[4]} IMF mfRH149004A d:4:00 r:3:00 f:100

; HPCI steam isolation valves auto logic fails
IMF cmfMV06_HV155F002
IMF cmfMV06_HV155F003

; Core Spray loop A and RHR pump A suction valve fails to close
```

```
IMF cmfMV09_HV152F001A f:100
IMF cmfMV09_HV151F004A f:100
aet n13scen5et14
aet n13scen5et15

; Condensate transfer pump A trips after NPO opens
; 152028 in field to initiate Supp pool makeup
{Key[5]} IRF rfCS151009 r:30 f:50
{Key[5]} IMF cmfPM03_0P155A d:30

; Condensate transfer pump B fails to develop
; normal discharge pressure due to shaft shear
IMF cmfPM05_0P155B

; HPCI and RCIC min flow valves fail closed
; to prevent additional supp pool makeup
IOR diHS15512 f:CLS
IMF cmfMV06_HV155F012
IOR diHS14919A f:CLOSE
IMF cmfMV06_FV149F019

; NPO opens CST to Core Spray valves
{Key[15]} IRF rfCS151010 r:30 f:100
{Key[25]} IRF rfCS151012 r:30 f:100

; ADS fails to arm and three ADS valves fail to open
IOR diHSB211S30AB f:DISARM
IOR diHSB211S31AB f:DISARM
IOR diHSB211S30BB f:DISARM
IOR diHSB211S31BB f:DISARM
IOR diHS14113L3 f:AsIs
IOR diHS14113M3 f:AsIs
IOR diHS14113K3 f:AsIs
```

n13scen5et12.et

```
;LIGHT:SERVICE WATER PUMP B
doHS10901B_3.CurrValue = #OR.doHS10901B_3.ON
```

n13scen5et12.scn

```
IMF cmfTH02_TE10901B r:3:00 f:200
cet n13scen5et22
```

n13scen5et14.et

```
;SWITCH:CORE SPRAY PUMP LOOP A SUCTION
diHS15201A.CurrValue = #OR.diHS15201A.CLOSE
```

n13scen5et14.scn

```
IMF cmfMV01_HV152F001A
```

n13scen5et15.et

```
;SWITCH:RHR PUMP A SUCT VLV HV-1F004A (E11A-S4A)
diHS15104A.CurrValue = #OR.diHS15104A.CLOSE
```

n13scen5et15.scn

```
IMF cmfMV01_HV151F004A
```

n13scen5et22.et

```
;LIGHT:SERVICE WATER PUMP C
doHS10901C_2.CurrValue = #OR.doHS10901C_2.ON
```

n13scen5et22.scn

```
cet n13scen5et12
IMF cmfTH02_TE10901C r:3:00 f:200
```

n13scen5mp.scn

```
insmp dgte03421c
changemp dgte03421c ,,,EDG C Jacket Temp

insmp dgte03458c
changemp dgte03458c ,,,EDG C LO Temp

insmp iappi12507b
changemp iappi12507b ,,,IA pressure

insmp rdpic121r013
changemp rdpic121r013 ,,,CRD Air Pressure
```

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SCENARIO EVENT DESCRIPTION FORM

Initial Conditions: Ensure shift positions are assigned, have the Crew conduct the turnover and perform a panel walk down before the start of the scenario.

EVENT	OP EVENT / TASK	TIME	DESCRIPTION
N/A	N/A	0	Crew assumes shift
1	N/A	5	Raise Reactor Power with Control Rods
2	N/A	15	Place Mode Switch in RUN and Withdraw IRMs
3	N/A	20	MSIV Closure Bypass Annunciator Does Not Clear
4	N/A	30	Spurious EDG C Start, ESW Pump C Trip, EDG C Jacket Water TCV Fails Closed
5	N/A	45	Service Water Pump A High Temperature and Degraded Performance
6	N/A	55	Seismic Event and Instrument Air Leak
7	N/A	65	Seismic Event, Un-isolable Suppression Pool Break, and Small Steam Leak in Drywell
8	N/A	70	Condensate Transfer Pump A Trips Upon Makeup to Suppression Pool, Condensate Transfer Pump B Shaft Shear, HPCI and RCIC Minimum Flow Valves Fail to Open
9	N/A	80	Three ADS Valves Fail to Open
N/A	N/A	90	Termination

SCENARIO EVENT FORM

EVENT	1
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Raise Reactor Power with Control Rods

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs ATC to perform control rod withdrawals per the startup control rod sequence, OP-156-001, and GO-100-002. Provides oversight for reactivity manipulation.

ATC		Withdraws control rods 10-43, 50-43, 50-19, 10-19 from position 04 to 08 one notch at a time:
		• Select control rod to be withdrawn one notch by Depressing corresponding CONTROL ROD SELECTION pushbuttons.
		• Observe:
		  o CONTROL ROD SELECTION pushbuttons ILLUMINATED.
		  o FULL CORE DISPLAY ILLUMINATED Green.
		  o Present position of selected rod INDICATED on FOUR ROD DISPLAY on CRT and Standby Information Panel 1C652.
		• Momentarily Depress W/DRAW ROD pushbutton until the rod insert light illuminates.
		• During withdraw cycle, Observe following occur in sequence within ~ 10 seconds:
		  o ROD INSERT light MOMENTARILY ILLUMINATED.
		  o ROD W/DRAWG light ILLUMINATED THEN EXTINGUISHED.
		  o Withdrawal drive flow of approx. 2-3 gpm during control rod withdrawal on CRT FOUR ROD DISPLAY.
		  o ROD SETLG light ILLUMINATED THEN EXTINGUISHED at end of cycle.
		• Observe at FOUR ROD DISPLAY control rod withdraws one notch from previous position AND position indicated is an even number.
		
		Monitors diverse indications:
		• RPIS
		• APRMs
		• Core thermal power
		• Main Generator output
		• Reactor water level
		• Reactor pressure
		• Recirc pump speeds
		• Recirc pump flows
		• Total core flow

BOP		Monitors plant parameters, including CRD parameters.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	1
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Raise Reactor Power with Control Rods

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

Role play any directed actions as required.

EVALUATOR NOTES

1. None

SCENARIO EVENT FORM

EVENT	2
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Place Mode Switch in RUN and Withdraw IRMs

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs ATC to place the Mode Switch in RUN and withdraw IRMs per GO-100-002 step 5.63.
ATC		Records the date and time when ALL operable APRM channels are ON SCALE AND indicating OK on top left corner of ODA with Reactor power 7 to 10%. Announces twice over Plant PA System: "Attention all plant personnel, Unit 1 will be entering Mode 1." Places MODE SWITCH HS-C72A-1S01 to RUN.
BOP		Monitors plant parameters.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	2
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Place Mode Switch in RUN and Withdraw IRMs

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

Role play any directed actions as required.

EVALUATOR NOTES

1. Once the Mode Switch is placed in RUN, the crew will recognize that Annunciator AR-104-001 (D03) fails to clear and continue in the next event. Although the crew's initial direction was to proceed to withdraw IRMs, they should stop when the Mode Switch manipulation does not produce the expected result.

SCENARIO EVENT FORM

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	MSIV Closure Bypass Annunciator Does Not Clear

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports Annunciator AR-104-001 (D03), MSIV CLOSURE BYPASS, did not clear as required when the Mode Switch was placed in RUN.
SRO		Determines the MSIV closure scram function (TS 3.3.1.1 Function 5) is inoperable. Determines Technical Specification 3.3.1.1 Condition C requires restoring trip capability within 1 hour. If trip capability not restored within 1 hour, Condition D requires application of Condition F. Condition F requires being in Mode 2 within 6 hours. May direct placing the Mode Switch in STARTUP/STBY.
ATC		Stops performing GO-100-002 actions. If directed, places the Mode Switch in STARTUP/STBY.
BOP		Monitors plant parameters.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	3
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	MSIV Closure Bypass Annunciator Does Not Clear

INSTRUCTOR ACTIVITY

1. None

ROLE PLAY

As **WWM** (or equivalent) contacted for assistance with the Mode Switch / MSIV CLOSURE BYPASS alarm, acknowledge request.

If asked as **Operations Management** (or equivalent) for guidance on how to proceed, ask,

> **"What is your recommendation?"**
>
> Follow up with,
>
> **"I concur, go ahead and carry out your recommendation."**

Role play any other directed actions as required.

EVALUATOR NOTES

1. None

SCENARIO EVENT FORM

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Spurious EDG C Start, ESW Pump C Trip, EDG C Jacket Water TCV Fails Closed

POSITION	TIME	STUDENT ACTIVITIES

Team		Recognizes / reports:
		• Initially:
		    o Annunciator AR-015-001 (C16), DG C PANEL 0C521C LO PRIORITY TROUBLE
		    o EDG C running but not closed on the bus.
		• One minute later:
		    o Annunciator AR-016-001 (A10), ESW PUMPS A, B, C, D TRIP
		    o Annunciator AR-016-001 (B10), ESW PUMP A && C AUTO START TRIP
		    o ESW pump C tripped.

SRO		Ensures execution of ARs. Enters ON-054-001, Loss of Emergency Service Water (ESW) Directs start of alternate ESW pump. Directs shutdown of EDG C per OP-024-001. May enter ON-024-001, Diesel Generator Trip. Directs ATC to complete SO-024-013 within one hour. Determines EDG C and ESW pump C are inoperable. Determines Technical Specification 3.8.1 Condition B applies. Required Action (RA) B.1 requires performance of SO-024-013 with in 1 hour and once per 8 hours thereafter. RA B.3.1 requires ensuring not a common mode failure within 24 hours. RA B.4 requires restoration of the DG to operable within 72 hours. Determines Technical Specification 3.7.2 Required Action C.1 requires restoring 'C' ESW Pump to operable within 7 days.
ATC		Monitors plant parameters.
BOP		Executes ARs. Determines no valid start signal exists for EDG C. Dispatches NPO to check EDG C.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Spurious EDG C Start, ESW Pump C Trip, EDG C Jacket Water TCV Fails Closed

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 1** to initiate event.

   {Key[1]} IOR diHS00051C c:15 f:RESET
   {Key[1]} IMF cmfPM03_0P504C d:60
   {Key[1]} IMF mfDG024010C f:0.0
   {Key[1]} IMF cmfTH02_TE03421C r:5:00 f:205
   {Key[1]} IMF cmfTH02_TE03458C r:5:00 f:185
   {Key[1]} IMF annLA521CC07 f:ALARM_ON d:1:00
   {Key[1]} IMF annLA521CA06 f:ALARM_ON d:4:30

2. If directed as NPO to perform an emergency shutdown of EDG C, wait 1 minute, then **depress KEY 11**:

   {Key[11]} IOR di43CMC_Q f:LOCAL
   {Key[11]} IOR di5ESC_Q c:3 f:STOP d:2

ROLE PLAY

As **NPO** dispatched to investigate EDG C, wait 2 minutes, then **report**,

> **"I don't see any reason for EDG C to have started. EDG C is running hot. Both jacket water and lube oil temperatures are rising** (may give actual values based on monitored parameters)**." Report annunciators as they come in on the EDG engine control panel.**

As **NPO** dispatched to investigate ESW pump C trip, wait 2 minutes, then **report**,

> **"ESW pump C breaker is tripped. I don't see any other obvious problems with the pump or breaker."**

If dispatched as **NPO** to check on another ESW pump, wait 2 minutes, then **report**,

> **"Everything is fine with ESW pump A(B)(D)."**

If dispatched as **NPO** to perform emergency shutdown of EDG C, wait 1 minute, **depress KEY 11** as indicated above, then **report**,

> **"Emergency shutdown of EDG C is complete."**

As **WWM** (or equivalent) contacted for assistance with EDG C or ESW pump C, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. Shutdown of EDG C from the Control Room includes a five minute cooldown timer. The crew is likely to direct emergency shutdown of EDG C locally to bypass this time delay due to elevated EDG temperatures.

SCENARIO EVENT FORM

EVENT	4
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Spurious EDG C Start, ESW Pump C Trip, EDG C Jacket Water TCV Fails Closed

POSITION	TIME	STUDENT ACTIVITIES
BOP (cont)		Executes ON-054-001, Loss of Emergency Service Water (ESW): • Dispatches NPO to investigate ESW pump C trip. • Starts at least one ESW pump. • May start additional ESW pump(s). • Checks spray pond valve alignment to ensure return path to Spray Pond available. Secures EDG C per OP-024-001 by either Control Room shutdown or emergency shutdown from Engine Control Panel: • Control Room shutdown of EDG C: o Position/Confirm DG C Voltage Adjust HS-00053C until ~ 4.25KV indicated on XI-00035C. o TO assure proper cooldown cycle, Allow Diesel Generator C to run unloaded 5 minutes. o AFTER 5 minute unloaded run, Depress DG C STOP HS-00052C pushbutton to initiate Automatic Cooldown Cycle. o Dispatches NPO to Engine Control Panel to observe following: ▪ Stop light ILLUMINATES. ▪ Five minutes after STOP pushbutton depressed, fuel cut off to engine and diesel generator STOPS. ▪ Running Idle light EXTINGUISHES. ▪ AT 280 rpm, DG C Pre Lube Oil Pump 0P532C STARTS. o Directs NPO, on Panel 0C521C, to ensure DG C Control Mode Select Switch in REMOTE. o WHEN diesel generator comes to complete stop, Depress Reset pushbutton for Annunciator and System Reset. o Observe DG C Available for Emergency light ILLUMINATED. • Emergency shutdown of EDG C from Engine Control Panel o Dispatches NPO to shutdown EDG C from Engine Control Panel.

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SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Service Water Pump A High Temperature and Degraded Performance

POSITION	TIME	STUDENT ACTIVITIES
Team		Recognizes / reports: • PICSY alarm for Service Water pump A bearing high temperature. • Annunciator AR-123-001 (D01), SERVICE WATER HEADER LO PRESS.
SRO		May enter ON-111-001, Loss of Service Water. Directs swapping Service Water pumps per OP-111-001.
ATC		Monitors plant parameters.
BOP		Executes ON-111-001, Loss of Service Water, as directed: • Performs section 3.3. • Ensure standby Service Water Pump 1P502B(C) STARTED. o Recognizes Service Water Pumps are not in auto and have discharge valves closed for single pump operation. o Starts Service Water Pump 1P502B and/or 1P502C per OP-111-001. o Dispatches NPO to open Service Water Pump discharge valve. • Dispatches NPO to check Service Water Pump 1P502A. • Monitor Service Water Pump 1P502B(C) parameters and suction pressure (PICSY SRWTR and CIRWT).

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Service Water Pump A High Temperature and Degraded Performance

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 2** to initiate event.
   {Key[2]} IMF cmfTH02_TE10901A i:160 r:3:00 f:200
   {Key[2]} IRF rfSW111004 d:3:00 r:3:00 f:40

2. If dispatched as **NPO** to open Service Water pump B discharge valve, wait 2 minutes, then **depress KEY 30**. This remote function may be modified as requested by crew. Provide immediate reports as appropriate.
   {Key[30]} IRF rfSW111005 f:100

3. If dispatched as **NPO** to open Service Water pump C discharge valve, wait 2 minutes, then **depress KEY 40**. This remote function may be modified as requested by crew. Provide immediate reports as appropriate.
   {Key[40]} IRF rfSW111006 f:100

ROLE PLAY

As **NPO** dispatched to investigate Service Water pump A, wait 2 minutes and **report**,
"Service Water pump A is running hotter and louder than normal. Discharge pressure appears to be slowly lowering."

As **NPO** dispatched to check on the Service Water pump that is manually started, wait 1 minutes and **report**,
"Service Water pump C(B) is operating normally."

If dispatched as **NPO** to open Service Water pump B discharge valve, wait 2 minutes, then **depress KEY 30** as indicated above, then **report**,
"Service Water pump B discharge valve is open."

If dispatched as **NPO** to open Service Water pump C discharge valve, wait 2 minutes, then **depress KEY 40** as indicated above, then **report**,
"Service Water pump C discharge valve is open."

As **WWM** (or equivalent) contacted for assistance with Service Water, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. Service Water pumps B and C are NOT in AUTO and have their discharges valves closed due to single pump alignment. The crew must recognize this and dispatch an operator to open the discharge valve(s) when needed.

SCENARIO EVENT FORM

EVENT	5
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Service Water Pump A High Temperature and Degraded Performance

POSITION	TIME	STUDENT ACTIVITIES

BOP (cont)		Swaps Service Water pumps per OP-111-001 section 2.7:
		• Check standby Service Water Pump 1P502C(B) seal water pressure > 30 psig on local PI-10901C(B).
		• IF Service Water Pump 1P502C is the standby pump, AND SERV WTR PP 1P502A to be removed from service, at Panel 1C668, Ensure HSS-10901C SERV WTR PP C PREFERRED BUS in 1A10111A position.
		• IF swapping SERV WTR PP 1P502B in service and stopping SERV WTR PP 1P502A, Perform the following:
		  o Start standby SERV WTR PP 1P502B as follows:
		    ▪ Dispatch NPO to ensure closed 109005 SW Pp B Dsch Iso.
		    ▪ Depress RUN pushbutton.
		    ▪ Dispatch NPO to slowly Open 109005 until 110-125 psig on local PI-10903B.
		    ▪ Check Service Water Pump 1P502B for cavitation indicating further venting required.
		  o Dispatch NPO to full Open 109005.
		  o WHEN system pressure stabilizes, Stop SERV WTR PP 1P502A as follows:
		    ▪ Dispatch NPO to close 109004 SW Pp A Dsch Iso.
		    ▪ Depress AUTO pushbutton, THEN
		    ▪ Depress STOP pushbutton.
		• IF swapping SERV WTR PP 1P502C in service and stopping SERV WTR PP 1P502A, Perform the following:
		  o Start standby SERV WTR PP 1P502C as follows:
		    ▪ Ensure HSS-10901C SERV WTR PP C PREFERRED BUS in 1A10111A position.
		    ▪ Dispatch NPO to ensure closed 109006 SW Pp C Dsch Iso.
		    ▪ Depress RUN pushbutton.
		    ▪ Dispatch NPO to slowly Open 109006 until 110-125 psig on local PI-10903C.
		    ▪ Check Service Water Pump 1P502C for cavitation indicating further venting required.
		  o Dispatch NPO to full Open 109006.
		  o WHEN system pressure stabilizes, Stop SERV WTR PP 1P502A as follows:
		    ▪ Dispatch NPO to close 109004 SW Pp A Dsch Iso.
		    ▪ Depress AUTO pushbutton, THEN
		    ▪ Depress STOP pushbutton.

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SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event and Instrument Air Leak

POSITION	TIME	STUDENT ACTIVITIES
TEAM		Recognizes / reports: • Annunciator AR-016-001 (G06), SEISMIC MONITORING SYSTEM TRIGGERED • Annunciator AR-124-001 (E01), SERVICE AIR LO PRESS • Lowering instrument air pressure. • Annunciator AR-124-001 (A01), INSTRUMENT AIR LOOP A LO PRESSURE • Annunciator AR-124-001 (B01), INSTRUMENT AIR LOOP B LO PRESSURE • Annunciator AR-107-001 (G01), SCRAM PILOT VALVE AIR HEADER LO PRESS
SRO		Enters ON-000-002, Natural Phenomenon. Enters ON-118-001, Loss of Instrument Air. Enters ON-100-101, Scram, Scram Imminent. Directs manual Reactor scram. Directs Reactor water level controlled +13" to +54" using Condensate, HPCI, RCIC, CRD, and/or SLC. Directs Reactor pressure controlled 800-1050 psig using SRVs, HPCI, and/or RCIC. May direct cooldown <100°F/hr.
ATC		Executes ON-100-101, Scram, Scram Imminent. Places the Mode Switch in SHUTDOWN. Recognizes/reports all control rods inserted. Inserts SRMs/IRMs. Observes Scram Discharge Volume Vent and Drain valves CLOSED. WHEN main generator load < 150 MWe, at 1C651, Depresses Trip Pushbutton for Main Turbine.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event and Instrument Air Leak

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, **depress KEY 3** to initiate event.

    {Key[3]} IMF mfEN099001D
    {Key[3]} IMF mfIA118002 i:5 r:10:00 f:7

ROLE PLAY

If directed as **NPO** to perform system walkdowns, acknowledge direction.

If directed as **NPO** to look for instrument air leakage, wait 4 minutes, then **report**,

> **"There is a large leak coming from the common header downstream of the Instrument Air dryers."**

As **WWM** (or equivalent) contacted for assistance, acknowledge request.

Role play any other directed actions as required.

EVALUATOR NOTES

1. The outboard MSIVs will close due to loss of instrument air. This will result in unavailability of Feedwater pumps for level control and Turbine Bypass Valves for pressure control.
2. The initial post-scram level control band is likely to be +20" to +45".
3. It is recommended that the next event (Suppression Pool leak) be initiated once the crew has completed initial scram response.

SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event and Instrument Air Leak

POSITION	TIME	STUDENT ACTIVITIES

ATC (cont)		Performs ON-193-002, Main Turbine Trip, to ensure main turbine trip and main generator lockout. Ensures:
		• Main Generator Output Breaker TRIPS.
		• IF Main Generator is unable to disconnect from grid after a turbine trip, Perform ON-198-004.
		• Main Generator Exciter Field Breaker TRIPS.
		• Auxiliary Bus "11A" 1A101 TRANSFERS to Startup Bus 0A103.
		• Auxiliary Bus "11B" 1A102 TRANSFERS to Startup Bus 0A103.
		• Motor Suction Pump 1P108 STARTS.
		• Turning Gear Oil Pump 1P111 STARTS.
		• Turbine Lift Pumps 1P109A,B,C,D,E,F,G, H & J START.
		• Reactor Recirc Pumps 1P401A and B TRIP caused by EOC RPT if thermal power > 26%.
		
		Resets Main Generator Lockouts in accordance with ON-193-002:
		• At Generator and Transformers Protection Relays Vertical Board 1C654, Circle as found position AND Reset the following Primary and Backup Lockout Relays if tripped:
		  o 86GA TRIPPED/RESET
		  o 86GC TRIPPED/RESET
		  o 86GE TRIPPED/RESET
		  o Reset/Ensure Reset Breaker Failure Lockout Relay 86BF–190B1 at Panel 0C190B.
		  o 86GB TRIPPED/RESET
		  o 86GD TRIPPED/RESET

BOP		Executes ON-000-002, Natural Phenomenon, as time permits: • Notify Security of event. • Notify Station Engineering to perform TP 000 015, Settlement Monitoring of the ESSW Pumphouse. • At Earthquake Monitoring Panel 0C696, Determine type of event which occurred by reviewing the information on installed monitor, the status lights and validating the event using OP-099-002. • IF OBE OR SSE earthquake occurred: • Test all Control Room panel annunciator alarms on both units to ensure all alarming conditions are visible. • Commence shutdown in accordance with GO 100 004 (GO 200 004), Plant Shutdown to Minimum Power. • Monitor plant for indication of leaks by observing sump level indication, tank and pool level indications, makeup water flow rises, and fire suppression actuations. • Direct operators to perform surveys for possible damage in accessible areas (especially concrete).

SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event and Instrument Air Leak

POSITION	TIME	STUDENT ACTIVITIES
BOP (cont)		Executes ON-118-001, Loss of Instrument Air: • IF any time Instrument Air System pressure decreases to < 65 psig, THEN Immediately Manually Scram Reactor in accordance with ON-100-101, SCRAM SCRAM IMMINENT. • Perform following sections concurrently: o Control Room Actions for Decreasing Instrument Air Pressure ▪ At 1C668, Unit Services Benchboard, Monitor Instrument Air pressure. ▪ IF Instrument Air lost AND cannot be restored, THEN Refer to Attachment A for actions occurring due to low I/A Pressure. ▪ Notify U-2 that a LOSS of U-1 I/A will cause all U-2 GASEOUS RADWASTE air operated valves to FAIL CLOSED. ▪ IF a system breach has occurred OR Instrument Air is lost AND can NOT be restored, THEN Dispatch an operator to ensure integrity of Refueling Gate Seals, Reactor Well (Refueling Cavity) Seals and Cask Storage Pit Seals. ▪ IF Service Water is NOT available to cool TBCCW, THEN Transfer in service TBCCW heat exchanger to ESW supply in accordance with OP 111 001, Service Water System. ▪ IF loss of the Fuel Pool Cooling System has occurred, THEN Perform ON-135-001, Loss Of Fuel Pool Cooling/Coolant Inventory, to preclude fuel pool boiling. o Local Actions for Decreasing Instrument Air Pressure ▪ Dispatches NPO to perform field actions. Executes ON-100-101, Scram, Scram Imminent. Controls Reactor pressure 800-1050 psig using RCIC, HPCI, and/or SRVs. Controls Reactor water level +13" to +54" using RCIC, HPCI, CRD, SLC, and/or Condensate. May manually initiate HPCI per OP-152-001 using either manual pushbutton method or component-by-component startup: May recognize/report HPCI min flow valve fails to open and secure HPCI.

SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event and Instrument Air Leak

POSITION	TIME	STUDENT ACTIVITIES

BOP (cont)		<u>Starting HPCI with Manual Pushbutton</u>
		• Ensure suction flowpath by ensuring either HPCI PUMP SUCT FROM CST HV-155-F004 OPEN OR HPCI PUMP SUCT FROM SUPP POOL HV-155-F042 OPEN.
		• Manually Initiate HPCI as follows:
		  o Place protective collar of HPCI MAN INIT HS-E41-1S33 pushbutton to ARMED position,
		  AND
		  o Depress And Hold HPCI MAN INIT HS-E41-1S33 pushbutton until HV-155-F001 indicated DUAL position.
		• Ensure following occur upon initiation of HPCI System:
		  o HPCI TURBINE STEAM SUPPLY HV-155-F001 OPENS.
		  o HPCI AUXILIARY OIL PUMP 1P213 STARTS.
		  o HPCI L O CLG WTR HV-156-F059 OPENS.
		  o HPCI BARO CDSR VACUUM PP 1P216 STARTS.
		  o HPCI TEST LINE TO CST ISO HV-155-F008 CLOSES if open.
		  o HPCI TEST LINE TO CST ISO HV-155-F011 CLOSES if open.
		  o HPCI PUMP DSCH HV-155-F007 OPENS if closed.
		  o HPCI STM LINE DRN TO CDSR IB ISO HV-155-F028 CLOSES.
		  o HPCI STM LINE DRN TO CDSR OB ISO HV-155-F029 CLOSES.
		  o HPCI BARO CDSR COND PP DSCH DRN HV-156-F025 CLOSES if open.
		  o HPCI BARO CDSR COND PP DSCH DRN HV-156-F026 CLOSES.
		  o HPCI INJECTION HV-155-F006 OPENS.
		  o HPCI PUMP ROOM UNIT COOLER 1V209A(B) STARTS.
		  o HPCI AUXILIARY OIL PUMP 1P213 STOPS when Turbine speed ~ 2150 rpm.
		• Observe HPCI Turbine ramps up at controlled rate of speed.
		• May recognize/report HPCI MIN FLOW TO SUPP POOL HV-155-F012 fails to open.
		• May attempt to manually open HPCI MIN FLOW TO SUPP POOL HV-155-F012.
		• Place the HPCI AUX OIL PUMP CONTROL SWITCH to START.
		• IF Step 2.3.5.a was not performed, THEN Observe HPCI turbine stabilizes with pump flow ~ 5100 gpm.
		• Adjust HPCI TURBINE FLOW CONTROL FC-E41-1R600 to maintain desired reactor vessel level.

SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event and Instrument Air Leak

POSITION	TIME	STUDENT ACTIVITIES
BOP (cont)		<u>Starting HPCI Component-by-Component</u> • Ensure HPCI TEST LINE TO CST ISO HV-155-F008 CLOSED. • Ensure HPCI TEST LINE TO CST ISO HV-155-F011 CLOSED. • Ensure HPCI PUMP DSCH HV-155-F007 OPEN. • Place HPCI TURBINE FLOW CONTROL FC-E41-1R600 in MANUAL set at minimum. • Open HPCI L O CLG WTR HV-156-F059. • Start HPCI BARO CDSR VACUUM PP 1P216. • SIMULTANEOUSLY Start HPCI AUXILIARY OIL PUMP 1P213, AND • Open HPCI TURBINE STEAM SUPPLY HV-155-F001. • Accelerate HPCI turbine with HPCI TURBINE FLOW CONTROL FC-E41-1R600 until HPCI pump discharge pressure within 50 psig of reactor pressure. • May recognize/report HPCI MIN FLOW TO SUPP POOL HV-155-F012 fails to open. • May attempt to manually open HPCI MIN FLOW TO SUPP POOL HV-155-F012. • Open HPCI INJECTION HV-155-F006. • Establish flow to maintain reactor water level in accordance with Emergency Operating Procedures using HPCI TURBINE FLOW CONTROL FC-E41-1R600. • WHEN flow established: o Null HPCI TURBINE FLOW CONTROL FC-E41-1R600. o Place HPCI TURBINE FLOW CONTROL FC-E41-1R600 in AUTO. o OBSERVE HPCI BARO CDSR COND PP 1P215 Automatically Starts to control Vacuum Tank level. o Ensure: ▪ HPCI STM LINE DRN TO CDSR IB ISO HV-155-F028 CLOSES. ▪ HPCI STM LINE DRN TO CDSR OB ISO HV-155-F029 CLOSES. ▪ HPCI BARO CDSR COND PP DSCH DRN HV-156-F025 CLOSES if open. ▪ HPCI BARO CDSR COND PP DSCH DRN HV-156-F026 CLOSES. ▪ HPCI PUMP ROOM UNIT COOLER 1V209A(B) STARTS.

SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event and Instrument Air Leak

POSITION	TIME	STUDENT ACTIVITIES
BOP (cont)		May manually initiate RCIC per OP-150-001 using either manual pushbutton method or component-by-component startup: May recognize/report RCIC min flow valve fails to open and secure RCIC. <u>Starting RCIC with Manual Pushbutton</u> • Place protective collar of RCIC MAN INIT HS-E51-1S32 pushbutton to ARMED position, AND • Depress and Hold RCIC MAN INIT HS-E51-1S32 pushbutton until RCIC INJECTION HV-149-F013 starts to OPEN. • Upon manual pushbutton initiation of RCIC System, Ensure following occur: o RCIC L O COOLER WTR SUPPLY HV-150-F046 OPENS. o STEAM TO RCIC TURBINE HV-150-F045 OPENS. o RCIC INJECTION HV-149-F013 OPENS. o IF CLOSED and PUMP SUCT FROM SUPP POOL HV-149-F031 NOT OPEN, PUMP SUCT FROM CST HV-149-F010 OPENS. o IF OPEN, TEST LINE ISO TO CST HV-149-F022 CLOSES. o IF CLOSED, RCIC PUMP DSCH HV-149-F012 OPENS. o RCIC BARO CDSR VACUUM PP 1P219 STARTS. o STEAM LINE IB DRAIN ISO HV-149-F025 CLOSES. o STEAM LINE OB DRAIN ISO HV-149-F026 CLOSES. o RCIC BARO CDSR COND PP DSCH DRN HV-150-F005 CLOSES. o IF OPEN, RCIC BARO CDSR COND PP DSCH DRN HV-150-F004 CLOSES. o RCIC Pump Room Cooler 1V208A(B) STARTS. o May recognize/report MIN FLOW TO SUPP POOL FV-149-F019 fails to open. o May attempt to manually open MIN FLOW TO SUPP POOL FV-149-F019. • Observe RCIC turbine ramps up at controlled rate until turbine speed ~ 4500 rpm and pump flow ~ 625 gpm and then stabilizes. • Place ESW System in operation in accordance with OP-054-001 to supply RCIC Pump Room Unit Cooler. • Adjust RCIC Pump flow controller to maintain desired reactor vessel level.

SCENARIO EVENT FORM

EVENT	6
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event and Instrument Air Leak

POSITION	TIME	STUDENT ACTIVITIES
BOP (cont)		<u>Starting RCIC Component-by-Component</u> • Place RCIC TURBINE FLOW CONTROL FC-E51-1R600 in MANUAL and set for MINIMUM SPEED. • Start RCIC BARO CDSR VACUUM PP 1P219. • Open RCIC L O COOLER WTR SUPPLY HV-150-F046. • Open STEAM TO RCIC TURBINE HV-150-F045. • Observe RCIC Turbine accelerate. • May recognize/report MIN FLOW TO SUPP POOL FV-149-F019 fails to open. • May attempt to manually open MIN FLOW TO SUPP POOL FV-149-F019. • Using RCIC TURBINE FLOW CONTROL FC-E51-1R600, Raise RCIC pump discharge pressure within 50 psig of reactor pressure. • Open RCIC INJECTION HV-149-F013. • Using RCIC TURBINE FLOW CONTROL FC-E51-1R600, Establish desired flow. • When desired flow established, null controller and place in AUTO. May inject SLC per OP-153-001: • Place HS-14804 SBLC MANUAL INITIATION keylock control switch to A(B) START. • Observe SBLC PUMPS 1P208A(B) STARTS • Once initiated, Observe the following: • HV-144-F004 RWCU INLET OB ISO CLOSES. • SBLC SQUIB READY A B white indicating lights EXTINGUISHED. • SBLC SQUIB VALVES LOSS OF CKT CONTINUITY annunciator ALARMS. • Pump 1P208A(B) Red indicating light ILLUMINATED. • SBLC PUMP discharge header pressure > 200 psig greater than reactor pressure. • SBLC FLOW Indicates ~ 40 GPM. • SBLC Storage Tank level decreasing. May maximize CRD per OP-155-001: • Using FC-C12-1R600, CRD Flow Controller, in MANUAL, Fully Open FV-146-F002A(B), CRD Flo Ctl. • Fully Open THTLG PV-146-F003, DRIVE WTR PRESS THTLG valve. May perform a Reactor cooldown <100°F/hr using HPCI, RCIC, and/or SRVs.

SCENARIO EVENT FORM

EVENTS	7, 8, & 9
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event, Un-isolable Suppression Pool Break, Small Steam Leak in Drywell, Multiple Suppression Pool Makeup Methods Fail, Three ADS Valves Fail to Open

POSITION	TIME	STUDENT ACTIVITIES
★		**Isolate HPCI when Suppression Pool level cannot be maintained above 17 feet.** **Rapidly depressurize the reactor when Suppression Pool level cannot be maintained above 12 feet.**
Team		Recognizes / reports: • Annunciator AR-016-001 (G06), SEISMIC MONITORING SYSTEM TRIGGERED (if previously acknowledged) • Annunciator AR-109-001 (H01), CORE SPRAY LOOP A PUMP ROOM FLOODED • Annunciators AR-111(112)-001 (E02), SUPPRESSION POOL DIV 1(2) LO LEVEL • Annunciator AR-109-001 (H08), RHR LOOP A PUMP ROOM FLOODED • Lowering Suppression Pool water level. • Rising Drywell pressure.
SRO		Enters EO-000-103, Primary Containment Control, on low Suppression Pool level, high Drywell pressure, and/or high Drywell temperature. Enters EO-000-104, Secondary Containment Control, on high water level. o Directs start of ESW and Unit Coolers. May direct Suppression Pool makeup using Suppression Pool Cleanup system per OP-159-001. May direct Suppression Pool makeup using HPCI/RCIC on min flow. **When determines Suppression Pool level cannot be maintained >17', directs isolation of HPCI.** When determines Suppression Pool level cannot be maintained >12': • Enters EO-000-102, RPV Control. • Enters EO-000-112, Rapid Depressurization. o Exits EO-000-102 pressure leg. o Directs preventing uncontrolled Condensate injection. o Directs overriding LPCI and Core Spray. o Directs opening all ADS valves. o Determines only three ADS valves opened. o **Directs opening SRVs until 6 are open.** Directs Reactor water level controlled +13" to +54" using RCIC, CRD, SLC, Condensate, LPCI, and/or Core Spray.

INSTRUCTOR ACTIVITIES / ROLE PLAY / NOTES

EVENTS	7, 8, & 9
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event, Un-isolable Suppression Pool Break, Small Steam Leak in Drywell, Multiple Suppression Pool Makeup Methods Fail, Three ADS Valves Fail to Open

INSTRUCTOR ACTIVITY

1. When directed by lead examiner, initiate the Suppression Pool break and small steam leak in the Drywell by **depressing Key 4**:
   {Key[4]} IMF mfMS183007 r:1:00 f:0.1 / {Key[4]} IMF mfEN099001D
   {Key[4]} IMF mfCS151002 r:1:00 f:100 / {Key[4]} IMF mfRH149004A d:4:00 r:3:00 f:100

2. If candidate attempts to close Core Spray loop A or RHR pump A suction valves, verify automatic event trigger n13scen5et14 or n13scen5et15 initiate to simulator breaker trip.

3. If dispatched to open 152028 (Condensate Transfer to Core Spray), wait 2 minutes, then **depress Key 5**:
   {Key[5]} IRF rfCS151009 r:30 f:50 / {Key[5]} IMF cmfPM03_0P155A d:30

4. If dispatched to open 152021 (CST to Core Spray), wait 2 minutes, then **depress Key 15**:
   {Key[15]} IRF rfCS151010 r:30 f:100

5. If dispatched to open 152F002B (CST to Core Spray B), **depress Key 25**:
   {Key[25]} IRF rfCS151012 r:30 f:100

ROLE PLAY

If dispatched as **NPO** to investigate flooding in Core Spray A room, wait 2 minutes, then **report**,
"There is a significant crack in the wall between the Suppression Pool and Core Spray A room. A lot of water is coming into the room."

If dispatched as **NPO** to open 152028 (Condensate Transfer to Core Spray), wait 2 minutes, then **depress Key 5** as described above, then **report**,
"152028 is open."

If dispatched as **NPO** to open 152021 (CST to Core Spray), wait 2 minutes, then **depress Key 15** as described above, then **report**,
"152021 is open."

If dispatched as **NPO** to open 152F002A (CST to Core Spray A), immediately **report**,
"I cannot access 152F002A due to flooding in Core Spray A room."

If dispatched as **NPO** to open 152F002B (CST to Core Spray B), **depress Key 25** as described above, then **report**,
"152F002B is open."

Role play any other directed actions as required.

EVALUATOR NOTES

1. The final Reactor water level control band is likely to be +20" to +45".
2. The Drywell leak is required for correct timing of the Suppression Pool drain down. The Drywell leak will likely not require any significant Containment control actions.
3. Recommended termination criteria:
   a. 6 SRVs open.
   b. Reactor water level being restored to or controlled in assigned band above -161".

SCENARIO EVENT FORM

EVENTS	7, 8, & 9
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event, Un-isolable Suppression Pool Break, Small Steam Leak in Drywell, Multiple Suppression Pool Makeup Methods Fail, Three ADS Valves Fail to Open

POSITION	TIME	STUDENT ACTIVITIES

ATC / BOP		If directed establish Suppression Pool makeup using Suppression Pool Cleanup system per OP-159-001:
		• Raise Suppression Pool level as follows:
		  o Observes open Cond Transfer to Loop B Min Flow Line 152031.
		  o Dispatch NPO to throttle Open Core Spray Cond Transfer Iso to Loop B Min Flow Line 152028.
		  o Observe Suppression Pool level gradually increases.
		  o Transfer to Loop B Min Flow Line 152031.
		• IF desired to add large amount of water in a short time:
		  o Dispatch NPO to unlock AND Open Core Spray CST Supply Iso 152021.
		  o Dispatch NPO to unlock AND Open Core Spray Pump A&C(B&D) CST Suction Supply 152F002A(B).
		  o Observe Suppression Pool level increases.
		  o Observe Condensate Storage Tank 0T522A(B) level decreases.
		
		May recognize/report trip of Condensate Transfer pump A.
		
		May execute ON-137-001, Loss of Condensate Transfer, as time allows.
		
		May start Condensate Transfer pump B.
		
		May recognize/report failure of Condensate Transfer pump B to develop discharge pressure and flow.
		
		If directed, establish Suppression Pool makeup using RCIC on min flow per OP-150-001:
		• Places RCIC in service if not already operating (see event 6 for detailed actions).
		• Throttle RCIC flow as low as possible to maximize min flow.
		• Recognize/report RCIC min flow valve fails to open.
		• Secures RCIC.

SCENARIO EVENT FORM

EVENTS	7, 8, & 9
OP EVENT / TASK	N/A
BRIEF DESCRIPTION	Seismic Event, Un-isolable Suppression Pool Break, Small Steam Leak in Drywell, Multiple Suppression Pool Makeup Methods Fail, Three ADS Valves Fail to Open

POSITION	TIME	STUDENT ACTIVITIES
ATC / BOP (cont)		If directed, establish Suppression Pool makeup using HPCI on min flow per OP-152-001: • Places RCIC in service if not already operating (see event 6 for detailed actions). • Throttle HPCI flow as low as possible to maximize min flow. • Recognize/report HPCI min flow valve fails to open. • Secures HPCI. **Isolates HPCI:** • Ensures closed HV-155-F002 and HV-155-F100 and/or • Ensures closed HV-155-F008 **Attempts to open all ADS valves.** Recognizes / reports three ADS valves failed to open. **Opens three SRVs.** Restores / maintain Reactor water level +13" to +54" using RCIC, CRD, SLC, LPCI, and/or Core Spray.

UNIT SUPERVISOR TURNOVER SHEET

UNIT 1 TO/DA/Y
Date

SHIFT	1900 to 0700	SHIFT	0700 to 1900
	Start / End		Start / End
MODE	1	MODE	
POWER LEVEL	8.0 %	POWER LEVEL	%
GENERATOR OUTPUT	0 MWe	GENERATOR OUTPUT	MWe
CASK STORAGE GATE INSTALLED:	YES/NO	CASK STORAGE GATE INSTALLED:	YES/NO

NRC CODE PRIOR TO 0800	Tango	Golf	Indigo	Foxtrot
NRC CODE AFTER 0800	Oscar	November	Indigo	Mike

REMARKS:

1) Plant startup is in progress
2) APRM 1 is bypassed due to spiking.
3)
4)
5)
6)
7) Shift activities are to:
   1. Continue to raise Reactor power by withdrawing control rods. Complete the next four control rod withdrawal steps in the startup sequence.
   2. Place the Mode Switch in RUN and withdraw IRMs per GO-100-002 step 5.63.
8)
9)
10) Unit 2 is at 100% power.
11)
12)

COMMON:

1) None
2)
3)
4)
5)
6)
8)
9)
10)
11)
12) (NRC SCN 5)

OFFGOING UNIT SUPERVISOR CHECKLIST:

1900-0700	0700-1900
MJ	
MJ	
MJ	
MJ	

1. Evolutions in progress and items to be completed during next shift, as noted in remarks, have been discussed with oncoming Unit Supervisor.
2. Problems encountered during past shift and abnormal plant conditions, as noted in remarks, have been discussed with oncoming Unit Supervisor.
3. Information in SOMS Log is complete and discussed with oncoming Unit Supervisor.
4. As applicable turnover plastic Security Badge cover and CRS Monitor function to oncoming Unit Supervisor.

1900 - 0700 *M. Jacopetti*

0700 - 1900 ____________

Offgoing Unit Supervisor

ONCOMING UNIT SUPERVISOR CHECKLIST:

0700-1900	1900-0700

1. LCO/TRO Log reviewed.
2. (14) SOMS Log reviewed for entries made in past 24 hours.

0700 - 1900 ____________

1900 - 0700 ____________

Oncoming Qualified Unit Supervisor

POST RELIEF

0700-1900	1900-0700

1. Walk down Control Room panels with Unit Responsible PCO.
2. CRC Book reviewed and Reactivity Brief performed with PCO.
3. Completed System Status Operable audit for open PMT this shift.

0700 - 1900 ____________

1900 - 0700 ____________

Oncoming Unit Supervisor